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EASTERN EUROPE'S LIVESTOCK ECONOMIES
PART II: THE CASE OF HUNGARY

by
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Hungary's livestock sector illustrates well many of the problems with livestock production in eastern Europe. Hungary's per capita meat consumption is about average for eastern Europe but its per capita production of meat is very high--157 kilos in 1983¹, which is among the highest in Europe. Despite high production levels and substantial exports of meat, Hungarian economists acknowledge that the livestock sector suffers from low profitability and economic inefficiency. Those problems are particularly severe in the large-scale farms. Since Hungary's agriculture is modelled along the same lines as in the Soviet Union and in most of the other East European countries, analyzing Hungary's problems of large-scale production provides insight into the livestock economies of the entire region.

Hungary has gone further than have most of the other East European countries in calculating profits in agriculture and in using profits to evaluate economic performance.

Another advantage of analyzing Hungary then is that it's possible, by looking at profits, to see which sectors of agricultural production are weakest and why. Hungarian agricultural cooperatives and state farms use profit calculations for several purposes. Yearly managerial and worker bonuses are based on the level of profits achieved. Most cooperatives and state farms also belong to technical production systems that provide them with agricultural inputs and technical advice, for particular crops or types of livestock. Payment for membership in these systems is usually based on increases in yields or profits as a result of using the production system. So the cooperatives and state farms have incentives to calculate costs and returns for individual branches of production within the farm, to determine whether the profit from belonging to the system justifies the cost. Managers of large-scale farms also find that calculating profits by branch of production helps them plan production and investment strategies. When they talk about these strategies, a clear consensus emerges that animal production is much less profitable for them than crop production.

The average profit data for large-scale farms, in Table I, bear this out. Profits for the six most important field crops averaged 37,48 forints per 100

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Table I
 Net Revenues¹ per 100 Forint Production Cost
 (Percent Profitability , 1982)

	<u>% Profitability</u>
<u>Crop Production</u>	
Wheat	32.30 %
Barley /Spring/	47.81 %
Corn	34.59 %
Sunflower	47.11 %
Sugar Beet	45.23 %
Lucerne	17.85 %
<u>Animal Production</u>	
Cattle Fattening /of single purpose beef breed/	12.48
Cattle Fattening /of double purpose beef/milk breed/	17.15
Milk	8.85
Pig Fattening	18.81
Chicken Production	11.32
Egg Production	21.05

Source: "A Termelési Rendszerek Főbb Ágazatainak Költség-
 és Jövedelemviszonyai 1982-ben", Mezőgazdasági
 és Élelmezésügyi Minisztérium, Statisztikai és
 Gazdaságelemző Központ, Budapest, 1983.

¹Net of taxes, inclusive of subsidies

forints production cost in 1982. This compares to average profits in beef and pork fattening and chicken, egg and milk production of only 14,94³ forints. Thus crop production is more than twice as profitable as livestock.

Why is animal production a relatively low profit activity for Hungarian farms? The answers are related to the organization of animal production, to the differences between beef and dairy production and pig production and to differences in the distribution of production between large- and small-scale farms.

Pig Production

Pork is the most important meat in Hungary, making up 57 percent of the meat Hungarians consume and 58 percent of the meat they produce.⁴ The structure of pork production is also interesting because small-scale farms produce a relatively large proportion of it on household plots and on auxiliary and private farms.

These household plots and private farms, almost all of them part-time, produce a large proportion of many types of agricultural goods in Hungary, but they are crucial in pig production. Household plots are plots that are allocated annually by state farms and cooperatives to their members and employees. The member does not own the plot, but every cooperative has an obligation to provide its members either with a household plot or some other form of income in kind. In addition to a household plot provided by the cooperative, individuals can also own a small auxiliary farm. Most members of agricultural cooperatives have both a household plot and an auxiliary farm, though the auxiliary farm may only consist of a kitchen garden and a couple of sheds for animals. The average land area farmed by these small producers including both the household plot and the auxiliary farm is only 7,600 square meters.⁵ In 1983 there were 790,000 auxiliary farms, including a very small number of full-time private farms, and 660,000 household plots.⁶ Because these auxiliary farms are mostly too small for cultivating crops, animal husbandry is the preferred activity. Raising pigs is especially popular. Small farms often raise 50-100 pigs at a time and in some cases keep as many as 300 pigs in an area no larger than 1,000 square meters. For example, one of these intensive mini-farms, a private backyard operation in the town of Hajduböszörmény in eastern Hungary, produces 600 pigs per year in an area no larger than 500 square meters.⁷ Together they raise some 52 percent of the pigs in Hungary, and have been doing so since 1975.⁸

