



Inter-Agency Task Force on
Social and Solidarity Economy

Role of Dairy Cooperatives in Achieving the Economic Dimension of the SDGs

Experiences and Lessons Learnt from India

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**Implementing the Sustainable Development Goals:
What Role for Social and Solidarity Economy?**

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Abstract

Indian government has made efforts to accelerate systematic promotion of dairy cooperatives (DCs) through financial and policy support. The study was an attempt to analyze contribution of DCs to economic dimension of sustainable development goals (SDGs) and to draw lessons to strengthen contribution of DCs to economic dimension of SDGs, and to suggest recommendations to enhance role and recognition of DCs in achieving SDGs. DCs are value-based and principle-driven sustainable and participatory organizations with emphasis on democratic practices, social inclusion, gender equality, job security, better working conditions, competitive wages, additional income via profit-sharing and distribution of dividends, and self-help community facilities and services to support achievement of SDGs. DCs and the social economy can make substantial, if not unique, contributions to achievement of economic dimensions of SDGs. Therefore, there is need to harness the potential of DCs in achieving SDGs, for which DCs should focus on implementation, financing, and partnership to achieve a few targets with greatest cooperative potential such as eradicating extreme poverty, facilitate access to assets, resources and services, progressively achieve and sustain income growth of very poor, and empower women, for which robust dairy cooperative policies, laws and institutions are highly desirable.

Keywords

Dairy cooperatives, Economic dimension, Sustainable Development Goals, Lessons learnt, India

Bio

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Introduction

Cooperative enterprises are the largest organization in the world, wherein 2.6 million cooperative societies employ over 1 billion members directly or indirectly with a combined turnover of US\$3 trillion (Grace 2014). Cooperatives are central to realizing the sustainable development goals (SDGs), most suited to address all dimensions of reducing poverty and exclusion by identifying economic opportunities for their members, empowering the disadvantaged, providing security and converting individual risks into collective risks by generating income. Cooperatives promote gender equality by expanding women's opportunities in local economies and empowering them to take leadership roles in decision making. Farmers' cooperatives increase small farmers' access to inputs, credit and market outlet, voice their concerns and interests, increase their negotiating power to influence policy making processes, food security and nutrition as well as incomes. Cooperatives generate sustainable employment opportunities, which are less likely to be negatively affected by cyclical downturns (Birchall 2013), thereby more likely to enhance longer-term financial and human capital investment (Brown 2014) based on democratic governance and joint ownership (Bajo and Roelants 2013). Cooperatives provide equitable opportunity for sharing of resources and promote greater role in decisions affecting the lives of members, fostering opportunities for decent work and social inclusion in participatory and transparent manner (ILO 2003). Promotion of cooperatives is widely viewed as the most important institutional arrangement for spurring dairy development in India. Indian government has made efforts to accelerate systematic promotion of dairy cooperatives (DCs) through financial and policy support. In 2017, 16.3 million dairy farmers (about 20% of total dairy farmers) with about 48% women members were associated with 180,000 dairy cooperative societies (DCSs) in India, which procured an average of 42.8 million kg of milk per day and sold 33.1 million litres of liquid milk per day (NDDB 2017). With above backdrop, the study was an attempt to analyze contribution of DCs to economic dimension of SDGs and to draw lessons to strengthen contribution of DCs to economic dimension of SDGs, and to suggest recommendations to enhance role and recognition of DCs in achieving SDGs.

Methodology

The study has identified targets that addressed economic dimension of DCs, and among those to whose achievement DCs could make an important or useful contribution, and among those where contribution was seen as dairy cooperative (DC) specific. The study has identified DC-specific SDG targets linked with economies of scale, increased bargaining power, voice and representation of producers through a DC, the self-help and voluntary character of DCs to successfully deal with large and dispersed members and more outreach capacity and local rootedness and community orientation. Main thrust of study was to evaluate the impact of Intensive Dairy Development Programme (IDDP) launched by Government of India in non-Operation Flood areas. The study was conducted in six geographical zones of India i.e. North, South, West, Central, East and North-East. After selecting projects over six zones, one representative State has been selected from within six geographical zones. Selection of representative State was based on resources allocated for dairy development at State level. Further distribution of total project in sample State between completed projects and ongoing projects provided basis of number of sample projects within State. Thus, approximately 30% of total projects (i.e. 24 projects) were taken for a representative sample by assigning due weights to completed projects and on-going projects. In consonance with objectives of study, a multi-site evaluation approach was adopted to collect necessary primary and secondary data and

information. Multi-stage stratified sampling design was followed for selection of households for study. Sampling units at different stages included districts, DCSs, members of DCSs, non-member households of DCSs, control villages and households of control villages. A total of 74 DCSs under IDDP and 72 villages have been selected from 24 projects. From each of selected villages, 20 households consisting of 15 beneficiaries and 5 non-beneficiaries households were interviewed. In all, a total of 1440 households were interviewed from 72 villages in 24 projects. Quantitative and qualitative information was generated by collection of primary and secondary data through structured interview schedules and focus group discussions with relevant stakeholders. Data has been analyzed using descriptive statistics and content analysis techniques.

