

POLSKA AKADEMIA NAUK
INSTYTUT GEOGRAFII I PRZESTRZENNEGO ZAGOSPODAROWANIA
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POPULATION, ENVIRONMENT AND DEVELOPMENT

Edited by Alina Potrykowska



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IM. STANISŁAWA LESZCZYCKIEGO**

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Edited by Alina Potrykowska



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FOREWORD

"The twentieth century has been an unprecedented century of population growth, economic development and environmental change. From 1900 to 2000, world population grew from 1.6 billion to 6.1 billion persons (United Nations, 2001). However, while world population increased close to 4 times, world real gross domestic product (GDP) increased 20 to 40 times, allowing the world not only to sustain a fourfold population increase but also to do so at vastly higher standards of living. Nevertheless, this rapid population growth and economic growth occurred unevenly throughout the world and not all regions have benefited equally from economic growth. Moreover, population growth and economic development occurred simultaneously with increasingly unsustainable utilisation of Earth's physical environment" (World Population Monitoring 2001, Population, environment, and development, UN 2001, p.1).

We live in a world of unprecedented demographic change. Global population increased by 2 billion during the last quarter of the 20th century. Despite declining fertility rates, population is expected to increase by another 2 billion during the first decades of the 21st century. The large part of this growth will occur in developing countries and will be concentrated in the poorest communities and in urban areas.

But this growth is likely to come to an end in the foreseeable future. W. Lutz, W.C. Sanderson, and S. Scherbov (2001), improving on earlier methods of probabilistic forecasting, showed that the world's population will stop growing before the end of the century. *"There is a 60 per cent probability that the world's population will not exceed 10 billion people before 2100, and around a 15 per cent probability that the world's population at the end of the century will be lower than it is today. For different regions, the date and size of the peak population will vary considerably ... While the 20th century was the century of population growth — the 21st century is likely to see the end of world population growth and become the century of population ageing. At the moment, we are at the crossroads of these two different demographic regimes, with some countries still experiencing substantial population growth and others already facing rapid ageing"* (W. Lutz, W.C. Sanderson, S. Scherbov, *The End of World Population Growth*, 2001, Nature, 412, pp. 543–545).

We also live in a world of unprecedented demographic diversity. Traditional demographic groupings of countries are breaking down. Over the next 25 years increases in population in sub-Saharan Africa, South Asia, and the Middle East are expected to be larger than in the past quarter century, and growth in North America will be substantial as well. In contrast, in most European countries and in East Asia, population growth has slowed or stopped, and rapid population

aging has become a serious concern. Mortality also varies widely across regions, with the burden of infectious disease, including HIV/AIDS, being particularly heavy in Africa. In addition, levels of mobility, urbanization, and education differ substantially among regions, affecting economic and health outlooks.

Research has shown that changes in population growth, age structure, and spatial distribution interact closely with the environment and with development. Rapid population growth has exacerbated freshwater depletion, climate change, bio-diversity loss, depletion of fisheries and other coastal resources, and degradation of agricultural lands. We observe the great diversification of world population-environment relationships. These interrelationships are never simple and are always changing. Human perceptions and utilisations of environment have varied greatly over time and space, responding to changes in culture, population growth, methods of production, energy use, government policies, international debt, as well as many other factors.

In more developed countries, the environmental impact of population growth and distribution must be considered jointly with high consumption rates. Even in countries where little growth is envisioned, unsustainable patterns of consumption have global implications for the environment and human well-being, and must be addressed with appropriate policies.

Before the end of this decade, the majority of the world's population will live in urban areas. Urbanization can improve people's access to education, health, and other services. But it also creates environmental health hazards, such as water and air pollution, and by increasing consumption levels, can have environmental impacts in distant rural areas as well. The mobility and spatial distribution of populations, especially at local and regional scales, is a significant determinant of sustainability. Where the population lives and works relative to the location of natural resources affects environmental quality. The expansion of the agricultural frontier and other human activity is encroaching on fragile ecosystems in many parts of the world.

The present volume contains revised versions of selected papers presented by authors during the conferences of the Commission of International Geographical Union on *Population and the Environment*.

The various approaches to the problem of relationships between population, environment, and the development, presented in this volume, provide some opportunities for future investigation of these issues.

The papers are organised in seven parts, encompassing such problems as: environmental ethics and justice (S. Nangia, N. Hansraj; M. Ramutsindela, J. Dixon); environmental and population changes (D.J. Hogan, J.M. Pinto da Cunha, R.L. do Carmo; M. Nembudani); migration and environment (N.M. Birkeland; A. Saikia); population change, migration and development (A.M. Findlay, D. Houston; R. Bedford, R. Wehrhahn); population and development (U. Jürgens, J. Bahr, R. Donalson, M. Więckowski). The introductory article questions the reference of population-environment relationships (A. Potrykowska). In the last chapter the research notes present: the overview

of recent research on Taiwanese Migrants in Australia (N. Chiang), and the activities of the Commission on *Population and the Environment*, International Geographical Union (A. Potrykowska).

I would like to express my gratitude to all Authors who contributed to this volume. I appreciate their generous collaboration and valuable suggestions regarding the publication.

The studies of the relationships between population and the environment could be much developed with a new perspective, at a time when the deterioration of the environment in various forms is posing enormous problems. To facilitate the joint consideration of population, environment and development, more interdisciplinary research and education addressing these topics is necessary at all levels.

Alina Potrykowska

of various countries in Europe and Asia. As a result of the research, the authors of the book have identified a number of key factors that influence the development of the country's economy. The book is a valuable resource for anyone interested in the economic development of the country. The authors have provided a comprehensive overview of the country's economic situation, including a detailed analysis of the country's economic structure, the role of the government, and the impact of external factors. The book is written in a clear and concise style, making it accessible to a wide range of readers. The authors have also provided a number of practical suggestions for improving the country's economic performance. Overall, the book is a well-written and informative work that provides a valuable insight into the economic development of the country.

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I. INTRODUCTION

Population, environment and development
Prace Geograficzne nr 202 (2005)

Alina Potrykowska

POPULATION CHANGE AND THE ENVIRONMENT: A GLOBAL APPROACH

1. FUTURE TRENDS IN WORLD POPULATION GROWTH

1.1. POPULATION GROWTH

World population has increased nearly two and a half fold since 1950, with the global rate of growth peaking at 2.04 per cent per year during the late 1960s. Annual increases of 86 million persons during the late 1980s were the largest in history. The world added its most recent billion people in just the 12 years from 1987 to 1999, the shortest period in history for an increase of this magnitude. The world population reached 6.3 billion in 2003, and is expected to continue growing (Fig. 1).

The 2002 Revision of the official United Nations population estimates and projections was based on the assumptions concerning the future human fertility and on the impacts of the HIV/AIDS pandemics¹.

According to latest United Nations estimates (*World Population Prospects*, 2003), by 2050, world population is projected to have grown to between 7.4 billion (low variant) and 10.6 billion (high variant). Despite the lower fertility levels projected, and the increased mortality risks in some regions, the world population is expected to rise by 2.6 billion over the next 47 years (medium variant). Based on the medium-fertility variant which assumes replacement-level fertility of 2.1 children per woman, global population is projected to increase from 6.3 billion in mid 2003 to 8.9 billion in 2050 (Fig. 2).

Another recent projection, by W. Lutz et al. (2001), provides a 2050 median figure of 8.797 billion, with an 80 per cent probability of it falling between 7.347 and 10.443 billion. The latter projection's figure for 2050 is slightly below that of the United Nations, but still implies a high growth of population.

¹ For the first time, the 2002 Revision of the UN Population Division, projected that future fertility levels in the majority of developing countries will fall below the level needed to ensure the replacement of the population (2.1 children per woman) at some point in the 21st century. The impact of the HIV/AIDS pandemics was introduced in terms of the increased morbidity, mortality and population loss. The population of the 53 affected countries in 2050 is projected to be 479 million lower than it would have been in the absence of AIDS. As a result of these changes, the 2002 Revision projects a lower population in 2050 than the 2000 Revision did, i.e. 8.9 billion instead of 9.3 billion according to the medium variant (*World Population Prospects, Revision 2002*, 2003, p. VII).

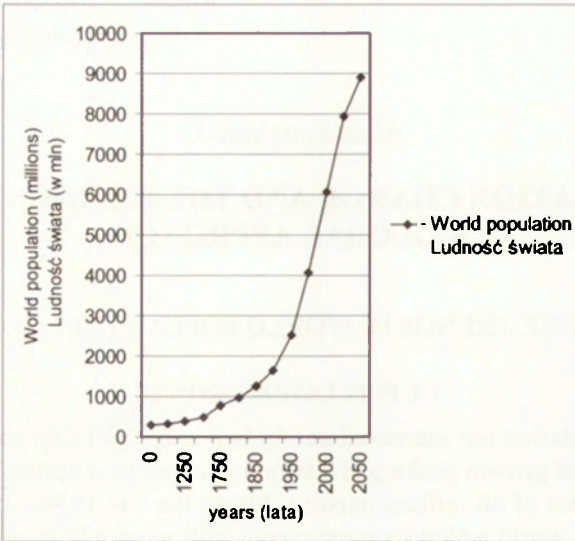


Fig. 1. World population growth: estimates and medium-variant projections, UN
 Rozwój ludności świata: szacunki i projekcje ludności (wariant średni), ONZ
 Sources (źródła): United Nations 1996; *World population Ageing 1950–2050* 2002; *World Population Prospects*, 2003.

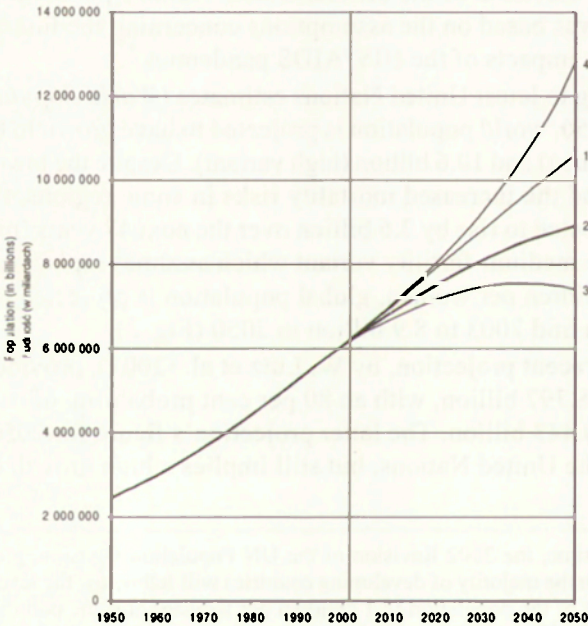


Fig. 2. Estimated and projected population of the world by project variants, 1950–2050.
 Projection variants: 1 – high, 2 – medium, 3 – low, 4 – constant
 Szacunki i projekcje ludności świata według wariantów projekcji, 1950–2050. Warianty projekcji:
 1 – maksymalny, 2 – średni, 3 – niski, 4 – stały
 Source (źródło): *World Population Prospects*, 2003.

Rapid population growth was associated with dramatic reductions in mortality, especially in the less developed regions, where the average expectancy of life at birth increased by over 20 years during the second half of the century.

Because the world's regions are at varying stages in the transition from high to low rates of mortality and fertility, their growth paths differ, resulting in significant shifts in the geographical distribution of population. While 68 per cent of the world population resided in the less developed regions in 1950, 80 per cent live there today.

According to the 2002 Revision, the population of the less developed regions is projected to rise from 4.9 billion in 2000 to 7.7 billion in 2050 (medium variant) – see Fig. 3. This projection assumes continuing declines in fertility; in the absence of such declines, the population of less developed regions would reach 9.3 billion (high variant). Particularly rapid growth is expected among the group of 48 countries classified as least developed (*World Population Prospects, 2003*). Their population is expected to nearly triple between 2000 and 2050, passing from 668 million to 1.7 billion, despite the fact that their fertility is projected to decline markedly in the future (from 5.1 children per woman today to 2.5 children per woman in 2045–2050).

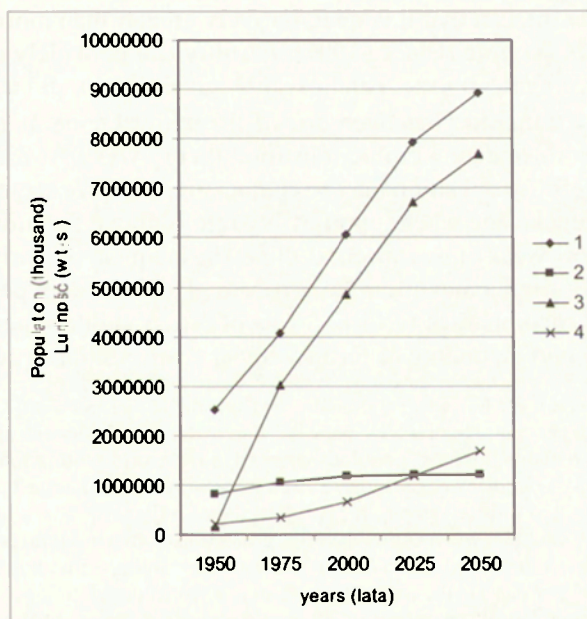


Fig. 3. Population growth: United Nations medium-variant projection 1950–2050

1 – World, 2 – more developed regions, 3 – less developed regions, 4 – least developed countries

Rozwój ludności: projekcja ludności według ONZ (wariant średni) 1950–2050

1 – świat, 2 – regiony rozwinięte, 3 – regiony słabiej rozwinięte, 4 – kraje najslabiej rozwinięte

Sources (źródła): *World population Ageing 1950–2050, 2002*; *World Population Prospects, 2003*.

As a consequence of declining fertility rates in most parts of the world, the global rate of population growth has been decreasing since the peak of 2.0 per cent per year which it reached in 1965–1970. The world's population is currently growing at 1.2 per cent or 77 million people per year. Ninety-five per cent of current population growth is taking place in the less developed regions.

Population growth is projected to slow down in both the more developed and the less developed regions. Whereas more developed regions are barely growing at 0.2 per cent annually, less developed regions are growing at an annual rate of 1.5 per cent. In the least developed countries, which are still at an early stage in the demographic transition, population growth is estimated at 2.5 per cent per year, which yields a population doubling time of 29 years² (Fig. 3).

The population of the more developed regions, currently 1.2 billion, will change during the next 47 years because fertility levels are expected to remain below replacement level.

These projections show clearly that the patterns to fertility and mortality decline in the coming decades will determine the ultimate level of the human population

1.2. FERTILITY

Fertility forms one of the most important subjects of population research. This reflects not only the fact that it is quantitatively greater than mortality but also the fact that it is variable (Clarke 1997). Fertility can be widely influenced by many social, economic, political and psychological factors (Bahr, Gans 1991).

The fertility transition has been one of the major concerns of population geography ever since demographic transition theory was first proposed (Clarke 1997). The fertility transition may be characterised by five stages that include the pre-transitional stage when total fertility rate is above 5 children per woman and shows very weak or no signs of decline; the incipient (or early) stage when fertility declines from a maximum level recorded to 5 children per woman; the core stage that encompasses fertility levels of 5 to 3 children per woman; the advanced stage corresponding to fertility lower than 3 children per woman but

² Six countries account for half of this annual growth: India for 21 per cent; China for 12 per cent; Pakistan for 5 per cent; Nigeria for 4 per cent; Bangladesh for 4 per cent, and Indonesia for 3 per cent. China remains the most populous country in the world, with a total population of 1.27 billion in mid-1999, followed by India. The country with the third largest population is the United States, with 276 million people. It is projected that India will have a larger population than China by the year 2045, when United Nations projections indicate a total population for the 1.501 billion for the former and 1.496 billion for the latter. India, with an annual population growth rate of 1.65 per cent, is the largest contributor to world population growth, accounting for 21 per cent of the 78 million annual increase to the world. China contributes about 15 per cent to annual world population growth. By 2016, the population of India (1.22 billion) is expected to be larger than the population of all the more developed countries combined [that is, all the countries of Europe (including Russia), plus Australia, New Zealand, Japan, Canada and the United States]. China and India will remain the only countries with populations of a billion. By mid-century the populations of 39 countries are projected to be smaller than today (e.g., Japan and Germany 14 per cent smaller; Italy and Hungary 25 per cent smaller; and the Russian Federation, Georgia and Ukraine between 28 and 40 per cent smaller).

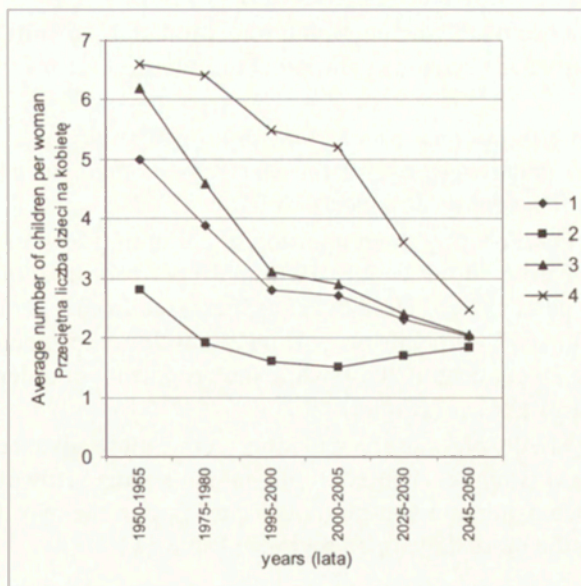


Fig. 4. Total fertility rate: United Nations Medium-variant Projections 1950–2050

1 – World, 2 – more developed regions, 3 – less developed regions, 4 – least developed countries

Współczynniki dzietności ogólnej: Projekcja ludności według ONZ (wariant średni) 1950–2050

1 – świat, 2 – regiony rozwinięte, 3 – regiony słabiej rozwinięte, 4 – kraje najsłabiej rozwinięte

Sources (źródła): *World Population Ageing 1950–2050, 2003*; *Population Division DESA, United Nations 2002*; *World Population Prospects, 2003*

higher than the replacement level of 2.1 children per woman; and the below-replacement fertility that is typical for the post-transitional stage (Bongaarts, Watkins 1996).

According to the 2002 Revision (*World Population Prospects, 2003*) total fertility at world level stood at 2.83 in the years 1995–2002. This average of course reflects very varied fertilities at the national level. In the years 1995–2002, 59 countries or areas (44 of them located in the more developed regions) had fertility levels at or below the replacement level whereas 133 countries or areas (132 located in less developed regions) experienced a total fertility at or above 2.1 children per woman. Among the latter, 47 had total fertility levels at or above 5 children per woman with the majority of them being among the least developed countries (Fig. 4).

Despite fertility declines to relatively moderate levels, the number of births continues to increase owing to the growth in the number of women of childbearing age. While in the years 1965–1970 the average number of births in less developed regions was 101 million, this number is estimated at 120 million today. The less developed regions are projected to absorb 98% of the population growth occurring between 1999 and 2015 (*World Population Prospects, 2003*).

1.3. POPULATION STRUCTURE

The consequence of the demographic transition and the shift to lower fertility and mortality has been the evolution in the age structure of the world population.

"As world fertility continues to decline and life expectancy to rise, the population of the world will age faster in the next 47 years than during the past half century" (World Population Prospects, 2003, p. 15).

Over the past half century the proportion of children (i.e., persons aged 0 to 14) has declined from 34 per cent in 1950 to 30 per cent in 2000 (as the proportion of older persons aged 60 or over has increased from 8 per cent to 10 per cent). Over the next 47 years, the proportion of children is projected to drop by a third, reaching 20 per cent in 2050, while the proportion of older persons will double, to reach 21 per cent (Fig. 5).

The growing rapidly process of population ageing, more advanced in the more developed regions is unprecedented in the human history. However, the older population is increasing at a substantially faster rate in the less developed regions than in in the more developed regions (Table 1).

Table 1. Average annual growth rates of the total population and the population in broad age groups, by major development regions, 2000–2050 (Medium variant) (percentage)

Major area	Age group				Total population
	0-14	15-59	60+	80+	
World	-0.04	0.72	2.29	3.39	0.77
More developed regions	-0.26	-0.32	1.06	2.24	0.04
Less developed regions	-0.01	0.92	2.79	4.20	0.91
Least developed countries ..	0.99	2.19	3.24	3.90	1.84

Source: *World Population Prospects, 2003, p. 17.*

In 1950, the proportion of children in the more developed regions was 27 per cent while that of older persons was 12 per cent. By 2000, the proportion of elderly persons in the more developed regions had exceeded that of children (19 per cent vs. 18 per cent) and in 2050, the proportion of elderly people is expected to be double that of children (32 per cent vs. 16 per cent).

Up to the year 2000, population ageing had been taking place considerably, more slowly in the less developed regions, where fertility remained relatively high. Figure 5 presents the young age structure of population in the less developed regions and the least developed countries. The proportion of children declined from 38 per cent in 1950 to 33 per cent in 2000, while the proportion of elderly people increased from 6 to 8 per cent. However, by 2050, the proportion of older persons in the less-developed regions will have risen to 19 per cent, whereas the proportion of children is likely to have declined to 22 per cent. This means that, by mid-century, the less developed regions will likely have an age structure similar to that of today's more developed regions.

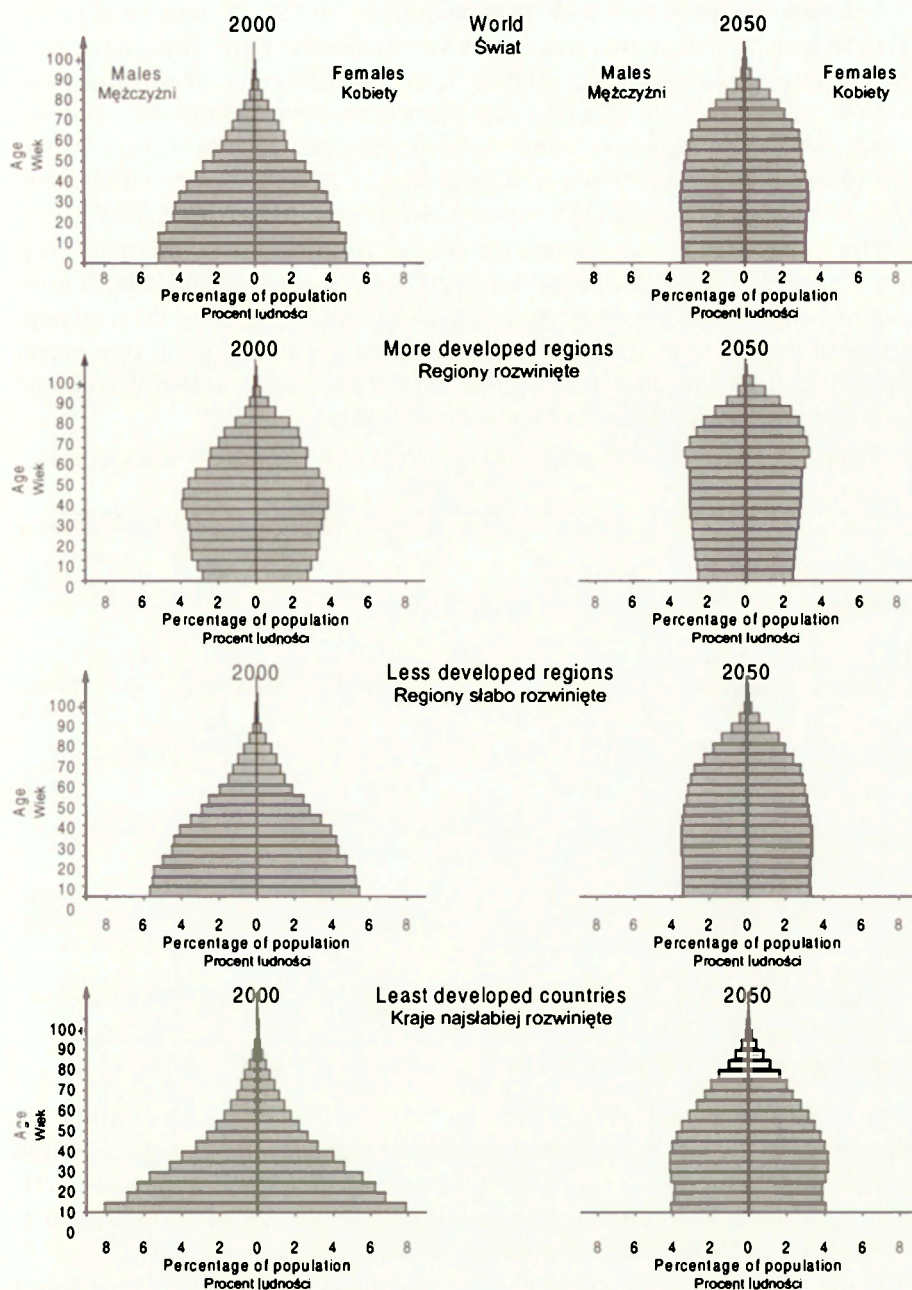


Fig. 5. Population structure by age and sex: world, regions and countries – 2000 and 2050

Struktura ludności według wieku i płci: świat, regiony i kraje – 2000 i 2050 r.

Source (źródło): Mirkin, Winberger, 2001, p. 48.

1.4. MIGRATION

International migration, with its demographic, social, economic and political determinants and consequences, is a very important issue influencing population size, growth, and distribution in many countries and regions as well as in the world as a whole. The last few years have seen, immigration become a major topic in an increasing number of countries. Almost one in every 10 persons living in the more developed regions, is a migrant, as compared to one in 70 in developing countries (*International Migration Report 2002, 2003*).

The UN estimates indicate that the number of international migrants grew from 75 million in 1965 to 175 million in 2000. Between 1990 and 2000, it grew by approximately 1.3 per cent per year, to constitute 3 per cent of the total population of the world in 2000 (Table 2). Refugees are an important component of population movements, which accounted for 9 per cent of the world's migrant stock (*International Migration Report 2002, 2003*).

Table 2. Population and international migration by major development regions, 1995–2000

	World	More developed regions	Less developed regions	Least developed countries
Total population 2000 (thousands)	6 056 715	1 191 429	4 865 286	667 613
Migrant stock : 2000				
Number (thousands)	174 781	104 119	70 662	10 458
% of population	2.9	8.7	1.5	1.6
Number of refugees 2000 (thousands)	15 868	3 012	12 857	3 066
Net migration. Average annual 1995–2000				
Number (thousands)	0	2 321	-2 321	-306
Rate per 1000 pop.	0.0	2.0	-0.5	-0.5
Workers' remittances 2000				
Total (millions USD)	62 239	15 535	49 704	-
Per cent of GDP	0.2	0.1	0.7	-

Source: *International Migration 2002, 2003*

Globally, the annual average between 1990 and 2000 was of 2.4 million net migrants from the less developed regions to the more developed regions. These migrants represented 3 per cent of the total population growth of the less-developed regions, but also accounted for no less than 56 per cent of the total population increase in the more developed regions during the same period.

In the years from 1995 to 2000, the more developed regions of the world received nearly 12 million migrants from the less developed regions, or about 2.3 million per year. The largest gains per year were observed in the United States, followed by Europe with an annual net migration of 0.8 million (the Russian Federation, Germany, Ukraine and France) hosted the largest number

of international migrants in 2000. In the developing world, India, followed by Saudi Arabia and Pakistan, hosted the largest number of foreign-born persons in 2000.

International migrants are not distributed evenly across countries or regions, and sixty per cent of the world's migrants currently reside in the more developed regions, with 40 per cent living in the less developed regions. Most of the world's migrants live in Europe (56 million), Asia (50 million) and Northern America (41 million). Thus, in 2000, they constituted 8.7 per cent of the population in developed countries, as compared with just 1.5 per cent in developing countries.

1.5. POPULATION DISTRIBUTION

There are important variations in the population growth, distribution and densities between countries. World population density increased from 13 persons per km² in 1900 to 19 persons per km² in 1950 to its current level of 45 persons per km².

Regions also differ in their levels of migration, both internal and international. These differences will in turn affect the degree of urbanization and the spatial distribution of people – Fig. 6.

Asia has more people and higher densities than does either Latin America or Africa. In parts of China, India and South East Asia there are large areas with population densities of over 1000 people per km². Such densities are only found in very limited parts of Latin America and Africa (for example in the Nile Valley). In contrast, both Africa and Latin America possess large countries with relatively small populations, for example Sudan, Zaire and Bolivia. The level of unevenness of the population distributions varies immensely from countries like Egypt with a high concentration, through to India with a much more even distribution (Noin 1997).

Historically, human beings have transformed the natural landscape significantly in areas of high population density through agricultural conversion, water diversion and extraction, urbanization and industrialisation.

The share of the population residing in rural areas fell from 70 per cent in 1950 to 53 per cent in 2000. On a global basis, rural populations are growing at a rate of only 0.4 per cent a year, while in more developed regions, it is shrinking at a rate of 0.8 per cent annually. Reductions in the rural population will take place after 2010 in all major areas except Africa and Oceania, as a result of the expansion of the urbanized territory, the flow of migrants from rural to urban areas, and overall declines in population growth. Population change, particularly that induced by migrations, has an important impact on the rural environment.

The world is becoming increasingly urbanized. The process of urbanization, stimulated by industrialisation and the growth of the service sector, has meant that a growing proportion of world population is living in cities: 47 per cent in 2000 and probably 60 per cent by 2030 (*World Urbanization Prospects. The 2003*

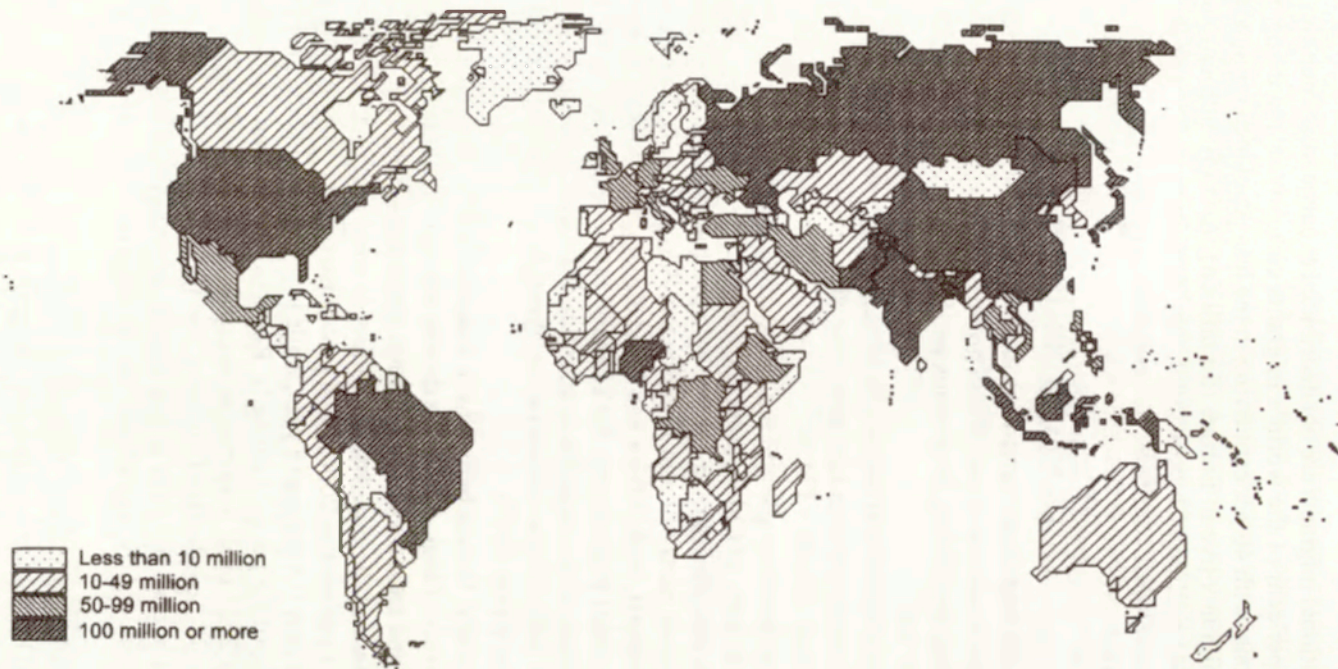


Fig. 6. World population distribution, 1999

Rozmieszczenie ludności świata, 1999

Source (źródło): *Charting the Progress of Populations 2000*, Department of Economic and Social Affairs; *Population Division*, United Nations, New York 2000, p. 12.

Revision, 2004). The process of urbanization is already very advanced in the more developed regions, where 75 per cent of the population lived in urban areas in 2000. Nevertheless, the concentration of population in cities is expected to increase further so that, by 2030, 83 per cent of the inhabitants of the more developed countries will be urban dwellers. Except for in Africa, all future population growth is now concentrated in urban areas. Today, urban population growth is estimated at 2.0 per cent per year. The proportion of urban-dwellers grew from 30 per cent of total population in 1950 to 47 per cent in 2000. Although the level of urbanization is considerably lower in less developed regions (40 per cent), urban areas in less developed regions are growing much more rapidly (at 2.7 per cent per year) than in more developed regions (0.5 per cent per year).

In particular, the twentieth century growth of mega-cities in developing countries has been exceptional, so that in 2000 there were 19 metropolitan areas with 10 million inhabitants or more (5 with 15 million or more inhabitants) (*World Urbanization Prospects. The 2003 Revision*, 2004).

At the same time, there has been relative and absolute depopulation of many of the marginal areas: in mountains, deserts, semi-deserts, tundra, etc.

These two forms of population concentration clearly have manifold environmental effects. Such consequences are not only important in the case of concentration of the population, (where the natural (physical) environment is increasingly replaced by the built environment with all its problems of congestion, housing, pollution and environmental degradation), but also in the depopulating areas which may also suffer from the effects of inadequate land management (Potrykowska 1997).

2. POPULATION GROWTH AND THE ENVIRONMENT

2.1. POPULATION, ENVIRONMENT, AND DEVELOPMENT

One could consider the ways in which population size, growth and distribution may be related to major environmental issues.

Interactions between demographic change, the environment and development are complex, varying with the type of resource, the stage of economic, political and social development. The ways in which population size, density and growth may be related to several major types of environmental phenomena.

The global population / resource problem is one of distribution. Population growth influences land-use patterns in combination with consumption behaviours and productive activities of the world's peoples. It is also essential to consider countries or regions in a broader international context (Table 3). Land-use patterns in the developing countries are sometimes strongly influenced by international trade and the high purchasing power of residents in the developed countries.

Table 3. Population , environment and development in world, regions and countries

	World	More developed regions	Less developed regions	Least developed countries
Total population 2001 (thousands)	6 134 135	1 193 861	4 940 274	674 954
Density 2001(Pop/km ²)	45	23	60	33
Annual growth rate 2000-2005 (percentage)				
Total	1.2	0.2	1.5	2.5
Urban	2.0	0.5	2.7	4.5
Rural	0.4	-0.8	0.6	1.6
Water resources per –capita 2000 (average annual in cubic metres)	7 113	10 852	6 196	7 065
Forest cover: average annual change 1990-2000 (percentage)	- 0.2	0.1	-0.5	-0.8
Cropland per capita (ha) 1996-1998	0.26	0.51	0.20	0.22
Undernourished 1996/1998 (percentage)	-	-	18	39
Gross Domestic Product 1998 (per capita in \$)	6 380	19 069	3 243	1 017
Energy consumption 1997 (per capita in kilograms)	1 671	4 741	838	300
Motor vehicles 1990s per 1000 population	124	473	30	5
Carbon dioxide emissions 1997 (per capita in metric tons)	4.2	11.3	2.1	0.2

Source: *Population, Environment and Development*, 2001.

The Earth's land resources will have to become more productive in the next 50 years if the growing needs for food are to be accommodated (Jolly, Boyle Torrey, eds, 1993). More advanced farming techniques will be needed in the future if projected population increases are to be offset. Worldwide, the average amount of cropland per person is projected to decline from 0.28 hectares per capita in 1990 to 0.17 hectares by the year 2025. Declines will be especially sharp in developing countries. The following three factors will determine whether food production can be increased fast enough to keep up with population growth:

Croplands. The amount of cropland available per capita is decreasing in all world regions, as population increases. The global availability of cropland has fallen by some 25 per cent over two decades (*Population, environment and development*, 2001). Currently the new land put into production each year may equal in size the amount that is rendered unusable by erosion, desiccation, salt deposits, or water saturation – a net gain of zero. Large amounts of land are also being taken over by expanding urban areas, including housing, roads, and industry (Potrykowska 2003).

"Farmers have traditionally satisfied increasing demand by ploughing new land, but in many regions opportunities for expansion are now limited. However, while the rates of growth in agricultural yields have been declining since the 1980s, food production per capita at the global level has continued to rise" (*Population, environment and development*, 2001).

Fertilizers and pesticides. The use of chemicals to boost crop yields and kill insects is likely to increase in order to meet growing demand for food. Already, however, excessive or careless use of chemicals in developing countries may bring about the deaths of several thousand people per year – most of them agricultural workers, as well as injuring an estimated one to two million others (*Population Reports*, 1992, p. 13).

Several different conclusions can be drawn from the above, i.e. that it is possible to feed the world's population, that changes in diet and consumption in the developed countries would assist greatly in this process, and that the real causes of hunger, malnutrition and famine in the least developed countries are largely economic and political in origin and frequently induced via external influences. Although the percentage of the population that is undernourished has been halved since 1970, some 792 million people in developing countries and 34 million in developed countries and those with economies in transition are still undernourished. Inadequate access to food results from poverty, political instability, economic inefficiency and social inequity. Almost two-thirds of the undernourished live in Asia and Oceania, while about one quarter are in sub-Saharan Africa. The problem is most severe in Central, Eastern and Southern Africa, where almost one half of the population is undernourished (Potrykowska 2003).

Consumption and gross domestic product per capita. The differences in consumption exist between more developed and less developed countries. The world's richest countries, with 20% of global population, account for 86% of total private consumption. The poorest 20% of the total population account for only 1.3% of global consumption. Energy consumption is a function of economic growth and level of development, and is therefore very unequally distributed in the world (see Table 3).

The characteristics of global economic growth in the latter half of the twentieth century have been its unprecedented pace and its unequal distribution between countries and regions. Even though population increased more rapidly during the twentieth century than ever before, economic output grew even faster,

owing to the accelerating tempo of technological progress. Gross domestic product per capita – the total amount of goods and services produced per person within the domestic territory of a country – increased almost sixfold over the century; though the increase in per capita income was less than threefold (*Population, environment and development*, 2001).

Poverty is clearly a major factor. Today, a half of the world population lives on 2 USD a day or less. More than a billion of people cannot fulfil their basic needs for food, water, sanitation, health care, housing and education. "*The percentage of the world's population living in absolute poverty (on less than one USD per day) has declined since the mid-1980s. However, the decline is below the pace needed to achieve the international development goal of reducing extreme poverty by one half by 2015; and the total number of the poor in 1998 was greater than it had been a decade earlier. Almost one-fourth of the population of less developed regions and economies in transition – no fewer than 1.2 billion people – live in absolute poverty*" (*Population, environment and development*, 2001). This is most pervasive in sub-Saharan Africa and South-central Asia and is related to a wide range of factors, including income, health, education, gender and ethnicity (i.e. hunger, illiteracy, vulnerability, sickness and premature deaths).

In their struggle to survive, poor people often destroy their surroundings by cutting down trees, overworking the soil, overgrazing rangelands, and overfishing. People's efforts to escape from poverty also damage the environment. For example, timber and cash crops are exploited beyond sustainable levels, and mineral supplies are depleted rapidly in bids to earn foreign currency (Potrykowska 1997). The effects of poverty also destroy environments, but the poor are at the end of a long chain of cause and effect (they are messengers of unsustainability).

Environmental damage has several sources: poverty, skewed systems of land tenure, uncontrolled commercialisation of natural resources, inadequate control of polluting industries, destructive farming techniques, and urbanization.

Urbanization and transport. Modern urbanization concentrates large numbers of people as never before in history, with these demanding dependable sources of water and adequate sanitation services on unprecedented scales. By 2015 more than half of the world's people will be living in metropolitan areas, and these areas will be home to 90 per cent of the absolute poor in Latin America and the Caribbean, 45 per cent of those in Asia, and 40 per cent of those in Africa. But urban infrastructures can take years to develop, and today that development is failing to keep pace with population growth. The changes in land-use patterns brought about by urbanization also affect renewable water supply, by altering and accelerating natural patterns of runoff, eroding soils and speeding evaporation. During the twentieth century, there was a major shift from rail and water transport to road and air transport. Since the 1940s, the number of vehicles on roads has grown from some 40 million to 680 million. The most rapid percentage increase in the number of motor vehicles is now in less developed regions, where automobile own-

ership is still low. Transport now accounts for one quarter of world energy use and one half of the world's oil consumption and is therefore a major contributor to greenhouse gas emissions, urban air pollution, urban congestion and health hazards.

2.2. THE ENVIRONMENTAL PROBLEMS

The environmental variables considered in relation to population cover a wide spectrum and range from specific resources (land, forest, water, and air), to problems concentrated in specific climatic zones, to urban/rural location. While the environmental problems are the result of human activities, they vary in the degree to which they can be linked directly to population size, growth or distribution. Even though the cases with environmental problems are concentrated mainly in countries with rapid population growth, it is not necessarily the case that population increase is the main root cause, or that slowing population growth would make an important contribution to resolving the problem. Each type of problem needs to be considered separately, with account being taken of the range of conditions that give rise to the problem.

Environmental overuse and degradation take many forms, including air and water pollution, the imprudent use of land, forests, and other renewable natural resources, the reduction of biodiversity, the emission of wastes, including greenhouse gases and global warming. Some types of environmental degradation are associated with affluence, others primarily with poverty. Some problems are confined to local areas, while others are regional or even global in scope (Obaid 2001).

Global threats require analysis and action at the local and national levels, but are also likely to require international cooperation if they are to be resolved successfully.

For example, increases in some types of pollution are primarily the by-product of rising per capita production and consumption in richer economies, where population has generally been growing slowly. Some types of pollution, such as the release of the chlorofluorocarbons, that harm the planet's ozone layer, are linked to particular technologies much more than to either population change or overall economic growth.

Today what is characteristic is the vastly greater scale of the impact of human activities on the environment, to the point where the impacts are now global. Table 4 offers estimates as to the degree to which human activities have affected global biogeochemical cycling of carbon, nitrogen, phosphorus, sulphur, water and sediments³. The intensive use of fossil fuels has led to substantial

³"between one third and one half of the land surface has been transformed by human action; the carbon dioxide (CO₂) concentration in the atmosphere has increased by nearly 30 per cent since the beginning of the Industrial Revolution; more atmospheric nitrogen is fixed by humanity than by all natural terrestrial sources combined; more than half of all accessible surface fresh water is put to use by humanity; and about one quarter of the bird species on Earth have been driven to extinction. All of these changes are ongoing, and in many cases accelerating; many of them were entrained long before their importance was recognized. (And) we are changing Earth more rapidly than we are understanding it" (Vitousek and others, 1997, pp. 494, 498).

Table 4. Examples of human intervention in the global biogeochemical cycles of carbon, nitrogen, phosphorus, sulphur, water and sediments

Element	Flux	Magnitude of flux (millions of metric tons per year) Natural	Anthropogenic	Percentage change due to human activities
C	Terrestrial respiration and decay CO ₂ Fossil fuel and land use CO ₂	61 000	8 000	+13
N	Natural biological fixation Fixation owing to rice cultivation, combustion of fossil fuels, and production of fertilizer	130	140	+108
P	Chemical weathering Mining	3	12	+400
S	Natural emissions to atmosphere at Earth's surface Fossil fuel and biomass burning emissions	80	90	+113
O and H (as H ₂ O)	Precipitation over land Global water usage	111 x 10 ₆	18 x 10 ₆	+16
Sediments	Long-term pre-industrial river suspended load Modern river suspended load	1 x x 10 ₆	2 x x 10 ₆	+200

Source: Falkowski et al, 2000, p. 294.

growth in global emissions of carbon dioxide (CO₂) and the build-up of greenhouse effects, a contributing factor in global warming. It is estimated that since 1751, over 265 billion tons of carbon have been released to the atmosphere, one half of these emissions having occurred since the mid-1970s. Annual global emissions of CO₂ from the burning of fossil fuels have been rising steadily and have quadrupled since 1950. The highest per capita emissions are in North America. Europe's per capita emission levels are less than half as high. Continuation of these upward trends in emissions may pose serious risks of climate change, especially global warming, possibly inducing surges in sea levels, flooding of low-lying coastal areas, the migration of ecosystems, the spread of vector-borne diseases and reductions in agricultural yields (*Population, environment and development*, 2001, pp. 121–130).

The signs of environmental stress growth as the world's population increases: worn-out farmlands, eroded hillsides, polluted water, parched grasslands, smoke-laden air, and deforestation are just some of them.

Deforestation. In the last decades deforestation rates have reached the highest levels in history. Each year about 17 million ha of tropical forest vanish – an area the size of Tunisia or Uruguay (Potrykowska 2003). About half "of the forests that originally covered the Earth have been cleared. Although some 90 million hectares of forest were lost between 1990 and 2000, the pace of deforestation is estimated to have been lower in the 1990s than during the 1980s. Deforestation has been arrested and even reversed in Europe and North America. Forests are critical because they house indigenous cultures, shelter global bio-

diversity, provide ecosystem services, store carbon, contribute to economic growth and meet recreational needs" (*Population, environment and development*, 2001).

Deforestation and the degradation of agricultural soil can accelerate or otherwise alter the water cycle, threatening the continuity of river and groundwater recharge. The dominant hazard is flooding, which can wash away topsoil and slowly choke rivers, dams and reservoirs with deposited sediments (see Nembudani in this volume, pp. 85–97).

Water. Agricultural demand for water doubled between 1970 and 2000. Half of this increase was needed just to keep up with population growth, while half went into increased food production. Water use grew at more than twice the rate of the population increase during the twentieth century. About one third of the world's population lives in countries that are experiencing medium-high to high levels of water stress (Engelman, Le Roy 1993).

Demand for fresh water has risen steadily with increasing population and socio-economic development. Most countries in Africa, the Near East, and North Asia face serious water shortages. At present, agriculture accounts for some 70 per cent of freshwater consumption worldwide. While fresh water is abundant globally, it is distributed unevenly among and within countries.

Chronic water shortages exist in many areas where precipitation is low or unreliable and/or where withdrawals have increased significantly to meet additional demand from expanding irrigation, industry or urban populations. Assessments of the world's water resources are commonly measured in terms of the ratio of water abstraction to water supply (see Nembudani in this volume, pp. 85–97).

Sanitation and health hazards. The availability of and access to clean water and sanitation are among the most important determinants of the health of individual human beings. Water and air, instead of sustaining life, cause disease. Air pollution contributes to such health problems as cancer, respiratory, heart, and lung diseases, genetic defects, and mental retardation. In Latin America some 2.3 million children suffer from chronic respiratory illness, and 100,000 elderly people suffer from bronchitis – all from breathing polluted city air (Potrykowska 2003).

Urban population growth, coupled with the increasing contamination of existing water supplies, threatens to make the provision of safe drinking water and sanitation in urban areas a critical issue for the next several decades. In many urban areas in poorer countries, people compete for access to polluted water to satisfy their drinking needs. Beyond the urban fringe the expanding development of rural land is also cutting into the availability of renewable fresh water.

In many countries, river pollution from raw sewage reaches levels thousands of times higher than the recommended safe limits for drinking and bathing. Drinking and bathing in polluted water supplies are the most common routes for the spread of infectious disease, and nearly half the world's population suffers from water-related diseases. Most of those affected are poor, and almost all live

in developing countries. Such diseases are the single largest killers of infants in developing countries – diarrhea alone causes 4 million deaths a year – and access to safe water correlates strongly with the survival of children under five years old. With many water-short households forced to rely on contaminated water supplies, waterborne diseases like schistosomiasis and cholera swept Latin America in the 1990s, and Rwanda, while there was an epidemic of plague in India. Deteriorating water quality is a particular threat in developing countries, where hundreds of millions of people lack access to clean drinking water and the vast majority of sewage is discharged into surface waters without wastewater treatment (Potrykowska 1997).

A "*Blue Revolution*" in water supply and sanitation is needed as much as the "*Green Revolution*" in food production was needed ... after 1950 (Engelman, LeRoy 1993).

3. CONCLUSIONS

The twentieth century witnessed extraordinary growth in world population – from 1.6 billion in 1900, to 6.1 billion people in 2000. World population has increased nearly two and one-half times since 1950, with the global rate of growth peaking at 2.04 per cent per year during the late 1960s. Rapid population growth was triggered by dramatic reductions in mortality, especially in the less developed regions, where average life expectancy at birth increased by over 20 years during the second half of the century.

The effect of differential demographic transition will certainly change the population balance of world regions, as those clusters in the developing world are growing much faster than those in the developed world.

Equally important is the fact that the distribution of world resources does not match up to the distribution of these populous and rapidly-growing countries.

The population growth clearly has manifold environmental effects. We observe serious environmental problems that threaten efforts to improve the standard of living, that worsen health conditions, and that reduce income from agriculture and other sources. In rural areas pressure to grow both more food and cash crops has led to massive losses of topsoil, trees, and native plants and animals. In cities increased congestion, industrial expansion, and lack of pollution controls result in unhealthy levels of air and water pollution. Although some consider that this environmental stress is the price paid for development, widespread environmental damage is in fact likely to hinder development efforts and worsen disproportionately the plight of people living in acute poverty.

Population and the environment are closely related, but the links between them are complex and varied, and depend on specific circumstances.

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ZMIANY I WZROST LUDNOŚCI A ŚRODOWISKO. PODEJŚCIE GLOBALNE

STRESZCZENIE

W XX wieku wystąpiły na niespotykaną skalę zmiany liczby i gwałtowny wzrost ludności z poziomu 1,6 mld w 1900 r. do 6,1 mld w 2000 r. Od 1951 r. ludność świata wzrosła ok. 2–2,5 raza, przy czym najwyższa roczna stopa wzrostu (2,04%) przypadła na koniec lat 1960.

Gwałtowny wzrost ludności w II połowie ubiegłego wieku był spowodowany zarówno wysokim poziomem płodności, jak i dużym spadkiem umieralności, szczególnie w słabo rozwiniętych regionach, gdzie średnia oczekiwana długość trwania życia w momencie urodzin wzrosła o 20 lat, tj. z 46 lat życia w 1950 r. do 66 lat. W końcu lat 1980. największy w historii roczny wzrost liczby ludności wyniósł 86 mln ludzi. W latach 1987–1999 ludność świata wzrosła o 1 mld tj. w najkrótszym w historii okresie 12 lat. W 2003 r. liczba ludności Ziemi wyniosła 6,3 mld i będzie nadal rosła.

Według najnowszych projekcji ludności ONZ, w wariancie średnim, który zakłada współczynnik dzietności ogólnej na poziomie zastępowalności pokoleń (2,1 dzieci na 1 kobietę w wieku reprodukcyjnym), ludność świata wzrośnie z 6,3 mld osób w 2003 r. do 8,9 mld w 2050 r.

Spadek płodności w wielu częściach świata spowodował zmniejszenie stopy wzrostu ludności świata do 1,2% obecnie, tj. 77 mln osób rocznie, z czego 95% przypada na regiony słabiej rozwinięte. W przyszłości wzrost ludności będzie zmniejszać się zarówno w regionach rozwiniętych, jak i słabiej rozwiniętych, głównie z powodu spadku płodności.

Konsekwencją przejścia demograficznego oraz spadku płodności i umieralności są zmiany struktury ludności według wieku, a przede wszystkim starzenie się ludności. Wzrastający gwałtownie proces starzenia się ludności na niespotykaną dotychczas skalę, występuje szczególnie w krajach wysoko rozwiniętych. Tym niemniej, paradoksalnie, roczna stopa wzrostu ludności w starszym wieku jest wyższa w regionach słabiej rozwiniętych niż w krajach wysoko rozwiniętych, co oznacza, iż w 2050 r. struktura ludności według wieku w regionach słabiej rozwiniętych będzie podobna do obecnej struktury wiekowej w krajach wysoko rozwiniętych.

Zmiany liczby ludności, stopy wzrostu i rozmieszczenie ludności mają szeroki wpływ na środowisko i możliwości rozwoju. Równie ważne jest, że występowanie zasobów naturalnych nie pokrywa się z rozmieszczeniem najbardziej zaludnionych krajów o najwyższym wzroście ludności, gdzie potrzeby są największe.

Ludność i środowisko są ściśle związane, jednak współzależności te mają charakter złożony i zróżnicowany w zależności od specyficznych uwarunkowań. Badanie tych współzależności wymaga szczegółowej analizy czynników takich jak postęp i rozwój, konsumpcja, technologia, wzrost ludności, struktura i rozwój społeczny, polityka i zarządzanie na wszystkich poziomach.

Wraz ze wzrostem ludności i rozwojem globalizacji pojawiają się kluczowe pytania uniwersalne dotyczące polityki, a mianowicie jak wykorzystać zasoby naturalne ziemi i wody w celu wyżywienia ludzkości; jak promować rozwój gospodarczy, aby zlikwidować ubóstwo; w jaki sposób niwelować negatywne dla ludzi i środowiska skutki industrializacji, takie jak globalne ocieplenie i zmiany klimatu oraz zanikanie biologicznej różnorodności.

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II. ENVIRONMENTAL ETHICS AND JUSTICE

Population, environment and development

Prace Geograficzne nr 202 (2005)

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ETHICS AND THE ENVIRONMENT IN INDIA

1. THEORETICAL ISSUES FOR GEOGRAPHERS

1. A. DETERMINISTIC AND POSSIBILISTIC ISSUES

Traditionally, geographers have had a deep curiosity about, and concern for, the face of the Earth, and the way that it provides, in a larger sense, a home for mankind. Much of what we see upon the Earth is the work of humankind and is a result of a variety of decisions that humanity has made at the individual or group levels over historical time. In this respect, the two most ideological formulations that have been used by geographers to view the relationship between "man" and "the environment" refer to the deterministic and the possibilistic schools of thought dating back to the nineteenth century (Arora 1995; Nayak 1990).

While *determinism* gained popularity in an effort to extend the findings of Darwin to the human sciences, it could develop only to the level of simplistic ideology, as a result of its inability to provide a sound theoretical framework for human–environment relationships. According to the *possibilistic* viewpoint, the environment offers human beings a choice of possibilities of which they may or may not take advantage. Thus humanity asserts its position at the expenses of nature, which it exploits in the name of enterprise, completely unhindered, unlimited and as he wishes. Both these approaches are historical and ignore the class-nature of the relationship. What is completely forgotten is the role played by the social structure as it has evolved over time and with meditation through nature, in shaping the environment, which simultaneously shapes it. Therefore "man" and "nature" are seen independent of each other in a game of who dominates whom. "Man" is universalized and the relationship of man with other men (which affects the appreciation of the environment) is trivialized (Barrow 1995; Nayak 1990).

