



IDENTIFICATION OF CROP PRODUCTION CONSTRAINTS AND TECHNOLOGY NEEDS IN H1 AGRO-ECOLOGY OF SHISHIR PA IN SOUTH ARI DISTRICT OF SOUTH OMO ZONE, ETHIOPIA

Wondwesen Shiferaw^{*1}, Ermiyas Mekonen², Kebere Bezaweletaw³, Yasin Goa³, Eliyas mesikelu³, Getachew Gashaw³, Shiferaw Boke³, Alayu Mekuria³, bereket zelege³

^{*1,2,3} Southern agricultural research institute, Jinka Agricultural research center Po.Box 96, Jinka, ETHIOPIA

*Correspondence Author: manyawqal@gmail.com

Abstract:

The livelihood of over 93% of the people Southern Nation Nationality and peoples Region of Ethiopia dependent on agriculture; however, agricultural system in the region is at subsistence level. Much effort has been put to generate or adapt agricultural technologies that would help to increase production and productivity but only few technologies adopt by the end users. Because, technologies might have not be driven from the real need of the end users. A top bottom approach that dominantly centered researchers/ professional attitudes has been fallowed. For the successful research and development achievement, an agro-ecology based assessment is crucial to understand the specific farming system production practices and problems and technology needs of farmers and /or pastoralists. In this line, an assessment study was conducted in H1 agro-ecology of Shishir PA in Debub Ari district of South omo zone. Mixed farming is the livelihood of the farmers in the PA. The rain fall pattern is bimodal .Major crops grown in the area are Sorghum Maize, Common bean, field pea, and sunflower, Enset (Enset ventricosum), Yam, Cassava, Irish Potato, Sweet Potato, Taro, Garlic, Shallot, Cabbage, Banana, Coffe, Sugarcane, Corianders, Ginger and Peppers.

Keywords:

Agricultural problem identification, production constraint, H1 agro-ecology, agricultural technologies, agro-ecology.

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1. INTRODUCTION

Agriculture is the most important determinant of Southern Nation Nationality and peoples’ Region of Ethiopia economy and it will continue to play the leading role in the overall economy development of the region. The livelihood of over 93% of the people of the region dependent on it, however, agricultural systems in the region is at subsistence level and food insecurity problem is increasing at alarming rate. Moreover, rapid natural resource degradation is prevalent.



Economy of Ethiopia largely based on agriculture which accounts for 46.3% of the gross domestic product, 83.9% of exports, and 80% of the labor force in 2006/2007, compared to 44.9%, 76.9% and 80% in 2002/2003, and agriculture remains the Ethiopian economy's most important sector [3]. Ethiopia has great agricultural potential because of its vast areas of fertile land, diverse climate, generally adequate rainfall, and large labor pool.

Agriculture is most important determinant of Southern Nation Nationality and peoples Region economy and it will continue to play the leading role in the overall economy development of the region .The livelihood over 93% of the people of the region dependent on it, however agricultural system in the region is subsistence level and food insecurity problem is increasing at alarming rate. Moreover, rapid natural resource degradation is prevalent.

The food insecurity problems in the area caused by complex of factors ranging from natural ones such as recurrent drought , degradation of natural resources , lack of appropriate technologies, weak institutional support and lack of alternative employment. The same information also stated by [2]. Therefore, there is a greater need to increase agricultural production and productivity.

Over the last five decades, researchers and extension have put much effort to generate improved agricultural production technologies and deliver to the users. Despite that several technologies have been developed, the conventional agricultural research and innovation pursued in the past have not been very successful to deliver appropriate technologies to the end users. As a result very few technologies developed previously are adapted by the end users and considerable number of technologies are shelved or kept in laboratory without significant contribution to the objective they are designed for .This is due to several factors , of which the important once is usually the critical process by which information is collected at grass root level from far factor farmers and pastoralist to understand their specific farming system, production practices and production problems and their technology need is ignored. A top bottom approach that dominantly centered researchers/ professional attitudes since long time for both research planning and technology generation. The technology generated in this way might not address the real problems of the farming community as they were users demand –driven and hence the farming community would be passive recipient of the new technology. The research approaches have also been blamed for not targeting agro-ecologies and for disregarding the indigenous technical knowledge's.

