

AN INVESTIGATION INTO AGRICULTURAL PRODUCTION IN MASOVIA
IN THE FIRST HALF OF THE 17th CENTURY*

I

For the last decade or so historians have begun to show growing interest in Polish agrarian problems during late feudal times. Thanks to numerous studies we already know a good deal about the agrarian system, the social organisation of production and the forms as well as extent of labour services. Less information is available about agricultural yields. More research has been done into the 16th than into the 17th century agrarian relations: for the 17th century we have valuable studies by J. Majewski,¹ A. Mączak,² A. Wawrzyńczykowa³ and A. Wyczański,⁴ but these

* This article is a condensation of a larger study entitled *Studia nad wydajnością gospodarstwa wiejskiego na Mazowszu w XVII w.* [*An Inquiry into Agricultural Yields in Masovia in the 17th Century*]. This study gives a detailed picture of the structure of the village community and the level of the forces of production on peasant holdings as well as the forms and extent of manorial duties. The entire source material relating to the Plock episcopal estates was taken from the estate inventories of 1595 and 1650 which are in the diocesan archives of Plock. In view of the compact nature of the sources no individual references are given here, but these will be found in the extended version of the article. The inventory for 1692 gives no information about the size of crops, either on peasant holdings or on *folwark* farms. For a general account of the development of agrarian relations in Poland in the 16th and 17th centuries cf. A. Mączak, *Polnische Forschungen auf dem Gebiete der Agrargeschichte des 16 und 17 Jahrh. 1945 - 1957*, "Acta Poloniae Historica," vol. I, 1958, pp. 33 - 57; J. Gierowski, *Les recherches sur l'histoire de la Pologne du XVI^e au XVIII^e s. au cours de 1945 - 1965*, in: *La Pologne au XII^e Congrès International des Sciences Historiques à Vienne*, Warszawa 1965, pp. 242 - 247. Cf. also authors' summaries of a number of new studies in "Studia z Dziejów Gospodarstwa Wiejskiego," vol. VII, 1965.

¹ J. Majewski, *Gospodarstwo folwarczne we wsiach miasta Poznania w latach 1582 - 1644* [*Folwark Farms in Villages Belonging to the Town of Poznań in the Years 1582 - 1644*], Poznań 1957.

² A. Mączak, *Gospodarstwo chłopskie na Żuławach Malborskich w początkach XVII w.* [*Peasant Holdings in Żuławy Malborskie in the Early 17th Century*], Warszawa 1962.

³ A. Wawrzyńczyk, *Gospodarstwo chłopskie w dobrach królewskich na Mazowszu w XVI i na początku XVII w.*, [*Peasant Holdings on the Royal Estates in Masovia in the 16th and Early 17th Century*], Warszawa 1962.

⁴ A. Wyczański, *Studia nad gospodarką starostwa korczyńskiego 1500 - 1660* [*Studies in the Economy of the Korczyn Starostwo 1500 - 1660*], Warszawa 1964.

do not cover much ground beyond the first decade of the 17th century, presumably because of the limited scope of the source material. The nearest approach to the subject of the present article is to be found in the above-mentioned work by A. Wa-wrzyńczykowa, which is based on very abundant sources (surveys of the royal estates and inventories) particularly for the years 1564 - 1630.

Least is known about the period 1630 - 1700. The 17th century in Polish history does not form a uniform whole. It has been marked by a series of destructive wars (1648 - 1667). In the central districts of the state, including Masovia, the wars were shorter (1655 - 1660), but the extent of the resulting destruction was enormous. Population losses have been estimated at 50 per cent.⁵ The historian of the second half of the 17th century is, therefore, faced with the central problem of economic recovery, both from the point of view of main trends (reconstruction or remodelling of agrarian relations⁶) and of concrete results.

Unfortunately the basic source material at our disposal does not provide answers to all questions. The lack of grain records is a particular handicap, only partially compensated for by inventory data concerning the amounts of grain sown and harvested in *folwark* farmsteads (demesne farms run by the feudal lord or his agent) and the grain tithes collected from peasants.

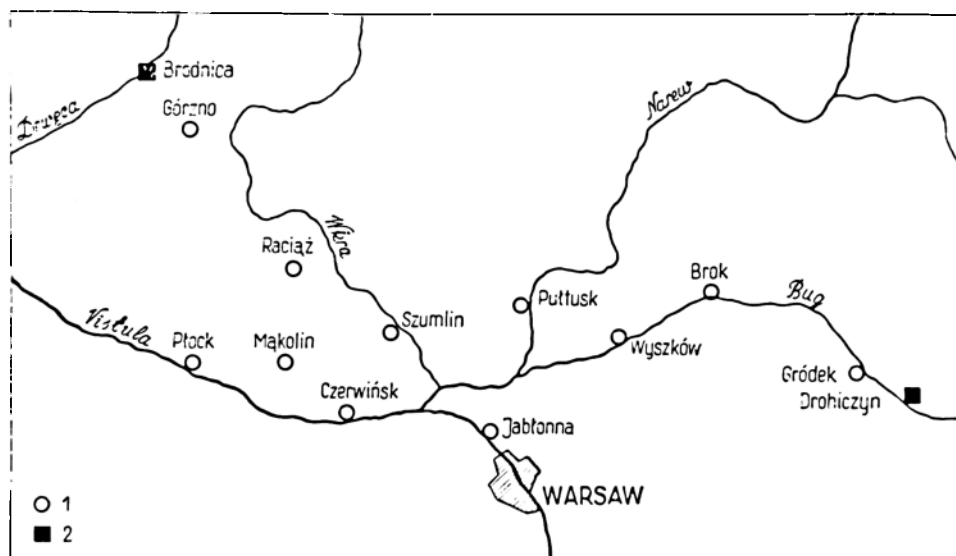
In this particular field, research into *folwark* farms is relatively easier than research into peasant holdings. Inventories and surveys generally record the amount amount of grain sown, less frequently the yields and size of the crop. Manorial grain records which make their appearance as early as the 16th century, make it possible to calculate in detail not only the size of crops, but also the extent of the grain circulation. Unfortunately, no similar information is available for peasant holdings, and the historian is therefore obliged to calculate their output by analogy to that of manorial farms, or on the basis of indirect data such as the size of holdings, information about grain reserves and about losses or damage suffered.

Information about the size of crops is essential for any estimate of agriculture productivity. In feudal times agriculture was the basic sphere of man's economic activity and production results were of decisive importance for the prosperity of a given society as well as for the economic strength of the State. The aim of the present study is to attempt to estimate the level and volume of grain production in only one district of Poland, i.e., Masovia, or more accurately, in the part of Masovia which lies north of the Vistula. The source material used in the present study relates to the large estates of the Płock episcopate. The choice of problems was influenced by the following considerations: 1) the preservation of detailed inventories

⁵ I. Gieysztorowa, *Guerre et regression en Masovie aux XVI^e et XVII^e siècles*, "Annales E.S.C.," Paris 1958, No. 4, p. 660.

