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FARMER – PROCESSOR RELATIONSHIPS IN THE CIS DAIRY SECTOR: KEY FINDINGS FROM THE SIDCISA RESEARCH PROJECT[1]

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1. INTRODUCTION

The dairy sector is an important component of rural economies in the Commonwealth of Independent States (CIS), providing vital employment and income, in an environment of weak social security and scarce job opportunities. Dairy farming in the CIS encompasses a wide diversity of farms: from 1 and 2 cow units, selling via village collecting stations, which provide an important subsidiary income for vulnerable groups, particularly the elderly, up to 'super-large' corporate farms, some of which have witnessed significant recent investment and control thousands of hectares. The *Supporting the International Development of CIS Agriculture* (SIDCISA) project has sought to understand the Supply Chain Relationships (SCR) of this diverse range of commercial milk producers. In particular we seek to analyse the degree of satisfaction with SCR and analyse the linkages between procurement practices and satisfaction, growth and investment. As far as we are aware this is the first comprehensive, cross-national survey of dairy farming in the CIS. This paper presents an overview of key findings from survey work conducted in Armenia, Moldova and the Dnepropetrovsk region of Ukraine. A more detailed presentation of the context of the study and results are available elsewhere.[9]

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2. DATA SET

Given the objective of the study was to understand the SCR of commercial milk producers in the CIS, paying particular attention to the linkages between SCR and farmer satisfaction, the population of interest was defined as primary producers who sell cows' milk to another supply chain actor. Therefore farmers without dairy cows, those who did not sell any of the milk produced or who processed all milk themselves (i.e. did not sell any raw milk) were excluded from the study. While given the objective of the study these restrictions are justified it means that our sample cannot be directly compared to official data on the structure of milk production.

To obtain the sample a quota of 300 responses was set per country with the intention of including a representative cross-section of commercial dairy farms, including both household producers if they marketed their output and agricultural companies. The geographical focus of Moldovan sample was set as all regions excluding the left side of the river Nistru, with a representative split (based on contribution to total milk production) between the northern, central and southern regions. For Ukraine, given that it is largest country solely within Europe, data collection focused on the Dnepropetrovsk region, with sampling weighted to five *rayons* which have significant commercial dairy production. Dnepropetrovsk is the third largest city in Ukraine and the mean wage and living standard in the region is close to the national average. In Armenia respondents were drawn from all regions (*Marzes*) which have significant commercial milk production, based on proportions given from statistical data on milk production. The population and geographical area of Armenia, Moldova and the Dnepropetrovsk region of Ukraine are similar (populations of 3.2, 3.6 and 3.5 million respectively and geographical area of 27,743; 33,843 and 31,900 km^2 respectively), so a common sample size was deemed reasonable, with a slightly higher figure for Ukraine to accommodate greater numbers of larger agricultural enterprises, which were absent from the other two countries. The cross-section of farm respondents for each country was identified from contacts with national statistical agencies, local and regional authorities, village majors, local livestock experts and agricultural agencies. Data were collected concerning: farm growth, prices, yields, investment, collaboration with other farmers and the nature of and satisfaction with relationships with their main buyer. However it should be noted that household farms in the CIS tend not to keep detailed records of their activities and therefore the data for these operations should be treated as estimates rather than verified results. The data set is presented in Table 1.

Table 1 Number of milking cows per commercial farm by country

No of milking cows	Ukraine	Moldova	Armenia	Total
1	185	34	0	219
2	78	212	0	290
3	12	27	4	43
4	7	6	16	29
5	4	3	50	57
6 to 9	2	5	111	118
10 to 19		3	77	80
20 to 49	2	3	29	34
50 to 99	1	2	8	11
100 to 199	8	3	5	16
200 to 499	11	2	0	13
500+	6	0	0	6
Total	316	300	300	916
Mean	31.3	6.2	13.4	17.2
Standard Deviation	138.4	27.3	18.5	84.0