1. B. ECONOMIC AND SOCIAL ISSUES

According to the Marxist viewpoint, society creates its own history by transforming itself, but in the process, the relationship with nature is transformed. Thus, here the conception of man-nature interactions is rooted in history; it may be viewed as the constant struggle of humankind to emancipate itself from the clutches of nature – a movement which has been described as "*from the realm of blind necessity to the realm of freedom*". In the course of this movement, nature is gradually humanized while humanity is increasingly naturalized. Since the humanization of nature and naturalization of man proceed simultaneously

through man's interactions with nature, "*human history may be viewed as a continuation of and a qualitatively new stage in natural history – the two constituting a differential unity*". The effect of nature on the human being would vary depending on the level and the form of social organization. The natural context is shaped by social activity: i.e. humans are increasingly conditioned by what they have collectively and historically made nature, i.e. by a social nature. It is through labour that human beings enter into a direct relationship with nature. In order to do this, humans have to interact with other humans, and as a result build a system of institutions, be these economic, social or political. It is a complex but integrated system, which makes social life possible and helps determine the direction of man-nature interactions, as society recognizes itself into various modes of population, and as the relation between one class and the other changes. Thus changes in the modes of production are rationalised and expressed as changes in the concept of nature. Man's concept of nature must then be located within the structure that a particular society has given itself (*Central Statistical Organization, 1997*).

Humankind organizes itself from the Paleolithic stage of complete unity of all that exists and a transcendence of the duality between the biota and the abiota, between the human being and nature, to the present day capitalism with its acute contradiction between man and environment. Thus the human-environment relationship is moded in all stages of human society, being characterized by a specific mode of production in which human beings enter into definite social relations entailing the domination of one class over the other. If the man-nature relationship is seen as the product of changing relations to production, dictated by a given mode thereof, according to which society organizes itself, then geography may be equipped with a methodology directly reflecting the uniqueness of the human-environment relationship. This is because it is herein that there lies the distinction in the "*understanding of the social man in the natural space*".

It is acknowledged today that the natural environment – with its four interlocking systems of the atmosphere, hydrosphere, lithosphere and biosphere – cannot be divorced from the social environment consisting of human societies, man-made infrastructure and the production relations, political power structures and institutional structures that have been devised. This brings out a common relationship among issues of the environment, population, equity and development. The important variables linking needs and production are the production, technology, social structure, distribution and culture of the population (Arora 1995).

1. C. CULTURAL ISSUES

Culture is often seen as the antithesis of the natural world – "*nature being regarded as that state which is independent of human affairs*". That which is completely natural from this viewpoint is that which is not manipulated and interfered with by peoples. However, not even the ice cap of Antarctica is free from the traces of human activity (an allusion to the fact that the waste products of industrial societies in other parts of the world have set their chemical

fingerprints upon that ice). It would not be conceptually possible to keep culture and the environment apart. Indeed, the framing of the environment in conceptual terms is a deeply human activity. The understanding of natural phenomena is channeled through a process of human interpretation (Sagoff 2000). *"The world has the wealth and the resources to provide everyone the opportunity to live a decent life. We consume too much when market relationships displace the bonds of community, compassion, culture and place. We consume too much when consumption becomes an end itself and makes us lose affection and reverence for the natural world"* (Svedin 1991).

I. D. ISSUES OF SUSTAINABLE DEVELOPMENT

The term was coined and developed as a link between economic development and the protection of the environment as an initiative of the United Nations Environment Programme in 1980. It contains within it two key concepts:

1. the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given.
2. the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

This would call for a shift from *"growth-oriented development"* to *"environmentally responsible"* or sustainable development, in an effort to meet *"needs of present generation without compromising the needs of future generation"* (Streinz 1999). It ought to be a process that discourages the present generation from becoming better off at the cost of the future generation (Arora 1995).

2. ECONOMIC DEVELOPMENT AND ENVIRONMENTAL MANAGEMENT

It is only since the Stockholm Conference of 1972 that the world has become serious about the abatement and control of air pollution, water pollution, noise, the depletion of resources, etc. However, most of the developing countries have followed the footsteps of the West on the path to development, with the environmentally adverse consequences of the process generally being ignored. Following the passing of the Environment (Protection) Act 1986, India was able to fix standards for pollutants from various industries. However, it faced problems in the cases of those industries which did not have the pollution control equipment, e.g. tanneries.

Environmental concerns have been viewed by developing countries as a shift away from their goal of economic development. In India, environmental concerns are elided with the twin assumptions of free disposal and superabundant natural resources. Until a century ago, India's natural resources – cultivable land, forests, grazing land and minerals, not to mention clean air and clean water – were far more abundant than they presently are. Population was but a quarter of what it is today and conventionally reckoned per capita income was probably half its current level (Table 1). The accessibility of some of this abundance permitted the bulk of the population to meet its basic requirements for fuel and

Table 1. Population growth rate in India, 1901–1991

Year	Population	Average Annual Exponential growth rate (per cent)	Progressive growth rate over 1901 (per cent)
1901	238,396,327	-	-
1911	252,093,390	0.56	+5.75
1921	251,321,213	-0.03	+5.42
1931	278,977,238	1.04	+17.02
1941	318,660,580	1.33	+33.67
1951	361,088,090	1.25	+51.47
1961	439,234,771	1.96	+84.25
1971	548,159,652	2.20	+129.94
1981	683,329,097	2.22	+186.64
1991	843,930,861	2.11	+254.0

Source: *Provisional Population Totals*, paper-I of 1991, Census of India 1991, series-I Statement 2, p. 21

Table 2. Estimates of forest cover in India, 1987–1995

Year	Satellite & Sensor	Data Period	Forest Cover Estimate
1987	Landsat-MSS	1981-83	640,819 (19.49%)
1989	Landsat-TM	1985-87	638,804 (19.43%)
1991	Landsat-TM	1987-89	639,364 (19.45%)
1993	Landsat-TM	1989-91	639,386 (19.45%)
1995	IRS-IB LISS II	1991-93	638,879 (19.43%)

Source: *State of forest report 1997*, Forest Survey of India, (Ministry of Environment and Forests) Dehradun.

Note: Figures in parenthesis are showing the percent of forest cover to geographic area.

housing materials, as well as inputs such as fodder, animal dung and artisanal materials by expanding labour alone (Singh 1992). Although the control of much of the cultivable land, credit and state offices was indeed concentrated, a sizeable part of the population met even its food needs through an assortment of activities including fishing, gathering, hunting, cattle grazing and shifting cultivation.

From 1865 onwards, the colonial regime enacted a series of laws converting a great deal of common land, all water sources and much of the forest area into state property (Gadgil, Guha 1992). This served to raise the revenues of the Empire and fuelled the ongoing industrialization of Britain with raw materials. The regime continued with little modification after independence, but its benefits have been distributed very unequally. Resources that were not simply usurped by those with the private or public clout passed formally into state ownership. However, state property and monopoly have provided a convenient cover for private and privileged appropriation. The state of forest cover is dismal as only approximately 19% area is under forest. However it is a matter of satisfaction that the estimate of forest cover in India between 1987 and 1995 indicate consistency in forest cover (Table 2). The changes in the forest cover have been observed between the two time periods at state level (Table 3). To be sure,

Table. 3. State-wise Estimates of Forest Cover in India, 1987–1995 (sq.km.)

State/ U.T	1987	1995
Andhra Pradesh	49,573	17,112
Arunachal Pradesh	64,132	68,621
Assam	25,160	24,061
Bihar	28,482	26,561
Delhi	15	26
Goa, Daman, Diu	1,240	1,250
Gujarat	11,991	12,320
Haryana	513	603
Himachal Pradesh	12,480	12,501
Jammu & Kashmir	20,905	20,433
Karnataka	32,268	32,382
Kerala	10,292	10,336
Madhya Pradesh	130,099	135,164
Maharashtra	45,616	43,843
Manipur	17,475	17,558
Meghalaya	16,466	15,714
Mizoram	19,084	18,576
Nagaland	14,394	14,291
Orissa	53,253	47,107
Punjab	943	1,342
Rajasthan	12,758	13,28
Sikkim	2,756	3,127
Tamil Nadu	17,472	17,045
Tripura	5,953	5,538
Uttar Pradesh	31,226	33,986
West Bengal	8,432	8,276
A&N Islands	7,601	7,615
Dadra & N.Haveli	238	204
Grand Total	640,819	638,879

Source: *State of Forest Report 1997*, Forest Survey of India (Ministry of Environmental and Forest) Dehradun

the independent state also ushered in an era of planned development from 1951 with massive investments in infrastructure. As a result, GDP grew 360% between 1951 and 1993. With population growing by 144%, per capita GDP rose by 87% over the same period (These correspond to annual compound growth rates of 3.7, 2.15 and 1.5% respectively). This entailed an enormous extension and intensification of natural-resources extraction, resource degradation and pollution (Gadgil, Guha 1992).

a) **Land:** The growing pressure on land and forest resources imposes increasing burdens on the rural poor. In the more threatened ecosystems, this may be legitimately described as a subsistence crisis, an important manifestation of which is the rapid decline in Common Property Resources (CPRs), including grazing lands, forest lands, watercourses etc. CPR's are especially important in offering sustenance for farm animals. Yet, over the past four decades, the CPR area has declined by between 30% and 50%, while even its yields have been strained by a doubling of population (Gadgil, Guha 1992).

b) **Water:** The tapping of the water resources critical to production and consumption alike is increasingly faced with physical, economic and social constraints. The average annual availability of water per capita has declined from 5,236 cubic meters in 1951 to only 2,227 meters in 1991. This is expected to have declined further to just 1,555 cubic meters by 2013. Even if this level of water availability should prove sufficient, the enormous regional variation in it will pose serious problems regarding water distribution or population location, and will exacerbate the already prevalent socio-political conflict. Given the current water use practices, water will be the constraint on production potential, not land availability.

c) **Habitat:** The system of production also affects the living environment/habitat of people directly: the water they drink, the air they breathe and the physical amenities (cooking fuel, housing, sanitation, energy and transport forms) they use to live and work. These effects may be expected to be particularly severe given the widespread poverty and poor sanitation, health services and housing. Poverty simply puts private solutions to environmental problems out of reach of most people. Though there has been a sharp decline in the percentage of population living below poverty line in India from 51% in 1973-74 to 16.1% in 1999-2000, still there is a large chunk of population in absolute terms which lives below the poverty line and hence has access only to poor habitats conditions (Table 4). The low level of literacy also implies that many people are unaware of the ways in which environmental conditioning affects their lives, or of the social means by which they might seek redress.

Table 4. Percent Population below the poverty line by states in India (1993-94)

State/ U.T	Total	Rural	Urban
1977-78	51.3	53.1	45.2
1983	44.5	45.7	40.8
1987-88	38.9	39.1	38.2
1993-94	36.0	37.3	32.4
1999-2000	26.1	27.1	23.6
2007*	19.3	21.1	15.1

Source: *Central Statistical Organization* 1997, Ministry of Planning and Programme Implementation. Government of India, Table 7.1.4.

d) Causal Factors of Environmental Degradation:

1. Environmental degeneration in India is related to the scale of economic activity, as defined by the product of two factors – population and the income per capita. Poverty and environmental degradation appear to be closely associated, and so are poverty and population growth.

2. For any given scale, there are patterns of resource use that are less damaging to the environment than others (substitution). These involve a complex of determinants and choices including technology, production, organization, monitoring and valuations, whether through markets or otherwise. There are important instances of choices that have been taken in India, in

irrigation, energy and forestry and their impact on the environment (the "large dam" controversy, kerosene use, transport more efficient by rail than by road, use of biogas).

3. Environmental degeneration may be linked more to the quality and equality of the growth process than just to growth *per se*, or with the distribution of income and wealth. Whereas inter-generational equity is at the core of definitions of "sustainability", inter-generational inequity in India anchors the causes driving ecological degradation (Rao 1995):

- Inefficient public transport in large cities, with the private solution of the poor being to encroach upon and squat on land near their place of work. The proliferation of slums is a source of water pollution and offers a breeding ground for parasitic diseases.
- Take an example of the drought conditions in the west this year. There was a newspaper report stating that one reason for the severity of the drought was that the local people had stopped using traditional water storage systems once they had gained access to tap water. Traditional CPR management collapsed in 90% of the villages (Jodha 1991).
- Take the case of tank irrigation on the Deccan Plateau. The rich now have private sources of irrigation and other inputs, resulting in a disinterest in the preservation of the tanks commonly used previously, but requirement maintenance on the part of rich landowners.
- Any physical limits to economic activity posed by ecological degradation will express themselves socially or politically. In India, eco-system distress and hardships of the people affected by it are increasingly being expressed in the form of open social conflict.

3. THE ORGANIZATIONAL RESPONSE TO THE ENVIRONMENTAL CRISIS IN INDIA

The history of the Western environmental movement indicates that the most critical factor responsible for success has been the organizational response. This refers to the response of the people or the governmental authority in establishing a system primarily responsible for dealing with the crisis. It necessarily has more than one response: at the government level, the non-governmental level and the inter-territorial or international level. While the last group act merely as motivators, the first two are the important political players. All three have been responsible for the fact that the environment has emerged as a movement in India.

India suffers from severe environmental deterioration, and despite a high level of politicization, the political system works on the basis of traditional norms. Patron-client networks are far more significant than are the interest groups.

A. RESPONSE FROM THE PUBLIC – Chipko Movement: One of the most celebrated environmental movements in India – a people's initiative in this direction, in the Garhwal Hill in U.P., which spread to the whole of India. It dem-

onstrates and reinforces the potential and promise of "satyagarh" before us. Its origin is an incident believed to have occurred in Rajasthan in 1763, when members of the Bishnoi sect laid down their lives to protect trees being felled under the orders of the Maharaja of Jodhpur. In 1973, the simmering discontent of the people of Uttarakand with the government found expression in the form of this movement again. It resulted as a response to the fragmentation of the village community and the growing social and ecological disintegration of a traditional hill society. The extremely antagonistic and complex relation between the state and the people found expression in the form of the popular consciousness generated by the Chipko movement (Dobhal 1992).

Today, there are numerous examples of environmental deterioration brought about by industrialization and urbanization; and environmental quality has become one of the goals of planning and social justice. India has been voicing its concerns over this since the early seventies. Environmental degradation of a societal nature is more widespread and serious throughout urban India and is largely neglected – since the vast majority of people perceive it to be part of urban life. It stems largely from overcrowding and urban economic poverty. Solid wastes contribute, a lack of sanitation and safe drinking water, domestic sewage from human settlements, waste waters which find their way into the local water systems – all contribute to deterioration (Madrudachalam 1990).

B. ENVIRONMENTAL NGOS: are voluntary, grassroots organisations working towards the protection of the physical environment without political authority. It is possible for them to act as regulators to build up public awareness through cultural means, such as folk plays, puppet shows, marches and evening social meetings. Such NGOs have grown sharply in India, especially after 1980. This may have resulted from the following:

- Two major national level controversies just before 1980 that drew public attention towards environmental protection. The Silent Valley Hydroelectric Plant threatened the survival of the only evergreen rain forest in India. Second, the oil refinery in Mathura was found to be blackening the Taj Mahal in the mid-1970s.
- The Indian Government established a fully-fledged Department of Environment in 1980.
- Media coverage of environmental news also reached the highest point.
- In 1983, Bhopal experienced a disaster from a poisonous gas leak at the Union Carbide Plant, affecting the lives of more than a lakh people.
- Despite this, public interest remains largely unorganized, weak in structure and small in size. it also fails to make much impact on environmental decision-making since public support and money are lacking. However, environmental literacy is fostered and awareness built (Khator 1988).

C. GOVERNMENTAL ORGANIZATIONS: The setting up of the Department of Environment, and later its conversion into the Ministry of Environment and Forests in 1985, indicates the continuation of the government's concern for the environment. This is also seen in a stronger commitment to dealing with air, wa-

ter and noise pollution in major cities. The government has made efforts to deal with this issue from the beginning. However, the response from the people is dependent on that of government.

4. INDIAN ENVIRONMENTALISM

The concern for Ethics and Environment in India can be traced back to pre-historical days. During the Vedic age, moral, religious and scriptural norms of conduct were laid down for the man-environment relationship. Man and nature were considered to be two beautiful creations of God, with nature being the treasure house for man. God has given nature the power to produce several valuable items. Man, though his efforts, can make "judicious" use of them and be prosperous. The idea is best illustrated by the following Sanskrit shloka as given in the Atharva Veda:

*"Anuvrata rohini rohitasya surih suvarna brhati suvacih.
Taya vajana visarupa jayem taya visvah prtana abhisom."*

Atharvaveda, Bhasaye, 13.1

The period of Hindu rulers in ancient India was a period during which the norms laid down in the scriptures were respected and followed rigorously. Over this period, all the five elements of nature (fire, water, air, earth and sky) were worshipped and symbolized with god and goddesses. Nature occupied a position much superior to man, as the former overawed the latter with its majestic sprawl.

This is also the period in which rivers were considered sacred (like the Ganges and Saraswati) and have since then been used for their holy water, festivals, pilgrimages etc. Several species of plants and animals are used as surrogates of godly symbols and worshipped accordingly by man: Tulsi, Barh, Neem and Pipal are worshipped for their medical value, for securing meditation and medicinal cure, and for providing supernatural knowledge: – Lord Buddha seems to have received enlightenment under the Bodhi tree. Like plants, animals too had their place of worship in man's mind. The cow was worshipped as "mother", being the provider of milk for humanity; while the bull (nandi) was domesticated and worshipped as Lord Shiva's favourite; special enclaves in forest areas were reserved as "Dewta", or the places of Gods. No resources, including forests, could be exploited from them.

The mediaeval period was a time of invasions and foreign rulers in India, during which the symbiotic relationship established between man and the environment hitherto was unscrupulously demolished. New equations emerged. It was a period of exploitation of natural resources for the demands of the rich and the powerful. However, the environment still survived, due to the scant technology and limited population growth.

During the modern period, under colonial rule, a new set of permutations and combinations of interaction with the environment emerged. It was a period of exploitation of natural resources, essentially to boost the economies of colonizing

nations. In the process, some forced development took place within the country for facilitating exploitation. Thus emerged new environmental ethics suiting the needs of colonial powers.

In the contemporary period-post independence phase- with the national plans of economic development on one hand and an enormous rise in population on the other, coupled with global concern for the environment and sustainable development, there has emerged a mixed bag of ethics towards the environment.

From the point of view of ethics and environmental history, the overwhelming emphasis of many historians in India has been on the process of ecological degradation, and on the identification of the human agents behind these processes (Guha 1993). While the characterization of past ecological degradation remains the primary task, the study of currents of resistance to environmental abuse- on the part of marginalized social groups or individuals with an ecological conscience finds a place in today's literature.

It is the pressure of the contemporary environmental movement, rather than internal scholarly debates, that explain the crop of recent works in ethics and environmental history in India, as in other parts of the world. The forest conflicts of the 1970's, for example, keenly influenced historical analysis of the colonial origins of state forest policy and the erosion of local rights. Likewise, the ongoing conflicts over large dams have promoted critical analysis of large irrigation systems as well as ethno-historical studies of small-scale indigenous systems of water management. In all these studies, colonial capitalism is held squarely responsible for initiating the process of resource depletion and social conflict, though scholars have been quick to point out that these processes have in many respects been intensified by the policies of the post-colonial state. Searching for countervailing processes (i.e. the secondary research agenda), peasant movements in defense of forest rights have anticipated the Chipko Andolan (Guha 1993).

N.P. Peritore (1993) provides a model for the Indian environmental problematic that looks at three factorial opinion types emerging from a factorial analysis and varimax rotation of an overall matrix inter-correlating each person's placement with that of every other person. Indian environmental actors agree on some significant core values. The value of life and its right to exist in full diversity, which is essential to Hindu philosophy, is strongly affirmed by all subjects. That the ecological problem requires policy changes aimed at efficient resource use and recycling is at least noted by all three types. Beyond this consensus, the three opinion types have their own perspectives. The three environmental opinion types are fitted within the nation's complex political structure. The four cells contain the three types of opinion, plus the panchayats on which so much of their efforts focus. The four categories outside the cells represent four ideal types of administrative behaviour generalized by Heiginbotham from fieldwork in Tamil Nadu.

The Dharmic administrative model values maintenance of stability and order through precise performance of traditional duties. All duties are equally important and are to be discharged without concern for consequences or resource limits. In S.J. Heiginbotham's summary:

"One does not strive to achieve results, nor does one feel concerned if the performance of one's duty produces what appears to be an undesired consequence. One keeps to established procedures and standards-neither seeking innovations nor quality of work that exceeds the traditional system-maintaining norms."

Heiginbotham 1975

The British colonial administrative model required training, strict supervision and repressive control over the administrative cadre by a socially-distinct executive stratum. The Community Development Model, an American import, requires local participation in the planning, execution and evaluation of pilot projects. The bureaucrat is not to administer change, but to motivate and raise the consciousness and competence of locals so they can resolve their own problems. The Gandhian model sees society as an organic whole dictating morality, selflessness, duty and value of work, within reference to caste. The individual has an ethical responsibility to do right within the specific circumstances of the local community (Peritore 1993).

The Greens are both Gandhian and Dharmic in their stress on morality and action deriving from the communal situation. They have revived and modernized important Indian traditions though the application of ecological science, and thus have strong legitimacy in national politics and in local movements like Chipko and Appiko. The Ecodevelopers lie at the intersection of the community development and Gandhian models and thus tend towards modern pragmatic politics and local pilot projects. Their environmental concerns are incorporated within a development perspective. The managers lie at the intersection of the colonial and community development legacies. They thus believe in elite technocratic management of economic development within an overtly human-centered perspective, which situates environmental regulations within a Western high-tech, hard-power, urban, industrial model of development. The village councils of cell four represent the intersection of the Dharmic and Colonial action types; they will respond in traditional ways to state and central government and NGO environmental initiatives (Peritore 1993).

The three opinion types all cross-cut sectoral lines between business, government and NGO's. All these types can be found within the environmental movement, which demonstrates that Indian environmentalism is an amalgam of extant cultural elements and thus is more firmly rooted in political culture, society and ethos than movements in the West.

However, India's environmental movement, for all its national and international cache and its impact on planners, is frustrated by the nation's sheer linguistic, cultural and environmental complexity. The Gandhian ethos provides the environmental movement with a coherent ethic, metaphysic and method of

struggle as well as strong legitimization on the national political scene. The movement is in the unusual position of having gained significant victories in policy formulation and in local resistance movements, but ultimately having little impact on the national situation. The government, which it pressures from within and without, is largely ineffectual in promoting the serious long-term changes required to meet what many experts consider imminent environmental collapse.

India's environmental movement has the advantages of the Gandhian religion, strong links to native cultural eco-management practices, an excellent intellectual and political infrastructure and multiple points of access to national and local government. But a corrupt and bureaucratically tangled government dissipates its sophistication and strength; by a declining economy and by an ecological and population crisis that surpasses known techniques of environmental repair and management. The movement, far from being avanguard, is fighting a rearguard action for cultural and ecological survival.

5. ETHICS OF THE ENVIRONMENT IN INDIA

From the above analysis of the ethics of the environment in India, it becomes clear that the country has had a long history of people living in synergy with nature. However, as a result of the numerous invasions and colonization and the rapid population growth in the 20th century, India lost this crucial ability. Today, the state of India's environment is critical – numbers are too high and quality resources too few. Traditional systems of management are fast disappearing. Awareness of environmental concerns exists, but not much is done about it because of a weak structure and non-organized interest groups. The state is showing its interest in preserving and maintaining the environment for sustainable development.

Keeping the history of Indian environmentalism in mind, we must learn from the Taoist ethic of frugality, of "grace without waste" and the Gandhian ethic of restricted consumption, with minimum wastage. It is highly ethical to suggest that the Gandhian model be followed and traditional systems of environment management revived. Awareness is increased. R.C. Heredia (June 2000), speaking of the ecological ethic of lasting value has suggested three paradigms for society:

First, human fellowship must be expressed in the primacy of the common good, understood as those conditions that make it possible for the members of the community to achieve fulfilment of their nature.

To achieve this common good, both power and responsibility are to be maintained at all hierarchical levels of community for coordination, communication and implementation of programmes in a responsible manner. There would be incomplete participation of all members of the society, which would also be manageable in size. Small is manageable.

Second, cosmic evolution must mean a regenerative development. For such a society, growth would not only be sustainable, but also regenerative. This implies more than just leaving the environment uncompromised by degradation and pollution, but renewing it to create a new earth community. It means a development not only in terms of quantitative growth, but also qualitative growth.

Third, a relationship to a transcendent or ultimate reality in the context of this human fellowship and the development process must leave no room for a metaphysical pessimism and must be expressed in terms of purposeful technology that will help us to take responsibility for ourselves and our future.

The common good, regenerative development and purposeful technology must be further elaborated into a character of human rights and cosmic duties. The Indian tradition of Dharma (where performance of duty takes precedence) must be extended to collective rights and duties, in a manner that would entail an eco-ethical approach to the man-environment relationship.

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ETYKA I ŚRODOWISKO W INDIACH

STRESZCZENIE

Artykuł jest poświęcony koncepcjom, terminologii i zasadom polityki ekologicznej w Indiach.

Wczesne badania współzależności między ludnością a środowiskiem, odnosiły się do dwu koncepcji powstałych w poprzednim stuleciu, a mianowicie determinizmu i pozytywizmu. Według ekonomicznych i społecznych koncepcji, oba te podejścia badawcze ignorują istotę tych współzależności poprzez m.in. abstrahowanie od roli struktur społecznych i procesu ich kształtowania. Czynniki ekonomiczne, społeczne i kulturowe są ważnymi elementami relacji między człowiekiem a środowiskiem.

W 1980 r. z inicjatywy Programu Badań Środowiska ONZ (UNEP) wprowadzono i zalecono do powszechnego stosowania termin „rozwój zrównoważony”, łączący w sobie elementy rozwoju ekonomicznego i ochrony środowiska i mający na celu przesunięcie akcentu z rozwoju zorientowanego na wzrost i zysk, na rozwój zrównoważony – odpowiedzialny za środowisko w celu zaspokojenia potrzeb obecnych i przyszłych pokoleń.

Od Konferencji Światowej w Sztokholmie (1972 r.) świat respektuje idee rozwoju ekonomicznego i ochrony środowiska, po wprowadzeniu kontroli zanieczyszczeń powietrza, wody, gleby, ochrony szaty roślinnej i fauny, hałasu, rabunkowej eksploatacji surowców naturalnych, wylesiania i in. Tym niemniej w wielu krajach, również rozwijających się, podejście to było ignorowane. Kwestie ochrony środowiska były postrzegane w krajach rozwijających się jako odejście od celu ich ekonomicznego rozwoju.

Na mocy *Aktu o Ochronie Środowiska*, Indie wprowadziły w 1986 r. standardowe normy dopuszczalnych zanieczyszczeń przemysłowych z wyjątkiem kontroli urzędów w niektórych gałęziach przemysłu.

Indie mają długą historię ludzi żyjących w harmonii z przyrodą, jednakże w wyniku licznych inwazji i kolonizacji oraz gwałtownego wzrostu ludności w XX w. kraj utracił tę ważną zdolność. Obecnie stan środowiska naturalnego w Indiach jest krytyczny. Tradycyjne systemy zarządzania gospodarką i środowiskiem szybko znikają. Państwo wykazuje zainteresowanie ochroną i zarządzaniem środowiska w celu zrównoważonego rozwoju.

Etyka i środowisko w Indiach sięga czasów prehistorycznych, gdy normy etyczne, religijne i obyczajowe były związane z relacjami między człowiekiem a przyrodą (traktowane jako stworzenia boskie i gdzie przyroda służyła człowiekowi jako skarbiec i schronienie).

W okresie antycznym Hindu, przyroda traktowana z majestatem, zajmowała pozycję wyższą, ponad człowiekiem. Normy etyczne respektowane były rygorystycznie, a pięć elementów przyrody (ogień, woda, powietrze, ziemia i niebo) symbolizowane przez bogów, było przedmiotem kultu religijnego (np. święte rzeki Ganges i Saraswati służyły do obrzędów religijnych w czasie świąt, pielgrzymek i festiwali; pewne gatunki roślin i drzew, np. święte drzewo Bodhi, pod którym Budda doznał oświecenia, a również Tulsi, Barh, Neem i Pipol służyły do celów medycznych i kultu; niektóre zwierzęta, np. krowa, jako matka karmiąca ludzi uznawana za świętą; enklawy w lasach – Dewta – jako miejsca święte zarezerwowane były dla bogów i in.).

W okresie średniowiecza wskutek inwazji i najazdów cudzoziemców dotychczasowe relacje między człowiekiem a środowiskiem zostały zniszczone, natomiast rozpoczęto rabunkową eksploatację surowców naturalnych na zamówienie władców i bogatych.

Od 1865 r., w okresie kolonizacji Indii, brytyjski system kolonialny na mocy dekretów zagarnął na własność państwa ziemię, zasoby wodne i lasy. Wprowadzona wówczas nowa „etyka środowiskowa”, odpowiadała interesom obcego mocarstwa, a rabunkowa eksploatacja surowców naturalnych i forsowny rozwój ekonomiczny sprzyjał interesom kolonizatorów i rozwojowi industrializacji w Wielkiej Brytanii.

Po uzyskaniu niepodległości Indii system był kontynuowany z niewielkimi modyfikacjami. Surowce i dobra przeszły formalnie na własność państwa, jednakże monopol i własność państwa były wykorzystywane do celów prywatnych kast uprzywilejowanych.

We współczesnych, niepodległych Indiach z narodowymi planami rozwoju ekonomicznego i gwałtownym wzrostem ludnościowym z jednej strony, a globalnym podejściem do środowiska i zrównoważonego rozwoju z drugiej strony, występują mieszane koncepcje etyki względem środowiska.

Mając na uwadze historię etyki i środowiska w Indiach, powinno się uwzględnić elementy Taoistycznej etyki i model etyczny Gandhiego, dotyczący ograniczonej konsumpcji. Model Gandhiego i tradycyjne systemy zarządzania środowiskiem powinny być przywrócone w praktyce.

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ENVIRONMENTAL JUSTICE AS A MEANS TO AN END

1. INTRODUCTION

Over the years, environmental justice has transcended its initial preoccupation with grassroots struggles around specific local issues so as to now encompass concerns over both social justice and environmental imperatives (Harvey 1996). In this way environmental justice resonates with a universal striving for human dignity and the construction of a just society. Due to its North American roots, environmental justice literature tends to focus on the impact of government policies on the poor and people of colour (Capek 1993; Pulido 1994; Cutter 1995; Bryant 1995; Goldman 1996; Weinberg 1998). In that country, the anti-toxics movement, on which the environmental justice movement was to be founded, focused attention on the injustices of pollution among urban and rural working people. The paradox is that, while environmental justice literature has clearly articulated processes that have brought injustices (*United Nations Centre for Human Settlement*, 1991), there has not been a continuous engagement with processes that are meant to bring about environmental justice. The question we ask in this paper is what processes should be put in place to bring about environmental justice? Using this question as a background, we suggest that procedures and strategies for environmental justice are as important as the outcome (i.e. environmental justice). We substantiate on this suggestion by offering a closer analysis of resettlement of informal settlements within the framework of development. To this end, the paper draws on examples of resettlement of informal residents in post-apartheid Johannesburg and Cape Town. As a background to the discussion of these two case studies, we first comment on the notion of environmental justice.

2. WHAT CONSTITUTES ENVIRONMENTAL JUSTICE

Ideas about the environment have long been divided between the natural and human sciences, with natural science, on one hand, showing a strong bias towards preserving the physical environment. On the other hand, social sciences have always emphasised the human environment. From a natural science perspective, environmental justice would therefore focus on protecting the 'natural' environment. This perspective has been embraced by deep ecologists, accusing humans for violating the rights of nonhumans and thus presenting a view of environmental justice that is rooted in ecology.

Clearly, the anthropocentric view of the environment as advanced by social scientists emerged from their initial preoccupation with the hardships suffered by local populations from nature preservation projects, and then followed closely on government planning policies and the need for better services. Indeed, this brought the plight of the poor and marginalised to the centre of environmental and development policies. By emphasising the living and working conditions of the poor, social scientists have contributed to the redefinition of the environment to include "*the totality of life in ... communities – the air and water, safe jobs for all at decent wages, housing, education, health care ...*" (*Southern Organizing Committee for Economic and Social Justice*, cited in Harvey 1996, p. 391).

It follows that the human element of environmental justice constitutes mainly the poor and people of colour. This is not surprising because the location of people of colour adjacent to toxic waste sites gave impetus to the discourse of environmental justice, particularly in the United States. In that country, Public Data Access, Inc, which was commissioned by the Church of Christ, found that, "*race was a more significant predictor of where commercial toxic waste facilities were located ... than were a variety of measures of income, property values, and proximity to markets, such as waste generators and sites needing clean-up*" (Goldman 1996, p. 127).

The United States-style environmental justice has its limits in other social, political and geographical contexts. L. Pulido (1996) has argued that, a shallow racial approach that emphasize only racism and race ... *and a homogenous community not fractured by class means we ultimately fetishize skin colo[u]r ...* instead of developing a broader and deeper understanding of how inequality is produced.

She feels that a more multi-ethnic movement is needed, and proposes that greater attention be paid to other forms of marginality, including gender. Moreover, its focus on toxic waste contamination, industrial pollution and associated environmental health issues, restricts the usefulness, and sometimes even the relevance, of the US Environmental justice framework to situations in less-industrialised countries. In most former colonies, which a greater part of the South is now made up of, land rights are an important element of environmental justice, yet this aspect has been ignored in North American environmental justice literature. What should environmental justice be to people who live in conditions of squalor in South Africa's informal urban settlements?

Admittedly, environmental justice in South Africa is enshrined in Section 24 of the country's Constitution. The Constitution gives citizens the right to an environment that is not harmful to their health or well-being. Accordingly, the National Environmental Management Act (*South Africa*, 1998) also aims at achieving equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being. These constitutional provisions provide opportunities for environmental litigation, which unfortunately, can only be used by few people who have the resources and technical knowl-

edge (Ruiters 2002). Nevertheless, the Constitution provides general guidelines that help policy makers, experts and civil society to ensure that peoples' rights are being upheld.

D. Hallowes and M. Butler (2002) have proposed an approach to environmental justice which focuses on the conditions of the poor and the marginalised, in relation to the way they live, work, and participate in social and institutional life. They argue that, "*environmental justice is not simply achieved through equal and fair distribution of benefits and costs but goes to the heart of how power relations define and reproduce development itself*" (2002 p. 52). In this context, environmental justice should go beyond the minimalist "basic needs" approach to encapsulate the ways in which the poor and marginalised could participate in shaping their future. As G. Ruiters (2002 pp. 122–124) has correctly noted, "*the demands of environmental justice must be able to increase the self-confidence and collective power of the dis-empowered so that people can learn to map their own environments from their own experiences and discover new forms of self-awareness*".

This begs the question of how all these should be accomplished. In other words, what is a just environmental justice process? We present two case studies in South Africa to debate this point.

3. THE CASE OF ALEXANDRA, JOHANNESBURG

Like many black townships in the Johannesburg area, the origin of Alexandra as a residential area for black people is inextricably linked to racial segregation. Alexandra has different housing types, namely owner-built, government-built (including hostels), backyard and free-standing shacks (Pers. Comm. Abueng Matlapeng). It was originally established to house 70 000 people, but it has been estimated that Alexandra had approximately one million people in 1998 (Dirsuweit 1998) and that there were 34 000 shacks in 2001 (Molefe 2001). Though attempts were made to upgrade the area over the years, the devastating floods in 2000 placed the entire population living on the banks of the Juk-kei River at high risk. A combination of meteorological conditions, rapid and uncontrolled urbanization, the blockage of drainage pipes by waste, and poverty, contributed to the high vulnerability of the informal dwellers (Mgquba, Vogel 2004). Against this background, the Gauteng Provincial Government sought to resettle informal dwellers from Alexandra to Braamfischerville and Diepsloot in 2001, as part of its vision for a "*better life to all*". Whereas many observers were sympathetic to the removal (*South African Human Rights Commission*, 2001), the way in which the removals were carried out came under sharper scrutiny.

The official position has been to use Alexandra's appalling socio-economic conditions as reasons for the need for removals. The Gauteng provincial government has maintained that the aim of the removals is twofold: to improve the quality of life in Alexandra and to pursue the Greater Alexandra Renewal Plan. Given the squalid conditions in which the squatter citizens of Alexandra live,

attempts to prevent a human disaster appear rational. Ironically, removals in the apartheid era were also couched in the same terms, albeit with different political motives. If indeed the rationale for removals of residents from squatter settlements in post-apartheid South Africa is to improve the quality of life of the poor, it may well be that more removals can be anticipated as squatter camps are littered country-wide.

Critics of the removal pointed to the lack of communication, the use of non-professional (Wozani) private security staff, the dumping of people in the open, the use of transit camps and the removal of people to give way to other victims of removal. Reports of violations of human rights during the removal prompted the SAHRC to investigate the nature and impact of the process on the target populations. The report concluded that: people had not been properly consulted about the removal; unnecessary force was allegedly used; children had been removed from schools without any plans in place to ensure that they were absorbed into schools in the new location; personal belongings were dumped in the streets or pavements opposite the yard to which they were allocated; people were relocated to areas without proper sanitation and electricity; several families were removed into one yard where they were told that they would have to share the available limited space with owners of those yards; some owners alleged that they had not been informed about people who would be moving into their yards; there was no evidence of the Housing Department monitoring the situation; and people's shacks were demolished and they were not provided with building material to erect new ones in areas to which they moved (SAHRC, 2001). That is to say that the manner in which the removals were carried out violated the rights of the very people who were being assisted. Despite all this, the SAHRC endorsed the view that the removal was necessary, thereby suggesting that resettlement of residents was an important alternative solution to conditions in shack settlements. In terms of the theme of this paper, the process of relocating people from inhospitable conditions is as important as the quest for environmental justice.

With regards to residents, those who were moved to Braamfischerville thought that the resettlement area was better than Alexandra, while those in Diepsloot were of the view that they were worse off than before (Ramutsindela 2002). At face value, the differences between the two destination areas could be ascribed to the location thereof. Braamfischerville is found south-west of Johannesburg and forms part of the South Western Townships (SOWETO). Diepsloot is located to the north-west of Johannesburg, an area that apartheid policy-makers wanted to make NORWETO (the North Western Townships), following the same logic that guided the establishment of SOWETO. It is important to note that those who were moved to Braamfischerville were provided with formal houses – the so-called RDP (Reconstruction and Development Programme) houses (Ramutsindela 2003). Indeed, those relocated to Braamfischerville not only agreed that the removal was important for their safety, but also felt that the resettlement site was better than Alexandra in terms of basic facilities (Ramutsindela 2002).

Removals to Diepsloot were a complex matter, not least because Diepsloot itself had been home for waves of squatters who had been removed from north of Johannesburg from the early 1990s on (Benit 2002). One part of Diepsloot, Diepsloot One, has remained a shantytown while the other part, Diepsloot West, has been developed into sites and services. Over time the boundary between the two sections has become blurred with a mushrooming of shacks. Those removed from Alexandra in 2001 found themselves living in the shacks in Diepsloot, as the promised better living conditions were still to be developed. Unsurprisingly, the majority of residents in Diepsloot were unhappy about the relocation; complaining about a lack of proper planning and the fact that they were dumped in Diepsloot. Most of them felt that Diepsloot was not better than Alexandra. This is understandable since people who were relocated from Alexandra to Diepsloot were not provided with government houses like those in Braamfischerville. The case of Diepsloot confirms the view that development-induced removals can actually lead to underdevelopment, such that they cannot be said to be improving people's quality of life.

4. THE CASE OF THE MFULENI FLOOD RELIEF PROJECT, CAPE TOWN

The Project originated as a response to the floods that hit the province of the Western Cape in July 2001. Although this involved 14 communities, the present paper focuses on the community which lived in RR Section in Khayelitsha. With about 2 500 resident families, RR Section is an informal settlement which first appeared in 1989 (*Councillor Sitonga*, 17/07/02). Approximately half of the settlement is located on a railway area that has been earmarked for future railway development, while the other half is a service area for the Electricity Supply Commission (ESKOM). Prior to settlement, this was an open piece of land with no facilities for residential use. According to Sitonga, the land was invaded illegally and continued to grow over the years as the sight of the first shacks "*spurred other people to build more*". Cut off from all major road networks, RR is completely surrounded by the railway line to the West, a wetland to the North, and an adjacent settlement to the South and East. Rubbish, sewage and any form of waste lie rotting along the banks of the wetland that forms the northern boundary of the settlement. As Nonkosi (Interview, 20/07/2002) explained: "*there is lot of rubbish lying around, so when it rains the water just spreads that rubbish all over the place and the children get sick with all kinds of diseases*".

The reasons why the RR Section floods during the winter are predominantly related to the fact that it is situated on low-lying land and a platform has not been created. The natural ground that once formed part of the Kuils River floodplain has been maintained purely because it is privately-owned and was not earmarked for residential development. The area does not necessarily fall under the 1:50 year floodline, as the Kuils River channel has been pushed back over the years through development in Khayelitsha, but because it is low lying, the water table pushes through when it rains (Interview, Dupree Lombert, 07/

08/2002). The residents, when asked about their experiences of the floods, emphasised this point: "*I think the sand is too full of water, then the water comes out, it comes from underneath*" (Interview, Nontobeko, 19/07/2002). The sandy soil found throughout the Cape Flats area (Awotona et al, 1995), makes it easier for the water to push through. The presence of the wetland permanently inundated during winter means that shacks located alongside it are the worst off when it rains: "*when it rains the water runs down, as you can see that this land is a sort of a downward slope, so all of the houses down there become flooded. And also at the back there is some sort of a dam, so when it rains that dam becomes full, and all of the houses next to it becomes flooded*" (Interview, Champion, 20/07/2002).

In contrast to the flattened platforms that characterise most of Khayelitsha (where RR Section is found), most of the settlements in Mfuleni have been built between the dunes and not on top of them. Having maintained some of the natural dune systems when it was first developed in 1974, the planners at the time created an environment that is far more appealing than almost any other area in the Cape Flats. With most of the Cape Flats' dune systems destroyed or modified by urbanization, Mfuleni can be seen as an important remnant of the historical landscape. It should be noted that Mfuleni was established as a transit area for migrant workers in 1974, and consisted mainly of hostels until some free-standing homes were erected in 1976. It remained relatively unaffected by squatting until early 1990, when, due to taxi violence and conflicts in Crossroads, people started moving into the area. Formal housing is restricted to the Old Location (original township), which largely consists of individual plots and hostels. Recent formal development includes the Garden City, which houses the wealthier inhabitants of Mfuleni (*Development Media* 1999) and most recently, extension 4, where the average plot size is 180 m².

The affected people of RR Section were invited and allocated plots, and were given the option of exchanging their titles for someone, like a family member, if they did not want to go. It should be noted that the main objective was to clear the flooded areas completely. To this end, a 'shack demolition certificate' was written up by the project manager, BKS, the intention being to ensure that beneficiaries of the project should certify that they had demolished their shacks and vacated the site. Meetings for the whole community were held by ward councillors on a regular basis (Thembisile, 19/07/02), to discuss any issues relating to the project. Accordingly, land use and facilities were agreed upon in consultation with representatives of the local community and the recipient community, through a project management team process (*Macroplan/Urban Dynamics*, 2002). Full engineering services including one flush toilet, basin and tap were installed per residential erf, and infrastructure for portable water, roads, sewerage and storm water have been provided. Due to the urgency of the relocation, the beneficiaries would be allowed to erect their own informal dwellings on the erven. That is, residents are allowed to build temporary shelter towards the back of their plots, leaving space for a house to be built in the front where the toilet and basin stand. Trevor Tokwana (Interview, 13/08/2002) appreciates

the plan, but thinks that the proposed residential erven with a minimum extent of 100m² and a maximum extent of 180m² does not provide space for future changes in socio-economic status: *"if a person will built a shack and later a house then there must be enough space. You might be poor now but later things might change, and you have to allow for this change"*.

The resettlement has not been without concerns. The environmental consultant, Dupree Lombert, was concerned that the project would double the population of Mfuleni, something which could lead to the development of another large township. He argues for a policy of proactively identifying the land, creating the erven and settling the people on the land *"[he maintains that] if you know you've got 600 people looking for houses you plan a 1 000 erven, if you've got 8 000 you plan 10 000 erven, not 4 000, otherwise you are always going to get a squatting problem"* (Interview, Dupree Lombert, 14/08/2002).

In contrast to Lombert's view, that of Trevor Tokwana (Interview, 13/08/2002) holds that the influx of new residents would lead to further development in Mfuleni. As threshold population levels increase, the development of additional facilities such as creches, churches, shops and sports fields is justified. Another area of concern relates to the impact that resettlement would have on community structures. On one hand, Jacky Sampson (Interviews, 05/08/2002) thinks that the Mfuleni project split communities asunder: *"it will be a challenge to those communities ... it's sometimes difficult for the communities to form a cohesive whole because their backgrounds are so different"*. On the other hand, the community liaison, Chuma Mfikili, is worried that keeping the informal residents as a community perpetuates the problem of warlords and gangsterism.

Unlike in the past, when the apartheid state forcibly loaded people and their belongings onto government trucks, the Mfuleni project required residents to arrange for their own transport. In retrospect, the government should have provided transport to RR Section residents so as to lower the cost of resettlement for the community. There is nothing inherently wrong with using government vehicles for the "public good", more especially because there was a willingness on the side of the residents to move to the resettlement site. In fact residents were worried that the project was taking rather a long time. They were highly concerned about the squalid conditions at the RR Section and could only hope that the resettlement site had basic facilities as the excerpts below show:

"The good things in RR ... we don't have any good things. We're just living under bad things all the time, we don't have a good life, sometimes there's too much noise, the crime is too high, and we don't breathe in any fresh air, that smell from the dam never goes. Here in the afternoon there is no good smiling, you see everyone is sad ... that is why we want just to move" (Interview, Nontobeko, 19/07/2002).

"We will see everything when we are there because we don't know about the structure of the place and how the transport operates ... if the basic things that I need are there, things like water, electricity and toilets, then I am more than willing to move" (Interview, Vusi, 19/07/2002).

For the residents of RR Section, the move to Mfuleni is a means to maintain their independence, and to gain legal ownership of a piece of land on which their basic needs can be met, while they will no longer live in fear when the rains come down.

5. CONCLUSION

This paper refers to notions of environmental justice to suggest that procedures and strategies that are meant to achieve environmental justice are as important as the outcome (i.e. environmental justice itself). We added substance to this suggestion by offering a closer analysis of the resettlement of informal settlements in post-apartheid Johannesburg and Cape Town. The paper highlights the need to humanise the resettlement process. In post-apartheid South Africa, the ways in which the removal of squatters is carried out is a litmus test of the moral conscience of the new state.

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SPRAWIEDLIWOŚĆ ŚRODOWISKOWA JAKO ŚRODEK PROWADZĄCY DO SPRAWIEDLIWOŚCI SPOŁECZNEJ

STRESZCZENIE

W artykule zajęto się pojęciem sprawiedliwości środowiskowej (definicji, procedur, strategii), które samo w sobie jest środkiem prowadzącym do celu. Pojęcie to odnosi się zarówno do środowiska naturalnego, jak i antropogenicznego. Jako przykłady niesprawiedliwości środowiskowej, przedstawiono dwa przypadki przymusowych przesiedleń nielegalnych mieszkańców z przeludnionych osiedli położonych w dzielnicach: Alexandra w Johannesburgu i Mfuleni w Kapsztadzie. Przesiedlenia zazwyczaj wiązały się z pogorszeniem warunków życia, szczególnie sanitarnych i zdewastowaniem otaczającego środowiska. Artykuł ilustruje potrzebę humanistycznego podejścia w przypadkach koniecznych przesiedleń mieszkańców zgodnie z zasadami demokracji nowego ustroju politycznego w Południowej Afryce. Udowodniono, iż zapewnione przez Konstytucję Afryki Południowej prawo i zasady sprawiedliwości środowiskowej nie są przestrzegane.

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III. POPULATION AND ENVIRONMENTAL CHANGE

Population, environment and development

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Daniel Joseph Hogan, José Marcos Pinto da Cunha, Roberto Luiz do Carmo

LAND USE AND LAND COVER CHANGE IN BRAZIL'S CENTER WEST: DEMOGRAPHIC, SOCIAL AND ENVIRONMENTAL CONSEQUENCES¹

1. INTRODUCTION

The major land use change underway in Brazil's Center-West² (2,129,010.7 km², representing 24.9% of the country's area – somewhat less than half the Amazon region), is the substitution of tropical humid forest on the region's northern reaches (Amazon) and (especially) of the savanna-like *cerrado*. With a 2000 population of 14,144,534, the region has undergone rapid development over the last three decades. In this period, the region has moved from (1) a sparsely populated area of subsistence agriculture to (2) a major migration destination for land-seeking migrants from other regions to (3) dynamic export-oriented monoculture. This has been a rapid process, coinciding with the modernization of Brazilian agriculture; increasing mechanization and government incentives have contributed to the transformation of vast extensions of land to the production of grains (especially soybeans, but also cotton, corn and rice) and cattle-raising. Great expectations have been placed on an expanding world market for soybeans and Brazil's comparative advantage in this field.

While the Amazon forest has been recognized as an important resource to be conserved and sustainably managed³, the *cerrado*'s rich biodiversity and carbon storage (principally in root systems) have, until recently, been largely ignored. The transformation of the region into productive, high-tech agriculture has been seen as a victory of technology over nature. This view does not take account of social and demographic consequences (destabilization of traditional family agriculture and high rates of urban growth); nor of environmental consequences (the destruction of natural vegetative cover, liberation of large amounts of CO₂ into the atmosphere, erosion and impoverishment of soils from

¹ This paper is a product of the project *Population Redistribution and Environment in São Paulo and the Center West* carried out in the Population Studies Center (1997–2001), with the support of the Brazilian Ministry of Science and Technology (MCT/Finep/Cnpq). For earlier analyses of the urban dimension of these changes in São Paulo, see Hogan, Carmo, Alves and Rodrigues, 1999; Hogan, Cunha, Carmo and Oliveira, 1999.

² We consider a somewhat larger region than that defined in traditional Brazilian statistical reports. The "*amplified Center-West*" includes, besides Goiás, Mato Grosso, Mato Grosso do Sul and the Federal District, the states of Rondônia and Tocantins. This region corresponds to an area ecologically and economically more homogeneous than traditional definition allows.

³ R.E. Bilsborrow, D.J. Hogan (eds.), *Population and deforestation in the humid tropics*. Liège, IUSSP, 1999.



Fig. 1. Brazil. 1 – Brasil's Center West
Brazylia. 1 – Region Środkowo-Zachodni

soybean monoculture). The fact that the *cerrado* and the Amazon Forest are contiguous means that "border effects" of burnings in the former affect the latter.

This paper discusses the process of economic and demographic expansion of the Center-West region of Brazil in recent decades, taking into account the relations, specific characteristics and implications in terms of the uses and the spatial pattern of occupation of the region, as well as environmental impacts. We demonstrate how the introduction of a new production model has reconfigured the earlier form of land use, from both economic and demographic perspectives. We also discuss the new characteristics of population dynamics, most especially migration. We use information derived from the *Demographic Censuses* of 1970, 1980, 1991 and 2000; the *Population Count* of 1996; the *Agricultural Censuses* of 1985 and 1995/96; and data from the satellite monitoring of large-scale burning.

From the perspective of population change, this process has led to growing urbanization. An extensive and highly mechanized crop such as soybeans disarticulates earlier forms of settlement, based on small farms, and results in lower labor requirements, provoking population movement toward cities. The expansion of cattle raising into large areas has similar effects. In this new economic situation, the role of cities is also modified, now generally subordinated and dependent on rural activities, with the exception of the region's largest urban agglomerations, such as state capitals and the Federal District.

The paper will first present an environmental description of the region; the economic importance of grain (especially soybean) production will be briefly discussed; the population movements which accompanied this process will be analyzed; and, finally, we present some considerations on possible alternatives. Unlike earlier processes of frontier settlement marked by migration of agriculturalists to new lands and later urbanization fed by rural-urban migration, the Center-West experience was extremely concentrated in time. The same generation of migrants who have swelled the Center-West's population in this period now seek a living in the region's cities. The Center-West was 83.5% urban in 2000. Thus, this is not a replay of similar processes in the past (in Brazil and other areas). What are the consequences for urbanization patterns, migrant adaptation, insertion into the national economy and environmental integrity of a process whose cycle of settlement/exodus, combined with environmental transformations wreaked by high tech agriculture in virgin lands, has been so concentrated in time? This paper raises more questions than it answers but is a necessary first step in posing these questions.

2. THE ENVIRONMENTAL TRANSFORMATION OF THE *CERRADO*

The Center-West includes two of Brazil's major ecosystems, the savanna-like *cerrado* and the *Pantanal*. While the *Pantanal*⁴ is nationally and internationally recognized as one of the world's most important wetlands, enjoying special protected status under Brazil's constitution, the *cerrado* has been consistently under-valued. Considered as unproductive for farming until the use of modern methods since 1970, the *cerrado* has always been considered as not worth preserving. The *cerrado*, with an almost entirely tropical climate, is a complex of different forms of vegetation which have variable physiognomies and floristic compositions, forming an ecological mosaic. According to R. Goodland and M.G. Ferri (1979), the *cerrado* is "a mixture of low trees and a well developed herbaceous strata" (cited in SMA, 9)⁵

Gold and diamond mining brought the first non-Indian populations to the region in the 18th century. When the mining cycle ended, the region remained isolated from the major population and economic centers of Brazil. This was

⁴ The Pantanal is the largest wetland in South America, with 140,000 km² in Brazilian territory. It is home to 650 species of birds, 80 species of mammals, 260 species of fish and 50 species of reptiles. Unplanned settlement of upland regions, where most of the rivers which flow into the Pantanal have their source, has already had deleterious effects. Other threats to ecological integrity are agricultural chemicals, erosion, gold mining, construction of hydroelectric plants and tourism. Nevertheless, the Pantanal is more preserved and more protected than the *cerrado*, which is the region which most suffered from the economic transformations of the late 20th century. This paper will concentrate on this second process.

