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Building Sustainable Rural Women Entrepreneurs

in Assam & West Bengal

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भारतीय बैंक प्रबंधन संस्थान
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TABLE OF CONTENTS

CONTENTS **PAGE NO.**

CHAPTER 3: FLORICULTURE VALUE CHAIN

CHAPTER 4: PIGGERY VALUE CHAIN

CHAPTER 5: DAIRY VALUE CHAIN

CONTENTS **PAGE NO.**

CHAPTER 6: TEA VALUE CHAIN

1INTRODUCTION

In the contemporary era of globalisation and digitalisation, India is witnessing a boom vis-à-vis women entrepreneurs. They come from all walks of life, all parts of the country and not limited to privileged sections of the society. From agriculture to highest level of industries, women have been participating with flying colours. Women entrepreneurship have now been recognized as an important untapped source of economic growth. They create new opportunities for themselves and others. This leads to more job creation for women which ultimately helps in reducing the gender gap in the workforce.

This report *''Building Sustainable Rural Women Entrepreneurs in Assam and West Bengal''* identifies the scope of entrepreneurship among rural women of the two states by identifying the potentials and challenges pertaining to six value chains. They are Mushroom, Handloom, Tea, Dairy, Piggery and Floriculture.

Promoting women in value chain development is contemporarily being recognized as an encouraging approach to address not only economic development, job creation and inclusive growth, but a wider range of social, environmental and development issues.

Based on a review of existing literature, this report provides a blueprint of approaches and perspectives that one can implement in value chain development. It also points to some of the challenges that the stakeholders across these value chains are facing in these two states to enhance their growth and sustainability. Majority of the existing works focus on development of value chains in context of industrial development and mainstream domestic economy.

Altenburg (2007) says that promotion of local value chains is complex challenge but also vital for local economic development. It is because women actors in the value chains come from different economic backgrounds and it is beyond doubt that developing a holistic blueprint is challenging. However, the potential of interventions in these value chains remain significant as local economy gets a push and local development leads to poverty reduction.

Projects such as *Enter-Growth Project*, an intervention in value chain development in sectors such as floriculture, dairy and fishing by International Labour Organization (ILO) in Sri Lanka shows that it has had positive general improvement in the local economic activities. The intervention also helped promotion of local markets and making the market more inclusive. It shows that a value chain development strategy does work if it is well designed and implemented religiously. A well designed intervention by the national and international agencies is likely to increase efficiency of such interventions.

2 OBJECTIVES OF THE STUDY

1. Identifying the current policies, programs, schemes, regulations and other interventions influencing rural women entrepreneurs' participation in the respective value chains.
2. Identify the current participation of rural women in the value chains in Assam and West Bengal.
3. Providing rationale for selection of intervention in the value chains and program districts.
4. Understand the current engagement of women in the SHGs, collectives, FPOs of the selected value chains.
5. To identify the opportunities for integrating ICT and sustainable technology for promoting entry and upward mobility of new and existing female workforce.

3 METHODOLOGY

i) Data Sources

Both primary and secondary data were used for this study. The main sources of secondary data included census reports, statistical handbooks, government publications, journals, relevant websites, etc. (find more in Annexure 6)

More specifically, the information on value chains that were assembled using secondary data are:

a) Regional and local structure of the particular sector.
b) Demand for raw materials and finished products.
c) Production and trade for the last few years.
d) Key drives and stakeholders.
e) Policies and schemes.
f) Demographic profile.
g) Current plans and investment priorities of the governments.

Data at the primary level were collected through Interview Schedules and Focused Group Discussions (FGD). Data assembled through primary study are:

a) Cost of production.
b) Cost of procurement of raw materials.
c) Income generated.
d) Value added products.
e) Services and schemes availed.
g) Service providers.
h) Sources of credit.
i) Constraints.
j) Opportunities.

ii) Sampling and Data Collection

The study was conducted in eight districts of Assam and West Bengal. Purposive sampling was used to identify the districts after our secondary literature review. Snowball sampling was used to identify the samples to be studied in the field. The choice of samples were primarily guided by criteria based on:

A) Districts where the production of the selected products are high by volume.
B) Districts where there is significant trade of the products.
C) Areas where consumption of the products are high and provide attractive markets.

Table 1.0: List of Districts identified for the value chains.

State	Selected Districts
Assam	Baksa
	Goalpara
	Kamrup Rural
	Nalbari
	Sivsagar
West Bengal	Coochbehar
	Darjeeling
	Jalpaiguri

Table 2.0: Blocks identified in each districts along with value chains.