The standard deviation of farm size, when measured by number of milking cows, is far greater in Ukraine, with a huge disparity between 'household farms', with 1 to 2 cows each, and corporate farms, of which 6 farms have in excess of 500 cows each. While households with 1 or 2 cows are often dismissed as subsistence producers, this is not the case in Ukraine. For example our data indicate, only 10.5 per cent of the milk produced from 1 cow units is actually consumed within the household or wider family (non-marketed consumption), the rest is sold. Similarly for 2 to 3 cow units only 6.7 per cent of the total milk produced is not-marketed. For Ukraine, therefore 1 to 2 cow producers should be seen as commercial operators and a similar conclusion can also be drawn for Moldova. At the other end of the size spectrum, corporate farms with herds of more than 200 milking cows are absent from Armenia but present in Ukraine and, to a lesser extent, Moldova. The Ukrainian sample includes 6 farms with more than 500 milking cows each with the largest farm possessing 1,500 animals. This makes any discussion of the 'average farm' in Ukraine problematic. However while Ukraine has a dualistic farm structure this is unlike the Soviet era as the majority of corporate farms operate in a very different manner to the former *kolkhoz* and *sovkhoz* farms. In Armenia disparities in farm size are less marked.

3. GROWTH AND INVESTMENT

Table 2 Evolution of Mean Herd Size and Milk Yield per Cow (years 2001-2005)

			Mean Number of milking cows per farm			Mean yields (litres per cow)		
		Number	**2001**	**2003**	**2005**	**2001**	**2003**	**2005**
Armenia	Total	300	8.5	10.7	13.4	1905	2108	2246
Moldova	Households	289	1.6	1.9	2.2	3016	3055	3447
	Corporate farms	11	116.3	103.1	111.2	3293	3406	3529
	Total	300	5.2	5.6	6.2	3024	3068	3450
Ukraine	Households	288	1.5	1.5	1.5	4265	4261	4314
	Corporate farms	28	317.1	310	338.8	3583	3781	3924
	Total	316	28.6	28.8	31.3	4210	4218	4280
All countries		916	14.5	15.3	17.2	3057	3148	3342

Source: own calculations based on survey data

For the total sample, significant growth was recorded in both average herd sizes and yields for the period 2001-2005 (Table 2). Considering all countries and farm types between 2001 and 2005, the mean herd size rose from 14.5 cows to 17.2 and yields increased from 3,057 litres per cow per year to 3,342 litres. These aggregated figures however disguise important variations between countries and farm types. For Ukraine and Moldova a distinction is drawn between household and corporate farms but this cannot be made for Armenia because none of the sampled farms in this country were registered entities and all legally are classified as individual farmers. Comparing the data in Table 2 on a country by country basis, Armenia witnessed the sharpest growth, with increases of 58 and 18 per cent in mean herd size and yield respectively. In contrast, in Ukraine the mean herd size grew by less than 10 per cent and yields were almost unchanged. The data for Ukraine and Moldova however reveals significant variations between corporate and household farms. In Ukraine the growth in average herd size was entirely accounted for by corporate farms as households recorded no overall change. Similarly while yields were almost unchanged for household farms, they grew by 9 per cent on corporate farms. In Moldova, however, the number of cows kept by corporate farms declined while household farms witnessed a net increase of 1 cow on average. Likewise, the rate of growth in yields was almost twice as high on Moldovan household farms compared to their corporate counterparts. Another contrast between Moldova and Ukraine is that while absolute yields are higher on household farms, compared to corporate farms, in Ukraine the reverse is apparent in Moldova. Finally comparing the data in Table 2 with official statistics on yields, it is noticeable that the reported average for each country is significantly higher in

the sample. This may reflect how the survey focuses only on commercial producers and discounts solely subsistence farmers.

The survey also reveals important differences in investment behaviour between the three countries. The level of investment in the Ukrainian dairy sector is relatively low with less than 10 per cent of respondents making any investment in their farming operation in the past five years. Moldovan and Armenian farmers are investing more, especially in animal housing. Dairy specific investments are made mainly by Armenian farmers, with a total of 120 respondents out of 300 claiming investments in cooling tanks, milk lines, and cows and so on. In Armenia a positive correlation between farm size and propensity to invest is also observed.