⁵ The core of the *cerrado*, considered the most characteristic and continuous portions, occupies 1,500,000 km² in the Central Brazilian Plateau, in the states of Goiás, Tocantins, Federal District, part of Minas Gerais, Bahia, Mato Grosso, Mato Grosso do Sul and part of Maranhão, Piauí, and Rondônia. Unconnected portions, forming islands of *cerrado*, are found in Amazonas, Amapá, Roraima, Alagoas, Bahia, Ceará, Paraíba, Pernambuco, São Paulo and Paraná. This fact, in addition to biological and political differences in defining *cerrado*, has led to a range of estimations of total area.

a period dominated by subsistence agriculture and extensive grazing. With the rise of the steel industry in Minas Gerais in the nineteen forties, the natural vegetation of the *cerrado* began to be devastated to produce charcoal. The construction of Brasilia (1960) was a decisive step in ending the relative isolation of the region.

Since then, and especially since the seventies, when soil management methods were developed for the region⁶, the *cerrado* has been definitively incorporated into the national economy, and is now seen by planners, investors and farmers as unoccupied and available for agroforestry, cattle raising and large-scale grain production. The intensive use of machinery and agricultural equipment, fertilizers, pesticides, herbicides and selected species have transformed the natural landscape of the region, frequently leading to the depletion of natural resources (desertification) and the contamination of food, soils and water. The original vegetation has been greatly reduced, 37% having been converted to pasture, annual crops such as soybeans, corn and rice and perennial crops such as eucalyptus and pine plantings, as well as such urban-generated land uses as reservoirs, cities and garbage disposal. In many areas, environmental degradation has already produced decreasing productivity and greater costs. These agricultural activities were rarely introduced with any environmental concern. Local varieties of plants were ignored and instead of adapting farming to the characteristics of the region, especially to the soil, the region's characteristics were adapted to the products (Shiki 1997). The result has been compacting of soils, erosion and the genetic impoverishment of the native biota.⁷

The use of fire to clear virgin land and for annual maintenance has been one of the most destructive tools in the transformation of the region. While the Amazon region has been most affected, the *cerrado* and all other ecosystems also suffer. Forest burning, in the Brazilian Amazon alone, represents 4 to 5% of the annual global flux of carbon to the atmosphere resulting from human activities⁸, with negative results for climate change, human health and soil quality. Regular satellite monitoring of burnings has been carried out in the nineties and particularly detailed information is available for the most recent peri-

⁶ Government policy was fundamental to this process. Embrapa, a research arm of the Ministry of Agriculture, created in the early 1970s, soon developed varieties of soybeans adapted to the climate and soils of the *cerrado*.

⁷ An example of inadequate soil use is soybean production in the headwaters of the Taquari, in the North of Mato Grosso do Sul. "*The plantations provoke erosion and silting of the river, which result in floods in the Pantanal. To avoid the floods on their properties, farmers dredge the river and end up blocking off its affluents. This then diminishes the oxygenation of the water and kills fish, leading to loss of biodiversity in the river.*" (WWF, 2001)

⁸ D.C. Nepstad, A.G. Moreira and AA Alencar, *Flames in the Rain Forest: origins, impacts and alternatives to Amazonian Fire*. The Pilot Program to Conserve the Brazilian Rain Forest. Brasília, 1999.

⁹ The principal source of information on burnings in Brazil is the Program for Monitoring, Prevention and Control of Burnings in the Ministry of Agriculture, developed by Embrapa Satellite Monitoring. This program includes research to characterize the most critical areas in terms of the occurrence of burnings in Brazil. The research considers the spatial and temporal concentration of burnings, trends in burnings and employs various spatial categories (states,

od.⁹ As the following table shows, burnings increased in all regions in this period; for the *cerrado*, however, the number more than doubled, approaching the number of fires in the Amazon (Table 1). The region increased its share of the national total from 37% to 48% between 1997 and 1999. When we examine the differences among the states of the Center-West, Mato Grosso stands out as the most serious case – due to forest clearing for lumber in the still virgin areas in the Amazon portion in the state’s Northern region (Table 2). But increases have been dramatic in all of the states. The increase in the number of quadrants where fires occurred, while considerable, was less dramatic than the number of total fires, suggesting a concentration of fires – although the affected areas are expanding.

This has been a rapid process: registered agricultural establishments increased their share of the Center-West region’s territory from 25% (40.3 million hectares) in 1950 to 70.7% in 1980 (113.4 million hectares). On the other hand, lands actually under cultivation (pastures, annual and perennial crops and reforestation) increased from less than 0.3% in 1950 to over 24% in 1985. The case of soybeans is emblematic of this process: cultivated area increased from zero in 1950 to 5 million hectares in 1989, which represented 42% of national production (WWF, 1995). The difference between total farmland and cultivated land shows the very significant potential which remains for agriculture expansion – and, by extension, the possibilities of preservation.

The most recent data available on land use are from the 1995–1996 Agricultural Census, presented in Table 3, which compares data from the previous census in 1985.

According to the World Wildlife Fund¹⁰, considering the many large agricultural and transportation infrastructure projects now underway, the *cerrado*’s days are numbered. WWF’s optimistic projections in 1995 were that by 2000, 45.4% of the *cerrado* would be converted to other uses (WWF, 1995). The WWF’s most recent report affirms that 40% of the original vegetation has been completely eliminated by agricultural activities and cities, while another 40% is degraded but recoverable (WWF, 2001). A recent workshop promoted by the Environmental Ministry’s *Probio* initiative, on the basis of methodology developed by Conservation International, concluded that only three localities with large extensions of relatively conserved lands remain: near the border between Piauí, Maranhão and Tocantins; near the border between Tocantins and Mato Grosso; and in the Pantanal in Mato Grosso do Sul. According to studies by the IBGE and INPE (the National Institute for Space Research), these areas represent 5% of the original extension of the *cerrado*. Worse yet, 25% of deforested areas today have no economic utility.

municipalities, ecosystems, river basins and development corridors as proposed in the National Development Plan). Information is presented in quadrants 10 km by 10 km. These data are available at http://www.queimadas.cnpm.embrapa.br/qmd_2000/index.htm.

¹⁰ See www.wwf.org for information on the *cerrado*, the *Pantanal* and preservation projects now underway.

Table 1. Burnings in selected ecological systems, Brazil, 1997–1999

Vegetation type	Area (km ²)	Number of quadrants with fires			Total number of fires		
		1997	1998	1999	1997	1998	1999
Amazon Forest	109,412.54	4,512	4,954	5,252	24,939	37,481	35,234
Seasonal Forests	112,038.05	4,046	6,809	6,352	15,404	30,968	34,960
Cerrado	5,679.00	3,982	5,163	7,155	11,495	27,667	27,882
Atlantic Forest	15,335.33	71	114	388	141	337	1,027
Other	1,459,924.90	1,416	7,134	2,874	3,135	5,921	13,546
Total	1,696,710.95	14,027	19,285	22,021	55,114	102,374	112,649

Source: http://www.queimadas.cnpm.embrapa.br/qmd_2000/index.htm

Table 2. Burnings in Center-West states, 1997–1999

States	Area (km ²)	Number of fires			Number of quadrants with fires		
		1997	1998	1999	1997	1998	1999
Tocantins	269,404.65	3,478	10,780	6,605	1,020	1,774	1,580
Rondônia	231,257.62	1,586	4,741	4,874	572	929	943
Mato Grosso do Sul	347,264.09	1,553	1,837	9,926	543	680	1,676
Mato Grosso	879,223.28	16,405	33,373	39,542	3,437	4,267	4,929
Goiás	339,727.72	1,929	6,677	4,523	824	1,684	1,525
Federal District	5,645.00	20	104	48	11	34	20

Source: http://www.queimadas.cnpm.embrapa.br/qmd_2000/index.htm

Table 3. Land use in Central-West states, Brazil, 1985 and 1995/96 (%)

State	Years	Land Use									Total (hectares)
		Crops			Pasture		Woods and Forests		Unused produc- tive lands	Unusable lands	
		Perma- nent	Tem- porary	Tem- porary in fallow	Natural	Planted	Natural	Planted			
Rondônia	1985	3.6	5.2	1.4	3.7	14.6	67.5	0.1	1.5	2.5	6,032,647
	1995/96	2.9	2.0	0.8	3.9	29.0	57.3	0.5	2.7	1.1	8,890,440
Tocantins	1985	0.3	3.5	2.8	42.4	19.0	16.8	0.0	10.4	4.9	17,354,400
	1995/96	0.1	1.5	2.1	34.6	31.5	18.1	0.0	7.8	4.3	16,765,716
Mato Grosso do Sul	1985	0.1	6.0	0.6	31.0	39.0	13.4	1.5	1.9	6.4	31,108,811
	1995/96	0.1	4.4	0.4	19.7	50.8	18.4	0.6	1.3	4.4	30 942 772
Mato Grosso	1985	0.4	5.3	1.1	25.6	17.8	37.3	0.1	5.8	6.7	37,835,647
	1995/96	0.3	5.7	1.0	12.6	30.8	42.7	0.1	2.8	4.0	48,939,511
Góias	1985	0.2	7.1	1.7	31.7	36.3	10.8	0.2	6.3	5.6	11,985,783
	1995/96	0.2	7.7	0.9	18.7	51.9	13.7	0.3	2.0	4.5	27,472,648
Federal District	1985	2.7	24.5	2.3	25.1	20.3	6.8	7.5	4.6	6.2	313,822
	1995/96	2.1	25.0	2.0	13.9	25.5	11.3	8.2	4.8	7.4	244,930

Source: IBGE, Agricultural Censuses, 1985, 1995/96

Environmental concern is related to three major questions:

1. **Biological diversity:** the *cerrado* is home to an estimated 420 species of trees, 10,000 different species of plants and 800 species of birds; 40% of its woody plants and 40% of its bees are endemic. It is the world's most biologically diverse savana, home to at least 5% of the planet's flora. One of the so-called biodiversity *hotspots* of the world, the *cerrado* is one of the most threatened biomes of the planet.

2. **Carbon sequestration:** although it has not yet received much attention, the capacity of the *cerrado* to store carbon is immense. While it does not have dense forest, this is compensated by its enormous size and a vegetation with deep roots, forming an "*underground forest*," which makes a significant global contribution as a carbon sink (Sawyer, 2001).

3. **Watershed protection:** the sources of the three major Brazilian and South American river basins – the Amazon, the Rio de la Plata, and the Rio Sao Francisco – are located in this region. Large-scale transformation of land use will have continental consequences in terms of water supply and quality. This biome also plays an important role in the support of biodiversity in general, inasmuch as its river network functions as a corridor for fauna and genetic exchange.

The rapid expansion of agriculture was accompanied by population growth in all areas of the *cerrado*. During the last 40 years, migration led to a six-fold increase in population. Contrary to expectations, however, this population growth was concentrated in cities. Earlier settlers were pushed off the land and newer land-seeking migrants were unsuccessful in the face of the low labor demands of high tech agriculture. Besides the unemployment and underemployment which resulted, urban growth further intensified several kinds of environmental impacts in cities and in their immediate hinterlands: deforestation to obtain firewood and wood for construction; increasing water demand; contamination of rivers by sewage (in the region's cities, only 38.3% of households were connected to the sewage collection system¹¹) and of the soil by inadequate disposition of solid waste; air and noise pollution provoked by vehicular traffic, especially trucks transporting grains to markets; and the construction of dams for hydroelectric plants.

3. THE ECONOMIC TRANSFORMATION OF THE CENTER-WEST

In the 1960s the Center-West region underwent an intense process of modification of its productive base, encouraged by government actions which sought to modernize farming and cattle-raising and to integrate the region with national and international markets. Technologies were developed which permitted large-scale agriculture on the region's soils and the flat topography was ideal for grain monocultures. The Center-West became the principal agricultural frontier in the country and a process began which led to current production levels: the Center-West is today responsible for more than 40% of soybean production in Brazil,

¹¹ IBGE, PNAD (National Household Survey), 1997.

Table 4. Soybean production by region and major soybean producing states in Brazil's Center-West, 1977–79 to 1998–2000, three-year averages (in thousands of tons)

Region/state	1977–79	1980–82	1983–85	1986–88	1989–91	1992–94	1995–97	1998–2000
Center-West	739.3	2,128.3	4,179.5	5,859.6	7,215.0	8,568.1	9,789.7	13,530.5
Mato Grosso	161.3	235.9	1,064.5	2,349.0	3,065.8	4,217.5	5,282.7	7,398.7
M.G. do Sul	660.5	1,382.9	2,088.2	2,252.5	2,364.7	2,199.4	2,209.4	2,430.1
Goiás	137.7	484.8	963.8	1,171.8	1,683.3	2,053.0	2,219.1	3,620.8
North/Northeast	-	2.1	41.8	247.7	557.0	778.5	1,192.7	1,861.5
Sul-Sudeste	9,951.0	12,290.6	11,806.9	10,028.0	12,036.3	13,159.9	14,112.2	15,865.8
Brasil	10,690.3	14,421.0	16,028.3	16,135.3	19,808.3	22,506.6	25,094.6	31,257.8

Source: Companhia Nacional de Abastecimento (CONAB), apud Freitas, Barbosa e Franca (2000).

Table 5. Population growth, Center-West Region, Brazil, 1970–2000

State	Population				Annual Growth Rates (%)		
	1970	1980	1991	2000	1970–1980	1980–1991	1991–2000
Rondônia	111,064	491,069	1,132,692	1,377,792	16.0	7.9	2.2
Tocantins	516,447	743,750	919,863	1,155,251	3.7	2.0	2.6
Mato Grosso do Sul	998,211	1,393,019	1,780,373	2,075,275	3.4	2.2	1.7
Mato Grosso	598,879	1,138,691	2,027,231	2,498,150	6.6	5.4	2.4
Goiás	2,414,325	3,125,354	4,018,903	4,994,897	2.6	2.3	2.5
Federal District	537,492	1,176,925	1,601,094	2,043,169	8.2	2.8	
Total	5,176,418	8,068,818	11,480,156	14,144,534	4.5	3.3	

Source: IBGE, Demographic censuses 1970–2000; Population Count, 1996.

23% of corn and 20% of rice, coffee and beans. Similarly, the *cerrado* is responsible for over a third of beef and nearly 20% of pork production.

The following decades were marked by the installation of important agro-industrial firms, both Brazilian and foreign, directly linked to state programs of fiscal incentives, investments in infrastructure, subsidized credit and policies of official development agencies.

The increase of Brazilian agricultural exports in these decades, principally soybeans, occurred at the expense of serious environmental and social impacts in the *cerrado*. Land ownership became even more concentrated and agricultural employment declined (WWF, 2001). In 1975, 13% of rural properties in Mato Grosso, for example, were between 100 and 1000 hectares, a proportion which rose to 30% in 1995/96, at the expense of smaller family farms. Between 1985 and 1995/96, agricultural jobs declined by 19% in the Center-West. In Goiás, this decline reached 23%.

In 1995/96, cattle-raising occupied 60% and agriculture 6% of the region, with soybeans leading the way with 3.7%. Brazil, the second largest soybean producer in the world (31.6 million tons per year), exports half of this. In the 1999–2000 harvest, the state of Mato Grosso became the largest soybean producer in Brazil, producing 25% of 31,644 thousand tons, followed by Paraná (22.4%) and Rio Grande do Sul (15.6%). In the last twenty years, the Center-West has become the major soybean producing area in Brazil (Table 4), soaring from an annual production of 740 thousand tons in 1977–79 to 13.5 million tons in 1998–2000. Mato Grosso increased its production in this period from 161 thousand tons to 7.4 million tons.

The 1970s, a turning point for Center-West development, witnessed the "*modernizing march to the West*", directing intense migratory streams to the most promising areas. However, the reduction or even the elimination of financial incentives for frontier colonization, modernization of agriculture and crop substitution, among other factors, led to the slowing of migration beginning in the second half of the 1980s.

4. MIGRATION TO THE CENTER-WEST REGION, 1970–1991

The Center-West began to have significant population increases in the 1950s, when growth rates of the previous decade (3.5% per year) increased to over 5.4% per year. In the following decade, the resident population of the region grew even more rapidly, at 5.6% per year. The average annual growth rate, while continuing very high, decreased slightly, although the states of Rondônia and Mato Grosso continued to grow at elevated rates, a situation which continued into the 1980s (Table 5).

In the 1980s the region grew at a rate of 3.26% annually. It should be noted that the abrupt decline of the growth rate of the Federal District did not reflect stagnation but the configuration of a metropolitan area, with a redirectioning of population to surrounding areas in the state of Goiás.

Data on interstate migration for the seventies and eighties¹² indicate that there was a significant increase in the volumes of in-migration for almost all states in the country, with the exception of the Federal District. In the Center-West, however, there was also an important increase in out-migration, although this did not imply a reduction of population gains in the larger part of these areas, as can be seen in Table 6.

In this respect, the states of Rondônia, Mato Grosso do Sul, Tocantins and Goiás stand out, in that in comparison to the seventies, they registered increasing gains in the eighties. In terms of the intensity of the phenomenon, however, these gains (with the exception of Tocantins) already showed a certain deceleration. The Federal District, on the other hand, for reasons already mentioned, and Mato Grosso, as a result of the more precocious end to its frontier settlement process and of the growth of cattle-raising, were exceptions to this trend. Both states saw declines in net migration in the period.

We should not lose sight of the fact that in this period the increase of out-migration already reflected the impact of the transformations mentioned above and, to the contrary of what happened in the seventies, was composed of return migrants.

G. Martine (1994) predicted this reduction of the migratory attraction of the agricultural frontier after 1986 (even before these detailed data were available), in function of a series of factors, among them the end of important projects such as the *Polonorte*, of government subsidies for colonization projects and agricultural investments, the lack of adequate technological solutions, etc. Besides this, as C.A. Pacheco (1998) has observed, the eighties were marked by a substantial change in the agriculture sector of the Center-West, such as the growing importance of more dynamic crops and of modern forms of production. Soybeans and the expansion of cattle-raising have had significant impacts on the region's capacity for absorbing migrants, who no longer enjoy the possibilities which existed earlier in the region. This transformation is the basic explanation for the high degree of circulation of migrants.

As for out-migration, the Federal District experienced an increase in the number of out-migrants, a fact which reflects to a considerable extent the migratory streams to its surrounding areas located in the state of Goiás. In this case, migration is much more an intra-regional than inter-state question.

¹² In view of the differences in the census information, the data analyzed in this section are different from those in the following section. In the present case, migration was defined on the basis of information on last residence, while in the following section the migrant is defined by residence on a fixed date. Besides the time differences, then, the first referring to an inter-censal period and the second to the five years prior to the census, the definitions are conceptually distinct. Nevertheless, with due caution, they can be usefully compared. It is also worth noting that data on fixed date do not permit including children under 5 years of age, which implies that the volumes derived from this information do not include this subgroup of migrants. The justification for using different concepts is related to the information available in the 1996 Population Count (fixed date). For more details, see J.M.P. Cunha and F. Silveira (1999) and J.A.M. Carvalho and J.I. Rigotti (1997).

Table 6. Internal migration, Center-West Region, Brazil, 1970-1991

States	In-migration		Out-migration		Net migration*		Average annual rates**			
							In-migration		Out-migration	
	1970-80	1981-91	1970-80	1981-91	1970-80	1981-91	1970-80	1981-91	1970-80	1981-91
Rondônia	287,874	416,207	20,988	157,951	266,886	258,256	12.33	5.58	0.90	2.12
Tocantins	92,822	159,291	87,116	144,704	5,706	14,587	1.50	1.93	1.41	1.75
Mato Grosso do Sul	298,864	271,923	204,669	237,430	94,195	34,493	2.53	1.73	1.74	1.51
Mato Grosso	328,376	543,187	121,456	244,434	206,920	298,753	3.98	3.58	1.47	1.61
Goiás	309,717	520,356	323,859	345,181	-14,142	175,175	1.13	1.47	1.18	0.97
Federal District	483,212	354,920	177,024	340,098	306,188	14,822	6.08	2.59	2.23	2.48
Total	1,800,865	2,265,884	935,112	1,469,798	865,753	796,086	2.79	2.35	1.45	1.53

Source: IBGE, Demographic censuses, 1980, 1991.

*From the demographic point of view, the differences between in-migration and out-migration cannot be considered as net migration. For convenience and because more adequate estimates are not available, the differences between in-migration and out-migration were calculated to show, even though only approximately, the result of the migratory process in the states.

**Number of migrants per 1000 population. The denominator of this rate is the geometric average of the population in the period.

In terms of migratory streams, the Center-West had, in the seventies and eighties, important population exchanges with various states of the Northeast and of the Center-West itself, as well as Paraná, Minas Gerais and Sao Paulo. Migrants from Minas Gerais and Paraná had already reduced their share of migration to the region, due to their decrease in out-migration in general, stemming from their own economic development, especially in their metropolitan areas. Another important aspect is *intra-regional* migration, which, on the one hand, clearly reflects the path of expansion of the frontier to the region's North, implying important migratory streams from the states of Mato Grosso do Sul and Goiás to Mato Grosso, Rondônia and Tocantins. In this last case, the construction of the capital city of Palmas (Tocantins achieved statehood in the late eighties) was important. On the other hand, the intra-regional origin of migrants also reflects population transfers from the Federal District to the state of Goiás, to a great extent directed to the Brasília-Goiânia corridor, especially to the area known as the *Entorno* of the Federal District.

While Minas Gerais and especially Paraná reduced their out-migration to the Center-West, they received progressively more migrants **from** this region, evidence that the regional migratory process was marked by clear counter-movements which intensified in the eighties, without, however, modifying the composition of their population movements according to destination, compared to what occurred in the seventies.

It is important to consider the principal cause of the increase in out-migration and an aspect of the migratory process which gained in importance in the eighties in all of Brazil: return migration. Data calculated for the Center-West states show that, compared to the seventies, return migration, both **from** (return to other states¹³) and **to** the region (the return of natives to Center-West states), increased considerably. The total number of persons residing in some Center-West state who returned to their state of origin in the eighties was approximately 453,000 persons versus fewer than 159,000 in the seventies; the same situation holds for migrants who returned from other regions to some state of the region, that is, just over 75,000 in the seventies and 219,000 in the following decade.

Besides this considerable increase, which is one of the most typical characteristics of Brazilian migration in the eighties, it is interesting to observe the weight of return migration in the volumes of in and out-migration for the Center-West in this period. From this perspective, we can conclude that the greater part of out-migration from the Center-West in the eighties was due to return migrants. This was not true of in-migration which was less affected by return migrants. It is worth emphasizing (Ribeiro 1997) that this direct impact does not permit an estimation of the true effect of return migration, since it does not include family members (generally children) who were not born in the same place as the father (indirect effect). Thus, the data are a conservative indication of the importance of return migration for regional out-migration.

¹³ Included in this group are those migrants who returned to other states of the Center-West itself.

Summarizing internal migration for the Center-West in the twenty years considered here, there are two major factors: the first related to the process of the settlement and expansion of agricultural frontiers and the second related to the growth of urban agglomerations (analyzed below), in general led by the state capitals. Both the "path" to the frontier and the "explosion" of the largest centers, in the eighties, were decisive processes for explaining the differential behavior of demographic growth of the Center-West states.

Mato Grosso and Rondônia are the best examples of this process: they combine areas of high demographic growth, clearly related to the expansion of the agricultural frontier, with areas where growing urbanization is related to the process of concentration and development of a more complex urban dynamic¹⁴. However, the tendency toward the deceleration of in-migration to these states is a fact consistent with the perspectives of the slowdown of expansion and settlement of the frontiers. The empirical evidence is also clear in indicating the trajectory of the frontier toward the North of the region in the eighties.

In Goiás, as well as in Mato Grosso do Sul, where settlement – especially of the frontier – had been consolidated in the seventies, the demographic dynamics of areas such as Goiânia, the *Entorno* of Brasília and Campo Grande are the other side of the coin of the process of Center-West settlement. It is especially important to emphasize that the behavior of these areas contributed decisively to reverse the net population loss of the seventies.

The perspectives for the nineties, as shown in the data from the 1996 Population Count, are that the Center-West and all of its states are no longer so clearly areas of migratory attraction but regions of considerable population circulation, where in-migration and out-migration have large volumes, without one predominating over the other. Return migration is one of the fundamental components of this process.

Thus, besides reflecting concomitant processes of redirectioning settlement to the North and of the slowing down of the pattern of frontier expansion, leading to re-migration to the more developed areas of the country, this fact reinforces an aspect of migratory movements which has been growing in Brazil, which is the low degree of stability of migrants resulting in greater circularity of migratory movements. These and other questions will be dealt with in the following section.

5. MIGRATION TO THE CENTER-WEST, 1986–1996

Table 6 in the last section shows that the behavior of growth rates of the Center-West states in the nineties corroborates what had been predicted, especially by G. Martine (1994), that the region is no longer as dynamic as in the recent past. Except in the case of Tocantins, which increased its rate in this pe-

¹⁴ Although considered separately, it is very difficult to know to what point urbanization processes, for example, of Cuiabá or Porto Velho, are not also related to the significant flow of migrants "expelled" from the frontier, a process which is not new in the region (Salim 1992).

riod, and Goiás and the Federal District which practically stabilized their intensities of population increase, in the remaining states the reduction is obvious and significant. Such behavior, of course, partly reflects the reduction of fertility which, as in all of Brazil, also fell significantly in the areas under consideration (*Codeplan and IBGE, 1999*). Nevertheless, the declining trend of in-migration to the region is the major factor.

The data suggest clearly that the eighties were a period of inflection of certain trends in the spatial distribution of population in the Center-West, particularly those related to the settlement process of the agricultural frontier. With the exception of the state of Tocantins which is still in the phase of settlement and consolidation of its territory, all of the other states significantly reduced their volumes and rates of population gains. In the case of Rondonia there was also a change in profile, no longer – as in the seventies – one of the more attractive areas, but experiencing net population loss.

The data in Table 7 show this trend clearly. When compared with Table 6, this information suggest that, effectively, there was a slowdown of the regional settlement process as of the mid-eighties, which we can see clearly if we compare the values of the volumes and intensities of these phenomena with those of the 1980–91 period. The states most directly related to the expansion of the agricultural frontier – Rondonia, Mato Grosso and Mato Grosso do Sul – experienced a visible slowing of migration, both in absolute¹⁵ and relative terms.

Other states such as Goiás and the Federal District – especially the latter, whose demographic growth was much less influenced by the dynamics of frontier settlement – maintained in the nineties migratory volumes and intensities similar to the eighties. In the first case, as can be seen below, a good part of this migratory dynamism is due to the growth of the so-called *Entorno* of the Federal District, an area which today constitutes a metropolitan region of the same name. In the second case, in spite of its spreading into Goiás, the Federal District remains a major migration destination for streams from various regions of the country. This has been a relatively constant phenomenon since its creation in 1960.

In the case of Rondonia, its average annual in-migration rate declined from 5.6% in the 1981–91 period to under 2.2% between 1986 and 1991, declining further in the nineties to 1.1%. This behavior also reflects the marked decline in the volumes of in-migration. Out-migration also declined, although to a lesser extent; the volume in the nineties fell by approximately 30% compared to the second half of the eighties, versus 50% for in-migration. It is therefore quite clear that for this state the period analyzed here registered a significant slowdown of

¹⁵ In this case, since the data in Table 6, besides being of a different nature, refer to a different time period, the solution used to compare volumes was to observe the average annual number of migrants. The qualifications registered earlier, as to a perfect comparison with the data in Table 6, merit repetition, especially with respect to the non-consideration of children under age five in the second table.

Table 7. Internal migration, Center-West Region, Brazil, 1986–91 and 1991–96

States	In-migration		Out-migration		Net migration*		Average annual rates**			
							In-migration		Out-migration	
	1986/91	1991/96	1986/91	1991/96	1986/91	1991/96	1986/91	1991/96	1986/91	1991/96
Rondônia	127,061	64,928	94,462	67,428	32,599	-2,500	2.2	1.1	1.7	1.1
Tocantins	82,327	84,747	71,804	55,901	10,523	28,846	1.8	1.6	1.6	1.1
Mato Grosso do Sul	124,046	87,374	105,021	72,748	19,025	13,626	1.4	0.9	1.2	0.8
Mato Grosso	226,905	150,421	118,332	110,026	108,573	40,395	2.2	1.4	1.2	1.0
Goiás	268,063	288,648	156,665	137,313	111,398	151,335	1.3	1.3	0.8	0.6
Federal District	195,233	166,849	143,670	147,697	51,563	19,152	2.4	1.8	1.8	1.6
Total	1,023,635	842,967	689,954	592,113	333,681	250,854	1.8	1.3	1.2	0.9

Source: IBGE, Demographic census, 1991; Population Count, 1996.

*See note in Table 6.

**Number of migrants per 1000 population. The denominator of this rate is the geometric average of the population in the period.

the settlement process, reflecting not only the considerable drop in its population growth rate but principally in the progressive decline of in-migration.¹⁶

In the nineties family composition of migration to the region also changed, with a decline in family migration (Cunha 2000, p. 86–87). This is consistent with the decline of migration to frontier areas, which reduces the importance of families – the predominant form of migration to colonization or settlement zones.¹⁷

One key element in understanding migrant adaptation in the area of destination is occupational status in terms of the kind of work relations (Table 8 and 9). From this point of view, the relations between the processes which structured the territory of the Center-West and migratory movements become more visible and concrete. As will be seen below, the profile of in-migration in each of the states reflected its role in the regional scenario. In this paper, as a first approximation, we analyze the census information on "*condition of occupation*"¹⁸ because it gives us a synthetic view of how the migrant is inserted in the state productive structure.

The data on Center-West states reveal a very peculiar picture which clearly reflects the form of settlement of these areas and their principal elements of attraction, especially frontier expansion and the growth of urban centers. The relation between frontier expansion and the profile of migration according to this variable is clear. In precisely those states where migration was most intense – even though declining – (Rondônia, Tocantins and Mato Grosso), greater proportions of household heads were registered in the category "*autonomous or self-employed in agriculture*". The proportions of this type of insertion in the seventies were much higher than those in the following decade, which is consistent with the trend of the slowdown of the traditional type of settlement of the region. Although information on Tocantins is not available, this difference was very important in Rondônia and Mato Grosso (51% and 33%, versus 21% and 10%, respectively). This decline in the importance of the self-employed meant that the proportions of sharecroppers and migrant workers increased in these decades; in the nineties, these represented approximately 12%.

Thus, these two categories together represent almost a fourth of in-migrant family heads for these decades. Compared to the lesser weight of these categories in the other states of the country, especially the Federal District and Mato Grosso do Sul, where we know that the economic processes were different, the importance of unpaid agricultural activity in these areas is underlined. This question

¹⁶ For a state by state analysis of migration trends and their regional composition (Cunha 2000 pp. 65–77; Cunha, Silveira 1999).

¹⁷ J.M.N. Sydenstricker (1992), in his study of Machadinho in Rondônia, showed that although the family head often arrived first to settle his plot in a colonization project, final settlement was almost always by families. As soon as the first settler (generally male) was minimally established, the family, fragmented at the moment of the decision to move, was reunited.

¹⁸ This variable distinguishes employees, employers, self-employed, sharecroppers and domestic workers. In the case of the "*employee*" category, where the activity sector is not obvious, we have specified the type of activity, using the traditional division of primary, secondary and tertiary.

Table 8. Migrant household heads by family status, Central-West states, Brazil, 1991 and 1996 (%)

State	Period	Single-person household	Married without children	Married with children	Extended families	Household head with children	Others	Total
Rondônia	1986/91	13.1	28.5	36.1	5.1	5.7	11.7	37,246
	1991/96	16.4	17.2	32.9	9.8	5.7	18.0	18,773
Tocantins	1986/91	11.4	27.2	34.9	7.3	6.3	12.8	23,812
	1991/96	16.4	16.2	28.3	11.1	6.1	22.0	23,995
Mato Grosso do Sul	1986/91	14.0	28.6	35.7	4.5	5.4	11.8	39,765
	1991/96	20.1	18.9	30.7	8.8	5.4	16.3	28,353
Mato Grosso	1986/91	13.8	27.9	36.1	5.0	5.0	12.3	69,123
	1991/96	18.8	18.8	32.1	9.2	4.8	16.3	47,186
Goiás	1986/91	12.7	26.9	32.6	6.6	7.8	13.4	78,580
	1991/96	14.7	20.4	28.5	9.8	6.3	20.3	85,542
Federal District	1986/91	18.4	25.6	24.4	5.2	7.3	19.0	47,576
	1991/96	17.3	13.2	14.6	13.6	3.4	38.0	42,804

Source: Demographic census, 1991; Population Count, 1996. Special tabulations, Population Studies Center, State University of Campinas.

Table 9. Migrant household heads by occupational position, Central-West states, Brazil, 1980 and 1991 (%)

Occupational position	Rondônia		Tocantins		Mato Grosso do Sul		Mato Grosso		Goiás		Federal District	
	1980	1991	1980	1991	1980	1991	1980	1991	1980	1991	1980	1991
Migrant farmworker	3.0	2.9	-	6.1	3.0	2.3	2.7	3.4	3.5	4.3	0.1	1.5
Sharecropper-employee	0.5	3.1	-	3.1	0.7	0.4	0.4	6.4	0.4	1.6	0.0	1.3
Sharecropper-autonomous, employer or self-employed	2.3	6.7	-	2.8	2.6	0.3	2.6	2.2	2.1	0.8	0.1	0.5
Domestic worker – employee, autonomous or self-employed	-	2.1	-	1.4	-	2.4	-	2.2	-	4.6	-	7.7
Autonomous or self-employed in agriculture	51.4	21.2	-	13.5	13.2	3.8	33.3	10.2	15.1	2.1	0.6	0.4
Autonomous or self-employed in other activities	13.0	17.7	-	21.2	15.2	15.0	15.8	16.8	19.0	21.2	10.2	14.7
Employer	3.8	4.5	-	9.2	6.9	8.7	5.0	7.7	5.3	4.3	1.9	1.9
Unsalariated worker	0.9	0.9	-	0.5	0.4	0.4	0.4	0.5	0.3	0.3	0.3	0.5
Employee in industry	7.6	10.2	-	9.8	13.3	12.9	9.5	14.5	15.4	18.1	18.5	14.1
Employee in sales and services	12.4	27.6	-	24.8	25.5	34.6	15.2	24.0	26.0	35.4	66.3	53.7
Employee in poorly-defined sectors	0.5	0.5	-	0.3	0.5	0.2	0.4	0.2	0.2	0.2	0.2	0.4
Employee in farming	3.2	0.6	-	2.2	8.1	4.3	9.5	4.6	6.0	2.2	1.1	2.1
Employee in cattle-raising	1.0	1.6	-	5.1	9.5	12.3	6.0	5.3	5.6	4.0	0.5	1.0
Other agricultural employees	0.4	0.7	-	0.2	1.1	2.0	0.8	1.7	0.9	1.0	0.2	0.6

is even clearer when we observe the negligible weight of the categories "*employed in farming*" and "*employed in cattle-raising*". In any event, it should be noted that these data are clear in the sense of reflecting the slowdown of the settlement of the frontiers, since more than half of in-migrants in these areas in the 1986–91 period were connected to urban activities.¹⁹

The situation is somewhat different in the areas where frontier expansion had little impact or occurred earlier, as in Mato Grosso do Sul. In this state, besides the fact that urban activity was predominant among migrant household heads, there was also an important proportion in cattle-raising, which reflects two characteristic aspects of this state: the development of important urban centers, such as Campo Grande, Dourados and Tres Lagoas and the predominance of cattle-raising activity in rural areas.

Furthermore, the significant proportion of in-migrants who were employers, found in Mato Grosso do Sul, Mato Grosso and Tocantins, reflects the expansion of extensive activities in these areas, such as cattle-raising and soybeans.

In the case of Goiás, the greater relative importance of the autonomous and self-employed categories (in this case, many with urban activities) and the clearly urban activities such as industry, sales and service, reveals the more dynamic side of the state, especially in the Goiania-Brasília corridor. The same can be said in relation to the Federal District, although with a greater emphasis on sales and service activities and domestic workers, which in the latter case is a particularity of Brasília. This result helps to understand, for example, the characteristics of migration from Minas Gerais, Bahia and, especially, Goiás to the Federal District which showed an over-representation of women in young adult ages in the periods 1986–91 and 1991–96 (Cunha 2000).

It is interesting to observe some of the specific aspects of these data disaggregated by migration streams. Thus, besides the general trend of the significant proportion of "*autonomous or self-employed in agriculture*" in all streams, especially those numerically more important, and of the greater participation in sales and services of those who went to Goiás and the Federal District, we can also see that among migrants from the Southeast and especially from the South, the proportion of employers is much greater than in the other streams. Besides this, the participation of sharecroppers and migrant workers is much more intense in the streams which originate in the Northeast, especially in those toward Rondônia and Mato Grosso, facts which also help to understand the character of migration to the Center-West and its clear differentiation in terms of the type of migration and the forms of insertion of migrants.

¹⁹ It should be kept in mind that some of these in-migrants may have changed activity sector after arriving in the area and that the numbers analyzed here do not precisely reflect reality. This issue will be examined in further research in the region.

The data analyzed here are unequivocal as to the generalized trend in the country of the precarious productive insertion of migrants to the Center-West. The high proportions in the autonomous and self-employed in other activities (predominantly urban) reinforces this interpretation, especially when we know that a large share of these in-migrants are low income.

6. URBANIZATION IN THE CENTER-WEST, 1970–2000

As mentioned above, the settlement of the Center-West was concomitant with an accelerated urbanization process. The migration trends described above resulted in a remarkably rapid process of frontier settlement and city growth. Table 10 shows that all of the states of the region – even the newly created Tocantins – were already predominantly urban by 1991. With the exception of the Federal District, as a function of its specific characteristics as national capital, all of the other states went from a predominantly rural to predominantly urban situation in this thirty-year period. Urbanization levels in the region now approximate national levels.

In terms of population concentration in the state capitals, all states but Rondonia show a tendency for population concentration in these largest cities (Table 11). There are two distinct situations to be found when we examine the proportion of the state's **urban** population which resides in these cities (Table 12). Campo Grande and Palmas increased their share of their state's urban population, while Cuiaba, Goiania and Porto Velho showed a decline. This is principally due to the rise and expansion of new urban areas in Mato Grosso and Goias. Goias was affected by the expansion of the Federal District, and much of its urban growth is part of the metropolitan area of Brasilia.

This rapid urbanization reflects both direct migration to the region's cities from other regions of Brazil and rural-urban migration from within the Center-West itself, as a result of migrants' failure to establish farms in the frontier areas.²⁰ In all of the Center-West states the overwhelming majority of migrants resided in urban areas by the mid-eighties (Table 13). This proportion continues to grow in the nineties, revealing the small proportions of migrants who actually managed to enter agricultural activities, and to fix their residence in rural areas.

The data analyzed here are sufficiently clear to show the relations which exist between the characteristics of the migratory movements experienced by the different Center-West states and their processes of development and organization of their productive structures. Even though it is in decline, the frontier settlement process can still be felt in the nineties. However, the new pattern of regional population distribution will be based much more on the growth and consolidation of the larger urban agglomerations, especially those centralized by the regional capitals, most especially Goiania and Brasilia. In the case

²⁰ This issue is important for the larger project from which this paper is drawn and will be examined in the future.

Table 10. Percent urban, Central-West states, Brazil, 1970–2000

State	1970	1980	1991	1996	2000
Rondônia	53.6	46.5	58.2	62.0	64.1
Tocantins	24.7	39.7	57.7	70.7	74.3
Mato Grosso do Sul	45.3	66.8	79.4	83.2	84.1
Mato Grosso	38.8	57.5	73.2	75.8	79.4
Goiás	45.9	67.6	80.8	85.8	87.9
Federal District	96.0	96.8	94.7	92.9	95.7
Total	48.1	67.8	79.2	83.2	85.6

Source: IBGE, Demographic censuses 1970–2000; Population Count, 1996.

Table 11. Proportion of total state population residing in capital city, Central-West states, Brazil, 1970–2000

State	Capital city	1970	1980	1991	1996	2000
Rondônia	Porto Velho	75.7	27.3	25.3	26.6	24.3
Tocantins	Palmas	2.6	8.2	11.8
Mato Grosso do Sul	Campo Grande	14.0	20.9	29.5	31.1	31.9
Mato Grosso	Cuiabá	16.8	18.7	19.8	19.4	19.3
Goiás	Goiânia	15.7	22.9	22.9	22.2	21.8

Source: IBGE, Demographic censuses 1970–2000; Population Count, 1996.

Table 12. Proportion of state urban population residing in capital city, Central-West states, Brazil, 1970–2000

State	Capital city	1970	1980	1991	1996	2000
Rondônia	Porto Velho	80.5	45.1	34.9	32.8	31.0
Tocantins	Palmas	3.6	11.1	15.5
Mato Grosso do Sul	Campo Grande	29.0	30.5	36.7	36.9	37.5
Mato Grosso	Cuiabá	38.0	30.2	26.6	25.2	24.0
Goiás	Goiânia	32.7	33.4	28.1	25.8	24.7

Source: IBGE, Demographic censuses 1970–2000; Population Count, 1996.

Table 13. Proportion of in-migrants living in urban areas, Central-West states, Brazil, 1986–91 and 1991–96

State	Capital city	Percent in-migrants living in urban areas		Number of in-migrants	
		1986–1991	1991–1996	1986–1991	1991–1996
Rondônia	Porto Velho	56.9	63.9	128,262	66,415
Tocantins	Palmas	71.3	84.2	82,510	85,416
Mato Grosso do Sul	Campo Grande	77.0	84.4	128,773	95,300
Mato Grosso	Cuiabá	69.5	70.7	227,644	153,218
Goiás	Goiânia	86.9	91.5	269,212	292,697
Federal District	*	*	*	198,132	171,013

*These data are unavailable.

of Tocantins, the natural tendency to grow as a result of achieving statehood at the end of the eighties has not resisted this slowdown, a fact already observed in the 1996 Population Count.

The trends which were already apparent in the eighties were confirmed in the nineties, pointing to a new phase for the region. With the first settlement phase completed, the region must now confront new challenges, such as maintaining population in the areas settled earlier, resolving problems of the large urban concentrations and of the urbanization process in general.

7. POSSIBILITIES FOR SUSTAINABLE DEVELOPMENT

The picture which emerges from this analysis provokes concern both for environmental integrity and the social welfare of the region's population. The only clear gain over the last thirty years has been in the impressive grain production, now a fundamental part of Brazil's economy. The negative trends are not irreversible, however. The challenge which is posed is how, simultaneously, to stem environmental degradation and create jobs which promote sustainability. Research must be directed to identifying those areas which may still receive migration without provoking more environmental degradation; areas which can at least retain their populations; and those areas which require a re-definition of their economic possibilities. The decline of migration may actually be negative for environmental preservation, since family farms have lower impacts than large-scale agriculture. The search for ways to permit family farms to survive is an essential ingredient in any long-run solution.

D.R. Sawyer (2001, p. 117–126), who has long experience in research and development activities in the region, suggests that the urbanization trends may also be positive for sustainable development. Both because cities make social services more available and because they are an alternative to frontier expansion, viable economic activities must be found for urban as well as rural areas. He makes several specific recommendations:

1. increase productivity of already occupied areas through intensification; frontier expansion will be stemmed and higher productivity will be capable of generating the necessary resources to mitigate environmental damage of more intensive practices;
2. the adoption of *integrated agro-environmental systems*, combining traditional family agriculture with the sustainable exploration of the region's biodiversity. He offers a long list of possibilities which may serve to complement incomes of family farmers;
3. articulate governmental policy initiatives related to the several distinct ecosystems of the region; tax incentives which favor sustainability; programs which support family agriculture; and environmental protection measures. Successful implementation of sustainable development will require concerted action of several different ministries and government departments.

These recommendations are not incompatible with the preservation efforts promoted by environmentalist groups. Particularly important is regularizing land-holding. The chaotic situation of title to land means that in some states there is more land owned than the total territory; any attempts to monitor and control environmental policy require unambiguous identification of who owns what. The WWF also recommends the qualitative improvement of private ecological preserves and incentives for the creation of large ecological preserves (over 300,000 hectares) in the more important remnants of the *cerrado*.

There is growing support for such policies but they are far from unanimous. If it can be shown that both social and environmental ends are served by a set of integrated measures, current emphasis on the expansion of export-oriented monocultures may give way to more sustainable policies.

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DEMOGRAFICZNE, SPOŁECZNE I ŚRODOWISKOWE KONSEKWENCJE ZMIAN UŻYTKOWANIA ZIEMI W ŚRODKOWO-ZACHODNIEJ BRAZYLII

STRESZCZENIE

W ostatnim trzydziestolecu nastąpił szybki rozwój ekonomiczny Regionu Środkowo-Zachodniej Brazylii, który zajmuje 25% powierzchni kraju i obejmuje 6 stanów (ryc. 1).

Artykuł ilustruje proces dynamicznego rozwoju demograficznego i ekonomicznego Regionu w ostatnich dekadach z punktu widzenia zmian w układach przestrzennych form użytkowania ziemi i ich wpływu na środowisko naturalne. Negatywne oddziaływanie tych zmian na środowisko naturalne na ziemiach dziewiczych przejawia się m.in. w zniszczeniu naturalnej pokrywy roślinnej, erozji i zubożenia gleb przez wprowadzenie monokultury soi, a także emisję dużych ilości CO₂ do atmosfery. Autorzy badali jak wprowadzenie nowego modelu produkcji, zwłaszcza zmechanizowanej uprawy zbóż (głównie produkcji soi oraz kukurydzy i ryżu) oraz trzciny cukrowej i bawełny, wpłynęło na przekształcenia wcześniejszych sposobów użytkowania ziemi. Przeprowadzono analizę dynamiki demograficznej i przestrzennych układów migracji, które były głównym czynnikiem procesu przyspieszonej urbanizacji w Regionie. W ostatnich latach migracje do miast nasiliły się, a wskaźnik urbanizacji wyniósł aż 83,5% w 2000 r. W świetle tych zmian, autorzy zastanawiają

się nad tym, jakie są konsekwencje procesów przemieszczeń ludności wywołanych zmianami w sposobach użytkowania ziemi i środowisku naturalnym, poprzez wprowadzenie wysokich technologii w rolnictwie. Pytania o skutki procesów urbanizacji odnoszą się do destabilizacji tradycyjnej rodziny rolniczej oraz do sytuacji migrantów, ich funkcjonowania i adaptacji w nowym środowisku wielkomiejskim. Są to również pytania o przyszłość Regionu w warunkach rozwoju zrównoważonego.

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Madzinge Nembudani

PEOPLE'S PRACTICES, PERCEPTION OF WATER USE AND MANAGEMENT IN THE VHEMBE DISTRICT: LIMPOPO PROVINCE, SOUTH AFRICA

1. INTRODUCTION

Many leading scientists and organizations are concerned about the rapid growth of population and the deterioration of natural resources and the environment human activities cause (Biswas 1997). The increase in population results in higher demand for basic resources like water, wood and land. Consequently environmental degradation occurs, leading to a decline in freedom of individual choice and quality of life. R. Livernash argues that it is not only the number of people that have an adverse effect on the natural environment (Livernash, Rodenburg 1998). It is people's lifestyles, political systems and social structures that define the relationship between population and the environment. Sustainable environmental and water management should be based on social justice, ecological concern and participation, as well as cooperation. Environmental issues need to be put at the center of economic and political decision making in order that full integration of these factors may be achieved (Agenda 21). N.S. Grigg (1995) stated that collaborative decisionmaking with the public should be the mechanism underpinning water management, while laws and regulations should provide a coordinating mechanism. Situations regarding the environment vary spatially, and as a result regionalisation appears to be the right approach in water management.

The legacy of apartheid in South Africa continues to have a serious influence on the way in which communities relate to the environment, water use and resource management. People's practices and perceptions display a lack of sense of identity and belonging regarding shared property and communal resources. In the villages, land is under the custodian of chiefs and therefore it is a common or communal property. Practices like slash and burn and clearing vegetation on mountain slopes have negative impact on the environment and water resources. These practices are either deliberate, or result from ignorance. A shortage of land, for example, has forced people to invade ecologically-fragile areas such as wetlands, watersheds and mountain slopes, that were reserved for nature conservation. Improper methods of cultivation that accelerate soil erosion, and the clearing of vegetation on watersheds and around water sources such as rivers and springs, are common practices. This is worsened by non-implementation of sound water and environmental management policies. Taking into account problems relating to water use and management, a survey on water use and management was conducted in the Vhembe district with the following objectives in mind:

- to investigate people's practices having a negative impact on water resources;
- to test raw water used at household level in order to determine the extent of its biological contamination;
- to determine people's perceptions of water use and health, as well as water management;
- to develop a model for integrated and sustainable water management in the Vhembe district.

2. METHODOLOGY

Both qualitative and quantitative methods were employed when conducting this research. Questionnaires were distributed to 305 households. Interviews were conducted with senior citizens and with selected officials in the departments that deal with water in the Musina, Mutale, Thulamela and Makhado municipalities, as well as with officials in the Department of Water Affairs and Forestry, the Department of Health and the Department of Agriculture. Samples of water from rivers and boreholes were tested in the Department of Water Affairs and Forestry' laboratory at Sibasa.

3. FINDINGS

Data analysis reveals that people's practices leading to environmental degradation and pollution are responsible for negative impacts on water quantity and quality. Past policies played roles in shaping population distribution, density and attitudes towards shared resources. The discussion of the findings of this research first focuses on the causes of environmental and water quality and quantity degradation, and secondly on people's perceptions towards environmental and water management.

4. ENVIRONMENTAL DEGRADATION

Vhembe district is a mainly rural area in which most people are dependent on agriculture for a living. It comprises former homelands and parts of former white South Africa. Gross population density varies between 5 persons/km² in the Musina municipality to 180 persons/km² in the Thulamela municipality. Net population density is, however, very high in the villages, ranging from 698 to 2259 persons/ km² (census 2001). The villages are densely populated because the former Bantustans (areas reserved for blacks) occupied only 13% of the total area. A shortage of land on which to farm in the Bantustans has prompted people to use any available piece of land for farming purposes. Agriculture in the Vhembe district remains the main source of living and survival. People in the Soutpansburg Mountainous areas are seen cultivating ecologically fragile areas such as wetlands, watersheds and high-lying lands that are vulnerable to soil erosion (Mphaphuli [in:] Fairhust *et al.* 1999). Tilling on mountain slopes with-

cut terracing is common in summer and land is cleared from August on, in preparation for summer maize cultivation. Trees are cut down for building materials and firewood purposes. Veld fires, lit without any form of control, are common in August. Proper tilling methods on slopes are not followed, and the terracing that should be carried out to reduce the rate of soil erosion is absent from most areas. Soil is prepared when the ground is very dry after the dry winter season. Veld fires, coupled with improper methods of cultivation on mountain slopes cause the soil to be loose and vulnerable to soil erosion during rainy seasons. Rain is in most cases in the form of storms that result from high temperatures. Heavy loads of soil are washed down slopes and deposited in streams, causing the sedimentation of rivers and dam lakes. Sedimentation causes the deposition of eroded material in rivers, and reduces the volume of water in streams and dams. The soil is repeatedly tilled on the mountain slopes, left without protective vegetation cover and vulnerable to erosion. According to D. Pimentel *et al.* (Biswas 1997), the average soil loss through erosion in African countries is between 20 and 40 tons per hectare per year.

Erosion influences water loss on steep slopes because the increased angle facilitates water flow movement. Vegetation cover reduces and slows the velocity of water running over the soil, and decreases the volume of water lost in surface runoff. According to D. Pimentel *et al.* (Biswas 1997), plant roots enhance water conservation by creating pores in the soil surface that enable water to enter easily into the soil. In Third World countries, including South Africa, vegetative cover is lost through the collection of wood to provide household fuel, thus leaving the soil barren and susceptible to erosion.

Erosion, according to D. Pimentel *et al.* (Biswas 1997) does not only damage the immediate environment, but also leads to loss of reservoir storage, basement siltation, flooding, disruption of stream ecology, eutrophication of waterways and increased water treatment costs. Sedimentation also harms aquatic plants and other organisms by contaminating the water with soil particles.

Siltation is a major problem because it reduces water storage, shortens the lifetime of dams and increases maintenance costs. Phiphidi dam, which in the sixties and early seventies supplied water to Sibasa town, is now full of sediment.

The cutting-down of trees in watersheds leaves water resources unprotected, and several fountains which in the past supplied drinking water to village communities, have dried up. There is no one who barred people from the practice of cutting down trees in ecologically fragile areas, and as a result people perceive this as an acceptable practice.

5. WATER POLLUTION

In the areas in which water taps run dry or are not installed, people rely on water from river springs and boreholes. The sampling of water in the main rivers and boreholes in the Thohoyandou area reveals that such water is heavily contaminated with faecal coliform bacteria and is not suitable for drinking by

Table 1. Water contamination

Source of water sample	Faecal Coliform/100 ml sample	
	January 2002	July 2002
Tshinane River	1200/100 ml	1300/100ml
Mutshindudi River	1400/100 ml	4020/100ml
Dzingahe borehole	1121/100 ml	was broken
Tshisele borehole	1100/100 ml	800/100ml
Mvudi river	1300/100 ml	50/ml
Mbahe borehole		Nil

Source: M.E. Nembudani 2002.

human beings. The results for the water samples from three main perennial rivers and two boreholes in the high density areas of Thohoyandou area are shown in Table 1.

The biological contents of the water samples drawn from rivers and boreholes as shown in Table 1 are abnormally high for both January and July, therefore leaving water unsuitable for human drinking without prior treatment to kill bacteria. People in Dzingahe village are dependent on this raw water from the Mutshindudi River and the borehole. Treated water is not available most of the time. Both Dzingahe and Tshisele boreholes are situated in densely populated areas (2259 persons per square kilometre). As residents rely on pit toilets, underground water in these areas is heavily polluted. In accordance with the content of Table 2 (faecal coliform guidelines), water that has faecal coliforms of one count per 100 milliliters of water is likely to cause an infection if used for drinking and food preparation. The faecal coliform guidelines are shown in Table 2. From the table it can be seen that water with a count that exceeds 100 poses a serious health threat to users. Under faecal coliform guidelines, water in this area should never be used for drinking purposes by humans, nor for food preparation, without some form of treatment. The communities need to be made aware of the danger of using this water without purification.

Domestic animals, such as cattle, goats, etc., in the villages live with people in their residential areas, since many communities do not have separate farms in which they keep animals. Any available piece of land where grass grows is used as a grazing place. Animals are therefore seen grazing near rivers, and as a result contribute to faecal contamination of water in these rivers. Domestic animals also use rivers as drinking places and as such it is not surprising to find water in rivers heavily polluted by both human and animal waste. Human faecal contamination results from the fact that almost all the households in the villages depend on pit latrines. From the Table 2 showing water contamination in the Thohoyandou area it can be seen that the borehole water in this area is heavily polluted (1121 faecal coliform bacteria/100ml sample). Dzingahe village is located on high ground, but the borehole is on the lower ground in the river valley. The location of the borehole in relation to the settled area might be contributing to the presence of faecal coliform bacteria in underground water.