District	Blocks	Value Chain
Baksa	Barama, Musalpur, Baganpara,	Piggery, Handloom, Mushroom
Goalpara	Kuchdowa, Matia, Kharmuza	Piggery, Handloom, Mushroom
Kamrup Rural	Boko, Rampur, Sonapur, Bezera	Dairy, Piggery, Handloom, Piggery, Floriculture
Nalbari	Tamulpur	Handloom, Mushroom
Sivsagar	Charaideo, Moran, Nazira	Tea, Handloom
Coochbehar	Coochbehar, Dinhata, Tufanganj, Mathabhanga	Dairy, Mushroom, Piggery, Handloom
Darjeeling	Darjeeling	Floriculture, Tea
Jalpaiguri	Falakata, Kumargram, Birpara, Nagarkata, Malbazar, Moynaguri, Rajganj, Haldibari, Mekhliganj	Dairy, Mushroom, Tea, Handloom, piggery

In total, the sample size was 430 including the stakeholders. They included rural women, input suppliers, traders, transporters, finance providers, NGOs and other state authorities.

iii) Data Analysis

Firstly, we involved descriptive statistics which characterized the production, consumption and market. Second, value chain mapping helped us identify the roles of different actors across the value chains. Third, a financial analysis of the value chain was carried out in the context of inbound logistics, operations and outbound logistics. This was to identify the financial returns and determine the value added at each stage of the value chain. Finally, a SWOT (strengths, weakness, opportunities and threats) analysis was carried out for each value chains.

4 JUSTIFICATION FOR SELECTION OF VALUE CHAINS

Step 1: Identification of popular value chains.

A primary step in any value chain development process is to identify the potential value chains which can have significant impact for a fairly large segment of population. Because resources are limited, this screening is vital to compare and prioritise potential value chains for promotion. Based on the secondary research and interviews with various stakeholders we have arrived at the potential value chains in Assam and West Bengal. These are apiculture, areca nut, banana, bamboo, dairy, food-processing, floriculture, goat farming, handloom, mushroom, piggery, poultry, pisciculture and tea (see Table 3).

Step 2: Criteria to choose the value chains.

In order to identify the value chains which are pro-women, five criteria were used. The criteria were selected after having discussions with stakeholders associated with the various sectors. These are;

1) Conducive environment for women (ease of undertaking the economic activity without much disruption of their family obligations)
2) Government interventions in the selected value chain (Presence of govt intervention in many parts of the value chain)
3) Value chain that has higher participation of women
4) Low capital requirement
5) Basic technology

Based on the above criteria, the value chains which would be conducive for women from amongst the potential value chains were identified.

Based on the above filter, we arrive at six value chains which has potential for growth with a pro-women focus. The value chains are; Handloom, Mushroom, Piggery, Tea, Dairy (Assam), Floriculture (West Bengal).

Table 3: Table showing the pro-women potential value chains

Popular Value Chains	Variables to identify value chains for study				
	Conducive Environment	Government Interventions	Higher Women Participation	Low Capital Requirement	Basic Technology
Apiculture				√	
Areca Nut	√			√	√
Banana	√				√
Bamboo	√	√		√	√
Dairy	√	√	√	√	√
Food processing	√		√		√
Floriculture	√	√	√	√	√
Goatery	√		√	√	
Handloom	√	√	√	√	√
Mushroom	√	√	√	√	√
Piggery	√	√	√	√	√
Poultry	√	√			
Pisiculture	√	√			
Tea	√	√	√	√	√

From the above table, it can be seen that six value chains have the satisfied all the criteria and have therefore been selected as the potential value chains for women entrepreneurs in both the states.

HANDLOOM VALUE CHAIN

5. Status of Handloom Sector

5.1 Overview of Handloom Industry in India

Handloom is a centuries-old traditional weaving practice in India in which fabric is produced on a loom by hand. It has been a key part of India's cultural and economic legacy for millennia and continues to play an important role in the country's textile industry. This industry's operations are mostly based in households, where many family members collaborate to produce goods. These activities, which entail passing skills from one generation to the next, are dispersed among thousands of cities and villages across the nation. Every region in India that uses handloom weaving has its own handloom traditions, patterns, textures, and motifs. The weavers of this industry are keeping alive the traditional craft of different states. The level of artistry and intricacy achieved in the handloom fabrics is unparalleled and certain weaves are still beyond the scope of modern machines. Most of the handloom units are run either as sole proprietors or on partnership basis. Amongst the many strengths of the sector include minimal use of capital and power, environment-friendly production processes and flexibility to innovate and offer products as per market requirements. According to the latest Handloom Census (2019-20), in India there are 31.45Lakh households associated with handloom and allied activities. Total of 26.73 lakh numbers of weavers was enumerated for the census. Nearly 12.69Lakh and 5.42Lakh handloom households are engaged in weaving and allied activities in Assam and West Bengal respectively.