Literature Review

DCs have ability and governance structure to help members achieve SDGs. Dairy farming involves high market dependency and socio-economic values (Bor 2014), wherein DCs help dairy farmers to vertically integrate to countervail power against oligopolistic powers in distribution and retailing (Van der Krogt, Nilsson and Høst 2007) by organizing dairy supply chains with better strategic logistics between production, processing and distribution (Berre et al. 2014) in emerging markets (D'antoni and Mishra 2012) and reducing financial risk and economic uncertainty faced by members in a mature market (Maynard 2009) due to increasing volatility in milk and feed prices (Wolf and Widmar 2014) and paying dairy farmers the milk price at levels that far exceeds market prices (Charlebois and Labrecque 2009), when markets are volatile or even depressed (Yoo, Buccola and Gopinath 2013) through democratic governance structure controlled by dairy farmers and managed by employees with appropriate skill sets, which help maximize returns and minimize costs of processing inputs, thereby reduce transaction costs (Labrecque, Dulude and Charlebois 2015).

DCs strengthen members' bargaining power to ensure more competitive prices for inputs and outputs, improve information symmetry, and improve agro-food safety and quality standards (Trebbin 2014), improve connection between farms and dairy processing to increase productivity and milk quality and to secure milk safety across supply chains (Yu 2012), offset undesirable negative externalities generated by supply and demand imbalance due to seasonal patterns of milk production and consumption (Washington, Kilmer and Weldon 2002). The organizational structure of DCs hinder their access to external financial resources (Grau, Hockmann and Levkovych 2015), however, DCs use effective economic instruments to develop markets for value added products even at higher transactional costs compared to private companies due to strategic purpose and intent (Charlebois and MacKay 2010).

DCs tend to adopt values intrinsic to agriculture, which help dairy farmers meet the increasing quality requirements of value chains (Acosta and Valdés 2014), even when external environment may influence their ability to implement effective quality management (Faysse and Simon 2015). Uncertain behaviour of members of DCs has a direct and negative effect on overall performance (Charlebois and Hielm 2014), for which management of DCs use a variety of mechanisms to select members, monitor performance and socialization opportunities to reduce performance shortcomings and enhance relationships (Rindfleisch and Heide 1997). Sometime, uncertain regulatory and socio-economic environments tend to negatively affect the

performance of DCs, which can have significant operational, financial and market-oriented implications (Marcos-Matas, Hernandez-Espallardo and Arcas-Lario 2013).

In India, DCs led to a significant increase in milk production and yield, decrease in cost of milk production, reduce transaction costs of accessing inputs, information, technology, and markets, and a realization of higher prices and profits (Kumar, Staal, and Singh 2011). DCs' membership also has a significant impact on compliance with food safety measures (Kumar, Shinoj, and Jee 2013). In India, DCs are yet to fully utilize dairy plant capacity for business prosperity by diversifying their products to open new avenues for milk production and marketing (Subburaj 1987). Management of milk collection, procurement, processing, marketing and other similar activities for milk and milk products under DCs would be an economic viable proposition. Establishment of milk producers cooperative societies (MPCSs) in rural areas had positive impact on marketable surplus of milk (Singh and Rai 1998) and provided more employment to young milk producers (Kakade and Bagade 2001). Therefore, MPCSs can include more dairy farmers to increase membership, purchase and supply high yielding varieties of milch animals, benefit local population, start new retail sales outlets, conduct awareness camp, collect waste dung to utilize as manure and fuel, and produce gas for cooking (Muruganandan 2004). DCs ultimately operates through its MPCSs, which have a lower inventory and better turnover compared to private dairy companies (PDCs) and need to make payments to its farmer members promptly and revise their credit policies frequently to maintain competitive edge (Verma 2008). Some women managed DCs are successfully engaged in milk processing and marketing based on scientific training in cattle-farming, management of collection centres, and use of automated devices and computerized billing system (Kolte 2010).