Table 2. Faecal coliform guidelines

Counts/100ml	Health	Food Preparation	Bathing	Laundry
0	No effect	No effect	No effect	No effect
0-1	Insignificant	Insignificant	Insignificant	Insignificant
1-10	Clinical infection unlikely in adults but may occur in some groups	Clinical infection unlikely in adults but may occur in some groups	Insignificant	Insignificant
10-100	Clinical infection common even with single exposure	Clinical infection common even with single exposure	Slight risk	Slight risk
> 100	Serious health effect	Serious health effect	Possibility of infection	Possibility of infection

Source: Dept. of Water Affairs & Forestry (1999).

The concentration of bacteria in water differs with seasons. In the cases of the Tshinane and Mutsindudi rivers, there is an increase in the concentration of microorganisms during the winter dry period. During rainy seasons, bacteria are likely to be washed away in the rivers as a result of the increase in the volume of water then. During the winter dry periods, the concentration of bacteria is likely to increase because the volume of water in rivers decreases. Mbahe borehole shows no presence of microorganisms because it is situated in a sparsely populated area away from settlement. It is therefore unlikely to be affected by seepage from households pit toilets.

The northern part of Vhembe district (in Mutale municipality) relies on untreated water from rivers and boreholes. Between February and April 2001, 384 cases of cholera were reported. All diarrhoea cases were treated as cases of cholera. A team comprising medical practitioners, nurses and environmental health practitioners was formed, and moved from house to house interviewing patients and educating communities and school children about water treatment. Factors identified as contributing to the problem were the lack of household toilets in the villages and people's reliance on untreated water from the Nwanedi River and from boreholes. People were also found to have cheated by building toilet structures without pits in their households, because they know that environmental policy obliges them to have toilets within their plots. The communities understand that toilets are essential if they are to lead a healthy life, but they put up structures in order to deceive the authorities.

The other problem contributing to health problems is lack of commitment or the part of those who transport water in mobile tankers to villages in which treated water is not available. When the tankers break down they are not replaced, and people spend months using water from the rivers.

A lack of personal hygiene is another factor contributing to the spread of disease. Between January and March, most villagers enjoy home-brew Maroe-beer, and this beer causes diarrhoea. Sufferers relieve themselves in the bushes and this further accelerates the rate of pollution when human wastes are washed into rivers during rainy periods.

Car washing in rivers also contributes to water pollution. In areas where major routes cross rivers illegal car-washes have been established. Signboards have been erected along roads to show where this activity is taking place. Unemployed young men and boys are seen washing cars in these areas in order to make a living. Such activity is not prohibited, even though the officials in the Department of Water Affairs are aware of it.

The dumping of waste material from demolished buildings and construction works near rivers is another problem in the area. People in the construction industry seem to take an advantage of the fact that there is no strict control as far as the dumping of waste material is concerned, and so use any available open space to dump such waste. During rainy periods such materials are washed into the streams and increase sedimentation.

6. PERCEPTION OF WATER USE AND MANAGEMENT

Table 1 shows that raw water in the Vhembe district is heavily polluted. Table 3 shows people's perceptions of water purification at household level. Fifty three respondents rely on water from boreholes and rivers. One person out of the fifty three respondents add chemicals to water before use, while six out of the same total boiled water and forty six people (86.6%) used it as it is.

Table 3. Frequency of raw-water purification at household level

Water purification	Frequency	Percent
Add chemicals	1	1.9
Boil it	6	11.3
Use it as it is	46	86.8
Total	53	100.0

Source: M.E. Nembudani 2002.

In accordance with the new law of South Africa, water should not be treated as a free commodity but rather be paid for. In contrast, half of the respondents view water as a free good that should not be paid for. Some of those who agree with payment for water wish the poor and the unemployed to be exempted from paying. The other half believe that payment will instill responsibility in people, who will then care for water resources. From the survey conducted on water use, only 15.7% of the respondents were paying for their water services. Residents in the rural areas are reluctant to pay, because payment for water consumption includes bills for other services, such as waste removal and upgrading of streets. Such other services are lacking and residents feel that they cannot pay for services that are not rendered. From information gained at the Thulamela municipality, the government has put payment of other services in the rural areas on hold until services in the rural areas improve. The Thulamela local government attempted to encourage people to pay, by allowing them to pay only 40% of what they owe up to the end of June 2002. This step was taken in an attempt to encourage consumers to pay for their water services. Residents in the areas where water is supplied through communal taps are also willing to pay, provided on-site taps are installed. The water tariffs from residential water consumption are shown in Table 4.

Table 4. Water tariffs for domestic consumption

Connection fee	R145 for those who earn below R800 a month R185 for those who earn above R800 a month
First 6 kiloliters	R2.00/ kilolitr (free water)
Additional 6 kiloliters	R2.80/ kiloliter
Above 12 kiloliters	R3.50/kiloliter
Basic service per months	R5.00

Source: Dept of Water Affairs and Forestry: Thulamela.

When it comes to water conservation and water use it was found that about 70% of the respondents do not recycle used water. The remaining 30% recycle water in various ways, such as by using it to clean the floor, flush the toilet or water plants. A very small percentage of the respondents recycle water only when it is scarce.

Vhembe district receives rain in summer, but winters are dry. In most areas, in winter, tap water is not available throughout the day and some people recycle it by watering plants and lawns, and in the rural areas for smearing cow dung on the floor, both inside the huts and outside (lapa).

On average, individuals use 30 liters per person per day. About 81.9% of the 305 respondents use a basin when bathing, 15.2% use a bath and the remaining 2.9% use both shower and bath. These results show that less water is used for bathing, such that water is not wasted in this manner.

With regard to respondents' perceptions concerning water conservation, about 88.5 percent of respondents agree that water should always be conserved, while about 5% feel that water should only be conserved during dry seasons. Their responses reveal that water should be conserved by building dams, storing water in containers, educating communities about careful use of water, refraining from irrigation during the hot part of the day and having a tank under the roof to harvest rain water. Communities that depend on raw water from the rivers and disagree with the removal of vegetation near water sources, since vegetation is considered to protect rivers from drying up.

Water could also be saved if on-site, instead of street, taps could be installed. In the Thulamela municipality, according to officials in the Department of Water Affairs and Forestry, only 30 000 (29.5% of) households have water on site. This is an increase of about 14% over the figures obtained from Statistics South Africa (*SA Explorer* 2001). From sources in the Makhado municipality, only 20% of the households have taps connected. The respondents feel that, in order for water to be saved and payment for water services to take place, taps connected to dwelling are preferred.

In order to accommodate the poor, the Minister of Water Affairs and Forestry announced that – as from June 2001 – each household should receive 6 kiloliters of water free. From sources at the Department of Water Affairs it is clear that the free liters are not yet being provided in the Thulamela and Makhado municipalities. The local government is charged for water that is pumped from dams into the reservoirs, and if residents were to obtain some water free of charge, the municipality would have difficulties recovering costs incurred.

Table 5. Water sources

Water source	Frequency	%
Borehole	33	10.8
Communal tap	117	38.4
In-house tap	56	18.4
On-site/ outside/ stand pipe	81	26.5
River/stream	18	5.9
Total	305	100.0

Source: M.E. Nembudani 2002.

Until the national government addresses the issue of these costs incurred between the dam and the reservoirs, residents will continue to pay for all the water consumed. It is ironic to find that residents in the poorest province in South Africa are not enjoying the free 6 000 liters per household per month announced by the Minister in 2001.

The population in the Vhembe district obtains water from various sources, such as rivers, boreholes, communal and on-site taps. The following table (Table 5) shows water sources, and the proportion of respondents relying on them. A large proportion of the households (40%) is still seen to rely on water from communal taps. This has an implication for water payment, since it is difficult to issue bills for a tap that is accessed by more than one household. The only option will be to bill households a flat rate. This appears to be unfair on households that are not consuming much water. From the perception of the people towards water payment it was seen that people would pay for water consumed provided on-site taps are installed.

As a result of deforestation of the mountain slopes, erosion rates have increased and several springs have dried up. Crop yields on the mountain slopes have decreased. In order to address the problem of mountain degradation, farmers of Lwamondo, Tsianda, HaMutsha and Tshakhuma, together with their chiefs and the Department of Agriculture came together to form a land rehabilitation project known as Lwatshatsimu. The main focus here is the rehabilitation of the degraded land through the planting of trees and grass and the construction of stone banks across valleys where there are fountains and rivulets, in order to prevent soil erosion. As a result, springs that became dry after the mountains were robbed of their vegetation have become active again. Eighty hectares of bare slopes are now covered with vetiver grass, there are seven kilometers of stone banks and 25,000 trees have been planted. Indigenous bushes, trees and grasses have started to grow and several springs that were dead are now active.

Rehabilitation of the degraded mountain slopes became possible because of the environmental campaigns by the Department of Agriculture and the cooperation of local farmers and traditional leaders. In order to make this possible, the officials of the Department of Agriculture moved from one village to another educating communities. A participatory approach was adopted and farmers were involved in these campaigns, such that they became amenable to changes in their attitudes towards land use. The farmers were initially reluctant to follow the advice of the agricultural extension officers, but changed their atti-

tude after they realized that crop yields were improving. Several workshops were run and a group of farmers also visited Zimbabwe to see how erosion is controlled and to receive some training. Farmers are prohibited from tilling on slopes of more than 60° and stones painted white have been put across mountain slopes to mark the upper limits of the land available for farming. Farmers are eligible for a fine of R 180 if found to be violating the agreement.

According to the officials in the Department of Agriculture, land care courses will also be introduced at all the schools, so that this newly-acquired knowledge should not disappear with the present generation but be carried on to future generations

In the past, according to indigenous practices, people were prohibited from cutting down live trees, and only collected dry wood for household use. Indigenous people respected the natural environment and activities that were perceived to harm the environment were prohibited. Activities prohibited included the cutting down of live trees, cattle grazing, the collection of firewood from sacred places, and cultivation on a watershed or on the source of springs and fountains. Trees that were traditionally known to hold and preserve water were also conserved and not cut down. Management of water resources also included planting of trees believed capable of holding and retaining water on the ground and preserving water in springs and fountains. Traditional leaders were respected and taken as natural resource managers, to the point where the decision to harvest or utilize resources rested upon them.

7. PROBLEMS AFFECTING WATER MANAGEMENT

Tilling on the mountain slopes has an adverse effect on the quality of water that flows into dams. Turbidity becomes high in the rainy season, and this increase costs of water treatment. In the Vondo purification plant, costs amounting to R32 000 thousand are incurred each month during rainy seasons, as compared with R21 000 during dry seasons. Phiphidi dam has also been filled with sediments as a result of tilling on the mountain slopes. The community of Matondoni was relocated from the area to Vhutshavhela in the early 1980s, in order to prevent any further impact from human activities on the quality of water behind Vondo dam. Sedimentation has been tremendously reduced at Vondo, but continues to occur in the Phiphidi reservoir.

Irregular water supply is another contributing factor that leads to wastage and huge water losses in the villages. Water is not always available and it remains unknown when the situation will change. In order to secure water supply, residents connect hosepipes to on-site taps and leave the tap on to fill the containers when water becomes available. Sometimes water becomes available at night and thus spills out when the containers are full, and starts flowing all over the street. Residents only realize in the morning that a lot of water has been wasted. People do not refrain from this practice because this is how they ensure that they do not miss the opportunity of collecting water. The alternative might be to spend days without a water supply.

Vandalism is a problem encountered by water managers. The amount of water entering the main reservoirs (R1, R2 and R3) that receive water from the Vondo purification plant was in the past capable of being monitored from the plant. Monitoring was possible through the use of solar-powered systems, but since these have been stolen, this is no longer possible. Pumping machines that are used to pump water from rivers or underground into reservoirs, are also stolen in the villages. Sometimes people in the villages through which water pipelines pass are greedy and interfere with the pipes and close water station so that water does not reach other villages. People at Dzingahe fetch water from a river that is infested with crocodiles, such that cases of people having been eaten by crocodiles are reported. Prepaid water meters were broken up in the Kutama area in the Makhado Municipality, in protest against water charges.

A lack of a sense of responsibility is another problem on the part of those who use mobile tankers to deliver water to villagers experiencing a shortage of water. This irresponsible act of collecting and delivering water that is not purified, to the communities puts people lives in danger of contracting diseases.

8. SUSTAINABLE WATER MANAGEMENT

To sum up this discussion, the management of water resources in the Vhembe district is capable of being explained by reference to three issues, namely people's practices, perceptions and management. The relationship between these three issues determines the sustainability of water management. It includes two-way relationships which are illustrated in Figure 1. Positive practices, perceptions and management result in sustainable water management, while negative practices, perceptions and management result in the deterioration of water resources. The lack of proper environmental management, for example, creates bad practices and wrong perceptions as regards water use and management. Non implementation of sound management policies for example result in bad practices and also in a *laissez-faire* attitude towards the utilization of natural resources. Considering the above, the following recommendations are made as regards sustainable domestic water management.

– **Change in people's practices** and perceptions through environmental education awareness. People should refrain from tilling and removing vegetation in ecologically fragile areas, using rivers for car washing and dumping waste near rivers, where water resources are negatively affected. Communities that depend on raw water for domestic use should be educated and made aware of the dangers of using water that is not treated, as well as of how to treat water before use. A sense of responsibility for those who use mobile tankers to supply water to the villages, and those that are assigned with the responsibility of adding chemicals to clean water, is essential. Sometimes untreated water is supplied to people by mobile tankers, when drivers are too lazy to collect safe water. The people who add chemicals to purify water should not neglect their duty and expose communities to the danger of drinking unsafe water.

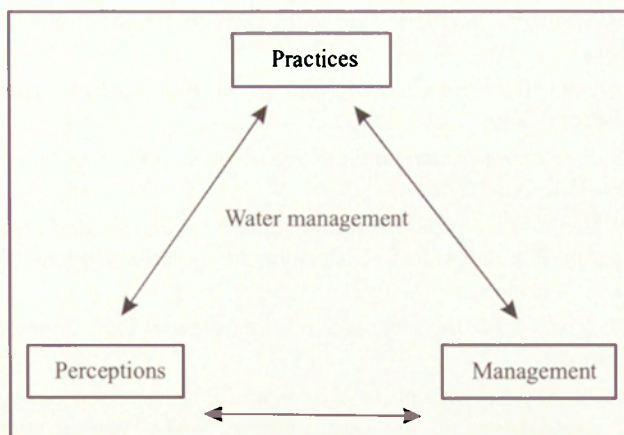


Fig 1. Model of people's practices, perceptions and water management
Model percepcji ludności, praktyk użytkowania i zarządzania zasobami wody

– **Change of perceptions.** Water should no longer be treated as a free good, but should be paid for. This will enable people to carefully look after water resources, since more consumption – for example – implies high cost. A sense of belonging needs to be created in the minds of the people, and they should see water resources as crucial for their survival and therefore not a subject for abuse.

– **Implementation of sound water management policies.** The government should work together with local communities in the management of water resources. Restoration of the powers of traditional leaders is crucial if communities wish to succeed in the management of their natural environment. Local chiefs and their assistants are respected in the villages and can be used to restore love and respect for our natural resources. The government should refrain from imposing issues, but rather consult with communities during the decisionmaking process. From the survey conducted it has been seen that residents prefer on-site taps to communal ones, and are prepared to pay for water services.

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PERCEPCJA ORAZ PRAKTYKA UŻYTKOWANIA I ZARZĄDZANIA
ZASOBAMI WODY W REJONIE VHEMBE: PROWINCJA LIMPOPO
W POŁUDNIOWEJ AFRYCE

STRESZCZENIE

Rolniczy rejon Vhembe położony w prowincji Limpopo, charakteryzuje się gwałtownym wzrostem ludności i wysoką gęstością zaludnienia oraz bardzo wysoką stopą bezrobocia (48%). Szybki wzrost ludności, skorelowany z wysokim przyrostem naturalnym powoduje wzrost zapotrzebowania ludności na ziemię w celach rolniczych, mieszkaniowych i usługowych. Duża presja ludności na ziemię spowodowała, iż tę użytkuje się na obszarach ekologicznie zagrożonych, co również ma negatywny wpływ na ilość i jakość zasobów wodnych na badanym obszarze. Uprawy na zboczach górskich, wylesianie, zanieczyszczanie gleby ściekami i nieprawidłowe zarządzanie zasobami wodnymi utrudniają dostępność i zaopatrywanie w wodę gospodarstw domowych. Badanie ilościowe i jakościowe zasobów wodnych oraz zarządzania nimi w rejonie Vhembe wykazało, iż zarówno wody powierzchniowe jak podziemne są zanieczyszczone przez działalność ludzką (zapory i zbiorniki wodne są zamulone osadami i roślinnością z upraw na zboczach górskich, zaś źródła wysychają z powodu braku pokrywy roślinnej na obszarach wylesianych). Percepcja i świadomość miejscowej ludności na temat usuwania mułów i roślinności ze zbiorników wodnych jest różna w zależności od tego czy pobierają oni wodę z naturalnych źródeł czy nie. Zróżnicowana jest także gotowość mieszkańców do uiszczania opłat za wodę zależnie od tego czy posiadają własne ujęcia wodne, czy korzystają z wodociągów komunalnych (ci ostatni nie oszczędzają wody). Autorka postuluje, iż zarządzanie zasobami wodnymi wymaga świadomego uczestniczenia zbiorowości lokalnych w podejmowaniu decyzji. Rekomendacje dotyczące zrównoważonego użytkowania i zarządzania lokalnymi zasobami wodnymi dotyczą przede wszystkim konieczności zmian w percepcji i świadomości mieszkańców oraz konsekwentnej polityki władz lokalnych.

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IV. MIGRATION AND ENVIRONMENT

Population, environment and development

Prace Geograficzne nr 202 (2005)

Nina M. Birkeland¹

ENVIRONMENTAL CHANGE AND FORCED MIGRATION: DOES ENVIRONMENTAL CHANGE CREATE IDPs OR 'ENVIRONMENTAL REFUGEES'?*

1. INTRODUCTION

This paper discusses the applicability and academic relevance of the term 'environmental refugees' in the context of forced migration in Angola. Environmental change contributes to displacement, but which concepts should we use when describing the phenomena, including 'labels' to differentiate various groups of forced migrants? The causes of displacement in Angola are complex: civil war, underdevelopment and environmental change are all prominent. Environmental change was given as part of the cause for displacement by several of the displaced people interviewed¹, but no one among the displaced themselves used a label such as 'environmental refugee'. The displaced preferred to use the term '*deslocado*' (Portuguese for 'displaced') when describing their identity as forced migrants. The paper concludes that it is empirically and analytically more coherent to use the wider concept Internally Displaced Persons – IDPs, rather than trying to fit displaced populations into categories such as environmental refugees, war-displaced, and so forth.

2. DISPLACEMENT IN ANGOLA

In February 2002, Jonas Savimbi, the former leader of UNITA (União Nacional para Independência Total de Angola) was killed by the government troops in Angola. His death opened up for the cease-fire that was signed on 4 April 2002 between the Angolan government and UNITA. The 27 years of civil war had ended. From that point it took only a matter of weeks before reports on return of IDPs and refugees started to emerge in Angolan and international media. A strong optimism about the future can now be experienced in most places and amongst most people in Angola.

The history of forced displacement in Angola can be briefly recapitulated as follows.

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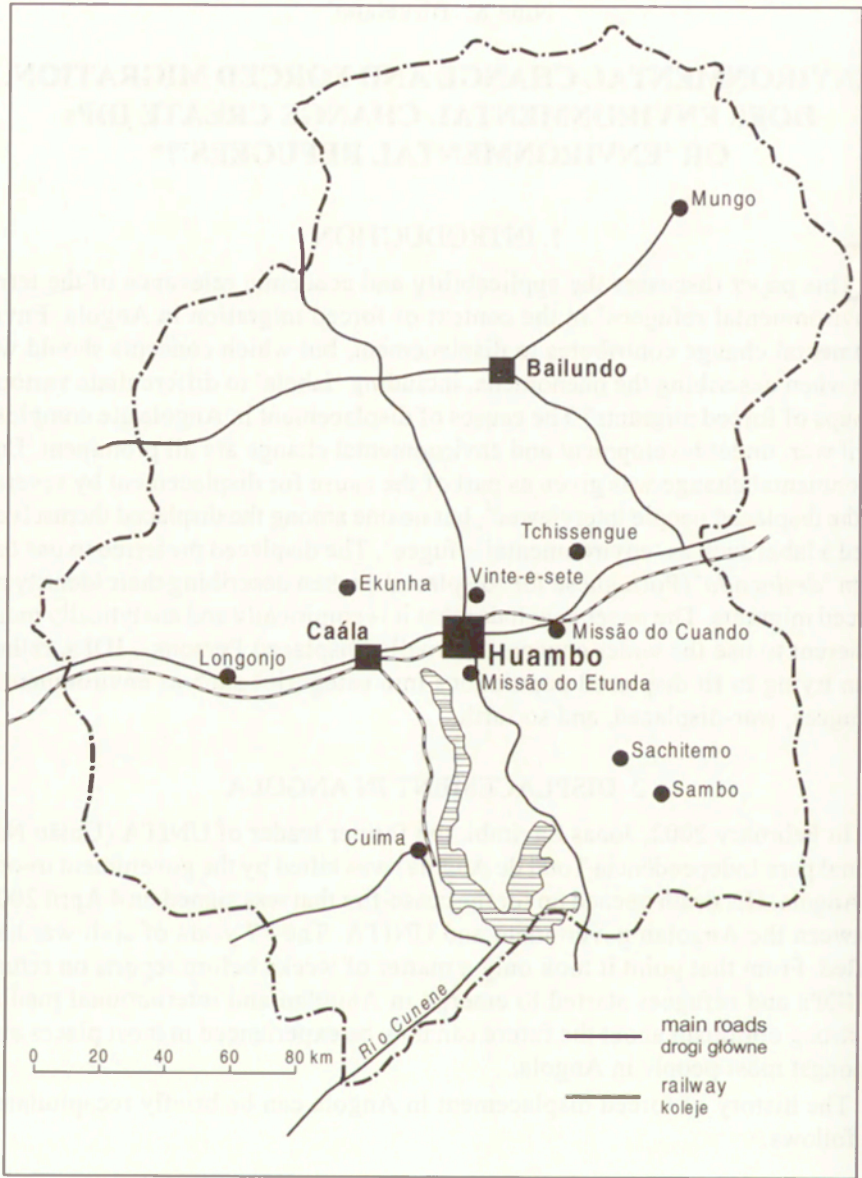


Fig. 1. Map of Huambo province
 Mapa Prowincji Huambo

Angola is one of the largest African countries, yet only has a population of approximately 13 million. The number of IDPs in mid-2002 was 4.1 million according to the Global IDP Project². This number has been more or less stable since April 2002 despite repatriation of many thousands of IDPs. With the return home by many IDPs, new people have simultaneously been displaced. In addition to the IDPs, c.450,000 Angolan refugees are living abroad, mostly in neighbouring countries: Zambia, Namibia, DR Congo, Congo, and South Africa. Zambia alone has about 225,000 Angolan refugees.

The fight for independence from Portugal started in 1963 and ended with success in 1974. Unfortunately, the Angolans have experienced three wars since then. First, the post-independence war of 1974–1991, which began when the three independence movements MPLA, (Movimento Popular de Libertação de Angola), FNLA (Frente de Libertação de Angola) and UNITA fought each other for the control of the capital Luanda, and thus control of the political power. The MPLA won, and established a single-party socialist government in November 1975. Second, after the peace agreement in 1991 multiparty elections were held in September 1992. The ruling party, the MPLA, won most of the seats in the parliament and their presidential candidate Jose Eduardo dos Santos received just over 49% of the votes, while Jonas Savimbi from UNITA won 40%. Before the second round in the presidential elections, Savimbi went back to war, the post-multiparty election war of October 1992 – November 1994. The most recent war was started in 1998 and finally ended in April 2002, only one and a half months after Savimbi had been killed by government troops.

This paper takes its empirical data from the Huambo Province (Fig. 1). The majority of the population in Huambo is displaced or has been displaced many times (Birkeland, Gomes 2001). Huambo and the other parts of the Central Highlands are the traditional homelands of the Ovimbundu, Angola's largest ethnic group. They constitute about one-third of the national population. Huambo Province has been called Angola's 'Garden of Eden' (Bender 1978; Russo 1993) because of its favourable climate and the belief, not borne out by reality, that the land is fertile. After 25 years of civil war, which itself was preceded by 35 years of intense exploitation by the Portuguese, the area has suffered the greatest drop in standard of living, including in social and cultural life, of all of Angola's provinces. The empirical data used in this paper builds on fieldwork in and around Huambo in 1998, 1999, 2000, and 2002.

3. WHY DO PEOPLE FLEE IN ANGOLA?

The causes of displacement in Angola are complex. Even though war has been most prominent during the last few decades it is not only the wars that have forced people to flee. Lack of access to basic services such as health centres, schools, infrastructure (e.g. roads and markets), and environmental change were all prominent when the displaced populations explained why they were forced

² Global IDP Project's webpage: <http://www.idproject.org>

to flee. Trusting that peace will last, this paper emphasises some of the causes of forced migration that will continue to trigger displacement in the absence of war, i.e. environmental change.

During the wars, both sides in the conflict (i.e. the Government and UNITA) have perpetrated extreme acts of violence against the civilian population: forced displacement, forced conscription to armies or as labourers, rape, kidnapping, rape executions, and physical assaults. Many IDPs state that the only difference between them was that: "*UNITA kills with machete, whereas FAA kills with bullets*".

In Huambo province many of the IDPs identified environmental change as one of a set of multiple causes of their displacement (Birkeland 2000). Particularly, land degradation was named as the cause of their decision to flee. Land degradation is not only caused by physical factors but also to a large extent by human activities, or a combination of the two, such as the change to intensive cash-crop agriculture in the marginal lands of the central highlands in Angola. In Huambo it is deforestation, soil erosion and loss of access to traditional lands that constitute the most prominent forms of environmental change.

Insecurity in the periods of war forced the population to gather in safer zones along the CFB railway⁴, particularly around the towns of Huambo and Caála. Such concentrations of population in safer zones intensify the degrading process in the limited land available for IDPs and host populations. Problems of local land degradation in these areas were experienced already before the wars started in this region in late 1976. Since then, the intensity of land degradation has become life threatening as the wars had made the more fertile areas further afield insecure and inaccessible. Deforestation further results in loss of other forest products such as honey, wild animals, berries, and fruits, identified by both the local population and IDPs as important contributions to their livelihoods. In times of crisis the forest products become more important, serving as a buffer in the hunger periods between harvests.

Many of the self-settled IDPs preferred to stay as far away from Huambo City as possible since this enabled them to have better access to forests. During 1998 and 1999 many chose to settle in more exposed areas, such as around Missão do Cuando and Ekunha instead of going to Huambo City because there was still wood available there.

When discussing the causes of forced migration D. Summerfield (1999, p. 131) states: "*It is likely to become increasingly difficult to distinguish the effects of war, of environmental degradation and of global economic policies that mean structural poverty for the overwhelming majority.*" This interweaving of causes is already taking place in Angola: a reality that creates challenges for adequate and timely interventions in the current post-conflict situation to avoid future displacement. It is decisive that national and international ac-

³ Forças Armadas Angola, i.e. the Angolan government army.

⁴ CFB: Caminho de Ferro de Benguela. The railway from Benguela at the Atlantic coast to the DR Congo border in the east.

tors realise that the formula for causes of forced displacement is more complicated than "war = IDPs \Rightarrow no war = no IDPs" if internal displacement is to be minimised in the future, environmental change being just one of many interwoven causes of forced migration.

4. ENVIRONMENTAL REFUGEES: ORIGIN AND RELEVANCY OF THE CONCEPT

"*Environmental refugee*"⁷ is a much-debated concept. It is one of many attempts to draw attention to single causes of displacement, other examples include "*economic refugees*" and "*development induced displacement (DIDI)*" (McDowell 1996). The origin of the concept "*environmental refugees*" can be traced back to a report from the International Institute for Environment and Development (IIED) published in 1984 (Kibreab 1997). Later, the concept became popular after UNEP's director El-Hinnawi used it in another report in 1985 and the World Watch Institute published a book in 1988 (El-Hinnawi 1985; Jacobsen 1988; Kibreab 1997 p. 21). During the late 1980s and early 1990s academics based in a broad variety of fields used the concept in their studies.

Despite the rather common use of the concept "environmental refugee" by politicians, practitioners, NGOs and some academics, there is no comprehensive international definition for people who are forced to flee because of environmental factors. The concept seems to have gained momentum in the early 1990s as a result of the end to super-power rivalry (Black 2001) and the increased focus on environmental change and its consequences created in the Rio/UNCED 1992 process.

Since the early 1990s the use of the term "*environmental refugee*" has become quite common in conflict studies (Homer-Dixon 1994; Myers 1996), whereas within refugee studies there is strong reluctance to use this term when describing and analysing displacement (McGregor 1993; Kibreab 1997; Black 2001). Part of the criticism relating to use of the term "*environmental refugee*" is that the introduction of a new category of displaced people could lead to the withdrawal of asylum for those who already receive it (Black 2001). McGregor (1993, pp. 158) writes that the use of the term "*environmental refugee can imply: ... a false separation between overlapping and interrelated categories*" of causes to displacement. My data from Huambo supports J. Mc Gregor's argument.

⁷ One of the most well-known definitions applied to environmental refugees is the one proposed by UNEP in 1985: '*People who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardised their existence and/or seriously affected the quality of their life*' (El-Hinnawi 1985). Environmental Refugees. Nairobi, UNEP (United Nations Environment Programme).

5. ENVIRONMENTAL CHANGE IN HUAMBO

5.1. LAND DEGRADATION AND FORCED MIGRATION

In the Huambo context it is land degradation that is the most important form of environmental change to focus on in relation to forced migration. Applied to land resources, degradation refers to the process whereby the productivity of land resources declines. Unless steps are taken to prevent further losses and restore the original level of productivity, land degradation tends to be a self-reinforcing process (Blaikie, Brookfield 1987). Traditionally, land degradation has been treated exclusively within natural science, where the central task has been to understand and explain the causes and impact of the degradation processes. According to the natural scientists, there are three main physical factors that contribute to land degradation: soil composition, relief and climate. Examples of natural land degradation processes are erosion, leaching, changes in and removal of vegetation cover, and changes in the hydrological balance of the soil and water chemistry. However, land degradation is not only caused by physical factors but also to a large extent by human activities or a combination of the two, such as the change to intensive cash-crop agriculture from the 1920/30s and onwards in the marginal lands of the whole Planalto Central (Central Highlands of Angola).

P. Blaikie and H. Brookfield (1987 p. 7) have provided a definition of land degradation in the form of an equation that aims at incorporating both the natural and social aspects of the phenomena: "*Net degradation = (Natural degradation processes + human interference) - (natural reproduction + restorative management)*". While this definition could ideally be applied to understanding how serious the environmental degradation that takes place in Huambo is, the variables of P. Blaikie and H. Brookfield's definition require primary data, which was not obtainable in Huambo. Furthermore, it is outside the scope of my research focus to produce these data. Accordingly, I have modified P. Blaikie and H. Brookfield's definition: "*Land degradation is the land resource's loss of quantitative and/or qualitative capacity to meet the human needs*". This definition emphasises that only degradation processes that create a situation where people experience that the land can no longer sustain them and thus reduce the productivity and quantity of land are recognised as land degradation.

Human interference modifies, and sometimes accelerates, natural degradation processes through activities that change the conditions of the processes. Human-induced land degradation usually occurs when land is managed unsustainably or where natural forces are so powerful that there are no means of management which can check and balance the degradation process. Degradation may also occur when land particularly vulnerable to degradation is used extensively, such as marginal land (Blaikie, Brookfield 1987). The severe local land degradation that can be observed along the CFB corridor, and particularly around the towns where IDPs have sought refuge in the Province of Huambo, can be closely associated to this argument. Certain degrading processes do not show immediate effects. Only when a given threshold of resilience is

exceeded do environmental discontinuities occur, which ecologists like to term "jump effects" or "ecological surprises" (Blaikie, Brookfield 1987). This phenomenon is likely to happen when the land absorbs stress, such as over-population, over a long period of time without outward signs of damage. Eventually the land is pushed beyond the limits of its resilience⁶. It should be noted that land degradation is a "slow onset disaster", but such natural disasters also cause displacement.

Bearing in mind G. Kibreab's assertion (Kibreab 1997) that the concept "environmental refugees" was partly invented by northern countries to depoliticise the causes of displacement, thus enabling these countries to derogate their obligation to provide asylum, I argue in accordance with R. Black (2001 p. 11) that this has not been the agenda nor intention of most of us writing on environmental change as a cause of displacement. Criticism of much of this literature should rather emphasise the lack of primary data, particularly recycling of often not relevant statistics and exaggeration of uncertain data. However, in this context of internal displacement the intention and motivation for researching whether environmental degradation has an impact on the IDP's decision to flee ought not to be controversial since "natural and human-made disasters" have been written into the "Guiding Principles" causes of displacement that constitutes IDPs (OCHA 1999 p. 6).

5.2. EMPIRICAL EVIDENCE FROM HUAMBO

Among the *deslocados* I interviewed were people who identified environmental change as part of the cause of their displacement both during the colonial period and during the civil wars since independence. The most prominent form of environmental change in Huambo is land degradation, particularly deforestation, soil erosion and loss of access to traditional lands. These are presented in more detail below. One issue is the environmental change that has taken place as a result of either development or lack of development in the region over the last century. Another is the environmental degradation experienced during recent decades due to the escalating level of insecurity and changing territorial control of the *municipios* (municipalities). The insecurity and war forced the population to gather in safer zones along the CFB corridor, particularly around the towns of Huambo and Caála. Such concentrations of population in safer zones intensify the degrading process of the limited land available for *deslocados* and host populations. Problems of local land degradation in these areas were experienced already before the wars started in this region in 1976/77. Since then, the level of land degradation in these areas has become life-threatening since the wars had made the more fertile areas further afield insecure and inaccessible. As observed by G. Kibreab, "... the safer areas get over-exploited while the unsafe areas remain un- and underused" (Kibreab 1997 p. 33). When non-accessible areas (many formerly controlled by UNITA) have been opened up for circulation following the peace agreement in April 2002 – i.e. when people can

⁶Resilience is the ability to absorb the effects of human interference and return to an original state after exposure to stress.

leave if they want and humanitarian actors can come in – it has become evident that in some of these areas the suffering of the people has been as grave as that experienced by those who fled prior to April 2002.

In the first months after the peace accord it became evident that many of the *deslocados* and other elements of the population located outside the coastal area and the provincial capitals were exposed to hunger. Many new *deslocados* came into those areas where there had been some sort of food distribution. Regrettably, the number of people in need dramatically exceeded the available resources. Further adding to the shortage of food that could be provided as aid for the population was the quartering of 80,000 UNITA soldiers and their families, estimated to involve up to 350,000. Also at this time, the myth about the high fertility of the land in Angola was maintained when journalists reported on the 2002 hunger catastrophe. For example, the BBC used the headline: "*Famine prays in Angola's fertile land*" (Pearce 2002, p. 1). The misconception of the high and inexhaustible fertility of African soils that is held by many northerners and others who are not familiar with the rapid plant growth in the tropics. Such misinterpretations add to current problems of environmental change since the myth does not justify use of resources to develop and apply sustainable land use practices.

5.3. DEFORESTATION

Deforestation is profound in some of the locations with the highest population density, but diminishes rapidly in the less populated areas. Forests play a crucial role in maintaining the quality of the land, thus securing the physical capacity to meet the needs of the population. Where there is dense forest cover, it contributes to the soil's humus layer through the constant addition of leaves and other organic matter. The forests also protect the land from soil erosion during the tropical downpours. In this respect, unfortunately, one of the main income-generating activities of the *deslocados* and also their own need for fuel and construction material has treated the forest harshly. When the forest is removed, for example through intensive fuel wood gathering and charcoal production, the fertility of the soil deteriorates rapidly.

Deforestation further results in loss of other forest products such as honey, wild animals, berries, and fruits, all of which are identified by both the local population and *deslocados* as important contributions to their diets and livelihoods. In times of crisis the forest products become more important, serving as a buffer in the short hunger periods between the harvests in January–February and July–August (Pacheco 1997).

In Huambo Province deforestation must be understood as a local problem. Nevertheless, this does not detract from the challenges encountered by the majority of *deslocados* in the deforested areas. The *deslocados*' accounts presented below shed light on the relationships between deforestation and displacement.

With a few exceptions, the areas along the CFB corridor are deforested. A high demand for fuel wood and other forest products was evident before the civil wars started but then the customary management regimes prevented de-

forestation. Before someone could cut a tree near settlements, the *soba* (traditional leader) had to be asked for permission. During the war both the deterioration of customary management practices and the need for wood has caused immense pressure on the forest and trees in the available and safe areas (see Figure 2 for the change in forest around Huambo and Caála towns from 1983 up to 2002). In the villages there are still fruit trees, but the woods and forest that traditionally have been used as the source for fuel wood, building material and other forest products have disappeared.

Many of the self-settled *deslocados* preferred to stay as far away from Huambo City as possible since they had better access to trees. During 1998 and 1999 many chose to settle in more exposed areas, such as around Missão do Cuando and Ekunha, instead of going to Huambo City because of the availability of wood. The importance of access to firewood (*lenha*) for the *deslocado*'s survival and coping strategies was summarised in many interviews as "*Huambo is sure death!*" since the close perimeters of Huambo are deforested. Further, the forests and woods are an important resource for construction materials. Logs are needed to construct huts and houses, in conjunction with the *adobe* blocks.

Along the road between Caála town and Ekunha, one of the very few forested areas along the CFB corridor is found. This is a forest reserve⁷, Ussomba, with planted eucalyptus and pine trees. Up until late 1998 the local management had been able to protect this forest against unsustainable logging. During the second half of 1998 and in 1999 Caála town received thousands of *deslocados* from municipalities located to the south, north and west, and the Ussomba forest had the only wood resources available in secure locations. *Deslocados* from the IDP camps at CFB, Salschiria and Caliamamo went there to gather wood even though this activity was strictly forbidden by the local administration. Clashes between police and *deslocados* over access to the forest reserve were reported. Several of the *deslocados* told that they had many problems with gathering wood as the obvious source is Ussomba yet the guards would not let them in. Normally the guards let people in if they paid "*gasosa*" (a bribe), though many of the *deslocados* did not have anything to pay with.

In the village surrounding the mission station at Missão do Cuando, a 65-year-old peasant from Epalanga⁸ told how she had fled from her home in December 1998 because people were being murdered in their village. She came to Missão do Cuando with her family, consisting of three adult women and two children, one boy and one girl; she is the head of this family. They chose to come to Missão do Cuando instead of Huambo city because wood was still available so it was possible to survive. When they arrived they received assistance from Padre Cornelio but he has since had to leave due to the war: "*It is very difficult to survive here since there is not any land available ... no more cultural values, everything disappeared with the war*". If the situation improved they planned

⁷ Another forest reserve, Sachala, close to Huambo City, had mostly been cut down during the 1992–1994 war.

⁸ Located 10 km south of Missão do Cuando, to the south of Calandula.

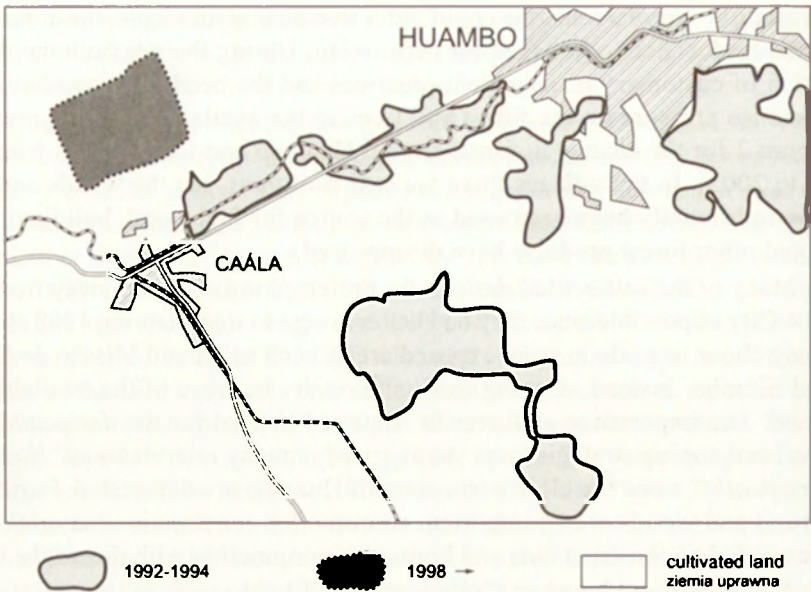


Fig. 2. The decrease in forest around Huambo and Caála, based on topographic maps, 1981, as well as observations and information from fieldwork in 1998, 1999, 2000 and 2002.

Ubytek lasów w okolicy Huambo i Caála. Mapę opracowano na podstawie map topograficznych z 1981 r. oraz obserwacji i informacji pochodzących z badań terenowych w 1998r., 1999r., 2000r. i 2002 r.

to return home and continue to work in their fields. However, they argued that they would be dependent on assistance from the government, e.g. for maize seed, since they did not have anything left and everything at home had been stolen or burnt. At the time of the interview, she emphasised that she was not able to think about the future. Subsequently, this woman and the other *deslocados* at Missão do Cuando were moved to an IDP camp at Cruzeiro (7 km north). In August 2002 (3 months after the cease-fire) the *deslocados* who used to live in camp Cruzeiro were told to return to their areas of origin. The IDPs were informed that upon arrival in Samboto international NGOs would assist them with farm inputs, building materials for houses, and food until the first harvest. However, the international NGOs claimed they had never heard of such an agreement and consequently, upon arrival the IDPs did not have anything to rebuild houses, work in the fields, etc. Following their departure from the IDP camp Cruzeiro the IDPs had set fire to their houses. The authorities claim that such burning is traditional when leaving houses permanently, though it is more likely that the IDPs had been ordered to burn their houses.

Thus, in Huambo the deforestation is rooted in unsustainable management of the forests. The deforestation was formerly triggered by the colonial forest management regime that replaced natural forest (*mata*) with eucalyptus, pine and cedar. The *mata* was cleared away to open up large fields for cash crop production and pasture for the Portuguese settlers. Agricultural practices changed dramatically during the first decades of the 20th century with the introduction

of cash crops and return of men after the collapse in the caravans and Portuguese expansion to the Planalto Central. Since independence the effect of wars have added to the environmental change, and resulted in serious local deforestation problems that force people to move and create considerable challenges in terms of gathering the necessary fuel wood for daily chores.

5.4. SOIL EROSION

Heavy rainfall, wind and intensive use of the cultivated plots (*lavras* and *nakas*) are the foremost immediate causes to soil erosion in Huambo in the absence of manure, compost or artificial fertilisers. Estimates suggest the national rate of soil erosion is 50–130 tons per hectare annually, which is extremely high compared to the acceptable values suggested at 15 tons/ha (Szabó 1997 p. 63). The annual rainfall is 1000–1400 mm, but the precipitation mainly comes during the rainy season (*estação húmida*) and normally within a few hours during the midday, when the intensity of the rainfall is 60–80 mm per hour. Consequently, the ferrous soils are exposed to heavy water erosion when there is a lack of plant cover (trees, bushes, shrubs and grasses).

The places identified by L. Szabó (1997) as potential sites for high risk of soil erosion profoundly overlap with the areas that IDPs fled to during the wars. Both *deslocados* and host populations reported land shortages in these heavily populated areas during 1998, 1999 and to a certain extent in 2000. There was a significant deficit in *nakas* (low-lying land that is cultivable the whole year), whereas there were still sufficient *lavras* (higher land that can be cultivated during the rain season). This resulted in continuous use of the same plots without crop rotation, as there was not enough land available to allow the traditional 30–35 year fallow periods for the *lavras*. Further, almost no manure was applied since most of the livestock had been stolen or sold since the war had resumed in 1998. Only chemical fertilizers were available and at prices beyond the reach of most people.

In relation to a question on return to their places of origin, nearly all the *deslocados* interviewed during 1999 to 2000 wanted to return as soon as possible. The argument given for that was "... *the living conditions here [in exile] are very bad*" and "... *we can not get any land here since it all belongs to [others]*". The *deslocados* were waiting for information from the government about when it would be safe to return home. It was only among those few who were displaced for the first time that there was more reluctance to return. My interpretation of this is that those who have previous experience of displacement 'know' that it is a better strategy for re-establishing livelihood at home, despite the destruction and losses they have experienced there. A key argument for this is that the land is better "*at home*". Quite a few of the *deslocados* pointed out that they will be dependent on assistance from the government.

5.5. INTENSIVE USE OF MARGINAL LANDS DURING WAR

An issue that many *deslocados* raised was the constant struggle to feed themselves, and the strategies they use to avoid dying of hunger. In Ekunha (30 km north-west of Huambo, on the other side of the frontline at that time), a mother explained how she and her five children had first fled from a hamlet near Sambo (40 km east of Huambo) to Huambo. However, in Huambo she felt that there was no chance of surviving and after two months they therefore fled further to Ekunha. At this time, Ekunha was considered as an unsafe place because of regular attacks from UNITA – this women's experience was that it is easier to live with war than without the possibility to sustain herself. She gave the lack of fertile land and inability to practice agriculture as her reasons for fleeing further from Huambo to a less safe area.

On a question about how the conditions of the land have developed over time in Tchissengue, another *deslocado* answered: "*Earlier our land was very good ... it gave large harvests, now it is different, we do not get anything even though we put a lot of work into working in the fields ... Before we had some years that were less good than others, but we never had hunger. Hunger has become normal the whole year now, before we had the months of hunger in December and January [i.e. before they could harvest that seasons first crops] now it is every month. Many of our children and the aged get sick and die ... therefore we could not live there any longer, and came here. The soils are very exhausted here as well, but we sometimes get food from CAD or PAM [World Food Programme]*".

One of the *deslocados* at Missão do Cuando was an old man, a 70-year-old peasant from Tchipango (located only 8 km to the south of Missão do Cuando). He and his family of seven others (2 wives, and 5 children – 3 boys and 2 girls) fled from Tchipango on the 24th of December 1998 because UNITA attacked their village (the 25th of December is the UNITA day, and often UNITA carry out more attacks then to attract attention). This is the second time he has been displaced; the first time was in the 1970s when he fled to Huambo city. He explained how it was a problem both at home in Tchipango and also at Missão do Cuando that there are many mines in the fields, and on paths and roads. It becomes dangerous to move around and to practice agriculture. At Missão do Cuando he and his family encountered another problem as there is not any land available to the *deslocados* there. The mission helped them with housing, but does not have the resources to assist with food or land for agriculture.

6. CONCLUSION: IDP NOT "ENVIRONMENTAL REFUGEES"

As shown here and also discussed by A. Suhrke (1993) and R. Black (1998), it is the slow undermining of the sustainability of individuals' and households' livelihoods that is the most prominent connection between environmental change and the production of displaced people.

In Huambo, land degradation and other forms of environmental change are only one of a set of causes of forced migration. Therefore it is not analytically coherent to use the concept "*environmental refugee*" when referring to the

deslocados in Huambo but rather there should be emphasis on all forms of causes that are already found in the UN's *Guiding Principles on Internal Displacement* definition of IDPs. Local, national and international actors need to acknowledge the multi-complex causes of displacement to ensure that all IDPs, not only those displaced by conflict, can secure their rights and obtain assistance if needed. In many IDP situations labelled as complex emergencies, such as the one in Angola, environmental factors are commonly not given due attention. The crisis of displacement has not come to an end in Angola. Peace will dramatically reduce the number of new IDPs. Yet unless there is understanding that causes of forced migration in Angola are multi-complex and unless this way of thinking is incorporated in emergency operations and development programmes future displacements can not be prevented in Angola. Finally, I conclude that with a theoretical approach to internal displacement developed from an actor-oriented approach, the use of the term 'IDP' is analytically more coherent than "*environmental refugees*", also when studying cases where environmental change is an immediate cause of displacement.

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ZMIANY ŚRODOWISKA A PRZYMUSOWE MIGRACJE.
CZY ZMIANY ŚRODOWISKA POWODUJĄ NASILENIE SIĘ
PRZYMUSOWYCH MIGRACJI WEWNĘTRZNYCH I UCHODŹCÓW
KRAJOWYCH, CZY „UCHODŹCÓW ŚRODOWISKOWYCH” ?

STRESZCZENIE

Przyczyny migracji przymusowych w Angoli są złożone, jednak wojna domowa, niedorozwój ekonomiczny (szczególnie brak infrastruktury i dostępu do podstawowych usług w tym medycznych, edukacyjnych i in.), katastrofalna degradacja środowiska naturalnego, powodowały w głównej mierze „przymusowe przesiedlenia”.

W artykule rozważa się pojęcia „uchodźców środowiskowych” w kontekście „uchodźców krajowych”, czyli wewnętrznych migracji przymusowych w Angoli.

W czasie wojny domowej w Angoli, obie strony konfliktu, tzn. zarówno rząd jak i UNITA stosowały akty przemocy dokonywane na ludności cywilnej (przymusowe wysiedlenia i wcielanie do armii, traktowanie jako robotników przymusowych, gwałty, porwania, egzekucje, fizyczne tortury i in.).

Po 27 latach trwającej wojny domowej w Angoli, 4.04.2002 r. podpisano rozejm między rządem Angoli a siłami opozycyjnymi UNITA, co wyzwoliło niezwykle optymizm ludności w sprawie przyszłości kraju.

Angola jest jednym z największych krajów afrykańskich, liczącym 13 mln mieszkańców w 2002 r., w którym liczba krajowych uchodźców wynosiła ok. 4,1 mln osób. Od kwietnia 2002 r. liczba ta ustabilizowała się, niezależnie od nasilającej się re-

patriacji wcześniejszych uchodźców, którzy po powrocie zastawali swe domostwa zamieszkałe przez innych. Ponadto ok. 450 tys. angolskich uchodźców przebywa za granicą, głównie w krajach sąsiednich: Namibii, DR Kongo, Kongo, Afryce Płd. i Zambii (ok. 225 tys.).

Autorka przeprowadziła analizę empiryczną w Prowincji Huambo w 1998 r., 1999 r., 2000 r. i 2002 r. Większość mieszkańców Huambo należy do największej grupy etnicznej Ovimbundu, obejmującej ok. 1/3 ludności kraju. Prowincja Huambo jest powszechnie zwana „Ogrodem Edenu”, ze względu na bardzo korzystny klimat i urodzajną ziemię. Po 27-letniej wojnie domowej, którą poprzedzała intensywna eksploatacja podczas trwającej 35 lat kolonizacji portugalskiej, region ogromnie ucierpiał z powodu załamania się podstaw egzystencji, w tym życia społecznego i kulturalnego.

W prowincji Huambo wielu krajowych uchodźców identyfikowało negatywne zmiany środowiska jako jedną z wielu przyczyn ich przemieszczeń, a przede wszystkim degradację ziemi spowodowaną zarówno czynnikami fizycznymi, jak i działalnością ludzką (np. wylesianie, erozja gleb i brak dostępu do tradycyjnych ziem uprawnych). Warto podkreślić, że degradację środowiska naturalnego powodują również przymusowe przemieszczenia ludności. Brak bezpieczeństwa w czasie wojny powodował, iż ludność przenosiła się do stref bezpieczniejszych, położonych wzdłuż linii kolejowej (CFB), szczególnie w miastach Huambo i Caala (por. ryc. 2)

Studium oparto na wywiadach z uchodźcami krajowymi, którzy jako jedną z głównych przyczyn uchodźstwa wymieniali degradację środowiska naturalnego w Angoli, przy czym respondenci nie używali terminu „uchodźstwa z powodu katastrof środowiska”, jedynie posługiwali się portugalską nazwą „deslocado” na określenie przymusowych migrantów.

Konkluzja autorki brzmi, iż właściwe jest stosowanie szerszego terminu, czyli „uchodźców krajowych”, którego nie powinno się kategoryzować np. na uchodźców wojennych czy uchodźców „środowiskowych” (związanych z katastrofami środowiska), gdyż przyczyny te najczęściej wzajemnie nakładają się.

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Anup Saikia

BANGLADESHI MIGRATION TO NORTH-EAST INDIA: PRESENT IMPACT AND FUTURE IMPLICATIONS

1. INTRODUCTION

The movement of people across geographical space in North-East India is as old as the hills. Immigration from Bangladesh, initiated in the early part of the last century, became illegal with the changed political boundaries of independent India. Since 1947, there have been dramatic changes in the scale and complexity of migration and in its implications. Illegal immigration from its demographically larger neighbour has become problematic for the North-East by virtue of its sheer volume. The present analysis considers the magnitude of immigration from Bangladesh into the region, as well as its present and future environmental and politico-security impacts.

2. THE REGION

The North Eastern Region (NER) comprises seven of India's states and shares international boundaries with China, Myanmar, Bangladesh and Bhutan (Fig. 1).

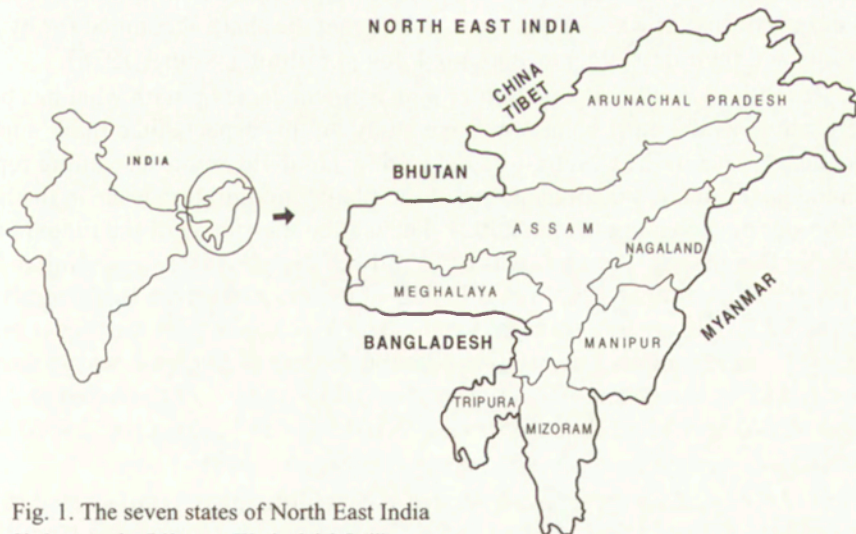


Fig. 1. The seven states of North East India
Siedem stanów Północno-Wschodnich Indii

Inhabited by numerous small ethnic groups at various stages of socio-cultural development, the 255,000 sq.km., largely mountainous NER has limited migrant absorbing capacity vis-à-vis the larger Indian states. Demographically, the NER is of about a quarter of Bangladesh's size, while density-wise the former has 141 persons per square kilometre, as against the latter's figure 7 times higher (1030 persons per square kilometre). However, in areal terms the NER is much larger, roughly 1.9 times the size of Bangladesh. Against such a background, it is not difficult to visualize the direction in which population flow occurs: from high-density Bangladesh to the relatively more sparsely populated NER.