Small-scale livestock production on household and auxiliary farms is actually closely integrated with the large-scale socialist farms. The large-scale farms, especially the cooperatives, are involved in every aspect of small-scale pig-production, from breeding to marketing. The most common system is for cooperatives to contract with individual small-scale producers, selling them feeder pigs and fodder. The small-scale producers fatten the pigs to market weight. The contract between the cooperative and the individual usually also specifies the purchase price at which the cooperative will buy back the fattened pig. Frequently, the cooperative also provides technical and veterinary services needed on the small farms. Almost all of the cooperatives in Hungary, about 90 percent, farm out pigs to individual producers in this way.¹⁰

The cooperatives and state farms in the socialist sector, which raise the remaining 48 percent of the pigs, produce on a much larger scale than the household and auxiliary farms. The size of pig production units in the socialist sector ranges from 800 pigs in traditional-type farms to over 4,000 in the more modern, industrialized farms.¹¹ These units are not exceptionally large by East European standards, but only 280 of these large-scale pig farms produce 20 percent of Hungary's pork.¹² Encouraged by state subsidies offered for the construction of large animal-fattening units, cooperatives and state farms have moved towards larger and larger pig farms. But large-scale production has not necessarily resulted in more efficient and more profitable pork production, especially in comparison to small-scale farms. Thus household and auxiliary farms continue to play a major role in pig production.

Beef and Dairy Production

In contrast to pigs, cattle are concentrated on the cooperatives and state farms, rather than on the small-scale units.

It wasn't always so concentrated. In 1970, small-scale farms had 38 percent of all cattle, but by 1983, they had fewer than 20 percent.¹³ Cattle numbers declined on small farms partly just because individuals have chosen to shift away from cattle, since they are difficult to raise successfully in the limited space available on household farms. But certain government policies have also had a major impact.

In the early 1970's the Hungarian government began making a concerted effort to improve milk yields. The major components of this effort were a massive breed improvement program and investment subsidies for large-scale farms to update their cattle breeding and milk production facilities. They imported high-producing Holstein-Friesian dairy stock from the United States, and improved average milk yields from 2,237 liters per cow in 1971-75 to 4,184 liters in 1983.¹⁴

This program however caused a decline in the quality of beef produced. The traditional Hungarian cattle breeds, although they had relatively low milk yields, produced good quality beef. These breeds have been largely replaced by the Holstein-Friesian, which is good for milk but not good for beef production. Consequently both the quality and quantity of beef production has declined--more cattle are being slaughtered, but average slaughter weight has decreased. For these reasons Hungary's Holstein-Friesian program has generated some controversy. Some observers feel that Hungary's meat export potential could have been better exploited by keeping the traditional breed for high-quality beef exports and working to improve its milk yields.

Hungary's breed improvement program has also had a negative impact on beef production on small-scale farms. Holstein-Friesians, which now make up a large proportion of Hungary's cattle herd, are not profitable to fatten because of the relatively lower value of their meat. Fattening cattle of the traditional breeds can still be profitable for small-scale farmers but those we interviewed

said that in order to contract with the cooperatives to fatten cattle, they had to accept a certain number of Holstein calves. Thus the fattening activity was, for them, only marginally profitable.

Milk production has also declined on the small-scale farms, from 42 percent of total milk produced in 1971-75 to only 28 percent in 1981.¹⁵ Large-scale farms are happy to contract out young Holstein fattening calves, but they often don't want to divert the Holstein cows for milking to the small farms.

Government subsidies too have played a role in changing the structure of beef and dairy production, because most of the subsidies for new dairy barns, milking equipment and other physical plant have gone to the large-scale farms.

Despite investment subsidies and dramatic increases in milk yields, the profitability of cattle and milk production is still low. The reason for this may be due to the nature of large-scale production in Hungary. Large-scale socialist systems of production may create certain inefficiencies that increase costs of production and consequently reduce profitability. The next section explores this proposition for pig and cattle production.

The Relation between Large Scale and Low Profits

There are many micro-economic, i.e., farm-level, factors that can lead to low profitability in agriculture. Three of the most important farm-level characteristics of large-scale animal production in Hungary that raise costs and lower profits are excessive use of labor, low capital productivity and poor efficiency in feeding.

