

Maize legume forage intercropping as a strategy for forage development, opportunities and challenges in Jabitehnan and south achefer woreda

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ABSTRACT: *The study was conducted in Jabi Tenan and South Achefer Woredas of West Gojjam Zone Amhara region with objectives of creating of wider demand on improved forages and production method and to strengthen linkage among the possible actors. Abchikli and Jiga kebele was selected purposively from south Achefer and Jabi Tehnan Woredas respectively. Training was given to participant on the production of lupine and cowpea as intercropping forage development strategy and the role and benefits FREG. Intercropping legume forages were under taken at 160 voluntary and potential farmers in each cropping year (2013/14 and 2014/15). The result indicated that, at South Achefer Woredas in 2013/14 cropping season on the average farmers were harvest 4.7 tone and 540kg Dry matter yield and grain yield of sweet lupin respectively. In Jabi tehnan Woredas farmers gain on average 2.6 tone dry matter yield of cow pea in 2013/14 cropping season. In 2014/15 cropping season farmers gain at South Achefer Woredas 345kg sweet lupin grain yield and at Jabitehnan Woredas 445 kg cow pea grain yield. In the area there are opportunities to expand legume forage expansion strategies such as potential of maize in the area and also the area is fully practicing free grazing control system. On the other hand, there are challenges that are furrowing practice and lack of alternative seed that can tolerate the moisture stress. It can be conclude that forage production can be possible using intercropping system. For better forage yield production, it is better to be intercrop the forages with short maize varieties sowing both at the same time.*

KEY WORD: *Jabi Tehnan, South Achefer, Inter Cropping Legume and Forage Cropping*

I. INTRODUCTION

Natural pasture and crop residues are the major source of livestock feed in Ethiopia in general and the western Amhara in particular for mixed farming system. In Western Amhara the major farming system was mixed farming with a fragmented farmland and crop production (Thiruvankadan et al. 2009). Livestock production supports crop production in drought power, source of cash to buy inputs like fertilizer and improved seed (Smith, 2013). In the other side, crop production supports livestock production as source of feed through supplying its residue (CSA, 2016). This situation was causing unsustainable crop production due to the fact that crop residue is used for livestock feed and source of energy for the community causes nothing left to maintain or improve the soil fertility of the maize dominant mono cropping system (Alemayehu Mengistu, 2006). As a strategy, conservation agriculture was promoted by SIMLESA/CASFESA for sustainable crop livestock production; one of its objectives is 30% of crop residue should left on the farmland to improve the soil fertility which would cost accessibility of feed for livestock production (Yeshiwas et al 2015). Andassa Livestock Research Center has conducted different adaptation; a variety releasing and agronomic research activity that has the overall objective of improving the livestock feed resources. As a result of its endeavor, it released sweet lupin varieties such as sanabor and vitabor suitable to mid and high altitude agro-ecologies (Wondemeneh et al 2014).

Hence, pre-scaling up of these technologies used to meet the following objectives:-

Objective:

- ❖ To create wider demand on improved forages and production method
- ❖ To create and strengthen linkage among the possible actors

II. MATERIALS AND METHODS

Site and farmer selection: Abchikli and Jiga kebeles were selected purposively based on their maize potential from South Achefer and Jabi Tehnan Woredas respectively. After having detail discussion with kebele experts, voluntary and potential farmers were selected purposively in each cropping year (

Table 1). After farmers selection farmers research extension group (**FREG**) were organized to share experience between farmers and kebele.

Table 1. Participants farmers across years

| Woreda | Implementation year | | | | | |
|-------------|---------------------|--------|-------|---------|--------|-------|
| | 2013/14 | | | 2014/15 | | |
| | Male | female | Total | Male | female | Total |
| S/achefer | 24 | - | 24 | 83 | 3 | 86 |
| Jabitehenan | 12 | 1 | 13 | 74 | - | 74 |
| Total | 36 | 1 | 37 | 157 | 3 | 160 |

Training provision: Practical and theoretical training was given to host farmers and development agents (

Table 1). The training since it's a new approach and on production of lupine and cowpea and lablab as intercropping forage development strategy and the role and benefits **FREG**.

Table 2. Training participants in 2013/2014 and 2014/15

| Woreda | Implementation year | | | |
|-----------|---------------------|------------------------|--------------|------------------------|
| | 2013/14 | | 2014/15 | |
| | Host farmers | Das and Woreda experts | Host farmers | Das and Woreda experts |
| S/Achefer | 28 | 5 | 85 | 13 |
| J/Tehenan | 28 | 4 | 83 | 18 |
| Total | 56 | 9 | 168 | 31 |



Data management and analysis : Data was collected by trained regular enumerator from 2012 to 2015 .Field days were organized to demonstrate the performance of the breed at the farmers management condition. **FGD** was conducted to assess farmer's perception. Pair wise ranking tools were used for identifying the opportunities and challenges of sheep rearing in the study area. The collected data were entered to the computer by using SPSS v16. Descriptive analysis of mean, frequency and percentage was used to analyze the collected data.