Main Findings

The Government of India (GoI) has promoted DCs through financial and policy support after initiation of the Operation Flood in 1970. India was the world's largest producer and consumer of milk at 19% of the world milk production in 2017, with 57% of world buffalo and 16% of world cattle population. DCs collectively procured 13.9 million tonnes of milk and marketed 11.7 million tons of liquid milk. Falling milk prices led to significant increase in milk procurement and increase in stocks of conserved milk commodities by DCs. Average productivity of milk cattle and buffalo is 4.65 Kg per day which is significantly low compared to dairy developed nations. In India, dairying has broader social and economic dimensions, wherein about 70 million rural households are engaged in dairying and contributes 26% income of the poorest households and 12% of rural income in 2017 (NDDDB 2017). The National Dairy Development Board (NDDDB) continued its efforts to influence State Government policies to enable DCs to function as true social enterprises benefiting small and marginal dairy farmers. With increasing uncertainty in rainfall and its adverse effect on crop production, dairying is increasingly becoming a major source of income to small and marginal farmers. DCs procure as little as one litre of milk from members and provide them an assured market for selling milk. As the price paid to producers for milk collected from them is based on its quality, which is measured at collection point itself, milk producers are assured of a fair price. Various services provided by DCs include doorstep Artificial Insemination (AI) services, sale of cattle feed and mineral mixture and knowledge dissemination on better animal management practices, which enables milk producers to increase productivity thereby reduce costs and increase income from milk production.

Dairy sector has demonstrated a significant growth in the last decade. In India, milk production has increased at 4.8% compound annual growth rate (CAGR), reaching 163.7 million metric tonnes (MMT) in 2016-17 from 155.5 MMT in 2015-16. Recent financial inclusion initiative through the Digital India programme has made significant contribution in payments to about 70 lakh out of 96 lakh members of DCs through banking system in 2016-17. The NDDDB's initiatives have improved the livelihood of dairy farmers, empowered women dairy farmers, improved operations of Cooperative Milk Unions (CMUs) and increased income of dairy farmers. Financial inclusion of producer members of village Dairy Cooperative Societies (DCSs) was also encouraged by opening their individual bank accounts. In 2017, 21611 villages were covered by new DCSs or strengthening of existing DCSs using bulk milk coolers and advanced testing facilities. About 5.54 lakh new members were roped in and 5.58 lakh existing members benefited from improvements in milk collection system (NDDDB 2017). Demand for milk and milk products has been rising due to increasing population, rising disposable income, changing lifestyle, food habits and export opportunities.

DCs have continued to support their members by ensuring that price paid to them is not reduced, which has resulted in excessive supply of milk and accumulation of large quantity of Skimmed Milk Powder (SMP). PDCs have pushed down prices to very low levels, thereby affecting farmers' income and viability of smallholder dairy farms. With increase in milk production and marketable surplus, DCs are likely to increase their coverage and milk procurement. In 2017, DCs have milk processing capacity of 66 million litres per day (NDDDB 2017), however, most of milk processing plants were commissioned more than two decades ago and have not been expanded or modernized since 1996. Therefore, there is need of expanding existing plants and establishing new plants to handle increased milk procurement in future. Democratic governance of DCs has been ensured by providing trainings to members of management committee. Efforts were made to develop cooperative structures in new areas by making dairying an attractive source of livelihood for milk producers.

In 2018, the Department of Animal Husbandry, Dairying and Fisheries (DAHD&F), Ministry of Agriculture and Farmers Welfare has prepared a National Action Plan (NAP) which covers the existing coverage of milk potential villages, farmer members, farmers income, growth of milk production, milk procurement, and existing milk chilling and processing infrastructure. Under the NAP, 2018, the Government of India has planned to increase the national milk production from 163.7 million in 2016-17 to 254.55 million by 2021-22 for meeting increasing milk demand by domestic milk production and also ensuring nutritional security at household level. Currently, 48% of total milk produced is either consumed at producer level or sold to non-producers in rural areas and 52% of milk is marketable surplus for sale to consumers in urban centres, of which 40% of milk sold is handled by organized sector including DCs and producer companies (20%) and private dairies (19%) and the rest by unorganized sector. It is planned to increase marketable surplus of milk to 60% by 2021-22, which is mainly to be handled by organized sector to improve livelihoods and economic well-being of milk producers as a part of doubling farmer's income by 2022 (MoA&FW 2018). This would require creation of additional chilling capacities, milk processing infrastructure along with additional drying capacities, dairy products manufacturing infrastructure and feed and feed supplement infrastructure.

