# SOCIO-ECONOMIC BENEFITS OF THE CONTRACT FODDER SEED GROWERS IN BHUTAN

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ABSTRACT: The study assessed socio-economic benefits of the farmers from contract fodder seed production program in Bhutan. Data were collected from 30% of the total contract fodder seed growers from four districts i.e., Bumthang, Pemagatshel, Samtse and Sarpang. The findings indicated that the fodder production program has benefitted the contract fodder seed growers to enhance their income and livelihood status. Almost all respondents were satisfied with the supports provided by the Government; besides having derived financial benefits from the program. It was observed that the income generated from the sale of fodder seed were used for livelihood improvement such as housing, drinking water, sanitation and in procuring inputs for enhancing seed production. The seed production also shows a steady increment over the years. However, there is a need to strengthen further linkages between the National Development Centre for Animal Nutrition Program and CFSGs in imparting knowledge and dissemination of technology, besides continued regular incentive supports. The study concluded that sustainability of fodder production is dependent on awareness of the farmers, availability of seeds and market linkage for sale of fodder seed. To sustained fodder seed production by the seed grower groups, the NDCAN need to design an appropriate intervention and create an enabling environment, both forward and backward linkages with dairy farmers to upscale improved fodder production.

Keywords: CFSGs; fodder seeds; production; socio-economic benefits

## 1. INTRODUCTION

Bhutan is an agrarian country with agriculture & livestock sector engaging about 48.49% of the total population (NSB 2022). Despite huge employment in the agriculture sector, the livestock sector had contributed only 5.71% to the Gross Domestic Product (NSB 2022). Nevertheless, livestock rearing is considered as one of the most important economic activities providing supplementary as well as stable income for the rural community round the year (FAO 2021). A constant increase of 1% in the total livestock population was recorded from 2019 - 2020 and 2020 - 2021 (RNR 2019 - 2021) in Bhutan. This increasing trend of livestock population demands for parallel increase in feeding resources such as pasture development, growing annual fodder crops and other agricultural products. Feed and fodder is the single most important element of animal production financially (Makkar 2016); besides, being the backbone of the livestock industry and an essential tool in meeting the changing annual feed and energy requirements of the livestock (FAO 2015; ICRISAT 2015). Ensuring adequate quantity and quality fodder is a priority of the Department of Livestock. This is one of the important strategies adopted to enhance livestock productivity (Wangchuk et al. 2019).

Increasing productivity of feed and fodder resources is directly proportional to quality seed supply to the farmers. A contract fodder seed program was initiated to ensure availability of quality seed for farmers to develop improved pasture. It can increase the yield potential of the crop and is one of the most economical and efficient inputs to improve crop production and productivity (APN 2005), the other factors include support, income and mechanization. The Contract Fodder Seed Growers (CFSGs) however requires incentives such as money, mechanization, technical advice and seeds. Although fodder seeds can be produced by farmers, more successful seed production is realized by skilled personnel with modern production and processing facilities (Tolera et al. 2019). National Development Center for Animal Nutrition (NDCAN), Bumthang facilitates and supports production and supply of fodder seeds through the CFSGs. In Bhutan, the government is the main player in the seed sector, controlling the production through basal seed supply of clover, cocksfoot, Italian rye grass, molasses, oat, ruzi, stylo and tall fescue thus enabling business for farmers.

NDCAN facilitate the transformation of a subsistence-based rural agricultural economy into market driven productive sector by promoting sale of fodder seeds. However, the impacts of the contract fodder seed production program have not been assessed objectively as of date. The outcome of such study will also provide a strong scientific basis for the govt. to make an informed decision for making further interventions on such program. Thus, it is felt imperative to assess and understand the socioeconomic significance of contract fodder seed production program by CFSGs in the country.

