

SOME ALTERNATIVES OF IMPROVEMENT THE COW MILK PRODUCTION EFFICIENCY IN ALBANIA (CASH FLOW ANALYSIS)**MAKSIM MEÇO, REMZI KECO, ILIR KAPAJ, ALQI NAQELLARI**

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ABSTRACT

Any major new capital investment, such as the purchase of land, machinery, buildings or animals, can have a large effect on cash flows, particularly if additional capital is borrowed to finance the purchase. Borrowed capital requires principal and interest payments. The questions to answer before making the new investment is: Will the investment generate enough additional cash income to meet its additional cash requirements? In other words, is the investment financially feasible, as opposed to economically profitable?

Farms with high production efficiency are more successful due to three factors. High levels of production result: (1) low cost per unit of output, (2) with an increase in the effective size of the farm business, and (3) with an increased effectiveness of labor and machinery (Ronald D, Kay, farm management 1994).

The high level of production provides a simple and effective method of increasing farm size. Farms with high agricultural productivity and high levels of productivity per head resulting in a large volume of business compared with farms with the same size but with lower production levels. This additional business volume is the result of working more effectively, without increasing the surface of the land or the size of the activities.

The main methods of raising the level of productivity of livestock production are: i) selection and improvement of breed; ii) choice of a balanced food ration in relation to the level of production, iii) sheltering conditions and health care, iv) appropriate and timely nutrition and; v) a good combination between use of pasture and concentrated food.

Keywords: cash flow, cow farms, milk quality, net farm income,

INTRODUCTION

The Republic of Albania is currently in the process of preparing for the EU Instrument for Pre-Accession Assistance on Rural Development (IPARD). The IPARD Programme should be based on analyses of the current situation in the rural areas and on in-depth analysis of the sectors concerned in the country.

The objective of this dairy sector analyses is to give a quantitative and qualitative description of the Albanian dairy sector, addressing both production and processing.

The methods to carry-out of the study had been desk studies, meetings and collection of detailed information of 104 dairy farms with cows. A questionnaire has been designed and data collected during several focus group meetings.

The results of the analyses is prioritising key areas for potential intervention to contribute upgrading to EU standards, strengthening the overall competitiveness and performance of Albanian milk sector as well as fostering the sustainable development of the sector in the EU accession context.

The current structure of dairy sector of Albania is characterised by large number of small milk producers. About 226 thousand dairy cow farms with total 360 thousand cows and 82 thousand farms with small ruminants (SR) with some 1.9 million milking sheep and goats are producing in total about 1 million ton of milk. About 86% of milk production is coming from cow milk. The average number with 1.58 milking cows per farm or 23 milking ewes or does per SR farm is very low in comparison with EU-27 average. The land privatization initiated in 1991 created a structure of primary production that is

characterized by extremely small plot and herd sizes. Private farm business re-started in 1991 quasi from zero.

Most milk producers are semi-subsistence households. Only up to 46% of milk production is delivered to milk processors. The rest is used for self consumption, direct sale to consumer or for feeding of animals. The average size of farms in the country is just 1.2 ha and the size of single plots about 0.3 ha. Typical farm feature is a high level of land fragmentation.

About 3 thousand dairy cow farms have more than 5 cows per farm and about 12 thousand SR farms have more than 50 sheep or goats per farm. However the structural change started during the last years particularly in the cow milk production. Some farms became more commercial oriented and specialised on milk production with the modernisation and extension of the dairy farm business. With the support of the IPARD programme those farms can achieve further steps to come closer to EU standards.

RESULTS

In general, milk production is labour intensive in comparison with other sectors. Therefore the IPARD investment support should give the dairy sector priority. The analysed investments on animal production are in most cases based on scenarios which keep the same quantity of animals and try to improve economic performance, following also the IPARD approach, which is focused in improving quality and performance of animal production, rather than aiming at increasing the number of heads. However, one scenario is also simulating the increase in the number of milking cows from 5 to 10, using the natural growth of the herd, as IPARD resources cannot be used to buy livestock.