Experiences from Field Survey

The study reveals that 61.7% and 32.8% of households' members of DCS have educational attainment up to secondary and post-secondary level respectively in beneficiary category compared to 53.2% and 37.5% households respectively in non-beneficiary category. About 16.3% of beneficiary households were self-employment in animal husbandry. Average annual income of beneficiary households stood at 32% higher than non-beneficiary households. Dairy contributes 25% and 30.21% to total income and total agricultural income of beneficiary households. DCSs have resulted in significant improvement in income of 60% of members and 83% of them were above poverty line, 69% food secure, 58% with better housing condition, 89% with access to electricity, 73% depending on tap water, 44% with subsidized self-help micro credit, 56% with comparatively more assets, 66% with improved nutritional and health services, and 83% of women members of DCs were actively participating and making decisions in meetings. Therefore, dairy has a vital role in increasing the income and reducing poverty and food security, better housing, electricity and water access, sustainable financial inclusion and asset possession, improved nutritional and health security and improved gender equality and women empowerment of the farming community and sustaining agriculture in the wake of ongoing agrarian crisis and economic slowdown and needs to be strengthened.

Value of milk per litre for beneficiary households was comparatively low except milk of local buffalo because they were selling their produce to DCs at lower prices, whereas non-beneficiary households were selling their milk directly to retailers or other middlemen at somewhat higher prices. Middlemen have kept their milk procurement prices slightly higher to attract more dairy farmers towards them, though they were fraught with numerous problems like delay in payment and even non-payment which caused severe hardships to dairy farmers, however, farmer members of DCs were receiving regular for their milk supplies. Beneficiary households were consuming a significant part of milk produce within family thereby adding to nutritional security of households, specifically children. Thus, DCS has not only increased income and financial status and reduced poverty but also contributed significantly in improving nutritional status.

On average, each DCS has 108 members, comparatively more male (72) than female members (37). There were 12 DCS with exclusive membership of women, which were confined to Orissa (5), Andhra Pradesh (4) and one each in Madhya Pradesh, Maharashtra and Sikkim. Thus, process of women empowerment through DCs has been initiated. Democratic process of formation of DCS has been adopted in 41.9% of DCS, where they were formed through proper election of the executives including the President, the Secretary and other members. In 39.2% and 18.9% of DCS, they were formed by selection and nomination respectively. Democratically formed and functioning institutional arrangements are more viable, equitable and sustainable, which should be promoted and strengthened. About 80% of members have attended DCS meetings regularly and of them a significantly high proportion (90.9%) has participated in decision making, which clearly reflects democratic functioning and decision making process adopted in DCS and needs to be strengthened further. Significantly, women members of DCS were reportedly participating in meeting and influencing their functioning in case of all DCS in Andhra Pradesh, Maharashtra and Sikkim. Greater participation of women in affairs of DCS has helped in addressing their genuine grievances and addressed gender inequality in decision making.

The proportion of households aware of various services provided by DCS stood at 81.9% (improved cattle), 77.9 (breeding animal), 75.1% (AI), 73.7% (marketing), 73% (basic knowledge of animal health care), 71.1% (quality fodder) and 58% (milk processing). However, the level of awareness differs significantly across selected states. Awareness regarding dairying services being offered by DCS was reportedly very high in Orissa and very low in Andhra Pradesh and Madhya Pradesh. Thus, there is need to take concerted efforts to improve awareness regarding services being offered by DCS so that more and more beneficiary households may avail those services and improve the outcomes. Due to modest level of awareness of various dairy services and consequent low provisioning of services like supply of cattle feed and green fodder seed, AI, and vaccination against diseases is really worrisome and calls for concerted efforts to make the existing institutional arrangements more robust and efficient and DCS should be equipped with all necessary basic facilities and infrastructure to perform their tasks effectively, failing which intended goals of the programme will be a distant dream to be realized.

DCs have been provided with facilities of managerial grant, purchase of milk testing machine, furniture, milk cans and construction of dairy and chilling plants. However, these facilities have not been provided on uniform and universal basis to each DCS in selected states. For instance, managerial grant has been provided to as high as 80% of DCS in Sikkim and as low as 11.1% of DCS in Andhra Pradesh. Assistance for purchase of milk testing machine has been provided to as high as 90.9% of DCS in Madhya Pradesh and as low as 42.9% of DCS in Maharashtra. Surprisingly, none of DCS has received any assistance for construction of dairy and chilling plants in Andhra Pradesh and Madhya Pradesh. In Andhra Pradesh, none of DCS reportedly received any assistance for purchase of milk testing machine and furniture. Overall, Andhra Pradesh has received lowest level of assistance for basic infrastructure needed for cooperative dairy development under the IDDP. Thus, there is urgent need to provide basic infrastructural support to DCS for effective and efficient performance, failing which intended goals of scheme would not be achieved.