## 2. MATERIALS AND METHOD

### 2.1 Study area

Bhutan a Himalayan nation lies above 4500 meter above sea level, temperate between 1000-4500 masl and sub-tropical region covering southern foothills lies below 1000 m (NSB 2021). It is administratively divided into 20 districts. Bumthang, Pemagatshel, Samtse and Sarpang with potential to produce fodder seeds for different regions, and given large number of CFSG's member,


**Figure 1:** Study Area

was identified for the study. The sites also represent different geographical zones; for instance, Bumthang lies at an altitude of 2400-6000 masl produce temperate fodder seed; Pemagatshel (445-3000 masl), Samtse (200-4400 masl) and Sarpang (210-2600 masl) (NSB 2021) that lies in the southern foothills producing sub-tropical fodder seeds for pasture development.

### 2.2. Sampling procedure

Of the total 407 CFSGs in the country, 30% were selected using probability sampling at 95% level of confidence to ensure equal opportunity to choose each CFSGs (FAO 2016) for the study. Uakarn and Chaokromthong (2021) recommended sample size adequecy of 15-30% for a population ranging in hundreds.

### 2.3. Data collection

A quantitative data was collected from 165 respondents (115 female and 40 male) through face-to-face interview using a set of questionnaires. The respondents comprised of 95 from Bumthang, 24 from Pemagatshel, 25 from Samtse and 11 from Sarpang.

### 2.4. Data Analysis

The data was entered in excel spread sheet, compiled, exported to SPSS version 23 and analyzed using descriptive statistics.

## 3. RESULTS AND DISCUSSION

### 3.1 Asset holdings

#### 3.1.1. Land ownership

The fodder seed growers were examined on the ownership of the land currently used for fodder production. The results showed that 74.20% of the respondents were landholders while 25.80 % of the respondents were found relying on others farmland (share croppers). About 85.80% have maintained the same area of land used for fodder due to limited land holdings for seed production and 14.20% of farmers have expanded the area during the production years. Farmland shortage was found to be the limiting factor in Kenya, Uganda and Tanzania during fodder seed production (NDO 2013). For that reason, the Kenyan administration made provision for government land to be used for seed production and observed a marked increase in fodder production as well as in number of producers. With 25.80% of the sample respondents dependent on others land for seed production, there is a need for such policy measures/ schemes to be implemented in Bhutan.

#### 3.1.2. Farm Mechanization

The information was also collected data on machinery owned by the seed growers. It was recorded that about 66% of the respondents owned at least one type of farm machinery (Table 1). By the number of holdings who reported using a particular machine, the top three are power tiller (36.12%) followed by tractor (27.09%) and chaff cutter (23.22%). Mechanization has a positive effect on productivity, harvesting and fodder conservation. About 5.16% respondents reported a drop in labour requirement and 85.80% stated that the labour engagement remained the same and that had attributed the ease of production compared to machinery. NDCAN has been providing machinery support in terms of provision of cutting materials, tilling service and CGI sheets for drying. The study captured that possession of farm mechanization equipment positively correlates with seed productivity enhancement.

Assessment of the seed sectors of eight countries in Africa (Burundi, Ethiopia, Ghana, Mali, Malawi, Mozambique, Uganda and Zambia) where the fodder producers were provided with farm machinery resulted in increased fodder seed production and the fodder producers continuing after the project

period. In Uganda, the government provided tractors, thresher, sorter and CGI sheets for drying cumulating to an increased production (FAO and ICRISAT 2015). The Mulukanoor cooperative society in India is a success story and accredits its production to having the necessary machinery and implements for every activity of the farm (NSAI 2022).