3. VOLUME OF MIGRATION

Undocumented migration or illegal migration is by its very nature difficult to estimate the world over. In the NER likewise, gauging the volume of illegal migrants from Bangladesh remains difficult. Nonetheless several estimates do exist.

One estimate on the basis of Indian and Bangladeshi documents holds that not less than one third of Assam's 22.38 million population are immigrants and their descendants, and that 10–14 million Bangladeshi migrants were settled in India (Hazarika 1992), of which some 7 million are in Assam (Hazarika 1994). Another estimate by a former Governor of Arunachal Pradesh and West Bengal holds that about 5 million illegal migrants from Bangladesh are settled in Assam (Rajeshwar 1996). Central Home Ministry/Intelligence Bureau sources place Assam's alien population from Bangladesh at about 4 million. In turn, Myron Weiner pointed out that, had Assam's population increased at the same rate as the rest of India's between 1901 and 1971 (i.e. at a rate of 130%), the net population would have been 7.6 million rather than 15 million in 1971. On the basis of that, it was possible to estimate that the share accounted for by migrants and their descendants amounted to 7.4 million (Weiner 1978).

Recently, a Task Force on border management came up with what has been referred to as the most comprehensive study on this aspect since India's independence. One of the Committees, headed by Godbole, wrote a scathing report on the government's inept handling of the illegal immigration issue in the light of border management (Singh 2002). The Godbole estimate of the illegal presence of Bangladeshis in India was of 15 million (Singh 2002) suggesting in line with previous estimates that roughly half of the migrants from Bangladesh are in the NER, and about a third in Assam. This Godbole report was never made public, considering its sensitivity, and a much-sanitised version was extracted in a report by the Group of Ministers (GoM). Even the GoM stressed that the *"massive illegal immigration poses a grave danger to our security, social harmony and economic well-being"* (as cited in Singh, 2002).

On July 14, 2004 the Union Minister of State for Home Affairs stated in the Rajya Sabha, the Upper House of India's Parliament, that there were 12 million illegal Bangladeshi immigrants in India as on December 31, 2001; with the larg-

est concentrations in West Bengal and Assam, at 5.7 million and 5 million respectively (*Times of India*, 2004). Under pressure the estimate was soon retracted, but it indicated the difficult and contentious nature of the task of estimating illegal migration from Bangladesh.

However considering that nearly all the estimates cite a figure of approximately 5 million, we take this as the most likely figure of illegal Bangladeshi immigrants in Assam. A quantum of 5 million illegal Bangladeshi immigrants would mean that 19% of Assam's population constitutes illegal aliens. Few regions in the world present comparable data, as can be seen if the situation of the USA is compared with that of Assam. The former is one of the largest recipients of immigrants in the world, with 3 million or more considered to have illegal status (Weiner, Munz 1997). This would imply that about 1.2 percent of the populace there are residing as illegal migrants: a far cry from Assam's case. The situation is aggravated by the low technological levels and land carrying capacities in Assam compared to the USA.

4. ENVIRONMENTAL IMPACT

In the past the impact of migrants from Bangladesh on the environment was intricately linked with the magnitude of migration. Between 1930 and 1950 some 1,508,000 ha were settled by immigrants, mostly in the Brahmaputra Valley (Weiner 1978); and this led to the opening up of new areas, previously under dense jungles. Although depletion of forests occurred slowly in the face of limited accessibility, this also meant that government control of the twin scourges of expanding tea plantations established on cleared forest lands and the encroachment of immigrant peasants from present-day Bangladesh on to forest lands, was much more ineffective (Tucker 1988).

The contemporary impacts are no less significant. A growing population places increasing pressure on the land from which the requirements, such as food, fuel wood and timber in case of the North East, are met. As food requirements increase, even marginal land needs to be put under the plough. Forest resources from which various minor products including fuel wood are derived are needed in incremental quantities.

Shortened doubling times of populations have resulted, and the immigration factor from Bangladesh has hastened this process. In Tripura, a four-fold increase in population occurred during the first half of the last century, chiefly due to the influx of population from Bangladesh. During the subsequent 20 years 1951–71, the population again doubled (Ramakrishnan 1985). The impact on the rain forest is not difficult to visualize, and both secondary and primary forest become victims, the former more so given its accessibility.

A study estimated that 58% of the annual firewood requirement for a village population of 20 members was 3060 kg (Mishra, Ramakrishnan 1982), and if 500 kg of fuel wood is considered as the average annual consumption by 20 individuals the consumption for a population of 19.58 million in the North East in 1971 would work out at about 489×10^7 kg; an alarming impact on the natu-

ral resources on this account alone (Ramakrishnan 1985). The effect of an illegal immigrant burden (mostly in the lower income categories) of roughly 7 million must be gauged in terms of fuel usage and the poverty-environment linkages.

Beyond fuelwood consumption, illegal migrants from Bangladesh are known to have encroached on forest margins. Although illegal migrants tend to inhabit the 'char' areas (riverine tracts that are inundated during the monsoon), growing population pressure has ensured that some proportion spills over, encroaching on nearby forest areas. While it is true that illegal Bangladeshi migrants have damaged the geo-ecological conditions of *chars*, *beels* (inland bodies of fresh water) and *bathans* (grazing lands) for buffalo (Das 2001) the level of damage is difficult to estimate in the absence of reliable data. It is also alleged that Bangladeshi migrants are engaged in illegal felling of timber and timber smuggling.

Although there are several agents of deforestation, the increasing population pressure triggered by Bangladeshi immigrants has been one among others that has aggravated deforestation in the North East. Though the region accounts for under 8% of the country's geographical area, it contains more than a quarter of its forest cover, such that in terms of forest loss this is one of the critical areas in the country (FSI 1995). Without illegal migrants the NER's population – and the resultant pressure on land and forests – would have been substantially more limited.

5. CLIMATE CHANGE AND IMMIGRATION

If past and current environmental impacts of illegal immigrants have been substantial, the future does not throw up signs of a diminished impact. The answer to this equation lies in an unlikely phenomenon: climate change. Climate change would lead to sea level rise and submerge large coastal areas, deltas and islands the world over. Bangladesh would be one of the worst affected countries, straddling as it does the delta of the Ganga (Ganges) and Brahmaputra Rivers. Among those that would be affected under the worst-case scenario (i.e. a one-metre sea-level rise), a majority live in China and in Bangladesh (72 and 71 million people respectively – Gomme et al., 1998). Another study points out that a one-metre sea-level rise (Fig. 2) would have a significant impact in coastal and deltaic areas, and that in Bangladesh, 13 million people would be directly affected, with 16% of the rice-growing land being lost (Nicholls, Leatherman 1995).

Deltas like that of the Ganges-Brahmaputra of Bangladesh – as distinct from those in closed seas, like the Nile or the Danube – would be particularly vulnerable as they are areas in which sea and land interact most closely: their average elevation is usually very low, to the extent that tidal effects can be felt for several tens of kilometres, and in some cases hundreds, inland... complex agricultural systems, and rain-fed agriculture dependent on water quality (salinity) and the washing out of salts by rains before planting crops exist; a disaster in the deltas would have profound economic and political effects well

beyond the delta proper (Gommes et.al,1998). In such a situation, R. Gommes observes that a likely scenario could be outmigration.

Where would such ecological displacees seek refuge? The North-Eastern states of India being the nearest neighbours – already inhabited by substantial numbers of Bangladeshi migrants residing illegally – would most likely be the area into which such displacees would spill.

While climate-change-induced sea-level changes to the tune of close to a metre represent the "worst case", the most likely magnitude of sea-level rise is in the range from 38 to 55 cm. An estimate by the Intergovernmental Panel on Climate Change (IPCC) places the most likely figure between 8 and 88 centimeters in the next 100 years (Anonymous 2001). In such a case the affected population in Bangladesh is likely to be well under the extreme estimates of 70 million. Nonetheless, considering that indirect effects of sea-level change operating in addition to the direct one, there are a whole set of indirect effects that would be no less important, such that the impact on the North-East could be very substantial. Indirect effects include erosion patterns and damage to coastal infrastructure, salinization of wells, sub-optimal functioning of the sewerage sys-

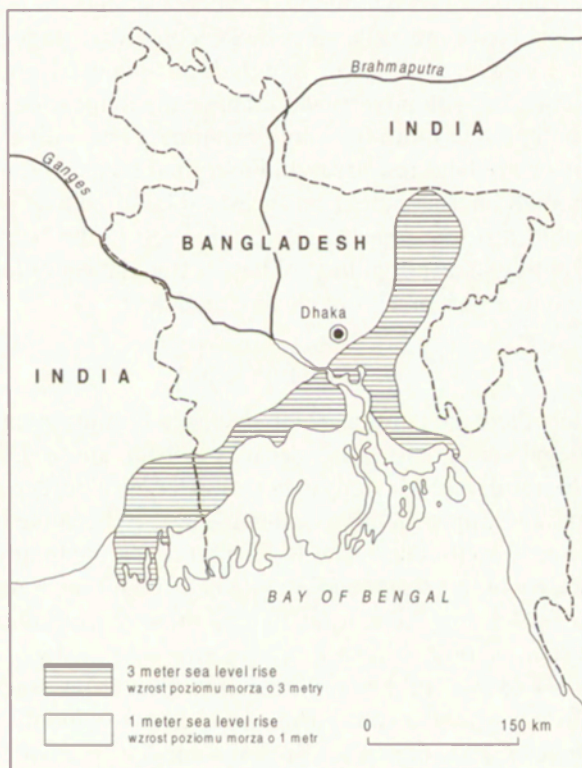


Fig. 2. Loss of land due to future sea level rise in Bangladesh

Przyszłe straty ziemi spowodowane podnoszeniem się poziomu morza w Bangladeszu

Source (źródło): Titus 1990.

tems of coastal cities with resulting health impacts and loss of biotic resources. In brief, the effects on human life would be deleterious in the extreme.

What options exist for Bangladesh? Is there a way out of the sea-level rise conundrum? Bangladesh could take protective measures, related to the construction of dykes and embankments along its coastline that would reduce the area of submergence. Here again one needs to stress a distinction between "*reactive adaptation*" and "*anticipative adaptation*". Given prevailing financial constraints, most developing countries might have to settle for reactive adaptation and try to stem sea level rise impacts *post facto*, with far more limited results as compared with pre-emptive action.

Although annual protection costs are estimated at about 0.1 per cent of gross domestic product (GDP), in the case of small developing countries these could be as high as 5 per cent of GDP. Putting aside as much as 5% of GDP towards a future event of considerable ramifications would be difficult for any developing country, and particularly for Bangladesh – as one of the world's most densely-populated nations burdened with severe overpopulation.

The tenuous linkages between population and the environment in the North-East would be compounded not merely by increased human numbers but also by another critical factor: poverty, since most ecological refugees would belong to economically weaker sections of Bangladeshi society. Heightened population densities coupled with poverty would have much more deleterious effects on the environment, and more intensive resource use would exacerbate over-exploitation of scarce land resources and marginal lands, and increase the utilization and human encroachment on forests. The effects of sea-level rise in Bangladesh could result in repercussions being felt in the North-East. Unfortunately State policy in tackling the problem of Bangladeshi illegal immigrants has remained contentious and inconclusive thus far.

6. STATE POLICY

Unfortunately there are political compulsions in framing state policy towards the issues of illegal immigrants and its security considerations. Despite the growing influence of immigrant Muslims in constituencies of border states like West Bengal and Assam, almost nothing is done – largely because local as well as central government politicians stand to lose more than gain anything. Matters are complicated by immigrants tending to be close knit by commonalities like religion, fear of detection and insecurity, and thereby tending to vote en bloc. They are thus in a position to play a determining role in state legislative bodies. In Assam's 126 Assembly constituencies, illegal immigrants constitute a majority in 36, according to Home Ministry sources (Sentinel, 2nd March, 2000 *as cited in* Narahari, 2002); in West Bengal a sudden spurt of Muslim legislators, reaching 47, is ascribed to the immigration of Muslims from Bangladesh, legislators that could influence decisions regarding illegal immigration (Narahari 2002). As such there exist a dual set of laws, one in Assam and another for the rest of the country. While the Foreigner's Act, 1946 (Act 31 of 1946) op-

erates in the whole of India, in Assam it is the Illegal Migration (Determination by Tribunals) Act 1983 (IMDT) that is in force for the detection of illegal migrants. While the repeal of the IMDT Act has been on the electoral agenda of a few parties, no serious efforts have been made at either the sub-national or national level.

This piece of legislation has merely had the effect of delaying and obstructing the process of action against illegal migrants in Assam (Reddy 1996), and has primarily served the interests of the illegal migrants (Sinha 1998), yet due to lack of political will and the growing clout of Bangladeshi migrant votes in Assam as well as in New Delhi, the Act continues to remain in force.

To complement legislation, border fencing between Assam and Bangladesh along the lines of the Punjab-Pakistan border has been carried out. However the pace of progress in fencing has been lethargic. Though the decision to fence the border was taken in 1985, actual fencing started only 7 years later and 15 years later it now remains half done. Compared to this, fencing in the Punjab sector was completed in 3 years flat, confirming the extremely slow pace of the work in Assam. Moreover the quality of fencing in Assam in terms of elevation, frequency of observation towers, lighting (which is absent) and density of troops guarding the border is a poor cousin of that in the Punjab sector (Sinha 1998). There are plans afoot to complete border fencing by 2007.

The tardy progress with fencing coupled with the cumbersome and time-consuming nature of legislation operating have allowed illegal migrants to continue entering Assam and its sister states in the North-East. Given the nature of illegal migration, wherein those involved constantly expand and strengthen social networks between their origin countries and destination areas and such networks inject a self-perpetuating dynamism into illegal flows (Hugo 1995), illegal migration can only continue if not accentuate in coming years. With state policy being eminently unsuccessful in tackling the problem, the observation that "*the great increase in illegal migration in the Asian region is being implicitly supported if not encouraged by governments at origin and destination through poor policing and little investment in detection of illegals*" (Hugo 1995) might be true in the context of the NER.

7. CONCLUSION

India has only recently begun to look upon the issue of illegal migrants from Bangladesh with concern. Contentious issues are at stake and in the guise of looking after the interests of the minority religious population politicians and policymakers actually «farm» immigrant votes to further personal ends. The environmental and socio-economic impacts that are currently significant are likely to become accentuated in the near future.

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WSPÓŁCZESNE I PRZYSZŁE KONSEKWENCJE MIGRACJI Z BANGLADESZU DO INDII

STRESZCZENIE

Imigracja z Bangladeszu do Północno-Wschodnich Indii, zapoczątkowana na początku ubiegłego wieku, została uznana za nielegalną wraz ze zmianą granic politycznych Indii po uzyskaniu niepodległości. Od 1947 r. nastąpiły dramatyczne zmiany w skali i strukturze migracji i ich konsekwencjach dla środowiska w indyjskim Regionie Północno-Wschodnim. Zanalizowano wielkość i uwarunkowania imigracji z Bangladeszu do Regionu (ok. 7 mln osób, w tym 5 mln imigrantów w Prowincji Assam), ich współczesne i przyszłe konsekwencje polityczne, dla stanu równowagi bezpieczeństwa publicznego i środowiska naturalnego.

Przedstawiono liczne przykłady dewastacji środowiska naturalnego w Regionie przez nielegalnych imigrantów żyjących w warunkach skrajnego ubóstwa. Negatywny wpływ masywnej imigracji na degradację środowiska naturalnego np. w dolinie Brahmaputry był spowodowany wylesianiem olbrzymich połąci pierwotnej dżungli (1,508 mln ha uzyskanej w ten sposób ziemi do zasiedlenia przez imigrantów) i zakładaniem na jej miejscu nowych plantacji herbaty. Lasy deszczowe są niszczone, na niespotykaną dotychczas skalę, z powodu rabunkowej gospodarki wylesiania i eksploatacji drewna na opał. Działania te wpłynęły niekorzystnie na zmiany klimatyczne, wskutek których systematycznie podnosi się poziom morza w Delcie Gangesu i Brahmaputry, głównie na terenie dzisiejszego Bangladeszu (por. ryc. 2). Według pesymistycznego scenariusza podniesienie się poziomu morza o 1 m spowodowałoby utratę 16% powierzchni upraw ryżu i pozbawiłoby podstaw do egzystencji ok. 13 mln ludzi w Bangladeszu. Negatywne współczesne konsekwencje społeczno-gospodarcze i środowiskowe imigracji z Bangladeszu będą nasilać się w przyszłości, dlatego polityka migracyjna w Regionie będzie szczególnie restrykcyjna.

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V. POPULATION CHANGE, MIGRATION AND DEVELOPMENT

Population, environment and development

Prace Geograficzne nr 202 (2005)

Allan M. Findlay, Donald Houston

MIGRATION, ECONOMY AND ENVIRONMENT: A REVIEW OF CONTEMPORARY DRIVERS OF MIGRATION TO SCOTLAND

1. INTRODUCTION

Many demographic, economic, social and cultural factors influence trends both in internal and international migration over time (Champion, Fotheringham et al., 1999). Traditionally the research literature suggests that most people have little choice over where they live and that economic factors determine most inter-regional and international trends. In the more advanced economies, however, at the beginning of the 21st century there are several forces at work that may be changing this situation. On one hand ageing of the population has meant that a higher proportion of the population than ever before are not constrained by the need to locate relative to labour market forces. At the same time within the economically active population technological developments have made home-working more feasible and have allowed some households to give more emphasis to quality of life considerations and other environmental influences in choosing where to live. It can therefore be argued that place attractiveness and quality of life factors are growing in significance in explaining migration behaviour (Findlay, Rogerson 1993). In addition some analysts (Florida 2002) have argued that what is perceived to be a pleasant and stimulating environment should be seen to be a key factor used in promoting skilled in-migration to the economic benefit of a receiving region.

R. Florida (2002) argues that the ideas and creativity of talented individuals are central to economic development, and the attraction and retention of this talent pool is critical to the development of a knowledge economy. Although there is a growing body of research which is focused on the movement, particularly the international movement, of high-skilled labour (Lowell, Findlay 2001) and a parallel literature on the importance of "*talent*" for economic development (Florida 2002), we still know little of the "*dynamics of this process as it affects labour flows into and out of mature industrial regions such as Scotland*". In particular there is a need for wider appreciation of whether the quality of the environment (physical and social) has any appreciable influence on migration or whether it remains a secondary driver of migration.

If arguments about the economic gains that can result from net skilled immigration are coupled to these ideas about the power of place and environmental attractiveness in influencing migration, then a strong case exists for examining the potential for a country adopting a selective targeted immigration policy.

As human capital becomes increasingly central to knowledge based economies, it can readily be argued that the attraction of skilled migrants along with the retention of the existing talent pool will be critical to the development of an economy.

This paper examines these issues relative to the experience of Scotland. The paper restricts its scope largely to evidence from secondary data, although clearly many of the questions posed above merit wider primary research investigation. The paper is structured into three sections. In the first section, the authors investigate empirical trends in in-migration to Scotland. Then the argument turns to considering the determinants and drivers of migration that seem to relate to these patterns. Finally the paper seeks to reach conclusions about the relative importance of the economy and the environment relative to other drivers of migration to Scotland.

2. MIGRATION TO SCOTLAND: RECENT TRENDS

Following the publication of the 2001 census, there has been an upsurge of interest in the demographic changes taking place in Scotland. On the one hand the decline of fertility to record low levels has attracted much attention (Wilson et al., 2003). On the other, the response of the leader of the Scottish government to Scotland's falling population, in calling for policies to encourage more in-migration and immigration has focused some attention of population mobility. It is the latter that we focus on below.

An important starting point is to recognise that Scotland does not face a "*migration problem*". Scotland has seldom experienced such a healthy migration balance both in relation to the UK and the rest of the world as it does at the beginning of the 21st century.

Scotland has a long history of population loss through migration to other parts of the UK as well as emigration to other parts of the world. The Scottish diaspora has been well researched both in terms of the historical patterns of Scottish settlement in England as well as across the former British empire (Devine 1999). As will be seen below, Scotland's position in national and international migration systems has been radically transformed over recent decades and Scotland should now be characterised as a location with a net migration balance and with prospects of becoming an area of significant net immigration, both from overseas and the rest of the UK.

Analysts agree that secondary data on migration to and from Scotland, as elsewhere in the UK, are flawed for a number of reasons. For example the results of the 2001 census indicate that previous population estimates for Scotland undercounted the level of out-migration and emigration by about 50,000 persons (Scottish Registrar General, 2002 – add reference to annual report). In light of the 2001 census, the UK Office of National Statistics in 2003 issued adjusted estimates of international migration for the previous decade, and a major review of how migration trends can be estimated is ongoing. There is a particular lacuna in data on emigration. One interesting attempt to address this is the

recent study by A. Stockdale (2002b) of out-migration from rural Scotland. If there is uncertainty over absolute numbers of movers, evidence about the characteristics of migrants is even more uncertain, although the creation of some new data sets such as the Scottish Longitudinal Study will help to tackle this to some extent.

Setting aside these concerns about data, there is clear evidence that Scotland's position in internal and international migration systems is changing very significantly. The most recent published statistics indicate a net gain of 9088 people by migration in 2002–2003. There have been small gains of this kind in two of the last four years, but what is more significant is that the gross in and out flows of about 70,000 persons per year are more or less in balance, with the net figures reflecting only minor year on year oscillations. Scotland should therefore no longer be considered as a country of net emigration as it was in the past.

Another striking feature that has received remarkably little attention is the longer term trend in migration. Figure 1 plots net migration (internal and international) over the last fifty years. Although the picture is one marked by substantial annual oscillations (probably reflecting in part the inadequacies of the database as well as economic cycle effects most notably the peaks in the early 1970s and early 1990s UK recessions), the long-run trend is unquestionably upwards. The trend line fitted to the data supports the view that Scotland has shifted from a situation of having significant net losses by migration through a phase of minor net losses towards a situation of small net gains by migration.

While projecting into the future is dangerous based only on statistical material without process-based evidence of the drivers of migration, it is self-evident that forward projection of this line to 2021 leads to estimates of net gains that are quite substantial. By 2021 the best fit line for all net migration would

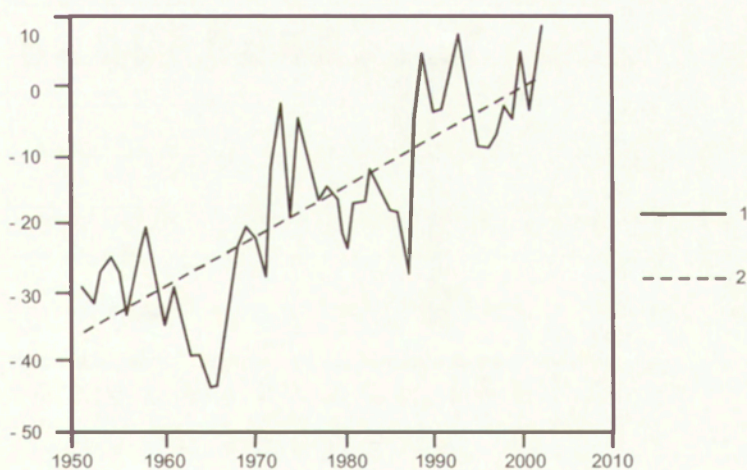


Fig. 1. Trends in Scottish net migration, 1951–2002. 1 – observed, 2 – lineary
Trendy zmian salda migracji w Szkocji, 1951–2002. 1 – wartości obserwowane,
2 – trend liniowy

Source (źródło): based on GRO annual report, 2002.

anticipate a gain of 15,500 per annum (30,000 by 2041). Extrapolations of this kind without reasoned understanding of the basis for migration changes are however of little value.

Figure 2 graphs the demographic structure of net migration, with peaks losses in the 20–24 cohort, but also significant losses in the 25–29 cohorts. Although absolute flow levels in older cohorts are low, Scotland makes some interesting net gains for all cohorts over 35 years of age peaking in the 55–59 cohort. Net gains in the 15–19 cohort are also significant and can be readily explained in terms of the net gain that Scotland enjoys in the flow of students within the UK.

The pattern of migration gains and losses in educational terms is a complex one that has been discussed in more detail elsewhere (Findlay et al., 2003). The Quarterly Labour Force Survey suggests that out-migrants of working age from Scotland (defined by place of birth), while being more qualified than the non-migrant population, are less likely to have two or more a levels or three or more highers than in-migrants from the rest of the UK. This pattern is repeated for migrants with degree level qualifications (Findlay et al., 2003, 55). This might mistakenly lead to the conclusion that Scotland has made net skills gains through migration. However, this is not the case, since historically the net migration balance has not been in Scotland's favour. One would anticipate, however, with the recent change in migration flows shifting in Scotland's favour that this position has altered.

Despite the widely held view that Scotland loses large numbers of its most talented young people through out-migration, the contrary appears to be the case. The evidence available to researchers from the most recent HESA data shows that Scotland retained a higher proportion of its first degree graduates in the local

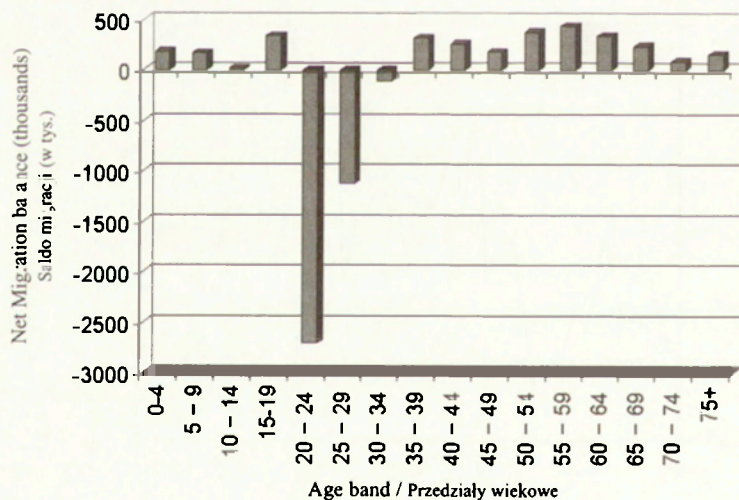


Fig. 2. Net within-UK migration for Scotland by Age, 2000–2001

Saldo migracji do Szkocji z pozostałych terenów Wielkiej Brytanii według grup wiekowych, 2000–2001

Source (źródło): 2001 Census.

labour market than any other region in the UK (85.1 per cent compared to for example the North-West of England at 66.7 per cent). It also had a lower proportion of its first degree graduates entering the Greater London labour market for their first job than any other UK region (Findlay et al., 2003, 62). As L. Jamieson (2000) has shown, however, the views of young Scots on migration are very complex. There is scope for more research on how their skills match the demands of the local labour market and whether to some extent skilled young people accept jobs for which they are overqualified in order to avoid having to leave the country.

Some socio-economic statistics are now available for the 2001 census for household reference persons. Tables 1 and 2 provide some indications of the relative composition of migration flows for this sub-group of the population. As in 1991, so also in 2001, migrants (both into and out of Scotland to the rest of the UK) were more likely to be economically active (employees and self-employed) than the non-migrant population. In terms of net flows there was however a small net loss of people in these groups. Scotland made small net gains mainly through the positive balance in the flow of students (Table 1).

In 2001, migrants (both into and out of Scotland) who were household reference persons were much more likely to be of managerial or professional status than non-migrants. The in and out flows are virtually in balance (Table 2). The 1991 SARs confirmed a similar picture a decade earlier with the majority of labour market circulation dominantly involving professional and managerial staff, but with the suggestion of a slight net gain by Scotland (Findlay, Stockdale et al, 2002). Comparative SARs information for 2001 is awaited with interest.

Table 1. Socio-economic activity of male HRP by type of migration (%), 2000–2001

Socio-economic activity	Non-migrants	In-migration		Out-migration
		From rest of UK	From outside UK	To rest of UK
Employee	54.14	62.25	61.94	71.13
Self-employed	9.11	8.17	5.62	5.59
Unemployed	3.15	5.65	4.64	4.27
Full-time student	0.46	1.06	3.58	1.17
Retired	19.32	9.98	4.42	6.21
Student	0.60	2.34	10.28	2.90
Looking after home	2.92	3.03	2.78	3.21
Permanently sick	6.99	4.33	0.80	3.32
Other	3.31	3.20	5.94	2.21
Total	100.00	100.00	100.00	100.00

Source: 2001 Census.

Table 2. Socio-economic position of male HRP by type of migration (%), 2000–2001

Occupation	Non-migrants	In-migration		Out-migration To rest of UK
		From rest of UK	From outside UK	
Higher managerial and professional occupations	7.58	24.07	31.30	27.59
Lower managerial and professional occupations	16.18	27.71	22.10	28.29
Intermediate occupations	6.29	7.29	7.03	7.05
Small employers and own account workers	6.56	4.90	3.66	3.14
Lower supervisory and technical occupations	7.83	5.10	4.64	5.67
Semi-routine occupations	9.23	6.86	5.53	6.66
Routine occupations	9.45	5.56	3.96	5.22
Never worked or long-term unemployed	3.22	2.59	3.60	2.76
Not classified	33.66	15.93	18.18	13.63
Total	100.00	100.00	100.00	100.00

Source: 2001 Census.

The picture of circulation and migration exchanges is underscored when the geographical pattern of migration is investigated. Edinburgh (despite not being the largest city) attracts by far the largest number of migrants from the rest of the UK, but it is also the main point of origin for migrant departures. The largest net gains 2000–2001 were also to Edinburgh, with Argyll and Highland also making significant net gains. The picture is rather different when numbers are standardised relative to the resident population, dampening the urban concentrations evident in the absolute figures and increasing the relative importance of in-migration to rural areas. The Registrar General's report for 2002 shows the highest net migration rates (1991–2002) to be in rural areas such as the Borders and Perth and Kinross.

Figure 3 provides another perspective on these processes by considering only English-born persons and by standardising number of migrants (again defined by place of birth) relative to the total resident population. The effect is to show that, relative to the resident population, in-migration of persons born in England is most evident in parts of the Highlands such as in Badenoch and Deeside and in the Borders. Later in this paper there will be further discussion of how these contrasting migration geographies might be interpreted. Although the absolute number of English-born in Edinburgh has risen rapidly, the greatest relative concentration remains in certain rural areas.

Turning briefly to international migration, Table 3 ranks the top 20 countries for foreign-born citizens from 1981–2001. The long-established Irish-born community, while remaining the single largest group, shows a continual decline (absolute and relative) in significance over these 20 years, while immigration from Pakistan and India become of more importance over the same period.

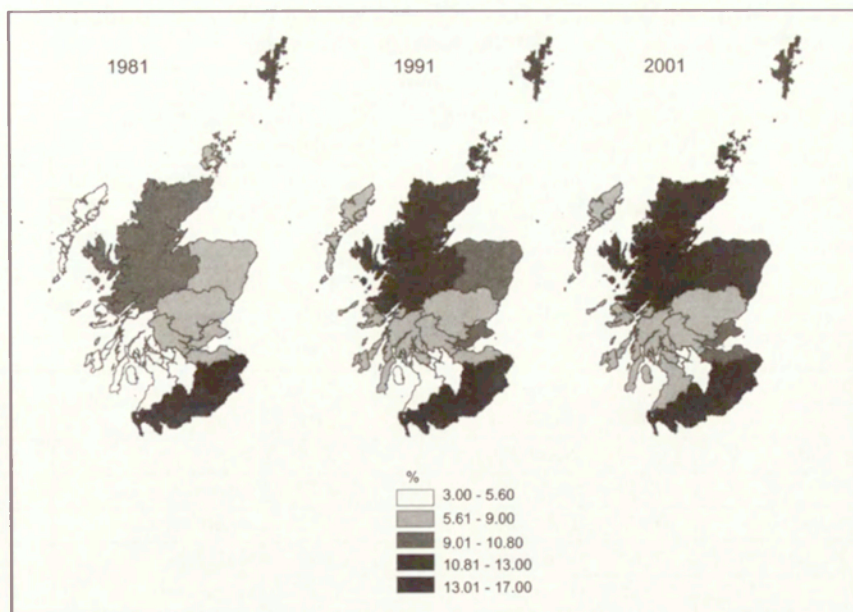


Fig. 3. Distribution of English in Scotland, 1981–2001

Rozmieszczenie Anglików w Szkocji, 1981–2001.

Source (źródło): 1981, 1991 and 2001 Census.

Germany's second ranked position in 2001 might surprise some observers, especially in view of the 35 per cent growth in numbers since 1991, but this can be partially understood in terms of Scotland's strong association with the armed services and the return home of service families whose children were born in Germany. Not all the increase in German-born persons, however, should be taken to reflect changing military deployments. Although the numbers of Italian, French and Spanish in Scotland are smaller they also enjoyed significant increases (1991–2001), with the French and Spanish-born populations more than doubling.

Much more could be said by way of interpretation of Table 3, but given the purpose of this paper, only two other issues are commented on here. First, it is noticeable that people born in the US citizens drop from second ranked position in 1981 to fourth in 2001 and this was accompanied by an absolute drop in the size of this minority group. Changes in US military deployment seem likely to be the main reason for these trends. Second, the large increase in the number of South African born citizens is interesting (second largest growth in absolute terms) once again pointing to the impact on Scotland of changing geopolitical circumstances in another part of the globe.

Finally a point worthy of note concerning international migration (British and foreign citizenship) to Scotland is that, in the year prior to the 2001 census, Edinburgh was by far the most important destination in numerical terms for inflows to Scotland. It had almost twice as many arrivals from outside the UK as was experienced by Glasgow. The effect becomes even stronger when mi-

Table 3. Migration defined by Place of Birth: Top 20 Countries of Birth, 1981–2001 (per thousand population)

2001		1991		1981	
Place of Birth	% of total population	Place of Birth	% of total population	Place of Birth	% of total population
Republic of Ireland	4.30	Republic of Ireland	4.56	Republic of Ireland	5.37
Germany	3.69	Germany	2.78	USA	2.43
Pakistan	2.50	USA	2.52	Germany	2.20
USA	2.20	Pakistan	1.88	India	1.81
India	2.08	India	1.80	Canada	1.70
Canada	1.69	Canada	1.59	Pakistan	1.28
South Africa	1.54	Hong Kong	1.18	Poland	1.01
Australia	1.49	Australia	1.01	Hong Kong	0.97
Hong Kong	1.40	South Africa	0.88	Italy	0.95
Italy	0.98	Italy	0.79	Australia	0.95
France	0.96	Poland	0.72	South Africa	0.72
New Zealand	0.67	Malaysia	0.50	Malaysia	0.51
China	0.66	France	0.47	Singapore	0.47
Netherlands	0.64	Singapore	0.47	New Zealand	0.39
Malaysia	0.57	New Zealand	0.47	Kenya	0.33
Singapore	0.55	Netherlands	0.43	South America	0.33
Spain	0.50	Kenya	0.36	France	0.32
Poland	0.49	China	0.35	Netherlands	0.31
Kenya	0.41	Cyprus	0.27	USSR	0.28
Zimbabwe	0.41	Malta & Gozo	0.25	Malta & Gozo	0.28

Source: 1981, 1991 and 2001 Census.

gration rates are calculated. Unlike internal migration, the highest international migration rates are limited to the cities and do not extend to rural areas. Indeed Edinburgh and Aberdeen stand out as significant poles of international immigration compared with the rest of Scotland.

In this section, an attempt has been made to describe some key features of migration to and from Scotland, as revealed by the Census, the UK International Passenger Survey and to a lesser extent the Labour Force Survey. Discussion has, however, in general stopped short of interpreting the drivers of migration, and it is to this that attention now turns.

3. MOBILITY TRENDS AND MIGRANT MOTIVATIONS

It has been suggested that Western Societies are in a phase of high mobility, due to changing cultural values and improved transport and communications technologies. In terms of migration these factors can be argued to have facilitated greater movement producing a greater mixing of the Scottish and English populations than at any time in the past. Indeed it has contributed to Scotland becoming a much more cosmopolitan society in terms of facilitating the immi-

Table 4. English Born in Scotland and Scottish Born in England over time

	2001		1991		1981	
	Total number	% of total population	Total number	% of total population	Total number	% of total population
English living in Scotland	408948	8.08	354268	7.09	297784	5.91
Scottish living in England	794577	1.62	743856	1.58	731472	1.60
	Change 1981–1991		Change 1991–2001		Change 1981–2001	
	Total number	%	Total number	%	Total number	%
English living in Scotland	56484	18.97	54680	15.43	111164	37.33
Scottish living in England	12384	1.69	50721	6.82	63105	8.63

gration of a large number of ethnically distinct groups as well as the emigration of Scots to every corner of the earth producing new contact patterns in people's personal and working lives. These wider contact patterns have affected the extent of intermarriage and migration for other personal reasons such as study, as well as expanding labour market exchanges. To some extent the rise in French, German and Spanish-born populations living in Scotland (and discussed above) may reflect these forces.

Table 4 charts some of these trends over the last three decades in terms of the rising proportion of Scots-born people living in England and inversely of English-born persons living in Scotland. Interestingly the table indicates first that there are almost twice as many Scots living south of the border as there are English born persons living in Scotland (not a picture widely presented in the media); although the English in Scotland represent a substantially higher proportion of the total population than the Scots in England. Secondly, it shows that the increase in the two populations living outside their country of birth between 1991 and 2001 was very similar (54,000 more English migrants in Scotland in 2001 and 51,000 more Scottish migrants in England). Such data does not, however, prove that the rising numbers in these populations are moving simply because of cultural or technological changes in mobility, that might reflect an increasing ability of people to choose where they want to live.

Some clues about these trends emerge from asking what motivating factors underpin migration behaviour (*General Registrar Office Scotland, 2002*). Motivational data derived from migrant surveys is of course notoriously difficult to interpret. Do migrants vote with their feet (Findlay, Rogerson 1993) or are their actions better accounted for by determinants (such as housing and labour markets) which are beyond their control, but in which they are inextricably caught up?

The results of a recent survey of 1200 households compared the motivations of English migrants to those of Scots migrating long distances within Scotland (Findlay, Stockdale et al., 2003). The results show that longer distance migrants

Table 5. International migration: estimates from the international Passenger Survey for The United Kingdom and Scotland

Reasons for migration	Inflow						Outflow						Balance		
	1980-89		1990-99		1995-01		1980-89		1990-99		1995-01		1980-89	1990-99	1995-01
	wt	%	wt	%	wt	%	wt	%	wt	%	wt	%	wt	wt	wt
UK															
All reasons	2089.1	1	2704.5	1	2225.2	2	2104.2	1	2179.9	2	1605.4	2	-15.1	524.6	619.8
Work related	324.3	4	582.4	3	576.9	4	465.6	3	665.5	3	538.3	4	-141.3	-83.1	38.6
Accompany/join	525.2	3	717.9	3	494.1	3	459.6	3	560.9	3	342.7	5	65.6	157.1	151.5
Formal study	329.7	4	593.6	3	518.1	4	56.6	8	105.9	7	71.4	9	273.1	487.6	446.7
Others	256.2	4	556.1	3	487.2	3	232.0	4	488.5	3	441.3	3	24.2	67.6	45.8
No reason stated	653.7	3	254.5	6	148.9	9	890.4	2	359.1	4	211.8	7	-236.7	-104.6	-62.8
Scotland															
All reasons	126.4	6	172.4	7	115.8	8	197.3	4	190.4	6	129.4	8	-70.9	-17.9	-13.6
Work related	17.4	13	26.2	16	25.2	17	49.8	9	54.9	12	41.6	14	-32.4	-28.7	-16.4
Accompany/join	32.0	11	42.8	12	19.1	18	43.8	10	54.0	12	33.1	16	-11.8	-11.2	-14
Formal study	24.6	12	45.7	13	34.3	15	3.6	34	8.3	30	5.8	39	20.9	37.5	28.5
Others	13.4	16	26.5	17	19.6	16	21.9	10	37.5	13	32.0	14	-8.5	-11	-12.3
No reason stated	39.0	11	31.2	18	17.5	27	78.1	6	35.7	15	16.9	25	-39.1	-4.5	0.6

Source: unpublished data from ONS.

are driven mainly by labour market forces (73 per cent gave labour market reasons as the dominant driver), but leave unspecified how labour markets operate to organise and shape migration behaviour. What is particularly interesting about this ESRC sponsored survey, however, is that the results showed a motivational shift over time. Namely, it pointed to recent migrants as being much more rather than less likely to be motivated by labour market factors than earlier migrants.

Special tabulations produced for this paper from the International Passenger Survey show less clear cut motivational patterns (possibly because international migrants entering the country without a work permit are unlikely at the time of entry to declare employment as their main reason for migration). Some 22 per cent of those entering Scotland from abroad between 1995 and 2001 did so "officially" for work reasons, while 32 per cent of departures were work related (Table 5). These figures contrast with the reasons given in the 1980^s (immigrants 14 per cent for work reasons and emigrants 25 per cent). The figures do not differ markedly from the motivations given by immigrants and emigrants to the UK as a whole, but once again the importance of work-related reasons for migration increases rather than reduces over time.

In summary, while no one would argue that motivational data should be interpreted at face value as an adequate account in itself of migration behaviour, it is interesting what it tells the researcher about post-migration rationalisation of movement patterns. In an increasingly individualised post-modern society one might have expected more and more migrants to claim that environmental and quality of life factors dominated their choices of where to live. In practice, the evidence for long distance movers to Scotland (both internal and international) suggests people increasingly perceive their behaviour to be driven by the labour market.

4. DETERMINANTS OF MIGRATION

The discussion above suggest that individual choices about migration for personal reasons such as environmental factors, marriage, better housing and quality of life remain relatively unimportant in the eyes of migrants in explaining longer distance migration into and out of Scotland. Instead migration choices seem to be linked ever more strongly to economic circumstances structured by deeper forces. In light of this conclusion it is useful to consider in a little more detail some of the main determinants of migration identified in the modelling literature.

Environmental factors: T. Champion, A. Fotheringham *et al.* (1999) in their comprehensive review of the determinants of migration flows in England, list the physical and social environment as a factor that affects migration, but they note that it predominantly influences short to medium distance moves from urban to rural areas. It has little power in accounting for longer distance moves (Champion, Fotheringham *et al.*, 1999, p. 104). In the case of longer distance migration to Scotland is there any evidence to the contrary? The strongest evidence

would seem to be the flow of English migrants to the Scottish countryside, shown earlier in Figure 4. The patterning of these flows certainly appears to suggest that certain types of rural landscapes are attractive destinations to longer distance migrants and that images of what might be perceived to be iconically attractive rural landscapes have a distinct effect on shaping this flow. The effect becomes less marked if one ignores in-migration to the rural Borderlands of southern Scotland where simple proximity to the English border might help account for many of the flows simply in terms of distance decay effects within classic interaction modelling.

Detailed survey work of in-migration to the Scottish countryside reveals some further points of interest. A major survey of 700 households conducted in 1997 indicated that access to scenic areas was cited as the single most important aspect of living in rural areas of Scotland (Findlay *et al.*, 1999, p. 57). However, amongst incomers who were in employment, quality of life was not the dominant motivation for moving. Only amongst incomers who were not in employment was the environment a dominant reason for moving, and this group (while significant, as shown for example from the net gains in the more elderly cohorts in Figure 2) was always a tiny minority of the total migrant population. Many migrants to rural areas were happy to commute to Scotland's cities for work, while a separate survey of English migrants to Scotland's cities in 2000 (Findlay, Stockdale *et al.*, 2003) found many of the latter group very satisfied with living and working in an urban environment. These locations after all had good weekend access to rural areas of high scenic value.

While some English migrants to Scotland therefore seem to be influenced by environmental factors, available evidence therefore points to clear conclusions. First, in absolute terms most migrants (both from within the UK and abroad) settle in urban Scotland (see empirical data in the introductory part of this paper). Second most migrants to rural areas explain their moves in terms of non-environmental terms, and reinforce economic explanations for longer distance migrants. Third, environmental factors are appreciated particularly by older migrants and remain a secondary consideration for most migrants.

Demographic structure: Migration researchers agree that one of the few generalisations about migration that can be extended to almost any situation, is that it is a highly age selective process. Young people are much more mobile than any other group in the population. Children have little control over their mobility, while mobility levels for cohorts aged 30 and older are generally low with people rooted by family and labour market commitments. This age selectivity has already been shown to apply to migration to and from Scotland (Fig. 2), while changes in the number of young people in a population, as for example when a baby boom enters the housing and labour market has been posited as an explanation of rising mobility rates. J. Mitchell and N. Pain (2003) in modelling UK immigration for the period 1981–2000, suggest that a rise in one percentage point in the share of a population aged 15–29 raises the total inflow by 5.9 percent. On a similar basis it can be hypothesised that the projected reduc-

tion in the Scottish population in the 15–29 age cohorts over the next few decades, as a share of total Scottish population, will reduce the potential number of out-migrants. This of course may be balanced by similar age structure effects in other parts of the UK affecting in-migration. It will not, however, apply to anything like the same extent to major international sources of persons seeking to migrate to Scotland such as India and Pakistan. It is also interesting to note that there is no demographic reason why the net migration gains to Scotland made currently in the older cohorts should diminish.

Social and cultural factors: Evidence has already been presented to show that socio-economic and employment status selectively impinge on the Scottish migration regime (Table 1 and 2). In the past few decades an ever-larger proportion of the UK population has been employed in the service sector, especially in professional and managerial positions (Rose *et al.*, 2001). At the same time the reorganization of the nature of service sector work has meant that more people than ever before have had to travel extensively for their work and have been asked by their employers to relocate at some point in their career (Green *et al.*, 1999). By implication, mobility has become a defining feature of the so-called 'new service class' (Noller, Ronneberger 1996; Findlay, Stockdale *et al.* 2003). D. McKinnon and N. Phelps (2001, p. 253) go further in suggesting that regional cities need to encourage the development of an 'inward investment service class' to support processes of globalisation.

In a Scottish context there seems compelling evidence to support the view that an ever greater part of English-born migration to Scottish cities is made up of new service class workers and that when migrant surveys reveal that people are moving for work-related reasons, this often reflects intra-company transfers of people from south of the border to Scottish branch plants of regional offices (Findlay, Stockdale *et al.*, 2003).

A different type of migration is referred to by T. Champion, A. Fotheringham *et al.* (1999) in relation to cultural factors. They note that once international migration links are established with a particular point of origin, that subsequent migration from these sources is more likely. Ethnic clusters such as Pakistanis and Indians in Scotland would fall into this category of mover. Undoubtedly there is evidence that during the 1990s immigration continued from these sources to Scotland (Table 3) and it seems probable that it will continue in the future. The scale of such flows seems likely to be controlled for the foreseeable future by UK immigration policy rather than being determined primarily by forces originating in Scotland. The flow will however change in nature reflecting the effects of transnationalism impacting on the organization of these ethnic minorities linking, them like others in the UK to global diasporas and to the other international opportunities that these will produce. It can be expected that not only will the forces of transnationalism therefore sustain existing linkages between Scotland, Pakistan and India, but it will in the future produce demands for more frequent travel back and forth as well the emergence of new international linkages with Indian and Pakistani communities in other parts of the world (and probably especially with those settled in the USA and Canada).

Labour market and other economic factors: A third force identified above that impacts on migration is the organization and functioning of labour markets. Numerous studies substantiate the power of inequalities in incomes and unemployment rates in stimulating labour migration flows (Blotevogel *et al.* 1997; Glover *et al.* 2001; Mitchell, Pain 2003). T. Champion, A. Fotheringham *et al.* (1999, p. 101) recommend that the scale of job creation and job losses by region should be the main determinant used in making migration projections. Recent modelling of Scottish net migration (between Scotland and the rest of the UK) shows a particularly strong correlation ($r = -0.75$) for the years 1986–2000 with the differential between the Scottish unemployment rate and that of the South East of England (Findlay, Harrison *et al.* 2003, p. 23). This is but one of many studies that suggest regional labour market inequalities may be an important influence affecting the scale of internal in or out-migration to/from Scotland.

The difficulty of treating the links between migration and labour markets in this way is that globalisation has meant that labour markets are increasingly organised in a hierarchical fashion. T. Fielding (1997) for example has argued that this places labour markets such as that in Scotland in a weaker position relative to that of core regions such as the South East of England, with professional and managerial staff migrating to and from the South East on what he sees as a labour market escalator whose structure is largely shaped by the internal labour markets of large companies and institutions. Increased integration of regional economies (Lee 2000), such as that of Scotland, into wider global systems has meant the reshaping and re-organization not only of local and regional labour markets at a national scale, but also internationally. This in turn can also be expected to be an ongoing force influencing the restructuring of migration opportunities. Cities such as Edinburgh, that have grown to assume key command and control functions, as a result have come to host an ever increasing number of service class migrants from higher levels in the global urban hierarchy as evidenced in the data presented earlier in this paper and elsewhere (Findlay, Stockdale *et al.* 2003b).

The integration of regional economies in a wider national, international and global system in turn may produce a functional disconnection within the (Scottish) labour market. This may increasingly result in social and cultural tensions (Nairn 1983) as locally trained staff find themselves faced increasingly with the choice of moving out of the region on a career escalator to get promotion in the core region or alternatively accepting more limited opportunities for progression in situ. The restructuring of professional and managerial labour markets of the kind implied above is particularly problematic when it is juxtaposed with forces favouring stronger regional identities and attempts to achieve increased regional autonomy. This is true whether it be in the specific context of devolution or whether it be in relation to other actions of the state to promote political and cultural processes intended to counter regional separatist movements of the kind found in other parts of Western Europe.

Policies impinging on migration: A fourth determinant of migration worthy of note is that of public policy, not only in relation to international migration, but also in relation to forces shaping the patterns of internal migration. Policies for example on land for new housing would be one example of the latter category of public policy interventions that might affect migration if significantly different policies emerged north and south of the border. This could add to other housing market effects that appear to influence migration waves between the south and north of the UK (Dunford, Fielding 1997).

Clearly UK national policy on immigration impacts significantly on the level of non-UK citizens coming to Scotland. Thus far the more positive approach taken to economic migration by the two Labour Governments to hold power since 1997 has primarily resulted in increased numbers of immigrants to the South East of England. These inflows may, however, result in a supply of foreign labour to employers in the South East that might in other circumstances be looked to regional labour markets such as Scotland (although technically under the work permit rules this displacement effect should not be taking place). Proving this would be very difficult especially in view of the relatively free flow of EU labour. There has however been an increased volume of asylum seekers entering the UK and a significant number of these have been redistributed to Scotland under the government's refugee dispersal policy. This has made Glasgow the single largest reception area outside the South East. It is interesting that the Westminster government has been happy to organise a regional dispersal of asylum seekers to Scotland, but thus far has been resistant to calls for the UK Work permit system to also operate a regional quota system.

While it is tempting often to see immigration policy as a purely national affair at the UK level, the politicisation of migration at other scales seems likely to increasingly impact on immigration to the UK and to Scotland. On the one hand it should be noted that political forces at EU level have resulted in recent decades both in increased freedom of movement between countries in Western Europe (as perhaps is reflected in the increased French, German and Spanish presence in Scotland – Table 3) and also in the increased area over which such movements can take place as ever more countries have joined the EU. On the other hand, devolution has produced new pressures on the UK government to cede partial control of immigration issues to the devolved nations, a pressure that seems probable to continue on account of regional demographic and economic disparities.

5. CONCLUSIONS

Researchers examining specific migration-related determinants of the kind discussed above provide interesting pointers to predictor variables that may be of value in modelling migration. They only hint at the deeper forces responsible for restructuring populations, economies and societies. Discussion of the determinants of migration has however been helpful in identifying what these more nebulous, yet key drivers might be. They include:

- a) drivers shaping the mobility cultures (increased personal mobility located in a context of substantial time-space convergence) of Scottish society,
- b) societal forces producing unprecedented fertility decline and demographic restructuring affecting the potential for future age-selective migration,
- c) social restructuring favouring the rise of a highly mobile new service class,
- d) transnationalism with its impact in transforming the nature of international connections amongst ethnic minority populations,
- e) economic integration of labour markets in the context of a range of forces associated with globalisation. These in turn are shaping migration opportunities to and from Scotland in constantly evolving hierarchical structure of skill exchanges,
- f) the increased politicisation of migration at different scales (national and international).

In the longer-term it is these forces that need to be researched to provide a more profound understanding of the processes shaping migration to and from Scotland. Researching these deeper structural processes should provide a better basis for thinking about the long-term migration exchanges that will take place between Scotland, the rest of the UK and the rest of the world over the next 50 years.

In this short paper, the relative role of economy and environment have been examined relative to empirical evidence about recent trends in migration to Scotland. Although out-migration and emigration have been mentioned the focus on in-migration and immigration has been intentional. This not only reflects the relative lack of data about those who leave Scotland (especially international emigrants) but also the interest in the relative importance of the Scottish physical and social environment as an attractive feature helping to account for the turnaround in Scotland's migration balance.

There seems plenty of evidence to show that Scotland has sustained a progressive shift from being a country of net out-migration and net emigration to a situation where net gains can be anticipated. Given that Scotland lies some distance from the core regions of the UK economy and is often perceived as marginal in terms of circuits of international capital, this migration turnaround may seem surprising. One plausible explanation from which the paper set out was that Scotland's physical and social environment offered a quality of life that was attracting migrants to the country. While survey data supports the view that residents of Scotland do indeed enjoy a high quality of life, there is little evidence that this is a dominant influence on longer distance migration, except perhaps amongst those in the later cohorts of the work force and retired migrants.

Both primary and secondary data seem to suggest that economic factors remain the dominant drivers of migration. Motivational data from migrant surveys indicates on the one hand that internal and international migrants to Scotland perceive the labour market to be increasingly significant. Analysis of regional economic inequalities within the UK support the view that net migration gains to Scotland are greatest when the South East of England is facing

depression simultaneous with phases of economic prosperity in Scotland. Deeper consideration of structural forces driving the UK and global service economy point to yet more profound influences associated with global economic and social restructuring that may be critical to understanding recent trends. These processes seem to account for the rise in the proportion of highly skilled migrants coming to Scotland and associated with the uneven geography of demand for the new service class in Scotland. It is perhaps paradoxical that it is the relatively abstract theorising about these deeper structural processes that provides ideas that offer the most satisfactory understanding of recent migration geographies within Scotland. These have seen cities like Edinburgh and Aberdeen make significant net gains by migration from England and overseas, while other cities have failed to make significant migration gains and have had their economic circumstances aggravated by association with falling population numbers.