Currently the regional government has recognized the needs move away from the existing research approach so as to generate and adapt problem solving appropriate technologies centering the real needs of farming community. Accordingly, the existing research approach and process was reviewed and found be lengthy and less effective to deliver appropriate technologies and unsatisfactory to the research customers (Farmers, pastoralist, and private investors). Consequently, reengineering the research process is under way .This reengineering process is expected to bring a radical , dynamic and rapid change and sustainable development in the agricultural sector through generating and adaptation deliver of appropriate technologies with in short period time by cutting-off length steps that adds no values to the customer. Recently Ethiopia was divided in to 18 major agro-ecological zones and 48 sub-zones based on altitude rainfall and



length of the growing period [4]. The research process, one of the essential that often ignored and presently received much attention in the new approach is agro ecology based assessment .The assessment study is take off for the subsequent research and extension activities and meant to identify agro-ecology based agricultural production constraints and technology needs of the farming community. Hence, this study was conducted in H2 agro-ecology of fasha PA with the following objectives Of (1).To describe and understand the nature of the farming system, and production practices, (2). To understand farmers indigenous technical knowledge, (3).To analyze and priorities the major agricultural production problems, (4). To identify farmers technology needs and (5) to better understand the existing condition in the H2 agro ecology and avail information to researchers and development workers.

2. THE STUDY AGRO-ECOLOGY AND METHODOLOGY

This study was conducted in Shishir PA of South Ari district of South Omo zone. The PA represents H1 agro-ecology. The study was conducted by a multidisciplinary team of researchers and development workers comprising of plant breeder, agronomist, socio-economist, extensionist and natural resource experts. The researchers were from Hadassah, Areka and Jinka agricultural Research Centers while the development workers are from South Omo and South Ari Agricultural and Rural development office.

Before starting of the study, the study team made short discussion with South Omo district of Agricultural and rural development office (ARD). Discussion was made to get information with regard to the important preliminary conditions for the study such as assignment of experts for the study team, the representatives of the PA, selection of the informant farmers and awareness created to the farmers of the selected PA and also to the PA administration and development agents working there.

A total of 49 informant farmers of extension groups representing each sub PAs, mix of variable ages and both sexes were selected by themselves in collaboration with Shishir PA administration and development agents.

For the purpose of discussion, the farmers were grouped in three interviewer sub groups of crop, livestock and natural resources each containing 15(12 males and 3 females) farmers in each sub group , respectively participated in the discussion. The other group formed was the key informants sub-group with four farmers.

The study team also re -group based on the area of specialization in to four sub-groups of crop, livestock and natural resource and socioeconomics. Another fifth sub group that was not related to the area of specialization was also formed. The group was meant to handle the discussion with the key informants.

Basic secondary data at zonal, district and PA levels were collected by the staff of the respective Agricultural and Rural development office and presented to the study team. Primary data were



collected through discussion between the disciplinary based sub-groups and the corresponding farmers sub groups. The discussion was guided by the checklist prepared by multidisciplinary team at regional level and issues raised during discussion were incorporated .visual observation were also made at farm level.

Upon completion of sub group level discussion, information particularly agricultural production and production related constraints identified by each sup groups of farmers were summarized together .Then, informants farmers were gathered as one group and summarized series of constraints had been briefed to them and then they ranked the problem by consensus in order of their importance.

3. CROP PRODUCTION

3.1.MAJOR CROPS CULTIVATED AND CROPPING SYSTEM

Crops grown in the PA include sorghum, maize, haricot bean field pea, Sunflower, Enset (*Enset ventricosum*), Yam Cassava, Sweet potato, Irish potato, Taro, Coffee, Sugarcane, Coriander, Ginger, Pepper, Garlic, Shallot, Cabbage, and Banana. The PA has two cropping seasons autumn and Summer. Common cropping systems practiced in PA are sole cropping, intercropping and mixed cropping. Farmers grow crops for home consumption, seeds and income generation. The crop varieties grown in the PA for all crops are local except maize in which all varieties are replaced by improved one.

As there are diverse in shishir PA, the production problems are also diverse. Farmers listed series of problems that affects the productivity of the existing crop varieties as army worm and stalk borer on maize and sorghum, coffee wilt disease, coffee stem borer, Coffee berry disease bird attack on sunflower and sorghum, erratic rainfall, mole rat attack on Enset and high rainfall result in rotting and failing down of sorghum and Enset bacterial wilt. Weevls and rat storage pest on different crops. In general the key informants strongly emphasized that the major production constraints in crop production, Enset bacterial wilt is the number one problem mentioned. In addition coffee disease, storage pests (Weevil rat) and stalk borer are the major production constraints in the PA.

