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Institutions and Technologies for Subsistence Agriculture:
How to Increase Commercialization

by

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Encyclopedia Britannica defines subsistence farming as “a form of farming in which nearly all of the crops or livestock raised are used to maintain the farmer and his family, leaving little, if any, surplus for sale or trade. ... Subsistence farms usually consist of no more than a few acres, and farm technology tends to be primitive and of low yield.”

This definition generalizes the long experience of agricultural economists in the underdeveloped countries of Africa, Asia, and Latin America. And yet it is closely echoed in what we see in the individual farming sector in transition countries. Box 1 is a vivid description of individual farms as a subsistence sector, and although written with Kyrgyzstan in mind, it reflects the prevailing view of individual farming in all transition countries.

Box 1. Subsistence Agriculture in Kyrgyzstan

Most village families practice subsistence agriculture and are allocated small parcels of land to produce food for their families. These plots are often barely sufficient to feed each family and the purchase of seed and fertilizer is often too expensive. Even if a surplus can be produced it is difficult to transport it to markets. The lack of machinery means that the labor is mainly carried out by family members. Most villages lack basic facilities to process wool, preserve fruit, and add value to their crops.

Source: Kyrgyzstan Community Business Forum (web site)

The synthetic profile suggests that subsistence farms are small, use mainly family labor, lack machinery, face difficulties in purchasing inputs and marketing their products (assuming that they generate a marketable surplus), and do not add value to primary commodities. For our purposes, the overriding characteristic of subsistence farms is that they produce food for the family and have no commercial orientation. This is the vicious circle that we need to break: how can individual farmers in transition countries start producing a sizable surplus that can be sold for cash or traded for manufactured goods?

Is there subsistence agriculture in transition countries?

Survey results indicate that, on the whole, individual farms in transition countries are far from pure subsistence operations. The majority of farms in all individual categories – household plots and independent peasant farms – sell at least some of their output. The proportion of

output sold by these farms is quite significant, averaging between one-third and one-half of total production (Table 1). In a certain sense, this is a continuation of established trends from the Soviet period, when farm products from household plots were always sold in local town markets. No data are available for a rigorous comparison of individual farm sales before and after 1990. Yet a rough feeling suggests that the level of commercialization of individual farms has increased. In the pre-transition era, the common wisdom was that “one-third of household plots sell one-third of their production”, while Table 1 suggests that today the formula is “two-thirds of household plots sell one-half of their production”. A higher proportion of individual farms sell a larger proportion of their output.

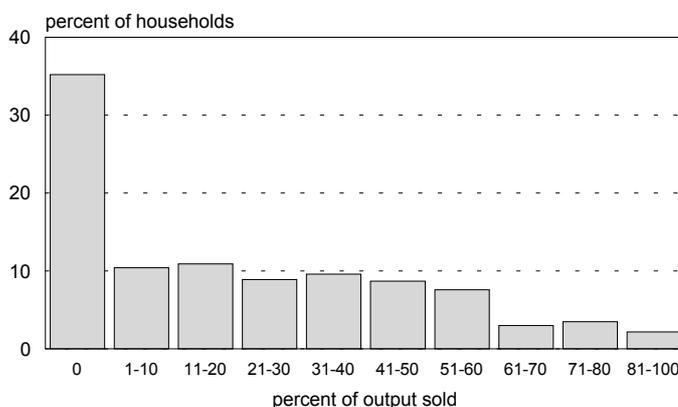
Table 1. Level of Commercialization in the Individual Sector

	Percent of “sellers”	Percent of output sold by “sellers”
Armenia	80	40
Georgia	64	40
Moldova – small private farms	83	48
– household plots	60	31
Ukraine – household plots	60	50
Belarus – household plots	76	22
Poland	72	52

Source: World Bank surveys 1998-2000.