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MIGRACJE, GOSPODARKA I ŚRODOWISKO: PRZEGLĄD WSPÓŁCZESNYCH CZYNNIKÓW MIGRACJI DO SZKOCJI

STRESZCZENIE

Czynniki demograficzne, ekonomiczne, społeczne i kulturalne wpływają na kształt migracji zarówno wewnętrznych, jak zagranicznych. W dotychczasowych badaniach nad migracjami podkreślano decydującą rolę czynników ekonomicznych, jednak obecnie, na początku XXI wieku obserwuje się duży wpływ innych przyczyn np. walorów środowiskowych, które w znacznej mierze wpływają na atrakcyjność obszarów przyciągających migrantów, zwłaszcza osób wykształconych. Autorzy badali czy jakość środowiska naturalnego lub społecznego ma decydujący wpływ na kształtowanie się migracji, czy też stanowi drugą, po gospodarczej, przyczynę migracji w Szkocji.

Historycznie Szkocja traciła ludność z powodu odpływu ludności do pozostałych regionów Wielkiej Brytanii (np. szkockiego osadnictwa w Anglii) i emigracji do innych części świata, w tym dawnego imperium brytyjskiego. W ostatnich dekadach odpływ migracyjny oraz rekordowy spadek płodności do poziomu najniższego w historii Szkocji, spowodowały duże straty ludności. Zaniepokojony niekorzystną sytuacją demograficzną, rząd Szkocji zareagował zmianą polityki migracyjnej na zachęcającą do osiedlania się migrantów krajowych i zagranicznych, co szybko przyniosło pozytywne efekty.

W ostatnich latach pozycja Szkocji w systemie migracji krajowych i międzynarodowych zmienia się znacząco, np. w latach 2002–2003 zanotowano dodatnie saldo migracji. Tendencje zmian salda migracji w Szkocji w ostatnim półwieczu wskazują wyraźnie na trend wznoszący, począwszy od poważnych ubytków ludności spowodowanych emigracją, poprzez fazę niewielkich strat do obecnego stanu dodatniego salda migracji. Projekcje migracji w Szkocji wskazują na wyraźny wzrost dodatnich sald migracji do poziomu 15,5 tys. osób rocznie do 2021 r. oraz odpowiednio 30 tys. osób do 2041 r. Szkocja nie powinna być dłużej postrzegana jako kraj emigracji netto. W ostatnich latach obserwuje się liczne migracje osób urodzonych w Anglii napływających do Szkocji, głównie na obszary wiejskie (np. w 2001 r. odsetek Anglików mieszkających w Szkocji (8,08%) przewyższał 4-krotnie propor-

cję Szkotów osiedlonych w Anglii). W ostatniej dekadzie wystąpiły również zmiany w migracjach międzynarodowych do Szkocji, a mianowicie zmniejszyły się napływy najliczniejszej dotąd grupy Irlandczyków na korzyść przybyszów z Indii i Pakistanu. Głównymi miastami w Szkocji skupiającymi imigrantów są Edynburg i Aberdeen.

W ostatniej części opracowania skupiono się na analizie specyficznych przyczyn migracji w Szkocji, wśród których analizowano: czynniki kulturowe, społeczne, ekonomiczne (zwłaszcza gospodarczą integrację rynków pracy w kontekście globalizacji), polityczne i środowiskowe. Przyczyny migracji w Szkocji pod względem ważności, które związane są z jakością środowiska zajmują drugą pozycję po ekonomicznych.

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Richard Bedford

PERSPECTIVES ON POPULATION GROWTH, MIGRATION AND SUSTAINABLE DEVELOPMENT IN THE PACIFIC REGION

1. INTRODUCTION

In the mid-1960s, when I began carrying out research on migration in the Pacific Islands in the atolls now known as Kiribati and Tuvalu, a major concern confronting the colonial administrations was accommodating rapid population growth (Bedford 1968). Resettlement of populations overseas in countries with more generous land endowments was still seen to be a policy option and between 1945 and 1969 some thousands of I-Kiribati, Tuvaluans and Tokelauans were resettled in Fiji (I-Kiribati and Tuvaluan), the Solomon Islands (I-Kiribati) and New Zealand (Tokelauan).

In the early years of the new millennium, resettlement of peoples from islands in the central Pacific is again a major policy issue, this time driven mainly by concerns over the potential impact of global warming on sea levels. The governments of Kiribati and Tuvalu have made approaches to the New Zealand and Australian governments seeking assurances that if rising sea levels do result in extensive salinization of the fresh water lenses that sustain the fragile atoll ecosystems then there will be a "home" somewhere else.

Of all the countries in the Pacific region, the ones that face the greatest challenges in terms of sustainable development, as "*development*" is now understood, are the atoll states of the central Pacific. They are not necessarily the islands in the Pacific with the highest poverty indices on the UNDP's "*Human Poverty Index*"; these are found in the land-rich countries of Papua New Guinea and Vanuatu in Melanesia. However, they are the countries with the most constrained environmental conditions when it comes to exploring options for rural or urban development. Their very small, fragmented land areas pose major constraints on carrying capacities for people.

There is a long tradition of overseas labour migration that has been a dimension of sustainable development in the central Pacific for over 100 years. Indeed, the first Pacific Islanders taken to Australia in the early nineteenth century were I-Kiribati who worked as farm labour in New South Wales in the 1840s. For most of the twentieth century I-Kiribati worked on contract overseas – in the Nauru phosphate mines, on coconut plantations in parts of Melanesia and for the past 30 years as ships crew on European and Asian freighters and commercial fishing boats. However, unlike the situation that exists for some of the

smaller island countries in Polynesia, there are no major outlets for permanent settlement overseas for I-Kiribati and Tuvaluans. This means that the governments have to look ahead to securing steady streams of capital to contribute to the development of infrastructure and economic opportunities for a steadily growing population.

One of the most important contemporary strategies for ensuring that there will be a regular income stream to governments to sustain basic services and modest standards of living in the central and northern Pacific is the creation of Trust Funds. Throughout the atoll territories the annual returns from investment of capital invested offshore is now seen to be a critical component of strategies to ensure sustainable development. These Funds may also become the sources of revenue to purchase land in other parts of the Pacific (including Australia and New Zealand) for resettlement purposes in the future.

I have commenced my discussion with specific reference to two central Pacific atoll countries because this example illustrates well the need for both a region-wide and an historical perspective when discussing migration and sustainable development in the island countries. The region-wide perspective is necessary because of the connections between populations in the different island groups and with the two countries on the southern Pacific rim: Australia and Aotearoa or New Zealand. The historical perspective is essential because there is considerable continuity in the debates both amongst policy makers and academics about migration and sustainable development in island societies.

In the next section I review briefly the history of population change in different parts of the region (including Australia and Aotearoa/New Zealand). The main reason for including this very generalised assessment of the region's population here is to provide a crude baseline from which to consider changes in population size and distribution over the past two centuries. The discussion then turns to the roles of international migration in Polynesia and internal migration in Melanesia in order to illustrate quite divergent relationships between population movement and sustainable development in different parts of the region. The paper concludes with some speculations about future population growth in the region in the context of sustainable development. Aspects of a "*doomsday scenario*" that R. Callick (1993) articulated almost a decade ago are revisited in the face of an on-going "*grim and challenging demographic picture*".

2. DISTINCTIVE POPULATION HISTORIES

Essentially the story of the islands and their southern neighbours is one where before 1800 indigenous populations had a comparatively high standard of living. Populations throughout the region depended on various forms of subsistence agriculture for their livelihood. There were no urban places in any parts of the region and over half the estimated population of around 2.2 million was living in Melanesia (Table 1). The population estimates for different parts of the region come from a very wide range of sources the detail of which is not important for this paper.

Table 1. The population situation around 1800

	thousands	%
Aotearoa	150	7
Australia	600	27
Polynesia	200	9
Melanesia	1,150	52
Micronesia	100	5
Oceania	2,200	100

Source: Estimates by author derived from extensive review of literature on the history of population change in the region.

Over the next century indigenous populations in many parts of the region declined largely as a result of the introduction of diseases by Europeans. The total populations of Aotearoa and Australia increased significantly because of extensive immigration from Europe. By 1900 it is estimated that the region's population had increased to around 6 million with the populations of Aotearoa and Australia accounting for 76 percent of the total (Table 2). Melanesia's population had increased, largely because of the fact that large parts of Papua New Guinea had not been influenced by European contact at this stage. The populations of Polynesia and Micronesia, by comparison had declined significantly, largely as a result of the impact of introduced diseases (Table 2).

Table 2. The population situation around 1900

	thousands	%
Aotearoa	810	13
Australia	3,800	63
Polynesia	100	2
Melanesia	1,300	21
Micronesia	60	1
Oceania	6,070	100

Source: See Table 1.

During the twentieth century indigenous populations began to increase again and, with continued immigration into Aotearoa/New Zealand and Australia especially, the region's population had grown to over 12 million by 1950 (Table 3). The shares of the region's population in Australia and Aotearoa/New Zealand increased at the expense of the Pacific island countries in Melanesia. Through the first half of the twentieth century population growth in Melanesia remained quite modest as the impacts of western diseases and, later, improved health systems diffused slowly through the interiors of the larger islands (Bedford 1980a). In the central highlands of Papua New Guinea, for example, the first sustained contact between indigenous peoples and Australians did not occur until the 1950s. Population recovery in Polynesia and Micronesia through the first half of the twentieth century ensured that their populations were at least as large as they had been in 1800. By 1950 indigenous populations in most parts of the region were greater than they had been in 1800 (Table 3).

Table 3. The population situation around 1950

	thousands	%
Aotearoa	1,910	15
Australia	8,300	65
Polynesia	236	2
Melanesia	2,110	17
Micronesia	168	1
Oceania	12,724	100

Source: See Table 1.

I have divided the twentieth century in half because the histories of economic and social development before and after the Second World War throughout the region (including in Australia and Aotearoa/New Zealand) were very different. The colonial administrations in most parts of the Pacific began preparing their colonies for eventual independence during the 1950s and there was much heavier investment in social infrastructure and economic development (Bedford 1980b). Population growth accelerated in all parts of the region, and the total more than doubled by 2000 to reach 30.5 million (Table 4). This is more than five times the population that was in the region in 1900 and 14 times greater than the 2.2 million estimated for 1800 (Table 1).

Table 4. The population situation around 2000

	thousands	%
Aotearoa	3,780	12
Australia	19,140	63
Polynesia	590	2
Melanesia	6,480	21
Micronesia	516	2
Oceania	30,510	100

Source: See Table 1.

By 2000 the distribution of the region's population had returned to that found in 1900 with 65 percent of the total in Australia and Aotearoa/New Zealand, 21 percent in Melanesia and the remaining 4 percent shared between Micronesia and Polynesia. Significant numbers from the latter two sub-regions were resident in the United States (around 250,000 Micronesians and Polynesians in 2001), New Zealand (230,000 mainly Polynesians) and Australia (over 100,000 Polynesians and Melanesians, especially Fijians). In the case of those living in New Zealand less than half of the Pacific peoples had been born in the islands; the majority were New Zealand-born.

Between 1950 and 2000 a significant part of Polynesian population growth especially had been transferred from the islands to countries on the Pacific rim. This largely accounts for the lower over all growth in Polynesia's population (150% increase between 1950 and 2000) than in either Micronesia (200% increase) and Melanesia (200% increase). While around 50 percent of the people living in Polynesia and Micronesia were resident in towns in 2000, in Melanesia only 25 percent were urban-resident. In this part of the Pacific the great

majority of people still depended on a semi-subsistence life-style. Population growth rates remain high, especially in Papua New Guinea, Solomons and Vanuatu, and opportunities for emigration to countries on the Pacific rim are much more restricted than those living in some Polynesian and Micronesian countries.

In concluding this brief overview of population transformations in the Pacific since the onset of protracted contact between indigenous peoples and Europeans it is useful to summarize the main trends and developments. It is clear from Table 5 that the nineteenth century was an era of population growth in the countries on the southern rim of the Pacific and virtual stagnation in the aggregate island populations. The hypothesised modest population growth suggested for Melanesia, which was largely in Papua New Guinea given the substantial population declines recorded for Fijians, ni-Vanuatu and Solomon Islanders during the second half of the century especially, was effectively cancelled out by declines in Micronesia and Polynesia.

Table 5. Population change within the region, 1800–1900

	1800	1900	Change	
	thousands		thousands	(%)
Aotearoa	150	810	660	440
Australia	600	3,800	3200	533
Polynesia	200	100	-100	-50
Melanesia	1,150	1,300	150	13
Micronesia	100	60	-40	-40
Oceania	2,200	6,070	3,870	176

During the twentieth century the pattern was very different. In all of the sub-regions listed in Table 6 the population in 2000 was more than three times what it had been in 1900. In Micronesia it was seven times the size it had been 100 years earlier. The Pacific population aggregates all grew more rapidly than that in Aotearoa/New Zealand. Australia's population grew slightly more than Melanesia's in percentage terms, but not as rapidly as the populations in Polynesia and Micronesia (Table 6). At the level of the region as a whole, the population at the end of the century was four times larger than it had been in 1900 – much more rapid growth than during the nineteenth century (Tables 5 and 6).

As noted earlier, there are two distinct periods of population change in the island Pacific during the twentieth century – before and after 1950. Growth was particularly significant during the second half of the century. Indeed in parts of the region, especially Polynesia, reference was made to a "*Malthusian*" situation in the 1960s (Borrie 1967). It was in the 1950s and 1960s that sustained emigration from Polynesia to New Zealand began and at the time this was seen to be an essential safety-value for small island groups experiencing rapid population growth (McArthur 1961, 1964; Cumberland 1962).

This sort of "*safety-valve*" was also there for some of the American colonies/dependencies in the northern Pacific, as well as for American Samoa. However, it did not exist for the inhabitants of most parts of Melanesia. These differences in access to residence in metropolitan countries on the rim are having

Table 6. Population change within the region, 1900–2000

	1900	2000	Change	
	thousands	thousands	thousands	(%)
Aotearoa	810	3,780	2,970	367
Australia	3,800	19,140	15,340	404
Polynesia	100	590	490	490
Melanesia	1,300	6,480	5,180	398
Micronesia	60	516	456	760
Oceania	6,070	30,510	24,440	403

a profound impact on the patterns of population change in Pacific island groups, both during latter decades of the twentieth century as well as through the early decades of the new millennium. The situation with regard to contemporary international migration in the region is examined briefly in the next section.

3. INTERNATIONAL MIGRATION AND SUSTAINABLE DEVELOPMENT: A POLYNESIAN DILEMMA

One cannot consider the issue of sustainable development in most parts of Polynesia without adopting a transnational perspective. Polynesian migration to New Zealand since the 1960s has produced a situation where there are almost three times as many Cook Island Maori, five times as many Tokelauans, and nine times as many Niueans in New Zealand as there are in the island countries (Table 7). Remittances from Polynesian populations in New Zealand, Australia and the United States contribute more to the domestic economies of the Cook Islands, Niue, Samoa and Tonga than all of the local sources of cash income combined (Brown, Foster 1995; Brown 1995). The flows of people, goods, money and services between the islands and their communities on the Pacific rim are at the heart of the debate about sustainable development in large parts of Polynesia (Brown et al. 1995; Bedford 2000; Connell 1997).

Table 7. Pacific people in New Zealand and their island "homes", mid-1990s

Polynesian	New Zealand	Island „Home”
Samoaan	101,700	171,000
Cook Islanders	47,000	19,000
Tongan	31,400	97,800
Niuean	18,500	2,000
Tokelauan	5,000	1,000
Total	203,600	290,800

The key issue here with regard to sustainable development in island countries is whether the Pacific communities living in cities on the rim will continue to retain an identity with and commitment to their kinsfolk in the islands. In New Zealand, less half of the resident ethnic Pacific peoples have been born in the islands; the younger population is very much dominated by the second and third generation New Zealand-born. There is considerable debate about the extent to which remittance flows to the islands will continue as the New Zealand-born

Pacific peoples develop different senses of identity (Macpherson 1997; Bedford et al., 2001). New patois, new music, new fashion, new customs and practices now differentiate Pacific peoples in the cities on the rim from their island-born kin (Connell 1994; and the various essays by Pacific writers in Macpherson et al., 2001).

Notwithstanding the on-going debate about the sustainability of remittance flows in Polynesia, one thing seems clear at least for island-born Pacific peoples, and that is the importance of identifying with the island "home". Tongan Professor Epeli Hau'ofa (1994, 15), a long-term resident of Fiji where he works at the University of the South Pacific, summed this sentiment up well when he observed:

"Wherever I am at any given moment there is comfort in the knowledge stored at the back of my mind, that somewhere in Oceania is a piece of earth to which I belong. In the turbulence of life it is my anchor. No one can take it away from me. I may never return to it, not even as mortal remains, but it will always be homeland. We all have or should have our homelands: personal, family, national homelands. And to deny human beings the sense of homeland is to deny them a deep spot on earth to anchor their roots."

The issue of return migration, like remittances, is a subject of considerable debate in the context of sustainable development in Polynesia as well (Bedford 2004). The island countries of the Cook Islands, Niue and Samoa all suffer from shortages of labour both in their rural as well as their urban economies. This has been a persistent problem for development planners in those parts of Polynesia with extensive communities living in cities in New Zealand, Australia and the United States. Although there is often an expressed intention on the part of Pacific migrants living overseas to return to their homelands at some stage in the future (indeed, this is one of the explanations for remitting money and goods to kin back in the islands), the reality of return is much less certain (Connell, Brown 1995; Connell 1994, 1997). After reviewing much of the writing on Samoan migration to New Zealand, J. Connell (1994, pp. 274–5) concludes that *"ultimately few definitely choose to return, and fewer succeed. Even those who visit Samoa are often glad to return to New Zealand. It seems that the closer the contact with the reality of home, the stronger is the migrant's resolve to consolidate his (sic) new life in New Zealand. Thus if the dream [of return] remains it seems likely that it is nostalgia for the past rather than a plan for the future"*.

Ambivalence about residence overseas or in the islands remains the norm for most Pacific migrants and their children living in cities on the rim. Keeping options open for movement between multiple potential homes in the Pacific and on the rim is now accepted to be a critical strategy which drives Polynesian economic and mobility behaviour (Macpherson 1997; Ward 1997). Much more cosmopolitan populations of Samoans, Tongans, Cook Islanders, Niueans and Tokelauans now inhabit both the villages in the islands and the cities on the rim than was the case in the 1950s and 1960s when the most recent Oceanic diaspora commenced. These people are much more at ease with the multiple identities

that are required to cope effectively with living in locations within and outside their island homes. This is a characteristic that distinguishes a much higher proportion of Polynesians than Pacific peoples living in Melanesia.

The only time when Melanesians were able to settle in large numbers in a country on the Pacific rim was between 1860 and 1900 when Pacific labour was required in Queensland's sugar plantations. Over 100,000 Papua New Guineans, Solomon Islanders and Ni Vanuatu went to Australia during this period (Bedford 1973). Large numbers returned to the islands, but a Melanesian component to Queensland's population evolved out of this labour migration. The only country in the western Pacific that has large numbers of its residents living in Australia and New Zealand is Fiji. The military coups of 1987 and the civilian coup in the late 1990s encouraged a major exodus, especially of Fiji Indians but also extensive emigration of ethnic Fijians (Bedford 1989; Chetty, Prasad 1993; Mohanty 2001).

Except for Fiji, international migration from countries in Melanesia has played a minor role in the development of the region's population and economy. The movement of people for tertiary education and vocational training overseas has been important for the development of Melanesia's human capital and for many years an important part of both New Zealand's and Australia's overseas development assistance has been in the form of scholarships for Pacific peoples (Bedford 1992). Many of these people have eventually returned to New Zealand and Australia, especially in recent years following political upheaval and tensions in several countries including Papua New Guinea, Solomons, Vanuatu and Fiji.

4. INTERNAL MIGRATION AND SUSTAINABLE DEVELOPMENT: A MELANESIAN DILEMMA

Internal migration has been much more important in the context of the debate about sustainable development in Melanesia than international migration. Although overall population densities in the large island countries on the continental shelf are much lower than those in the coral and volcanic islands to the north and east, there is enormous diversity in population distribution (Brookfield 1971). In parts of Melanesia there is considerable pressure of people on the resources required for a basic subsistence livelihood. Even though the great majority of Melanesians still live in rural areas (over 75 percent in Papua New Guinea, the Solomons and Vanuatu) movement from interior locations to the coast, especially coastal urban areas, has been accelerating for the past 30 years (Connell 1987).

There is no tradition of urban places in the Pacific – all towns in this part of the world owe their origins to European settlement since the beginning of the nineteenth century. Before the Second World War there were restrictions on migration to and residence in towns by indigenous peoples throughout Melanesia (Brookfield 1972). It was not until the 1950s that rural-urban migration began to assume significance for Melanesians (Bedford 1980c). Population movement

within rural areas was, and remains, much more important. Indeed, by the 1970s, the low levels of urbanization in Melanesia were being seen by some as a major constraint on development – "*if the towns are stunted, so will be the nation*" (Ward 1971).

By 2000 migration into towns was seen increasingly as a problem, especially given high levels of urban unemployment and the development of extensive squatter settlements on the outskirts of most of Melanesia's larger urban areas. Indeed, it has been a conflict between "*the people of the land*" and immigrants from other islands in the Solomons Islands that has produced very serious civil disorder in recent years. Similar sorts of conflicts are emerging in Vanuatu and in parts of Papua New Guinea, not always around urban areas. In Fiji this civil disorder has another dimension – the reluctance of Fijian landowners to renew leases of some of their land to Fiji Indian tenant farmers is creating a landless underclass that has no opportunity to obtain employment in the towns (Naidu, Reddy 2002).

The debate about sustainable development in Melanesia is much more a debate about making productive and efficient use of the land and any associated mineral and forestry resources that can be extracted for commercial gain than about maintaining flows of resources into island economies and societies from communities based overseas. Flows of labour within countries like Papua New Guinea are much more important for resource development than international migration, although immigration from parts of Asia especially has become more common in recent years.

In recent years, the implications of rapid population growth in Melanesia for the region's future has attracted increasing attention from researchers, policy makers and planners (Cole 1993). Throughout the western Pacific national populations are growing at rates in excess of 2 percent per annum (except for Fiji where emigration is containing annual growth rates to around 1.7 percent per annum), according to statistics released by ESCAP and the Pacific Commission in Noumea. Total fertility rates in Papua New Guinea, Solomons and Vanuatu exceed 4.3 children per woman by comparison with 1.8 and 2.0 for Australia and New Zealand. Over 40 percent of Melanesia's population is under 15 years of age compared with 20 percent in New Zealand and Australia. Already the next generation's options are diminished, unless there is a change in immigration policies allowing extensive movement from Melanesia to the countries on the Pacific rim. Within Melanesia, there is less land for each clan or family, and fewer resources to go round both in the village and in the national economy as a whole (Gannicot 1993).

For much of the past century a critical development issue throughout Melanesia has been labour supply – internal migration has been essential for rural development. In the next century oversupply of labour, not shortages, will be much more important, and increasing numbers of younger Melanesians will be looking for opportunities for work and residence outside of their islands. Australia especially is readily accessible by sea from most parts of Melanesia, especial-

ly Papua New Guinea (the international boundary between the two countries skirts the coast in southern Papua). It will not be too long before we have a new wave of Pacific boat people to countries on the Pacific rim, 1000 years after the forebears of New Zealand's indigenous Maori population travelled by canoe from eastern Polynesia to Aotearoa.

5. WORLD ENLARGEMENT AND A PERSPECTIVE ON THE FUTURE

The Maori settlers of Aotearoa around 1000 AD were continuing a long-established tradition of inter-island travel and colonization. The colonial era in the nineteenth and twentieth centuries interrupted this flow of Pacific peoples between island groups, a process that E. Hau'ofa (1994b) termed "*world enlargement*". In the post-colonial era the flows of Pacific peoples into new resource areas, where they will secure employment and overseas family property and develop extended kinship networks through which they will circulate themselves, their relatives, their material goods and their stories (Hau'ofa 1994b) will, again, become much more prominent. In part this will reflect pressures in island homes; in part it will reflect demands for labour overseas.

Looking ahead to 2050, it can be seen that projected population growth for Melanesia especially is very significant (Table 8). The United Nations' medium variant population forecasts for this region show a staggering 14 million residents – more than three times the size of New Zealand's population, and almost double the population of all of the Pacific states in 2001. Population growth in Polynesia and Micronesia is also forecast to be very significant, although neither of these sub-regions are likely to see more than a doubling of their populations over the next 50 years. Emigration to the Pacific rim, coupled with lower levels of fertility, accounts for these differences.

Table 8. The population situation around 2050

	thousands	%
Aotearoa	4,750	10
Australia	26,500	56
Polynesia	890	2
Melanesia	14,080	30
Micronesia	1,080	2
Oceania	47,300	100

Source: See Table 1.

There is an enormous challenge implicit in the population estimates contained in Table 8 – a challenge clearly recognised by R. Callick (1993) when he wrote his controversial "*Doomsday Scenario*" for the Pacific when the population of Melanesia was less than half it is forecast to be by 2050. Amongst other things, he suggested, with the added element of imagination, that:

"Young people brought up in the region's growing towns will lose their option of subsisting on their ancestral lands, not because they are hypnotised by the bright lights but because that option of returning 'home' permanently is closed to them. The land is already being farmed to the limit by relatives."

"But opportunities for formal employment in the towns have also bogged down. Young people, and the not so young, end up waiting for the previous generation to retire or die as they queue for the few jobs available, chiefly in the public service and tourism. The older generation, still hanging on, was promoted early to the best positions in the time of high hopes engendered by localization. Increasing numbers of islanders thus seek work overseas, in some desperation, to keep their families alive. But as growing numbers of the elderly return to their island homes to retire, this places new and great stresses on the formal health system and on informal social networks unused to catering for large groups of elderly people.

There are still no government welfare payments, and since commodity prices have suffered a decade-long slump, relatives on the land are unable to help out. There are beggars on the streets of every town. Malnutrition is spreading, and is already endemic in squatter settlements of towns [especially in Melanesia]. While general health levels remain high, new problems have surfaced – including, of course, AIDS – many of whose victims have returned from the towns to die in their home villages without the disease ever being diagnosed. The changed diet of town dwellers, dependent substantially on imported, processed food, has greatly increased the proportion of deaths from heart diseases and cancers."

And so he goes on with what he sees as a "nightmare" based on the emerging grim statistical evidence of demographic, social, economic and environmental change in the island Pacific. This was a highly debatable scenario, but it is indisputable that life in many parts of Melanesia in the future cannot continue as it is now lived. Sustainable development of Melanesia's rural and urban communities will depend increasingly on opportunities for overseas migration for employment and training by young people.

In this paper, I have deliberately taken a broad perspective on migration and sustainable development – a perspective very much rooted in the demographic histories of population aggregates rather than the histories of specific islands, communities and families. This has been done deliberately given that most people are not familiar with the complex geography and history of this part of the world. The detail of 20 countries and territories would only serve to confuse rather than to clarify. That said, it must be acknowledged that the links between population growth, migration and development in the region's rural and urban communities are not amenable to easy generalisation. Migration is a process that thrives on differentiation and selectivity; what is a positive outcome for one region or community is not necessarily mirrored in another.

In this context it is appropriate to conclude with a reference to the increasing concern both within the region and amongst those agencies contributing development assistance to Pacific states at the deepening disparities between elites and the poor. As M. Mohanty and V. Naidu (2002) have noted in their review of the interrelationships between poverty, migration and development, the poor and the rich have very different opportunities when it comes to migration, especially international migration. As they point out in their conclusion, "There

is clear evidence that, at least as far as the direct effect of migration is concerned, the benefits accrue disproportionately to the richer regions, sectors and classes (ILO 1999). It may reinforce more poverty conditions and widen the inequalities between 'haves' and 'have-nots' ". This applies as much in the countries on the Pacific rim as it does to the island states. At the heart of the debates about sustainable development in Australia and New Zealand, for example, are questions about patterns of population movement and the policies that governments adopt to attempt to influence or regulate flows of people between regions and countries.

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PERSPEKTYWY WZROSTU LUDNOŚCI, MIGRACJE I ZRÓWNOWAŻONY ROZWÓJ W REGIONIE PACYFIKU

STRESZCZENIE

W połowie lat 60. XX wieku polityka kolonialnej administracji była częściowo uwarunkowana gwałtownym wzrostem ludnościowym na wyspach i atolach Środkowego Pacyfiku (np. Kiribati i Tuvalu). Przesiedlenia ludności z tych wysp za granicę były realizowane jako główne opcje polityki w latach 1945–1965, kiedy tysiące mieszkańców atoli, należące do plemion I-Kiribati, Tuvaluans i Tokelauns, było przesiedlonych na Fiji, Wyspy Samoa i do Nowej Zelandii.

Obecnie, na początku nowego tysiąclecia, ważnym zadaniem polityki są przesiedlenia ludności z wysp Środkowego Pacyfiku, spowodowane głównie potencjalnym wpływem globalnego ocieplenia na podnoszenie się poziomu morza.

Ze wszystkich wysp Pacyfiku, atole Środkowego Pacyfiku wykazują obecnie największe zagrożenie i wyzwania dla zrównoważonego rozwoju. Autor zilustrował na przykładzie dwóch krajów wyspiarskich Środkowego Pacyfiku problemy migracji i zrównoważonego rozwoju. Uzgodnienia międzyrządowe mają na celu niesienie pomocy i ewentualne przesiedlenia ludzi z Kiribati i Tuvalu do Australii i Nowej Zelandii, w wypadku gwałtownego podniesienia się poziomu morza, za-

solenia wód słodkich i zagrożenia życia mieszkańców atoli. Zagrożone katastrofami są także inne większe wyspy, m.in. np. Papua-Nowa Gwinea i Vanuatu w Melanezji.

Przedstawiono analizę zmian ludnościowych w różnych częściach regionu Pacyfiku (włączając Australię i Nową Zelandię) w okresie minionych 200 lat, a także perspektywy wzrostu ludności i migracji w kontekście zrównoważonego rozwoju regionu.

Projekcje demograficzne ONZ wskazują na znaczący wzrost ludności Melanezji do 2050 r. Według średniego wariantu tej projekcji liczba ludności wyniesie tam 14 mln, tzn. trzykrotnie więcej od obecnej liczby ludności Nowej Zelandii i dwukrotnie więcej niż ludność krajów Środkowego Pacyfiku.

Podkreślono rolę migracji międzynarodowych w Polinezji i migracji wewnętrznych w Melanezji w badaniu współzależności między mobilnością ludności a zrównoważonym rozwojem w różnych częściach regionu. Zrównoważony rozwój miejskich i wiejskich obszarów Melanezji będzie zależeć w znacznym stopniu od możliwości migracji za granicę młodych ludzi w celach zarobkowych i kształcenia się. Autor zwraca uwagę na wzrost polaryzacji społecznej w regionie, pogłębianie się dysproporcji między elitami i warstwami najuboższymi ludności oraz szybkie poszerzanie się sfery ubóstwa.

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MIGRATION IN POSTMODERN METROPOLISES: DEMOGRAPHIC ASPECTS OF PERIURBANIZATION IN MADRID

1. INTRODUCTION

In analyzing intraregional migration within Western countries in line with their development over time, it is possible to note three essential changes: an increase in intraregional migration in comparison with more extensive migration, an increasing complexity of the migration movements within regions, and a change in the motives for migration.

Suburbanization is a central factor accounting for intensifying internal migration within areas of agglomerations. According to L. van den Berg et al. (1982), the further process of the deconcentration of the population is called the phase of disurbanization. From a demographic standpoint, disurbanization implies that the population of the core city is decreasing so strongly that it is no longer compensated for by growth on the periphery, thus leading to a negative population development in the entire region. Consequently the migration balance is negative in both the core city and the entire agglomeration. In the final stage of disurbanization the migration balance may also be negative on the periphery.

However, this phase of urban development is also characterized by ongoing processes of suburbanization, alongside an influx of mainly foreign people into the center. In the largest metropolises, migration movements away from the core city – and the influx of low-income groups in the population into it – are augmented by trends towards reurbanization, mainly as forms of gentrification. Overall, this means that the model phases of cyclic suburbanization, disurbanization and reurbanization can not only happen consecutively, but also in parallel with one another.

In addition to this, new migration movements across the borders of defined agglomerations are taking place, i.e. an exurbanization or periurbanization. Unfortunately, the term periurbanization is not used consistently, especially at the international level (Dézert 1991; Méndez 1993; Ford 1999).

In this paper, the following criteria for the definition of periurbanization/exurbanization are to be considered:

- The settled area is no longer expanding directly adjacent to already-developed areas, as in suburbanization, but is rather occurring far out in rural areas.

- The new settlements form islands, i.e. are not connected with one another. Individual, independent centers develop far apart from each other and no longer in rings, as in the (early) suburbanization phase.
- The areas that are being settled lie in agricultural or recreational regions, isolated from urban life.
- The land prices are much lower than in the suburbs; though at certain sites, e.g., in recreational areas near the city, they can be considerably above average.
- Jobs are much farther from homes than is the case in the actual suburbs.
- The infrastructure in these settlement areas is extremely deficient, such that for shopping and services the residents have to depend on the few large centers of the tertiary sector in the suburbs, and in some cases the center of the core city.
- The population of periurban areas is much more heterogeneous than that of the suburbs.
- Migration into periurban regions entails a greater change in lifestyle than does a move to suburbia.

Although settlements are less dependent on the center than in the case of suburbanization, economically and socioculturally there are links with the center and with the larger area as a whole. Unlike with counterurbanization (Fielding 1989; Champion, Vandermotten 1997), this is not a case of urbanization of peripheral parts of the nation or a region, involving a loss of economic and social connections with the metropolis.

Corresponding to the new forms of and spatial patterns of migration, the explanations for intraregional migration have become more complex. The motives for migration can be found in the connection between choice and constraints (Champion 1995). Here, it becomes evident that, next to the "strong" factors like economic constraints or encouragement, which are usually combined with the labor market, the housing market or a certain phase of the life cycle, there are other factors which are gaining in importance. A. Findlay and R. Rogerson (1993), for example, investigate the role of the quality of life, and give an overview as regards the variety of motives for migration. However, this study resembles most of the others – in referring to internal migration at the national level, and not especially to processes within smaller areas. Specifically in the urban sector, lifestyle and, more generally, sociocultural factors have to be taken into account. Influenced by globalization even away from global cities, these factors are affected by an immense change. Thus, motives for migration cannot be seen in isolation from general socioeconomic developments, nor without reference to the context of changes in postmodern cities either.

Against this background – and using Madrid as an example – an investigation sought to determine the way in which suburbanization is replaced by periurbanization and/or disurbanization, as well as the role that structures of migration are playing in this change. The reasons for the observed transformations in Madrid's intraregional migration are finally discussed by means of explanatory attempts and hypotheses for further investigation.

2. POPULATION DEVELOPMENT IN SPANISH METROPOLISES

Agglomerations in Northern and Western Europe and North America have often reached the stage of disurbanization. Having suffered heavy losses from the core cities, they are now experiencing only slight growth, or even population loss, in the suburbs. In contrast, southern European metropolises are generally still in the phase of suburbanization (Leontidou 1994).

The transition from urbanization to suburbanization in Spanish metropolises differs from that in Western European conurbations in both its chronological sequence and the type of urbanization taking place on the periphery. Whereas in Western European metropolises the process of population concentration in the core cities had already been superseded by suburbanization after the Second World War, the 1950s can still be symbolized as the main phase of urbanization (Vinuesa Angulo 1997). Suburbanization did not begin until the second half of the 1960s. The population growth concentrated primarily in the ring directly adjoining the urban area, so that undeveloped spaces within the administrative boundaries of the core city and some neighboring municipalities were first filled. For this reason the compact structure of Spanish cities was initially preserved and with it a "*city boundary*" that formed an abrupt transition from high-rise residential buildings and industrial zones to areas of agricultural land use. This form of suburbanization was supplemented by high population growth in a few large subcenters that functioned as dormitory towns.

If we compare the recent development in the Spanish metropolitan regions, we can observe considerable differences in the extent and course of demographic restructuring within the various regions. It was during the 1980s that population decreased for the first time in the large suburban centers in the Greater Barcelona and Bilbao areas (Vinuesa Angulo 1997), so that in the first ring around the municipality of Barcelona the total population was already decreasing between 1981 and 1986 (Díaz Orueta 1991). In Madrid it took until the 1990s for a few large peripheral cities to begin to show negative growth rates.

There are various reasons for the differences in development, one being the way the administrative boundaries within the agglomerations are drawn, as well as the absolute size. But there are also differences in the type and dynamics of economic development (e.g., old industrialized regions versus modern service metropolises and areas with new types of industries). The main reason for the regional differences are related to economic developments in Spain as a whole and the individual provinces, including the influence of democratization after the Franco era and Spain's admission to the EU. These factors caused extensive changes in migration behavior, in particular putting an end to the rural exodus in the second half of the 1970s. The economic crisis of the 1980s in general brought a decrease in migration, though after the middle part of that decade interprovincial migration picked up again (cf. Garcia Coll, Puyol 1997). However, the target areas are no longer the big agglomerations, as investigations of interregional migration by A. Garcia Coll and J. Stillwell (1999) and J. Romero and J.M. Albertos (1997), show rather that Spain has now entered a phase of counterurbanization.

Most of the more remote municipalities in the peripheral areas of provinces or large conurbations showed a negative population development due to heavy migration into the core city and later into the inner suburbs (Zamora López 1994). Until 1970 the population of the periurban zone (as a whole) stagnated or decreased slightly. Here too the development depends greatly on how the boundaries between the core city, the suburbs (which are usually referred to as *área* or *corona metropolitana*), the periurban zone and the outer boundary of the province are drawn.

3. POPULATION DEVELOPMENT IN MADRID

On the whole, for the years up to 1970, we can speak of a process of centralization in Madrid, or "*urbanization*" in the sense of L. van den Berg et al. (1982) (Table 1). The core city gained 1 million inhabitants in the 1960s. The suburbs gained many fewer inhabitants, although the first dormitory towns (Getafe, Alcorcón, Leganés, etc.) were developing, especially in the southern part of the metropolis. This process did not come into full swing, however, until the 1970s, when the first gigantic settlement complexes with high-rise buildings were completed (Estébanez 1990; Santos-Preciado 1991).

The first half of the 1970s was characterized by a drastic reversal of population development. The suburbs grew enormously (Table 1). In the municipality of Madrid the number of inhabitants increased by only 107,000. The growth rate in the periurban area was comparatively modest. Overall the CAM was growing at a rate of 2.8% per year and thus faster than any other Spanish metropolitan area (as in the previous decades; Estébanez, Pérez 1990). In the period from 1975 to 1981 the annual growth rate in the *corona metropolitana* decreased to 7.8%, which was still very high, with an absolute population increase of 400,000 in this six-year period. The fastest growing municipalities within the CAM lay almost exclusively in the *corona metropolitana*, especially to the west and east of the core city (Wehrhahn 2000). A few southern subcenters were also growing fast. The core city lost population for the first time. The periphery showed slight population gains.

On the whole, the 1970s can be termed the highpoint of suburbanization. In the *suburbios proletarios*, gigantic new settlements with large apartment houses were constructed. The state housing construction policies aimed at replacing the shanty towns that had grown up in the 1950s to 70s. In the second half of the decade, terraced houses appeared increasingly, as well as a very few detached houses, indications of increasing suburbanization of the middle class (Estébanez, Pérez 1990; Méndez 1993).

In the 1980s the annual population growth rate in the CAM sank to 0.4%, mainly as a result of the economic recession. The high unemployment rate, connected with a slowdown in building activity, left the Greater Madrid area less attractive to migrants, and many of the *madrileños* lacked the financial means to be able to move within the CAM. Both suburbanization and population loss in the core city continued, though at a slower rate. In the second half

Table 1. Population development in the subregions of the CAM

Indicator	Year	CAM	Municipio de Madrid	Corona Metropolitana	Corona Periurbana
Population	1900	772,011	575,675	50,500	146,836
	1950	1,823,410	1,553,338	74,869	195,203
	1970	3,761,348	3,120,941	413,337	227,070
	1996	5,022,289	2,866,850	1,709,956	445,483
Increase (absolute)	1970–1975	558,559	107,116	433,756	17,687
	1975–1981	366,991	-69,239	394,094	42,136
	1981–1986	93,677	-100,636	168,417	25,896
	1986–1991	166,983	-47,690	172,476	42,197
	1991–1996	74,734	-143,642	127,879	90,497
Increase per year (%)	1970–1975	2.81	0.69	20.99	1.56
	1975–1981	1.37	-0.36	7.75	2.87
	1981–1986	0.39	-0.65	2.71	1.81
	1986–1991	0.68	-0.31	2.45	2.70
	1991–1996	0.30	-0.97	1.62	5.10

Source: Author's calculation from census data, *Padrón Municipal* 1996, *Anuario Estadístico de la CAM* 1997 and Zamora López 1993.

of the 1980s, the population growth rate in periurban areas exceeded that in the *corona metropolitana* for the first time, although the *corona* grew much faster in absolute terms (Table 1). With a few exceptions, the municipalities with the highest growth rates were still within the *corona metropolitana*, but farther out than in the previous phase.

Following the suburbanization of the previous decades, periurbanization began in the 1990s. Meanwhile, the population growth had slowed down greatly in the *corona metropolitana*. The absolute figures no longer made up for the losses of the core city (-144,000 compared with 128,000), so that overall we can speak of disurbanization of the population, if we are looking at only the two inner zones beyond the periurban areas. The population gains in the periurban zone were considerable, however. At 90,000 they amounted to almost the increase in the much more populous suburban zone. The annual growth rate rose to 5.1%. This shift of population growth to the edge of the agglomeration is clearly reflected in the spatial pattern of the municipalities with the highest growth rates (Wehrhahn 2000).

4. THE ROLE OF MIGRATION IN PERIURBANIZATION

If we look at the individual components to the population development within the agglomeration, we can determine that in the CAM natural growth played a more important role than migration in the entire period from 1970 to 1995 (Table 2). Even between 1981 and 1985 the birth rate made up for the high migration losses. The municipality of Madrid has shown migration losses since the beginning of the 1970s, and the natural growth rate has not been able to compensate for them for a long time. Except in the period 1981 to 1985, migration gains are clearly predominant in suburban and periurban areas. Until 1990 the migration balance dropped continuously, however (disregarding the special phase 1981–85), only to increase again in the most recent phase.

Table 2. Components to population development in the subregions of the CAM, 1971–1995

Region	Indicator	1971–1975	1976–1980	1981–1985	1986–1990	1991–1995
Comunidad Autónoma de Madrid (CAM)	Total	558,556	366,991	3,677	166,983	74,734
	natural increase	313,656	278,860	160,766	97,388	65,497
	migration balance	244,900	88,131	- 67,089	69,595	9,237
Municipio de Madrid (MM)	Total	107,116	- 69,239	- 100,636	- 47,690	- 143,642
	natural increase	191,850	130,858	61,373	18,703	697
	migration balance	- 84,734	- 200,097	- 162,009	- 66,393	- 144,339
Corona Suburbana and Corona Periurbana	Total	451,440	436,230	194,313	214,673	218,376
	natural increase	121,806	148,002	99,393	78,685	64,800
	migration balance	329,634	288,228	94,920	135,988	153,576

Source: Vinuesa 1994; Anuario Estadístico de la CAM 1997.

Table 3. Indicators of migration in the subregions of the CAM, 1981–1995

Indicator	CAM	Municipio de Madrid	Corona metropolitana	Corona periurbana
migration balance (total)				
1981-85	-66,505	-160,784	76,955	17,324
1986-90	72,817	-65,365	104,627	33,555
1991-95	7,471	-144,192	71,649	80,014
net migration rate (total)				
1991-95	1.5‰	-49.1‰	43.5‰	199.9‰
efficiency ratio (total)				
1990	0.07	-0.09	0.17	0.32
1995	-0.01	-0.19	0.05	0.29

Source: Author's calculation from *Estadísticas del Movimiento Migratorio 1990–1995* and Castro Martin 1998.

Let us differentiate further within the periphery. It is evident that the role of migration in growth is considerably more important in the periurban zone than in the suburban zone (Table 3). The migration balance doubled there within the five-year periods from 1981 to 1995. At 80,000 persons, it now (1991–95) lies above that for the suburban zone. The exact time of the reversal was 1993, when the migration balance in the periurban zone first exceeded that of the suburban zone (11,336 compared with 9,123 persons). The net migration rates document a shift at a slightly earlier point. In the last period the net migration rate was even five times as high as in suburbia.

At the beginning of the 1990s, at the latest, we can speak of a true reversal from suburbanization to periurbanization on the periphery of Madrid. Another fact that points to such a process of "*peripherization*" is that in the 1990s only very few peripheral municipalities still had a negative migration balance (14 in the CAM). Ten years earlier most of the municipalities at the edge of the CAM registered migration losses (1981–86: 50; 1975–81: 67).

An analysis of the net migration rates at the level of the 178 municipalities in the CAM additionally reveals the spatial pattern to periurbanization (Wehrhahn 2000). First, the focus of migration has obviously shifted successively outward from the ring immediately adjoining the municipality of Madrid (into the 1980s) to the outermost peripheral municipalities. Second, the former large centers of immigration in the south and west and in the corridor of Alcalá no longer play a role. Finally, and this is an important component for urban and regional development strategies in the CAM, the relatively compact suburbanization mainly to the south and west of the core city was followed in the 1990s by fragmentation in the peripheral zone of the CAM. The municipalities with the highest net migration gains are more dispersed than those with the highest population growth rates.

The analysis of the net rates of intra-CAM migration reveals a similar picture. The reason for the only slight differences between this and the total net migration rate is that by far the majority of the migration is coming from the CAM itself. National and international migration only plays a role within the municipality of Madrid and very few cities in the suburban zone.

5. ORIGIN AND STRUCTURE OF PERIURBAN MIGRANTS

First we can determine that most of the immigrants come from other municipalities within the CAM. The migration balance of the periurban zone versus other Spanish provinces or versus foreign countries has risen in the past years, it is true, but it only accounts for a third of the total migration balance. Within the CAM migration out of both the city of Madrid and the *corona metropolitana* has increased greatly since 1981 (Table 4). The balance for the periurban zone versus Madrid rose from 19,000 to 34,000, that for the periurban zone versus the suburban zone from 2,000 to 17,000 in favor of the periphery. Even within the latest period further peripherization has occurred – as the indicators prove (Table 5). From 1990-95 migration out of Madrid (to the periurban zone) rose by 66% and that out of the suburban zone by 76%.

Table 4. Origin of intra-CAM migrants to the periurban zone, 1981–1995

Indicator	1981–1985	1986–1990	1991–1995	1995
Inmigration	34,779	44,357	71,643	18,048
Participation of Municipio de Madrid (%)	75.2	66.4	61.7	61.8
Participation of Corona Metropolitana (%)	23.0	33.6	38.3	38.2
Zones: Norte	13.9	11.7	12.6	13.2
Este	24.0	26.9	24.9	25.9
Sur	54.5	51.3	48.8	44.9
Oeste	7.5	10.1	13.6	15.9

Obs.: – without intra-periurban migration; – 1981–1985: 1.8% of migrants cannot to be classified

Source: Author's calculation from data of J. Vinuesa Ángulo (1994) and *Estadísticas del Movimiento Migratorio* 1991–1995.

Table 5. Migration to the periurban zone of the CAM, 1990–1995

Indicator	1990	1995
total immigration	16,642	26,247
migration balance (total)	8,074	11,980
national and international immigration (excluding CAM)	6,023	8,199
migration balance (external)	1,309	-305
immigration from Municipio de Madrid	6,710	11,160
immigration from <i>corona metropolitana</i>	3,909	6,888
migration balance (CAM-internal)	6,765	12,285
participation of migrants from Madrid to the periurban zone among migrants from Madrid to periurban and suburban zone (in %)	22.9	32.8
participation of migrants from suburban to periurban zone among migrants from the suburban zone to Madrid and periurban zone (in %)	29.8	39.6
participation of CAM-internal immigration in total immigration (in %)	63.8	68.8
increase of immigration from Municipio de Madrid 1990–95 (in %)		66.3
increase of immigration from suburban zone 1990–95 (in %)		76.2

Source: author's calculation from *Estadísticas del Movimiento Migratorio de la CAM* 1990 and 1995.

If we analyze the places of origin within the *corona metropolitana* in more detail, we come to the following results. Most of the immigrants continue to come from the populous southern part of the agglomeration (almost 50%, Table 4), but the proportion of migrants from the western part, where strata of higher social status in particular live (Estébanez 1990) has increased greatly in the past 15 years at the expense of the southern parts. Many of the migrants are migrating in stages from Madrid via the *corona metropolitana* to the periurban zone.

The proportion of persons in the group with the highest level of education currently exceeds that of the migrants into the suburban zone, though is not yet as high as for the migrants into the western part of the *corona metropolitana*. One of the main reasons for the relatively high educational status of the migrants to Madrid is that students are moving into the core city. It should be noted that the migrants whose target area is the western part of the suburban zone have the highest educational level, though the educational level of the migrants into the

periurban zone is also rising gradually. The result is a greater heterogeneity with respect to socioeconomic status, with the extremes being the traditional rural population on the one hand and upper-class immigrants on the other.

Due to the heavy immigration, the age structure is also changing on the periphery. The high percentage of elderly persons reflecting strong outmigration up to and into the 1980s is gradually being offset, because persons of all age groups are moving in, including young families. However, the immigrants are older on average than in the suburban zone, especially in the south, to which particularly young lower-class persons are moving. An unusual number of persons over 45 are moving into the periurban zone. This is an indication that the zone is attracting higher social classes and persons seeking retirement homes. Even a longitudinal comparison reveals that the socioeconomic status has developed positively.

There are, however, considerable differences between the individual municipalities, both with regard to migration rates and the demographic and social characteristics of the immigrants and the population as a whole. The zone is highly fragmented, in some cases there is polarization, e.g. very rural villages and traditional agriculture versus middle and upper 'class' immigrants. Even within individual municipalities polarization is occurring between new housing developments and traditional village cores. In addition, periurbanization is extending beyond the boundaries of the CAM, because a number of adjoining municipalities in other provinces are also registering extremely high immigration rates.

6. EXPLANATORY ATTEMPTS

In attempting to explain migration movements in metropolises, it would seem to be sensible to combine urban geographical and urban sociological approaches to research with the demographic approaches that have already been described. This is all the more necessary as the crucial changes to urban development under postindustrial conditions, which can also be found in research literature, were to be observed in the past 20 years. Here, it is important to mention economic restructuring in connection with the transformation from a fordist to a postfordist economic style, resulting in a deconcentration and afterwards in a decentral concentration which can, in extreme cases, be expressed via the creation of edge cities (Garreau 1991; Hall 1998). The development towards an entrepreneurial city, towards creative cities, etc., leaves traces in the style of urban development: these economic, but also social and psychological changes lead to an increasing heterogeneity of economic and social demands and desires; to a disintegration of former economic structures of social strata, and thus, finally, to a fragmentation of the spatial structure of agglomerations (cf. Soja 1995; Dematteis 1998).

The fact that these processes are closely connected with migration is obvious, for new means of settlement and social structure can just be created by the in- and outmigration of certain groups of the population. In the long run, the

effect of migration and the subsequent change in fertility and mortality is especially evident in the communities of the suburban area. In Madrid, it is also the case that new forms of socio-spatial differentiation can be observed, with these being expressed through fragmentation of an economic, a social and a cultural kind (cf. López de Lucio 1998; Wehrhahn 2000).

How can we explain these phenomena? In the following we shall attempt to introduce some explanations, some of which can serve as hypotheses for further investigations. It is obvious that the motives for the migration of individual persons are a complex mixture of choice and constraints. Simultaneously there is an interplay of globally effective factors, particularly economic ones, with localities – something which manifests itself primarily in culture and individual lifestyle.

- Generally known reasons are the improvement of infrastructure, especially transportation routes. In the CAM the traffic conditions in the periphery have only been under improvement since the mid-1980s, a relatively late onset when set against those in the metropolises of north-western Europe. Construction of the third ring is now beginning, and this will be of central importance to the periurban zone. Simultaneously we can determine that, in Madrid as in other metropolises, the commuting distance is generally increasing.
- The economic transition following democratization and Spain's entry into the EU in the 1980s had mainly positive consequences for Madrid. Numbers of jobs and income rose, increasingly on the periphery as well (i.e. through suburbanization of industry, commerce and the service sector, new industrial districts, high-tech centers, outsourcing in the direction of the periphery: cf. Wehrhahn 2000). Postfordist structures led to a greater degree of independence of central sites, and the peripheralization of jobs contributes to the peripheralization of residential areas.
- New supply centers on the periphery are increasingly taking the place of shopping in the center of Madrid. Modern shopping centers have been growing up – particularly in the north and west – since the 1980s (Carrera Sanchez 1995).
- The type of urban development in the periphery is changing: construction is primarily in the hands of private developers now, where formerly the focus lay on publicly-assisted housing construction for the lower classes. It was most important for the urban development in the inner periphery near the center. This non-centralized settlement development leads to extremely dispersed construction on the periphery. The most obvious example of this is that many municipalities in other provinces adjoining the CAM have seen land allotted for new housing developments.
- Sociocultural change also contributes to periurbanization. Quality of life, ifestyle and fashion not only relate to such processes as inner city gentrification, but also influence rural areas (Findlay, Rogerson 1993). Rural areas are now experiencing a positive evaluation. "*Ruralismo*" is no longer the rige at weekends only, being part of a new lifestyle. This signifies that the jo-

- larization between urban and rural society, which is particularly pronounced in Spain, in contrast to Central Europe, is being broken down. In the suburban zone the ties to the core city still play a much greater role in the lifestyle.
- The special significance of *residencias secundarias* in Madrid is important as well. For one thing, these can become the principal domicile, thus facilitating migration. On the other hand, they influence the (positive) evaluation of *ruralismo* among their owners, and their children and acquaintances. The role that second homes play in Spain also offers an answer as to why suburbanization – and especially counter-urbanization – did not occur to the same extent as, for instance, in the US, where this outlet for city dwellers practically does not exist.

The central duty of further research in this tense field of migration and urban development must be to find out which connection there is, especially between the transformation of economic, social and settlement structures in post-modern metropolises and the parameters of direction, distance and motives for migration.

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MIGRACJE WE WSPÓŁCZESNYCH METROPOLIACH: DEMOGRAFICZNE ASPEKTY SUBURBANIZACJI I PERYURBANIZACJI W MADRYCIE

STRESZCZENIE

Autor przedstawił kolejne fazy przemian ludnościowych w regionie metropolitalnym Madrytu (CAM), ze szczególnym uwzględnieniem roli migracji w tych procesach.