Table 1. Crops cultivated in autumn and summer in the Shishir PA

| Autumn | Summer | Both Autumn and Summer |
|--------------|--------------|------------------------|
| Sorghum | Sunflower | Maize |
| Maize | Maize | Common bean |
| Common bean | Common bean | Sunflower |
| Pepper | Sweet potato | Taro |
| Shallot | Field pea | Sweet potato |
| Sweet potato | Taro | |



| | | |
|-----------|-----|--|
| Taro | Yam | |
| Sunflower | | |
| Cassava | | |

Table 2. Local and improved crop varieties and their special character in the PA

| Crop | Local varieties | Special character |
|-----------------------------------|-----------------------------------|---|
| Maize | Awassa-511 | High yielder, large seed size with small cob, early maturing, susceptible to stock borer and weevil attack |
| | BH-140 | High yielder, late maturing and short in height. |
| Sorghum | ‘Ziyaka’ | Preferable to making of <i>Injera</i> and more adaptable to the area, good market value, stock used for house construction and fencing, 2 nd high yielder, susceptible to birds. |
| | ‘ Dima white seed color’ | Preferable for ‘ <i>Injera</i> ’ and for making bread, boiled grain in special ceremony, good market demand, resistance to lodging and susceptible to birds. |
| | ‘Girsho’ | Its green sorghum can serve for preparing gruel, resistant to bird attack, resistant to lodging, high yielding good for malt preparation, less competent, with other crops and maintain soil fertility. |
| | ‘Zenga’ | Gruel made from it serve as milk for children, stalk for home construction and do not ferment easily (dough), resistant bird attack. |
| Common bean | White seed color | Preferred for making boiled grain and has high market demand |
| | Black seed color | Good for making boiled grain, used for preparing local food called ‘ Fosose’ but has low market demand. |
| | ‘Asheta’ | Climbing type and with large seed size, do not rot by heavy rainfall |
| Banana | Asmera | Short pseudo stem length, large and thick fruit size, takes short time to be harvested, Easily affected by disease, high yielder compared to other varieties |
| | Yehagerew muz (has no local name) | Has long pseudo stem, long and thin fruit size, takes long time to be harvested, highly preferable for animal feeds, resistance to diseases and third in yielding potential. |
| Enset(<i>Enset ventricosum</i>) | Osido | It takes 2-3 years to be harvested, long in its length, its corm is used to prepare local food called Kocho, fourth in its yielding potential as compared to the other varieties. |



| | | |
|-----|--------|--|
| | Gena | Takes around for years be harvested, thick and short in its length, first in its yielding potential and corm is not used as food |
| | Selta | Takes around three years to be harvested, tall in its height, corm is used for food and second in its yielding potential |
| | Jolako | Corm is used for food and third in its yielding potential. |
| Yam | Asni | Climbs up ward equal to the size of supporting material, widely produced in the PA, do not give good yield in water logged areas and when cooked it has bitter test |
| | Odi | Climbing type, it grows to some extent horizontally, do not climb up ward as Asni, gives good yield and has good market demand, do not resist water stress, grown on well drained areas, has no a bitter corm test when its cooked |

3.2. METHOD OF SEED SELECTION AND MAINTENANCE

According to the interviewed farmers seed selection is done by selecting maize plants with large cobs and big seed size and sorghum having arge head at field condition.

For haricot bean seeds are selected after threshing from those plants which have good looking seeds and free from disease/pest. The selected plants in case of maize and sorghum are harvested separately, tied together and hung over smoking places whereas selected plant of haricot bean and other pulses would be threshed and mixed/ treated with ash in order to protect it from weevils(storage pests' infection).

4. AGRONOMIC PRACTICES

4.1.LAND PREPARATION

Large proportion of the farmers use oxen plowing for land those farmers who are living in hilly and mountains are used hand tools 'Boyira' for land preparation. The land is tilled 3-4 times until it gets ready for seed sowing depending on crop types. Major constraints of land preparation and planting as mentioned by the key informants are shortage of oxen, livestock diseases, erratic nature of rainfall, shortage of farm implements and labor.