Labor Use

Hungary's large-scale livestock farms seem to use excessive amounts of labor. Livestock production is a relatively labor-intensive activity, especially in comparison to crops, so excess labor usage in livestock has a proportionately larger impact on profits. Labor use on large-scale farms, contrasted with small-scale farms, shows that in pig production, the larger farms are relatively inefficient. Observations on large agricultural cooperatives in Hungary indicate that typically one full-time worker handles 250-300 pigs annually. Small farmers can usually do considerably better than this--the equivalent of one full-time person can raise as many as 500 pigs per year in small-scale production, although 400 is probably closer to the average.¹⁶ It is difficult to extrapolate the time spent on pig production on small-scale farms to full-time equivalents because in only a few cases are small farms full-time. Usually pig production is a part-time activity for the employees of cooperatives and state farms and their families. In general, about half as much time is spent on household farm activities as on full-time jobs.¹⁷ This in fact may be a reason for efficient labor use on small farms because caring for livestock can be effectively interspersed with other household activities.

This comparison shows that relative to small farms, large-scale units are using too much labor in producing pigs. Part of the problem is that their barns and feeding and waste removal systems are outmoded. By looking at labor usage

in pig farms designed to be competitive with the world's most modern technologies, one can see just how far behind many Hungarian farms are lagging. For example, in the system designed by EMONA, a large agricultural complex in Yugoslavia, one worker can produce more than 1,000 pigs per year.¹⁸

Comparing labor use on large-scale dairy farms with that on household farms is difficult because there is almost no data on how much households use to produce milk. But it is possible to compare Hungary's large farms with a typical U.S. dairy farm, where two full-time workers are milking 90-100 cows as well as raising field crops. Hungarian animal scientists agree that large dairy farms in Hungary do use excessive amounts of labor. Even in the dairy farms built during the 1970's with modern, labor-saving technologies, it takes 7,5 workers to handle 100 cows. This ratio doesn't represent an improvement over labor use in dairy farms built in the 1960's using the traditional confinement-stall system. Although the number of workers who actually handle the animals has declined in the new system, the number of maintenance and administrative workers has increased.¹⁹ Our own observations in several large cooperatives suggest even less favorable ratios are common, ranging from 8 to 13 workers per 100 cows.

Part of the reason that there is still too much labor being used in dairy is that cooperative managers don't really want to cut back on labor use. Cooperatives have to provide employment for their members, many of whom gave up their land and animals to the cooperative during collectivization. The cooperative is frequently the only employer in the village, so it also has an obligation to provide jobs in the community. Providing jobs continues to be a burden because people in Hungary are reluctant to migrate to urban areas. Urban housing shortages are severe and rural/urban income differentials are small.

Thus, precisely because dairy farms can absorb so much labor, cooperative managers stick with dairy production despite its low profitability. This conflicts with the objectives of planners and policy-makers, who are trying to increase productivity by introducing modern labor-saving technologies in agriculture. Cooperative managers would like to modernize too, but they can't afford to lay off their workers and they know that livestock production is the key to maintaining employment. One cooperative president observed that purely in terms of profit considerations, he would like to eliminate animal production in his cooperative altogether, and concentrate just on crops. But this would eliminate some 200 jobs, completely impossible for him politically. Even shifting from a mix of cattle and pigs to only pigs was forcing a reduction in workforce of four or five workers.²⁰

Cooperatives and state farms can rarely discharge employees, so they must find a place for less productive, and often older, workers. Since that place is usually in the animal barns, the quality of the labor force in livestock production is also a problem. Animal work does not attract the most talented and technically-skilled workers, because the work is hard, the hours are long, and the wages are low, especially in comparison to crops. One farm reported to us that some workers in the livestock branches received the same annual wage, 65,000 Forints, as workers in crop production, despite working five times as

many days per year. Thus the poorer quality of the labor force in animal production contributes to the excessive quantity of labor used in that more workers have to be used to achieve the same results.

Capital Productivity

Capital productivity is also a problem in large-scale farms. Ever since collectivization created the large-scale farms, capital productivity in livestock has been unsatisfactory. Primarily because central planners have tried to impose technical solutions on the farms that weren't really appropriate given existing conditions, increased investment in animal production facilities has not produced a corresponding increase in output.²² But the nature of capital productivity problems has changed over the years.

Before 1965 the large-scale farms invested heavily in livestock barns, but the massive clay-brick buildings that they built were not well-suited to large-scale production. Often they were simply larger versions of barns on peasant farms, and were almost impossible to mechanize; since cleaning and feeding must be done by hand, productivity remains low. Currently 60 percent of Hungary's cattle on large-scale farms is housed in these traditional-style buildings, and 55-60 percent of pig barns are traditional structures.