⁶ This problem was raised by J. Rutkowski in his article on the remodelling of the village economy in Poland after the wars of the mid-17th century (*Przebudowa wsi w Polsce po wojnach z pol. XVII w.*, "Kwartalnik Historyczny," 1916); reprinted in *Studia z dziejów wsi polskiej XVI - XVIII w.* [*Studies in Polish Rural History from the 16th to the 18th Centuries*], Warszawa 1956, pp. 81 - 107.

for these estates for the years 1595 (incomplete), 1650 and 1692/1693. The first two inventories contain a number of data on the basis of which it is possible to calculate the grain production of *folwark* as well as peasant farms (i.e., amounts sown and harvested; grain yields on folwark farms, and list of grain tithes collected by the bishops' stewards on the episcopal estates). The inventory for 1692/3, on the other hand, contains only information concerning the amounts sown on *folwark* farms, which can be used in calculating the extent of the recovery of the *folwark* economy. Apart from this, all inventories include lists of peasant holdings, their size (in the Polish measure of *włoka* or *mansus*) and their feudal duties. The inventories for 1650 and 1692 also list the number of draught animals on peasant holdings.



Large estates of the Plock episcopate in the mid-17th century

1: centre of the fief (*klucz*); 2: other localities

The dates at which these inventories were compiled are of special significance for agrarian historians. The first was compiled at a time generally considered to mark the beginning of an economic recession in Poland, the second, a few years before the disastrous Swedish invasion of 1655 and the third after 40 years of economic recovery and not long before the outbreak of a new Northern War in 1700. 2) The Plock episcopate owned sizeable estates including over 150 villages and 50 folwark farms as well as five and a half towns.⁷ These did not form a compact whole since groups of villages belonging to one fief (known in Poland as *klucz* or “key”) were dispersed over a long line stretching from near Brodnica on the Drwęca (on the borders of Royal Prussia) to the vicinity of Drohiczyn on the Bug (Podlasie). The

⁷ The number of villages and *folwark* farms given is an approximation, as it changes from inventory to inventory.

three largest fiefs (about 60 per cent) were situated on the lower stretches of the Narew and the Bug, not far from Warsaw. Three small fiefs were situated actually on the Vistula, three others a day or two's journey away, one on the middle reaches of the Bug and one of them two or three days' journey from Toruń (see map). On the whole, the estates investigated were within easy distance of the Vistula, Poland's most important trade artery at that time. The vicinity of Warsaw, which was then assuming the function of Poland's capital, probably also facilitated sales of agricultural produce (Masovia at that time was able to offer large grain surpluses for sale).

II

The basic form of social organisation on which the Polish *folwark* farm was based at that time was serfdom (*pańszczyzna*). This is also true of the estates under investigation. All cultivated land was divided into peasant fields and *folwark* fields. The ratio of one to the other shows the degree of intensity of *folwark* development, which cannot be calculated with great accuracy and only approximate figures can be given. Peasant fields were measured in *włókas* — an economic rather than geometrical unit which might vary in its actual size. Perhaps the *włóka* here approximated to the *Chelmno włóka* (*mansus Culmensis* = 30 *morga* = 16.8 hectares or 41.5 acres) which was widely used in several districts of Poland and also known in Masovia. *Folwark* fields, on the other hand, were generally not measured. It seems likely that the inventories state the number of *folwark włókas* only when they concern the fields formerly belonging to peasants or to the *soltys* or *wójt* (head of village), which were later taken over by the *folwark*. Moreover, during the period under investigation *folwark* farms usually cultivated other land such as clearings or fields that peasants had given up or which had been taken away from them. Calculating the area actually under cultivation in a given *folwark* is further complicated by the fact that, having ample land at his disposal, the feudal lord could choose to till only the best fields and let the rest lie fallow. This meant that there was a difference between the total area of land belonging to a given *folwark* and the actual area under cultivation. Hence the amount of grain sown is a better indication of the size of *folwark* farms. Calculating *folwark* area on this basis, however, can also yield only approximate results owing to the divergence of data on the density of sowing. The number of *folwark włóka* under cultivation obtained in this way will be treated as an approximate and hypothetical figure, rather than an index of the actual size, useful in so far as it allows us to plot changes in the size of *folwark* farms.

We shall take the coefficient of *folwark* development to be the ratio of the number of *folwark włókas* under cultivation to one hundred peasant *włókas* (Table 1). Unfortunately, there are many serious gaps in the data given in the inventory of 1595, so that the conclusion that the coefficient of *folwark* development fell between 1595 - 1650 can only be a tentative one. It is not out of the question, however, as at that time regressive elements were more strongly in evidence in manorial than in peasant farms. On the other hand, there can be no doubt as to the relative expansion of

Table 1. Changes in the number of settled *włókas* and peasant holdings 1595 - 1650, as well as the coefficient of *folwark* development

Fief	Com-parable villages	Settles <i>włókas</i>				Peasant holdings				Coefficient of <i>folwark</i> development	
		1595	1650	difference	percentage	1595	1650	difference	percentage	1595	1650
Górzno	9	342.5	274.5	-68.0	19.9	205	162	-43	21.0	.	5
Płock	4	54.5	56.25	+1.75	3.2	58	54	-4	7.0	30	12
Mąkolin	9	167.0	121.0	-46.0	27.5	214	146	-68	31.5	9	17
Szumlin	5	77.5	65.0	-12.5	16.0	96	94	-2	2.1	.	14
Raciąż	5	57.0	58.0	+1.0	1.75	85	91	+6	7.1	30	28
Czerwińsk	4	87.5	79.5	-8.0	9.1	99	93	-6	6.1	.	9
Brok	19	225.25	261.0	+35.75	15.7	415	447	+32	7.7	27	19
Gródek	5	87.0	81.5	-5.5	6.3	160	239	+79	49.4	15	.
Pułtusk	—	.	471.0	.	.	.	718	.	.	.	15
Jabłonna	—	.	40.0	.	.	.	85	.	.	.	13
Wyszków	—	.	176.0	.	.	.	461	.	.	.	30

folwark farms in relationship to the total area of peasant holdings during the second half of the 17th century. Feudal lords aimed above all at reconstructing their own estates, thus increasing the burden on peasant holdings, since the *folwark* system continued to be based on serf labour.

The problem of regressive elements in the first half of the 17th century is a complicated one. It is generally accepted that the development of the *folwark* farm based on labour service caused the impoverishment of the peasant population and the consequent reduction of peasant holdings. Let us compare three elements: the coefficient of *folwark* development, the number of farms, and the number of *włókas* cultivated by peasants. From this comparison, which is only possible for 8 groups of villages (see Table 1), it appears that there was a very sharp drop (20 per cent) in the amount of land held by peasants in the Górzno fief where the *folwark* was least developed. In those fiefs, on the other hand, which had the highest coefficient of *folwark* development (Raciąż, Brok and Plock), the number of peasant-held *włókas* did not diminish but, on the contrary, even showed some increase — quite a considerable one in the large Brok fief (16 per cent). The Szumlin and Czerwińsk fiefs — with a relatively low coefficient — show a fall in the number of peasant *włókas*. An exception is the smallish Mąkolin fief where an upward trend in *folwark* development was accompanied by a reduction in the size of peasant holdings. There is no evidence, therefore, for the view that the *folwark* (and serfdom) were generally responsible for the decrease in the amount of land cultivated by peasants. Indirectly, the sources used by the author point to other factors. It is surprising to note how long it took to overcome the effects of the plague of 1625 and the Swedish war of 1626 - 1629. We have no information concerning the extent of war damage, but we know that in the neighbouring Great Poland it was very considerable.⁸ This indicates the low development potential of the economy and the very slow expansion of the forces of production which could, of course, have been a by-product of the agrarian system.

