Causes of farm diversification over time: an Australian perspective on an Eastern Norway model

Richard J. Culas
School of Agricultural and Veterinary Sciences, Charles Sturt University
Locked Bag 588, Wagga Wagga NSW 2678 Australia
rculas@csu.edu.au

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Abstract. Farm planning often focuses on optimal diversification with respect to risk, where the risk-management strategies combine production, marketing, financial and environmental aspects of the farm-firm. In this study an empirical examination of diversification has been carried out using a sample of farms in Eastern Norway. Four measures of diversification (indices) were defined to record the risks in relation to income from farm production. Using these alternative measures of diversification and panel-data, the results show that larger farms are more diversified, and for farms in more favourable locations and access to labour, the farmers have a greater incentive to spread risk. These results suggest that diversification and farm size are positively linked and that there may not be sufficient economies of scale to warrant specialisation and/or farm specialisation may not be environmentally desirable because of the pollution that would result. The Norwegian model offers good prospects for analysing similar issues of diversification in the Australian farming sector.

Keywords: farm diversification, causes of farm diversification, panel data

Introduction

While risk to varying degrees surrounds all forms of activity, it is considered more of a problem for agricultural production than for industrial production due to the influence of climate and other natural factors, and because of the length of agricultural production cycle. Typically, the different types of risk that most farmers face are climatic factors, pests and diseases, price uncertainties and polices related to agricultural production, marketing and trade. Farm diversification may be considered as a rational response to avoid many of these uncertainties.

There are several important considerations related to diversification in the management of risk. First, a farmer can give up a large expected return from specialisation in order to insure against risk through diversification. Second, aside from farm size, there is a number of potentially interesting micro-level variables, which may affect diversification choices. These variables may include form of farm ownership and organisational structure, technological and policy changes, geographical location, labour, experience of the farmer, wealth of the farmer, agricultural insurance, etc. Third, there are policy instruments designed to increase food security and to manage the environment and other resources in a sustainable manner rather than to maximise short-term farm profit. They may affect diversification choices.

There is a rich literature on farm diversification which has developed since the early 1950s. Following the work of Heady (1952) and Markowitz (1959), attention focused mainly on mean-variance portfolio approaches (Stovall 1966; Johnson 1967). Indeed, the main purpose of diversification in agriculture is to reduce the risk of the overall return by selecting a mixture of activities that have net returns with low or negative correlation. The aim is to find the risk-efficient combination of farming activities, not the one that merely minimises variance. Farm planning models solved by quadratic risk programming, using, the portfolio selection framework, have been employed to find such combination of farming activities (Hazell 1971; Chen and Baker 1974).

These studies, however, have focused on the normative issue of optimal diversification under uncertainty. Few authors (for example, White and Irwin 1972; Pope and Presscott 1980) have undertaken a positive examination of diversification using detailed microdata. According to these more descriptive studies, ambiguities exist about the relationship between various farm characteristics and diversification. In particular, the study by Pope and Prescott (1980), using alternative measures of diversification for a large cross-section of California farms, revealed some evidence that larger farms are more diversified, while wealthier and less experienced farmers are more specialised, and co-operative farms are the most specialised. However, their

study indicated that further empirical research into diversification was warranted in order to delineate more the ability of farmers to self-insure through diversification.

The objective of this study is to relate the ability of farmers to manage risk over time to farm size and other socio-economic characteristics. We use a set of panel data from Eastern Norway. Using these data, four measures (or indices) of farm diversification were first developed. Then by regression analysis the estimated indices (dependent variables) were related to farm size and other socio-economic variables.

It was anticipated that the findings of this analysis could provide valuable insights and guidance for farm diversification-related studies elsewhere, including Australia.

The paper is organised as follows. Section 2 provides a brief description of some properties of the diversification measures (diversification indices). Presentation of data and model specification is in Section 3. The econometric results and the discussion are presented in Section 4. Finally, Section 5 contains the summary and conclusions.

Measures of farm diversification (M_j)

Diversification can be measured in a number of alternative ways (Clarke 1993). It can be examined with respect to farm production alone or it could include non-farm sources of income depending on the information available, the relationship between farm and non-farm income and the objectives of the study. Further, depending on data limitations, measurements of diversification in production can be examined using the variables: area (land area under production), net income (net revenue) and/or total income (production income). Properties of a diversification measure, however, will also need to reflect the nature of problem studied.