Orissa has improved its performance comparatively more after the scheme than other selected states. Low performing states have to take vigorous efforts to improve their performance further so that overall performance of programme could be increased. Increase in dairy outcomes, impact indicators, qualitative outcomes and impact on women has also been comparatively more in beneficiary households than non-beneficiaries households and nearly two-third of beneficiary households were satisfied by functioning of DCS in selected states. However, DCS have faced numerous managerial problems in its smooth functioning in selected states, which includes large gap between milk procurement and market prices, diversion of marketed milk surplus, inadequate transport facility, and factional tendencies among DCS officials and above all misappropriation of benefits by DCS officials and their associates with varied degrees across selected states. All this calls for strict regulation and its monitoring and implementation for ensuring reasonable gap between milk procurement and market price and minimum diversion of marketed milk surplus away from the DCS. Besides, transport facilities needs to be improved vigorously to ensure speedier procurement and disposal of milk and milk based products. Factional disputes and conflicts as well as misappropriation of benefits of the scheme need to be curtailed to optimize the outcome. Overall, the objectives of programme have not been realized to fuller extent. Since, in the successful cases, the scheme has rendered the intended benefits

(income/employment/poverty reduction), the programme holds the potentials if success stories are multiplied. Three aspects are critical to the success of programme, which includes raising the local milk production for adequate marketable surplus, effectiveness of DCSs as facilitators for delivery of inputs and procurement of marketable surplus, and viability and sustainability of the operation of DCSs.

Summary table of the results and recommendations

Results	Recommendations	SDG targets
About 52% of milk is marketable surplus, of which 40% of milk sold is handled by organized sector including DCS and producer companies (20%) and private dairies (19%) and the rest by unorganized sector.	Increasing marketable surplus of milk through DCS call for creation of additional chilling capacities and milk processing infrastructure. along with additional drying capacities and dairy products manufacturing infrastructure.	Goal 8: Decent Work and Economic Growth Goal 12: Responsible Production and Consumption Goal 17: Partnerships to achieve the Goal
About 61.7% and 32.8% of beneficiary households' members of DCS have educational attainment up to secondary and post-secondary level respectively.	Smaller DCS cannot afford to recruit professional managers, which needs to be addressed through training, education, and appropriate advisory and support services.	Goal 4: Quality Education
DCSs have improved income of 60% of members and 83% of them were above poverty line, 69% food secure, 58% with better housing condition, 89% with access to electricity, 73% depending on tap water, 44% with subsidized self-help micro credit, 56% with comparatively more assets, 66% with improved nutritional and health services, and 83% of women members of DCS were actively participating and making decisions in meetings.	DCs have increased the income and reduced poverty and improved food security, housing, electricity, water access, nutritional and health security, gender equality and women empowerment in the wake of agrarian crisis and economic slowdown, which needs to be strengthened. Democratically formed and functioning institutional arrangements are more viable, equitable and sustainable, which should be promoted and strengthened.	Goal 1: No Poverty Goal 2: Zero Hunger Goal 3: Good Health and Well-being Goal 5: Gender Equality Goal 6: Clean Water and Sanitation Goal 8: Decent Work and Economic Growth Goal 10: Reduced Inequality Goal 17: Partnerships to achieve the Goal
Awareness of various services provided by DCS stood at 81.9% (improved cattle), 77.9 (breeding animal), 75.1% (AI), 73.7% (marketing), 73% (basic knowledge of animal health care), 71.1% (quality fodder) and 58% (milk processing).	Concerted efforts should be made to improve awareness regarding services being offered by DCS so that more and more beneficiary households may avail dairy services and improve the outcomes.	Goal 12: Responsible Consumption and Production Goal 15: Life on Land Goal 17: Partnerships to achieve the Goal
DCs have been provided with facilities of managerial grant, purchase of milk testing machine, furniture, milk cans and construction of dairy and chilling plants, but not on uniform and universal basis to each DCS in selected states.	There is urgent need to provide basic infrastructural support to all DCS uniformly for effective and efficient performance, failing which intended goals of scheme would not be achieved.	Goal 9: Industry, Innovation and Infrastructure Goal 12: Responsible Consumption and Production Goal 17: Partnerships to achieve the Goal

Lessons Learnt and Recommendations

The cooperative enterprises are best suited to meet economic dimensions of SDGs such as reducing poverty and exclusion by identifying economic opportunities for their members, empowering the disadvantaged to defend their interests, providing food, nutritional and health security to the poor by allowing them to convert individual risks into collective risks, and mediating member access to assets that they utilize to earn a living. DCs are value-based and principle driven sustainable and participatory organizations with emphasis on democratic practices, social inclusion, gender equality, job security, better working conditions, competitive wages, additional income via profit-sharing and distribution of dividends, poverty reduction, food, nutritional and health security, women empowerment and increased decision making and self-help community facilities and services to support achievement of SDGs. Poverty alleviation was one of the goals of DCs by mobilizing self-help mechanisms to create opportunities and social protection and facilitating empowerment of unprotected dairy farmers through joint, equitable and democratic ownership and management of resources, enhanced resilience by reducing financial and economic uncertainty based on the principles of mutuality, solidarity and reciprocity. DCs have been built upon a common and universal set of values and principles by building horizontal networks (unions) and vertical structures (federations) to enhance voice and representation of members and primary dairy cooperative societies. DCs and dairy-specific self-help groups enable the poor members to purchase food at lower prices and sometimes against credit. The values and principles of DCs motivate their members to sell only healthy and nutritious milk by increased milk supply and thus decreased milk prices due to enhanced dairy productivity by generating economies of scale and scope through the joint use of modern and/or expensive equipment, the division of labour between members, joint pre- and post-production services like input supply and output marketing, and the exchange of knowledge and innovation. Dairy unions and federations have shared information on prices and markets, which limited extreme milk price volatility.

