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Improving smallholder livelihoods: Dairy production in Tanzania

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Abstract. Tanzania is primarily an agro-based economy, characterized by subsistence agricultural production that employs more than 80% of the population and contributing up to 45% of the GDP (2005). This country is endowed with a cattle population of 21.3 million, composed mainly of indigenous Zebu breed and about 680,000 improved dairy animals. About 70% of the milk produced comes from the traditional sector (indigenous cattle) kept in rural areas, while the remaining 30% comes from improved cattle mainly kept by smallholder producers. In Northern Tanzania and particularly in Hai district of Kilimanjaro region, some dairy farmers organize themselves into small producer groups for the purpose of milk collecting, marketing and generally promotion of the dairy sector in their community. Nronga Women Dairy Cooperative Society (NWDCS) Limited is one of such organisations dedicated to improve the well-being of Nronga village community through promoting small scale dairy farming and its flow-on benefits. Milk flows out of the village, services for investment and dairy production flow into the village, ensuring a sustainable financial circulation necessary for poverty reduction, rural development and better life for the rural community. In 2001 NWDCS introduced a school milk feeding program that interested Australian donors since 2005. Guided by Global Development Group a multifaceted project integrating micro-enterprises, business, education and child health/nutrition was proposed and initiated by building a dairy plant in Hai district headquarters, the Boma plant. In March 2013, Australian High Commission to East Africa approved Direct Aid Program funding of AUD \$30,000 towards the NWDCS - Biogas Pilot Project in Tanzania, which include the renovation of zero grazing cow shade units, the construction of 6 m³ biodigester plants on each farm, and encouragement of the use of bio-slurry for pasture production and home gardens.

Keywords: Small scale dairy farmer, Nronga Women Dairy Cooperative, Hai district, Zero grazing dairy.

Introduction

Tanzania is primarily an agro-based economy, characterized by subsistence agricultural production. Despite of its subsistence nature, the agricultural sector employs more than 80% of the population and contributes up to 45% of the GDP (2005). The livestock sector contributes 30% of the agricultural GDP, which includes a contribution of 40% by beef production, 30% by milk production and 30% by poultry and small stock production (ASR 2008).

Tanzania is endowed with a cattle population of 21.3 million (ASR 2008), ranking third in Africa after Ethiopia and Sudan. The Tanzanian cattle population is composed mainly of indigenous Zebu breed and about 680,000 improved dairy animals. Livestock keeping offers a livelihood to 1.3 million men and women who raise their animals on the semi-arid plains and highlands of Tanzania. The cattle herd has been increasing at 2.1% per annum which is still short of the targeted growth from 2.7% in 2000 to 9% by 2010 set by the National Strategy for Economic Growth and Poverty Reduction, otherwise known by its Swahili acronym as MKUKUTA.

Tanzania's dairy industry is meager despite it having

the third largest cattle population in Africa. Estimated milk production is 1650 ML (2011). About 70% of the milk produced comes from the traditional sector (indigenous cattle) kept in rural areas, while the remaining 30% comes from improved cattle mainly kept by smallholder producers. Per capita consumption of milk is estimated to be 42 L (2011). Around 10% of the small scale dairy farmers are found in Northern Zone and Southern Highlands, where rainfall levels are high, climate is temperate and disease vectors are minimal. Hai district, in the Northern zone with 49,225 households and 38,280 dairy cattle population on southern slopes of Mount Kilimanjaro, practices intensive dairy production with improved dairy cattle breeds. Most of the households own from 1 to 3 animals and hence milk production is above family requirement and the surplus milk is sold to meet financial obligations of the family. Average dairy milk yields per milking cow ranges from 7-12 L/d. There are 12 small scale dairy farmer groups in the district, collecting on average 4,550 L of milk daily.

This case study focuses on one of the groups, the Nronga Women Dairy Cooperative Society Limited. The paper describes the structure and operation of the cooperative, discusses some of the main challenges and

constraints, outlines Australian assistance programs and points towards some lessons for the future.