III

Let us now deal with the production of peasant holdings and then of *folwark* farms, on the basis of the abovementioned tithe list. This covers 29 villages in 1595, and 49 villages and 2 towns in 1650, which provide suitable data for the calculation of crop sizes. In both cases the tithes collected came from the harvests of the previous years, i.e., 1594 and 1649. The tithe consisted of every tenth sheaf of every cereal crop and the tithe collector had the right to select the best sheaf. It seems that grain sown on fallow land was exempted from tithes. The inventory of 1595 gives the number of shocks of every cereal collected as tithes in the whole village and then the estimated yield in *korce* or bushels (in round figures) per shock

⁸ Z. Guldon, *Uwagi w sprawie zniszczeń gospodarczych w pol. XVII w. na terenie Wielkopolski* [Remarks on Damage to the Economy in Great Poland in the Middle of the 17th Century], "Zapiski Historyczne," vol. XXIV, 1958, part 1, pp. 75 - 78.

(one Polish *kopa* or shock = 60 sheaves). The same source gives the number of *włókas* cultivated by peasants in the same villages, although we cannot always be certain of the accuracy of these data. However, the errors which might result from this are not large enough to distort our figures to any great extent. The suspicion that peasants hid part of their harvest from the tithe collector is more likely to cause the historian some concern. Inaccuracies resulting from our ignorance of the actual yields after threshing cancel each other out if we take into account the fact that estimates embraced as many as 29 villages including 435 *włókas* cultivated by peasants.

Divergences in the yield per *włóka* are striking and range from 42 to 541 Gdańsk bushels.⁹ Without going further into these figures for the moment, let us examine equivalent calculations made on the basis of the 1650 inventory. Here the data are both fuller and more accurate. The inventory gives the actual tithe yields (or such as it wishes to give as actual), usually for several villages (from 2 to 4) together. Calculations can be based on 49 villages and 2 towns; 4 villages are left out because of metrological difficulties. In this instance the results are less divergent and range from 99 to 216 Gdańsk bushels per *włóka*.

The following groups of yields can be distinguished:

I — from 1.5 to 2 Gdańsk lasts	— 8 villages and 1 town	17.6%
II — from 2 to 2.5 Gdańsk lasts	— 26 villages	51%
(this group includes a few villages where the yield slightly exceeded 2 - 2.5 Gdańsk lasts).		
III — from 2.5 to 3 Gdańsk lasts	— 11 villages and 1 town	23.5%
IV — from 3 to 3.5 Gdańsk lasts	— 4 villages	7.8%
Total		49 villages and 2 towns 100%

On the basis of this table we may regard a yield of 2 to 3 Gdańsk lasts as typical, as it occurred in 74.5 per cent of cases investigated. Higher yields were obtained in a bare 7.8 per cent of villages listed and lower yields in 17.6 per cent. Ten villages from the 1594 inventory can be included in the last 2 - 3 group. Cases which clearly diverge from this norm may be explained either by particularly bad crops (in some instances by good crops) or by unclear entries. Possibly some tithes were not collected in full or comprised a part owing from previous years. In actual fact there are only 5 villages where yields were surprisingly high (398.5 to 541 bushels) and 6 villages where they were unusually low (42 - 88 bushels). In our total picture this amounts to a proportion of 6.75 and 7.5 per cent respectively. (All from the 1594 inventory.)

The tithes lists throw some light on the structure of grain production on peasant holdings.¹⁰ The main crops are rye and oats. Whereas in 1549 rye production did not

⁹ The weight of a Gdańsk bushel was calculated by Z. Binerowski in his *Gdańskie miary zbożowe w XVII i XVIII w.* [*Gdańsk Corn Measures in the 17th and 18th Centuries*], "Zapiski Historyczne," vol. XXIII, 1957, parts 1 - 3, p. 79. The weights he gives are as follows wheat 40.04 kgs.; rye — 36.45 kgs.; barley — 29.62 kgs.; oats — 23.97 kgs.; peas — 43.18 kgs.; buckwheat — 32.16 kgs. (the average weight is given). 60 bushels equals 1 last. The structure of crops cultivated makes it possible to accept an average weight of 30 kgs. for one bushel.

¹⁰ A detailed table of tithes collected for every variety of grain is not given for reasons of space.

exceed, at most, 60 per cent of the total (normally 40 - 60 per cent), in 1649 it accounted for 60 - 71 per cent of grain production in one village out of three and or 40 - 60 per cent in every other village. The proportion of oats, on the other hand, fell from 30 - 57 per cent in 1594 to at most 27.8 per cent in 1649. These changes seem to indicate that peasants — and not only *folwark* landlords — had become more interested in the cultivation of rye, the most marketable of the cereal crops. Barley generally accounted for a dozen or so per cent of the total, rarely more than 20 per cent, followed by buckwheat, wheat and peas, in that order. Millet was sown only to a very limited extent. Unfortunately we cannot be certain that the structure of the tithes accurately reflects the structure of total production. The amounts of actual grain sown would certainly be a better indication of what a peasant intended to produce, but unfortunately no data are available on this subject.

IV

What is striking is the extremely extensive nature of *folwark* production, particularly in the middle of the 17th century. The 1650 inventory continually mentions peasant fields which were ploughed up by the *folwark* landlord (as many as 230 *włókas* were counted by the author). At the same time the amount of grain sown in 19 comparable *folwark* farmsteads decreased by about one third of the figure for 1594. From this it appears that a large part of *folwark* land was allowed to lie fallow. The growing extensification of *folwark* cultivation is an undoubtedly regressive symptom. It was an attempt to counteract the increasing sterility of the soil, since the low level of stock-raising did not permit manuring. Average yield ratios were barely maintained at the same level (2.8 in 1594 and 2.7 in 1650).¹¹ We can work out amounts sown and harvested for four cereals in 39 *folwark* farms in 1594 (using estimates for several *folwark* farms). Other cereals were sown to an extremely limited extent and can be omitted without affecting the total picture. Corresponding calculations for 1649 cover 49 *folwark* farms and all crops. The higher average output per *folwark* in 1649 does not contradict the fact — stated above — that there was a reduction in the amount of land under cultivation. The calculations for 1649 include two large fiefs (Wyszków and Pułtusk) left out in the 1595 inventory. *Folwark* farms in both these groups were larger than the average in the Plock episcopal estates. The fall in oat production might be only apparent, as part of the oat crop was probably used as cattle fodder before threshing. This would fit in with the growing custom, at that time, of wintering oxen and fattening them for sale the following year. If we were to accept a hypothetical average yield ratio for oats of 3.0 as in 1594, the structure of comparable cereal crops in both years would be more similar in character. The only essential difference in the structure of grain sown is the greater share of barley, which increased by 67 per cent compared with 1594. The main cereals are of course rye and oats, which accounted for about 40 per cent (together 80 - 90 per cent) of the total (in terms of grain sown). These two crops must have determined the basic

¹¹ The nature of the source material makes it impossible to calculate yields from a specific unit of land, so that the ratio of grain harvested to grain sown has been used instead.