Investment scenarios are inter-combined with gross margin analysis in the context of dynamic analyses.

1. Cattle dairy farm, investing in improving quality of milk quality, with constant quantity (*The first Scenario*)

Key cost figures and basic assumptions

Assumptions and parameters used for the simulations are listed below.

Key cost figures and basic assumptions		
Size	Yield	Total production cost
<i>5 milk cows</i>	<i>5,000 lit/head 4 calves per year available for sale 305 days lactation</i>	<i>591,250 ALL</i>
Land required for animal feed production	Farm gate sales prices	Primary target
<i>owned</i>	<i>Milk: 50 ALL per litter Calf: 25,000 ALL per head</i>	<i>Quality</i>
Investment cost	Annual Percentage Rate	Loan duration
<i>10,000 Euro, of which 50% is a grant and 50% is obtained through a loan</i>	<i>1scenario: 12 %</i>	<i>Scenarios ranging between 3 years (the shortest) and 5 years (the longest)</i>

The investment is **not focused on maximising quantity of milk**, so that it is assumed that the animals are properly fed, and genetically good, but are not according the best performing ones.

At present, the average production per cow is about 2,500 lit, but it may range up to 4,000. The assumptions of raising it to 5,000 litres/year is therefore already an ambitious target.

Table 1 shows the feed requirements for optimising milk production

Table 1. Feed requirements to produce 5,000 liters milk

No	Item	Quantity/head (kg)
1	Concentrate	5
2	Hay	5
3	Silage	25

The yearly cash flow generated by the breeding activity has been calculated as shown in Table 2 below.

Table 2. Yearly cash flow budget for a milking cow farm (5 cows)					
Item	Unit	Quantity	Price	Amount	
				ALL	Euro
I. Income					
Milk	litter	25,000	40	1,000,000	7,407
Calves sold	Head	4	25,000	100,000	741
Total income				1,100,000	8,148
II. Expenses					
Concentrate	Kg	9,125	25	228,125	1,690
Straw	Kg	9,125	8	73,000	541
Silage	Kg	45,625	5	228,125	1,690
Veterinary services				25,000	185
Electric power				12,000	89
Stable maintenance				10,000	74
Expendable equipment				15,000	111
Total expenses				591,250	4,380
Net farm income				508,750	3,769

1 Euro=135 ALL

Table 3 below shows the cash flow scenarios of the holding, including the surplus or deficit after paying for the costs, loan and the equivalent of two minimal wages.

Table 3. Cash flow analysis for a milking cow farm (size 5 cows)

Item	Year				
	1	2	3	4	5
Cash inflow (in Euro)					
Net farm income (milk & Calf)	4,848.8	4,848.8	4,848.8	4,848.8	4,848.8
Cash outflow (in Euro)					
Two full time minimal wages	3,352	3,352	3,352	3,352	3,352
Principal payments	1,667	1,667	1,666		
Interest payments	600	400	200		
Total outflow (in Euro)	5,619	5,419	5,218	3,352	3,352
Net cash flow (in Euro)	-770.2	-570.2	-369.2	1,496.8	1,496.8

1 Euro=135ALL

The quality milk improvement is a long-lived capital investment, so it is important to look at the cash flow over a number of years, rather than month by month for one year as done for the whole-farm cash flow budget.

To guarantee two full time minimal wages requires 3352 Euro and the new loan requires a principal payment 1667 Euro each year of the three-year loan, plus interest on the unpaid

balance. This obligation generates a large cash outflow requirement during the first three years, causing a negative net cash flow for these years. Once the loan is paid off in the third year, there is a positive net cash flow in following years. This result is common when a large part of purchase price is borrowed and the loan must pay off in relatively short time.

This investment is obviously going to cause a cash flow problem the first three years. Does this mean the investment is a bad one? Not necessarily. Investment on improvement of milk quality should last for more than the five years shown in the table and will continue to generate a positive cash flow in later years. Over the total life of the investment, there would be a positive net cash flow, perhaps a substantial one. The problem is how to get by the first three years.