Case study

The Nronga Women Dairy Cooperative Society Limited (NWDCS, registered as KLR 476) is an organisation of dairy farmers whose main purpose is to improve the well-being of Nronga village community through promoting small scale dairy farming and its flow-on benefits. For the Wachagga tribe on the southern slopes of Mount Kilimanjaro, milk production is considered a traditional chore/role for women, and so women in Nronga were the originators of the organization that now serves the whole community. The cooperative services to the Nronga community include:

- Buying milk from all dairy farmers in the village
- Promoting milk consumption through school milk nutrition programs
- Offering saving and credit facilities to the community (by way of a village community bank)
- Providing artificial insemination of dairy cows in the village as well as in neighbouring villages
- Promoting slow combustion wood stoves in an effort to reduce their environmental impact.

The Nronga village is situated in Machame division, Hai district, located on the mountainous area on slopes of Mount Kilimanjaro. It has 659 households with a population of 2,181 inhabitants, and population density of 860 people per km² (2011). An International heritage area, the Kilimanjaro Forest to the north of the village is the source of two major rivers, the Semira and Kikavu, located on the E and W of the village, respectively. These rivers converge to the south of the village, with deep valleys isolating Nronga from the neighbouring villages. Animal fodder, firewood and building materials were collected from riverside and heritage forests until recently, when the government restricted the exploitation of these natural resources. Hence, the community is left with very narrow options on the alternative sources of basic materials, particularly firewood.

NWDCS is women cooperative started in March 1988 as a model producer based organization to promote dairy production through milk marketing. Its formation was assisted by FAO, DANIDA and Tanzania Ministry of Livestock Development. NWDCS started with 75 members collecting daily, about 200 L of milk from its members and sold the milk untreated to food shops in Moshi town, as they had neither milk coolers, neither processing machine nor office. The members were milking their cows just past midnight and send the milk to collecting points where a vehicle would go round to pick the milk in cans, drive to Moshi and sell in bulk to food stores before dawn. This procedure was cumbersome, tedious and actually painful to women who traditionally own the milk, but it was necessary to minimise losses from milk going sour. Recoding was done by elected leaders who also were responsible for payments done fortnightly in an open area in Nronga primary school playing grounds. Today, NWDCS has 402 members is collecting daily between 800

litres and 900 litres of milk from Nronga village and the neighbouring villages of Foo, Shari and Kyeeri. The evening and morning milk is collected and cooled in electric powered cooling tank before processing or selling unpasteurised to whole sellers or consumers in Kilimanjaro and Arusha regions urban areas. The collected milk is disposed of in the following products: 36% fresh whole milk, 36% skimmed cultured milk, 24% whole cultured milk in packets (500 ml for ordinary market and 200 ml for school distribution), 4% pasteurised butter and 1% yogurt. These products are produced manually using local facilities and limited skills to produce market competitive products.

Hence, NWDCS benefits the Nronga village community, dairy farmers in Hai district and Tanzania at large. The main benefits are:

- Dairy productivity has been enhanced in the Nronga village as well as around the neighbouring villages. Nronga village and the neighbouring village dairy farmers have a definite milk market and the consumers and traders have reliable milk supply.
- The cooperative has made a business out of dairying, which was once considered a subsistence activity. As milk flows out of the village, services for investment and dairy production flow into the village, ensuring a sustainable financial circulation necessary for poverty reduction, rural development and better life for the rural community. The NWDCS initiatives business has fostered a Saving and Credit Cooperative Society (SACCOS) and Village Community Bank (VICOBA) in Nronga village
- In their endeavour to increase future per capita milk consumption in northern Tanzania in 2001 NWDCS introduced a school milk feeding program. Currently 6 schools (3 in Kilimanjaro region and 3 in Arusha region) with a total of 4,717 pupils are fed milk on cost-sharing basis. The parents contribute Tsh 150 (150 Tanzanian shillings) and the Tanzania Dairy Board (TDB, which receives Australian donor funds) also contributes Tsh 150 per 200 ml packet fed to the pupils. NWDCS of its own accord donates milk to a total of 540 orphan pupils in the same schools. The school milk feeding program in these schools has improved health and academic performance of pupils, improved their enrolment and attendance, and enhanced the morale of teachers.
- About 650 farmers are self-employed through dairy farming and supply of milk to NWDCS. The lowest supplier earns Tsh 70,000 per month from milk sales, more than Tanzanian minimal wage for rural workers. The highest supplier earns about Tsh 450,000 per month, a middle-class employee salary. Moreover the NWDCS has indirectly created employment opportunities for traders, vendors and dairy farming input suppliers in and around Kilimanjaro and Arusha regions.
- Other benefits of NWDCS includes public awareness creation, women empowerment, promotion of the dairy sub-sector nationwide, and the model for dairy development in Tanzania