Table 2. *Folwark* production^a (in Gdańsk bushels)

Year	Farms	Winter and spring rye				Wheat				Barley				Oats				4 cereals together			
		seed	harvest	yield ratio	surplus	seed	harvest	yield ratio	surplus	seed	harvest	yield ratio	surplus	seed	harvest	yield ratio	surplus	seed	harvest	yield ratio	surplus
1594	39	6055	14235	2.3	8080	137	618	4.5	481	997	4483	4.5	3486	5643	16932	3.0	11289	12832	36168	2.82	23336
	1	155	362	2.3	207	3.5	16	4.5	12.5	26	115	4.5	89	145	434	3.0	289	329	927	2.82	598
	%	47.0	39.1	×	34.6	1.1	1.7	×	2.1	7.8	12.4	×	14.9	43.9	46.9	×	48.3	100.0	100.0	×	100.0
1649	49	7246	22735	3.1	15489	195	873	4.5	678	2263	10745	4.8	8482	6637	9674	1.5	3037	16341	44027	2.7	27686
	1	148	464	3.1	316	4	18	4.5	14	46	220	4.8	174	135	195	1.5	60	333	897	2.7	564
	% ^b	44.3	51.7	×	56.0	1.2	2.0	×	2.5	13.8	24.4	×	30.9	40.6	22.0	×	10.6	100.0	100.0	×	100.0
		41.8	47.7	×	51.2	1.1	1.8	×	2.2	13.0	22.5	×	28.0	28.0	20.3	×	10.0	93.7	92.3	×	91.3
1649	49	Peas				Buckwheat				Millet ^c				4 main cereal crops				total			
	1	250	1102	4.4	852	768	2298	3.2	1530	15	211	14	196	16341	44027	3.70	27686	17374	47638	2.74	30264
	%	5	22.5	4.4	17.5	16	51	3.2	31	0.3	4.3	14	4	333	897	2.70	564	355	973	2.74	617
		1.5	2.3	×	2.8	4.4	4.8	×	5.7	0.1	0.4	×	0.6	93.7	92.4	×	91.4	100.0	100.0	×	100.0

^a Excluding the Gródek fief (2 *folwark* farms). ^b Upper figure expresses percentage of 4 cereal crops and lower figure percentage of all crops. ^c 32 *folwark* farms.

appearance of the Polish agricultural landscape at that time. Other crops were sown in very limited quantities — buckwheat accounted for 4.4 per cent, wheat for a bare 1.1 per cent, peas for 1.5 per cent, an millet for 0.1 per cent of the total.

What determined this particular structure of *folwark* cultivation? The following factors should be taken into consideration: 1) the market, 2) the expansion of vodka distilling, 3) cereal crop rotation in the three-field system and 4) the extremely limited use of manure.

We know in general that Masovia was an important grain (i.e., rye) exporting region. This is shown by the registers of the river customs-house in Włocławek, below Masovia. Mention was made above of the fact that the Płock episcopal estates were within easy reach of the Vistula and hence also of Gdańsk. These large latifundia, with their well developed *folwark* economy, no doubt had an active share in the cereal trade. The proportion of rye sown was certainly high, which is quite understandable. The very limited cultivation of wheat, on the other hand — although, according to our sources, wheat yields were higher than rye yields — was due to the difficulty of manuring fields, connected with the low level of stock-raising.¹² It appears that it was easier to sow barley, as larger amounts of cattle dung were available on the *folwark* in spring (wintering of oxen). But here too there were difficulties and sources at times note that a lack of manure had prevented the cultivation of barley.

One should probably beware of overestimating the limitations imposed by the three-field rotation system, since 1) the sources (particularly the 1595 inventory) frequently indicate that the three *folwark* fields were not equal in size; 2) as has already been mentioned, the *folwark* utilised abandoned peasant fields and was able to select them at will, according to need, and 3) it hardly seems likely that fields manured for spring crops were left fallow the following year, as manure remains effective for more than one season.

Now let us turn to the question of yields, i.e., of agricultural productivity. Table 2 contains the yield coefficients for every cereal. It should be made clear, however, that these are group coefficients for all *folwark* farms included in our sample. They allow us to form an estimate of farming results — but not of the functioning of farms at that time, for which we would require individual coefficients. These give a more accurate picture of actual conditions, and particularly of the phenomenon of fluctuation deriving from uncertain harvests. Our table includes altogether 258 yield coefficients for the four main cereal crops (91 for 1594, and 167 for 1649) and 131 coefficients for the remaining grains (all for 1649) (Table 3). Rye and oat yields are compared separately and so are wheat and barley yields. For the latter we have used a higher scale of comparison, as these two cereals had higher yields.¹³

¹² The livestock belonging to the estates did not amount, to more than a few animals per *włóka*. Stock-raising was auxiliary to arable farming and only the “wintering” of oxen can be regarded as an independent branch of agricultural production.

¹³ This scale for an estimate of yields has been based on the overall comparison of grain yields in Poland from the 16th to the 18th century in the article by L. Żytkowicz, *Ze studiów nad wy-sokością plonów w Polsce od XVI do XVIII w.* [Studies in Yield Ratios in Poland in the 16th - 17th Centuries], “Kwartalnik Historii Kultury Materialnej,” vol. XIV, 1966, No. 3, pp. 479 - 482.

The coefficients of oat yields in 1649 are certainly lower than they were in actual fact¹⁴ and not suitable for our calculations.

Crop failures were exceptional, which is a sign that the years investigated were "normal" ones. In view of the fact that the low coefficients of oat yields for 1649 are misleading this cereal has not been included in the following comparison (in %):

	Rye	Wheat	Barley	Peas	Buck- wheat	Spring Rye	Millet
Failed	2.6	2.7	2.9	4.4	4.4	52.6	3.1
Bad	17.1	16.2	2.9	20.0	19.6	36.8	—
Average	46.0	40.5	41.4	35.5	47.8	10.5	15.6
Better	19.0	16.2	21.4	6.7	8.7	—	—
Good and very good	14.5	24.5	31.4	33.3	19.6	—	81.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3. Classification of crop yields based on the inventories of 1595 and 1650

Year	No. of entries	Failed 0-1		Bad 1-2		Average 2-3		Better 3-4		Good 4-6		Very good 6+		Average yield
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Winter rye														
1594	27	2	7.4	9	33.3	11	40.7	4	14.8	1	3.7	—	—	2.34
1649	49	—	—	5	10.2	22	44.9	11	22.5	9	18.2	2	4.1	3.14
Oats														
1594	28	—	—	3	10.7	9	32.1	8	28.6	6	21.4	2	7.1	3.02
1649	47	16	34.0	25	53.2	6	12.8	—	—	—	—	—	—	1.46
Year	No. of entries	Failed 0-1		Bad 1-2		Average 2-4		Better 4-5		Good 5-6		Very good 6+		Average yield
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Wheat														
1594	13	—	—	1	7.7	7	53.8	3	23.1	1	7.7	1	7.7	4.53
1649	24	1	4.2	5	20.8	8	33.3	3	12.5	4	16.7	3	12.5	4.50
Barley														
1594	23	1	4.3	1	4.3	8	34.8	5	31.7	1	4.3	7	30.4	4.50
1649	47	1	2.1	1	2.1	19	40.4	11	23.4	5	10.6	10	21.3	4.75
Peas														
1649	45	2	4.4	9	20.0	16	35.5	3	6.7	6	13.3	9	20.0	4.41
Spring Rye														
1649	19	10	52.6	7	36.8	2	10.5	—	—	—	—	—	—	—
Buckwheat														
1649	46	12	4.4	9	19.6	22	47.8	4	8.7	5	10.9	4	8.7	3.25
Millet														
1649	32	1	3.1	—	—	5	15.6	—	—	4	12.5	22	68.8	14.05

¹⁴ See above p. 105.