1. At this point, the investment on improvement milk quality should be incorporated into a cash flow budget for the entire farm. This budget may show that other parts of farm business are generating enough excess cash to meet the negative cash flow that would result from investment on improvement milk quality.
2. If not, one possibility would be to negotiate with the lender for a longer loan with smaller annual payments. This solution would help reduce the cash flow problem but would extend principal and interest payments over a longer period and increase the total amount of interest paid.
3. Another alternative is that cash flow for the third first years required to guarantee one full time minimal wages and not two how is planed in initially scenarios

Key findings and comments

This farm cannot afford such investment, unless additional sources of income are available. Otherwise, the farm size should be larger.

2. Cattle dairy farm, investing in increasing quantity of milk per milking cow, with land owned by beneficiary (The second Scenario)

Key cost figures and basic assumptions

Assumptions and parameters used for the simulations are listed below.

Size	Yield	Total production cost
<i>5 milk cows</i>	<i>From 5,000 to 6,100 lt/head 4 calves per year available for sale 305 days lactation</i>	<i>682,500 ALL</i>
Land required for animal feed production	Farm gate sales prices	Primary target
<i>owned</i>	<i>Milk: 40 ALL per litter Calf: 25,000 ALL per head</i>	<i>Quantity</i>
Investment cost	Annual Percentage Rate	Loan duration
<i>10,000 Euro, of which 50% is a grant and 50% is obtained through a loan</i>	<i>1 scenario: 12 %</i>	<i>Scenarios ranging between 3 years (the shortest) and 5 years (the longest)</i>

The main methods of raising the level of productivity of livestock production are: i) selection and improvement of breed; ii) choice of a balanced food ration in relation to the level of production, iii) sheltering conditions and health care, iv) appropriate and timely nutrition and; v) a good combination between use of pasture and concentrated food.

In view of this objective, the applicant aims at increasing farm mechanization. The applicant wants to buy a mini tractor and its equipments and to improve the storage conditions of feed, building of a new storage facility. With this number of animals, purchasing an animal feed a mixer cannot be profitable.

Table 4 shows the feed requirements for optimising milk production.

Table 4. Feed requirements to produce 6,100 liters milk

No	Item	Quantity/head (kg)	Total
1	Concentrate	5	2,555
2	Hay	5	1,825
3	Silage	25	9,125

The yearly cash flow generated by the breeding activity has been calculated as shown in Table 5 below.

Table 5. Yearly cash flow budget for a milking cow farm (5 cows)

Item	Unit	Quantity	Price	Amount	
				ALL	Euro
I. Income					
Milk	litter	30,500	40	1,220,000	9,037
Calf	Head	4	25,000	100,000	741
Total income				1,320,000	9,778
II. Expenses					
Concentrate	Kg	12,775	25	319,375	2,366
Straw	Kg	9,125	8	73,000	541
Silage	Kg	45,625	5	228,125	1,690
Veterinary services				25,000	185
Electric power				12,000	89
Stable maintenance				10,000	74
Expendable equipment				15,000	111
Total expenses				682,500	5,056
Net farm Income				637,500	4,722

1 Euro=135 ALL

Table 6 below shows the cash flow scenarios of the holding, including the surplus or deficit after paying for the costs, loan and the equivalent of two minimal wages.

Table 6. Cash flow analysis for a milking cow farm (size 5 cows)

Item	Year				
	1	2	3	4	5
Cash inflow (in Euro)					
Net farm Income (milk & Calf)	5319.9	5319.9	5319.9	5319.9	5319.9
Cash outflow (in Euro)					
Two full time minimal wages	3352	3352	3352	3352	3352
Principal payments	1667	1667	1666		
Interest payments	600	400	200		
Total outflow (in Euro)	5619	5419	5218	3352	3352
Net cash flow (in Euro)	-299.1	-99.1	101.9	1967.9	1967.9

1 Euro=135 ALL

Key findings and comments

The improvement quantity of milk per cow is a long-lived capital investment, so it is important to look at the cash flow over a number of years, rather than month by month for one year as done for the whole-farm cash flow budget.