Sustainable growth of dairy sector is essential for improving nutritional security, economic prosperity, poverty reduction and livelihood, and greater gender equality and women empowerment for which rural milk producers should be provided with greater access to organized milk processing in DCs to ensure remunerative prices and sustainable livelihood option. In major milk producing states of Gujarat, Karnataka, Maharashtra, Rajasthan, Tamil Nadu and Andhra Pradesh, coverage of DCs in quantity of milk procured through more coverage of DCS and its membership is relatively high, which account for 77% of total milk collected by DCs. There is not much scope for increasing the members or organizing new villages level DCSs in these states, which calls for increasing the volume of milk procurement by increasing share of productive animals in the existing herd and their productivity. In states of Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, Orissa, West Bengal, Bihar, Chhattisgarh and Jharkhand, the coverage of DCs is moderate or low, wherein there is need for establishing new DCs along with institutional strengthening of existing DCs. About 70% of Indian rural women are engaged in dairying; therefore, engaging more women in DCs would be an appropriate strategy for their empowerment, which has been low in eastern and northern regions. Therefore, special efforts should be made in these regions to increase the women membership in DCs.

Cooperatives cannot be a miracle solution to every problem but can be the best solution specifically in dairy and agriculture sector by focusing on those goals and targets for which they are best suited. The targets of SDGs with the greatest cooperative potential in dairy sector

includes targets related to eradicate extreme poverty for all people everywhere and reduce at least by half the proportion of population of all ages living in poverty in all its dimensions including the targets that seek to facilitate access to finance, markets, food, water, land, and ICT and progressively achieve and sustain income growth of very poor population. Sustainable growth of dairy sector is essential for improving nutritional security, economic prosperity and livelihood, for which rural milk producers should be provided with greater access to organized milk processing in DCs to ensure remunerative prices and sustainable livelihood option. Greater participation of women has been ensured through legislative measures to promote gender equality, including through improved access to resources and ownership in DCs. DCs have also used cooperative values and principles in enhancing water supply through renovating and maintaining water harvesting structures for increased access to water for dairying and agricultural activities resulting in increased production and productivity, thereby contributing significantly to economic growth.

Besides, DCs have potential for joint development of innovations and sharing among members. With suitable dairy cooperative development policy along with appropriate legal and institutional framework, DCs are conducive for joint entrepreneurship, creation of decent jobs, bridging the gaps between informality and formality, improved access to finance, and employment generation through member-ownership, joint contracting, and facilitate access to resources, markets, land and finance. More rural youth are engaged in dairy cooperative entrepreneurship based on the principles of equality, mutuality, and democratic governance and management. Joint marketing, finance, processing, and other services through horizontal cooperation and vertical integration enable members of DCs to achieve higher value chain through processing and fair milk and related trade. Recent surge in community-based internet access and information and communication technologies have also been used by members of DCs for better marketing. DCs are oriented towards equality and greater social justice to enable poorer members to reap a greater share of benefits from collective action and provide a robust platform to interface with enabling small-scale producers, dairy farmers and consumers in cities and overseas for mutual benefits based on effective, accountable and inclusive institutions based on cooperative values, principles and governance structures.

Dairy cooperative policies, laws and institutions are not still fully conducive to the emergence and proper functioning of genuine, democratically controlled and economically viable DCs in India. Despite significant progress in recent past, DCs are confronted with leakages and fraud. Most of district DCs are not big enough to reach the economic break-even point, and small enough to ensure democratic governance and management. Appropriate and democratically controlled vertical cooperative structures may solve the dilemma of the optimal size. Smaller DCs cannot afford to recruit professional managers well versed with democratic management, which needs to be addressed through training, education, and appropriate advisory and support services. Realizing SDGs require cooperation, but not necessarily formal, registered, fully-fledged cooperatives. Therefore, keeping in view the level of education and management skills of members of DCs, they must stay true to their values while adjusting to the realities in a dynamic world.