Four indices of diversification are used for comparison. We define the following variables as a preliminary step to establishing the indices.

A_i = income in activity i, for i = 1,……,n; so that

$\sum A_i$ = total farm income. Then

$P_i = A_i / \sum A_i$, denotes the proportion of income from activity i.

Then the following diversification measures are considered.

Index of maximum proportion (M_1)

$M_1 = \max P_i$

This index is defined as the ratio (proportion) of the farm's primary activity to its total activities. Thus, if the farm's activities are ranked from largest to smallest, the index of maximum proportion shows the degree of importance of the farm's largest activity. When a farm has only one activity (specialised), $P_i = 1$ and $M_1 = 1$. With increasing diversification M_1 decreases.

Number of enterprises (M_2)

$M_2 = i$

This is the simplest index where we count the number of activities the farm operates. Thus, for increasing diversification M_2 should increase. The weakness of this index is that it gives no weight to the importance of each activity.

Herfindahl index (M_3)

$M_3 = \sum P_i^2$

This index, by squaring the shares of a farm's activities, gives particular weight to the farm's principal activities. It means that a farm's secondary activities are given only limited weight in calculating the index. This is desirable since it focuses attention on the major activities of the farm. This index takes the value of one when a farm is completely specialised in its primary activity, and approaches zero as n gets large.

Entropy index (M_4)

$M_4 = \sum P_i \log (1/P_i)$

This index weights the shares of a farm's activity by a log term of the inverse of the respective shares. It takes then a value of zero when the farm is completely specialised, and it will approach its maximum when diversification is perfect. Thus, for increasing diversification M_4 should increase. This index gives less weight to larger activities than the Herfindahl index.

Data and model specification

The data used in this study were collected and published by the Norwegian Institute for Agricultural Economics Research (*NILF*). The objective of collecting the data is to obtain information about economic conditions of Norwegian agriculture. In this study, data on 434 farms for the period from 1991 to 1996 from the region of Eastern Norway *(østland)* were analysed. By repeated surveys at periodic (yearly) intervals, the panel data consists of about 2600 observations. This dataset provides useful information on the dynamics of farmers' behaviour over time.

Appendix 1 shows the various activities conducted on the 434 farms in the sample for the period 1991 to 1996. There are altogether 27 types of activity. Appendix 2 presents average income from each activity in each of the six years of the analysis. The values are expressed in real 1994 Norwegian Kroner (NOK). Appendix 1 shows little change in the extent of diversification over the years when the farms in the sample are viewed in aggregate. Appendix 2 shows that 1991 was a high income year overall, and that there has been a tendency for income

from cereals to decline relative to livestock production.

The causes of farm diversification (explanatory variables)

The following is a short description providing definitions of the explanatory variables specified in our model.

Eastern Norway is divided into lowlands (*flatbygder*) and other parts (*andre bygder*). This is because the production basis is substantially better in the lowlands region. For this reason we specified a dummy variable (R), taking the value 1 for lowlands and 0 for other lands.

Forestry can be viewed as a close alternative and additional source of income to agriculture. In 1996 the forestry sector contributed 17 % of total net income from agriculture and forestry, and the average family labour input to forestry on the sample farms in 1996 was 220 hours, whereas it was 2100 hours for the agricultural sector overall (NILF 1997). Thus forestry may be a relatively small income source for the sample farms. Nevertheless, by employing a dummy variable (F), taking the value 1 for having forestry and 0 for not having forestry, we can assess how access to forestry has an impact on farm diversification.

Typically, a farm will employ its family consisting of the farmer, spouse and any children aged under 17. For any additional labour requirements, the farmer can hire children aged over 17, if any, and/or hire labour outside the family (denoted respectively by Z_1 and Z_2). Thus Z_1 takes the value 1 if the farmer hires labour within the family and 0 if not, while Z_2 takes the value 1 if the farmer hires labour outside the family and 0 if not. Employing dummy variables, in this way attempts to assess the effect of farm organisation on farm diversification.

The next variable is farm size (S), measured in hectares.

In the literature, we often find factors such as experience, managerial skills and knowledge are important for effective farming. However, it is also difficult to find appropriate variables to measure such factors. In this study, age (E) has been employed as a proxy variable to discover the influence of such factors on diversification.