To guarantee two full time minimal wages requires 3352 Euro and the new loan requires a principal payment 1667 Euro each year of the three-year loan, plus interest on the unpaid balance. This obligation generates a large cash outflow requirement during the first and second year, causing a negative net cash flow for these years. Once the loan is paid off in thesecond year, there is a positive net cash flow in following years. This result is common when a large part of purchase price is borrowed and the loan must pay off in relatively short time.

The alternatives of solving the problem (negative cash flow for the three-year) for this scenario are the same as the first scenario. But the possibility of solutions is easier.

3. Cattle dairy farm, investing in increasing quantity of milk per milking cow, with rented land (*The third Scenario*)

Key cost figures and basic assumptions

Assumptions and parameters used for the simulations are listed below.

Size	Yield	Total production cost
5 milk cows	From 5,000 to 6,100 lt/head 4 calves per year available for sale 305 days lactation	742,500 ALL
Land required for animal feed production	Farm gate sales prices	Primary target
Rented (3ha)	Milk: 40 ALL per litter Calf: 25,000 ALL per head	Quantity
Investment cost	Annual Percentage Rate	Loan duration
10,000 Euro, of which 50% is a grant and 50% is obtained through a loan	1 scenario: 12%	Scenarios ranging between 3 years (the shortest) and 10 years (the longest)

A farmer is keeping **five** milking cows, which produce 5000 liters per head (305 days lactation). He wants that feed for cows to produce in the farm. No land owned. But, he is leasing the land. The rent that is paying is **150 Euro/ha**. To produce the necessary feeds for cows, he is leasing **three** hectares of land.

He wants to invest in **improvement of quantity** of milk per milking cow from 5000 to **6100** per milking cow (20 liter/day per milking cow).

In view of this objective, he aims to increase the level of farm mechanization. The farmer wants to buy a mini tractor and its equipments and to improve the storage conditions of feed through the building of a new store. *Table 7* below shows the feed requirements for optimising milk production

Table 7. Animal feed inputs

No	Item	Quantity/head (kg)	Total
1	Concentrate	5	2,555
2	Hay	5	1,825
3	Silage	25	9,125

Table 8 shows the yearly cash flow generated by the breeding activity.

Table 8. Yearly cash flow budget for a milking cow farm (5 cows)

Item	Unit	Quantity	Price ALL	Amount	
				ALL	Euro
I. Income					
Milk	Litter	30,500	40	1,220,000	9,037
Calf	Head	4	25,000	100,000	741
Total income				1,320,000	9,778
II. Expenses					0
Concentrate	Kg	12,775	25	319,375	2,366
Straw	Kg	9,125	8	73,000	541
Silage	Kg	45,625	5	228,125	1,690
Rent of land	Ha	3	20,000	60,000	444
Veterinary services				25,000	185
Electric power				12,000	89
Stable maintenance				10,000	74
Others				15,000	111
Total Expenses				742,500	5,500
Net farm income				577,500	4,278

1 Euro=135 ALL

Table 9 below shows the cash flow scenarios of the holding, including the surplus or deficit after paying for the costs, loan and the equivalent of two minimal wages.

Table 9. Cash flow analysis for a milking cow farm (size 5 cows)

Item	Year				
	1	2	3	4	5
Cash inflow (in Euro)					
Net farm Income (milk &Calf)	4878.7	4878.7	4878.7	4878.7	4878.7
Cash outflow (in Euro)					
Two full time minimal wages	3352	3352	3352	3352	3352
Principal payments	1667	1667	1666		
Interest payments	600	400	200		
Total outflow (in Euro)	5619	5419	5218	3352	3352
Net cash flow (in Euro)	-740.3	-540.3	-339.3	1526.7	1526.7

1 Euro=135 ALL

Key findings and comments

The improvement quantity of milk per cow is a long-lived capital investment, so it is important to look at the cash flow over a number of years, rather than month by month for one year as done for the whole-farm cash flow budget.