In India, the ‘Anand Model’ of dairy development is an effective institutional policy framework. Therefore, similar institutional models involving small dairy holders should also be created such as the Cooperative Dairy Company, Producers’ associate production/non-government organization (NGO)/Contract dairying farming, and Private-Cooperative

participation by introducing suitable policies. Besides, similar institutional models should also be replicated in other agri-business sector so that, with larger employment generation at the grassroots, rural-urban migration could be reduced. The basic concept of Anand Model, a producer owned institution, managed by professionals appointed by them are missing in DCs. Besides other newer policy initiatives/institutional systems should also be explored to correct the major weaknesses in the Indian dairying industry. The 'Anand Model' of cooperative dairy development should be the answer to foster the growth of small dairy holders both at the regional as well as national levels. However, there are problems in propagation of such a model, particularly where the government interventions are high and the basic structure of the model is being diluted.

The national strategy should be to sustain the basic character of Indian dairying and to deal with competitive environment, arising out of globalization. Making a real impact on the ground, however, will require going beyond identification of constraints, policy prescriptions/options and institutional models. A close examination of policy processes, including legislation, will be the first step towards identifying ways of empowering the farmers with political voice and influence, which calls for securing commitment at the highest political level and nurturing appropriate dairy organizations and leaders. This would enable cooperative institutions to become an effective tool for fostering the growth of small dairy holders. Besides, building credible alliances with NGO's, dairy education institutions, as well as the private/corporate sector participation will play a crucial role in this endeavour. In sum, DCs and the social economy (SE) can make substantial, if not unique, contributions to achievement of economic dimensions of SDGs. Therefore, there is need to harness the potential of DCs in achieving SDGs. DCs should focus on goals and targets for which they are best suited. DCs and SE should focus more on implementation, financing, and partnership to achieve a few targets with greatest cooperative potential such as eradicating extreme poverty, facilitate access to assets, resources and services, progressively achieve and sustain income growth of very poor, and empower women, for which robust dairy cooperative policies, laws and institutions are highly desirable for achieving SDGs in SE.

Bibliography

- Acosta, A., and Valdés, A. "Vertical Price Transmission of Milk Prices: Are Small Dairy Producers Efficiently Integrated Into Markets?" *Agribusiness* 30, no.1 (2014): 56-63.
- Bajo, C. S., and B. Roelants. *Capital and the Debt Trap: Learning from Cooperatives in the Global Crisis*. Hampshire: Palgrave Macmillan, 2013.
- Bernard, T., Taffesse, A.S., and Gabre-Madhin, E. "Impact of Cooperatives on Smallholders' Commercialization Behaviour: Evidence from Ethiopia." *Agricultural Economics* 39 (2008): 147-61.
- Berre, David; Blancard, Stéphane; Boussemart, Jean-Philippe; Leleu, Hervé; and Tillard, Emmanuel. "Finding the Right Compromise between Productivity and Environmental Efficiency on High Input Tropical Dairy Farms: A Case Study." *Journal of Environmental Management* 146 (2014): 235-44.
- Birchall, J. *Resilience in a Downturn: the Power of Financial Cooperatives*. Geneva: International Labour Organization, 2013.
- Bor, Ö. "Economics of Dairy Farming in Turkey." *International Journal of Food and Agricultural Economics* 2, no. 4 (2014): 49-62.

