

Within economic and ecological bounds – Pastoralism in Azerbaijan

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1. Problem outline

Pastoralism is one of the major land uses in Middle and Central Asian transformation countries. After the dissolution of collective or state farms pastoralists now act under market conditions to generate their income, whereas the carrying capacity of pastures remains the same. How did pastoralism develop under market conditions and what can its future look like? This study addresses overgrazing in grasslands of Azerbaijan from an economic point of view.

Azerbaijan has a traditional transhumant sheep farming sector, which is recently growing in terms of livestock numbers (Aliyev et al., 1965). But national statistics show, that agriculture regarding the share of GDP, generated incomes and employment is strongly underdeveloped, compared to other, rapidly growing sectors of economy (Statistical Committee of Azerbaijan, 2008), (Yalçın-Heckmann, 2005). Therefore, rural development is needed for poverty reduction and economic growth in rural areas (Kray and Csaki, 2005). However, excessive growth of livestock numbers leads to problems of overgrazing and erosion, which are already reported for mountaineous regions in Azerbaijan (Mamedov, 2003).

In this study, we address the following questions:

1. Which forms of farm organisation emerged after the dissolution of collective farms in transhumant sheep farming? How is their present economic performance?
2. How can an ecologically sound and welfare enhancing development of sheep farming be facilitated?

2. Study sites and data collection

Data collection took place 2008 in a semi-nomadic system in western Azerbaijan. Herders and livestock migrate between semi-arid winter pastures in Jeiranchel region and alpine/subalpine summer pastures in the Lesser Caucasus (Dashkesen and Gedebe region). The distance between both sites varies between 40 and 80 km. Interviews were conducted with 43 farm managers, which included a structured part covering farm organisation, costs and revenues as well as a semi-structured part, which addressed the institutional framework and problems in farm management and possible solutions (Atteslander, 2000).

3. Current situation

Analysis revealed comparably large-scaled management units (farms) of approx. 600 ewes (see table 1).

Table 1 Assets of pastoral farms (N=43)

		min	median	max
Ewes	pcs.	171	600	2400
Winter pasture	ha	200	406	1721
Summer pasture	ha	70	165	600
Shepherds		2	4	32
Raised lambs/ewe		0.45	0.87	1

Summer and winter pastures are leased long-term from the state. The economic performance of an average farm based on the median in table 1 was assessed in cost revenue calculations shown in table 2 (Dabbert, 2006).

Table 2 Cost revenue calculation for average model farm (based on median in table 1) (New Azeri Manat (AZN), 1 AZN = 0,83 € August 2008)

	AZN/Ewe
Revenues	65.50
Variable costs	21.28
Contribution margin	44.22
Overhead costs	7.16
Labour costs	14.10
Profit	22.96
Family labour costs	4.80
Interest on permanent and current assets (i=0,12)	14.50
Entrepreneurial profit	3.66
Net rentability (%)	119

Farms are characterised by nearly full market orientation. The largest share of revenues accounts to the sale of approx. six month old lambs. Labour costs comprise four shepherds with 220 AZN/month salary each. Costs for family labour were calculated with 191 AZN. Compared to the statistical average salary in Azerbaijan (215 AZN) these are moderate salaries, compared to the average agricultural wages of 80 AZN even high (Statistical Committee of Azerbaijan, 2008). Although capital costs are among the higher cost positions, most farms show an investment deficit in buildings and machinery. Winter stables often remain from Soviet times and are in many cases low-rise with leaky roofs.

Overall economic results are acceptable as the positive entrepreneurial profit and net rentability above 100 % indicates. However, sensitivity analysis revealed, that positive results strongly depend on the number of raised lambs, which in turn depends on management quality.

The present acceptable economic performance of farms indicates possibilities for investment and improvements. It can also be assumed, that the current growth in livestock numbers is fuelled by investment in an economically attractive land use.

4. Scenarios for sustainable development

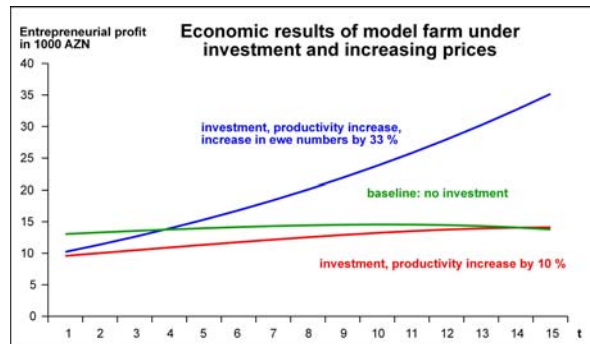
In order to mitigate the current pressure from livestock on the pasture while securing future economic growth improvements in productivity seem necessary. At first, enhancing productivity per ewe seems to be rewarding. The number of raised lambs is with 0.87 lambs per ewe comparable to results in nomadic societies (Dahl and Hjort, 1976), but improvements up to 1.2 lambs per ewe are estimated as realistic by herders.