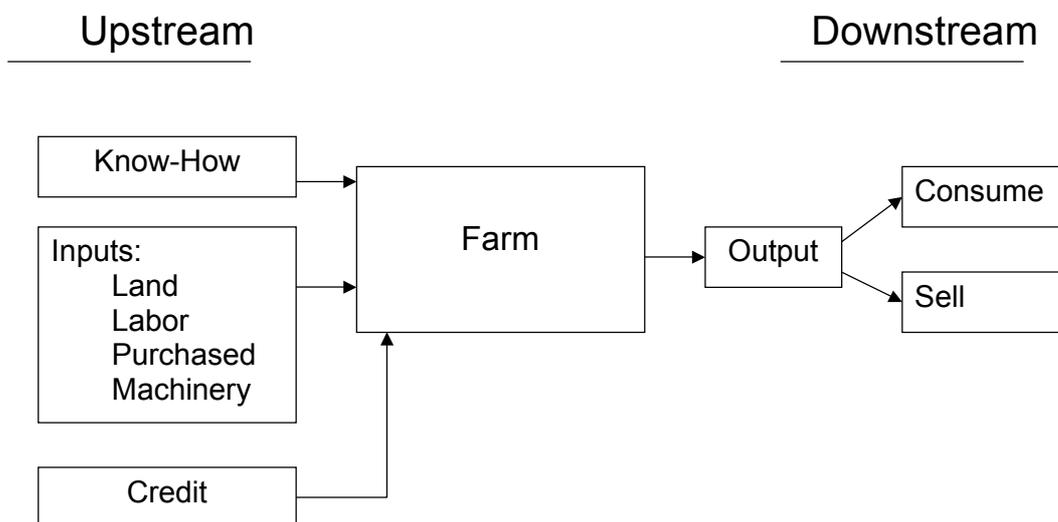
Some would disagree with the present author’s interpretation of Table 1 as a picture of commercial orientation of individual farms in transition countries. These critics would claim that 30%-40% of “non-seller” farms is a very high proportion and it actually proves a subsistence orientation. They would further argue that only 50% of farm output is sold, so families largely consume the food produced on their farms, instead of purchasing food in the marketplace. So is the glass half full or half empty? Individual farms in transition countries are certainly far from the level of commercial operation as we understand it in market economies. But having said that, we must acknowledge that their commercial activities are not negligible, and that on the whole the picture that emerges from Table 1 is definitely different from that described in Box 1 or in the *Encyclopedia Britannica* definition of subsistence agriculture.

Moldova: Commercialization of Rural Households and Small Individual Farms



Individual farms in transition economies span the whole spectrum from pure subsistence operations that do not sell any farm products to fully commercial operations that sell more than 80% of their output. Figure 1 shows the distribution of farms in Moldova by the percentage of output sold. The figure represents the level of commercialization of small individual farms that are typically regarded as subsistence operations: these are the household plots and the small- or medium-sized registered peasant farms with up to 100 hectares (the data are from a World Bank survey conducted in the autumn of 2000). Consistently with the data in Table 1, only one-third of the farms do not report any sales. Most of the remaining farms show a fairly uniform distribution by commercialization levels from 10% to 60% of output sold, and a substantial percentage of farms report sales of more than 60% of output.

The focus of our discussion is thus on how to increase the readiness of individual farms to sell and to increase the percentage of output sold among the “sellers”. Figure 2 is a standard input-output diagram adapted to farming. We will examine what needs to be done with the main input streams – land, purchased inputs, machinery, credit, know-how – if the objective is to increase the share of output that goes through the commercial sales channel.



More Land Means Higher Commercialization

We have used farm survey data from a number of CIS countries to analyze the determinants of the decision to sell among individual farmers. Mathijs and Vranken carried out a similar analysis for Hungarian farms. Table 2 is one of the outputs of this type of analysis. It presents the comparative profiles of “seller” and “non-seller” farms in Armenia, where large corporate farms do not exist and agriculture is entirely agriculture of smallholders. The Armenian smallholders are conventionally regarded as subsistence farmers, although we have seen in Table 1 that fully 80% engage in commercial sales.

The sellers are characterized by larger land holdings, a larger amount of fertile irrigated land, and more animals. Sellers also command a larger pool of potential family labor, and the head of the household works full time on the family farm in a significantly higher percentage of cases. Finally, sellers allocate much greater sums of money to payment for mechanical field services (both in absolute terms and per hectare). Interestingly, some variables that a priori

would appear relevant to the decision to sell are not significantly different between the two categories of households. For example, the average distances to the main delivery location or point of sale and the average road conditions are virtually identical for sellers and non-sellers. The product mix is practically the same. The educational endowment is not different. The picture emerging from the profiles of Table 2 is confirmed by logistic regression: the probability that a household is a “seller” increases with the increase of its land endowment, the number of animals, the number of family members, and the number of farm workers per hectare.

Table 2. Armenia: Comparative Characteristics of Sellers and Non-Sellers

	Sellers (1,104)	Non-sellers (264)
Land, ha	2.3	1.4
Irrigated land, ha	0.44	0.24
Animals, standard head	2.2	1.0
Family size	5	4
Number of farm workers	4	3
Full time occupation on farm	63%	45%
Annual cost of mechanical field services	19,500 dram/ha	8,900 dram/ha
Product mix	60% crops	59% crops
Educational endowment of head of household	13% higher 59% secondary	12% higher 62% secondary

