



POLICY BRIEF

A summary for decision making of key research findings



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CAMS Policy Brief
December 2021

Value chain development: The critical role of Trust and cooperation

Summary

Efforts to establish and sustain value chains have been challenged by recurring problems mostly related to coordination, pricing and quality imperfections. The policy focus on technology generation without considering the underlying problems of market imperfections and institutional and socio-economic processes, has contributed to low technology adoption and limited development in the target value chains. Social norms and trust are keys in fostering cooperation among actors and increasing the efficiency of value chains. Trust is explored using social network analysis and gaming simulations to allow actors to experiment strategies of cooperation. In the dairy sector, these strategies lead to increased returns, improved quality of milk and better returns to all stakeholders.

Background

Imperfections in the dairy value chain include pricing mechanism, quality measurement, information asymmetries, and overall market failure. The lack of organization, coupled with the large number of stakeholders (small breeders, milk collection centers, large private producers, service providers, intermediaries, etc ...), has led to malfunctioning of the value chain. The coordination problem is strongly linked to the absence of organization among the different agents in the value chain. The narrow policy focus on biophysical technology generation and dissemination, without considering the underlying problems related to institutions and social norms such as trust and cooperation has contributed to low technology adoption and limited broader development in the dairy sector.

Key messages

- *Building trust is crucial to linking actors and strengthening cooperation and coordination along the value chain. This ensures a sustainable dairy production.*
- *Trust and cooperation are requisites to adopt innovations, to deliver better product quality and therefore to ensure better returns to farmers.*
- *Product quality, price attributes, and farmers' socio-economic characteristics are important indicators to build a business model which addresses the trust and coordination problems in the value chain.*
- *Gaming is a support tool to build these values. Game simulations allow farmers to experiment cooperation and therefore have significant practical implications on the management of the dairy sector and the value chain.*
- *Farmers involved in game experiments are willing to improve the quality of milk according to the payment to quality scheme. This ensures sustained supplies and higher quality.*
- *Traders and collection centers shall develop competence and credibility signals, such as regular communication and information sharing to create an enabling environment to integrate farmers in the value chain.*
- *Farmers appreciating the signals of competence would better judge and trust their partners, and chose formal channels instead of informal ones.*

Methodology

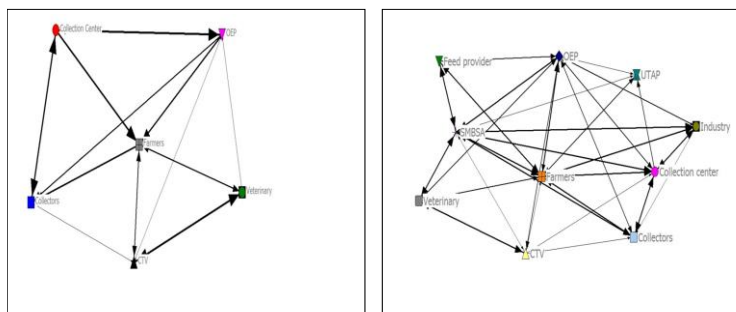
A game experiment was carried out in two regions and in four sessions each. Results show that benefits to breeders are derived from the price of milk which is determined by the number of cooperation in the repeated games strategies. The resulting Nash equilibrium is one where farmers cooperate without cheating. This solution avoids farmers the risk of rejection of milk and results in price increase as a result of the collective cooperative action. The game data was combined with that of a survey administered beforehand to investigate what determines trust. At the beginning of the game, each farmer received in pretend money 1000 TND. Farmers were then given

cards on which they could write the percentage of high-quality milk that they decided to produce and their preference for cooperating or not. A dice is used to determine the quality that the farmer produced; the milk was either accepted or rejected. The methodologies adopted were based on participatory approaches, social network and gaming simulation. They are revolutionary tools to study human behaviour and the various interactions and links between the stakeholders of the value chain. These interactions determine coordination and cooperation between stakeholders and are based here on informal rules of trust and cooperation

Key findings





Social network mapping: Participatory rural appraisal was used. Indicators of the organized group of farmers show better cooperation and integration than those in the non-organized group of farmers.

Figure 1 Social map for organized and non organized groups



Gaming simulation: Results show that the utility (profit) of farmers increases when cooperation increases during the four sessions of the game. These conditions are conforming to finite repeated game. The combined strategy cooperation and trust is a Nash equilibrium. This could be reasonable if there is a long interrelationship that leads players to form opinions about how others play. It could also be reasonable if there is a social convention or a consensus or an agreement adhered to by the other players. In other words, no player has the interest of unilaterally deviating if he correctly guesses the strategies of the other players.

Table 1 Results of the four sessions' game experiment (Cheating C and Non Cheating NC)

Dice	Cooperation				No cooperation			
	Nb. Players	Price	C	NC	Nb. Players	Price	C	NC
Session1 	0	Pr1	0	0	10	Pr1	(10 ; -75;10 ;10 ;15)	(10 ;10 ;10 ;10, 10)
Session2 	2	Pr2	0	(30 ;30)	8	Pr1	(10 ;25 ;15 ; 15)	(10 ;10 ;10;10)
Session3 	4	Pr3	0	(45 ;45 ;45 ;45)	6	Pr1	(15 ;10)	(10 ;10;10 ;10)
Session4 	5	Pr4	0	(60 ;60 ;60 ;60 ;60)	5	Pr1	(-75 ; -95)	(10 ;10 ;10)
Total utility			0	520			-110	160
Average utility			0	47,2			-8,46	10

If a player looks at a strategy profile as a social convention, no player would want to deviate when he or she thinks the other players are following the convention. Even if deviations from reality have been revealed, the farmers consider that this schematic representation of the reality proposed in the game allows them globally to evolve as in the real value chain. They find there a certain number of rules they share with each other. The rules, behaviours, interactions and processes represented here in this study are not exhaustive

Conclusions

This study showed the importance of building trust in the dairy value chain. The methodologies adopted were based on participatory approaches such as PRA, social networks and gaming simulations. They are revolutionary tools to study human behaviour and the various interactions and links between the stakeholders of the value chain. The adoption of these experimental tools is useful to understand farmers and other stakeholders' behaviours and the factors limiting trust and cooperation. These interactions determine coordination and cooperation between stakeholders and are based here on social norms of trust and cooperation. Stakeholders along the value chain need to develop signals of competence such as regular communication and pricing schemes that encourage farmers to cooperate and trust their partners.

Acknowledgement

Financial support for this research was provided by the *Institution of Agricultural Research and Higher Education (IRESA)*, Ministry of Agriculture and Water Resources, Tunisia.

References

Readers may find more information about this research and results in published papers by the authors:

- Msaddak, M., J. Ben-Nasr, J. and L. Zaibet. 2021. Dynamics of Trust and Cooperation in the Dairy Value Chain: A Game Simulation Approach. *Journal of International Food and Agribusiness Marketing* 33(4):353–373.
- Msaddak, M., J. Nasr., L. Zaibet. 2019. Resolving recurrent imperfections of the dairy production using gaming simulations. *New Medit* (4):35-49.

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