Wealth is estimated from farm accounts on agriculture, forestry, private account, accounts receivable and income from non-farm occupations. Wealth (W) is indexed and measured in real 1994 NOK.

Labour (L) is an aggregate of family labour and hired labour. It is measured in hours. For persons aged under 18 or over 65, the hours-worked are converted to standard hours in accordance with a multiplication (reduction) factor.

Agricultural insurance (A) is considered to be an explanatory variable which can influence farmers' attitude towards risk and thereby farm diversification. The values of insurance are indexed and measured in real 1994 NOK.

Description of data

Table 1 shows an overview of the farms in the sample for the period 1991 to 1996 (note that the respective total number of farms for each year is given in the parentheses in column 1).

Table 2 shows an overview of mean values of quantitative (explanatory) variables for the period 1991 to 1996. The data indicate also that over the years the number of farms has decreased from 439 to 408 while the average size of farms (land area) increased from 22.54 ha to 25.16 ha. There is no apparent trend in the other variables.

The dependent variables: estimated indices (measures of farm diversification)

The four indices outlined above were estimated using the variable 'production income' as a basis. When interpreting the estimated indices one should take care because of the way they are defined. For example, the two indices, index of maximum proportion and Herfindahl index fall in value as diversification increases, whereas the two indices, number of enterprises and entropy increase in value as diversification increases (see Table 3).

The Empirical Model

The following linear model was estimated.

$$M^j_{it} = \alpha^j_0 + \alpha^j_1 Z_{it} + \alpha^j_2 R_{it} + \alpha^j_3 F_{it} + \alpha^j_4 S_{it} + \alpha^j_5 E_{it} + \alpha^j_6 W_{it} + \alpha^j_7 L_{it} + \alpha^j_8 A_{it} + \varepsilon_{it}$$

where;

M^j_{it} is the j^{th} diversification measure on i^{th} farm in time t for $j=1,...4; i=1,...,N; t= 1,...T$,

Z_{it} is a vector representing organisational form (wrt family labour and/or hired labour),

R_{it} is dummy variable for location,

F_{it} is dummy variable for access to forestry,

S_{it} is farm size (land area under production),

E_{it} is experience (age of the farmer),

W_{it} is wealth (net worth) per unit area,

L_{it} is labour used per unit area,

A_{it} is agricultural insurance per unit area,

ε_{it} is the error term.

Econometric results

Following the theoretical reasoning and the approaches discussed, "hypotheses" regarding the influence of each of the causes on

diversification were tested. The null hypothesis is that the tested variable has no influence on diversification whereas the alternative hypothesis is that it has influence on diversification. Alternatively, the null hypothesis can be that the tested variable has influence on specialisation but the alternative is that it has no influence on specialisation *ceteris paribus*.

Estimates of model for simple pooled regression were carried out (see Table 4). There was no improvement in estimated parameters and significance of the variables of the model when account was taken for autocorrelation and heteroscedasticity. It can therefore be safely inferred that there are no serious problems of autocorrelation and heteroscedasticity in the model.

On the basis of the sample used and with respect to the four different diversification measures applied, the results obtained are 'robust' mainly for the two variables, farm size (S) and location (R). All the estimated regressions support for the positive effects of farm size and farm location on diversification.

With respect to the other variables, consistent results are found for the variables representing the farm organisational forms in relation to hired labours (Z_1 and Z_2), where except the index M_1, the regressions for all the other indices support for a positive effect of these variables on diversification.

Using the index M_1, a positive effect on diversification is found for the variable farmer's experience and a negative effect on diversification is found for the variable agricultural insurance.

The effects of the variables labour per unit area (L) and wealth per unit area (W) are inconsistent with respect to the different diversification measures applied. For instance, a negative effect on diversification is found for the variable labour per unit area by the index M_1 whereas a positive effect on diversification is for this variable by the index M_2. Also a positive effect on diversification is found for the variable wealth per unit area by the index M_1 whereas a negative effect on diversification is found for this variable by the index M_2.

The effect of the variable access to forestry (F) on diversification is found to be insignificant for the regression estimates of all the indices.

Discussion

Overall, the results indicate that farm size (S) has a positive effect on diversification. This is similar to the evidence from a study of large cross-section of California crop farms (Pope and Prescott 1980), but in contrast to inconclusive evidence estimated from the US census (White and Irwin 1972). The results, thus, suggest that there are few economies of scale in Norwegian farming.

