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Business Model: Community-Based Breeding Programs

Dereje Legesse, Rahel S. Wubie, Girma T. Kassie, Barbara Rischkowsky and Aynalem Haile

ICARDA, Addis Ababa

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ICARDA Science for resilient livelihoods in dry areas

CIAT International Center for Tropical Agriculture Since 1967 Science to cultivate change

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Business Model: Community Based Breeding Program

1. Rationale

The International Center for Agricultural Research in the Dry Areas (ICARDA), International Livestock Research Institute (ILRI) and Boku University of Austria came up with the idea of community-based breeding program (CBBP) in Ethiopia. It is a value chain development intervention that focuses on improving the indigenous breeds.

CBBP seems to be mandatory for smallholders not only due to their small sized flocks but also resource limitation as some of the village resources are owned and managed communally. These include grazing lands and watering resources, and even breeding rams are used communally under uncontrolled communal grazing/ mating systems. Thus, implementing genetic improvement, grazing land management and disease control programs would be challenging unless all or most of the villagers participate in the program.

This document presents a sustainable CBBP business model for smallholder farmers in Menzi, Doyogena and Bonga areas. The net present value (NPV) of the investment in Menzi, Doyogena and Bonga areas show good positive numbers and also higher Internal Rate of Returns (IRR).

For farmers to engage in the CBBP on sustained basis, they have to perform functions such as:

- Production
- Managing costs and maximizing Revenue
- Marketing
- Creating and maintaining partnership with supporting institutions

2. Production

2.1 Production System

The CBBP business aims at producing well performing marketable products from small ruminants to maximize profit and make the business sustainable. It depends on identification and selection of well performing breeds, and business owner's knowledge /skills to apply improved sheep management practices (feeding, health, housing etc.).

Breed Selection: In the intervention sites, there are local sheep breeds that perform well if improved feeding practices are applied under farmers' management conditions. So, producers need to select better breeds from the local ones. In this business, higher quality indigenous breeds of sheep will be used for breeding activities. Furthermore, best management practices, feed and veterinary services need to be in place to supply superior quality products and services to customers.

Community-based breeding programs combine selection of breeding rams/bucks based on careful recording of important production parameters, such as body weight at 6 months, ewe lambing interval, ram lamb bodyweight and conformation at 12 months, etc. (Haile et al., 2011). There are CBBPs for certain breeds such as Menz, Doyogena and Bonga that select breeding males from farmers to serve as breeding rams for about two years. They are then castrated and fattened for sale.

Feeds: Feed is a serious limiting factor of the livestock production sector in Ethiopia with the result that many animals arrive at the market in less than optimal body condition (Demissie, 2017). For faster weight gains, use of locally available bale feed resources like natural pasture, crop residues and agro-industrial by products is essential for running profitable CBBP. For this analysis, we are assuming that the producers use open range grazing and give supplementary feed.

2.2 Products and Services

The CBB, as a business, offers a range of benefits depending on the herd composition and breed types. The outputs from such businesses can be grouped into improved sires, fattened animals (meat), and by-products such as manure, skin, and offal. Immediate products include meat and its processed products. Economic and environmental benefits are derived from dung (which improves soil fertility and structure) and from nutrient recycling. Such a business can also have training services for smallholder farmers, cooperatives and others private investors who are planning to enter in to the business.

In this CBBP, the majority of income is derived from the sale of market sheep of all breed Menz, Doyogena and Bonga sheep.

3. Managing Costs and Maximizing Revenue

3.1 Cost of factors production

Managing the costs of CBBP leads maximization of revenue from the activity. To make the business more profitable, it is required to know the vital resources in the intervention sites that represnt majority of the cost item. These are items including investment cost for fixed items, feed, land, veterinary service, labor and market related costs.

Investment: the producer will need sufficient soft and hard capital to cover for initial investment and run the CBBP business. Own savings, rural savings and credit associations, microfinance institutions, etc. are the major sources of credit in the intervention areas (Legese et al., 2014).

Feed: The Feed cost accounts more than half of the total sheep production costs. Small ruminants obtain at least half of the energy requirement from grazing, which is very low-cost feed source and suited for local sheep. This helps to reduce the feed cost.

Land: Availability of investment land varies with agro-ecological zones and it is relatively easier to get land in the lowlands where there is lower population pressure. Population pressure in the highlands makes it difficult to get large plots of land for livestock breeding activities (ICARDA and ILRI, 2014).The intervention sites fall under the highland category.