To guarantee two full time minimal wages requires 3352 Euro and the new loan requires a principal payment 1667 Euro each year of the three-year loan, plus interest on the unpaid balance. This obligation generates a large cash outflow requirement during the first three years, causing a negative net cash flow for these years. Once the loan is paid off in the third year, there is a positive net cash flow in following years. This result is common when a large part of purchase price is borrowed and the loan must pay off in relatively short time.

The alternatives of solving the problem (negative cash flow for the three-year) for this scenario are the same as the first scenario.

4. Cattle dairy farm, investing to increase the number of milking cows (*The fourth Scenario*)

Key cost figures and basic assumptions

Assumptions and parameters used for the simulations are listed below.

Size	Yield	Total production cost
<i>Initial: 5 milk cows Final: 10 milk cows</i>	<i>From 5,000 to 6,100 lt/head 305 days lactation 90% fertility 20% replacement of animals</i>	<i>Initial: 682,500 ALL Final: 1,403,000 ALL</i>
Land required for animal feed production	Farm gate sales prices	Primary target
<i>Owned; sufficient for 10 cows</i>	<i>Milk: 40 ALL per litter Calf: 25,000 ALL per head</i>	<i>Quantity</i>
Investment cost	Annual Percentage Rate	Loan duration
<i>10,000 Euro, of which 50% is a grant and 50% is obtained through a loan</i>	<i>2 scenarios: 10 and 15 %</i>	<i>Scenarios ranging between 3 years (the shortest) and 10 years (the longest)</i>

The scenario foresees a gradual increase in the number of milking cows, either keeping the heifers or using the sale revenues of calves to buy more heifers.

Table 10 below shows the feed requirements for optimising milk production

Table 10. Animal feed inputs

No	Item	Quantity/head (kg)	Total	Price/kg ALL
1	Concentrate	5	2,555	25
2	Hay	5	1,825	8
3	Silage	25	9,125	5

Table 11. Expected evolution of parameters used to calculate the yearly cash flow

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7-10
I. Stock							
Cows at the beginning of the year	5	7	9	10	10	10	10
Cows at the end of the year	7	9	10	10	10	10	10
<i>Of which: Milking cows in full productivity</i>	5	5	5	5	7	9	10
<i>Cows not yet in full production</i>	0	0	0	2	2	1	0
<i>Cows not yet in production</i>	2	4	5	3	1	0	0
Calves born	5	5	5	7	8	9	9
Calves retained for expansion/replacement	3	3	2	1	2	2	2
II. Outputs							
Calves sold	2	2	2	3	5	6	7
Milk produced (litters)	30,500	30,500	30,500	39,650	51,850	59,475	61,000
III. Inputs							
Concentrate (kg)	12,775	17,885	22,995	25,550	25,550	25,550	25,550
Straw (kg)	9,125	12,775	16,425	18,250	18,250	18,250	18,250
Silage (kg)	45,625	63,875	82,125	91,250	91,250	91,250	91,250
Veterinary services (cost ALL)	25,000	35,000	63,000	126,000	126,000	126,000	126,000
Electric power (cost ALL)	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Stable maintenance	10,000	11,000	12,100	13,310	13,310	13,310	13,310
Others	15,000	16,500	18,150	19,965	19,965	19,965	19,965

In the first years, the expenses are higher than in other scenarios, as young cows are eating, but not producing, while revenues are lower, as part of the value of calves' sales is

balanced by the investments in buying more cows. *Table 11* shows the evolution of parameters over the years.

Based on the above, the cash flow has been calculated, as shown in *Table 12* below.