The sector contributes 6% of GDP and 13% of exports. The industry's manufacturing setup is second largest in the world, after China. The industry employs more than 3 million people in direct and allied activities (IBEF, 2022). Out of which majority of them are women workers, with a share of 72.29 percent as per the Handloom Census (2019-20). The industry has an installed capacity of 512 lakh spindles, 8.6 lakh rotors, 0.68 lakh looms in organized sector, 25.23 lakh power looms and 23.77 lakh handlooms.

Some of this industry's advantages include the availability of inexpensive and plentiful labour, the use of local resources, low capital expenditures, distinctive skill in product manufacturing, and growing recognition by international consumers. Despite these distinctive qualities, the business only makes up a small percentage of Indian exports and the world market, necessitating efforts to promote and refocus the industry's offers in order to unlock its untapped potential.

5.2 Major Handloom Clusters in India: Assam and West Bengal

State(s)	Product Speciality Work	/Major Clusters
Assam	Sualkuchi	Guwahati
West Bengal	Carpet Weaving	Darjeeling

Source: Human Resource and Skill Requirements in the Handlooms and Handicrafts Sector, KPMG

5.3 Geographic Distribution of the handloom value chain across the two states

According to the 4th Handloom Census, the handloom sector is dominated by women in Assam as compared to West Bengal and India. In Assam, almost 91 % of the persons involved in handloom are women as compared to 72 % in India and 54% in West Bengal.

Handloom weaving is ubiquitous across Assam. However, some of the districts where it is more concentrated based on the number of weavers are: Goalpara, Lakhimpur, Dhemaji, Dibrugarh, Jorhat, Majuli, Golaghat, Cachar, Kamrup (M), Kamrup Rural, Nalbari, Baksa and Udalguri. These districts are also important because most of the interventions for handloom value chain have been taken up in the above-mentioned districts under ASRLMs. However, districts with highest production of handloom in meters are Udalguri, Baksa, Nalbari, Kokrajhar, Karbi Anglong. When it comes to the production of handloom cloth Kamrup, Golaghat, Nagaon, Dhubri, and Barpeta tops the list.

Besides, handloom Assam is renowned for producing some of the best silk fabrics in India and has a long history of silk weaving. The golden-hued muga silk, which is exclusive to Assam and renowned for its tensile strength, softness, and gloss, is the state's most well-known silk fabric. The Eri silk, Pat silk, and Muga silk are a few other well-known silk textiles made in Assam.

Assam ranks 3rd amongst raw silk producing states in India contributing over 80% of Muga silk and over 65% of Eri silk produced in India. The state houses more than 13 lakh looms out of the total 28 lakh looms in the country. Sualkuchi in Assam is known as the Manchester of the East and is world renowned for its unique Assam Silk. 98 Weavers Extension units and 20 Handloom Production Centres produce 65.3 thousand metres of handloom fabrics in the state. Silk production in the state for 2021-22 was at 5,700 MT (IBEF, 2022).

For the development of Eri and Muga silk industries in the state, the Government has initiated Assam Silk Outreach Mission and by 2025, this mission aims to produce 1 million kg of Muga silk & 10 million kg of Eri silk. Further, in 7 districts of the state, Integrated Sericulture Development Project is being applied, out of which 3 districts are for Eri whereas 4 districts are for Muga.

According to a report prepared by IIT Guwahati (2021), Kamrup, Sivsagar, Charaideo, Lakhimpur, Majuli, Biswanath Jorhat, and Sonitpur are highly potential districts in case of Eri and Muga.

West Bengal's handloom industry is distinguished by the use of traditional techniques and natural fibres such as cotton, silk, and jute. The Jamdani, Baluchari, Tant, and Tangail sarees are the most well-known handloom goods of West Bengal, and they are known for their exquisite designs and patterns. In recent years, West Bengal’s handloom sector has experienced issues like competition from machine-made fabrics and diminishing demand for traditional handloom materials. However, efforts are being made to revitalise the sector and conserve its traditional techniques and cultural legacy.

According to the Directorate of Textiles (Handloom, Spinning Mills, Silk Weaving & Handloom Based Handicrafts Division), Government of West Bengal, parts of Nadia district, Hoogly district, Burdwan district, and Bankura district are mainly handloom concentrated districts of West Bengal.

1.4 Key characteristics of the Handloom Value Chain

Social profile of the weavers – Findings from the field

Women have been at the forefront of promoting handloom textiles and raising awareness about their cultural and economic importance. According to the Handloom census, in India 72% of the workers associated with handloom are women. Assam has the highest proportion of women involved in the sector (92%) which is more than the national average. West Bengal on the other hand have 58% of women involved in the sector.