- Through NWDCS it has been possible to introduce other appropriate technologies to the community, such as energy-saving firewood stoves and the use of biogas from zero grazed cattle waste, to conserve forest resources.
- Nronga village is among the most developed villages in Tanzania. It has a good source of income to pay for social needs such as good housing and school fees. Enrolment in primary school is 100%, while 85% of primary school graduates join secondary schools and 10% join vocational colleges. About 45% of high school graduates join Universities. The village has 12 university professors and other high level manpower working on various projects. This involvement has been attributed to the impact of the NWDCS.

Challenges and constraints

Market competition

As the number of dairy groups and processors increase, competition on the market increases as well. To lower the price is not a good option in order to remain viable. To satisfy the customer may be a better choice. Quality of the products, better packaging, product diversification and promotion of the products and other means need to be employed. The resources to take these steps are the main constraints. NWDCS needs better technology, skills, machinery funds, buildings, organization and legal frame work, quality ensuring facilities, to mention but a few in order to be competitive.

Location

The NWDCS factory is not centrally located to the market for their products. The land on which their facility is located is limited for expansion. The terrain for transportation is difficult. It is located in the rural area where utilities like electric power, water, and telephone is unreliable. In order to expand their processing facilities, NWDCS will soon have no choice but to transfer to a location with enough land, relatively reliable utilities, and where workers housing can easily be provided.

Inadequate infrastructure

NWDCS is a pioneer in the dairy business in the Hai district. Other milk collecting groups would like it to grow enough to be able receive milk from their group. But now the capacity for receiving milk is over stretched. These other groups are ready to supply Nronga with milk only if they position their processing in the lowland area where it will be easily accessed, rather than in the undulating terrain of the Hai district on the slopes of Mount Kilimanjaro.

Technology and training

Dairy farming productivity in the Hai district as a whole is under capacity. The effective training of farmers, extension agents and other key players in the sub-sector development is a paramount need. If the milk production is to increase in quality and quantity, the milk collection system must be made efficient and the dairy products competitive with customer needs. A training centre specific for these purposes has to be in place.

Processing facilities

The school milk program is a tool to boost future per capita milk consumption and ultimately expand the milk and milk products market. The immediate benefit of the program is remarkable. The cooperative would like to expand to more schools and reach more pupils and orphans for development of the Tanzanian economy and well-being of its people. As much as the will is there, the production of more school milk pouches is the main constraint. An automatic packing machine is required to make the many extra pouches that will be needed by the schools.

Investment

In the past NWDCS has not been doing well in terms of profit. Their past three years business performance is available. For sustainability and development of the cooperative and dairy sector in the Hai district at large, the NWDCS has to make a profit or break even. A good investment plan is therefore vital.

Undeveloped distribution network

In rural areas, excess milk disposal is difficult to organise. In Tanzania there are few if any government milk collecting centres. To manage disposal of excess milk farmers in Hai district, Kilimanjaro region and in the neighbouring regions have adopted the NWDCS model to form milk collection groups. Most of these groups have come to NWDCS to learn and they depend on NWDCS for advice and development. In the Hai district alone, there are 12 new groups that have been formed after the NWDCS.

Australian involvement

School milk project

Since March 2007, NWDCS has been obtained support from Australian donors to subsidise school milk feeding program in six schools. In order to improve, promote, scale up and sustain the milk feeding program by NWDC the donor has facilitated construction of a dairy factory in Hai district headquarters. This factory will receive and process milk not only from Nronga community but from the whole district. The products will be marketed under a trade name Maziwa Hai. As return to the assistance, 10% of the milk that will be collected will go toward milk feeding program. The factory will provide several benefits, including: the production of a diversified range of quality milk products that are more competitive with alternate products sourced from elsewhere; enhance the number of beneficiaries; an increase in the volume of milk processed; higher dairy farm productivity; a greater number of pupils can be fed milk; increased income for the beneficiaries; uniting producer groups; boosting the district economy; and contributing to the development of the Tanzanian dairy subsector. The overall project, the Tanzanian School Milk Project, is a multi-faceted community development project integrating micro-enterprises, business, education and child health/nutrition. Global Development Group (GDG), an Australian charity organisation that implements humanitarian projects with approved partners and provides aid to relieve poverty in a tangible way provided a governance role and assisted in the areas of planning,

monitoring, evaluating, compliance, risk management, and auditing to ensure the project was carried out to Australian AID requirements.