Labour: Labour demand for CBBP depends on the number volume of sheep maintained and the objective of breeding program. Most smallholder rural and small-scale peri-urban and urban keep very few sheep for breeding in a given cycle.

3.2 Revenue Maximization Strategy

Profit margins in agricultural enterprises tend to be small. However, it is possible to make a profitable CBBP if costs are controlled and returns carefully managed. The profitability of this

business depends principally on the cost of the initial herd, feed cost, feed conversion efficiency ratio, and selling price of the products (Sheep). Participants can manage feed costs by maximizing the use of natural pasture when available, producing their own harvested feeds, mixing their own rations, buying and storing feed in bulk, and minimizing feed wastage. It is also important to understand the conversion ratios and profit margins before starting this business.

Revenue is important because it is the main indicator of a business' performance. Producers should take different approaches to maximize revenue, such as using various marketing strategies as translated through their business models. They can seek to grow revenue by offering competitive prices in the market. In addition, there are key strategies for maximizing revenues including:

- Increase the quality and quantity of sales
- Develop networks and client bases

4. Marketing

Product marketing is about selling a product the customer demands, identify and targeting potential buyers, choosing right market channel, and building relationship with customers. Successful marketing of the products of such a business requires consistency, careful organization and cost-effectiveness

4.1 Marketing and Market Channels

In Ethiopia, the demand for sheep generally increases prior to various religious and cultural festivals. It is customary for households to slaughter small ruminants during these festivals. Taking religious holidays as a case in point, there is a high demand for sheep at the end of August to celebrate Ethiopian New Year, in December for Christmas and in April for Easter. There is also high demand during the Ramadan and Arafa festivities.

In fact, with the ever-increasing prices of livestock products, a growing number of households are unable to afford well-conditioned animals.

In all intervention sites where these innovations were tested, farmers sell sheep at their farms and/or the village and primary markets close to their residences. Farmers and rural traders from different local markets supply animals of varying sex, age and weight to secondary markets. There are two major market routes through which animals from the sites reach the tertiary markets. The first route is through agents of export abattoirs who collect young male sheep from the local markets. The second and most important route is through medium and large traders who collect animals from Bonga, Doyogena and Menz areas and supply through large traders to terminal domestic markets in Addis Ababa.

Marketing services have many overlapping components including assembling small ruminants from local farmers, transporting to potential markets and distributing them to customers. In the current market structure, animal traders collect animals from the rural areas and sell them in animal markets in the urban areas. Many actors are involved in small ruminant marketing. The actors can be broadly classified as producers, traders, butchers, retailers, consumer and exporters. Private and public livestock inputs and service providers are also other important market actors (Figure 1).

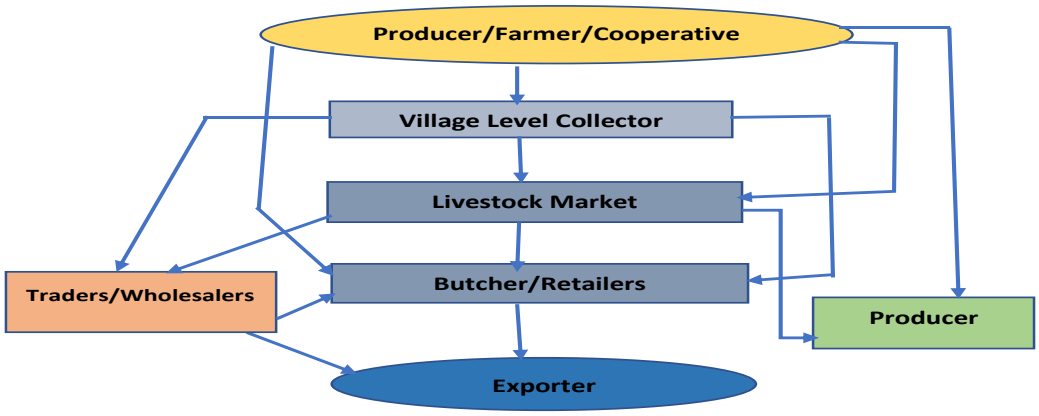


Figure1: Market Channel of Sheep

Six major marketing channels were identified in the intervention sites:

- Channel 1: Sheep purchased by other farmers for breeding purposes.
- Channel 2: Sheep purchased by individual consumers
- Channel 3: Sheep purchased by small traders
- Channel 4: Sheep purchased by big traders
- Channel 5: Sheep slaughtered at hotels and butcheries
- Channel 6: Sheep purchased by other cooperatives for breeding.

To fetch reasonable market prices, therefore, farmers are encouraged to market their live animals directly to processors and the final consumers, by organizing in to marketing cooperatives.