- Brown, R. "The Performance of Employee-Owned Businesses in Scotland: Some Preliminary Empirical Evidence." in Fraser of Allander Institute Economic Commentary: 37, no. 3 (2014): 108-17.
- Charlebois, S., and Labrecque, J. "Socio-Political Foundations of Food Safety Regulation and the Governance of Global Agrifood Systems." *Journal of Macro-marketing* 29, no. 4 (2009): 363-73.
- Charlebois, S., and MacKay, G. *World Ranking: 2010 Food Safety Performance*. Regina/Saskatchewan: Johnson-Shoyama Graduate School of Public Policy, 2010.
- Charlebois, S., and Hielm, S. "Empowering the Regulators in the Development of National Performance Measurements in Food Safety." *British Food Journal* 116, no. 2 (2014): 317-36.
- D'antoni, Mishra. "Determinants of Dairy Farmers' Participation in the Milk Income Loss Contract Program." *Journal of Dairy Science* 95, no. 1 (2012): 476-83.
- Faysse, N., and Simon, C. "Holding All the Cards? Quality Management by Cooperatives in a Moroccan Dairy Value Chain." *The European Journal of Development Research* 27, no. 1 (2015): 140-55.
- Grace, Dave. *Measuring the Size and Scope of the Cooperative Economy*. New York: UN DESA, 2014.
- Grau, A., Hockmann, H., and Levkovych, I. "Dairy Cooperatives at the Crossroads." *British Food Journal* 117, no. 10 (2015): 2515-31.
- Holloway, G., C. Nicholson, C. Delgado, S. Staal, and S. Ehui. "Agro-Industrialization through Institutional Innovation: Transaction Costs, Cooperatives and Milk-Market Development in the East-African Highlands." *Agricultural Economics* 23, no. 3 (2000): 279-88.
- ILO. *Working Out of Poverty*. Report of the Director-General, International Labour Conference, 91st Session, Geneva: International Labour Organization, 2003: 53.
- Kakade, V. B; and Bagade D. S. "Profit and Loss of Dairy Industry: A Case Study of Malshiras Taluka." *Cooperative Quarterly* 34 (2001): 60-62.
- Kolte, S. B. "Women Empowerment: A Study of Hirkani Women's Multi-State Dairy Cooperative." *Journal of Commerce and Management Thought* 1 (2010): 285-95.
- Kumar, A., S. J. Staal, and D. K. Singh. "Smallholder Dairy Farmers' Access to Modern Milk Marketing Chains in India." *Agricultural Economics Research Review* 24, no. 2 (2011): 243-53.
- Kumar, A., P. Shinoj, and S. Jee. "Do Dairy Co-operatives Enhance Milk Production, Productivity and Quality? Evidences from the Indo-Gangetic Plain of India." *Indian Journal of Agricultural Economics* 68, no. 3 (2013): 457-68.
- Labrecque, J., Dulude, B., and Charlebois, S. "Sustainability and Strategic Advantages Using Supply Chain-Based Determinants in Pork Production." *British Food Journal* 117, no. 11 (2015): 2630-48.
- Marcos-Matas, G., Hernandez-Espallardo, M., and Arcas-Lario, N. "Transaction Costs in Agricultural Marketing Cooperatives: Effects on Market performance." *Outlook on Agriculture* 42, no. 2 (2013):117-24.
- Maynard, L. J. "Feasibility of Hedging Milk Input Costs for a Dairy Processor: A Case Study." *Journal of Food Distribution Research* 40, no. 1 (2009): 123-38.
- MoA&FW. *National Action Plan for Dairy Development, Vision 2022*. , New Delhi: Ministry of Agriculture and Farmer's Welfare, Government of India, 2018.
- Muruganandan, P. "Performance Appraisal of Thatchur Milk Producers' Cooperative Society." *Tamil Nadu Journal of Cooperation* 4, (2004): 11-14.
- NDDDB. *Annual Report 2016-17*. Anand, India: National Dairy Development Board, 2017.
- Rindfleisch, A., and Heide, J.B. "Transaction Cost Analysis: Past, Present and Future Applications." *Journal of Marketing* 61, no 4 (1997): 30-54.

- Singh V., and Rai, K. N. "Economics of Production and Marketing of Buffalo Milk in Haryana." *Indian Journal of Agricultural Economics* 53 (1998): 41-52.
- Subburaj, B. Production and Sale of Dairy Products in Trichy District Cooperative Milk Producers Union Tamil Nadu: A Break-Even Analysis." *Indian Cooperative Review* 25 (1987): 307-15.
- Trebbin, A. Linking Small Farmers to Modern Retail through Producer Organizations: Experiences with Producer Companies in India." *Food Policy* 45 (2014): 35-44.
- Van der Krogt, D., Nilsson, J., and Høst, V. "The Impact of Cooperatives' Risk Aversion and Equity Capital Constraints on Their Inter-Firm Consolidation and Collaboration Strategies: With an Empirical Study of the European Dairy Industry." *Agribusiness* 23, no. 4 (2007): 453-72.
- Verma, A. "Working Capital Management in GCMMF Vis-A-Vis Dairy Industry." *Cooperative Perspective* 42, no. 4 (2008): 49-54.
- Washington, A. A., Kilmer, R. L., and Weldon, R. N. (2002). "Practices Used by Dairy Farmers to Reduce Seasonal Production Variability." *Agricultural and Resource Economics Review* 31, no.1 (2002): 127-37.
- Wolf, C. A., and Olynk Widmar, N.J. Adoption of Milk and Feed Forward Pricing Methods by Dairy Farmers." *Journal of Agricultural and Applied Economics* 46, no. 4 (2014): 527-41.
- Yoo, C., Buccola, S., and Gopinath, M. "Cooperative Pricing and Scale Efficiency: The Case of Korean Rice Processing Complexes." *Agricultural Economics* 44, no. 3 (2013): 309-21.
- Yu, X. "Productivity, Efficiency and Structural Problems in Chinese Dairy Farms." *China Agricultural Economic Review* 4, no. 2 (2012): 168-75.