4. MILK PRICES

Data were recorded on the mean milk prices received by farmers from their main buyer. This information was converted into Euros per litre for ease of comparison and we have excluded those farmers who sell directly to final consumers, so that prices reflect what is offered by intermediaries in the dairy supply chain. The mean price varies significantly between countries with the highest figure recorded for Ukraine (€0.1928 Euros per litre) and lowest in Moldova (€0.153). The average for Armenia is €0.1750. Noticeable differences in the spread of prices are also apparent: the standard deviations for Moldova and Armenia are far greater than the comparable figure for Ukraine. Comparing household and corporate farms, the latter receive a price premium, equivalent to an average of 1 euro cent per litre in Ukraine and 1.6 cents in Moldova. In explaining the variation in prices, competition plays an important part. Farmers were asked to estimate the number of realistic commercial buyers they had for their milk. Those farmers who had only 1 potential buyer received the lowest mean price, around €0.158 per litre. This figure rises to a mean price of €0.175 for two potential buyers, €0.180 for three potential buyers and over €0.19 for four or five potential buyers. This suggests that policy initiatives to improve farm welfare will have limited success where there is a lack of competition.

5. BUYER RELATIONSHIPS: TYPE AND SATISFACTION

Dairy processors are the most common main buyers of milk from farmers (Table 3). However there are significant variations between countries. In Armenia over three quarters of farms sampled sell directly to dairy processors while the comparative figure for Ukraine is just 11 per cent. In Ukraine over 90 per cent of household farms sell to dairy logistics / milk collecting firms. These firms, which are typically small-scale entrepreneurs, specialise in collecting milk from

household farms. As a result few Ukrainian household farms know which dairy processor is the eventual purchaser of their milk. Such intermediaries are required in Ukraine to deal with the extremely fragmented production base. In contrast, the majority of corporate farms (71.4 per cent) deal directly with dairy processors. In Moldova the majority of both household and corporate farms deal directly with dairy processors albeit with the latter category more likely to do so. Milk marketing co-operatives are important for household farms in Moldova and 'others' account for approximately one quarter of the main buyers for this group. Regarding the 'others' category, 96 per cent were classified as agricultural markets. Other cases cited were another farm, canteen, kindergarten and schools. In Moldova none of the corporate farms sold via a co-operative.

Table 3 Type of main buyer by Country (2005), %

		Dairy processor	Dairy logistics firm	Co-operative	Other
Armenia	Total	76.0	2.3	20.7	1.0
Moldova	Households	51.2	1.4	22.1	25.3
	Corporate farms	72.7	9.1	0.0	18.2
	Total	52.0	1.7	21.3	25.0
Ukraine	Households	5.6	91.3	0.0	3.1
	Corporate farms	71.4	25.0	0.0	3.6
	Total	11.4	85.4	0.0	3.2
All countries		45.9	45.9	30.8	13.8

Source: survey data

The vast majority of small-scale household farms in Ukraine sell to intermediary entrepreneurs without any form of written or oral contract. Prices are not set in advance but depend on current market rates and the intermediary makes no long-term guarantees to purchase milk. As a result household farmers in the Ukraine receive no *support measures*, where the latter can be defined as goods and / or services provided by buyers to farmers as part of their relationship. The prevalence of particular support measures in each country is detailed in Table 4.