In the early 1970's, in an effort to modernize animal production, the state offered to pay large-scale farms 70 percent of the costs of constructing new livestock barns. This subsidy was so attractive that too many farms launched ambitious programs to build livestock housing. Even though these structures were more modern, the investments were often poorly chosen, because the farms built to capture the subsidies rather than because they had good potential as efficient livestock producers. Where they lacked the technical expertise, breeding stock and labor force to make livestock a paying proposition, the productivity of this newly built capital stock was low.

In recent years, the state has reduced its investment subsidies for livestock. But because so many cooperatives and state farms have built new animal production facilities with the state's assistance, they can't cut back on livestock even though it's not very profitable. The state continues to support these farms financially, mostly through direct production subsidies rather than investment subsidies. These direct production subsidies constituted 54 percent of the profit per kilo of beef and 45 percent of the profit per kilo of pork produced by large-scale farms in 1982.²³

Even though the total value of investment subsidies has been declining, our observations indicate that most of the new livestock facilities on large-scale farms are still being built with, and sometimes because of, state subsidies. It was possible last year, for example, for a cooperative to obtain a subsidy of 7,000 forints per stall to build pig housing and some cooperatives are continuing to build on this basis. The investment subsidies for dairy farms have been reduced, but nevertheless some cooperatives are building new facilities and capturing a 40 percent subsidy from the state.

With these investment subsidies the state has effectively intervened in the design of new livestock facilities, and farms haven't been able to choose

appropriate technical solutions to their own problems. Because of this they haven't always been able to realize the productivity increases they expected from their capital investments. This has been especially true on large-scale farms, where the state has subsidized construction of modern and highly mechanized facilities that have had only marginal impacts on productivity.²⁴ Investments in modern pig facilities have not always paid off either, as was the case in one cooperative in northwestern Hungary. The workers lacked the technical expertise to use effectively a modern system with automatic feeding, watering and ventilation. Because they continued to feed and water by hand, there was no increase in output to justify the cost of the investment.

Feeding Efficiency

Inefficient feeding is another factor that reduces the profitability of livestock production; Hungary's farms are using too much feed, as well as too much capital and labor, to produce meat and milk. This is shown by feed conversion ratios that are generally higher in Hungary than in West European countries. For example in pig fattening, Hungary's large-scale farm use about 4.2 kilos of feed for each kilo of meat produced,²⁵ as compared to 3.65 kilos and 3.27 kilos in West Germany and Denmark.²⁶

For all types of animals on large-scale farms in Hungary, in 1979, it took an average of 5.51 kilos of total feed protein to produce one kilo of animal protein. By contrast in West Germany in 1975 only 4.5 kilos of feed protein were needed to produce one kilo of animal protein.²⁷ Thus Hungarian farms lag well behind western Europe in feeding efficiency.

The major reason that feed conversion ratios are high is that there is a shortage of digestible protein in animal feeds. Domestic sources of high-protein feed concentrates, primarily peas, sunflower, and bone meal, are not sufficient to provide optimally balanced feed ratios. Hungary therefore imports high-protein concentrates, primarily soybean meal and fish flour totaling as much as 200-220 million dollars per year. These imports would be even higher if the Hungarian government did not restrict them to conserve foreign exchange, because much more feed protein is needed to achieve maximum feeding efficiency. According to Csanky and László, if Hungary imported the correct amount of protein, it could reduce the amount of feed protein, corn, wheat, etc., needed to produce one kilo of animal protein by about 10 percent, from 5.51 to below 5.0. This would bring Hungary's feeding efficiency more in line with West Germany's. They further estimate that if Hungary imported 300 million dollars worth of high-protein concentrates rather than 200-220 million dollars worth per year, Hungarian farms, by feeding more protein and less grain, could reduce the amount of wheat and corn fed to animals by 15-20 percent.²⁸

Feeding efficiency is not particularly good on the large-scale farms, but it is better than on the small-scale farms. As Table II shows, small-scale farms use more feed per kilo of meat produced than do large-scale farms, for all types of poultry and pork. Comparable figures are not available for beef and milk production on small-scale farms.