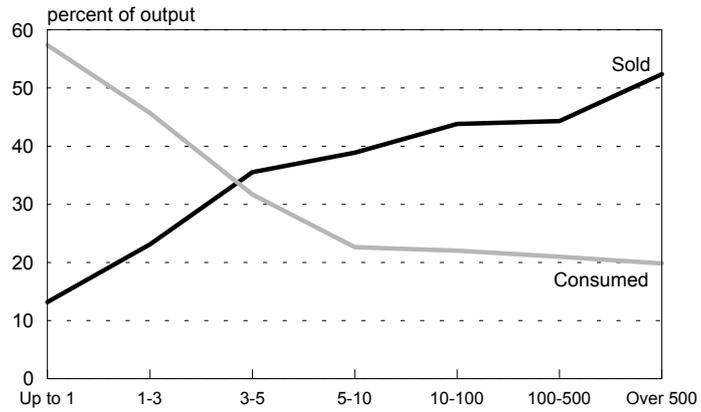
Source: Lerman and Mirzakhanian, *Private Agriculture in Armenia*, Lexington Books (2001).

The specific profile components and regression results vary from country to country, not only because of local differences, but also because of different availability of particular variables. Thus, no data on farm machinery were available in Armenia, whereas in Moldova this proved to be one of the significant factors in the decision to sell. While geographical location had no impact in Armenia, it was found to be a highly significant factor in Moldova, where commercialization declined rapidly with the distance from the capital. The product mix was the same for “sellers” and “non-sellers” in Armenia, whereas in Moldova we witnessed a distinct adjustment of the cropping pattern in “seller” farms (more sunflower, grapes, and vegetables as the main cash crops). Yet farm size as measured by land emerges clearly and consistently in all countries as the major determinant of the decision to engage in sale of farm products. Seller farms are larger and use greater inputs of productive resources. They accordingly produce more output and have a greater saleable surplus after satisfying the family’s consumption needs. Small farms produce just enough to satisfy family consumption and do not trade. To have saleable surplus output, the farm must be larger than some minimum size.

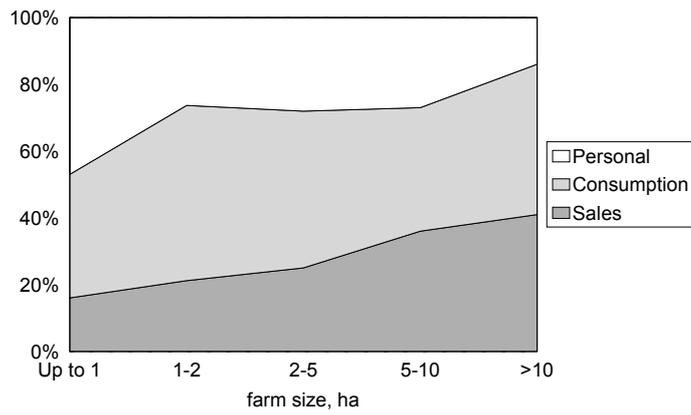
Figure 3 demonstrates the relationship between the level of commercialization and farm size for a sample of individual farms in Moldova that participated in a World Bank survey in the autumn of 2000. The sample included household plots and a wide range of registered peasant farms, spanning a wide range of sizes from a few tenths of a hectare to more than 500 hectares in some exceptional cases. The level of commercialization consistently increased with the increase of farm size: the proportion of output sold rose from less than 15% for the smallest farms of up to 1 hectare to 45-50% for farms of more than 100 hectares. The percentage of output consumed by the farmer’s family correspondingly declined from nearly 60% for the smallest farms to about 20% for the largest entities (the two proportions do not

add up to 100% because some of the output is used as intermediate inputs on the farm and some is stored for future consumption and sales).

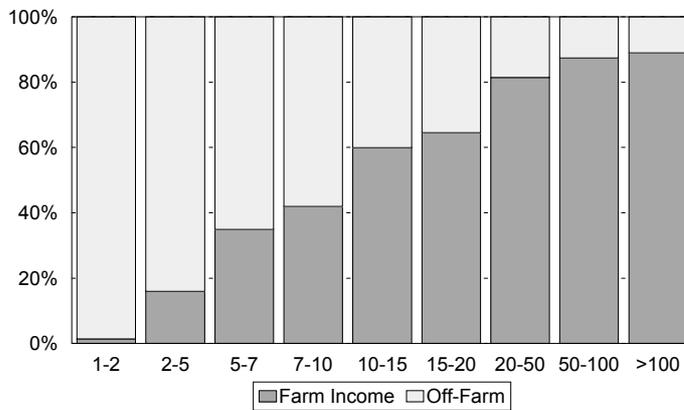
Moldova: Proportions Sold and Consumed by Farm Size