Considerable regional specialisation has taken place within Norwegian agriculture during the last few decades (ie. the period between 1950-1990). This has led to an increase in animal production, for example milk production, in certain parts of the Norway, while crop production has increased in other areas. Although this progress towards regional specialisation has to a large extent been politically desired, discussion of policy changes is stimulated when the specialisation results in increased pollution (Vatn 1989).

Current Norwegian agricultural policy emphasises environmental friendly production measures, through the provision of different types of subsidies for more environmental friendly agricultural production (NILF 1996). Farm diversification could have been encouraged by these policies (Ellis 1993), independently of the farm sizes in the region.

The location dummy variable (R) shows a positive effect on diversification. This means that the farms located in the lowlands of Eastern Norway are more diversified than the farms located in the other parts of the region. This is an expected result given the better soils and other resources available to these farms and the consequent wide set of production possibilities that are available.

The dummy variables representing farm organisation are the other significant variables in relation to farm diversification in the region. Farm organizational form may be rationalised The results reveal that greater use of both family and hired labour was associated with more diversification. Also, hired labour was more significant than family labour. These results could be an indication that more labour is required to enable diversification or that lack of available labour constrains diversification, or merely that specialised farms do not need so much labour.

Only in, one of the regression equations is farmers experience (E) positively related to diversification. This implies that younger or less experienced farmers are more specialised. One might speculate that younger farmers are less risk averse. But, more plausibly, young farmers may start small and specialised, and become more diversified as they expand their operation. This may be indicative of capital shortages for young farmers. Also, it may be difficult for less experienced farmers to manage diverse activities.

The evidence for the influence of the variable labour per unit area (L) on diversification is ambiguous, having a positive sign in some equations and negative in others.

Agricultural insurance (A) is negatively related to diversification. This result supports a risk balancing framework of farming in which diversification and insurance are substitute risk avoiding strategies. In general, Norwegian farmers are highly insured against uncertainties related to production (crop failures and death of farm animals) and for their personal well being through health insurance.

Forestry (F) was not significant for any of the indices that have been estimated. It was expected that farms having access to forestry would be less diversified because forestry represents a type of diversification that they are already engaged in. Indeed, an explanatory variable for nonfarm income (*inntekter utenom bruk)* should have been incorporated in the analysis. Due to data limitations for non farm income, it was not possible to analyse the influence of nonfarm income on diversification and also it was necessary to restrict the indices to include only on-farm agricultural production activities. However, it is now evident that the nonfarm income-generating sources contribute increasingly to the total (net) income of the farmers. For example, on average, nonfarm income sources contributed 25 % of the total (net) income of the farmers in the year 1986, whereas its contribution has gradually increased to 44 % in the year 1996 (NILF 1997).

Little can be said from the analysis about the impact of wealth on diversification, since the effect of variable wealth per unit area (W) is positive for the index M_1 but negative for the index M_2. Further, its coefficient is very small in those estimated indices thereby its effect on diversification seems to be negligible.

Summary and conclusions

Farm planing models generally focus on normative issues of optimal diversification under uncertainty. In this study a positive examination of farm diversification has been carried out for a sample of farms in Eastern Norway. Four alternative measures of diversification (indices), defined over income from farm production, were used as the dependent variable. Several micro-level causes were tested for their effect on farm diversification. Based on the overall results from an analysis of panel data, there was evidence that larger farmers are more diversified, farms located in the lowlands of Eastern Norway are more diversified, and farms that hire labour within the family and/or outside the family are more diversified.

The evidence reported here suggests that diversification and farm size may be positively linked. That is, economies of scale may not be sufficient to warrant specialisation and/or farm specialisation may not be environmentally desirable because of the pollution that can be caused. In general, the results here are consistent with risk theories, ie. farms diversify to spread risk. Further, with a more favourable location and access to labour, the farmers have more opportunity to spread risk. An essential point is that these results may be a cause for concern for proponents of policies which are tied to small diversified farms. Further, the conclusions reached in the analysis here must be tempered by the fact that nonfarm income-generating activities were not included in the analysis.

Farm diversification can also be regarded as a way to attain certain policy objectives other than spreading risk. In particular, it can have positive consequences for product diversity and food security, alternative income sources and income stability, employment opportunity and rural (regional) development, environmental and natural resources management, and efficiency in agriculture.