III. RESULT AND DISCUSSION

Table 3. Cow pea and sweet lupine biomass and grain yield in 2013/14

| Variables | Mean ± SD |
|------------------------------------|-----------|
| DMY of sweet lupine ton /ha | 4.7± 2.07 |
| Grain yield of sweet lupine kg /ha | 540± 372 |
| DMY of cow pea in ton/ha | 2.6±1.57 |

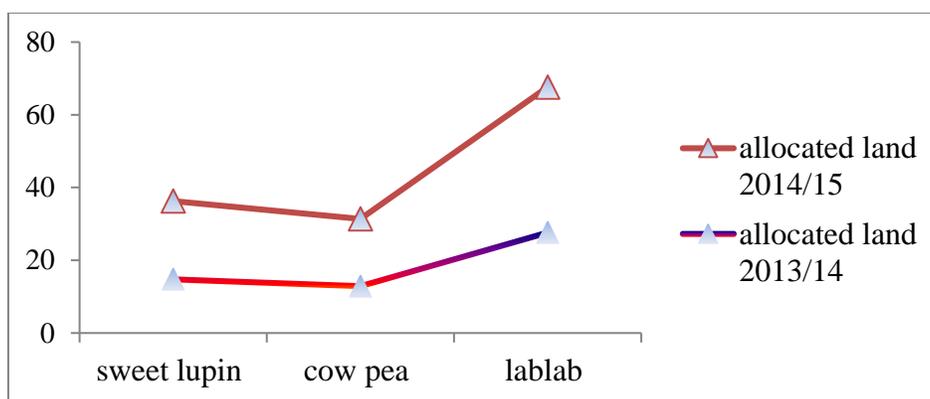
At south Achefer districts in 2013/14 on the average farmers harvest 4.7 tone and 540kg Dry matter yield and grain yield of sweet lupin, also at Jabi tehnan district farmers gain on average 2.6 tone dry matter yield of cow pea. In 2014/15 cropping year farmers gain at south Achefer district 345kg sweet lupin grain yield and at Jabitehnan Woreda 445 kg cow pea grain yield.

Table 4. Cow pea and sweet lupine biomass and grain yield2014/15

| Variables | Mean |
|------------------------------------|------|
| Grain yield of sweet lupine kg /ha | 345 |
| Grain yield of cow pea in kg/ha | 445 |

Farmers in J/tehnan district obtained average 1 ton per ha and 0.7 ton per ha dry matter yield of cow pea sown under maize in conservational practice and conservational practice respectively Opportunities for intercropping legume forage with maize

Demand for the forages: There was high demand to participate in the intercropping activities at both Woreda



Opportunities for intercropping legume forage with maize

High maize potential : There was high maize production potential in the study area, thus the farmers have the opportunity to use the *space between rows* for forage production

Natural resource management practice : The BoA was working a natural resource conservation practice, in related to it the farmers was agreed to stop free grazing. Therefore the farmers are inclined to search alternative source of forage development strategies i.e. (**intercropping**)

Challenges of intercropping legume forage with maize

Practice of furrowing

44 percent of the participant farmers has practice of furrowing .Farmers was practicing furrowing for the following advantages save labor for weed control, drain out the lodged in water and support stand of the maize stand



Challenges for intercropping legume forage with maize

Practice of furrowing : The above practice becomes a challenging problem to implement the biological research recommendation of zero days sowing of legume forages. 92 percent farmers respond that intercropping of legume forage a same day of maize sowing affects the maize yield through: -

- Hanging the leave of the maize
- Computing maize nutrient
- **Dryness** of cow pea and pest incidence at flowering stage
- **Moisture stress for** early germination and shedding effect after germination for both cow pea lablab and sweet lupin
- No uniform **maturity and shattering** before harvesting of lupine and cowpea



Farmers perception

❖ Field days and individual discussion and interview was made to mine the opinion and perception of farmers towards demonstrated result of the forage intercropping.

Table 2 Field day participants

| District | Farmers | | | Experts at all level /k,W,Z,R/ | | |
|-------------|---------|--------|-------|--------------------------------|--------|-------|
| | Male | female | Total | Male | female | Total |
| S/achefer | 38 | 5 | 43 | 26 | - | 26 |
| Jabitehenan | 42 | 4 | 46 | 22 | 1 | 23 |
| Total | 80 | 9 | 89 | 48 | 1 | 49 |

Recommendation : The forage production shall be done short maize varieties and with wider spacing between rows and minimum plant population. Feeding trials should be incorporated with the production. Intercropping with the recommended way of sowing i.e intercropping at zero day of maize sowing day and sole production system shall be used as an alternative means of forage production for green matter utilization. Optimum harvesting time should be studied and recommended by the researchers.

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