Moldova: Structure of Family Income by Farm Size



Poland: Structure of Family Income by Farm Size



The very fact that sellers engage in additional income-generating commercial activities leads to a striking difference in the level and the composition of family income. Sellers enjoy much higher total incomes, and the difference is basically attributable to cash earned from sales of farm products. In Moldova, net farm sales (revenues less costs) contribute \$290 to “seller” families, and their average income is \$1,240 per year, compared with \$980 for “non-seller” farms. In Poland, farms larger than 50 hectares selling a high proportion of their output generate family incomes of about 100,000 zloty per year, compared with 20,000 zloty for farms of up to 10 hectares that sell a much smaller proportion of their output. As a result, the importance of the farm for the family welfare increases markedly with the increase in the level of commercialization observed for larger farms. This effect is illustrated in Figure 4 (Moldova) and Figure 5 (Poland), which show how the share of the income from farm sales in total family income increases in larger farms, which are characterized by higher commercialization.

Individual farmers apparently recognize the advantages of operating a larger farm. World Bank surveys in transition countries reveal a clear pattern of willingness to increase the farm size. In Armenia, 20% of individual farmers expressed a desire to double their land holdings from 2 hectares to 4 hectares. In Moldova, 58% of rural households would similarly like to double their plots to somewhere between 1-6 hectares and another 13% would like to operate more than 6 hectares (an increase of 5 to 10 times the current size). In Poland, 11% of farms actually increased their holdings by nearly 40% on average between 1997 and 1999 (from 19 hectares to 27 hectares).

Land Market Institutions Needed for Farm Enlargement

We have shown that, among individual farmers, farm size has a strong positive impact on the degree of commercialization and on family incomes. Everywhere in the world, farms are increased through land market transactions, which include buying and selling and, no less importantly, leasing of land. It is land markets that enable land to flow from passive to active owners (e.g., from pensioners to farmers) or from less efficient to more efficient producers, thus increasing the overall productivity of this resource and improving farm efficiency.

Relatively little empirical information is available on the development of land markets in transition economies. The legal framework for land transactions is generally in place, but in many countries the buying and selling of land is restricted by various legal provisions, which are not conducive to the emergence of vigorous markets for land sales (Prosterman and Hanstad provide a detailed review of these restrictions in some transition countries). Although there is definite evidence of buying and selling of land in all transition countries, including the CIS, the overall impression is that agricultural land markets are very thin, with relatively small and infrequent transactions. According to very rough (and probably highly subjective) estimates prepared for the European Union (Baldwin), the frequency of land transactions is around 2.5% in Hungary and around 1% in the Czech and Slovak Republics, Latvia, Poland, and Slovenia (this percentage is the ratio of titles transferred to the total number of titles in cadastral registry). These estimates of transaction frequencies are substantially lower than the EU average transfer rate of 7%. A recent survey by Schulze and Tillack estimates that farmers’ buy-and-sell transactions in 1995-1996 entailed about 1.7% of farm land in Poland, 0.15% in the Czech republic, and 0.25% in Slovakia. Although Mathijs has found that in Hungary a substantial proportion of land in individual farms is actually bought, only 5% of Polish farmers in a 2000 World Bank survey report buying or selling land

in the last five years. CIS farmers interviewed in numerous World Bank surveys have so far failed to provide any positive indication of buy-and-sell transactions in land. Even in Armenia, where buying and selling of land has been completely legal since 1992, two large surveys covering 6,000 farms in 1996 and 1998 did not detect any significant transfers of land ownership through market mechanisms.

But land market transactions are not limited to buying and selling of land. Land leasing and other forms of transferable use rights are important components of land markets throughout the world, and they acquire particular prominence in transitional economies in view of administrative and political restrictions on buy-and-sell transactions. Thus, in Russia, land leasing appears to be much more common than buying and selling: according to Goskomstat national surveys, 33% of peasant farmers report the existence of land leasing transactions, while only 6% have knowledge of buy-and-sell transactions in land.

In the developed market economies, many farmers are “operators” and not “landowners”: they cultivate land that they do not own. Thus, farmers in Belgium, France, and Germany rent more than 60% of the land they cultivate, while the overall “tenancy rate” in the 15 countries of the European Union is 40%. In Canada, 30% of farmed land is not owned by the farmers, and in USA, only one-third of farmed land is fully owner operated: another 55% is a mixture of own land with land leased from others and 10% is cultivated by farmers who do not own any land. In both Europe and North America, land leasing is definitely conducive to larger farms. In Europe, the average farm size is almost 40 hectares in countries where farms operate with more than 30% of leased land, compared with 18 hectares in countries where farms have less than 30% of leased land; in Canada farms with leased land are 40% larger than farms operating with own land (224 ha and 164 ha, respectively); and in the USA farms operating with a mixture of own and leased land are more than three times as large as farms that use own land only (358 ha and 112 ha, respectively).