As per the primary data, most of the workers are Hindu in both states. Similarly, in terms of their social

status, most of them are OBC (63%) in Assam as opposed to 100% SC in West Bengal. In Assam, the SC numbers are very few. However, there is also a significant numbers of ST households (22%) which are involved in handloom in Assam.
In terms of education, majority was educated only up to Class X level; 79% for West Bengal and 76% for Assam. In terms of age, weavers of Assam are younger than their counterparts in West Bengal. The numbers of weavers in the age group 21 – 50 is 96% in Assam as compared to 91% in West Bengal for the same age group.
A large number of weavers are involved in handloom only in both the states. (67% in Assam and 60% in West Bengal). Only the remaining have more than one economic activity. This pattern has an adverse impact on the income of the weavers. More on this in the economic profile section of this report.

Economic profile of the weavers – Findings from the field

In terms of income received from handloom, both secondary data and the primary data clearly shows that the income level is very low.

5.4 Business Models of the Handloom Industry

There are three broad models that we see emerging in the handloom landscape in Assam. (See Annexure I)

a) Traditional Model: The first model is the traditional model. This model is the most popular and is ubiquitous across Assam. Almost 80% of the persons are part of this model. Under this model, the weaver households buys yarn from the open market or spins yarn from cocoon (in case of silk) weave the finished cloth and sells it in the market. Most of the weavers covered under the primary survey comes under this model. Most of the firms under this model are tiny and are in informal sector. Most of the weavers are also part-time. Most of the women are involved in the lower end of the value chain. However, the potential of growth is limited. The large number of part-time weavers, who are involved in other activities are part of this model. A variant to this model is where one person or a group of persons evolve to be a master weaver and provides yarn to the weaver and procures the finished product from the weaver and sells it in the local market. Although the secondary data indicates that a large number of Master weavers reside Assam, the primary survey did capture any Master weaver who is involved in such activity in Assam.

b) Collective Model: The second model is the Co-op/collective driven model where the institution provides the input supply and procures the finished product from the weavers. The finished product is sold through retail outlets which the Co-op/ collective runs. The examples are ARTFED, SHG Collectives under ASRMLs etc. A variant to this model is the primary weavers' cooperative societies which market the produce in the local areas, and hence the volumes are small. However, in terms of its outreach, this model only covers a small segment of the weavers. Despite a lot of Government initiatives, membership in collectives like co-operatives or producer companies are still very low in Assam or West Bengal. At the national level, some states like Tamil Nadu etc. have a fairly large membership in the co-operatives. Only SHGs are more prominent amongst the weaver. There are however severe lacunae related to the govt interventions under this model.

The most prominent model supported by the government bodies/institutions is the Co-op/Collective model. The handloom value chain promoted by ASRLM follows the collective model. Some of the Govt

schemes like SFURTI (Scheme of Fund for Regeneration of Traditional Industries) has also followed the collective model. There is however several challenges associated with such schemes as will be discussed later in this report.

c) Entrepreneur Model: The third model is the entrepreneur driven model where the entrepreneur is in the center of the value chain and provides the forward and backward linkages. There are two variants under this model under this model. The first one is the evolution of the Master Weaver from a local market and smaller scale to a larger market. This is evident mostly in West Bengal where they are involved also as an input supplier and also providing finance etc. Although the secondary data suggests that there are a lot of Master weavers in Assam, the primary survey did not capture any such category. Therefore, it can be safely assumed that the impact of master weavers is very little in Assam.

The second variant is the urbane entrepreneur, who may not necessarily come from the handloom background. The case study of Mary Devi illustrates this model very clearly. Here, the entrepreneur provides large part of the value-added services like design, dyeing, marketing, raw material supply etc.

5.5 Women in Handloom: A Socio-Economic profile of the Handloom workers

a) Basket of livelihood taken up by women:
67% of the participants are only involved in Handloom and no other economic activities. While the rest 33% are engaged in other economic activities such as agriculture and livestock.

b) Idea of the Business:
68% of the participants have inherited handloom as a part of family legacy. 16% of the women have gained this idea as a part of Exposure visit to their places. 9% of the women have adopted handloom by imitating their friends and relatives.

c) Nature of Enterprise: Out of the total respondents in both the states, 99% of them own their enterprise single handedly. 1% of the respondents have a shared enterprise. This shows that women in all these districts have the potential to further develop their business, provided they receive some support

d) Registration/Trade license:
According to the primary data, 98% of the participants have not registered their business and neither do they have any license. 3 of the respondents have Udyami License. Out of all the participants of both the states only 2 of them have GST number.

e) Seasonality in production:
According to the primary data April to June is the highest earning season whereas October to December is the lowest earning season in handloom business in Assam and West Bengal.

f) The nature of workers in the handloom enterprises are stated below in a tabular form.
Nature of engagement (fulltime and part time):

State	Full Time	Part Time	Total
Assam	279508	1004373	1283881

West Bengal	416742	214705	631447
India	1788765	1733747	3522512

Source: 4th Handloom Census

g) Digital: The use of ICT in the enterprises is close to non-existent. 88% do not use digital payment for their enterprise. 44% RWEs do not use smartphone.