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Appendix

Table 1: Number of farms with various characteristics

Variable	Location (Eastern Norway)		Access to forestry		Farm organisation (labour hired)		Farm organisation (labour hired)	
Year	lowlands (1)	other parts (0)	yes (1)	no (0)	within family (1)	none hired(0)	outside family (1)	none hired (0)
1991 (439)	179	260	274	165	193	246	116	323
1992 (440)	206	234	278	162	195	245	114	326
1993 (446)	179	267	281	165	201	245	121	325
1994 (443)	165	278	279	164	198	245	118	325
1995 (429)	170	259	278	151	200	229	145	284
1996 (408)	173	235	259	149	188	220	133	275

Table 2: Quantitative variables and their mean values

Variable Year	Land area (ha)	Experience (age)	Wealth* (NOK/ha)	Labour (hours/ha)	Insurance* (NOK/ha)
1991 (439)	22.54	46.0	99492.2	167.9	639.3
1992 (440)	23.10	45.9	97485.8	160.2	576.6
1993 (446)	23.29	46.1	95597.2	158.6	564.4
1994 (443)	23.55	46.4	94979.9	155.6	530.5
1995 (429)	24.60	46.6	92713.8	147.4	478.1
1996 (408)	25.16	47.4	93166.7	145.5	494.2
Mean	23.68	46.4	95612.1	156.0	548.1

*Adjusted to consumer price index 1994 = 100.

Table 3: Maximum and minimum value of the indices

	Totally Specialised	Totally diversified
Maximum proportion	1	0
Number of enterprises	1	16
Herfindahl index	1	0
Entropy index	0	1

Table 4: Regression results

Independent Variables (*t*-ratios)	Dependent Variable			
	M_1	M_2	M_3	M_4
Constant	0.723 *** (39.385)	1.247 *** (3.799)	0.621 *** (31.952)	0.232 *** (12.464)
Z_1	-0.592×10^{-4} (-0.011)	0.665 *** (6.792)	-0.131×10^{-1} ** (-2.269)	0.252×10^{-1} *** (4.550)
Z_2	-0.289×10^{-2} (-0.491)	1.120 *** (10.643)	-0.256×10^{-1} *** (-4.108)	0.469×10^{-1} *** (7.863)
R	-0.288×10^{-1} *** (-4.697)	0.426 *** (3.885)	-0.320×10^{-1} *** (-4.925)	0.368×10^{-1} *** (5.920)
F	-0.406×10^{-2} (-0.672)	0.224×10^{-1} (0.207)	-0.176×10^{-2} (-0.275)	0.309×10^{-2} (0.506)
S	-0.453×10^{-3} *** (-18.066)	0.557×10^{-2} *** (12.442)	-0.477×10^{-3} *** (-18.002)	0.486×10^{-3} *** (19.165)
E	0.175×10^{-4} (0.063)	0.157×10^{-1} *** (3.150)	0.990×10^{-4} (0.335)	0.206×10^{-3} (0.730)
L	0.138×10^{-2} *** (4.257)	0.824×10^{-1} *** (14.230)	0.147×10^{-3} (0.428)	0.164×10^{-2} *** (4.990)
W	-0.149×10^{-5} **	-0.203×10^{-4} *	-0.574×10^{-6}	0.396×10^{-7}

	(-2.353)	(-1.791)	(-0.854)	(0.062)
A	0.244×10^{-3} ** (2.204)	0.172×10^{-2} (0.870)	0.168×10^{-3} (1.431)	-0.907×10^{-4} (-0.808)
R^2	26.683	21.026	23.464	24.062

*** Significant at 1 per cent. ** Significant at 5 per cent. * Significant at 10 per cent.

Appendix 1: Number of farms (observations) for different activity (production income)