The principal reason that small-scale farms have poorer feed conversion ratios is because the small farms have much more limited access to high-protein

Table II
 Feed Conversion Ratios on Small- and Large-Scale Farms
 /Kilos of Feed¹ per Kilo of Meat Produced/

	<u>Small-Scale Farms</u>	<u>Large-Scale Farms</u>
Geese	4.0-7.0 kg/kg ²	2.8-3.0 kg/kg
Ducks	4.0-6.0 kg/kg	3.0-3.5 kg/kg
Turkeys	5.0-6.0 kg/kg	2.8-2.9 kg/kg
Chickens	3.0-4.0 kg/kg	2.3-2.4 kg/kg
Pigs	5.0-5.5 kg/kg	4.2-4.5 kg/kg
Beef	-	4.0-5.0 kg/kg
Milk	-	04-0.5 kg/kg

¹Includes only concentrates, not roughage

²These figures are biased upwards by the inclusion of goose-liver production

Source: Personal Communication from Agrárgazdasági Kutató Intézet

concentrates than do the large-scale farms. Cooperatives and state farms buy high-protein concentrates from a few firms that have foreign trading rights and small-scale producers in turn must rely on the state farms and cooperatives for supplies of these concentrates. Since these supplies are limited by the state's import restrictions, small-scale farms get even less high-protein feed than do the large-scale farms: they are the last ones in the distribution chain. Without adequate high-protein concentrates, they can't achieve feed conversion ratios that are as good as those on large-scale farms.

Comparing Profits of Large-Scale and Small-Scale Farms

Even though small-scale farms can't provide optimal feed rations, they are often better at maximizing net revenues. Table III shows that in animal husbandry household plots and auxiliary and private farms realized net revenues totaling 34 percent of gross production value in 1981, while state farms and cooperatives realized only 22 and 18 percent. The small-scale farms did better because they held down both their current costs of production and their depreciation costs. Depreciation costs in particular, as a percent of gross production value, were very low compared to the state farms and cooperatives. This again reflects the over-capitalization of large-scale farms.

Our own observations also show that small-scale pig production can be just as profitable as large-scale. In Hajdu-Bihar county, the third largest county for pork production, in 1983, small-scale farmers said they could earn a net profit of 700-800 Forints per pig, which is about 20 percent of its marketed value. This compares to a 1982 profit of 15.8 percent of the value of marketed product in pig fattening on large-scale farms.²⁹

Small-scale farms appear to be more profitable partly because small farmers, in calculating their current production costs, don't include household labor costs. That is, they don't calculate an explicit wage for the labor put in by the household members. However, even if their actual labor costs amounted to as much as 5 percent of the value of the marketed product, animal husbandry on small-scale farms would still be at least as profitable as on large-scale farms. The real source of the success of small farms in animal production seems to be that they are able to use their capital and labor more efficiently than large farms.

This greater relative efficiency of small farms was observed in Hungary even twenty years ago,³⁰ and was one of the reasons that the state changed its policy towards small farms, allowing them to play a greater role in animal production. While efficiency was declining on the large-scale farms, substantial amounts of labor and capital remain unused on the small farms. In view of this, official policy towards small farms changed during the period 1968-1972, permitting them to purchase fodder and sell animals on contract to cooperatives and state farms. This allowed greater exploitation of these unused sources. Small-scale pig production, in particular, expanded rapidly as a result of this policy change.

Finally, the continuing importance of small-scale animal production in itself indicates that livestock production on large-scale is not as efficient

Table III
Gross and Net Production Values¹ in Animal Husbandry, by Type of Farm, 1981

	State Farms	Cooperatives	Household Plots of Cooperative Members	Auxiliary and Private Farms
Gross Production Value, million Forints	19,597	46,788	26,992	20,844
Current Production Expenses, million Forints	14,295	35,026	17,167	13,246
Depreciation, million Forints	988	3,320	491	477
Net Production Value, million Forints	4,314	8,442	9,334	7,121
Net Production Value, As Percentage of Gross Production Value	22.0 %	18.0 %	34.6 %	34.5 %
Current Costs, As Percentage of Gross Production Value	72.9 %	74.9 %	63.6 %	63.5 %
Depreciation, As Percentage of Gross Production Value	5.0 %	8.0 %	1.8 %	2.3 %

¹In current prices

Source : Mezőgazdasági Statisztikai Évkönyv, 1981, Központi Statisztikai Hivatal, 1982, pp. 73-76

as it could be. The situation in Hungary contrasts sharply with that in western countries, where the overwhelming efficiency of large-scale animal production continually threatens to eclipse small producers. It's true, of course, that the degree of integration of small- and large-scale production in Hungary means that small farms could not exist without the large farms. But since the large-scale animal production uses too much labor, too much capital and is inefficient in feeding, it's clear that small farms remain the key to the long-term viability of animal production. They are essential if Hungary is to continue to produce an exportable surplus of animal products.