Leasing also emerges as a mechanism for augmentation of individual farms in transition countries (Table 3). Although the percentage of individual farms that lease in land is relatively small, farms reporting some leased land are significantly larger than farms that rely entirely on own land. This is entirely consistent with the experience of market economies described above.

Table 3. Leasing of Land by Individual Farmers in Transition Countries

	Percent of farms	Total size, ha	Leased land, ha	Farms without leased land, ha
Armenia	14	2.6	1.0	1.3
Georgia	2	8.7	7.8	0.7
Moldova 1996	6	16.9	13.5	2.8
2000	51	196	191	3.7
Romania	7	4.1	1.7	3.0
Bulgaria	9	4.8	3.3	1.1
Hungary	8	19.6	8.8	3.4
Poland	17	25.7	11.9	7.3

Source: World Bank surveys for Armenia, Georgia, Moldova, Romania, and Poland; Phare ACE surveys conducted by the Catholic University at Leuven for Bulgaria and Hungary.

The state should desist from restricting the development of land transactions, be it buying and selling or leasing. The role of the state is to create an institutional and technical framework that supports land markets. The impact of a conducive framework is clearly seen in the case of Moldova in Table 3: the changes in the legal and political environment between two World Bank surveys (1996 and 2000) increased the frequency of land leasing among individual farmers from 6% to 50%. The rule of law, or more specifically, availability of contract enforcement mechanisms is probably the most important component of the framework required for the development of land markets in general and land leasing in particular. Individuals will be understandably reluctant to lease out their land unless there are strong guarantees that they will retain their ownership rights even though they do not cultivate the land personally. Leaseholders, on the other hand, will not necessarily take the best care of the leased land if they may lose it any time through arbitrary administrative actions. In addition to contract enforcement, the state should provide adequate registration and titling arrangements to ensure the existence of proper ownership and transfer records, including records of lease agreements and mortgages, where necessary. These records are necessary to support any contract-enforcement mechanism. Last but not least, the state should ensure maximum simplicity and transparency of all procedures related to land transactions: excessive red tape and rigid bureaucratic attitudes, so deeply embedded in the socialist heritage, should be ruthlessly eliminated.

Market Services for Commercial Operation

However important, land is only one component of the operating environment that encourages commercialization. Given land, farmers should be able to produce, which requires channels for the delivery of knowledge, inputs, and machinery to the farms (see Figure 2). Once the harvest is in, farmers should be able to sell it, which requires access to marketing channels.

In the past, the traditional individual sector – the household plots – was generously supported by the local collective or cooperative enterprise, which actually provided all the upstream and downstream services. In this way, the large farm enterprise substituted for the missing market channels and enabled the “one-third” commercialization level of the household plots. The traditional role of the collective farm in relation to the household plots is illustrated in Table 4, which is based on the latest farm survey for Belarus. Belarus has remained frozen in time among the transition countries, and it still provides a faithful picture of the pre-1990 situation as it prevailed with regard to household plots in the socialist world.

Table 4. Traditional Role of Collective Farm vis-à-vis Household Plots

	percent of farm enterprises
Help with fieldwork on household plot	91
Plowing, tillage	67
Inputs	
Fertilizers, pesticides, herbicides	15-20
Seeds, feed, young animals, veterinary services	60-70
Marketing	56
Extension: access to specialists	?

Source: World Bank survey in Belarus (1999).

Although some of the deep symbiosis between the household plots and the local farm enterprise still persists (as we shall hear from Pepijn Schreinemachers in his paper on Russia), the individual sector today largely has to fend for itself in the new market environment, however imperfect. World Bank surveys in CIS provide consistent evidence that the individual sector – both household plots and peasant farms – is shifting its business from farm enterprises and state-affiliated channels to private traders, wholesalers, and retail markets. This observation is equally valid for both product sales and farm supply purchases.

The main difficulties that individual farmers experience in their attempts to sell farm products are documented in Table 5. Farmers universally complain of low prices received; they often complain that it is difficult to find a buyer for their products; they experience serious problems with transporting their products to the market (except in Poland); and, in the two countries where the relevant question was asked, individual farmers indicate that their output is too small to sell. With regard to farm inputs, the universal complaint is that the prices are too high, although physical availability as such (i.e., finding a supplier) is not a problem.