5.6 Description of existing models in Handloom value chain

The production of handloom products involves multiple steps from the procurement of raw materials to production and finally to marketing of the products.

a) Traditional Driven Model:
The first model is the Traditional Model. This is also termed as livelihood model. This model is the most popular and is ubiquitous across Assam. Almost 80% of the persons are part of this model. Under this model, the weaver households buy yarn from the open market or spins yarn from cocoon (in case of silk) weave the finished cloth and sells it in the market. Most of the firms under this model falls under the category of necessity firms[1] as opposed to opportunity firms[2]. The dominance of the necessity enterprises in this model suggests that most of the enterprises are tiny and are in the informal sector. Most of the weavers are part-time. Most of the women are involved in the lower end of the value chain. The scale of the enterprise is also very small.

Key Characteristics of Handloom Value chain

Women in Assam is involved in variety of economic activities from raising animals, to making pickles, handloom, raising the eri silk cocoons, cane and bamboo products like hand fans, some enterprising women have also small nurseries which sells saplings and flowering plants in their vicinity etc. Most of these activities are of second nature to them. On an average, a household may have up to 7-8 basket of livelihood activities.

The handloom value chain for Eri/Muga starts from eggs to cocoons (Muga approx. 45 days for warmer months to 87 days for winters) 2 of the crops are commercials and rest of the 6 crops cocoon quality is of low grade. Plus, Muga needs a pollution free environment, and any noise or vehicular pollution would result in dying of all silkworm before cocoon formation stage. Comparatively Eri silkworm is very sturdy and survive from dry arid to tropical climate and feed on 6-7 varieties of plants can be raised domestically and better survival rates.

After Eri cocoons are formed they are cut and the silkworm taken out to be sold in the local haats for consumption, while the cut cocoons are sold for spinning of the yarn. Spinning of the yarn are mostly done by hand in Assam, Fabric plus used to machine spun the Eri silk, but for the past many years, even they were sending the cut cocoons to Bangalore for spinning and then send back the finished yarn to Assam as consumption of Eri yarn is highest in the Northeast.

Yarn hanks are then wound into bobbins for warp and pirns are wounded for weft yarns. Weaving

[1] firms established by the owner because they can find no other alternatives and provides the much needed cash flow to the households

[2] Firms established take advantage of business opportunities

takes place and after that normally calendaring is done to the textile to give it a flat finish and better appearance but finishing processes are not usually done in north-eastern textiles. This is another reason why north-eastern handloom hasn't been able to make its mark in the national and international arena.

The entire value chain is dominated by women except for Muga rearing as this takes place in the tree itself and men are involved in this process. Muga cocoons are bought by a particular for 1.50 -2.00 each from the rearer and sold to the rearer entrepreneur/sericulture department for anywhere between Rs 5 – Rs 7. The finished handspun muga yarn retails presently at Rs. 28000/- kg (about 4-5k cocoon needed for 1 kg of yarn) While machine reeled yarn retails at Rs. 22000/- kg.

Eri on the other hand, the silkworm is sold at Rs1 -1.50 per worm, cut cocoons sold between 400-700 per kg. Handspun retails at 1800-2200 per kg. while machine spun depending upon the count sells anywhere from 1500-3500kg. As for warping of the loom, each warping ranges from 800-1200/-

Weaving rates varies depending upon the design, though the State government rates are the lowest, for a Gamusa they pay weavers between Rs35-Rs50. For mekhela chadors the rates vary from 600/- for Eri/cotton/polyester etc. to Rs 4000/- for the ones which takes about a week to make (these are bulk rates) all overheads are extra (accommodation, fooding ,etc.) For Muga/Mulberry silk as the weaving gets considerably slower and takes more time and designs are more intricate so actual rates can go up to Rs10,000/- Calendaring rates vary from 25-50 per piece and packaging is extra.

