

Demonstration of goat feeding package in community based goat improvement

Reducing Land Degradation and Farmers' Vulnerability to Climate
Change in the Highland Dry Areas of North-Western Ethiopia



TECHNICAL REPORT OF EXPERIMENTAL ACTIVITIES JUNE 2016

Implemented by



In collaboration with



Funded by



Contributes to



About the Project

Implemented By

International Center for Agricultural Research in the Dry Areas (ICARDA)
Project Agreement No. 100202

Funded by

Austrian Development Agency (ADA)
Project Reference No. 2012/04

Duration

01 April 2013 to 30 June 2016

Project coordinator

Dr. Claudio Zucca

Partners

Dept. of Water, Atmosphere and Environment, Institute of Hydraulics and Rural Water Management, BOKU - University of Natural Resources and Applied Life Sciences, Vienna Austria

Amhara Region Agricultural Research Institute (ARARI), Bahir Dar, Ethiopia

Ethiopia Institute of Agriculture Research (EIAR), Ministry of Agriculture and Rural Development, Addis Ababa, Ethiopia

Cover photo: Monitoring the goat feeding experiment | 15-11-2015 | Simachew Yedmie

About ICARDA

The International Center for Agricultural Research in the Dry Areas (ICARDA) is the global agricultural research Center working with countries in the world's dry and marginal areas, supporting them for sustainable agriculture development to help increase their productivity, raise incomes for smallholder farmer families, improve rural nutrition and strengthen national food security. With partners in more than 40 countries, ICARDA produces science based-solutions that include new crop varieties (barley, wheat, durum wheat, lentil, faba bean, kabuli chickpea, pasture and forage legumes); improved practices for farming and natural resources management; and socio-economic and policy options to enable and empower countries to improve their food security. ICARDA works closely with national agricultural research programs and other partners worldwide in Central Asia, South Asia, West Asia, North Africa, and Sub-Saharan Africa.

International Center for Agricultural Research in the Dry Areas (ICARDA)
PO Box 950764, Amman 11195, JORDAN
www.icarda.org

Synthesis

Activity type: Technology generation

Report submitted by: Yonas Worku

Summary report

In the framework of the project “Reducing land degradation and farmers’ vulnerability to climate change in the highland dry areas of north-western Ethiopia’, pre-extension demonstration of was done to show improved goat fattening techniques using cow pea hay and concentrate mixture supplementation to farmers and extension workers and to assess farmers and extension workers reactions on the technology. At Gumara-Maksegnit watershed, community based goat breeding practice have been now implemented to improve the productivity of animals. Unselected ones are culled from the stock either by castrating, slaughtering or selling to the market without fattened the animals. Therefore this research was initiated to demonstrate the improved supplementary feed practices nineteen experimental animals were selected and fattened for about 90 days. To compare the improved practice (supplementing 400gm/animals/day of which 300gm cowpea and 100gm concentrate of 50% wheat bran and 50% nug cake) with farmer’s experience twenty one other control animals were selected and compared. Training and field day were organized to evaluate and disseminate the technology. The result of body weight measurement taken showed that after 90 days on average experimental animals had 27.55kg/animal and gained about 2.95kg/animal whereas the control animals had 22.7 kg weight and gained only 0.99kg. The financial also showed that the improved practice had 120% marginal rate of return (MRR) over the farmers practice. In general, it is found that supplementing 400gm/animals/day will improve animals’ body weight and farmer’s income. Hence, the fattening technology is recommended to be used by famers participated before culling their animals..

Schematic summary of information

Location:	Denzaze Village, Gumara Maksegnit watershed
Period of implementation:	January 2016 to June 2016
Duration of trials:	5 months
Activity leader(s):	Yonas Worku
Other researchers involved:	Simachew Yedeme, Tikunesh Zelalem
Technical staff involved	Biyadige Wube and Eshetu Melesse

1 Background and rationale

In most parts of Amhara region, during dry season animal are not able to fulfil the required amount of feed, even for their body maintenance because the availing grazing land is highly degraded. So it cannot give good quality and quantity of green feed for the animals. Besides, if it is possible to produce a certain amount of animal feed from such pasture land its quality very low and quality of crop residues are also too poor (Alemayehu, 2002). In Gondar zuria district at Gumara-maksegnit watershed farmers use communal grazing lands, crop aftermath, crop residues, hay, browsing on trees and shrubs, improved forage, and industrial by-products and by-products of local drinks to feed their animals. Feed shortage during dry season is one of the major production constraints of the study area that contributes a lot for reduction of production and productivity of the livestock (Yonas et al., 2010). As a result, farmers get low benefit from selling animals that are in poor body condition. Furthermore, consumers do not normally get good quality and quantity meat from these animals.