Table 5. Marketing Difficulties Reported by Individual Farmers (average scores over all commodities)

	Armenia	Georgia	Moldova	Poland
Low prices	42	36	75	51
No buyer	34	20	30	14
Transport	38	48	25	3
Untimely payments	15	8	17	15
Meeting quality standards	13	NA	12	8
Small volume	NA	NA	30	16

Source: World Bank surveys 1998-2000

All these are typical problems of smallness (Box 2). They are not unique to transition countries: family farmers all over the world experience similar problems, although admittedly they are less acute in a functioning market environment. In addition to difficulties with sales and inputs due to lack of bargaining power (prices) or restricted physical access to markets (finding a buyer, transport), the problems of smallness are also reflected in shortage of machinery (too expensive to buy for a small farmer) and restricted access to credit (lack of collateral, high transaction costs for small loans).

Box 2. Smallness is a universal problem, not only in transition

- Buying inputs – higher prices for small quantities; small quantities not always available at any price; shipping small quantities complicated; no bargaining power to negotiate better terms
- Selling to processors – hard to sell in small quantities; difficult to meet quality standards; no bargaining power to negotiate better terms
- Physical access to markets – transport to markets, meeting entry threshold (either formal or informal)
- Buying machinery – too expensive for a small producer; cost-ineffective for a small farm
- Negotiating credit – no collateral, high transaction costs on small loans, high interest rates

Service Cooperatives and Machinery Pools

The standard solution for the problems of smallness in market economies is to establish a farmers' service cooperative. Both theory and world experience suggest that service

cooperatives are established to correct for market failure, i.e., when private entrepreneurs are reluctant to enter into a particular area for various reasons (spatial dispersion, remoteness, narrow product requirements) and as a result farmers are faced with missing services. Service cooperatives cure the problems of smallness by endowing small individual farmers with the benefits of collective operational size; they assure access to supplies and markets for their members; and achieve market power through size. Cooperative machinery pools relieve the individual farmer from the pressure of purchasing own equipment. Service cooperatives also achieve overall risk reduction through portfolio diversification effects. This improves their credit standing vis-à-vis the banks, enabling them to negotiate access to loans and lower interest rates for their members.

These advantages of joint action through cooperation in services (as opposed to cooperation in production) are borne out by long-term experience all over the world. In market economies, cooperatives of course are not the only institutional tool that farmers use. Many functions and services are handled competitively by private entrepreneurs, obviating the need for service cooperatives. In transition economies, where the market environment is still underdeveloped and not fully functional, the benefits of cooperation appear to be self-evident. There is, however, a strong psychological resistance to cooperation bred from years of abuse of the whole concept by socialist regimes. Plunkett Foundation, the guru of worldwide cooperation from Oxford, aptly noted in its 1994 Review of Activities:

The use of the word “co-operative” in Central and Eastern Europe will not only create the wrong impression, it will also create barriers to progress. The old style of co-operative or collective has no relevance in the new free-market approach.

Despite this resistance, we are witnessing the emergence of new forms of cooperation among individual farmers in transition countries (Table 6). This is voluntary cooperation, often informal and sporadic, that stands in a stark contrast to the all-pervasive mandatory cooperation of the socialist era. Cooperation is quite strong in many areas, with the notable exception of processing and credit. Consistently with theoretical considerations, the level of cooperation is lower in Poland, where the market environment is substantially more developed than in the other countries (compare the difficulties with transport in Poland versus the other countries in Table 5).

Table 6. Cooperation Among Private Farmers

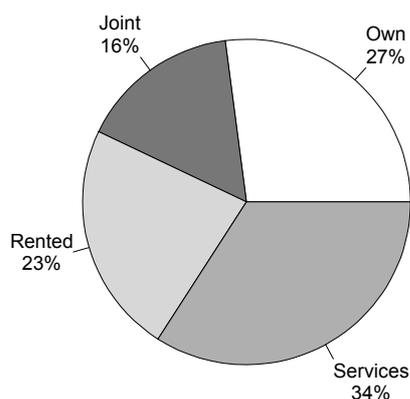
	Russia	Ukraine	Belarus	Armenia	Moldova	Poland
Some form of cooperation	74%	82%	60%	44%	30%	20%
Consulting	58	64	33	9	10	8
Marketing	33	24	13	10	11	8
Input supply	30	20	7	1	7	5
Machinery	43	45	37	19	19	7
Production services	27	34	17	10	11	6
Processing	8	6	0	1	7	2
Credit	37	16	10	0	2	2

Source: World Bank surveys 1994-2000.

Cooperation in machinery is understandably one of the major areas of cooperation among individual farmers in transition countries. Through cooperation, the actual access of

individual farmers to machinery and machinery services is much higher than that suggested by machinery ownership rates. Thus, in Armenia only 14% of farmers own farm machinery (either individually or jointly with their relatives and neighbors). Machinery pools and service cooperatives, however, ensure that fully 80% of individual farmers in this country have access to machinery or mechanical field services. In Moldova, less than 30% of peasant farmers participating in the 2000 World Bank survey have their own machinery; another 40% have access to machinery through joint ownership (a kind of low-level cooperation) or rental; finally over 30% buy mechanical field services (Figure 6). It is not clear how much of the machinery rentals and custom machinery services originate from cooperatives and how much from private rental companies (we have seen in Table 6 that about 20% of farmers have cooperation in machinery). Either channel provides an adequate solution to the problems of smallness and fixity, which prevent widespread ownership of farm machinery by individual farmers. If private entrepreneurs provide competitive machinery rentals and services, all the better. If no such services are available from private companies, cooperatives can be established to fill the gap.