Individual weavers, they have looms at their homes, they majorly work in adhi system (barter system) where a person buys the yarn for them and they weave and share 50-50 the quantity produced. With the hope that weaver will be able to sell their portion to local traders or shops. Mostly gamusa and daily wear mekhela chadors are made by them. Quality is comparatively poor. (Most of these fall in the category of model 1)

The growth potential for model no.1 is limited. The large numbers of part-time weavers, who are involved in other activities mostly agriculture, are part of this model. A variant to this model is where one person or a group of persons evolve to be a master weaver and provides yarn to the weaver and procures the finished product from the weaver and sells it in the local market. According to the 4th Handloom Census, any households where there are more than 50% of the handloom workers are hired handloom workers, construe a master weaver household.

In case of the collective model, most of the RWE work in the CFC (common facility centre model) where looms are located at one place and the weavers goes there to weave. Productivity is very low and women usually don't spend more than couple of hours at these centers. So these centres function more on paper than being part of the production and market process.

Micro units have about 10-12 looms and provide accommodation and fooding facilities so that the weavers spend full shift in weaving thus productivity is higher. Plus, the entrepreneurs usually have good market linkages. (Most of these fall in the category of model 3)

Traditional Mode of production:

Amongst the three models, the most dominant mode of production is the individual home-based activity. This is evident from the table 9, where most of the weaver HHs is individual based. The dominant mode of production adopted is traditional loom (see table 3). However, there is also increased awareness for upgrading to more modern method of production as is evident from the requirement. However, one significant challenge associated with this mode of production is the use

og loom. As per our primary findings More than 95% of the respondents have stated that old tools and machineries are one of the major challenges in the production process. 67% of them point out about the lack of information regarding new tools and how to operate it as another gap. 98% of them mention the cost of tools as another barrier.
(see more in Annexure 1)

b) Collective Driven Model:

The second model is the Co-op/Collective driven model where the institution provides the input supply and procures the finished product from the weavers. In case of the collective model, most of the RWE work in the CFC (common facility centre model) where looms are located at one place and the weavers goes there to weave. Productivity is very low and women usually don't spend more than couple of hours at these centres. So, these centres function more on paper than being part of the production and market process.

Out of all the respondents from Assam and West Bengal only 16% follow this model. In this model, the finished product is sold through retail outlets which the Co-op/ collective runs. The examples are ARTFED, SHG Collectives under ASRMLs etc. A variant to this model is the primary weavers' cooperative societies which market the produce in the local areas, and hence the volumes are small.

However, in terms of its outreach, this model only covers a small segment of the weavers. Despite a lot of Government initiatives, membership in collectives like Cooperatives or producer companies are still very low in Assam or West Bengal (See Table 5).

There are however severe lacunae related to the Govt. interventions under this model. Only SHGs are more prominent amongst the weavers (See Table 5). However, at the national level, some states like Tamil Nadu etc. have a fairly large membership in the co-operatives.

Collective Mode of Production
The collective center model is the next important mode of production. Most of the Govt interventions are taking place in this segment and is increasingly becoming important. Most of the investment in terms of capital requirements like advances looms, skill training, and institutional building for providing forward and backward linkages are undertaken by the govt bodies. However, the collectives have seen a failure in Assam. This is primarily due to poor management of the collective and lack of sustainable nature of the collective.

The limitations of this model are somewhat different from the traditional or livelihood model. This is mostly because; in this model the challenges start with institution building. Institution building is a complex and multifaceted process that involves range of activities and strategies. The process of creating an institution is ongoing and iterative, and it necessitates the active participation and cooperation of all stakeholders. Other players including governmental institutions, non-governmental organizations, and business partners may also be required for assistance. Successful institution-building involves a long-term outlook, a dedication to teamwork, and the flexibility to adjust to changing conditions and requirements. In recent times, a number of clusters are seen to be stopped running for this reason.

c) Entrepreneur Driven Model:

The third model is the Entrepreneur Driven Model where the entrepreneur is in the centre of the value chain and provides the forward and backward linkages. A very small section of women associated with

handloom follow this model. There are two variants under this model. The first one is the evolution of the Master Weaver from a local market and smaller scale to a larger market. This is evident from the fact that almost 96% of the master weavers of the country reside in Assam. The next state where the maximum number of master weavers resides is in West Bengal. The second variant is the urbane or semi-urbane entrepreneur, who may not necessarily come from the handloom background. Only 4% of the participants during our primary survey

Entrepreneur Mode of Production

Where the entrepreneur/master weaver drives the economic activity, more modern method of production is adopted, particularly in designs, looms sometimes even moving to power looms as is the case with Mary Devi follow this model. The case study of Mary Devi illustrates this model very clearly.

6. RESULTS OF SECONDARY LITERATURE REVIEW AND PRIMARY STUDY

2.1 Income

Income from handloom alone is very less and almost the entire population earns less than Rs.10000 per month. Which is also supported by the primary survey as 82% of the respondents mentioned that they earn around Rs.10000 a month. (10% earn from Rs.20000 to Rs.40000, 5% earns Rs.40000 to Rs.60000) They therefore need to supplement their income from other sources. Even after this a significant proportion earns below Rs.10000 income per month.