The Biogas and Zero Grazing Dairy (ZGD) projects

Increasingly, environmental-sustainability and conservation are being intertwined with the issue of poverty alleviation. Through local contacts in Tanzania, GDG identified the need and suitability of a local Biogas program to complement its existing poverty-alleviation project with the NWDCS in Nronga village. The NWDCS also identified, through attendance of awareness training and subsequent discussions at their annual general meeting, that a local Biogas program would complement plans for adopting ZGD methods that would provide wider community benefits. Following an application made by GDG and NWDCS, the Australian High Commission to East Africa approve in March 2013 Direct Aid Program funding of AUD \$30,000 towards the NWDCS - Biogas Pilot Project in Tanzania. The features of this pilot program on 17 dairy farms include the renovation of zero grazing cow shade units, the construction of 6m³ biodigester plants on each farm, and encouragement of the use of bio-slurry for pasture production and home gardens.

Biogas is the use of livestock waste to produce renewable energy in a climate-friendly and resource-efficient way. Energy is generated from biogas produced from livestock residues, thus reducing greenhouse gas emissions and environmental damage in the regions concerned. The energy can then be harnessed on a local domestic level to improve the quality of living of the beneficiary community. Rural communities in Tanzania traditionally rely upon firewood, charcoal purchased gas, and kerosene as sources of energy for their households. The importance of reducing these practices is of particular importance in the target community due to its close proximity the international heritage listed Kilimanjaro Forest. Access to domestic biogas provides great economic gains through financial savings for the beneficiaries. The production of biogas is sustainable, renewable, carbon neutral and will reduce the dependency of the beneficiary community on other fuel sources (*i.e.* firewood and charcoal). The project has the potential to reduce illegal logging in the international heritage listed Kilimanjaro Forest, where the community traditionally gathers firewood from. Often beneficiaries of biogas plants are able to become fully energy self sufficient, producing the heat and electricity they consume.

ZGD development is seen as a vital step to increase underperforming dairy farms. The concept of ZGD is cutting grass and taking it to the cattle, rather than the animals walking the distance to graze the grass. Poor feeding as a result of poor grassland management was revealed as a major setback to improved milk production.

due to the region's poverty, farmers are unable to afford chemical fertilizers for their pastures to improve soil quality which impacts the community's dairy business. Manure from the cattle houses is left to decompose without any treatment and normally not applied to improve pastures.

Incorrect cow shading methods have also been identified as contributing to low milk production. Currently, farmers tether their cattle permanently in what is locally called "Machame cattle houses" – structures that are fully roofed with only the manger and a tethering post. The cattle sleep in their own manure and often have painful overgrown hooves due to a lack of exercise – this situation is quite inhumane and unsanitary. As a result, calving intervals are longer and consequently lowers milk production.

NWDCS members have identified that there is a need to renovate their cow sheds to the appropriate ZGD units as well as improving the level of feeding cows through growing proper pasture grass and manure application. They have also identified the benefits of biogas plants in environmental conservation as well as energy production for cooking and slurry for fodder production, which complement ZGD methods.

These projects have been designed to continue benefiting the community after the funded component has been completed. Sustainability will be achieved through environmental-sustainability, economic-empowerment and capacity-building. Access to domestic biogas provides great economic gains through financial savings on energy-consumption for the beneficiaries. It potentially will also increase milk production for the co-operative through assisting improvements to grassland management and fodder production – providing long-term continuing economic benefits to the Nronga community, leading to greater self-reliance. Through cooperation with the TDB, the project also builds up local capacity through the training of local masons on bio digester design, construction and maintenance. The project implementation will primarily be done by local Tanzanians.

Conclusions

The formation and development of the NWDCS has been pivotal to the well-being of the dairy industry, farmers, villages and school children in Tanzania. Development organisations as well as the policy makers commend this model of rural formation for stimulating and spearheading improvement of living standards in rural communities. NWDCS is a living example of a successful primary cooperative society that addresses its community needs.

References

- Agriculture Sector Review (ASR) (2008) Final Report 2008. Ministry of Agriculture Food Security and Cooperatives, The United Republic of Tanzania