Moldova: Sources of Machinery for Individual Farmers



Access to Credit

In principle, farms, like all business entities, need access to two types of credit: long-term credit to finance long- investments in fixed assets and short-term credit to finance working capital requirements (i.e., to bridge the temporary gap between production costs and sales receipts). I am not aware of systematic studies of the borrowing patterns and needs of individual farmers in transition in comparison with those of farmers in market economies. The conventional wisdom is that individual farmers in transition countries suffer from a severe shortage of credit, which is an obstacle to normal and efficient operation. We do not know to what extent this is empirically true and how the borrowing of farmers in transition countries is different from the borrowing of comparable farmers in market economies. To put the problem of credit in perspective, I can only cite one piece of evidence from personal experience. When a few years back I spoke to a commercial crop farmer in affluent Texas about his borrowing and his relations with the banks, the answer was, “I finance everything out of cash”. However anecdotal, I think this evidence is consistent with the worldwide view of small farmers as highly conservative and risk-averse individuals who do not wish to borrow. If this is the case in market economies, should we continue to emphasize the deficiencies of farm credit in transition countries?

In any event, the incidence of borrowing among individual farmers varies widely from country to country (Table 7). What is common to all countries is that borrowing is mainly short-term and predominantly informal (from friends and relatives). Naïve estimates of farmers' demand for credit based on simple survey questions about how much they would like to borrow reveal a very healthy appetite for future borrowing. The expressed demand for credit is four-five times the present level of borrowing and, most surprisingly, two-three times the present level of sales (Table 7). The latter ratio suggests that the credit demand estimates may be exaggerated. Another point to bear in mind is that farmers primarily signal a need for investment credit – there is no indication that they would like to borrow for current production expenses, i.e., for working capital.

Table 7. Do you need credit for next year?

	Moldova	Georgia	Armenia
Yes	60%	50%	53%
Amount	\$1300	\$3000	\$1000
Sales	\$450	\$1250	\$400
Desired term	1-5 yrs	1-2 yrs	1-2 yrs
Desired rate	8%	12-24%	1-6%
Today's borrowing			
Frequency	20%	1%	50%
Amount	\$250	\$800	\$200
Term	short	3 mo	6-24 mo
Annual rate	30%	NA	2-10%
Source: from relatives, friends	96%	100%	94%

Source: World Bank surveys, 1996-1998

Investment financing is always a problem for farmers all over the world. But experience in market economies shows that farmers do not rush to the banks to finance every investment instantly with debt. Farmers wait until they have accumulated enough savings to buy or build, as needed. When credit is easily available through (generally subsidized) government sources, farmers, like everybody else, fall into the moral hazard trap of soft-budget constraints: they over-borrow, over-invest, and end up in serious trouble. There are plenty of examples for this all over the world, and the 1986 farm debt crisis in Israel is just one of them. To facilitate investment, we need to encourage farmers to be profitable and save “out of cash”. In my mind, sophisticated rural credit facilities for investment are less relevant.

If farmers are profitable and are willing to save, working capital financing should not be a serious problem either. In any event, the maximum that is needed is a short-term loan to cover one year's production costs, repayable in full from the next season's sales receipts. In market economies, such loans are very often handled through channels that do not involve bank borrowing. First, there is natural supplier credit that all farms use. Second, short-term financing can be raised through a variety of product–credit interlinkage arrangements: the farm pledges its future harvest against a bridging loan for working capital. Interlinkage arrangements are universally practiced by service cooperatives, which supply inputs and extend credit to their members in return for the promise of future delivery of members' harvest.

A more sophisticated non-cooperative interlinkage scheme involves contract production, whereby a farmer undertakes to produce and deliver a certain crop to a marketer or a processor in return for a working-capital loan or inputs supplied in kind. There is evidence of such contract arrangements in Romania, Poland, Moldova, Ukraine, and Russia, where the buyer–financier is usually a large foreign corporation with a special interest in gaining a market share for its products (farm inputs) or securing a source of farm commodities for its marketing or processing operations (grain, grapes, vegetables).