4.2. Pricing Strategy

In this business model, an easy pricing strategy for farmers to understand is adopted that is a cost based pricing method. Producers calculate all the costs incurred to fatten a sheep and add the profit margin to determine the final price.

4.3 Competitiveness in the market and competitors

The Sheep fatteners in the intervention areas will face competition from local farmers, private farms engaged in similar activities in Doyogena, Bonga and Menz and other neighboring Woredas. The major difference between products supplied by such a business and those supplied by competitors is that the products of the business will be well managed, free of diseases and of the quality demanded by customers. The business is expected to sell sheep carefully managed clients at competitive prices. Another competitive advantage such a business will bring to the industry will be involving in high standard packaging and processing of meat.

4.4 Promotion Strategy

A small-scale breeding business that sells undifferentiated products to the markets with many suppliers, investing on promotion may not be a feasible strategy. But, participating in the agricultural exhibitions and market fairs organized by government or other actors and promote the products and services would be a good strategy. Also a project facilitated market linkage to selected potential buyers through visits and business to businesses meetings can serve as alternative promotion strategy. Facilitating access to market information is essential to make farmers an informed decisions on what to produce, for whom to produce and how to produce.

5. Working with Partners

The CBBP participants' success highly depends on their ability to utilize the supports services from various organizations/partners working to improve the small ruminant sub sector. Strengthening producers/cooperatives' capacity to absorb the extension, training and market information services provided by the public and private sector partners increases the probability of success in the CBBP businesses. The farmers'/cooperatives will need to have a well-established partnership with financial service providers, meat associations, agricultural research institutions, and bureaus of agriculture at district level. They also need to have a business relationship with a distribution companies to deliver these products to customers. It is also better to create linkages between producers and cooperatives, exporters and institutional buyers, including military camps, universities etc.

6. Understanding the Model

The study is limited to produce a spreadsheet production system model for sheep breeding businesses in selected project area. Numerous biological parameters can be used to formulate the model, however, to keep the model simple, only Menz, Bonga, and Doyogena sheep breed are chosen as components of the program. A change in biological components has a potential effect on the economics of CBBP. Therefore, the computer model has two separate components. The first component deals with the biological production, while the second deals with the economic analysis and calculations. The financial analysis components of the model compute annual incomes and costs.

7. Financial Analysis

A detailed financial model has been developed to analyze the commercial viability of CBBP. Various cost and revenue related assumptions along with results of the analysis are outlined in this section. This analysis shows whether investing in a sheep breeding and ram selection will be financially rewarding and financially viable.

7.1 Materials and methods used for analysis

- Major cost items include: Investment cost for fixed items, feed, land, veterinary service, labor and marketing costs.
- Revenue estimates are derived mainly from sale fattened animals (Sheep).
- Project worth analysis is done using the average interest rate 13.5%.

7.2 Key Assumptions

- The project will start with a 500 sheep in one production cycle. Over the years the size of the farm will increase regularly.
- Human Resource Requirement (Supervisor (1), Accountant (1), Daily Laborer (2) and Cleaner and Feeder (1)
- Mortality Rate = 8%
- Percent lambs born live = 150%
- Ewe replacement rate = 15%
- Ram replacement rate = 5%
- Sheep price will increase by 8% per year
- The cost of other expenses (e.g., feed, veterinary cost, labor cost, utilities etc.) will increase by 2% per year.

7.3 Financing Assumptions

- Interest rate = 13.5%
- Income tax = 30%

7.4 Depreciation Rates

- Housing (Renovating of existing building structure) = 5% per year.
- Office Furniture and Equipment = 20% per year.

8. Limitations in preparation of the budget

Budgets are generally constructed to reflect future actions and it is difficult to accurately predict future prices and yields.

9. Total Initial Investment Cost

The costs in this document represent an average scenario for producers; expenses will vary depending on the producer and their management decisions. The total initial investment cost of the project including working capital is estimated for the three intervention sites in Table 1.

Table 1: Total initial investment cost (in Birr)

		Sheep		
Costs	**Common costs**	**Bonga**	**Doyogena**	**Menz**
Purchasing cost of Sheep		402,500	419,750	316,250
Housing (Renovating of existing building structure)	75,000			
Office Furniture and Equipment	25,000			
Handling system	15,000			

Feeders (hay, grain, mineral)	10,000			
Feed storage	12,000			
Total initial costs	**137,000**	**432,000**	**447,000**	**357,000**

10. Other costs

The total project feed costs estimated to be 278,208, 258,174, 224,305 Birr per annum in Bonga, Doyogena and Menz, respectively (Table 2). For initial operational requirements including feed costs, vaccination costs, electricity costs, utilities, transport, and salaries a total of 548,220 Birr estimated per annum (Table 3).