The cultivation of winter cereals was extremely risky — almost 20 per cent of the crop was below average, that is in one farm out of five. In barley cultivation, which was more successful, failed and bad crops were almost exceptional. More than half the farms had above average crops and one in three had crops that were classified as good or even very good. The average yields of wheat and barley were almost equal. Of the four main cereals barley gave the best results.

Although the 1650 inventory makes no mention of flax or hemp it would be an error to conclude that these were not cultivated at all. They might have been grown in gardens or on a very limited scale and not included in the *folwark* accounts.

There seems to be no clear correlation between the *folwark* development and yield coefficients, or between the percentage of barley sown — on a fief scale — and the size of the crops. It is only in two fiefs (Brok and Mąkolin) that we find a comparatively high percentage of barley sown accompanied by the largest yields. Within the same fief differences in yields were quite considerable. The ratio of the largest to the smallest yield in the same fief fluctuates from 2 to 3.4, and on one occasion even amounted to 5.3 (rye). This indicates the paramount need to analyse individual yield coefficients. The phenomenon cannot be clearly analysed as long as we make use of group coefficients, both for a number of years. In any case, the fluctuation in the size of crops shows that the results of agricultural enterprise were very uncertain and impossible to forecast. This was a factor favouring larger farms, and therefore the gentry rather than peasant farmers, and magnates rather than the gentry.

V

Let us now turn to the next problem: the grain circulation on peasant holdings and *folwark* farms.¹⁵ Our point of departure will be the total volume of output previously established. Grain consumption, on the other hand, will have to be calculated on the basis of estimates.

A. Peasant holdings. Two elements have to be taken into account: variations in the yield per *włoka*, which has already been mentioned, and variations in the size of holdings or, in other words, the structure of land tenure. The fragmentation of peasant holdings was already far advanced, both in the Płock episcopal estates and in the royal estates in Masovia.¹⁶ In order to illustrate this phenomenon we shall confine ourselves to the villages of the Płock episcopate in Masovia and omit two fiefs beyond its boundaries.

¹⁵ For a similar attempt to estimate the grain circulation in peasant holdings see Wawrzyńczyk, op. cit., pp. 186 - 192, where the author assumed much higher yields and reached different conclusions. The full version of A. Wyczański's, *Próba analizy matematycznej ekonomiki gospodarstwa chłopskiego w Polsce XVI - XVII w.* [*A Tentative Mathematical Analysis of the Economics of Peasant Holdings in Poland in the 16th and 17th Centuries*] has not yet been published. A summary and discussion was printed in "Studia z Dziejów Gospodarstwa Wiejskiego," vol. VIII, 1966, pp. 341 - 347; S. Cackowski also attempted to work out the grain circulation in a large peasant holding at the beginning of the 18th century in his *Gospodarstwo wiejskie w dobrach biskupstwa i kapituły chełmińskiej w XVII - XVIII w.* [*Farming on the Estates of the Chełmno Episcopate and Chapter in the 17th and 18th Centuries*], part 1, Toruń 1961, pp. 153 - 155.

¹⁶ Wawrzyńczyk, op. cit., pp. 32 - 36.

The following comparison presents the size of holdings in *włókas*:

size of holding	year 1595		year 1650	
	No.	%	No.	%
$\frac{1}{8}$	7	0.6	18	0.8
$\frac{1}{4}$	135	12.1	517	22.6
$\frac{1}{2}$	490	43.8	1094	47.8
$\frac{3}{4}$	73	6.5	220	9.7
1	338	30.2	341	14.9
larger	75	6.7	97	4.2
Total	1118	100.0	2287	100.0

In the above comparison the total for 1595 includes 6 fiefs and for 1650 nine, which accounts for the considerable difference in the total number of holdings.

Quarter, half and one-*włóka* holdings seem to be the most frequently found. Our estimate of the grain circulation must therefore be worked out in nine different versions, as follows:

size of holding	yield per <i>włóka</i> in Gdańsk lasts		
	2.0	2.5	3.0
$\frac{1}{4}$ <i>włóka</i>	0.5	0.625	0.75
$\frac{1}{2}$ <i>włóka</i>	1.0	1.25	1.5
1 <i>włóka</i>	2.0	2.5	3.0

One should perhaps also take into account the structure of the crops on peasant holdings, but in the present instance this is not advisable, as it would create an illusion of accuracy where accuracy is not possible in view of the approximate nature of the figures. In any case the substitutability of different cereals, though not unlimited, should go some way towards correcting distortions caused by simplification. We take into account the following categories of consumption: 1) sowing. 2) food for the family and farm hands; 3) tributes to the manor; 4) tithes and church dues; 5) fodder for cattle and poultry; 6) the rest can be regarded as a marketable surplus.

Re point 1. In spite of the appearances to the contrary, divergent information given in the sources makes it difficult to estimate precisely how much grain a peasant had to sow on his holding.¹⁷ The most likely proportion would seem to be 100 - 160 kgs. of rye per hectare. Taking into account the fact that oats have a smaller intrinsic weight than rye and that peasants were no doubt more economical in their sowing than the *folwark* landlord, we arrive at a rough working estimate of about 120 kgs. of the different cereals to the hectare.¹⁸ We cannot convert peasant *włókas* into

¹⁷ See L. Żytkowicz, *Studia nad gospodarstwem wiejskim w dobrach kościelnych XVI w* [Farming on 16th Century Church Estates], Warszawa 1962, pp. 251 - 253; Wawrzyńczyk, op. cit., pp. 81 - 84; H. Łowmiański, *Początki Polski* [The Beginnings of Poland], vol. III, Warszawa 1967, pp. 300 - 303.

¹⁸ Or, in other words, 4 Gdańsk bushels (assuming the average weight of corn at about 30 kgs.); this makes 2.25 bushels for one Chelmno *morga*; Wawrzyńczyk, op. cit., pp. 81 - 82 assumes 2 to 2.5 bushels of rye and 2.5 to 3 bushels of oats for one Chelmno *morga*.

metrical units, but accept for the present purpose, that a *włóka* equalled 30 *morgas* (approximating to the Chelmno *morgas* = 0.56 hectares). In view of this we must deduct 45 Gdańsk bushels per *włóka*, not including the fallow land. Now let us compare these figures with the crop yields which we tried to calculate above. From this it appears that 120 bushels were obtained when the yield was 2.66, 150 – 3.33, 180 – 4.00. These figures fit in with the yields which we worked out elsewhere as typical for this period.¹⁹

Re point 2. In line with the previous literature we assume that a peasant family consisted of 6 persons. On a small quarter-*włóka* holding a farmhand was no doubt exceptional. Even on a half-*włóka* holding he would be uncommon if the family had its full complement of members. On a one-*włóka* holding, on the other hand, it was normal to employ 1 or 2 hands. Taking into account the smaller needs of children and old people,²⁰ we assume that there were five persons on a quarter-*włóka* holding, six on a half-*włóka* holding and seven or eight (on average (7.5) on larger holdings.

A. Wyczański recently made a very detailed and careful estimate of corn consumption in the 16th century, and arrived at a figure of about 300 kgs. of various cereals per working adult *per annum*, not taking into account the grain used in the distillation of alcohol.²¹ H. Łowmiański arrives at a similar figure for the previous period.²² This would give 1,500 kgs. 1,800 kgs., and 2,250 kgs. for the different types of holding respectively. If this is converted into bushels according to the weight of rye (36.5 kgs), as rye was the staple food, we obtain 41, 50 and 62 bushels respectively.