According to interviewed farmers, the common cropping systems practiced in the PA are mono cropping, intercropping, and mixed cropping. Both broadcasting and row planting are practiced in the PA. Sorghum field pea and faba bean are broadcasted whereas maize and haricot bean are planted in row. Haricot bean is planted being mexed with maize. The actual seed rate for all crops



is not known. But they use around 12 kg seed of maize and sorghum to cover one hectare of land. The use of hill planting of 3 to 4 maize seeds per hill for sowing maize.

4.2. WEEDS AND WEEDING

The major weed species of the PA are ‘gichila’(Bermuda grass),’ Aribi (Meskel flower),’ commolina .Cultural practices such repeated cultivation and hand weeding are used to control weeds. The major problems associated with weeds and weed control emphasized in the PA are human disease, shortage of labor, shortage of money to employ labor and continues rainfall during weeding time.

5. FERTILIZER USE

5.1. INORGANIC FERTILIZER

Farmers reported that apply of Urea and DAP fertilizers only for maize production in the locality. Both types of fertilizer are applied at the rate of 100kg/ha each. But the time of application is different. DAP is applied and covered with soil just before sowing. Urea application is done within 30-40 days after sowing.

5.2. ORGANIC FERTILIZER

According to the interviewed farmers the use organic fertilizer is common in the PA especially homestead crops like vegetables (Shallot, beet root and cabbage) and Enset (Enset ventricosum). Major problems encountered in inorganic fertilizer and organic fertilizers uses are increment of inorganic fertilizer price year to year, unavailability of fertilizer at the appropriate time and shortage of livestock for transportation of organic fertilizer to the farming field. Farmers of the PA leave residues of maize and sorghum in order to improve the soil fertility and also mixed cropping of cereals and pulse are practiced as well for the same purpose.

6. FARM IMPLEMENTS /MECHANIZATION

Variable traditional implements are used in the PA for different activities. The major implements include ‘Wolle’, ‘Boyira’ ‘Gosha’ axe and plow. According to interviewed farmers ‘gosha’ is used for cultivation, ‘Boyira’ is used for digging and cultivation whereas ‘wolle’ for cutting grass and clearing. These implements are traditional, less effective, time consuming and laborious. The sources of farm implements are local markets.

Table 3. Farm operation calendar of some crops in Shishir PA

| Crop | Land preparation | Sowing/planting | Harvesting |
|---------|----------------------------------|-----------------|----------------------|
| Sorghum | March | April | February |
| Maize | November to January (Autumn) | Mid January to | September to October |
| | June to July (Summer) | August | January to February |



| | | | |
|--------------|------------------------------|-------------------------|---------------------|
| Field pea | August | Mid August | December |
| Haricot bean | November to January (Autumn) | Mid January to February | June to July |
| | Jun to July(Summer) | August | December to January |
| Taro | December(Autumn) | December to January | - |
| | May | May to June | - |
| Sweet potato | October | November | - |
| Yam | December | December to January | - |
| Sunflower | June to July | August | January |
| Cassava | November to January | Mid-January to February | - |
| Pepper | November to January | Mid-January to February | June |
| Cabbage | November to January | Mid-January to February | - |

7. STORAGE, PROCESSING AND MARKETING

Farmers in the PA store their crop products mainly in granary made of wood /bamboo .Rats and weevils are the common storage pests in the locality. With regard marketing, the farmers revealed that as the PA is potential for diverse crop production they have surplus production for sale. Coffee and maize are sold in large quantity for for merchants in local as well as in urban market at Gazer. Coffee being the first important cash crop. Maize is sold in large quantity to earn money to cover the fertilizer cost and to pay taxes. Maize is susceptible to weevil and usually sold immediately after harvesting. Those product in small quantity such as sorghum, haricot bean and field pea are sold at local market by women's for covering of expenditures for buying salt, fuel and other items.

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9. REFERENCES

- [1].Almekinders SJM ,Elings A. collaboration, crop improvement in perspective . *Euphytica* .2001.122:425 -438.doi;10.1023/A:10779687875.
- [2]..Matous.P.Y.Tado.2013."Role of extension and ethno-religious network in acceptance of resource conserving agricultural resources among Ethiopian farmers " *International journal of agricultural sustainability*.11(4): 301-316.
- [3]. " *The Federal Republic of Ethiopia: Selected Issues Series* " *International Ministry Fund Country Report No.08/259*, pp.5, 26(Accessed 4 February 2009).
- [4]. *Ethiopian Institute of Agricultural Research website*.