**Table 2:** Type of fodder seeds produced annually (MT)

| Fodder seeds type | 2019-2020 | 2020-2021 | 2021-2022 |
|---|---|---|---|
| Temperate Seed | 12.9 | 12.26 | 9.1 |
| Subtropical Seed | 16.72 | 10.76 | 10.76 |
| Fodder Oat | 114.2 | 130 | 130 |
| Fodder Maize | 45 | 90 | 90 |
| Tall Fescue | 7.42 | 8.97 | 8.97 |

### 3.1. Improvement in production

Table 2 depicts different type of fodder seeds produced by CFSGs for the last three consecutive years from 2020 to 2022. The overall seed production recorded in 2020, 2021 and 2022 was 196.24 MT, 251.99 MT 248.83 MT respectively. An increase in fodder seed production by about of 23.62% was recorded over three years period from 2020 to 2022. The basal fodder seed are supplied by NDCAN and this activity was found to be an important stimulus to enhance production. Similarly, in Kenya and Somalia, the yield level of fodder crops grown by beneficiary households receiving quality tested seeds from government was reported to be higher than the fodder crops grown by the non-beneficiary households (AERC 2019).

The production of fodder seeds in Bhutan shows an increasing trend. This growth can be strengthened through successful support as demonstrated in other countries. Support such as supply of farm automation equipment in Uganda, financial and technical support in Ethiopia, training on seed production to the seed producers in Tanzania and Kenya, providing fertilizer and mechanical inputs in India resulted in continued and increased production (ISSD 2022: NSAI 2022). Similar support are instrumental and may need to be facilitated in the country to sustained seed production.

### 3.2. Income from fodder seeds

The assessment of income generated demonstrated a total net income of Nu.9.31M, Nu 13.53M and Nu.13.77 M in 2019, 2020 and 2021 respectively. There was an increment in income of 36.95% from the fiscal year 2019 to 2020 and 1.75% from 2020 to 2021. The study also explored the percentage share of household income to the farmers from seed production. 74.19% of the respondent stated 0-25%, 22.58% respondent mentioned 26-50% and 3.22% responded that it contributed between 51-75% of the total income generation annually.

The seed production trend shows steady upwards development resulting in increased income generation. Mean income of the sampled fodder seed growing households earned is shown in Table 3. The income generated from sale of seed were spent for renovation of their housing, drinking water, sanitation and in purchase of inputs to expand fodder seed production. The cost for purchase of mother stock seed for fodder seed production is quite low when compared with other production costs, yet, no single factor is as imperative in determining the success of the operation (NSAI 2022). A total of 80% of the respondents mentioned that the price needs to be increased while 20% stated that the price was satisfactory for the current economy. The seed producers desire to increase fodder seed price is to offset inflation and meet the increasing price of basic amenities. Agriculture and livestock are the main source of income for 95.94% of the respondents and only 4.05% rely on other income sources. In India, the comparative economics on cost of cultivating fodder crops and its competitive crops shows that

fodder crop cultivation undertaken by the fodder seed growers was comparatively profitable.

**Table 3.** Mean HH income generated from different fodder seeds in 2022

| Fodder types | Income (Nu) | Respondents (no) |
|---|---|---|
| Oat | 19,058 | 165 |
| Stylo | 17,190 | 13 |
| Ruzi | 16,995 | 105 |
| TF | 13,519.5 | 107 |
| CF | 7557 | 97 |
| Paspalum | 7350 | 13 |
| Italian Rye Grass | 5403 | 54 |

**Table 4.** Economic benefits due to income generated from fodder seeds production

| Household expenditure areas | No. of Respondents (%) |
|---|---|
| Basic Household Amenities (Food & Cloth) | 57 (19.19) |
| Building of House/Expansion | 73 (24.57) |
| Drinking Water | 67(22.55) |
| Electrical Wiring of the Household | 14(4.71) |
| Mechanical Equipment | 20(6.76) |
| Sanitation Facilities | 66(22.22) |

The fodder grower respondents expressed that the fodder cultivation fetch them higher returns than other competitive crops (AERC 2019). Farmers in India (Namakkal, Erode, Dharmapuri, Thoothhukudi, Krishnagiri, Trichy, Dindigul Karurin) have converted their land to produce fodder seed because income from selling of fodder seed is twice the income from other agricultural crops (NSAI 2022). Such studies provide evidence that fodder production generates higher income and it is easier to motivate producers to engage in this business.