Re point 3. Inventories enable us to calculate manorial tributes in detail. They were not uniform in all villages, but can be estimated at an average of 7.5 bushels per *włóka* (most often the tribute consisted of oats).

Re point 4. As was mentioned above, the tithe consisted of every tenth sheaf or an equivalent monetary payment. We also deduct one bushel per *włóka* for church dues (*missalia*) although we cannot be certain that these were collected in all villages.

The results of the above calculations and estimates are set out in Table 4. What remains can be regarded as the surplus put aside for sale, or possibly, in part, for feeding livestock and poultry (column 10).

The overall picture is rather a gloomy one. There is a clear and sizeable deficit on quarter-*włóka* holdings and also on half-*włóka* holdings, except in years of good harvests. Would it therefore not be advisable to introduce corrections in the attached

¹⁹ Żytkowicz, *Ze studiów nad wysokością plonów...*, pp. 479 - 482; yield ratios 2 - 4 are found most frequently.

²⁰ Wawrzyńczyk, *op. cit.*, 187 - 188.

²¹ A. Wyczański, *Uwagi o konsumpcji żywności w Polsce XVI w. [Food Consumption in 16th Century Poland]*, "Kwartalnik Historii Kultury Materialnej," vol. VIII, 1960, No. 1, p. 24. In the mid-17th century peasants could no longer brew beer freely, see below p. 113.

²² Łowmiański, *op. cit.*, vol. III, p. 310.

table? Minor alterations would not change the overall result and major ones are hardly justified. Only a peasant cultivating a half-*włóka* holding, and that during a good season, was in a position to cover his needs and even achieve a small surplus.

Table 4. The grain circulation on peasant holdings (Gdańsk bushels)

Size of holding	Yield per <i>włóka</i>	Output of holding	Seedcorn	Tithoes	Church dues	Tributes to the manors	Consumption	Total	Difference	Degree of self-sufficiency (in %)
1/4 <i>włóka</i> holding	120	30	11.25	3.0	0.25	2.0	41	57.50	-27.5	33
	150	37.5	11.25	3.75	0.25	2.0	41	58.25	-21.75	50
	180	45	11.25	4.5	0.25	2.0	41	59.0	-14.0	66
1/2 <i>włóka</i> holding	120	60	22.5	6.0	0.5	3.75	50	82.75	-22.75	55
	150	75	22.5	7.5	0.5	3.75	50	84.25	-9.25	81
	180	90	22.5	9.0	0.5	3.75	50	85.75	+4.25	over 100
1 <i>włóka</i> holding	120	120	45.0	12.0	1.0	7.5	62	127.5	-7.5	over 100
	150	150	45.0	15.0	1.0	7.5	62	130.5	+19.5	over 100
	180	180	45.0	18.0	1.0	7.5	62	133.5	+46.5	over 100

This coincides surprisingly with the advice given in 1588 by Anzelm Gostomski, a well known writer on agricultural affairs, who owned large estates in Masovia: "A peasant should have land enough not to have to buy bread in a good year, if he is a good worker."²³ The same author opposes the division of half-*włóka* holdings amongst the farmer's heirs.²⁴ The authors of the inventories of 1595 and 1650 also oppose the existence of holdings smaller than half a *włóka*.²⁵ It seems clear that smaller holdings were not in a position to be self-supporting. But nevertheless such holdings existed and their number continued to grow.

How were they able to make up for the deficit? We must assume that the owners of such holdings were undernourished, but were there any ways of compensating for the underproduction of food, not, of course, in a disastrous season but in an average year? 16th century sources constantly refer to "excrementiae" cultivated by peasants "willfully," that is without the permission of the manor. Of course, the manor fought this tendency.²⁶ Another measure might be the partial utilization of fallow land and of cottage plots which were manured every year and not included in the three-field system.²⁷ Part of the population could supplement their livelihood outside agriculture, as craftsmen or wagoners. Others could work as

²³ A. Gostomski, *Gospodarstwo [The Farm]*, Wrocław 1951, p. 21.

²⁴ *Ibidem*. p. 43.

²⁵ Inventory for 1595, folio 100; inventory for 1650, folios 40, 66.

²⁶ Cf. Żytkowicz, *Studia nad gospodarstwem wiejskim...*, pp. 68 - 72.

²⁷ This was pointed out by Łowmiański, *op. cit.*, vol. III, pp. 253 - 260. *Steuer- und Urbarial-regulierung Josephs II (1785)* notes that crops were sown on a fallow field, see J. Fierich, *Uwagi nad techniką rolniczą w Polsce w II poł. XVIII w. [Agricultural Techniques in Poland in the Second Half of the 18th Century]*, "Roczniki Nauk Rolniczych i Leśnych," vol. XLIV, 1938, p. 248.

hired hands for richer peasants or pay for products with labour. The 1650 inventory mentions that the poor peasants from the Gródek fief (Podlasie) "ran" to Żulawy to earn their living.²⁸ The final alternative was to be behindhand with tributes or to eat the seedcorn, which meant being in debt to the manor. Of course, where there were large forests and a low population density food gathering could play a much more important role than in later ages. J. K. Haur, a very popular agricultural writer in the second half of the 17th century, advises his readers to feed *folwark* hands on bread containing an admixture of "herbs and weeds."²⁹ We must also remember that a peasant had to earn a certain amount of money for rents and taxes, and the purchase of essential articles which he was unable to produce on his own holding.

It is only on holdings above half a *włóka* in size that we can consider a marketable surplus to be a normal and constant phenomenon, and then only if we except seasons when the harvest was poor. Only this section of the peasantry was able to benefit from increases in the price of corn, or even to save relatively large sums of ready money, make loans and take land in mortgage.

B. Folwark holdings. Research into the grain circulation on *folwark* farms is complicated by the fact that the manor was able to dispose not only of its own *folwark* production, but also of peasant corn in the form of various tributes such as "dry measures," "mill measures," and in the present instance also tithes. In view of this, two methods of investigation are possible: 1) to base our calculations on the entire manorial revenues or 2) to confine our selves to *folwark* produce. Both these methods can raise certain objections since they are based on abstract stipulation. In the first case, the results are of no help in determining the level and productivity of *folwark* farms, since the size of manorial revenues could depend on such elements as the structure of feudal rents, money rent or tributes, or usually, varying proportions of both. We know that the manor frequently bought cereals for processing or sale especially at a later period.³⁰ In the second case, we must assume that the manor used its own produce to supply the requirements of its own household and destined all cereals from other sources for sale. The choice of method would seem to depend on the ultimate purpose of the investigation. If this is to determine the volume of the grain trade in Poland and supplies available on the market, the first method seems indicated. If, on the other hand, we wish to investigate the economic efficiency of the *folwark* farm and its place in the agrarian structure — in a word, if we are concerned with agrarian production — the second method would seem more useful.

The second difficulty springs from the fact that estate owners' consumption requirements were not uniform. Estates belonging to the middle gentry usually

²⁸ Inventory for 1650, folio 172.

²⁹ J. K. Haur, *Skład albo skarbiec znakomitych sekretów ekonomiej ziemiańskiej* [Storehouse or Treasury of Excellent Secrets Pertaining to the Economy of Landed Estates], Kraków 1693, p. 36.