Notes to Part II

1. Központi Statisztikai Hivatal, Statisztikai Évkönyv, 1983, Budapest, 1984, p. 388.
2. There are approximately 1,400 large-scale farms in Hungary, including both cooperatives and state farms. In 1981 cooperatives averaged 4,023 hectares in area, and state farms averaged 7,644 hectares. Ibid., p. 155
3. Livestock may have become even less profitable since 1982 because chicken exports declined dramatically last year. The Middle East, Hungary's primary market, bought chicken from Brazil instead of Hungary. Despite falling profits, farms are continuing to produce chicken, hoping that the market will turn up again before they have to liquidate their investment in large chicken farms. While acknowledging the importance of chicken as an export product, this report focuses on cattle and pig production because of the paucity of comparative data on large- and small-scale poultry production.
4. From Hungarian Central Statistical Office, Statistical Pocket Book of Hungary, 1983, Budapest, 1984, p. 154 and Központi Statisztikai Hivatal, Statisztikai Évkönyv, 1983, Budapest, 1984, p. 252.
5. Varga, G., et.al., "A Mezőgazdasági Kistermelés Szerepe a Termelés, Foglalkoztatás, az Életszinval és az Életmód Alakulásában," Agrárgazdasági Kutató Intézet, Budapest, 1982, p. 48.
6. Hungarian Central Statistical Office, op. cit., p. 145.
7. Personal observation, May 1984. From March through June, 1984 we interviewed managers and operators of twenty large- and small-scale farms, including cooperatives, state farms and private and auxiliary farms in Hungary. Much of the information presented in this report is from these interviews as well as from interviews with officials in the Ministry of Agriculture, the Research Institute for Cooperatives and researchers at the Agricultural University of Debrecen.
8. Központi Statisztikai Hivatal, op. cit., p. 388.
10. Misi, S., Household and Subsidiary Farming in Hungarian Agriculture, Agroinform, Budapest, 1981, p. 49.
11. Agrárgazdasági Kutató Intézet, Bulletin No. 50, Budapest 1982, p. 90.
12. OECD, Organization for Economic Cooperation and Development, Prospects for Agricultural Production and Trade in Eastern Europe, Paris, 1981, Vol. I., p. 207.
13. Központi Statisztikai Hivatal, op. cit., p. 163.
14. Központi Statisztikai Hivatal, Mezőgazdasági Statisztikai Zsebkönyv, Budapest, 1984, p. 147.

15. Ministry of Agriculture and Food Industry, Centre of Statistics and Economic Analysis, Agriculture and Food Industry, 1982, Budapest, 1983.
16. Personal observation, see Note 7.
17. Personal communication from M. Némethi, March 28, 1984.
18. Figures provided by EMONA, Feb. 1984.
19. Agrárgazdasági Kutató Intézet, op. cit., p. 139.
20. Personal communication, March 19, 1984.
21. As one cooperative manager succinctly put it, "Our animal barns serve as rest homes for our older workers."
22. Agrárgazdasági Kutató Intézet, op. cit., p. 139.
23. Mezőgazdasági és Élelmezésügyi Minisztérium Statisztikai és Gazdaságelemző Központ, A Termelési Rendszerek Főbb Ágazatainak Költség és Jövedelemviszonyai 1982-ben, Budapest, 1983.
24. Agrárgazdasági Kutató Intézet, op. cit., p. 138.
25. OECD, op. cit., p. 210.
26. OECD, Animal Feeding and Production: New Technical and Economic Developments, Paris, 1981, p. 211.
27. From Csanky Z. and László L., "A Takarmányfehérjetermelés és a Takarmányhasznosulás Néhány Gazdasági Kérdése, Agrárgazdasági Kutató Intézet, Budapest, 1980, and personal communication from the authors.
28. Figures provided by Z. Csanky and L. Laszló.
29. Mezőgazdasági és Élelmezésügyi Minisztérium Statisztikai és Gazdaságelemző Központ, op. cit. Figure calculated from Table 16 by dividing profit for the marketed product by the average price of the marketed product. Those profit figures include state subsidies but exclude taxes.
30. Csizmadia, M., "Cooperation in the Hungarian Food Economy," in Economic Studies on Hungarian Agriculture, I. Benet and J. Gyenis, Akadémia Kiadó, Budapest 1977, p. 152.