Table 2: Annual Feed Cost by Woredas (in Birr)

Feeding Cost	
	Breeding
Bonga	278,208
Doyogena	258,174
Menz	224,305

Table 3: Annual total costs (in Birr)

	Breeding
Veterinary costs	277,200
Labor	
Supervisor	27,600
Accountant	20,700
Daily Labor	33,120
Cleaner	8,280
Utility	
Water	8,280
Electricity	6,900
Telephone	4,140
Transport	82,800
Marketing cost	28,800
Miscellaneous	50,400
Total Annual Expense	**548,220**

11. Financial Evaluation

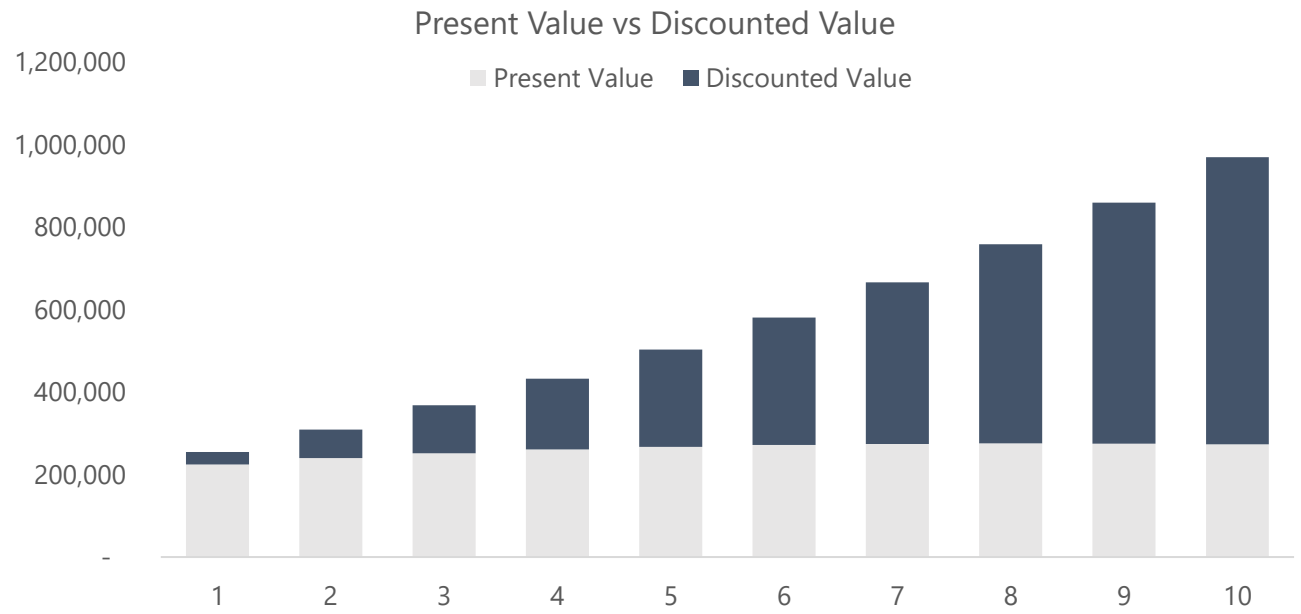
According to the projected income statement, the businesses will start generating profit in the first year (see Tables A1 to A6 below). Important ratios such as profit to total sales and net profit plus interest on total investment (return on total investment) show an increasing trend over the lifetime of the project. The income statement and the other indicators of profitability show that the project is viable.

Assuming the costs of inputs and the market price of output will rise proportionately through the project life, the project feasibility analysis is performed using a discount rate of 13.5% percent to analyze the net present value of CBBP.

Using the NPV criterion for an investment with an objective of profit generation, a NPV greater than zero is acceptable. Since NPV in our study is positive, the investments are financially feasible. In addition, the value of IRR is greater than the value of the current cost of capital (bank interest rate). Therefore, we encourage private and public actors to invest in these interventions as CBBP are financially rewarding and would also help the rural communities who are seeking out a living from very limited resources.