Procesy suburbanizacji i dekoncentracji ludności z centrum do strefy zewnętrznej (podmiejskiej i peryferyjnej) wystąpiły w CAM stosunkowo późno (na początku lat 90.) w porównaniu do innych metropolii hiszpańskich np. Barcelony czy Bilbao, gdzie procesy te nasiliły się w latach 1981–1986. Różnice regionalne wiążą się z tempem i dynamiką rozwoju gospodarczego w prowincjach hiszpańskich, wpływem demokratyzacji państwa po obaleniu reżimu Franco oraz wejściem Hiszpanii do Unii Europejskiej w latach 80.

Niniejsze studium dokumentujące przestrzenną dekoncentrację ludności w regionie metropolitalnym Madrytu, ilustruje kolejne fazy procesów urbanizacji i suburbanizacji oraz tzw. peryurbanizacji w odniesieniu do struktury przestrzennej CAM, a mianowicie strefy centralnej (rdzenia) regionu (m. Madryt) oraz strefy zewnętrznej składającej się ze strefy podmiejskiej i peryferyjnej (corona metropolitana).

Proces urbanizacji w regionie metropolitalnym Madrytu występował w dekadzie lat 60. i trwał przez kolejne dziesięciolecie. Równocześnie w latach 70. rozwijały się procesy suburbanizacji i dekoncentracji ludności, które trwały w latach 80. i 90. Na początku ostatniej dekady wystąpiły procesy peryurbanizacji, które obecnie są w fazie silnego rozwoju.

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VI. POPULATION AND DEVELOPMENT

Population, environment and development

Prace Geograficzne nr 202 (2005)

Ulrich Jürgens, Jürgen Bähr, Ronnie Donaldson

ETHNIC CHANGE IN SOUTH AFRICAN CITIES: A COMPARATIVE PERSPECTIVE

1. OBJECTIVES

The process of transformation from Apartheid towards a democratic system that began in the early 1990s has had far-reaching effects on socio-spatial structures in South African metropolitan cities.

The Apartheid doctrine was not merely a normative, rather abstract factor in defining the social coexistence of citizens of different colours, since it served simultaneously as a concrete element of spatial planning. This resulted in an all-encompassing spatial segregation of the races, which one-sidedly favored the white population in their choice of residential areas and workplaces (Bähr, Jürgens 1993; Christopher 1999; Donaldson, van der Merwe 1999) (Fig. 1). South Africa's democratization and governmental measures of affirmative action designed to promote the social advance of non-whites have substantially altered Apartheid's spatial structures substantially. The former doctrine of racial segregation is now replaced by the ideal of a multi-ethnic society. However, as opposed to Apartheid, this ideal can not be enforced by repressive means, but can only be achieved on a voluntary basis.

Our study of social and demographic changes in different South African metropolitan cities is designed to explain how the pattern of racial segregation has changed, what kind of dynamism drives these fundamental changes, and which consequences for the future of urban development can be deduced.

2. THE STATE OF RESEARCH

Ethnic changes and the various reactions shown by different population groups to these changes (i. e. hostility towards newcomers, moving away, or amalgamation) enjoy scientific attention all around the world. Seeking to explain the demographic dynamics in North American cities, the Chicago school of sociology worked on this issue more than eighty years ago. Analogous developments were confirmed for other cultures, too. The more recent inquiries into the social, cultural, and ethnic fragmentation of societies undertaken by P. Marcuse or P. Bourdieu could not replace socio-ecological approaches, but have occasionally just promoted new terminology (Bourdieu 1991; Marcuse 1998). In the case of South Africa, various studies with a spatially confined focus have been conducted since the late 1980s (Jürgens 1991; Morris 1994, 1999; Guillaume 1997; Horn 2002; Bähr, Jürgens 2002; Jürgens, Gnad, Bähr 2003).

These pointed either to the importance of racial categories when it came to the choice of residential areas even after the abolition of Apartheid, or else to the replacement of racial barriers by socio-economic class barriers. However, because of their very different approaches and methodology, the studies in question have only been comparable to a very limited extent.

3. SURVEY AREAS AND METHOD

Our own studies of the late 1980s and late 1990s have (for the first time in the South African context) attempted to introduce a comparative statistical approach into the examination of demographic change in defined survey areas. The subject of analysis was the Yeoville residential area at the edge of the city of Johannesburg (Jürgens 1991; Gnad 2002). The studies were based on extensive random samples taken from a base comprising all Yeoville households. This area

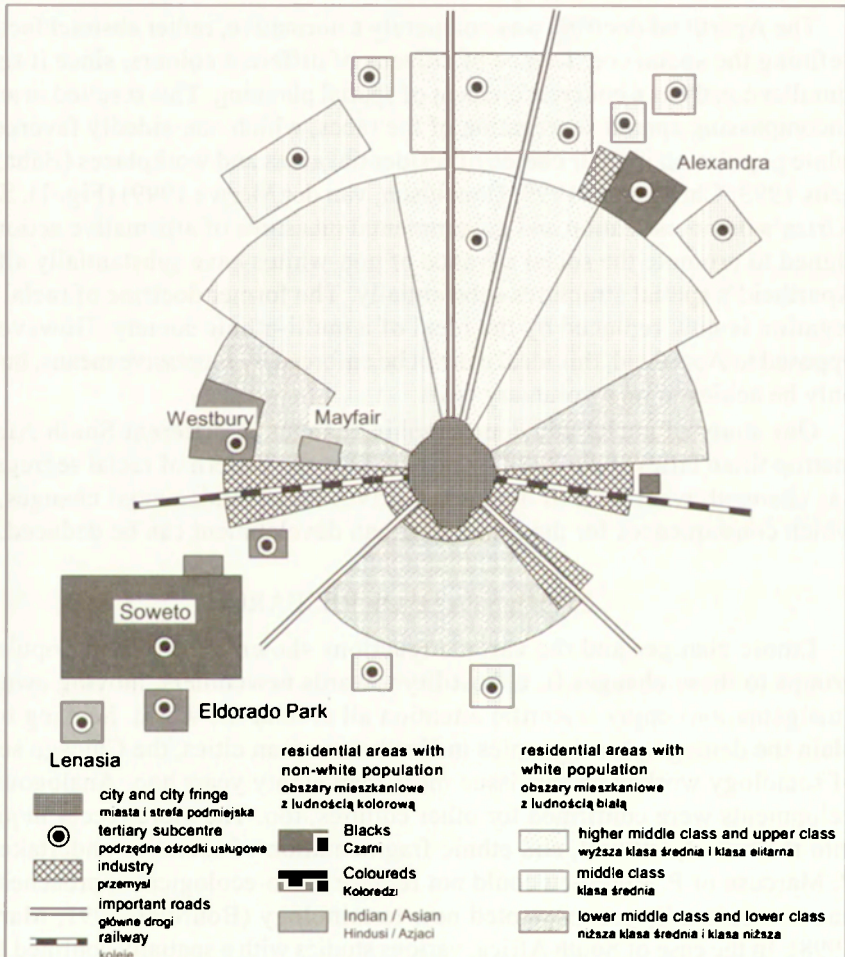


Fig. 1. Model of the Apartheid city
Model miasta w ustroju apartheidu, Johannesburg
Source (źródło): Bähr, Jürgens (1993).

is characterized by a high density of construction, a combination of multi-floor and solitary buildings, and a multicultural tradition. The latter, however, was shaped by an exclusively white population until the late 1980s. Yeoville's image was characterized as rather English-liberal. Even when Apartheid was still in place, breaches of the residential-spatial regulations for racial segregation were largely tolerated. As a result, Yeoville was able to gain some experience with multi-racial co-existence even before the official abolition of Apartheid laws and regulations. In cooperation with South African universities, comparable sampling using identical questionnaires was conducted in three other South African cities, namely Durban, Bloemfontein, and Pretoria (Fig. 2).



Fig. 2. Cities under investigation

Miasta badane

In terms of their construction pattern, their location in the city or at the city edge, and their former nature as exclusively white residential areas, the other surveyed areas are comparable to Yeoville. Pretoria and Bloemfontein can, however, be described as rather conservative, Afrikaans-speaking cities, thereby allowing for an expectation that the reactions on the part of the white population to the influx of non-white people would be different. The expansion of the sample to include three more cities was aimed at excluding the influence of local peculiarities (Table 1). In this way it might eventually become possible to discern a characteristic pattern of population dynamics in South African inner cities.

Table 1. Survey areas and sample sizes

Survey area	Time of survey (year)	Sample size in number of persons
Yeoville, Johannesburg	1998	1,059 (=350 households)
Albert Park, Durban	2002	401 (=150 households)
CBD, Bloemfontein	2001	600 (=268 households)
Sunnyside, Pretoria	2001/2002	585 (=250 households)

Source: own surveys

4. DISCUSSION

4.1. DEMOGRAPHIC STRUCTURES

All four surveyed areas show population replacement to a dramatic extent (Table 2). A comparison of the ethnic composition at the time of the general census of 1991 (the time when Apartheid laws and regulations were abolished) with our own samples reveals a rapid decrease in the white population and

Table 2. Percentage of non-white persons in surveyed areas

Survey area	Population census 1991	Sample result
Yeoville, Johannesburg	21	84
Albert Park, Durban	25	86
CBD, Bloemfontein	4	53
Sunnyside, Pretoria	4	59

Source: own surveys

a simultaneous increase in the numbers of non-white persons. While in the English-speaking areas, the share of non-whites already amounted to more than 20 per cent in 1991, the starting point in Afrikaans-speaking survey areas was almost zero. However, in just ten years, the share of white persons decreased by some 50 to 60 per cent in all four areas. Younger non-white people seeking to improve their residential status, and to live in proximity to infrastructure for daily supplies, work, and education have in particular moved in. They have also been seeking to avoid the typical township problems like high crime rates and time-consuming commuting to the inner city. The relatively inexpensive rent in multi-floor apartment houses (for which the traditionally limited demand among white residents ensured former use as transitional accommodation only) further promoted the movement of non-whites from a confined situation in the townships towards the inner cities. For many, the inner city and city edge have served as a starting point in a process of further improvement in social and residential status. The next stage is soon a move on into formerly white residential areas with a more extensive construction style. Such a pattern of residential-spatial spill-over-effects from the city's core areas into neighboring quarters can clearly be observed in Johannesburg at least (Fig. 3).

The dynamics to population exchange after the abolition of Apartheid are found to be independent of whether rather liberal, or rather conservative atti-

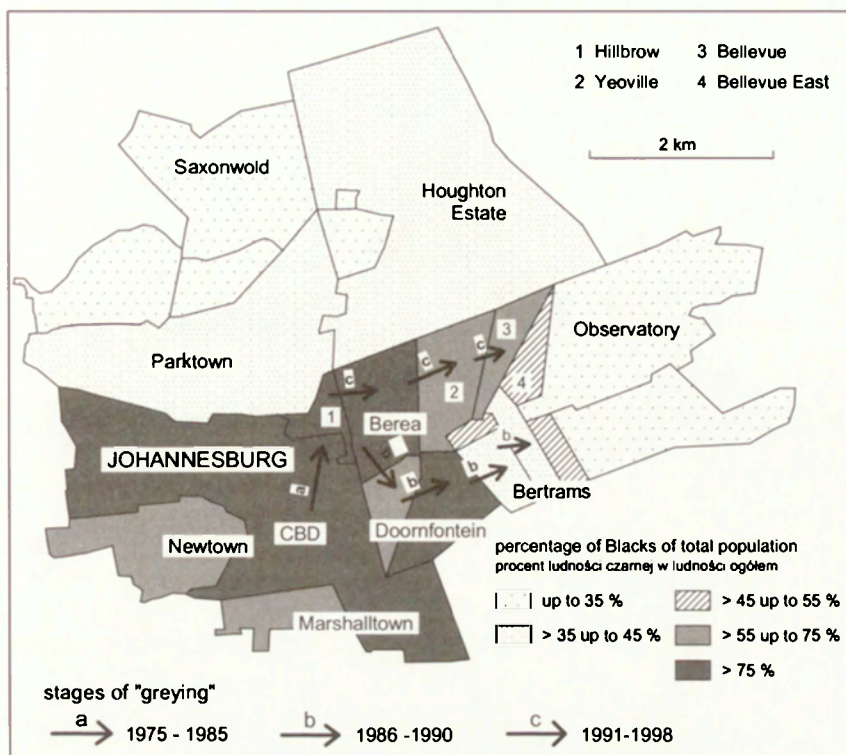


Fig. 3. Spatial diffusion of residential "greying" in Johannesburg

Dyfuzja przestrzenna obszarów mieszkaniowych z ludnością mieszaną w Johannesburgu

Source (źródło): Gnad (2002)

tudes were traditionally prevalent in the affected residential areas. Distinctly uneven distributions of ethnic groups can only be found at the low-scale level of individual blocks or buildings. For example, the influx of non-whites in Bloemfontein concentrates particularly in the south of the CBD, while Bloemfontein's northern part is still dominated by white residents. Similar experience can be gained in Yeoville, where the remaining white population concentrates particularly along roads with single houses or condominium buildings. This white population usually belongs to older age groups and to the lower or average middle class. There is a general tendency for the city and areas close to the city edge to be typical zones of transition with highly mobile residents. In contrast, the remaining white population in these areas constitutes a highly stable element. People from this group have usually acquired residential property, and have thus invested all of their savings in the city. As they have been ageing in place in the surveyed areas, and are characterised by physical and social immobility (and also the absence of buyers for residential real estate), these persons do not move away with the younger white people. As – on account of perceived changes in ethnicity and "atmosphere" in the area – there are no other young whites to move in and replace those who leave, there is no more normal

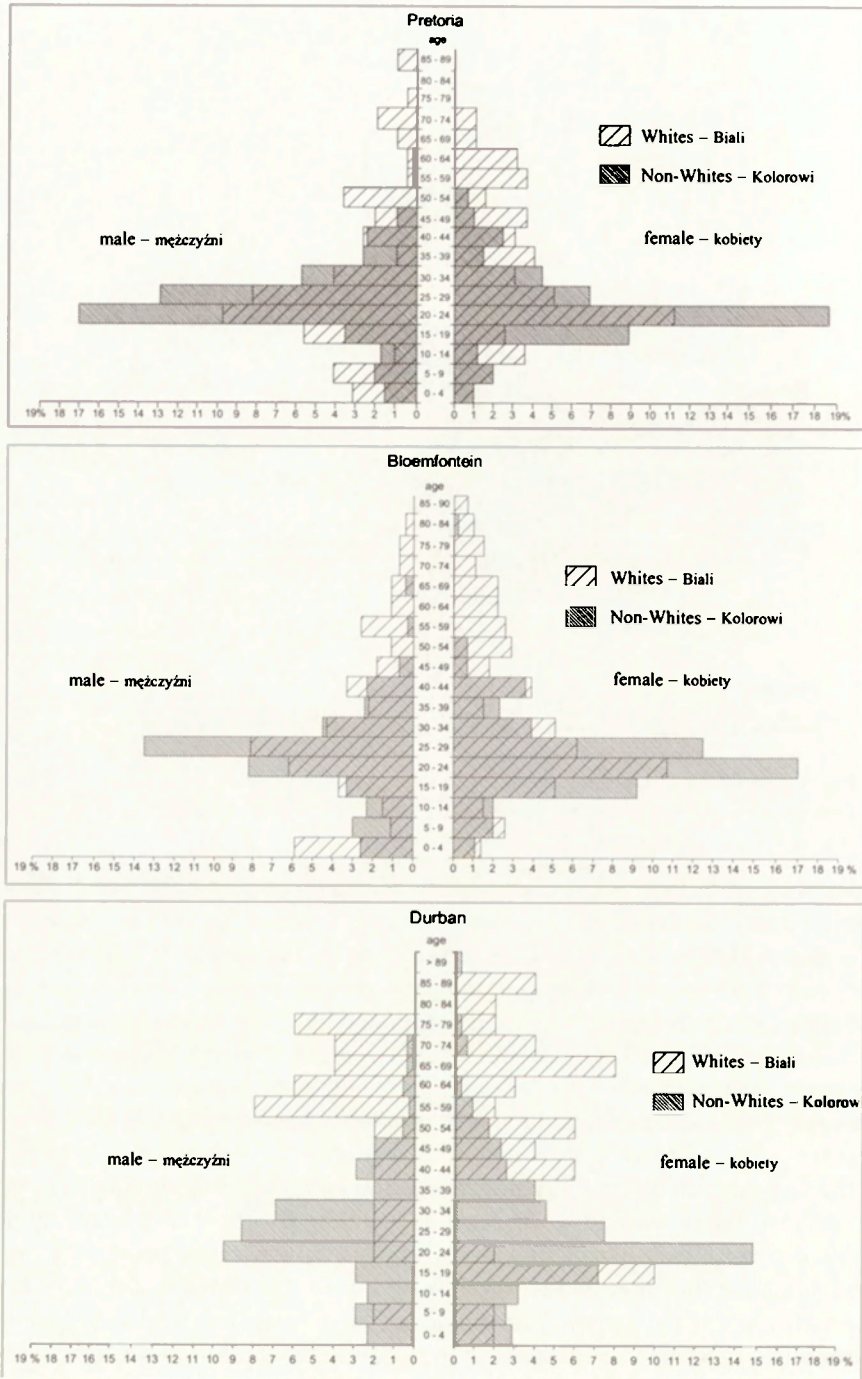


Fig. 4. Population pyramids for sample areas (source: own surveys)

Piramidy ludności badanych obszarów (źródło: własne)

turnover of the white population in the surveyed areas (Fig. 4). The persistence of older white persons is correspondingly high. These would only be able to sell their residential property at a marked financial loss, while not being able to find affordable alternatives in other residential areas. The result is an average residential duration three to four times longer than that to be noted for non-white households (Table 3).

Table 3. Average duration of residence in years

Survey area	White households	Non-white households
Yeoville, Johannesburg	16.8	2.9
Albert Park, Durban	17.7	4.3
CBD, Bloemfontein	10.6	4.6
Sunnyside, Pretoria	7	3

Source: own surveys.

Since the non-white residents are remarkably young, there is a pronounced polarization along age lines (Fig. 4). In contrast to the international trend towards a residential exodus from inner-city areas (as could still be observed under Apartheid with a resulting increase in single households and a high rate of rental vacancies), the non-white influx contributes to a revitalization of the surveyed areas. The newcomers comprise both single-person households (e.g. of students) and small families, as well as groups of people sharing an apartment. Consequently, the population did not decrease in the manner that could still be observed during the 1970s and the 1980s, but rather rose sharply. It can be assumed that the population of areas close to the city edge almost doubled during the 1990s. The development in the CBD of Bloemfontein is less significant, but even here the decrease in the population has been arrested. Comparisons with the 1991 general census reveal an increase in the population of some 9 per cent by the time of the 1996 census. This can be attributed exclusively to the influx of non-white residents. Thus the number of black residents increased by more than 1,100 per cent, while the number of white persons decreased by 23 per cent to 4,752. Some parts and individual buildings in the surveyed areas are already affected by overcrowding, a fact reflecting the high level of attractiveness of these areas for the non-white influx, because of their central location and their affordable rent levels or condominium prices. Because housing is still too expensive for some non-white households, landlords of some buildings have begun to rent single rooms, or to re-designate whole buildings as student halls, low budget hotels, or charitable housing projects (as, for example, in Albert Park, Durban). While this enables landlords to increase their profits, it simultaneously changes the residential density and the social atmosphere of the area.

During the period from the 1950s to the 1970s, a large number of European immigrants moved into the inner cities, using them as transit zones. Taking up this multicultural (white) heritage, some inner city areas today have turned into centers of black African social life previously unknown in South Africa (Table 4). This development can be attributed to the fact that legal and illegal immigration from other parts of Africa has increased significantly in the course of South Africa's democratization. These immigrants understand the inner city

residential areas as their port of entry into metropolitan life and the labor market just as the black South African population does.

Table 4. Head of household's region of birth (percentage)

Survey area	South Africa	Africa	Other
Yeoville, Johannesburg	77.5	16.3	6.2
Albert Park, Durban	94.3	5.3	2.7
CBD, Bloemfontein	96.3	3.7	-.-
Sunnyside, Pretoria	88.6	7.8	3.6

Source: own surveys.

5. SOCIAL STRUCTURE

The fact that white households avoid inner city areas as their new residential areas raise not only questions of ethnic conflict, but also issues concerning the social disparities between those who still move into these areas and those who do not. South Africa was traditionally divided along a race-class dichotomy: the social stigma of a dark skin colour simultaneously meant severe economic disadvantages. The principle of affirmative action under the new administration, i. e. the so-called positive discrimination with special programs to promote non-white persons in the labor market, aims at compensating for these disadvantages. Blacks, Indians, and Coloureds are meant to occupy such a share of positions in the public (and later also in the private) sector as would correspond with their percentage shares of the overall population. The consequent income increases among these groups open up new opportunities to seek better residential circumstances than can be found, for example, in the townships. Thus a trend towards the social equalization of whites and non-whites could have been expected for the surveyed areas, too, though this was in fact found to be partly true only .

Social contrast is particularly evident in Yeoville (Table 5), where white homeowners often face non-white tenants and lodgers with substantially more-limited purchasing power. Social tensions also flow from unemployment figures, which – with the exception of Bloemfontein – are several times higher for non-whites than for the white population (Table 6). Many non-whites have to sustain their living through casual labor and informal, sometimes even illegal, activities. Yet even that is enough to allow them to stand out positively against the overall non-white population of South Africa. Immigrants from other parts of Africa, whose average net income per household is still significantly lower than the black South African average, and who depend primarily on the usually local informal sector for their living, constitute a particularly marginalized group.

As a result of the fundamental ethnic and social changes described, the micro-economic situation has changed, too. The formal sector, which had traditionally been catering to the needs of the white residents, is being replaced by new structures better suited to the demand pattern and purchasing power of their predominantly non-white patrons. For Johannesburg at least there is evidence

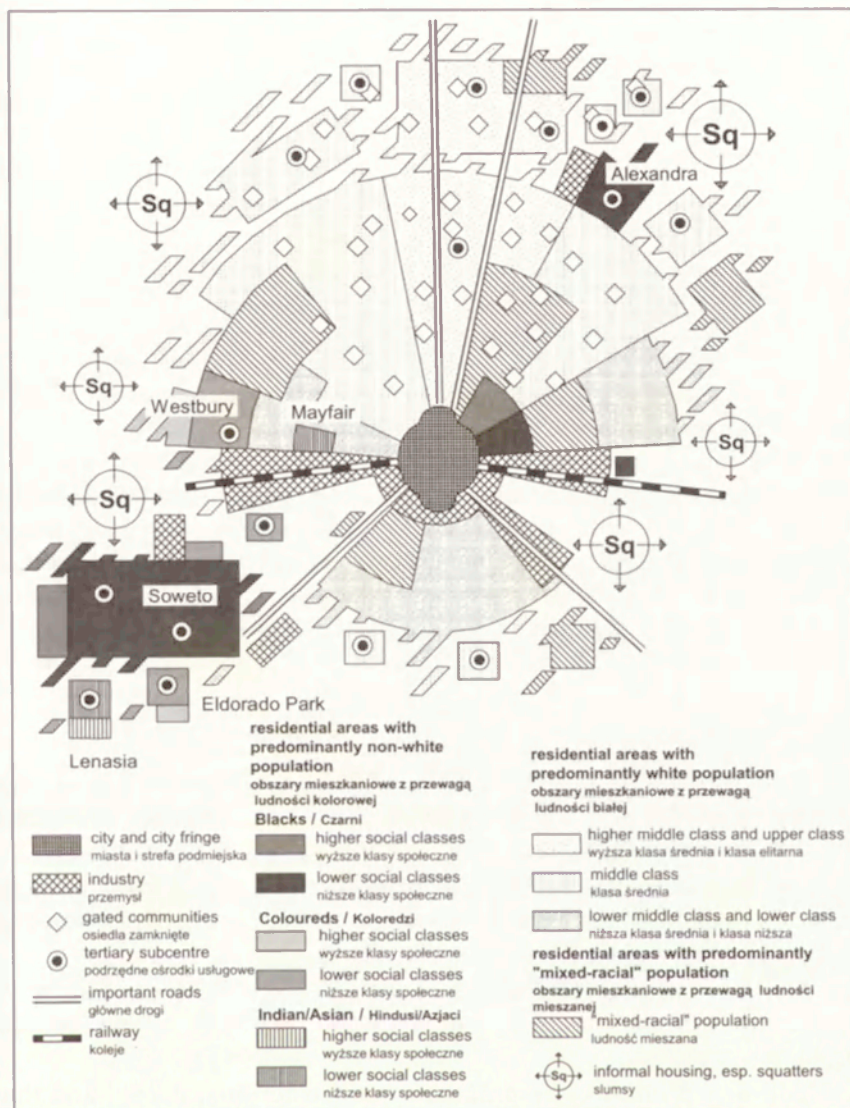


Fig. 5. Model of the Post-Apartheid city
 Model miasta w nowym ustroju demokratycznym, Johannesburg
 Source (źródło): Bähr & Jürgens (1993); Gnad (2002).

Table 5. Average net monthly income per household (in ZAR)

Survey area	White households	Non-white households
Yeoville, Johannesburg	7,600	3,250
Albert Park, Durban	3,160	3,200
CBD, Bloemfontein	3,780	3,600
Sunnyside, Pretoria	5,200	4,770

Source: own surveys.

Table 6. Percentage of unemployed to employed persons

Survey area	White persons	Non-white persons
Yeoville, Johannesburg	3.0	25.9
Albert Park, Durban	-.-	14.0
CBD, Bloemfontein	8.7	7.2
Sunnyside, Pretoria	1.3	7.0

Source: own surveys.

for the so-called redlining by banks and insurance companies, which withdraw from certain areas and do not grant loans there any more. Due to overcrowding and an increasing economic informalization, they do not see sufficient guarantees for the timely repayment of debts. It is also quite disadvantageous that even many "new" non-white residents use the surveyed areas only as transit zones, due to urban blight in their immediate neighborhood or because of their own social advance. More than 50 per cent of the surveyed households declared their intention to leave their residential area in the near future.

6. CONCLUSION

The following trends are discernible:

a) All across South Africa – albeit from different starting points – inner cities are witnessing an extensive ethnic exchange. The white population is avoiding moving into these areas. The ideal of a "rainbow nation" is not achieved.

b) A downward-leading social filtering effect can not be ruled out as long as non-white social climbers quickly leave these areas again because of urban blight (as at Yeoville, Sunnyside and Albert Park).

c) There is an ongoing informalization of local economies, which serves to underscore the "Africanization" of inner cities, also in terms of their cultural atmosphere.

d) Redlining promotes the process of constructional decay, and thus a negative social segregation in the concerned areas. The emerging no-go-areas are avoided even by the police.

e) Cities as a whole are breaking down into zones with very different social and supply conditions. For a large part of the white population, the most privileged and sought-after of these islands are still to be found in the traditionally white garden suburbs of the new so-called "gated" communities (Jurgens, Gnad 2002) (Fig. 5).

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BADANIA PORÓWNAWCZE STRUKTURY ETNICZNEJ W DUŻYCH
MIASTACH POŁUDNIOWEJ AFRYKI

STRESZCZENIE

Proces transformacji ustrojowej od Apartheidu do systemu demokratycznego w Południowej Afryce, który rozpoczął się na początku lat 90., wywarł wielki wpływ na przestrzenną strukturę społeczną miast metropolitalnych. Procesy demokratyzacji kraju pozwalają na promowanie awansu społecznego ludności kolorowej. Poprzednia

„wieloetnicznego” („rainbow nation”). W artykule zanalizowano różne uwarunkowania i szybkość przemian przestrzennej struktury etnicznej, społecznej i ekonomicznej, które dokonują się po 1991 r. w dużych miastach Południowej Afryki. Badania ankietowe obszarów wewnętrznych Johannesburga, Pretorii, Durbanu i Bloemfontein, które były prowadzone w latach 90. a także w 2000 r. i 2001 r., dostarczyły szczegółowych danych źródłowych. Porównywalność danych uzyskano dzięki zastosowaniu identycznych kwestionariuszy ankietowych. Niektóre z badań były realizowane we współpracy z lokalnymi uniwersytetami. Głównym celem było ustalenie czy badane miasta reprezentują wspólny model przekształceń struktury społecznej i czy obecne struktury odzwierciedlają różne etapy procesów transformacji. W artykule analizowano przyczyny przesunięć w czasie dotyczących rozwoju badanych struktur. Wyniki badań ankietowych zweryfikowano na podstawie danych spisowych z 1991 i 1996 r., jak również na podstawie wcześniejszych badań własnych. Wyniki badań potwierdziły tezę, iż w obszarach wewnętrznych dużych miast Południowej Afryki zachodzą intensywne przemiany struktury etnicznej, przy czym ludność biała unika osiedlania się w tych dzielnicach. Następuje szybki rozwój sektora nieformalnego gospodarki, tzw. „szarej strefy”, czego wyrazem jest „afrykanizacja” stref śródmiejskich dużych miast oraz pogłębiająca się segregacja społeczna badanych obszarów. Miasta metropolitalne są podzielone na strefy o różnorodnej strukturze etnicznej, społecznej i ekonomicznej, przy czym ludność biała w dalszym ciągu najbardziej uprzywilejowana, preferuje tradycyjne, zamknięte podmiejskie osiedla-ogrody (“gated communities”). Idea społeczeństwa wieloetnicznego nie została zrealizowana.

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THE CONTEMPORARY POLISH-SLOVAK TRANSBOUNDARY COOPERATION

1. INTRODUCTION

Over the decades the homogeneous natural environment in the Carpathian Mts., being divided by a state boundary, was subject to separate forms of development, and was put to distinct kinds of economic use. The border may thus also be a spatial barrier to the development and maintenance of socio economic ties between the Polish and Slovak populations either side of it.

The political and economic changes in Central and Eastern Europe have contributed to the putting in place of transboundary cooperation between population from the bordering countries, with a view to their strengthening cross-border connections, and to transboundary regions emerging¹. In the 1990s, cooperation between the Polish and Slovak populations was reactivated to a point where it resembled the pre-World War II situation. Similar ethnicity, history and language were of assistance in the forming of transboundary ties – e.g. of a social, family etc., nature. The ethnic minority in question (of the eastern and western part of the Spisz-Orava borderland) resides in a region located on both sides of the border.

The Polish and Slovak populations here have been characterised by similar demographic rates. The population has significant activity and a marked dynamic of development, with its people wishing to cooperate in those domains related to the natural environment like joint rational use of nature for touristic purposes, forestry and water management. Transboundary cooperation, particularly in

¹ The legal bases for transboundary cooperation between Poland and Slovakia have been put in place after 1995; being constituted by:

– the Agreement between the Government of the Republic of Poland and the Government of the Slovak Republic of July 18th, 1994, as approved by Decision of the (Polish) Council of Ministers no. 107/94 of December 21st, 1996 (the Polish-Slovak Intergovernmental Commission on Transboundary Cooperation was created on the basis of this agreement);

– the Agreement between the Republic of Poland and the Slovak Republic on legal relations and collaboration over the common state border of July 6th, 1995 (*Dziennik Ustaw Official Journal of Laws 1996*, no. 55, item 250);

– the Agreement between the Republic of Poland and the Slovak Republic on local transboundary movement, concluded in Zakopane on December 6th, 1996 (*Dziennik Ustaw Official Journal of Laws 1997*, no. 127, item 827);

– numerous governmental, regional, and local-governmental agreements concerning cooperation in particular domains;

– the statutes of: Carpathian, Tatra and Beskidy Euroregion Associations.

mountain areas, must give broad consideration to matters linked with the environment. The justification here is that "*modern society attaches ever greater weight to living conditions and activity in an environment as unpolluted as possible, What is involved here are, for example, joint actions in protected areas cut through by borders, in drainage basins, etc. Also involved is the taking of joint action to link environmental protection with tourism*" (Stasiak 1995). The interesting aspects of transboundary cooperation in the mountain areas in Europe have been presented by many authors, including: Sahlins (1989); Forné (1991); Sanguin, Guiraud (1995); Le Coeur (2002).

Within the Polish-Slovak borderland, the national parks located on either side of that border have recently come to serve as cores of cooperation. Within the confines of the protected areas there are numerous tourist routes (both following and joining the border). These are starting to be used by tourists from the two countries, following the establishment of new border crossings. Cooperation is also being enhanced by transport connections, which usually cross the border between the protected areas. In fact, the transboundary cooperation is now extending to an ever greater number of domains of human activity. These include nature protection, tourism, transport, water management, forestry, trade, culture, and education.

A reflection of the course of transboundary cooperation processes is provided by the transboundary ties. These should be understood as the regional or local bonds which function across the state borders. They include all types of contacts between authorities, institutions and people from the two bordering countries, as well as transboundary transport connections. In turn, such ties are defined by a certain spatial reach which can be used in establishing the limits of the transboundary region.

The transboundary ties may concern many aspects of life and human activity on both sides of the border. While the most important types of tie are the political, economic, social and cultural, it is also possible to distinguish those of other kinds, involving, for example: communications, science, religion, family, tourism, sports or administration. This aspect may also be used to account for the situations in which ties have not taken shape due to excessively strong barriers.

2. THE POLISH-SLOVAK BORDER AS A BARRIER

The fact that borders serve as barriers is almost undeniable, and something that is repeated by many authors (Holdich 1916; Boggs 1940; Reynolds, McNutty 1968). Further references to national borders as spatial barriers appeared as the interruptive role of the boundary (Ullman 1939; Moodie 1950; Minghi 1963), as the *boundary effect* (Hartshorn 1939; Mackay 1958) and as the *barrier effect* (Yuill 1965).

Polish author, J. Loboda (1974) declares that every political (including administrative) boundary represents a contemporary spatial barrier. In the main, however, it was the voices of Polish authors holding that borders act as spatial

barriers that continued to be heard, in the persons of J. Łoboda (1983), Z. Rykiel (*i.a.* 1990, 1991), S. Kałuski (1992) and T. Komornicki (1999). According to Z. Rykiel (1991) the concept of the border and the spatial barrier were not considered to overlap more than partially. Clearly, a barrier is a much broader concept, while a spatial barrier is an obstacle to linkages, movements and interactions in physical space. The fact that a border constitutes an economic barrier (Boogs 1940; Hoover 1948) is also confirmed by the analyses of many authors (Suarez-Villa, Giaoutzi, Stratigea 1992; Vernier 1993; McCalum 1995; Menville 1996; Engel, Rogers 1996).

The Polish-Slovak border is thus shown to have numerous barriers overlapping with one another (e.g. the legal, psychological, infrastructural, economic and natural). Aspects of the state border as a barrier to the development of socioeconomic ties between the Polish and Slovak populations have been presented by M. Więckowski (2003). The elimination of many factors leads to the conclusion that a border is the more permeable, the less the psychological and other barriers are significant. In many cases, the most important factor can be considered to be the existence of border crossings as an essential element in creating a cohesive transport network and favouring crossing of the border (in a legal manner). As a spatial barrier, a border exerts an influence in as much as it distorts distance in both absolute and temporal, social or other senses.

The existence of any state border that is not completely permeable is bound to be reflected in the consciousness of people, in this way constituting a certain kind of barrier that may be termed psychological. The greater the sealing of the barrier, the more it comes to be perceived by people as something limiting. In fact, the psychological barrier is sometimes built upon by centres of government or the media (Więckowski 2002).

In turn, from the beginning of the 1990s onwards, the easing of the border and border-crossing regime gave rise to a situation in which the psychological barrier associated with its existence dissipated rapidly. A psychological barrier is often linked with a language barrier, but in the Poland-Slovakia case this is hardly perceptible, as the languages are quite similar. Indeed, more and more use of Polish is being made on the Slovakian side, mainly with a view to attracting Polish tourists.

A lack of transboundary ties or their feeble level of development, results where many factors come into play. The most important of these reflect the existence of political, economic or ecological/natural barriers. Strictly speaking, the ecological barriers are in fact often related to limitations provided for in international and domestic law on nature protection. These forbid the development of certain kinds of human activity within protected areas. In turn natural barriers *sense strict* are formed by the natural environment itself, though are again capable of operating in either a direct or indirect manner. In the cases of both Poland and Slovakia it is this shared border between them that is the hardest to cross of any. This mainly reflects the deeply-incised relief, with the valleys of rivers such as the Poprad and Dunajec combining with large areas of forest

to pose a basic problem for those seeking to cross the border and develop trans-boundary ties. The biggest spatial barriers of all are those put in place by the Bieszczady Mts., the Low Beskid Mts., the Tatras, and Beskid Żywiecki. Natural conditioning is important as regards the direction and course of transport lines. Some mountain chains like the Tatras, Bieszczady Mountains and Beskid Żywiecki range are a major barrier to the laying of roads and railway lines, and hence also for cross-border connections and movements of people.

3. THE DECLINE IN THE BARRIER ROLE OF A BORDER

A positive phenomenon along the Polish-Slovak border is the steady reduction in the role of formal and legal barriers. In the second half of the 1990s in particular, the effect of the previous lifting of visa obligations combined with ongoing simplification of border procedures to make the crossing of the Polish-Slovak border an ever less-troublesome matter. The signing of the relevant documents – initially in regard to small-scale border traffic, and from 1999 in regard to the opening of tourist crossings – also led to a considerable limiting of the border's role as a formal and legal barrier. As of 2004, the crossing of the Polish-Slovak border is little more than a formality from the legal point of view. The lack of extreme or time-consuming clearance procedures or completion of different documents also give rise to a reduction, or even the complete abolition, of queuing at border crossings.

As of 1990, the whole Polish-Slovak border had only 5 crossing points. By 1995, 6 new ones had appeared. In turn, the period from 1996 onwards (following the signing of the agreement on small-scale border traffic) saw the establishment of border crossings for those living in gminas at distances of up to 15 km from the border. Fifteen examples of this kind of crossing were in existence by 1998, such that there were a total of 27 crossings (representing a 540% increase on the 5 existing in 1990). The greatest year-on-year increases were the 136.4% increase between 1995 and 1996, and the 180% increase between 1996 and 1997. In turn, 1999 saw the establishment of 22 new tourist crossing points, though these are not of course of significance where road or rail traffic are concerned. The Polish-Slovak border now (as of 2004) boasts 13 crossings open to all, 14 reserved for those living in the region and 22 designed for tourists on tourist trips.

The increase in border traffic in the same period was in fact more limited. While in 1990, 6.2 million persons crossed the Polish-Slovak border, the figure had reached 20.8 million by 2000. This represents a 336 % increase. The greatest year-on-year increase in the number of crossings of the border came in 1995 (up 37.5% on the previous year) and 1991 (up 37.4%). The increases in the number of crossings of the border and in border traffic are as presented in Table 1. The spatial locations of crossing points and border traffic are in turn as presented in Figs. 1 and 2.

It needs to be emphasised that the increase in the number of border crossings has been associated with a reduction in the distances between the different points. This fell from 105.5 km on average in 1990, to 58.6 km in 1994, and

Table 1. Crossing points, border traffic and level of traffic per crossing on the Polish-Slovak border in the years 1990–1998

Year	Number of crossing points		Border traffic	
			people in 1000s	No. of crossing in 1 points per 1000 people
1990		5	6 226	1 245
1995		11	12 800	1 164
2000	A	27	20 809	771
	I	13	19 695	1 515

A – altogether, I – including those generally-accessible. Author's own study on the basis of materials from the Border Guard

19.5 in 1998 and 2000. A further consequence has been an increase in the mean altitude of border crossings, by 57.5 m in the years 1990–2000 (to reach a value of 649 m a.s.l.).

Cross-border rail and coach links form a certain kind of configuration of defined range, which denotes a real level of use of roads, railway lines and border crossings, as well as revealing defined demand. It also attests to the possibilities and real systems working to create transboundary societal ties (see Więckowski 2000).

The years 1993–1999 brought a three-fold increase in the number of people visiting the neighbouring country. 1999 saw more than 4.5 million visits by Slovaks to Poland, and about 5 million visits by Poles to Slovakia. While tourist attractions are obviously the magnets drawing people in, purchases and interests are also hugely important reasons behind trips to a neighbouring country. Differences in the level of socioeconomic development also have their influence on the quality of tourism. Lower prices in Slovakia allow Polish tourists to stay longer over there. In turn, the high price of overnight stays in Poland ensures that less than 17 thousand Slovaks decided upon such a stay in this country.

Nevertheless, there is a greater number of Slovaks visiting the Polish part of the borderland than vice versa. Slovaks mainly come to Poland for the day, while when Poles go to Slovakia (as they do ever more often), they stay longer and longer. The two Slovak border regions (of Presov and Žilina) accommodated more than 63,5 thousand Poles in 1998. In comparison, the former Polish voivodships of Krosno, Nowy Sącz and Bielsko-Biała put up only 2300 Slovaks. Equally glaring are the disproportions in the mean length of stays, with Slovaks spending an average of 2,4 days in the Polish part of the borderland, cf. a figure of 4,7 days for Poles in the Slovakian part (see Table 2).

Among the more important manifestations of, and bases for, transboundary cooperation are the agreements entered into between towns or cities in the two countries. These are a sign of goodwill, and of a willingness to take joint action in various spheres. They are leading to closer cooperation and the forging of ever stronger transboundary ties. Agreements of this type concern a range of fields, among which the following may be considered the most important: economic development, nature conservation, the development of tourism, infrastruc-



Fig. 1. Border traffic in 2000. 1 – international boundaries, 2 – roads, 3 – railways, 4 – border traffic in thousand persons, 5 – Poles from Poland, 6 – Poles to Poland, 7 – foreigners to Poland, 8 – foreigners from Poland

Ruch graniczny w 2000 r. 1 – granice państw, 2 – drogi główne, 3 – koleje, 4 – ruch graniczny w tys. osób, 5 – Polacy z Polski, 6 – Polacy do Polski, 7 – cudzoziemcy do Polski, 8 – cudzoziemcy z Polski



Fig. 2. Local transboundary movement in 2000. 1 – international boundaries, 2 – roads, 3 – railways, 4 – local border traffic in thousand persons, 5 – Poles from Poland, 6 – Poles to Poland, 7 – Slovaks to Poland, 8 – Slovaks from Poland

Mały ruch graniczny w 2000 r. 1 – granice państw, 2 – drogi główne, 3 – koleje, 4 – mały ruch graniczny w tys. osób, 5 – Polacy z Polski, 6 – Polacy do Polski, 7 – Słowacy do Polski, 8 – Słowacy z Polski

Table 2. Polish and Slovakian tourists in places of overnight accommodation in the near-border provinces in 1998

	Tourists	Numbers spending the night	Number of overnight accommodation places	Length of stay
A	Slovaks in Poland	2 274	5 461	2,40
B	Poles in Slovakia	63 513	300 650	4,73
	B / A	27,9	55,1	1,97

tural development (*i.a.* the building of roads and border crossings), cultural and sporting exchanges.

This cooperation brings together towns and cities that are: in close geographical proximity, of the same administrative rank (with regional/provincial capitals the separating distance may be greater because the rank and range of impact are greater), characterised by a similar functional structure (e.g. as spas or health resorts, like Krynica and Bardejov).

Cooperation tends not to be launched between towns and cities that are: located in different parts of the borderland (e.g. with one in the eastern part and one in the central or western part), characterised by obstructed mutual linkage across the border, as with Sucha Beskidzka (isolated by the Babia Góra massif), Liptowski Mikulasz (by the Tatras), Ustrzyki Dolne (by the barrier constituted by both the Bieszczady Mountains and a rather peripheral location).

The transport system plays important role in the shaping of cross-border ties between Polish and Slovak population. Connections that could facilitate transboundary tourist traffic would be of great importance. In 90-s the growth in the number of bus or coach connections has been more dynamic, and a great number are now in operation. The most important in the western part of the borderland are the ones linking Cieszyn, Žilina and Banska Bistrita. In turn, crucial links in the central part of the borderland run via the Łysa Polana – Javorina crossing (connecting Zakopane and Nowy Targ with Poprad and Spiska Nova Ves). In turn, the border of the eastern part is crossed via the Dukla Pass (Barwinek – Vysny Komarnik). The most important line here is that connecting Krosno with Presov and Kosice. Some mountain chains like the Tatras, Bieszczady Mountains and Beskid Żywiecki range are a major barrier to the laying of roads and railway lines, and hence also for cross-border connections and movements of people.

4. PROTECTION OF THE ENVIRONMENT AS AN IMPORTANT FACTOR IN POLISH-SLOVAK TRANSBOUNDARY COOPERATION

The 541 km Polish-Slovak border runs along the Carpathians and divides an area that is very attractive in terms of natural assets. The environment of this borderland is very diverse, and is considered to be one of the most interesting in Europe. The relatively limited transformation of the natural environment, resulting in particular from difficult access to many areas due mainly to relief, the proximity of the state border contributing to less-intensive exploitation of

the border areas, the significant distance from cities, industrial centres, etc., as well as the efforts undertaken quite early with a view to the protection of the natural environment, coupled with the possibility of protecting nature on both sides of the border.

The Polish-Slovak borderland is indeed an exceptional area from this point of view. Many areas of protected nature of both domestic and international importance have been established here. Thus, the zone up to 50 km from the border on both sides now has 13 National Parks (6 on the Polish side and 7 on the Slovak), 17 Landscape Parks (12 in Poland, 5 in Slovakia), ca. 210 Nature Reserves, and many more minor areas where nature is protected by law. What is more, there is no other state boundary anywhere in the world which is straddled by two International Biosphere Reserves (of the Tatra Mts. and the Eastern Carpathians), and is in the immediate vicinity of yet another one (Babia Góra).

Likewise, it is this border of Poland which has the longest stretch of protected areas in the vicinity. National and Landscape Parks abut on to a stretch of border 410.7 km long (or some 79.3% of the total). If account is taken of the semi-protected surroundings of Parks the length increases to 453.3 km, equivalent to 87.5% of the entire border. Making reference to Poland's National Ecological Network one can state that Poland's border with Slovakia is the only one (other than that formed by the Baltic) which is worthy of protection along its entire length. As much as 90% of the border's length is constituted by biocentres, nodal areas and ecological corridors of international significance, 8% by those of national significance, and only the remaining 2% which are excluded from the network. This is the only border with such a high share of areas included in the ecological network.

Four transboundary protected areas have now been established in the area under discussion. These are:

- the Western Beskid area (in the Żywiec or Żywiec-Orava areas), including the Beskid Żywiecki Landscape Park (LP) and the Kysuce LP and Horna Orava LP (involved in joint actions since 1989);

- the Tatra Mountains area, embracing the two National Parks in the Tatra Mountains which have been cooperating since 1967 (closely since 1989);

- the Pieniny Mountains area, taking in the two countries Parks of this name, which began cooperating in 1932, before a long period of dormancy until 1989-1991;

- the Eastern Beskid area, including the Bieszczady and Poloniny National Parks, the Ciśniańsko-Wetliński LP, the San Valley LP and the Jaśliski LP as well as Slovakia's Vychodne Karpaty LP and to some extent also Poland's Magurski National Park - cooperation has been proceeding since 1992 r. (see Fig. 3).

Having become a nucleus for cross-border cooperation of enormous significance in the shaping of transboundary ties, the protection of the environment may have a negative influence on some other activities. It may even lead to lim-



Fig. 3. Transboundary protected nature areas and crossborder points. 1 – international boundaries, 2 – international biosphere reserves, 3 – protected nature areas with transboundary cooperation, 4 – other protected areas, 5 – names of national parks, 6 – names of landscape parks, 7 – road border crossings, 8 – railway border crossings, 9 – crossings for local transboundary movement, 10 – roads, 11 – railways

Transgraniczne obszary ochrony przyrody i przejścia graniczne. 1 – granice państw, 2 – międzynarodowe rezerwy biosfery, 3 – obszary chronionej przyrody z transgraniczną współpracą, 4 – inne obszary chronione, 5 – nazwy parków narodowych, 6 – nazwy parków krajobrazowych, 7 – drogowe przejścia graniczne, 8 – kolejowe przejścia graniczne, 9 – przejścia graniczne dla małego ruchu granicznego, 10 – drogi, 11 – koleje.

itations on the development of tourism, for example. It will also affect the development of cross-border roads and border crossings. Actions working for socioeconomic growth in the area must also comply with intentions as regards the protection of the natural environment. Nevertheless, the retention of the environment in a state as little transformed as possible will impact positively overall on both the development of tourism and the quality of life enjoyed by local people.

Polish-Slovakian cross-border cooperation in the field of nature conservation is becoming ever more and more intensive. It is having an ever-greater limiting influence in regard to activities impacting negatively upon the environment. At the same time, the areas of joint protection being put in place are in many cases becoming the nuclei of Euroregions (as in the Carpathians, Tatras and Beskids).

5. THE EMERGENCE OF TRANSBOUNDARY TERRITORIAL UNITS

Thanks to them barriers are either liquidated altogether or effectively weakened. Border crossings and transport connections are in place, and transboundary cooperation in many domains is well developed. Examples of such ties are provided by the Euroregions, i.e. specific regions situated on both sides of the border. The three Euroregions in existence in the Polish-Slovak borderland are those of the Tatra Mountains, the Beskids (in Beskid Żywiecki) and the Eastern Carpathians.

Again, it is the natural environment that plays a leading role in shaping transboundary territorial units. This is revealed in:

- an area of cross-border ties either side of borders, with the nucleus being formed by the main chain of the Carpathians, or in several cases a region of one distinct physico-geographical unit (the Tatras or Beskid Żywiecki);
- the natural environment's being that element which links societies on both sides of the border – something which is revealed in the names of units as Euroregions of the Eastern Carpathians, Tatras and Beskids;
- the fact that management of areas so valuable from the natural point of view in line with sustainable-development principles is a priority of all the cross-border units of the Polish-Slovak borderland;
- the fact that one of the leading aims of the establishment and functioning of transboundary units is the protection of the natural environment and the use of nature in the development of tourism (and at the same time socioeconomic development in general).

6. CONCLUSIONS

The opening up of frontiers required increased investment on crossing-points, roads, railways, the movement of persons and transport connections. The integration of transportation and communication systems, as well as common efforts regarding environment protection, facilitate the contacts among the pop-

ulations separated by a border. At the Polish-Slovak frontier traffic has increased explosively. While in 1990, 6,2 million persons crossed this border, the figure had reached 12 million by 1995 and 21 million by 2000. Following the opening of the border, Poland and Slovakia commenced with a programme for the renovation and enlargement of border crossings along the 541 km-long frontier, including at 13 crossings open to all, 14 reserved for those living in the region and 22 designed for tourists on tourist trips.

In comparison with other frontier areas of Poland, the Polish-Slovak border presents itself in a kind of dual manner. On the one hand, it is a zone which is very valuable from the point of view of nature, featuring the longest belt of protected areas along any of the two countries borders and constituting a tourist attraction so major that development in this respect must be seen as the area's best option. On the other hand it is characterized by a low level of economic use, such that social and economic activity can and must be developed in harmony with nature (via sustainable development).

The coordinating studies of the development of Polish-Slovak border areas of 1993/1994 and 1997 stated that "*the main factor in the socioeconomic activation of the area is the huge natural and landscape potential for the development of all kinds of tourist traffic and health-resort treatment*" (Studium ... 1994). There is thus likely to be a constant increase in: the role of pro-environmental activity seeking to preserve the environment in a form as little modified as possible; the significance of protected areas and touristic use and the need for joint action in regard to the relationship between tourism and nature conservation.

The conclusion to be drawn from this is that the areas adjacent to the Polish-Slovak border have a great chance of preserving their valuable natural features. In turn, by way of the development of transport and other infrastructure, these may serve a further expansion of tourism and an activation of the whole region. This seems likely to contribute to dynamic development of the areas located close to the Polish-Slovak boundary, thereby ensuring that the region in question enjoys considerable prospects.

It should be hoped that the now-underway process of shaping transboundary ties between Polish and Slovak populations will progress further, while the actions of the authorities will lead towards the full opening of the border. This should take place with account taken of the specifics of what are mountain areas exceptionally sensitive to anthropopressure.

The Polish-Slovak border cuts across areas very important and precious from the natural point of view. Transboundary cooperation should take place, with account being taken of the specifics of what are mountain areas exceptionally sensitive to anthropopressure. It should be hoped that the now-underway process of shaping transboundary ties between Poland and Slovakia will progress further, while the actions of the authorities will lead towards the full opening of the border.

Thanks to the fact that Poland and Slovakia acceded to the European Union at the same time, it was possible for further cooperation to continue without interruption, thereby serving as a good model for transboundary cooperation to be developed by all.

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WSPÓLCZESNA POLSKO-SŁOWACKA WSPÓŁPRACA TRANSGRANICZNA

Przez wiele dziesięcioleci, przedzielone granicą polityczną, górskie obszary północnej Słowacji i południowej. Polski były oddzielnie zagospodarowywane i wykorzystywane gospodarczo. Kontakty między Polakami i Słowakami były dość ograniczone. Dzięki zmianom politycznym, a także społeczno-ekonomicznym, za-

początkowanym na przełomie lat 80. i 90. XX w. granica polityczna zmieniała swoją rolę i stała się bardziej otwartą a większość barier ulegała osłabieniu. Mimo utrudnień stwarzanych przez środowisko przyrodnicze Karpat od początku lat. 90 udoskonalano drogi, linie kolejowe i otwierano nowe przejścia graniczne. Ruch graniczny rósł w znacznym tempie, z 6,2 mln w 1990 do 21 mln w 2000 r. W 2004 r. na granicy polsko-słowackiej było 13 drogowych i kolejowych przejść granicznych ogólnodostępnych, 14 dla małego ruchu granicznego i 22 dla turystów (w 1990 r. przejść granicznych było tylko 5). Nastąpiło znaczne ożywienie kontaktów transgranicznych pomiędzy ludnością Polski i Słowacji, wzrosła rola współpracy w wielu dziedzinach, np. w: ochronie przyrody, transporcie, turystyce. Pojawiły się formalne kontakty pomiędzy miastami i ludnością wsi w zakresie kultury, edukacji i sportu.

Niezwykle atrakcyjne środowisko przyrodnicze Karpat od wielu dziesięcioleci jest przedmiotem prawnej ochrony. W latach 90. nastąpiła wyraźna intensyfikacja działań na rzecz ochrony cennych przyrodniczo obszarów przez obydwa sąsiadujące kraje. Efektem współpracy transgranicznej jest powołanie kilku transgranicznych obszarów chronionej przyrody (np. Tatrzański Rezerwat Biosfery, Rezerwat Biosfery Karpaty Wschodnie, ścisła współpraca pomiędzy Pienińskimi Parkami Narodowymi) i podejmowanie wspólnych prac, badań naukowych itp.

Podstawą gospodarki tych regionów staje się turystyka i od kilkunastu lat coraz większe znaczenie ma jej transgraniczny charakter. Rozwój turystyki zgodnie z zasadami zrównoważonego rozwoju jest niezwykle ważny zarówno dla samego środowiska przyrodniczego, jak i ludności zamieszkującej te tereny.