Table 12. Cash flow evolution

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7-10
I. Incomes							
Calves	50,000	50,000	75,000	125,000	150,000	175,000	175,000
Milk	1,220,000	1,220,000	1,220,000	1,586,000	2,074,000	2,379,000	2,440,000
Total Incomes	1,270,000	1,270,000	1,295,000	1,711,000	2,224,000	2,554,000	2,615,000
II. Expenses							
Concentrate (ALL)	319,375	447,125	574,875	638,750	638,750	638,750	638,750
Straw (ALL)	73,000	102,200	131,400	146,000	146,000	146,000	146,000
Silage (ALL)	228,125	319,375	410,625	456,250	456,250	456,250	456,250
Veterinary services (cost ALL)	25,000	35,000	63,000	126,000	126,000	126,000	126,000
Electric power (cost ALL)	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Stable maintenance	10,000	11,000	12,100	13,310	13,310	13,310	13,310
Others	15,000	16,500	18,150	19,965	19,965	19,965	19,965
Total Expenses	682,500	943,200	1,247,900	1,402,000	1,403,000	1,403,000	1,403,000
Gross cash flow	587,500	326,800	47,100	309,000	821,000	1,151,000	1,212,000
Equivalent in Euro	4,352	2,421	349	2,289	6,081	8,526	8,978

1 Euro=135 ALL

In any scenario, the cash flow is not sufficient to cover the costs of the loan and to pay for 2 persons minimum wages **in the first four years**, when expenses for animal feed are high and output is low. In particular, in the third year, when all the young cows are eating, but not producing milk and the income from sale of calves is lower, the cash flow is even not sufficient to repay the loan instalment, apart from any wage.

However, the business is sustainable and profitable in the medium term. The accrued cash flow becomes positive only from the seventh year (i.e. the total income obtained from the beginning of the investment exceeds total expenditures from the seventh year on), as shown in *Table 13* below.

Table 13. Net yearly and accrued cash flow (three year loan repayment period, 10% interest)

Item	Financial flow in Euro						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7-10
Gross cash flow	4,352	2,421	349	2,289	6,081	8,526	8,978
Loan repayment	1,936	1,936	1,936				
2 minimum wages	3,200	3,200	3,200	3,200	3,200	3,200	3,200
Net cash flow	-784	-2,715	-4,787	-911	2,881	5,326	5,778

The figures changes if a 15% annual percentage rate on the loan is applied, but the conclusion is the same: the yearly cash flow turns positive from the fifth year.

Table 14 shows the cash flow scenario of the holding, including the surplus or deficit after paying for the costs, loan and the equivalent of two minimal wages in the case of cattle dairy farm, applying investment related to increased number of milking cows.

Table 14. Cash flow analysis for a milking cow farm (size growing from 5 to 10 cows)

Duration of the loan in years	3	4	5	6	7	8	9	10
Gross cash flow in the period	7,121	9,410	15,492	24,018	32,996	41,973	50,951	59,929
10 % annual percent rate loan								
Loan repayment	5,808	6,087	6,374	6,669	6,972	7,284	7,602	7,929
Accrued two people minimal wages	9,600	12,800	16,000	19,200	22,400	25,600	28,800	32,000
<i>Net cash flow</i>	-8,287	-9,477	-6,882	-1,852	3,623	9,090	14,549	20,000
15 % annual percent rate loan								
Loan repayment	6,240	6,679	7,137	7,612	8,105	8,614	9,139	9,680
Accrued two people minimal wages	9,600	12,800	16,000	19,200	22,400	25,600	28,800	32,000
<i>Net cash flow</i>	-8,718	-10,069	-7,645	-2,794	2,491	7,760	13,012	18,249

Key findings and comments

The cash-flow in the first years of business is negative, so that if the investment period is shorter than 5 years, the business is not able to generate enough cash to pay for two minimal wages and repay the loan. Two more years are necessary to recover the unbalances of the previous years and to obtain a profit exceeding the minimal cost/opportunity of labour.

The main constraint is linked to the initial investment: 10,000 euro are not sufficient to increase the size of the stable, buy the necessary equipment and purchase new adult cows; as a result, the number of cows must be gradually increased and in the first years the income is lower, as production is lower.

For this kind of business it is better to invest more from the beginning and buy adult cows, entering immediately in full production. Yearly repayments will be higher, but so will be the income from the first year. Costs will be not minimised, but profits will be maximised. However, in the long run, a family farm with two permanent work force can manage 10 milking cows, getting a better profit than with 5 milking cows.

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