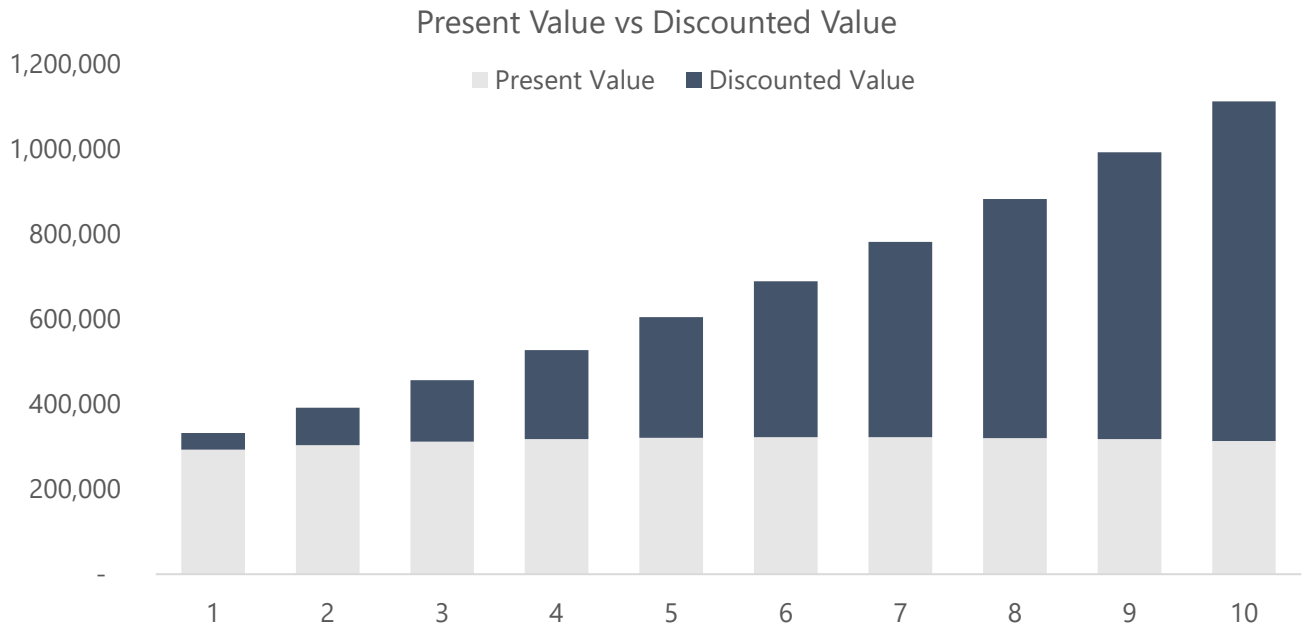
Annex A1: Financial Analysis Summary for Sheep Breeding in Bonga (in Birr)

Discount Rate	**13.5%**									
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Discount Factor	0.88	0.78	0.68	0.60	0.53	0.47	0.41	0.36	0.32	0.28
Undiscounted Cash Flow	**255,048**	**308,943**	**368,045**	**432,802**	**503,696**	**581,250**	**666,032**	**758,652**	**859,776**	**970,120**
Present Value	224,712	239,820	251,718	260,799	267,417	271,887	274,488	275,471	275,057	273,443
Net Present Value	**2,614,811**									
Discounted Value	30,336	69,122	116,328	172,003	236,279	309,364	391,543	483,181	584,719	696,677



Annex A2: Financial Analysis Summary for Sheep Breeding in Doyogena (in Birr)

Discount Rate	**13.50%**									
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Discount Factor	0.88	0.78	0.68	0.60	0.53	0.47	0.41	0.36	0.32	0.28
Undiscounted Cash Flow	332,344	391,486	456,247	527,107	604,584	689,240	781,685	882,575	992,624	1,112,601
Present Value	292,814	303,896	312,042	317,625	320,979	322,400	322,152	320,468	317,557	313,604
Net Present Value	**3,143,537**									
Discounted Value	39,530	87,590	144,205	209,481	283,604	366,840	459,533	562,107	675,067	798,998



Annex A3: Financial Analysis Summary for Sheep Breeding in Menz (in Birr)

Discount Rate	**13.50%**									
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Discount Factor	0.88	0.78	0.68	0.60	0.53	0.47	0.41	0.36	0.32	0.28
Undiscounted Cash Flow	**278,851**	**330,866**	**387,812**	**450,109**	**518,209**	**592,605**	**673,827**	**762,450**	**859,096**	**964,438**
Present Value	245,684	256,839	265,237	271,228	275,122	277,198	277,701	276,850	274,839	271,841
Net Present Value	**2,692,539**									
Discounted Value	33,167	74,027	122,575	178,881	243,087	315,407	396,126	485,600	584,256	692,596