At Gumara-maksegnit watershed community based goat breeding practice have been done since 2012. Animal selection is done in every six month to improve the local breeds. While selected animals maintained, the unselected ones are culled from the stock by either castrating, slaughtering or selling to the market without fattened them. Based on GARC feed and nutrition trail done during 2014 it was found that supplementing 300gm(75%) cowpea hay and 100gm(25%) commercial consternate feed had 362% MRR compared to not supplemented animals (Tikunesh, 2014). Introducing promising fattening practice can increase efficient utilization of available feeds to improve animal's body conditions of unselected goats, increase meat yield and consequently increase the income of the farmers. Many study showed that concentrated feeds could increase the body weight of animals.

2 Objective

The main objective of this research activity was to demonstrate improved goat fattening techniques using cow pea hay and concentrate mixture supplementation to farmers and extension workers and to assess farmers and extension workers reactions.

3 Experimental Methods

Selection of farmers and experimental animals

Community based goat breeding program is implemented at Das dinizaz village. Das Dinizaz is one of fifteen villages found in Gumara-maksegnit watershed. Buck selection is done to improve the body weight of goats and unselected animals culled either by castrating, slaughtering or selling to the market. Participant and control farmers are selected from community based goat breeding program participated farmers. Nineteen yearling experimental animals were selected from 8 households while 21 yearling control goats were selected from 11 households. All goats (the treatment and control animals) were castrated, dewormed and vaccinated before starting the fattening program. Ear tags were given for each goat to identify animals. The total experimental day is about 105 days. The first 15 days was an acclimatization period and the rest 90 days were experimental days.

Demonstrated technology

Selected experimental goats have been browsed in the day time and offered recommended feed packages in the morning and in the evening for 90 days while the control animals were browsed without supplemented additional feed. The recommended feed level was 400gm/day/animal of which 300gm (75%) were cowpea hay and 100gm of concentrated feed (50% wheat bra and 50% nug cake). Cowpea was planted on six farmer's field. Each farmer allocated about 800m² land to grow cowpea. The planted cowpea was harvested at 50% flowering stage.

Data collection and analysis

Two enumerators have been employed to feed the goat and record all the necessary data. Data such as initial body weight, fortnight body weight and final body weight of the animal, feed offered and refusal, Economic data (feed cost, animal purchasing, labor, selling price and medicament cost) was collected from both experimental and non-experimental animals. Farmers' and experts' opinion was also gathered during field day and farmers' evaluation. The collected data was analyzed by using descriptive statistics. Partial budget analysis was done to see the feasibility of the recommended technologies. Farmer's perception were also taken and discussed.

Awareness creation and technology dissemination

Before starting the actual work awareness creation was made for host farmers and farmer's research and extension group (FREG) members. The main purpose of establishing FREG was farmers in a group evaluating the improved fattening practice by

comparing with their own practices. It will be easy to disseminate to other farmers. One training session was organized and training was given to the 8 host members and 3 experts on goat fattening practice, disease management, housing, cowpea production, marketing and concepts of FREG. Field day also organized by inviting concerned stakeholders and the neighbouring farmers. During the field day, About 40 farmers and 4 stakeholders made them to see the practice. The merits of fattening practices were briefly explained by researchers and then demonstrated to the invited guests. The field day was concluded by making discussion with stakeholder and farmers as how this technology packages could be scaled out in a large scales, then after roles and responsibilities of potential stakeholders were set to scale up the technology in large size.

4 Results

As shown in the below table the overall average initial body weight was 24.78kg with a standard error of 0.77. The mean initial weight of treated/experimental animal was about 24.6kg while the mean initial body weights of control animals were 22.1 kg. On average the initial body weight of experimental and the control animals had no statistically significance. This means that at initial stage both groups had no body weight differences. However, after 105days including the acclimatization period the body weight of experimental and control animals showed differences. The average final body weights of experimental animals were 27.55kg. On average the treated animals gained about 2.95 kg and on daily bases they had about 33.77 gm weight gains. Regarding the control animals, their average final body weights were 22.7kg and on average gained 0.93kg body weight. The average daily body weight gains were about 10.33gm. The statistical T-test analysis showed that after 90days, there were statistically differences in body weight, weight gain and daily weight gain at 1%, 5% and 5% significance level, respectively.