On the other hand, more than 65% of the higher income (from all sources) HHs, (above rs.50000 per month or above) is in Assam (see Table 11) This however drops significantly when only income from handloom is included. This indicates a small proportion of the sector has increasingly becoming commercialized and entrepreneurs with other economic activities have also entered the sector. these are usually women and are engaged as aggregators provide input supply as well as market the products.

2.2 Market Players

Most of the procurement of raw materials is from open market. Co-op societies and master weavers do play a significant role in raw material procurement in West Bengal and at the national level, while it is insignificant in Assam (see table 7).

In Assam

For Cotton – Orient and a couple of yarn stores in Fancy Bazar and each district will have a yarn depot or shop catering to the cotton needs.

For Mulberry - Fabric Plus was a major vendor but now after the death of the owner, Mr. Dilip Barua, most of the Eri reeling takes place in Bangalore and then yarn comes back to the state and sold by their yarn stores, this has resulted in major revenue loss for the rural reelers/spinners.

The final product sales is mostly from the unorganized micro entrepreneurs and very few companies have made any mark in terms of quality/quantity in the market.

2.3 Market-supporting institutions

Market institutions can be defined as rules of the game, enforcement mechanisms. Or the kind of organizations that facilitative: market interaction, coordination, contract formation and enforcement.

Strong market institutions minimize “transaction costs” to a reasonable cost.

Additionally, as per our findings in the primary study, 97% of the participants do not have brand/identity of their business.

Only ARTFED & Tantuj are prominent market players of Assam and West Bengal respectively.

Assam Apex Weavers & Artisans Co-operative Federation Ltd. (ARTFED) was formed on 27th July 1977 by reorganizing the Assam Apex Weavers Co-operative Society Ltd. with the aims and objects that the Apex Society shall organize Handloom Weaving and other Cottage Industries in the state on Co-operative basis. ARTFED has 55 showrooms (49 in Assam and 6 outside Assam). The revenue figures for ARTFED are not available.

Tantuja of West Bengal on the other hand has 84 showrooms (67 in West Bengal and 17 outside West Bengal) and has 2 crores of revenue in 2020-21 and online sales in 2019-20 are Rs 1 crores. These two only constitute a small share of the actual market. Private sector sales still are most dominant with more than 95% share. As far as exports goes, it's not even 1% of the total handloom production. Further, the transaction costs of engaging with a govt marketing enterprises are way too high for the weavers to make any substantial income. Also, the commission rate of 25%+ is way too high to be competitive when compared to states like West Bengal, Jharkhand, and Bihar etc.

Demand side factor - this is the most disappointing aspect, as we have failed miserably to tap the talent, due to failed market linkages, resulting in generation of very low incomes usually less than 5k a month per loom. Major consumption of handloom textile still is within the state and national and international trade is minimal and more individualized.

Some policy implications Follow-up question is WHY – We have failed in market awareness that our handloom products are 100% handwoven. Further ambiguity by the textile ministry of using the word handloom to categories all loom textiles when done in small scale whether power loom or handloom. Take for instance Panipat is well known for its handloom home furnishings – consumer assume that it is all handwoven, while each and every piece is made in small scale Power loom, same with Banarasi textiles and Sarees made in mechanized or power loom. Thus, when we market our product as handloom price becomes a major turn- off when it comes to market penetration.

Further the expos which our textiles takes part in are the ones catering to the mass markets who buy small scale Power loom products as handloom whereas we fail to participate in upscale authentic handwoven exhibitions where Paithani Sarees, Zamawars, Jamdanis, Patola sarees are sold at. Then we lament that our products are too high priced and thus no market available.

2.4 Market size

As per primary finding and interview with various stakeholders, we gathered that Handloom products have a niche’ wedding market. The size of the market in Assam is roughly around Rs. 200Crore and there are approximately 30-40 boutiques in Guwahati, Assam.

7. GAPS IN SERVICE DELIVERY AND ACCESS TO INPUT AND OUTPUT MARKETS

Though there are several schemes and support initiated by the Government ofIndia and the state governments, majority of the weaver household members are unaware of the schemes available to enable them in the weaver activities of handlooms. As per the Fourth Handloom Census Report more than 65 percent of the weavers are unaware about the existing schemes, training, and other enablers. There are other constraints also, which includes poor market linkage for the products and exploitation by the middleman, which demotivates the artisans.