³⁰ I. Rychlikowa, *Studia nad towarową produkcją wielkiej własności w Małopolsce w latach 1764 - 1805* [Commercial Production on Large Landed Estates in Little Poland 1764 - 1805], part I, Wrocław 1966, pp. 87 - 104.

included the owner's residence, whose household requirements were met from manorial receipts. On large estates the situation could be quite different. It has been pointed out, for instance, that the administrative and military functions attached to the office of *starostwo grodowe* (i.e., of county sheriff and judge) entailed increased demand for grain and other farm produce.³¹ On other types of estates the fact that the lord had his residence there or not, also influenced consumption. For instance, certain magnates' estates might be without a residence if the owner happened to live on other estates belonging to him. As a rule, there was no residence on urban estates.³² The length and frequency of the proprietor's stays are also factors to be taken into account.³³

In the 17th century grain accounts are a rarity. Data concerning grain sales in surveys and inventories have a different function — namely to calculate manorial profits. Profits could include the entire surplus after deducting the so-called *usus praeclii*, that is seedcorn and food needed on the *folwark* (not by the manor) for household purposes. Sometimes only the seedcorn was deducted. The rest includes both the cereal consumed on the manor and that destined for the market. The inventories of the Plock ecclesiastical estates give no data for grain sales, so that we must resort to estimates.

Taking *folwark* grain production as the point of departure, we leave aside tributes, tithes and "mill measures" since these were not part of the *folwark's* own produce. Now let us return to Table 2. Surpluses of wheat, peas and millet were tiny and probably destined for consumption. Buckwheat yields were higher and amounted to about 1,600 bushels over the whole estates. In 1594 the amount of seed sown was very small. The list of tithes shows that buckwheat was favoured also by peasants: in 1594 it was cultivated in 83 per cent of all villages and in 1649, in all the villages. Its share in the total produce of peasant holdings also increased. It seems likely that the increased cultivation of buckwheat in *folwark* farms was due indirectly to the growing importance of manorial breweries. It could be processed into various starchy foods, while barley, a more difficult plant to cultivate, could be used for brewing beer. In view of this we assume that buckwheat was mainly consumed on the *folwark* farm itself. Only insignificant amounts, if any, reached the market.

Above, we have drawn attention to the low oat yields, which we explained by its use as cattle fodder. After subtracting the amount used for seed, about 60 bushels of oats remain per *folwark*. Peasants' tributes were mainly collected in the form of oats, since requirements were considerable. Oats were needed as fodder for the horses used by the administration and on the manor — draught-horses were not, on the whole, found on the *folwark* farmstead.

Barley is the only cereal whose output rose both relatively and in absolute terms — the amount sown rose from 7.8 to 13.8 per cent and the surplus from 89

³¹ Wyczański, *Studia nad gospodarką starostwa korcezyńskiego...*, pp. 58 - 59.

³² Majewski, *op. cit.*, pp. 96 - 107.

³³ Żytkowicz, *Studia nad gospodarstwem wiejskim...*, p. 271 and tables 54 - 56.

to 174 bushels per *folwark*, that is by almost 100 per cent. This may be attributed to the development of home-brewing, which is confirmed by the inventory. Between 1595 and 1650, a network of manorial breweries (26) and inns was established. Although there are no data concerning manorial beer production, we may assume, by analogy with the output of urban breweries on the same estates, that the *folwark*'s total barley output hardly sufficed to satisfy requirements. We know from sources concerning other estates that brewing was a paying proposition, since pure profits were as much as 100 per cent or more of production costs.³⁴

The most important cereal crop on the *folwark* was rye, which alone accounted for 40 per cent or more of the entire grain output. The surplus — after deducting seedcorn — came to 207 and 316 bushels per *folwark*. The increase was achieved not by extending the area sown, but by improving yields. Corn accounts from the Włocławek episcopal estates for various years during the 16th century suggest that *folwark* rye consumption was not large and may be estimated at about 10 per cent of output.³⁵ The reason for this is to be sought in the role played by labour services on the estates under investigation, which ensured that the *folwark* had few permanent hired hands. Together with the seedcorn we may estimate the *onera fundi* at 40 - 50 per cent. The amount of rye consumed by the estate administration and manor is both more significant and more difficult to establish. Magnates' households were usually numerous and a bishop's palace was no exception.³⁶ In neighbouring Włocławek, in the years 1531 - 1534, average consumption in the bishop's palace was about 550 Gdańsk bushels, but annual fluctuations were considerable and depended on whether the bishop was in residence in Włocławek or not.³⁷ In the present instance these figures should be far larger, as the requirements of the feudal class had risen considerably since the first half of the 16th century. We therefore assume a working estimate of 1000 - 1500 Gdańsk bushels.

Let us now sum up rye consumption (for the sake of simplification, spring rye, cultivated on a small scale, is also included).

Yields in 10 fiefs (49 <i>folwark</i> farms)	22,735 bushels
2 <i>folwark</i> farms in the Gródek fief (estimate)	930 bushels
Total	23,665 bushels
Seedcorn (according to the previous year's data)	7,246 bushels
In 2 <i>folwark</i> farms of the Gródek fief (estimate)	300 bushels
Total seedcorn	7,546 bushels 31.9%
<i>Folwark</i> consumption	2,366 bushels 10.0%
Consumption of administration and bishop's household	1,000 - 1,500 bushels (4.2 - 6.3%)
Total consumed and used for seedcorn	10,912 - 11,412 bushels (46.1 - 48.2%)
Remainder	12,753 - 12,253 bushels (53.9 - 51.8%)

³⁴ Cackowski, op. cit., part 2, p. 154; T. Czwojdrak, Z. Żak, *Przemysł propinacyjny i karczmarstwo w dobrach biskupa poznańskiego w XVII i XVIII w.* [Distilling and Innkeeping on the Estates of the Poznań Episcopate in the 17th and 18th Centuries], "Studia i Materiały do Dziejów Wielkopolski i Pomorza," vol. II, 1957, issue 2, table on p. 91.

³⁵ Żytkowicz, *Studia nad gospodarstwem wiejskim...*, table 52.

³⁶ From 1640 to 1655 Ferdynand Karol Waza, son of Zygmunt III, was Bishop of Płock.

³⁷ Żytkowicz, op. cit., tables 54 and 55.

VI

The "remainder" arrived at in this way should be regarded as the saleable produce. It is true that in 1650 there are references to the distillation of spirits in the bishops town breweries, but this was on a small scale and did not consume much grain (rye and oats).³⁸ We do not know if, and to what extent, spirits were distilled in the manor households. There might, of course, have been some other uses to which rye was put, which we have omitted. Taking all this as well as unavoidable losses into consideration, we reduce the figure obtained above to 12,000 bushels, which is 50 per cent of the rye output and about 24 per cent of the entire cereal production.

The bishop's estates could, of course, have sold more grain, which might have been obtained from sources not included in our calculations. The saleable surplus might have varied in volume in different parts of the estates, depending on yields and manorial consumption.³⁹ Although there are no direct data, we can assume that Gdańsk was the main market for corn from the bishop's *folwark* farms. This is indicated by the administration's familiarity with Gdańsk prices, the presence of Gdańsk bushel baskets among the implements on the *folwark*, the conversion into Gdańsk measures of crops in certain *folwark* farms in 1595 and the fact that the size of a large granary belonging to the bishop (in Gródek on the Bug) is given by the source in Gdańsk lasts.⁴⁰ It should be noted that the transport of grain from Masovia to Gdańsk was not only cheaper than from more distant parts of the country, but also faster. This, of course, ensured more advantageous sales.