Table 1: Initial and Final Weight

Treatments	Initial weight in kg (std error)	Final weight in kg (std error)	Total weight gain in kg (std error)	Average daily weight gain in gm (std error)
Treated	24.6 ±1.24	27.55±1.52	2.95±0.87	33.77±9.75
Control	22.10±0.89	22.27±0.92	0.93±0.38	10.30±4.23
Overall	24.78±0.77	24.78±0.95	1.89±0.48	21.00±5.37
T-test	1.64	-3.03	-2.38	-2.18
P-Value	0.1070NS	0.0043***	0.0220**	0.0351**

Financial analysis also done to compare the financial feasibility of improved fattening with farmers practice. All costs that shows profitability of animal fattening was recorded. At initial the purchasing price of all the experimental and control animals were estimated based on the market price. The average purchasing price of experimental animals were about birr 695.75 while the average market price of control animal were birr 659.45. Production costs of cowpea hay were estimated and purchasing prices of concentrate was recorded for each animals. Labour cost was also included to prepare and feed the supplementary feed for experimental animals. Therefore, the total cost of supplementing improved fattening practice was birr 178.97. The final selling price of each animal was taken. The average selling price of experimental animal was birr 987 whereas the control animal was birr 735.00. Concerning the net income generated the experimental animal's generated net income of birr 291.25 and the control had the net income of birr 75.55. Investing on supplementary feed over farmers practice had 1.20 marginal rate of return (MRR). This means that one birr spending on improved supplementary feed over farmers practice can cover the cost and have a return of birr 1.20.

Table 2: Partial budget analysis

Parameter	Control	Treatment	Remark
Purchase price of bucks	659.45	695.75	
Cost of concentrate for (90 days/head 6.75birr/kg	0	60.75	
Cost of cow pea hay (90day*300gm*4birr/kg)	0	108	
Labour+ feed cost (600 per month/22 animal)	0	10.22	-Animal watching=600birr/month /22 animals= - assume it takes 1hr to feed 1 animal per day
Cost total that vary		178.97	
Total cost	595.45	874.72	
Selling Price	735.00	987	
Total return	75.55	291.25	
Income Change		215.70	
Change TVC		178.97	
MRR (%)		1.20	

5 Conclusion and recommendation

Though the experiment was done during dry season when there was no enough feed in the area, all animals did not show higher body weight increments. However, supplementing 400gm per animal per day feed (300gm cowpea and 100gm concentrate of which 50% wheat bran and 50 % nug cake) had higher body weight increment than farmer's practice (browsing only). Social evaluation during the field day and financial analysis result also confirms that using improved supplementary feeds was better than farmer's practices. Therefore, in the study area where community goat practice is implemented, before unselected animals culled from the production they should be castrated and fattened by supplementing 400gm of supplementary feed which is composed of 75% cowpea hay and 25% of concentrate for 90 days.

6 References

- Tikunesh Zelalem, 2015. Evaluation of on farm goat fattening practice using cow pea hay with concentrate in GM area. (Gondar Agricultural Research Center; unpublished report)
- Yonas, W., A. Teferi, A. Solomon, K. Hailu and G. Ambachew, 2010. Socio-economic characterization of the Gumara-Maksegnit watershed. pp. 42-71. In: F.eras Z. and B. Wondimu (eds.). published by Routledge 2 park square, malton park, Abingdon,Oxon OX14 4RN and Routledge 711 third avenue, New york NY10017.

***NOTE:** The data presented in this report are currently being elaborated for scientific publication, thus some of them are not final. The aim of this report is to summarize the nature and quality of the activities conducted and of the dataset generated, and to illustrate the main results obtained.*

Project Manager

Claudio Zucca
Soil Conservation/Land Management Specialist
CGIAR Research Program on Dryland Systems
ICARDA
Marrakesh, Morocco
C.Zucca@cgiar.org

Science for Better Livelihoods in Dry Areas