A very popular solution for rural credit problems advocated by international donors involves the establishment of credit unions. These are small specialized credit cooperatives that rely on mutual guarantee and strong peer pressure for successful operation. Their operation is not interlinked with input supply or product marketing: their charter is to lend money to their members for business needs (including farming). There are large numbers of such credit unions in Armenia, Georgia, Moldova, and the Baltics. Efforts are underway to extend the network to Ukraine and Russia. The problem is that, by their very nature, they are designed to make very small loans: somewhere between \$50 and \$100. This is nowhere near what farmers perceive as their credit needs in Table 7, even if we discount their wishes by half. Credit unions may be an excellent solution for the development of small cottage industries or, indeed, for the support of subsistence farming. They are too small for our purpose of moving from subsistence to commercialization.

Extension and Education

In our discussion of the profile of “commercial” farmers in Armenia (Table 2) we have noted that the farmer’s formal education does not have a significant effect on the decision to sell. A similar result is observed in other countries (Moldova, Ukraine). This curious result is probably attributable to the generally low variability in the educational attainment of farmers who grew up during the Soviet period, with its universal and free access to schooling. We intuitively feel that education and human capital in general are extremely important for successful operation of the farm, especially when our thesis is that individual farms should be encouraged to grow in the interest of commercialization. After all, farms in market economies grow until the owner reaches the limit of his or her managerial capacity, which is clearly determined by a combination of personal intelligence, experience, and education.

Table 8. Areas Where Small Farmers Need Technical Advice

	Get today	Want more
Business planning, farm management	48%	31%
Agronomy and livestock	49%	62%
Processing technologies	13%	7%

Source: World Bank survey in Moldova, 2000

Farmers express a clear need for instruction and advice related to preparation of business plans and farm management practices (Table 8). There is clearly nothing in their background that prepares them for these specific tasks that are essential in a market-oriented environment. Yet somewhat surprisingly (to the present author, at least) farmers also express a very strong need for technical extension services related to straightforward crop and livestock production. They seek advice concerning seed selection, fertilizer and pesticide application, crop rotation, and animal health. This clearly emerges from Table 8, which although based on a farm

survey in Moldova is indicative of the needs of farmers in CIS and probably in other transition countries as well.

In the past, household plots received all their technical advice and extension services from the large team of agro-specialists in the local farm enterprise. This mechanism does not function any more, and field visits in transition countries indicate that the delivery of extension to the farm level has indeed suffered considerably. Partial solutions include establishment of private advisory services by former collective-farm specialists. A more comprehensive solution to instruction, technical advice, and extension services could be found in local cooperative frameworks. After all, member education is one of the traditional subsidiary tasks of farmer cooperatives in all market economies. Yet we cannot ignore the fact that education and information are public goods, and governments certainly should play an active role in rehabilitation and reanimation of the agricultural extension systems in transition countries.

As with credit, however, the need for extension and education has to be put in a proper perspective. The small farmers in transition countries are not illiterate peasants. These are educated people who spent all their lives working on a large farm. Even if their formal job was a tractor driver or a milking-machine operator, they gained valuable all-sided experience from many years of work on the household plot. They essentially know how to farm even under the new conditions, without the strong traditional backing of the old farm enterprise. Extension can help to improve their performance and raise their profitability. In this way, extension should be conducive to greater commercialization. Yet the small farmers in transition countries will continue to operate and develop even if extension systems are not fully in place for some time to come.

Conclusion

Let us conclude by prioritizing the various tasks that we have discussed in this paper. In our subjective view, the absolute top priority is allowing farms to increase their size. Larger farms will produce more surplus, and this surplus will find its way to the markets. Farm enlargement requires an environment conducive to land markets and land transactions. This means elimination of all restrictions on transferability of land, moral and legal support for contract enforcement, and finally land registration and titling systems.

As a second priority, it is necessary to pay attention to the development of functioning market services, including input supply channels, product marketing, and processing. These tasks can be effectively handled through the establishment of service cooperatives until private entrepreneurs dare to step into the breach.

As a third priority, we need to look at the question of farm finances in general and rural credit in particular. Emphasis on profitability and savings provides a natural solution to financing needs of small farms. Various interlinkage arrangements and contract production can provide an additional source of working capital for farms. The natural role of service cooperatives as interlinkage agents should not be forgotten. Programs for full-scale revamping and development of functioning rural credit systems take a very long time and should be allowed to proceed in the background, while other less comprehensive but more pragmatic solutions are being implemented.

Finally, governments should start playing an active role in provision of extension services. Cooperatives can provide a supportive shell for the delivery of these services with assistance and partial funding from the government. Modern agriculture cannot develop efficiently without science and research. Farmers cannot optimize their operations without information and professional education. While less urgent than the other tasks enumerated above, extension and education are essential ingredients in the future success of commercial agriculture in transition countries.