	Activity (production income)	1991	1992	1993	1994	1995	1996	Mean
1	Barley	287	282	278	277	262	244	271.6
2	Oats	224	222	219	204	186	174	204.83
3	Wheat	159	166	186	186	162	156	169.17
4	Other cereals	6	6	15	18	19	20	14.00
5	Oil seeds	27	34	42	39	40	33	35.83
6	Potatoes	184	174	163	163	153	140	162.83
7	Grass seeds	39	31	16	24	27	21	26.33
8	Vegetables	39	30	35	32	24	25	30.83
9	Fruits and berries	9	17	16	15	16	14	14.50
10	Other plant product (carrot and other root crops)	11	11	9	12	6	10	9.83
11	Cattle milk* ++	192	187	193	193	189	182	189.33
12	Cattle sold live	133	122	121	130	131	125	127.00
13	Cattle beef (cows)	193	198	208	211	210	203	203.83
14	Cattle beef (other)	205	214	220	223	224	212	216.33
15	Goats milk*	12	9	8	7	6	6	8.00
16	Goats meat	13	10	9	8	6	8	9.00
17	Pigs (sows and boars)	72	74	74	70	66	63	69.83
18	Pigs (piglets)	53	63	70	64	58	53	60.17
19	Pigs (pork)	108	113	108	104	88	87	101.33
20	Sheep sold live	25	26	25	24	20	27	24.50
21	Sheep (mutton and lamp)	63	68	67	71	67	64	66.67
22	Sheep (wool)	61	63	62	67	62	60	62.50
23	Poultry sold live / meat	53	47	43	41	37	34	42.50
24	Poultry egg++	194	174	155	170	141	98	155.33
25	Horses	6	3	4	6	6	2	4.50
26	Livestock, other products++	79	85	88	81	71	49	75.50
27	Coarse fodder	122	137	219	164	197	192	171.83
	Total	2569	2566	2653	2604	2474	2302	2528.00

*Production income includes subsidies. ++ Production income includes private use (household consumption).

Appendix 2: Averages of the production income under different activity (NOK 000**)

	Activity (production income)	1991	1992	1993	1994	1995	1996	Mean
1	Barley	75.08	45.67	56.86	43.53	46.85	58.35	54.39
2	Oats	53.85	30.18	31.04	21.51	27.20	27.19	31.83
3	Wheat	50.67	36.29	59.33	33.84	44.99	38.34	43.91
4	Other cereals	0.83	0.62	1.15	0.63	1.78	2.02	1.17
5	Oil seeds	2.69	3.24	5.15	3.26	4.35	3.91	3.77
6	Potatoes	20.78	29.41	15.35	23.50	22.06	20.53	21.94
7	Grass seeds	4.69	2.19	1.37	3.35	3.36	2.81	2.96
8	Vegetables	6.02	4.44	4.09	3.74	3.67	4.01	4.33
9	Fruits and berries	4.56	3.78	6.34	3.88	1.99	2.62	3.86
10	Other plant product (carrot and other root crops)	0.50	0.42	0.21	0.33	0.08	0.62	0.36
11	Cattle milk* ++	172.76	165.24	162.21	147.02	152.98	148.79	158.17
12	Cattle sold live	8.14	6.60	6.90	7.71	7.59	8.00	7.49
13	Cattle beef (cows)	20.15	25.29	24.70	23.47	22.67	23.22	23.25
14	Cattle beef (other)	46.88	50.34	45.63	46.88	43.15	46.87	46.63
15	Goats milk*	5.98	4.50	3.50	3.16	2.86	2.80	3.80
16	Goats meat	0.38	0.45	0.28	0.24	0.18	0.20	0.29
17	Pigs (sows and boars)	5.52	5.11	4.98	5.30	4.87	5.06	5.14
18	Pigs (piglets)	12.79	9.64	9.74	9.91	9.95	10.81	10.47
19	Pigs (pork)	71.69	53.30	62.91	66.02	64.55	65.95	64.07
20	Sheep sold live	0.33	0.28	0.41	0.29	0.34	0.54	0.36
21	Sheep (mutton and lamp)	8.11	8.52	7.67	8.59	7.04	7.35	7.88
22	Sheep (wool)	1.98	2.12	1.57	1.76	1.54	1.26	1.71
23	Poultry sold live / meat	4.72	4.84	3.73	3.23	3.44	3.81	3.96
24	Poultry egg++	27.11	24.54	20.42	20.38	19.57	19.17	21.86
25	Horses	0.04	0.02	0.05	0.06	0.07	0.03	0.05
26	Livestock, other products++	0.79	0.74	0.87	0.90	0.63	0.49	0.74
27	Coarse fodder	2.34	2.47	5.65	3.81	5.89	5.69	4.31
	Total	609.39	520.25	542.13	486.32	503.64	510.44	528.69

*Production income includes subsidies. **Adjusted to consumer price index 1994 = 100.
++ Production income includes private use (household consumption).