4.1. Investment in stables

For mitigating the above mentioned problems with winter stables, we assume investments in stables for 50,000 AZN, which is financed completely by credit with 12 % interest and 15 years duration. This measure would realistically lead to a 10 % increase in ewe productivity

caused by energy gains and less veterinary problems. Results of dynamic capital budgeting (Wöhe, 2000) for the model farm under assumptions of increasing factor and product prices of 5 % and 7.5 % increase of labour costs annually are shown in Figure 1.

Figure 1 Economic results of model farm under investment and increasing prices



Under these assumptions, the investment pays off with sole productivity increases. However, only increases in ewe numbers lead to distinct gains in entrepreneurial profit.

4.2. Cooperation of farms

Although farms are relatively large-scaled herders can benefit from cooperation by reduced costs. Cooperation between agricultural farms leads to optimised results by reduced costs or enhanced benefits (Heinrich, 1995). Especially transaction costs associated with e.g. marketing of animals or visits of the veterinary surgeon are lower. As benefits from cooperation we assume a reduction in: veterinary costs by 25 %, labour costs by 25 %, variable machine costs by 26 %.

However, for cooperation trust between partners and favourable conditions, e.g. location of farms is needed. Results for two different investment scenarios are given in table 3.

Table 3 Results of model farm under cooperation and investments assumptions

		no cooperation		cooperation	
		none	new stables truck	none	new stables truck
Investment	AZN	0	64,300	0	64,300
Profit	AZN	13,764	9,344	16,708	12,951
Net rentability	%	119	77	144	107
Net gearing	%	0	28	0	25
Return on ownership equity	%	15	8	19	13

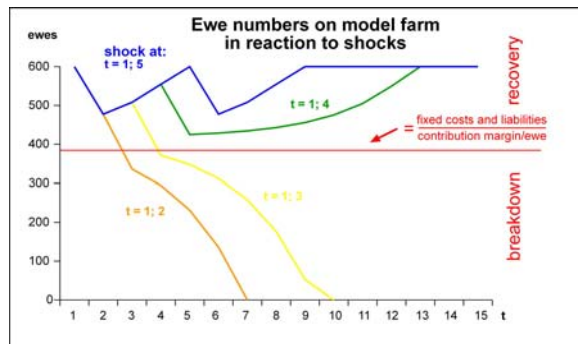
Cooperation can improve the net rentability of non-investing farms from 119 to 144 %. Furthermore, under cooperation investments become feasible, which are unprofitable for one single farm.

4.3. Risk assessment

Especially in semi-arid winter pastures weather conditions are variable, while herders depend on constantly available pasture forage (Scoones, 1994). Herders reported severe winters with snow or droughts in autumn or spring as occurring randomly but on average all 7 years. These weather conditions can lead to losses in lambs and ewes. We modelled severe winters as shocks in dynamic capital budgeting shown in 4.1 under investment and productivity increase conditions. In the model, shocks lead to a 50 % decrease in revenues. Resulting losses in entrepreneurial profit directly translate into reduction in ewe numbers in the following year,

while positive results lead to increasing ewe numbers up to the former 600 ewes. Results are shown in figure 2.

Figure 2 Ewe numbers on investing model farm in reaction to shocks



Two subsequently occurring shocks at $t = 1;2$ or $t = 1;3$ lead to the breakdown of the model farm. In these cases ewe numbers have shrunk so much, that even under normal conditions with revenues of 65,5 AZN per ewe no positive entrepreneurial profit can be achieved. If shocks occur in larger intervals, the model farm can recover. No instances of breakdown were observed with non-investing model farms. The breakdown of investing farms could be prevented by savings or deferment options in agricultural credit schemes. However, the risk from weather conditions has to be clearly addressed in all investment decisions, as it seriously affects economic indicators.

5. Conclusion

We assessed the current economic performance of pastoral farms in Azerbaijan and explored possibilities for sustainable development. Studied farms show nearly full market orientation, an acceptable economic performance, but investment deficits contribute to this results. Under limited carrying capacity of pastures development can be achieved by productivity increases and cost reduction. Great potential is seen in increased ewe productivity through investments. However, the stability of farms under variable weather conditions has to be taken into account. In the long run, in order to enhance rural incomes improvements in work productivity seem to be necessary.

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