Dla społeczeństw żyjących na obszarach przy granicy państwa niezwykle ważne jest jej całkowite otwarcie, co może się ostatecznie udać w ramach integracji europejskiej i dzięki wstąpieniu Polski i Słowacji do Unii Europejskiej.

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VII. RESEARCH NOTES

Population, environment and development
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Nora Chiang

OVERVIEW OF RECENT RESEARCH ON TAIWANESE MIGRANTS IN AUSTRALIA*

1. BACKGROUND

The last six years have been very rewarding to me as my research work on Taiwanese migrants started out from a proposal presented at the Professional Development Program in February 1998 at Griffith University, Brisbane, Australia. As a result of support from the National Science Council of R.O.C. for the years 1999–2004, I have been studying the Taiwanese in Australia continuously and have published several papers in journals, including the *Asian Pacific Migration Journal* and *International Migration* (Chiang, Kuo 2000; Chiang 2004a). The most recent support coming from the Overseas Chinese Affairs Commission has enabled me to carry out a survey of over 350 Taiwanese households living in Australia (Chiang, Hsu 2004). My research covers employment patterns, residential mobility and their decision-making, women's roles in families in Australia, the young first generation of Taiwanese migrants and return migrants, and other aspects of adaptation. I would like to summarize the background, methodology and major findings as regards my research in the following pages.

Taiwanese emigration has reached a considerable level in the last two decades, with major destinations headed for including the United States, Canada, Australia, and New Zealand. Among the various reasons accounting for the increase in out-migration, rapid economic growth, political instability, an increase in personal income and the relaxation of restrictions permitting citizens to go abroad as tourists starting in 1989 are foremost. Other important factors are the introduction of economic business migration policies by various countries targeting skilled and entrepreneurial groups.

A broad picture of the Taiwanese immigrant population in Australia is presented in Table 1, which indicates that over a recent fifteen-year period, the Taiwanese immigrant population increased approximately 10-fold between 1986 and 1996, while it nearly doubled between 1991 and 2001.

While the number of Taiwanese settler arrivals was highest in 1990–1991 (3,491 persons), and 2000–2001 (2,599 persons) (fig. 1), by the late 1990s, Taiwan became the ninth largest source country for immigrants to Australia, accounting for 2.5 percent of all arrivals in 1996–1997 (2,180 persons).

* An earlier version was presented at the workshop on "Transnationalism in the Pacific Rim: The China-Hong Kong-Canada Connections", Dept. of Geography, University of Hong Kong, 19 May 2001.

Table 1. Distribution of Taiwan-born in Major Cities in Australia, 1986, 1991, 1996, 2001

City \ Year	1986		1991		1996		2001	
	No.	%	No.	%	No.	%	No.	%
Sydney	806	39.3	4,921	38.0	6,729	34.4	7,502	33.5
Melbourne	577	27.1	2,413	18.6	3,432	17.6	4,248	18.9
Brisbane	219	10.7	3,600	27.8	6,038	30.9	7,205	32.1
Other cities	454	22.0	2,024	15.6	3,348	17.1	3,463	15.4
Total	2,056	100.0	12,958	100.0	19,547	100.0	22,418	100.0

Source: Australian Bureau of Statistics, Unpublished Census Data, 1986, 1991, 1996, 2001

My first publication in the area of Taiwanese migration was a preliminary investigation of recent Chinese migration from Taiwan, Hong Kong and Mainland China to the United States, Canada and Australia (Chiang, Chao, Hsu 1998). Contemporary Chinese migrants, originating from the rapidly industrializing countries of Asia, differ from the migrants in the early part of the century in their adaptations and impact at the destinations. They enter the host country mainly for children's education, economic-related reasons, family reunion and political security. Their mobility patterns have created "astronaut" families that are different from conventional patterns of migration. Some have even returned to their home countries, and have as a result been challenging the traditional notions of state and citizenship. Some differences among the Taiwan-born, Hong Kong-born and China-born migrants are observed. Taiwanese migrants have appeared quite recently on the scene in the three countries of the United States, Canada and Australia, thus being spatially more concentrated than the other two groups. To appreciate complex differences in ethnicity, adaptation, and transnational mobility, it is necessary to conduct community-based research to supplement macro-level studies using the census technique.

Despite the numerical significance of Taiwanese immigrants in Australia, the phenomenon they are participating in has been under-researched. Migration scholars did not note the rapid increase of migration from Taiwan, but there have

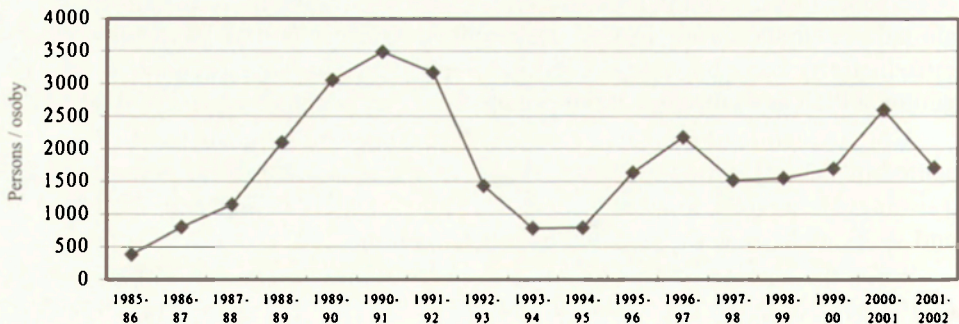


Fig. 1. Settler arrivals of Taiwan-born in Australia, 1985-2002

Przyjazdy rdzennych Tajwańczyków na pobyt stały w Australii, 1985-2002

Sources (źródła): DIMA, Settler arrivals, various issues; DIMA, 2002, Australian immigration consolidated statistics, various issues, <http://www.immi.gov.au>; DIMA, 2002, Immigration update., <http://www.immi.gov.au>

not been any in-depth studies of this phenomenon at the micro-level. In particular, there is a lack of qualitative research on economic integration of business and skilled migrants from Taiwan who settled in Australia. Australian immigration policymakers commonly assume that well-off business immigrants with a track record of business success in their home countries can reproduce their success in Australia. Economic and business migrants are expected to compare favourably with the host population in terms of education, entrepreneurial skills, employment rates, and home ownership.

Indeed, a greater proportion (24.2%) of immigrants from Taiwan have college degrees or high-school diplomas than do the Australia-born (16.5%). They are also quite skilled. The proportion of low-skilled individuals is much lower among the Taiwan-born than is the case among the Australia-born; very few Taiwanese immigrants are manual labourers. A conspicuously large proportion of the Taiwan-born are employed in managerial occupations (Chiang 2001). Despite their recent arrival, immigrants from Taiwan have a high proportion of home ownership (75.3%) compared to the Australia-born (72%). At the same time, the Taiwan-born have an unexpectedly high unemployment rate of 19.6%, compared with 8.6% unemployment found among the Australia-born population. In contrast to the Australia-born, many more Taiwanese occupy the lower income categories.

The following research was conducted in the three Australian cities of Sydney, Brisbane and Melbourne, wherein the majority of Taiwanese migrants are concentrated. Eighty-five percent of Taiwanese migrants lived in these three cities as of 2001: 33.5% or 7,502 individuals resided in Sydney, 32.1% or 7,205 persons in Brisbane, and 18.9% or 4,248 migrants in Melbourne. The Taiwanese community studied in the following research encompass both those born in Taiwan and those who were born elsewhere, especially in China, but had lived in Taiwan before they migrated to Australia.

2. RESEARCH METHODOLOGY

Two different approaches have been used in studying the Taiwanese migration in Australia. Data from the Australian Census provided the backdrop for qualitative studies later on. On the other hand, interviews have been designed to elicit information complementing the Census data.

Informants were interviewed on various occasions: after church gatherings or volunteers' meetings, after Chinese martial arts training classes, at morning tea or social gatherings in the evening, at the workplace or during parent's meetings at local Chinese schools. A snowball technique was employed to identify individuals to be interviewed since it was difficult to establish a sampling frame in order to select a random sample. The selection of informants took into consideration such criteria as place of residence, gender, occupation, and immigration status. Mandarin, Hokkien and Hakka, the three dialects most commonly spoken by Taiwanese migrants, were used during the interviews in order to facilitate a smooth flow of conversations and clear articulation of ideas. While the

interviews were unstructured and open-ended, they were guided by a list of general questions. They lasted anywhere from 45 minutes to three hours and were taped. My analysis is based on ethnographic research that investigated the labour-force experience of recent immigrants from Taiwan to Australia from an *emic* (insider's) perspective, giving voice to the immigrants and focusing on self-assessment of their residential mobility and economic integration.

3. RESEARCH FINDINGS

I previously used the Australian Censuses of 1981, 1986, 1991 and 1996 to write on the employment structure among Taiwanese immigrants in Australia (Chiang, Kuo 2000). Here I would like to point out that the census material has limited value for estimating the number of Taiwanese migrants because ethnic groups are only differentiated by birthplace. The number of Taiwanese migrants is therefore underestimated, as many were born in China and came to Taiwan with Chiang Kai-shek's army in 1949. However, I have used the Census to look at the employment structure of the Taiwan-born in Sydney, Melbourne and Brisbane, the top destinations for Taiwanese immigrants in Australia. My findings suggest that the employment rate among Taiwanese immigrants is among the lowest noted for any immigrant group. Taiwanese men tend to be more successful economically than Taiwanese women in terms of their income levels, occupational status, and labour-force participation. Most Taiwanese immigrants to Australia experience downward social mobility due to factors such as unaccredited overseas qualifications, a lack of English proficiency and local knowledge, and other institutional discriminatory factors.

On the basis of a questionnaire survey run in Sydney, Brisbane and Melbourne, I found that education for their children in Australia, as well as the high crime rate and perceived political instability in Taiwan were foremost actors when it came to people's decisions to leave Taiwan. My paper also discusses the reasons for moving to Australia, especially Sydney, as well as the choice of residential location. In spite of their high educational levels, Taiwanese migrants face various difficulties with finding employment commensurate with their former business skills. As underemployment and downward mobility are common within this recent group of migrants, there is a need to depend on other sources of income, such as savings and work in Taiwan. "Astronauts" and return migrants are the outcomes of various migration experiences (Chiang, Hsu 2000).

Against this background, I continued to explore the issue of employment among that group of well-educated and generally affluent Taiwanese who have migrated to Australia as business and skilled migrants. I found that the Taiwanese immigrant community is relatively new, and that it is difficult for them to start profitable businesses or adapt well right away. Apart from the English language, the major difficulties of the Taiwanese are: an unfamiliarity with Australian business culture and labour relations, complex rules and regulations, the small size of the market and high tax. Not only is it difficult for them to establish them-

selves in a relatively short time after settlement, but it is also clear that their employment status is much lower than it was originally in Taiwan. Originating from Taiwan as business migrants with capital and expertise in manufacturing, export and international marketing, they find it hard to take up work that is not commensurate with their education and economic background. It is therefore unlikely that they engage themselves as wage/salary earners. Many go for further technical education (TAFE) or university degrees, or engage in various types of self-employment, apart from the small number who have succeeded in trade investments and created employment. The ethnic businesses that they are engaged in go beyond the conventional definitions of employment and occupations in Australia. Starting with their own social organization, they have carried out admirable voluntary work and thus have been in contact with Australian society in spite of their lack of fluency in English and familiarity with Australian way of life (Chiang, Song 2001).

Many Taiwanese migrants are eager to establish their own careers in Australia, in spite of the many difficulties they have encountered. For many, unemployment is only a transitory situation, as they resort to self-employment as a way out of their predicament (Chiang 2004a). Furthermore, many others are also pursuing further education and qualifications in preparation for seeking work in Australia. The self-employment experiences of Taiwanese migrants in Australia have also raised important questions about the effectiveness of the Business Migration Programs not only in Australia, but also in other countries with similar arrangements. A comprehensive post-settlement program is necessary to ensure that migrants maximize their opportunities to be actively incorporated into the host society's economy. Pre-departure information can be provided by the policy makers of both sending and receiving communities to ensure that the migrants are better prepared before they go to live in a new country. Policy recommendations to foster early integration of skilled migrants from Taiwan are included (Chiang 2004a).

Micro-level studies based on fieldwork are conducted in my study of the residential mobility of Taiwanese Migrants in Sydney, Brisbane and Melbourne. The study examines the distribution and residential mobility of recent Taiwanese migrants in terms of residential choice for first and subsequent moves through the use of Census data and in-depth interviews in Sydney and Brisbane. While Taiwanese migrants in Sydney favoured the northern part of that city, those in Brisbane favoured the south. In general, the migrants preferred new houses that are dominated by three and four-bedroom units and that tended to give them a high level of satisfaction. The factors considered in their locational choice included income and housing budget, children's education, proximity to work and shops, and friend's opinions. Over time, the reasons for residential choice changed, reflecting individual preferences and experiences, apart from such main reasons of change as life-cycles and fluctuating housing prices. Gradually, there appeared a lower preference for houses with swimming pools and gardens, as migrants relocate to different houses (Chiang, Hsu 2001).

To conclude, since the overseas-born in Australia account for 23% of its total population, compared to 16% in Canada and 7.9% in the United States, it is a small wonder that the new Asian immigrants have been producing an impact in the host country in the last two decades. While Chinese immigrants tend to live in large cities and in suburban neighbourhoods such as "Little Taipei", "Little Shanghai", or "Little Hong Kong", they become a significant part of the social and cultural geography that is worth looking into in Australia. In recent years, many Taiwanese migrants have returned to Taiwan for various reasons, and the young first generation of Taiwanese whose experiences would be different from their parents' is the focus of my recent research. The role of women in the transnational household also deserves greater attention in future (Chiang 2004b).

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PRZEGLĄD NAJNOWSZYCH BADAŃ DOTYCZĄCYCH MIGRANTÓW TAJWAŃSKICH W AUSTRALII

STRESZCZENIE

W ostatnich dwóch dekadach szybko rozwija się emigracja Tajwańczyków, szczególnie do USA, Kanady, Australii i Nowej Zelandii. Głównymi przyczynami tego zjawiska są m.in. szybki wzrost gospodarczy, brak politycznej stabilności, wzrost dochodów ludności oraz rozluźnienie (w 1989 r.) restrykcji, które pozwoliły obywatelom na wyjazdy turystyczne za granicę i inne czynniki związane z polityką migracyjną grup businessu.

Omówiono badania nad migrantami tajwańskimi w Australii, prowadzonymi w ramach projektu badawczego na australijskim uniwersytecie w Griffith, w latach 1998–2004 (*Professional Development Program Griffith*, Brisbane, Australia). Projekt badawczy był także sponsorowany przez Tajwańską Narodową Radę Naukową (R.O.C.) w latach 1999–2004, a ostatnio również przez Tajwańską Komisję do Spraw Zamorskich. Objęto badaniami 350 tajwańskich rodzin i gospodarstw domowych mieszkających w Australii, w celu analizy ich warunków życia, zatrudnienia, mobilności, podejmowania decyzji dotyczących zmiany miejsca zamieszkania, roli kobiet w rodzinach, młodego pokolenia migrantów (pierwszej generacji) i migracji powrotnych. Badania jakościowe i ilościowe oraz ich wyniki przedstawiono w pracy w odniesieniu do tajwańskich imigrantów osiadłych w Sydney, Brisbane i Melbourne. Niezależnie od poziomu wykształcenia, tajwańscy migranci z trudnością znajdują zatrudnienie na poziomie odpowiednim do ich pozycji w kraju, a także wykazują duże trudności w adaptacji do nowych warunków życia, m.in. z powodów językowych, kulturowych i społecznych. W analizie uwzględniono także preferencje lokalizacyjne i przestrzenne rozmieszczenie chińskich migrantów w miastach australijskich (w Sydney, Brisbane i Melbourne) i ich koncentrację w słynnych dzielnicach „Little Taipei”, „Little Shanghai” czy „Little Hong Kong”.

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COMMISSION ON POPULATION AND THE ENVIRONMENT
COMMISSION "POPULATION ET ENVIRONNEMENT"

Alina Potrykowska

ACTIVITIES OF THE IGU COMMISSION ON *POPULATION AND THE ENVIRONMENT*, 1996–2004

I. INSTITUTIONAL FRAMEWORK

The IGU Commission on *Population and the Environment* was established by the International Geographical Union at the 28th International Geographical Congress in the Hague, August 1996, for the term of 4 years (1996–2000). At the 29th International Geographical Congress in Seoul, August 2000, the Commission was approved and accepted to continue its activities for the next term: 2000–2004. The Commission was a successor of the previous IGU Commission on *Population Geography*, chaired by Prof. Daniel Noin in the period 1988–1996, and continued its framework programme.

MEMBERSHIP

For the years 1996–2004, the Commission undertook its research programme through its Steering Committee members (11), and with the support of its 460 members worldwide.

STEERING COMMITTEE:

During the period 1996–2004, the composition of the Steering Committee was as follows:

Chair, 1996–2004:

Dr Alina POTRYKOWSKA, Institute of Geography and Spatial Organization, Polish Academy of Sciences, Warsaw, Poland

Vice-Chair, 1996–2004:

Prof. dr Jürgen BÄHR, University of Kiel, Germany

Honorary Member:

Prof. Daniel, NOIN, Institute of Geography, Université Paris I-Sorbonne, France (full member: 1996–2000)

Members (1996–2004):

Prof. dr Maria Carmen FAUS-PUJOL, Faculty of Letters, University of Zaragoza, Spain

Prof. dr Allan M. FINDLAY, Department of Geography, University of Dundee, UK

Prof. dr Andrei ROGERS, University of Colorado at Boulder, USA

Other members:

Prof. Giovanna BRUNETTA, Department of Geography, University of Padova, Italy (1996–98)

Prof. Alfredo S.C. BOLSI, Department of Geography, University of Tucuman, Argentina (1996–98)

Prof. dr Richard BEDFORD, Migration Research Group, University of Waikato, New Zealand (2000–2004)

Prof. Abdellatif FADLOULLAH, Faculty of Letters, University of Rabat, Morocco, (1996–2000)

Prof. Naoharu FUJITA, Department of Geography, Meiji University, Japan (1996–2000)

Prof. dr Heinz Dieter HEIDEMANN, Department of Geography of the University of Sao Paulo, Brazil (1998–2000)

Prof. Sudesh NANGIA, Jawaharwal Nehru University, New Delhi, India (2000–2004)

Dr Frejomil Enrique PROPIN, National University of Mexico (UNAM) (2000–2004)

Dr Maano F. RAMUTSINDELA, Department of Geography, University of Cape Town, South Africa (2000–2004)

Prof. Graziano ROTONDI, Department of Geography, University of Padova, Italy (2000–2004)

Prof. Michael SAUBERER, Department of Geography, University of Klagenfurt, Austria (1998–2000)

Dr Anchalee SINGHANETRA-RENARD, Department of Geography, University of Chiang Mai, Thailand (1996–2000)

Prof. Pierre-Jean THUMERELLE, Université des Sciences et Technologie de Lille, France (2000–2004)

II. ACTIVITIES OF THE COMMISSION

OBJECTIVES

The Commission on *Population and the Environment*, of International Geographical Union undertook a research programme on population problems and environmental issues. The primary objective of the Commission were:

- to continue developing the geographical approach to population topics and environmental issues. Over the last few years the world has become greatly concerned with the human implications of global environmental changes, and studies of population-environment relationships are urgently required;

- to develop the Population Sciences in order to contribute to improving knowledge of population problems and population/environment issues. Those

aspects of population geography, concerned with relationships with the environment were regarded as a field of geographical studies. These studies could be much developed with a new perspective, at a time when the deterioration of the environment in various forms is posing enormous problems.

This approach was considered by many scholars to substantially improve knowledge of numerous population phenomena such as population growth, fertility, mortality, population health, gender, migration.

The investigations undertaken by the Commission pertained more to fundamental than applied research, though they constantly contribute to study the important problems of the world at the beginning of the 21st century.

For the years 1996–2004, the Commission chose to put the emphasis on six themes:

1. Methodological problems (Models and concepts) in population geography

Population Geography is now largely developed in the world and is taught in many universities. Population geographers need to develop the theories of space and place, which the distinctive identities of the discipline.

The Commission contributed to expand Population Geography over the last few years. It developed and popularised theoretical approaches especially the Models and Theories of Fertility Change.

2. Population, Ethnicity, Poverty, and Sustainable Development

Sustainable development aims at improving human well-being, particularly by alleviating poverty, increasing gender equality, and improving health, human resources, and stewardship of the natural environment.

Population policy should be oriented toward improving social conditions and expanding choices for individuals. Focusing on people – their rights, capabilities, and opportunities – would have multiple benefits for individuals, for society, and for their sustainable relationship with the environment.

A consideration of sustainable development policies must include population growth and distribution, mobility, differential vulnerability, and the empowerment of people, especially women.

3. Demographic transition and Fertility patterns, Family structures and changing households

Fertility and reproductive health is an important demographic factor of population growth.

The last two decades have been a period of great change for families and households. Household and family formation is a particular point of reference at which demographic phenomena and economic, social, psychological and cultural processes interact. Despite the differences of definition and problems of data comparability, trends in household size are remarkably consistent.

Family structure may have a more direct link with population-environment interactions in communities which have strongly divided gender roles and responsibilities in agricultural activity, especially in developing countries.

Research in this field is particularly important for developing countries where excessive population growth, due to high fertility, and environmental problems mount.

4. Migrations: internal and international. Spatial patterns and models. Environmental aspects

The geographical pattern of internal and international migration flows has changed rapidly over the last few years and it is still changing. New flows have developed within the more developed countries. Moreover, this should also be done for international migration streams, which are generally from lesser to more developed countries where economic opportunities are greater, but the growing number of refugee movements has complicated the patterns.

The continuing globalisation and the growing significance of international migration call for more attention to the interdependence among countries. The flows from less developed countries to North America and Western Europe are still massive. They now originate from many countries of Latin America, Africa, and Asia.

In view of the uncertainties about the benefits and drawbacks of rural-urban migration to the balance of environmental degradation, detailed investigations should be undertaken of the environmental causes and effects of differing migration streams. An important issue is the question of environmental refugees. The studies of border regions and international migration are of significant importance.

5. Mortality, Morbidity, Health and the Environment

Mortality differentials and life expectancy by sex widened dramatically during this century. The gender differentiation appears more and more to be a key element in the field of mortality and morbidity. Life duration is generally a little longer for women but there are marked differences around the average (about 3 years in the world population). In some cases, the difference is much higher (12–14 years in some parts of Russia), in other cases the difference is erased and even slightly reversed (for instance, in some parts of the Indian subcontinent). The course of mortality differentials during the recent decline in old age mortality is ambiguous.

The regional convergence in mortality levels can be accompanied by divergence in age patterns, which is an argument for studying cause and age-specific disease outcomes, rather than aggregate levels. Whether these differences will narrow, remain stable or increase is a question for population geographers. It will attempt to scientifically unravel some of the inter-relationships between the environment, mortality, and morbidity.

6. Urban population growth in the megacities

Globalisation of the economy and international migration are also reflected in the growth of modern city systems and mega-cities, especially in East and Southeast Asia, but also in Latin America. Urbanization and the growth of the

mega-cities, per se, are global issues within the field of study of population geography.

The emerging city systems also cover several other aspects, including environmental problems due to population concentration, etc.

Cities are outlets for large numbers of rural-urban migrants who reduce environmental pressures in rural areas but increase them in cities. Such migrations have greater environmental disbenefits for cities. Cities like Cairo, Mexico, Calcutta and Shanghai suggest that mega-cities pose more environmental problems.

The themes of research chosen by the Commission for the years 1996–2004 were investigated in two different ways:

1. By the organization of international meetings in which members of the Commission actively participated, and in which, whenever possible, the most competent geographers, demographers and environmentalists were invited.
2. By the publication of books and maps on population patterns and population – environmental issues.

III. MEETINGS OF THE COMMISSION

During the period 1996–2004 the Commission was organised 13 conferences:

1. **The 28th IGC Congress of the Hague, International Geographical Union, The Hague, The Netherlands, August 1996.**

The Commission organised 9 sessions on the theme "*International Migration at the end of the 20th Century*". The state-of-the-art lecture on this theme was presented by Dr John Salt (University College London). Three sessions were devoted to: international migration trends, recent changes, characteristics and policies.

The other sessions were devoted to the following specific topics as: – migration and integration (1 session); – labour migration and labour migrants (1 session); – international migration impacts on the internal migration in developed countries (1 session); – population change: demographic issues (2 sessions).

Many geographers attended these sessions on 5th, 6th and 7th August 1996. About 32 papers were presented. Moreover, two joint sessions were organised with the Commission on Urban Development and Urban Life and the Commission on World Political Map on International Migration and ethnic segregation: impacts on urban areas (7th and 9th August – 18 papers).

Altogether 50 papers were presented. Several papers were selected for publication in the special volumes.

2. **Symposium of the Commission on *Population and the environment* IGU, on *Population, Health and the Environment*, 7–11, January 1997, Chiang Mai, Thailand.**

Symposium was organised by the Department of Geography, University of Chiang Mai, Thailand on behalf of the Commission on Population and the Environment, IGU with the participation of the IGU Commission on Health, Environment and Development which was represented by its member – Prof. dr Nancy Davis Levis (University of Hawaii).

The conference was organised around 4 general questions: – the geographical inequalities of health (definitions, concepts, methodological problems); – international patterns of the epidemiological transition; health and gender (gender inequalities and their impact on health within populations); – health and the environment (the impact of environmental conditions on health, the role of natural disasters); – population, development and health.

The conference generated great interest among scientists from Thailand and the countries of Southern Asia. The symposium attracted more than 70 participants from 18 countries of the world, and gave rise to 38 contributions. The Thai Authorities showed their concern for the conference in delegating Dr Sumet Tantivejkul – the Secretary General of the Royal Development Projects Board, who works closely with His Majesty, King Bhumibol Adulyadaj – to open it. Various national and international institutions working in the field of population health and the environment participated, and notably National Research Council of Thailand, United Nations Development Programme, United Nations HIV/AIDS, INED, and others.

Dr Anchalee Singhanetra-Renard, Department of Geography, University of Chiang Mai was responsible for local organization of the symposium.

The Proceedings of the Symposium in Chiang Mai were already published and were presented to the participants during the symposium.

3. International Conference on *Environment and Development in Africa: an Agenda and Solution for the 21st Century*, 29 June 4 July 1997, Pretoria, South Africa. Session on *Population policy in Africa*.

One-day session on *Population policy in Africa*, were organised by: Society of South African Geographers, Association of African Geographers, IGU Commission on Population and the Environment, and convened and chaired by Prof. P. Hattingh.

This session included the following topics: – population change and the environment; – demographic pressure and the environment; – fertility change. health and the environment; – gender issues; – migration and the environment

4. Symposium on *Population, Poverty and the Environment*, 28th October – 1st November 1997, Rabat, Morocco.

The symposium was organised jointly by the IGU Commission on *Population and the Environment*, and the Centre for the Studies and Demographic Research (CERED) in Rabat, under the patronage of the Secretary of a State to the Prime Minister charge of the Population. The local organization was due to Prof. dr Abdellatif Fadloulah, University of Rabat, Faculty of Letters and Human Sciences, Rabat, as well as to Director Ahmed Nouijai, and Dr El Hassan El Mansouri, CERED.

The conference was organised around 5 general questions: – the socio-economic aspects of the poverty versus the environment; – poverty and demography; – population and the environment at the regional scale; – population and the environment at the urban scale; – women, poverty and the environment.

The symposium attracted more than 140 participants from 16 countries of the world, and gave rise to 32 papers. The authorities of Morocco showed their concern for the conference in delegating: Mr. M. Bijaad – the Secretary of a State to the Prime Minister charge of the Population, Mrs Z. Naciri – Secretary of State to the Prime Minister charge of the Mutual Aid, Mr S. Alaoui – Member of Parliament in Morocco. National and international institutions working in the field of population, poverty and the environment were represented in the event (the UNFPA, FAO, and others). Proceedings of the symposium were published in January 1998, in a special volume.

5. Symposium on *Theories, Concepts and Models in Population Geography*, August 26–28, 1998, Dundee, Scotland, UK.

The Symposium was organised jointly by the IGU Commission on *Population and the Environment*, and the Centre for Applied Population Research, University of Dundee. It was a very successful and fruitful event. Its perfect organization was due to its Prof. Allan M. Findlay, Centre for Applied Population Research, University of Dundee. The theme of Symposium presented one of the main objectives of the Commission, i.e. to study the important problems of the world at the end of the 20th century.

The main focus was the methodological development of the discipline. The part of the conference was devoted specifically to methodological and philosophical issues.

The conference was organised around 6 general topics: – quantitative methods and progress in population geography; – models and theories of fertility change; – biographical methods in migration research; – exploring qualitative methods in population research; – exemplars of multi-method research; – theory and methods for studying global population issues.

Over 60 delegates from 16 countries participated in this meeting. These papers were published in the special volumes on *Global Population Issues*, and on *Methodological Explorations in Population* of the journal *Applied Geography*.

6. IGU Regional Conference 98 on *The Atlantic: Past, Present and Future* August 30–September 2, 1998, Lisbon, Portugal.

Meeting on *Population and Environment of the Atlantic Countries* of the International Geographical Union Commission on *Population and the Environment*, 1–2 September 1998.

During the IGU Regional Conference 98 on *The Atlantic: Past, Present and Future*, August 30–September 2, 1998, Lisbon, Portugal, two-day session on *Population and Environment of the Atlantic Countries*, organised by IGU Commission on *Population and the Environment*, took a place at the University of Lisbon, Lisbon, Portugal, on 1st and 2nd September, 1998.

This session included the following topics: demographic pressure and the environment; population change and the environment; fertility change, health and the environment; gender and migration issues.

Prof. Dr Maria L. Fonseca, University of Lisbon, CEG, Faculty of Letters, was responsible for organization of the programme and for handling local arrangements.

7. Symposium of the Commission on *Population and the Environment* IGU, on Migration: nation, place and territorial dynamics, April, 19–25, 1999, Sao Paulo, Brazil.

The symposium organised jointly by the Commission on Population and the Environment of the International Geographical Union, and the Department of the University of Sao Paulo (USP/FFLCH/DG), was held at the Faculty of Philosophy, Letters and Human Sciences, University of Sao Paulo. The local organization was in the responsibility of Prof.dr Heinz Dieter Heidemann, Laboratory of Urban Geography (LABUR/DG/USP), Department of Geography of the University of Sao Paulo; the Centre of Migration Research (CEM) and the Pastoral Service of Migrants of the National Conference of the Brazilian Bishops (SPM/CNBB).

The general theme of the conference focused on social and cultural contemporary processes as well as emphasizing problems of redefinition of nation states and nationalities; it stressed also the roles of place and territorial dynamics in social sciences and geographical discussions.

The conference was organised around 6 general topics: – migration and human mobility in spatial patterns and social theories; – rethinking methods, models and techniques in migration research: between demographic approaches and oral history; – migration policies of national states and private institutions; – migration and environment; – migrants beyond nationalism, ethnicism and social conflicts; – migration in the urban/metropolitan society.

These topics were discussed during the round-tables and three main sessions:

- opening session: *Migration and human mobility in contemporary modernization crisis,*

- second session: *Territory and migration: a conceptual geographical discussion,*

- third session: *Migration studies in the IGU: balance and perspectives.*

This symposium was supported by the Executive Committee of the International Geographical Union, University of Sao Paulo, Commission on Population and the Environment, IGU, and the United Nations Population Fund (UNFPA).

Professor Bertha Becker (University of Rio de Janeiro), Vice-President of the IGU has represented the Executive Committee of the International Geographical Union.

The local authorities of the University of Sao Paulo showed their concern for the conference. Various national and international institutions working in the field of population, migration and the environment were present; notably Prof. Pedro Pinchas Geiger, President of the Brazilian National Commission to the IGU as well as the Centre of Migrants Research (CEM), The Pastoral Service of Migrant (SPM) which forms the Social Pastoral Sector of the National Conference of Brazilian Bishops.

The theme presented great interest to Brazil and to other countries of Latin America. The symposium attracted more than 400 participants from 12 countries of the world, and gave rise to 100 contributions.

Compared to other Symposia of the Commission, there were many population geographers from Brazil and South America, who generally are able to attend international conferences on rare occasions because of lack of funding. The symposium was very useful from this point of view. Although Brazil was often at the centre of the presentations, other parts of South America also drew some analyses and others participated in the discussions and in the presentation of the documents.

Under the excellent organization of Prof. dr Heinz Dieter Heidemann and Dr Lea Francesconi, Department of Geography of the University of Sao Paulo, the symposium was followed by a one-day city tour in Sao Paulo. From 23 to 25 April 1999, there was organized a three-days field trip to the region of Sao Paulo. On March 23, 1999, the participants were hosted by Prof. Dr Daniel Hogan and colleagues at the Population Studies Center (NEPO), University of Campinas (UNICAMP).

8. Meeting of the Commission on Population and the Environment, IGU on *From Young to Old demographic structure* March 29, 2000, Madrid.

In conjunction with the VIIth Congress on Spanish Population in Madrid, March 30, 2000–April 1, 2000, one day meeting was organised jointly by the Commission on *Population and the Environment*, of International Geographical Union, the Department of Geography, University of Madrid, and the Committee on Population Geography of the Association of Spanish Geographers.

The conference was focused on the ageing processes and population structures, i.e. changing characteristics of the old age population; socio-economic consequences of population ageing, health and the elderly population; family care for the elderly; demographic and policy considerations. The process of ageing is of a historically unprecedented magnitude, and is projected to bring the new problems demanding solutions in the near future.

Over 40 participants from 7 countries participated in this meeting. 14 papers were presented during 4 paper sessions. During this meeting a representative of the European Union, Commission on *Population*, presented a paper on socio-economic consequences of population ageing, and policy considerations in Europe.

Main organisers of the meeting were: Prof. Dr Aurora Ballesteros, University of Madrid, Department of Geography, Prof. Maria-Carmen Faus-Pujol, University of Zaragoza, Department of Geography Spain, and Dr Alina Potrykowska.

The selected papers were published in a special volume on *Ageing of population*, in: Espace, Population, Societes, 2001, Lille.

9. 29th International Geographical Congress, International Geographical Union, *Living with diversity*, Seoul, 14–18, August 2000. Symposium of the Commission on Population and the Environment, IGU *Population, Ethnicity, and the Environment*, Seoul, August 15–16, 2000.

This symposium, organised by the Commission on Population and the Environment, IGU took place in Seoul, 15–16 August 2002, during the International Geographical Congress. The conference was formally incorporated into the Scientific Program (sessions designated with T-17 s* *Late modernism, Global Culture and Ethnic Groups*).

This conference was focused on diversity in the population, ethnicity and environment, i.e. population structures; demographic structures and processes of old and new minorities; migrant population and the environment; integration and spatial segregation of population in different environments.

Over 80 participants from 30 countries participated in this symposium. About 20 papers were presented during four sessions:

- Session 1 convened by Lee, Hee-yeon and A. Potrykowska (chairs), was devoted to demographic transition and population change

- Session 2 organised by A. Potrykowska (chair), entitled *Ethnicity and the environment*,

- Session 3 convened by J. Bahr (chair), was devoted to population and the environmental issues,

- Session 4 convened by R. Bedford (chair), entitled *Migration and the environment*, was organised around three topics: a) Trends and developments in European migration; b) Migration in Asia and the Pacific; c) Migration in India and the West Indies.

A one day field trip to Chinatown in Incheon was organised on August 17 by local organiser: Prof. Lee, Hee-yeon, Department of Geography, Konkuk University, Seoul, Korea.

10. International Conference on *Population Geography and Geographers*, Lille, November 21–23, 2001.

This symposium was organized by the Institute of Geography, University of Lille with a participation of members of the IGU Commission on *Population and the Environment*.

The conference was focused on diversity of theoretical and practical approaches in the population studies, ethnicity and environment, i.e. population structures; demographic structures and processes; migrant population and the environment; integration and spatial segregation of population in different environments.

Over 50 participants from 10 countries participated in this meeting, whose main focus was the methodological development of the population geography. In addition to the methodological papers presented at the conference, there were the diverse practical approaches in the population studies, ethnicity and environment.

The local organiser was Professor Pierre Jean-Thumerelle, a full member of the Commission.

The proceedings of the symposium were published in the special volume of *Espace-Populations-Sociétés*, 2002.

11. Regional Conference of the International Geographical Union, 2002 on *Geographical Renaissance at the Dawn of the Millennium*, 4–7 August 2002, Durban, South Africa. Symposium C-20 of the IGU Commission on *Population and the Environment*.

The conference was focused on diversity in the population, ethnicity and environment, i.e. population structures; demographic and ethnic structures and processes of old and new minorities; migrant population and the environment; integration and spatial segregation of population in different environments.

The Commission organised 2 sessions on the theme under the local leadership of Dr Maano Ramutsindela from the University of Cape Town. The first session, chaired by M. Ramutsindela, took place on 6th August, and was devoted to political and demographic issues. Second session, chaired by Alina Potrykowska, took place on 7th August, and was organised around 4 specific topics: population change and demographic, ethnic structures as well as environmental issues.

Many geographers (about 60 participants) from different countries over the world, attended these sessions on 6th and 7th August 2002. Twenty authors contributed to the symposium. Several papers were selected for publication in a special volume of "*Geoforum*".

12. Meeting of the IGU Commission on *Population and the environment on Where is Population Geography Going? A Third Look* August 30, 2003, Warsaw, Poland.

In conjunction with the European Population Conference in Warsaw, 26–30 August 2003, one day meeting was organized jointly by the Commission on Population and the Environment, International Geographical Union and the Institute of Geography and Spatial Organization Polish Academy of Sciences.

The main purpose of this meeting *Where is Population Geography Going? A Third Look* was to discuss the future of our discipline in the context of the future activities of our Commission.

The different questions were discussed, especially: – the state-of the art, i.e. the scientific problems and the methodological studies in population geography; – population-Environment and Development issues; – the strategy and future activities of the Commission; – co-operation between the members of Steering Committee, and their active participation in the activities of the Commission.

Over 25 participants from 7 countries (Poland, Belgium, Italy, Russia, Ukraine, Turkey, Latvia) participated in this meeting. The local organiser was Dr Alina Potrykowska, chair of the Commission.

13. 30th International Geographical Congress, International Geographical Union, 15–20, August 2004, Glasgow, UK. Symposium of the IGU Commission on *Population and the Environment*.

The IGU Commission on *Population and the Environment* organized a symposium during the IGC in Glasgow. The meeting was formally incorporated into the Scientific Program in four thematic sessions. The general theme of these sessions focuses on considerations about Population, Environment, and Sustainable Development.

– **Session I.** August 17, 2004, on *Population change and migration dynamics*, Chair: Alina Potrykowska

This session included the following topics: – population growth and the environment; – population structures by sex and age; – fertility; – migration dynamics and – ethnicity. It progresses to consider contemporary demographic processes emphasizing specific problems and territorial dynamics in different regions. The papers (11) presented the case studies in: India, Pakistan, Slovenia, Croatia, Poland, Switzerland, Japan and Australia.

– **Session II.** August 17, 2004 *Population dynamics and the Environment*, Chair: Allan M. Findlay

Geographers have a long record of analysing the complex relationships linking demographic and environmental processes. This session commences with papers that explore the issue of whether it is still possible to identify distinctive demographic regimes in different ecological regions and how the links between population and environment may best be theorised. It then progresses to consider specific environmental impacts on population such as the effect of weather variability and water quality on health. Case study material considered in this session was drawn from Brazil, India, South Africa, Sweden, Slovenia, and Tanzania (9 papers).

– **Session III.** August 20, 2004 *Population, Environment, and Sustainable Development*. Chair: Richard Bedford

Sustainable development is likely to be the key concept guiding social, economic and environmental transformation during the first half of the 21st century. After a century of massive urban-industrial change, where the emphasis was on aggregate economic growth, concern for the quality of the environment that sustains life on the planet has become much more prominent in political as well as academic discourse. In this session speakers address a range of themes re-

lated to population, environment and sustainable development. Issues such as climate change, ecological monitoring, landscape restoration, over-and under-consumption, and resource-sensitive regional planning strategies are addressed by speakers from a wide range of countries (8 papers).

– Session IV. August 20, 2004 *Population, Environment, and Development*.
Chair: Harendra Nath Sharma

The papers presented in this session were devoted to various aspects of : – employment changes and environmental effects; – women's agency and environment; – population and environment; – women's labour force participation and environment; – women's life course and environment; – gender differences in residential choice processes; – problems of housing purchase by single women; – population growth and food security; – cultural ecology and bio-intensive organic culture; problems of time travel in the historic city of Kyoto (10 papers).

IV. COLLABORATION WITH OTHER IGU COMMISSIONS

The Commission *Population and the environment* extended the relationships with the IGU Commission on *Health Environment and Development*, as well as the IGU Commission on *Gender Geography*.

1. The members of the IGU Commission on *Health Environment and Development* already participated in the Symposium of our Commission on *Population, Health and the Environment*, held in Chiang Mai, Thailand, 7–11, January 1997.

2. The members of the IGU Commission on *Gender Geography* already participated in the Symposium of our Commission on "*Population, Ethnicity, and the Environment*" held in Seoul, August 15–16, 2000.

3. The Commission on *Population and the environment* participated commonly with IGU Commission on *Evolving Issues of Geographical Marginality* in the international Conference on *Spatial mobility in Italy and in other European countries: trends in changes, and the regional differentiation of the new multicultural society* organised by the Institute of Geography, University of Trieste, March 14–17, 2002, Trieste, Italy.

Six conference sessions were devoted to the following specific topics as: – spatial mobility of population in Italy, – population mobility in international scale and interdisciplinary perspective, – migration in European countries, – geographical and historical studies on migration in Adriatic and Balkan regions.

Moreover, three round-tables were organised: – Methodological approach in the studies on spatial population mobility, – Geopolitical approach in migration studies, – Migration processes in Italy – institutional and practical approach.

Over 100 participants from 11 countries participated in this meeting, whose main focus was the spatial population mobility issues. About 50 papers were presented.

About 32 participants and 10 representatives of Italian and regional institutions contributed to the event in the table-round discussions.

The local organiser was Professor Pio Nodari from the Institute of Geography, University of Trieste. The proceedings of the symposium were published in the special volume ed. by P. Nodari, *Spatial mobility in Italy and in other European countries: trends in changes, and the regional differentiation of the new multicultural societ* of the Institute of Geography, University of Trieste, 2003.

4. The IGU Commission on *Population and the Environment* was represented by chairperson Dr Alina Potrykowska, who participated actively in a Commemorative session to Prof. Giovanna Brunetta, held in Padova, Italy, 12 June, 2003,

The Department of Geography of the University of Padova, and the Association of Italian Geographers organised a one-day session, to commemorate Prof. Giovanna Brunetta – full member of the Commission (1996-98), distinguished scholar and a great specialist on population geography, died on 8 September 1998. Prof. Giovanna Brunetta contributed to national and international population projects, especially the migration studies. In Italy she was very well known among geographers and demographers for her very detailed and highly qualitative studies. As a leader and a promotor of numerous works on population, and migration, Prof. Giovanna Brunetta was a creator of the migration center at the University of Padova. The local organiser of the session, was her successor – Prof. Graziano Rotondi, member of the Steering Committee of the Commission of International Geographical Union on *Population and the Environment*.

V. COLLABORATION WITH OTHER INTERNATIONAL, INTER-GOVERNMENTAL AND INTER- OR MULTI-DISCIPLINARY GROUPS, 1996–2004

1. The IGU Commission on *Population and the environment* actively participated in the *Geographical Research Programme on the World Population* financially supported by the United Nations Population Fund (UNFPA). The Commission was grateful for the grant received from United Nations Population Fund to support the main activities of the Commission. The Commission already published the detailed regional dot maps of the spatial distribution of world population and those for African countries, to replace the existing maps which are often very approximate (see: Daniel Noin, *People on the Earth*, 1997; *The population of sub-Saharan Africa*, 2000).

2. The IGU Commission on *Population and the Environment* was represented by chairperson Dr Alina Potrykowska, who participated in the International Conference on *Health Transformation in Central Europe after 1990: a Third Look*, Warsaw, 29–30 October 2001

This symposium was organised jointly by the Health Promotion Foundation, Poland, World Bank, WHO Collaborating Centre, Maria Skłodowska-Curie Memorial Cancer Centre and Institute of Oncology, Poland.

One of the purposes of the conference was an attempt to formulate hypotheses for the explanation of the positive trends. The main focus was, however, on planning interventions to help extend these trends to the other countries of the region.

The main goal of the meeting was: to improve the health of Eastern and Central Europeans.

The state-of-the-art lecture on this theme was presented by Prof. Walter Willet, Harvard University.

Over 140 participants from 17 countries participated in this meeting, whose main focus were the processes of population ageing, and the environmental issues. About 25 participants presented their contributions during 5 paper sessions.

Moreover, three round-tables were organised: – is democracy healthier? Health indicators in the 1990s in Eastern Europe; – what is optimal dietary fat composition? – how can we best take advantage of knowledge?

During two days of the conference two poster sessions were organised. Many participants attended these sessions, and 58 posters were presented.

The proceedings of the conference were published in a special volume edited by J. Zatonski, *Health Transformation in Central Europe after 1990*, Warsaw, 2001.

3. The members of the IGU Commission on *Population and the Environment* actively participated in the discussion on the statement on *Population in Sustainable Development* prepared by the Global Science Panel to the Johannesburg Summit in 2002.

The Commission adopted the full text of this statement with one remark on "*reciprocal nature*" of the interaction between population and the natural environment. On behalf of the Commission – Dr Alina Potrykowska (chair), sent to the Global Science Panelists a recommendation letter for this statement.

4. The members of the IGU Commission on *Population and the Environment* actively participated in the activities of the international, multidisciplinary *Population and Environment Research Network*.

5. The IGU Commission on *Population and the Environment* was represented by chairperson Dr Alina Potrykowska, who participated actively in the European Population Forum 2004, organized by the United Nations Economic Commission for Europe, 12–14 January, Geneva, Switzerland.

The Forum was organised for European debate among population specialists and experts. Over 300 participants from all European countries participated in this meeting, whose main focus was the future development of the population in Europe.

Four conference sessions were devoted to the following specific topics such as: – global population and development trends: the European view; – childbearing and parenting in low fertility countries: enabling choices; – morbidity, mortality and reproductive health: facing challenges in transition countries; – international migration: promoting management and integration. The invited independent experts participated in the special event on *The Generations and Gender Programme*, January 13, 2004.

VI. COOPERATIVE EFFORTS WITH ICSU

1. The Commission IGU Commission on *Population and the Environment* proposed to the International Council for Science the research project for 2003 entitled *Fertility, Reproductive health, Family structures and the Environment*, and asked for a scientific grant. The project was endorsed by the IGU and the Polish Academy of Sciences.

VII. PUBLICATIONS

Publication and dissemination of the Commission's Newsletters: The Commission continued its practice of publishing the newsletters biannually. Sixteen Newsletters were produced in English and French versions: Newsletter 1, October 1996; Newsletter 2, May 1997; Newsletter 3, December 1997, Newsletter 4, May 1998; Newsletter 5, December 1998; Newsletter 6, September 1999; Newsletter 7, December 1999. Newsletter 8, May 2000, Newsletter 9, December 2000/January 2001, Newsletter 10, May 2001, Newsletter 11, December 2001/January 2002, Newsletter 12, May 2002, Newsletter 13, December 2002/January 2003, Newsletter 14, December 2003/January 2004, Newsletter 15, June 2004, Newsletter 16, December 2004/January 2005.

MAIN PUBLICATIONS

Ahmad A., Noin D., Sharma H.N. (eds), *Demographic Transition. The Third World Scenario*, 1997, Rawat Publications, Jaipur and New Delhi, 421 pp.

A special issue on *International migrations and ethnic segregation: impact on urban areas*, Urban Studies, 1998, vol. 35, 3, contains 12 papers which were presented in a joint session of four Commissions: Population Geography, Gender and Geography, Urban Development and Urban Life, and World Political Map.

A special volume on "*Ageing of population*", Espace, Population, Societes, 2001, Lille.

A special volume on *Global Population Issues*, Applied Geography, 1999.

A special volume on "*Population geography and geographers*", 2002, Espace, Population, Societes, Lille.

Clarke J.I., Noin D. (eds), *Population and the environment in the arid regions*, 1998, UNESCO (Man and the Biosphere Series) and Parthenon Publishing.

Fairhurst U.J., Booyens I., Hattingh P.S. (eds), *Migration and gender, place, time and people specific*, 1997, IGU Commission on Gender and Geography, IGU

Commission on Population Geography, Department of Geography, University of Pretoria, Pretoria, 533 pp.

Findlay A., *Methodological explorations in population geography*, 1999.

Noin D., 1997, *People on earth* (World Population Map) / L'Humanité sur la planète (Carte Mondiale de la Population), UNESCO, Paris.

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Population, Environnement et pauvreté, 1998, Actes du Symposium International, Commission *Population et environnement* de l'UGI, Centre d'Etudes et de Recherches Demographiques (CERED), Rabat.

Potrykowska A. (ed.) 2005, *Population, environment and development*, Prace Geograficzne, Institute of Geography and Spatial Organization, Polish Academy of Sciences, Warsaw.

Roseman C.C., Laux H.D., Thieme G. (eds), *Ethnicity, geographic perspectives on ethnic changes in modern cities*, 1996, Rowman@Littlefield Publishers, Inc, 309 pp.

Singhanetra-Renard A. (ed.) et al., *Population, health, and the environment*, 1997, The Proceedings of the Symposium of Chiang Mai, Department of Geography, Chiang Mai University, 308 pp.

ARCHIVAL CONTRIBUTIONS

The Commission was sending successively all the documents to Villa Celimontana (Newsletters and copies of books published during the period 2000–2004).

ACKNOWLEDGEMENTS

As a chair of the IGU Commission on *Population and the environment*, I would like to express my gratitude to all members of the Steering Committee as well as all organisers of the Commission conferences for their generous collaboration, valuable suggestions regarding programme, topics and contributors. In particular, I appreciate the assistance and guidance provided by Prof. Daniel Noin, the chair of the previous Commission on *Population Geography*, as well as Prof. Allan M. Findlay, the chair of the new Commission on *Population and Vulnerability*. Special thanks go to all members and collaborators of the Commission.

VIII. CONTINUATION OF THE COMMISSION ACTIVITIES: THE NEW COMMISSION

The name of the Commission has changed into *Population and Vulnerability*. For years 2004–2008, the new Commission has undertaken a research programme on the population problems.

A chair of the new Commission is Prof. dr Allan M. Findlay, University of Dundee, Department of Geography.

Instytut Geografii i Przestrzennego Zagospodarowania im. Stanisława Leszczyckiego, Polskiej Akademii Nauk, wydaje następujące publikacje seryjne: Geographia Polonica; Prace Geograficzne; Przegląd Geograficzny; Dokumentacja Geograficzna; Europa XXI, Geopolitical Studies; Bibliografia Geografii Polskiej; Atlas Warszawy oraz *Atlas Rzeczypospolitej Polskiej* (1995), *Centralny katalog zbiorów kartograficznych w Polsce* (2000).

MONOGRAFIE

- 1 – T. Kozłowska-Szczęsna, K. Błażejczyk, B. Krawczyk, 1997, *Bioklimatologia człowieka*.
- 2 – L. Starkel, 2001, *Historia Doliny Wisły od ostatniego zlodowacenia do dziś*.
- 3 – T. Kozłowska-Szczęsna, K. Błażejczyk, B. Krawczyk, D. Limanówka, 2002, *Bioklimat uzdrowisk polskich i możliwości jego wykorzystania w lecznictwie*.
- 4 – T. Kozłowska-Szczęsna, B. Krawczyk, M. Kuchcik, 2004, *Wpływ środowiska atmosferycznego na zdrowie i samopoczucie człowieka*.
- 5 – A. Gawryszewski, 2005, *Ludność Polski w XX wieku*.

ATLAS WARSZAWY

- 1 – Węclawowicz G., Jarosz A., 1993, *Struktury demograficzne i gospodarstw domowych*.
- 2 – Węclawowicz G., Książak J., 1994, *Struktury wykształcenia i zatrudnienia ludności w świetle Narodowego Spisu Powszechnego 1988*.
- 3 – Węclawowicz G., Jarosz A., 1995, *Warunki mieszkaniowe ludności w świetle Narodowego Spisu Powszechnego 1988*.
- 4 – Kozłowska-Szczęsna T., Błażejczyk K., Krawczyk B., 1996, *Środowisko fizyczno-geograficzne – niektóre zagadnienia*.
- 5 – Węclawowicz G., Jarosz A., Śleszyński P., 1998, *Wybory parlamentarne 1991 i 1993*.
- 6 – Misztal S., 1998, *Przekształcenia struktury przemysłu Warszawy*.
- 7 – Potrykowska A., Śleszyński P., 1999, *Migracje wewnętrzne w Warszawie i województwie warszawskim*.
- 8 – Luniak M., Nowicki W., Kozłowski P., Plit J., 2001, *Ptaki Warszawy 1962–2000*.

Sprzedaż i prenumeratę publikacji IGiPZ PAN prowadzą księgarnie:

– Księgarnia DHN Sp. z o.o. PAN, ul. Szczęśliwicka 2/17, 02–352 Warszawa, tel./fax 22/822–98–69; tel. 22/658–15–58.

– Główna Księgarnia Naukowa im. Bolesława Prusa, ul. Krakowskie Przedmieście 7, 00–068 Warszawa, tel. 826–18–35.

Bieżące i poprzednie numery można nabyć w Dziale Wydawnictw IGiPZ PAN, ul. Twarda 51/55, 00–818 Warszawa, tel.: 0–22–697–88–59, e-mail: t.paczus@twarda.pan.pl

We live in a world of unprecedented demographic change. Global population has increased by 2 billion during the last quarter of the 20th century. Despite declining fertility rates, population is expected to increase by another 2 billion during the first decades of the 21st century. The large part of this growth will occur in developing countries and will be concentrated in the poorest communities and in urban areas. There has been an enormous concern about the consequences of human population growth for the environment and for social and economic development.

Today, we observe the great diversification of world population - environment relationships. These interrelationships are never simple and are always changing. Human perceptions and utilisation of environment have varied greatly over time and space, responding to changes in culture, population growth, methods of production, energy use, government policies, international debt, as well as many other factors.

The present volume contains revised versions of selected papers presented by authors during the conferences of the Commission of International Geographical Union on: "Population and the Environment". The various approaches to the problem of relationships between population, environment and development, presented in this volume, provide some opportunities for future investigation of these issues.

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