### 3.4. Impact of income on livelihood

Contract seed production program has created an avenue for income diversification and substantially contributed to household incomes. Over 89.18% of the respondents reported an improvement in household structural facilities while the rest stated that the income is being used to meet the expenses of basic amenities (Table 4**)**. Income generated from the sale of fodder seeds gives opportunity to the producers for trading with other goods. In Uganda, Tanzania, Sudan and Ethiopia, the business of fodder seed growers is sustained owing to strong financial and technical support from the project. Thus, providing monetary incentives to the seed producers are imperative (FAO and ICRISAT 2015) in sustaining their business. In Kenya and Somalia, the study evidenced that through the provision of grants, the fodder seed growers purchased inputs such as basic seed and invested in required facilities for production (NDO 2013). All these facilities contributed to making the seed growers more competitive in the market. With provision of cash resource, 6.76% of the fodder seed growers used the income earned for procurement of mechanical equipment and 22.55% for water facilities, meaning that the growers invested in resources that allow for ease and accessible production.

### 3.3. Incentives for seeds production

The supports or incentives provided by NRDCAN are shown in Table 5. Over 99.32% of the respondents mentioned that the overall supports provided for the fodder seed production were satisfactory. The respondent reported that the free basal seed supply for production, facilitation in acquisition of equipment such as threshing machine and land utilization due to fodder production benefitted the most. The beneficiaries also reported that the support on tilling service may need to be continued. With such resource support, the utilization of fallow land for fodder seed production was evident. The CFSGs in Bhutan are also provided with quality tested basal seed, free of cost to initiate seed production. Almost (99.32%) of the respondents expressed satisfaction in supports received and 98.70% were willing to continue as CFSGs. Support facilitation and timely technical guidance

from NDCAN plays an important role in determining the success and start-up of fodder growers.

**Table 5:** CFSGs availed inputs services from NRDCAN

| Inputs | CFSGs (%) | CFSGs (no) |
|---|---|---|
| Cash | 28 | 117 |
| E-Fencing | 17 | 70 |
| Free Transportation | 27 | 111 |
| Ready Market | 11 | 44 |
| Technical Advisory | 11 | 45 |
| Tilling | 6 | 25 |

The ISSD Africa program (2022) found that the fodder seed growers were provided with initial inputs and seed for multiplication, and machinery supports. Similarly, in Mulunkanoor, all inputs from seeds to fertilizers, credit and farm automation are provided to the seed producers (NSAI 2022). In Ethiopia, continuous monitoring and supply of inputs resulted in farmers to venture into seed business. Lack of input such as seed and start up fund aggravated by poor follow-up (Ahumuza et al. 2022) activities impacted forages cultivation in Uganda. However, in 2003, the Uganda government provided incentives in the form of startup seed, fertilizers and pesticides on top of advisory services to farmers. Owing to this support, by 2005, the fodder growers expanded the fodder seeds production and marketing got picked up well.

## 4. CONCLUSION &RECOMMENDATION

The CFSG programs aims to strengthen fodder seed production and support the development of an economically viable seed sector. The findings from the study revealed the relevance of the program benefiting farm household's income and livelihood in the fodder producing Dzongkhags. It is contributing to food and nutrition security through fodder seed and fodder production and improving livelihoods through income earned from fodder seed businesses. The rendering of technical support, access to complementary inputs such as quality basal seeds and incentive provision needs to be continued. While constraints may contravene production, bottlenecks such as wildlife and farm automation shortages have been addressed successfully through fencing support and equipment provision. In order to be a successful seed producer, the confidence level of the farmers to procure the seed for improved pasture development is very crucial. Further, there is a need to implement formal seed certification system in the country through seed quality test in terms of organic production and germination quality. To sustained fodder seed production by the seed grower groups, the NDCAN need to further investigate and design appropriate interventions to overcome the challenges in seed sector development and create an enabling environment with appropriate support mechanism in place.

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