Table 4 Percentage of farms in each country receiving a particular support measure from their main buyer

Support measure	**Ukraine**	**Moldova**	**Armenia**
Credit	0.0	0.7	30.7
Physical Inputs	2.2	9.3	16.3
Transportation	0.0	61.7	20.3
Specialist storage	0.3	48.7	2.0
Guaranteed prices	0.3	43.7	46.7
Veterinary support	0.0	10.0	23.7
Business and financial management support	0.0	18.0	4.0
Farm loan guarantees	0.0	0.3	4.0
Investment loans	0.0	0.7	1.7
Quality Control	4.4	84.7	82.7
Prompt payments	1.9	81.0	87.7
Market access	0.0	53.7	40.0
Mean number of support measures	**0.1**	**4.2**	**3.6**

Source: survey data

Support measures are far more extensive in Armenia and Moldova than Ukraine. The most prevalent types of support are prompt payments and quality control, which are received by over 80 per cent of farms in each country. Specialist storage (e.g. the provision of cooling tanks) is also important in Moldova. Around 30 per cent of farmers in Armenia also receive credit from their main buyer but this is untypical in Moldova. Farm loan guarantees (to enable a farmer to obtain bank credit) and investment loans are uncommon. Over forty per cent of farmers in both Armenia and Moldova receive a guaranteed price for their milk as stipulated in their contract. Overall, Ukrainian farms received a mean of 0.1 support measures compared to averages of 3.6 and 4.2 for Armenia and Moldova respectively.

The satisfaction of farmers with their relationship with their main buyer was measured according to a 5 point Likert scale, ranging from ‘very dissatisfied’ (coded 1) to ‘very satisfied’ (coded 5). On this measure, 1.5, 12.9, 20.6, 49.2 and 15.8 per cent were very dissatisfied, dissatisfied, and indifferent, satisfied and very satisfied respectively. The mean level of satisfaction in Armenia, Moldova and Ukraine was 4.02, 3.7 and 3.24 respectively, with the differences between countries (ANOVA, F-test) significant at the 1 per cent level.

To analyse the determinants of satisfaction in further detail, we apply an ordered probit model with the five point Likert scale as the dependent variable. Four independent variables were included in the analysis. *Trust* is a composite variable based on responses to seven Likert scale questions concerning the degree to which the main buyer kept their promises and refrained from opportunistic behaviour. These questions were derived from verified scales taken from the marketing literature. It was expected that there would be a positive relationship between *trust* and satisfaction with the main buyer relationship. *Price* is the average amount received per litre of milk from the farmer's main buyer, which was converted into Euros for cross-national analysis. *Payment date* is measured as the number of days on average farmers had to wait for payment after supplying their milk. *SMtotal* refers to the total number of support measures received by the farmer from their main buyer (as detailed in Table 4). The results for the model reveal significant positive associations for *trust* and *SMtotal* with relationship satisfaction. *Payment date* and price are not significant determinants of satisfaction. The latter may appear surprising but reflects the lack of variation in price and payment dates, particularly in Ukraine. As farmers lack contracts in Ukraine with milk collected by intermediary agents, payments are immediate with little variance in price between household farms.

6. CONCLUSIONS

The analysis reveals a varied set of supply relationships in the CIS. In Ukraine a dualistic farm structure is apparent. Household farms in Ukraine have 1 or 2 cows and sell principally to milk collecting entrepreneurs. They have neither contracts nor receive support measures. For these farms, investment and growth in herd size and yields for the period 2001 to 2005 was minimal. This group has the lowest relative satisfaction with their main buyer relationships. In both Moldova and Ukraine corporate farms receive a significant price premium over their household farm counterparts. Corporate farms also increased their yields during the period 2001 to 2005 but herd sizes were rather unstable, reflecting wider market volatilities. The standard deviation of herd size is substantially lower in Armenia than the other two countries studied, with the growth in yields and cow numbers being smoother and substantial. In Armenia most farmers have a contract with their main buyer and this country registered the highest mean level of satisfaction with their main buyer relationship.

An analysis of the determinants of farmer satisfaction with their main buyer relationship highlights the significance of trust and support measures. Research with dairy processors has identified the importance of such support measures in stimulating farm yields and improvements in quality. Our analysis shows that such support measures are also valued by farmers. Trust is an important issue for the farmers studied as the prevalence of opportunistic behaviour is rather high: 10 per cent of those with contracts report that their main buyer often or always fails to respect the terms of their agreement and a further quarter of farmers with contracts report that opportunistic behaviour has occurred, albeit infrequently.