Can the level of commercial production on the episcopal *folwark* farms be considered high? Other research in this field permits comparison with a previous period. For instance, according to the estimates made by A. Wyczański, based on the accounts of the *Korczyn starostwo* in Little Poland (on the Vistula), which give data for seven years between 1533 and 1572, the average saleable grain surplus there amounted to not much more than 50 per cent of the entire cereal production, but it should be added that the author also took into account manorial revenues from sources outside the *folwark* farm.⁴¹ According to J. Majewski, *folwark* farms on the outskirts of Poznań sold 38 per cent of their total produce, but the estate owner did not have his residence there.⁴² In the Cuyavia estates of the bishops of Włocławek 24.3 per cent of the rye crop was sold in the years 1531 - 1534, while the corresponding figure for the Ciechocin fief, situated on the other side of the Vistula, was 40.2 per cent; this fief did not, however, make grain deliveries to the Włocławek palace. Rye accounted for 93.7 per cent of all the grain sold. In 1565 and 1566 as much

³⁸ For instance 13 lasts in Wyszaków, 6 in Brok, 11 in Andrzejów; Inventory for 1650, folio 85, 133, 135. These breweries belonged to burghers and not to the episcopate.

³⁹ This was the case in Włocławek, for instance, see Żytkowicz, op. cit., tables 54 and 55.

⁴⁰ Inventory for 1595, folio 81.

⁴¹ Wyczański, *Studia nad gospodarką starostwa korczyńskiego...*, p. 65.

⁴² Majewski, op. cit., p. 233. In both instances quoted the structure of the grain sold differed. There was, for instance, a considerable proportion of wheat which was only cultivated on a very small scale in the Płock estates.

as 50 per cent of the crops was sold, but these were exceptionally good years.⁴³

It is also pertinent to glance at other attempts to estimate the level of commercial agricultural production in the 16th century Poland. As far as we know, no similar attempts have been made for the 17th century. Subsequent periods, from the middle of the 18th century onwards, are less suitable material for comparison in view of improved crop yields. On the basis of demographic changes in Poland and agrarian progress since the middle ages H. Łowmiański estimates commercial production at 37.5 per cent.⁴⁴ W. Kula, who based himself on J. Rutkowski's researches into the revenue structure of large landed estates, suggested a figure of 35 - 40 per cent, but pointed out that he considered Rutkowski's results exaggerated.⁴⁵ It is a fact that his sources are in need of critical reexamination. A. Wyczański arrived at different results. He calculated that urban consumption of rye together with export sales accounted for about 31 per cent of the total output (1570 - 1580).⁴⁶ This figure could indicate the approximate level of commercial production. Rye was the most important commercial cereal crop at the time and probably accounted for about 40 - 50 per cent of total cereal production. 31 per cent of rye would be about 12.5 - 16.5 per cent of the total grain output, but as certain amounts of other cereals were also offered for sale, these figures should be raised by a few per cent. The level of commercial production on large landed estates in Masovia must, of course, have been above the national average.

We must also remember that our estimate of a saleable surplus of 12,000 bushels (about 440 metric tons) of rye was the produce from 51 *folwark* farms, to which 121 villages belonged with 1,120 serf *włókas* — altogether 1,781 peasant *włókas* if we include those where serfs were buying their release. The proportion of *folwark* grain for sale to one serf *włóka* was 10.7 bushels, or nearly 400 kgs. Our estimate refers to an average year — after a bad harvest, a frequent occurrence at that time, the results must have been worse.

Which of the two then, was able to produce more grain for sale in proportion to the amount of land cultivated — peasant or *folwark*? We have calculated above, that a peasant farming one *włóka* of land was able to sell 19.5 bushels in an average year and 46.5 bushels (Table 4) in a good year. One-*włóka* holdings were not, however, the largest group of homesteads (p. 108). The level of commercial production on smaller holdings could hardly be high. On the other hand, we must remember that a considerable proportion of peasant-grown corn might find its way to the market in the form of tithes and tributes. Tithes, for instance, (15 bushels per *włóka*, assuming average yields) and tributes (7.5 bushels per *włóka*) from the above-mentioned 1,781 peasant *włókas* amounted to as much as 40,000 bushels. This was almost

⁴³ Żytkowicz, *Studia nad gospodarstwem wiejskim...*, tables 36 and 56.

⁴⁴ Łowmiański, op. cit., vol. III, p. 321.

⁴⁵ W. Kula, *Teoria ekonomiczna ustroju feudalnego [An Economic Theory of Feudalism]*, Warszawa 1962, p. 102.

⁴⁶ A. Wyczański, *Tentative Estimate of Polish Rye Trade in the Sixteenth Century*, "Acta Poloniae Historica," vol. IV, 1961, p. 128.

more than three times as much as the *folwark* farms on these same estates were able to offer for sale after household requirements had been met. In our estimates we have not taken into account land rented by "outsiders" such as holders of the office of *soltys* or *wójt* (village elder and head). It makes no difference to the conclusions arrived at in this study that tithes and tributes might have been partially commuted into money payments, as this in itself can be considered one of the ways in which the feudal landowning class provided grain for sale.

How much grain then, was sent for sale by the immediate producers from their own land? As our point of departure let us take 19.5 bushels from a one-*włóka* holding in an average year. Holdings of this type accounted for 420 *włókas* in 11 fiefs. Almost as much (416 *włókas*) belonged to larger holdings with a higher level of commercial production (say 50 per cent more). In this way we arrive at nearly 21,000 bushels of saleable grain from holdings of one *włóka* upwards. Smaller holdings (945 *włókas*) were also forced to sell a certain amount of grain, say 5 to 10 bushels annually per *włóka*, — which amounts to 4,725 - 9,450 bushels from holdings of less than one *włóka*. In round figures this gives a total of 26,000 to 31,000 bushels, or 66,000 to 71,000 bushels if we include tithes and tributes. This estimate does not include grain collected by the manor in the form of "mill measures" (usually $\frac{1}{16}$ of the ground grain). If we take a mean figure of 68,500 bushels, this makes 80,000 bushels together with *folwark* grain, 85 per cent being the output from peasant holdings and 15 per cent from *folwark* farms.

This amount was produced on 51 *folwark* farms and 1,781 peasant *włókas*. On the average, one peasant *włóka* produced 38.5 bushels of various cereals for sale. If we take the average weight of a bushel to be 30 kgs., as above,⁴⁷ this makes a total of about 1,150 kgs. which might have found its way to the market by various channels. This is about 26 per cent of the total output in an average year (Table 4). Corresponding estimates for *folwark*, land would be misleading in view of the hypothetical size of a *folwark* *włóka*. The level of commercial production of the *folwark* was estimated above at 24 per cent. If these figures are reasonably accurate this would mean that the *folwark* did not sell a larger proportion of its grain than the peasant farmer. It was only able to sell a larger proportion of its rye crop, in view of its own lower level of consumption. An rye after all was at that time the main corn exported for sale.

Can one put forward the tentative conclusion that the development of the *folwark* system did not contribute much to increasing the total amount of grain available for sale? Perhaps this was so, but such a conclusion needs verification. In any case, the main reason for the emergence of this system was not that it produced more food, but that it enabled the feudal landowning class to increase its revenues.

(Translated by Hilda Rusiecka)

⁴⁷ See above note 9.