Also, to achieve targets, the implementing agencies are not executing/following the processes properly, which result in flawedcompliances. The backward and forward linkages are not properly operational in the working areas. For instance, for sourcing of yarn, there is NHDC, but they have a very limited variety of yarn with them, that too just mulberry silk. For all other varieties of yarn, the artisans have to source themselves.Moreover, the quality of most dyed yarns is not compatible with international standards, color bleeding of yarn is a very common problem among them. Innovative yarns like bamboo, hemp etc. are not still popular in the state. Some of the potential barriers for women in scaling up their enterprise are highlighted below:

a) A major problem for restricting growth is the poor productivity due to the use of low technology. As can be seen from (table 3) most of the looms (>90%) are traditional. Which also supports the data from primary survey, where we observed that 95% of them consider old machinery as one of the prominent barrier for which affects productivity? The average production of major fabric per weaver per day in Assam is only around 5.09 metres as compared to more than 7 meters in West Bengal. Some states like Rajasthan and Sikkim show a much higher productivity with 24.8- & 23.8-meters average production.

b) Along with low technology, low skills in operations of the advanced looms, developing new designs etc. is a major gap.

c) Lack of standardization is a problem. Even after training, measurements are still one by ‘hand’ and not by feet or inches. Only a few weavers are aware of standard measurements (10/100). This problem on standard measurements by weavers was alsohighlighted by Mrs. Mary Devi at her unit in Morigaon, Assam.

d) The weavers demand liquid cash upon delivery of final produce on an urgent basis. The lack of access to finance is a big barrier for them to scale their production.

e) Moreover, branding and packaging also remains a concern. The weavers often face issues of standardization of their products.

f) Authentic source of procurement of raw material remains a challenge. Although thereare 33 yarn banks in the state, ultimate weavers do not get quality yarns. The qualityand specific type of color shade is not available throughout the year in these banks.As they are eventually procured from local weavers, there is a compromise in thequality, color combination issue etc.

g) There are also major gaps in the ecosystem which also restricts growth in the value chain. For example, a handloom CFC (common facility centre) requires not onlyneed good weavers, but also production services like jacquard card punchers, graphic designers/ creative talent which come up with new motifs in graphs, jacquard and loom repair persons, managers, common welfare services like helpers, catering services like tea/lunch, basic financial services like savings, loans etc. Usually, the focus is only on weavers with very little importance given to the other services as mentioned. This is

a major barrier in up scaling the cluster.

h) Compared to the mainland, in Assam the density of population is low, and our villages are not exclusively a handloom/fishing etc. oriented village. Here each village consists of people engaged in multiple occupations. Due to low density, accessibility is an issue as most ofthe weavers spend both time and money to reach the center which affects their income. So, instead of one big center, a hub and spoke model could be adopted where micro level centers work with 10 -15 weavers. This would make the centers more accessible. They could also be used for providing a set ofcomplementary skills, rather than giving weaving skills alone.

i) The prevalent patriarchal system also prevents women from expanding their enterprises with most of them involved only part time due to domestic compulsions. A study titled *'Pecarity among Women Workforce in Handloom Sector at Sualkuchi, Assam (2022)'* states that large family size, economic necessity and poverty are the major reasons that women are compelled to take up part time economic activity like handloom, agricultural laborers, and domestic help to supplement their income. In addition to the above, women arealso involved in backyard home based economic activity like poultry, fishery, silk, she would need –vegetables etc. which supplement the income ofhouseholds. All of these prevent the women from expanding their handloom activity which is perceived more as a part time activity.

j) One of the obstacles to growth and improvement of the skill is the lack of training and design facilities for the weavers.Most women weavers continue to make traditional designs without any change to a limited product range. Government has initiated ZED compliance free of cost for entrepreneurs but awareness amongst entrepreneurs is low.

k) High requirement of working capital as stock is the major component of this sector.

l) Local middlemen: Primary survey reveals that 47% of the respondents associated with handloom take the help of middlemen to connect better to the local market. In some cases, some members of SHGs have become the middlemen. There is a need to integrate them into the value chain with more benefits accruing to the weavers

8. WAY FORWARD: THE INTERVENTIONS THAT CAN BE TAKEN UP

Following from the above, some of the interventions which can be taken up are as follows;

1. **Providing market intelligence:**
   Market data is unavailable and very difficult to gather. The Handloom Department had tried to commission a study on the markets but failed in the venture. It is therefore imperative that a study be commissioned on the market for handloom products and to maintain it at the centralized level with the state govt. Providing marketing linkages and intelligence to the women will help them earn a sustainable earning from the craft and produce market relevant products. Market studies should also be conducted regularly to understand which products are in demand in the international markets and results should be shared with artisans. Moreover, this shall help the women to level up their participation in the up end of the value chain.

2. **Regular Supply of Raw Materials:**
   Since according to the primary survey, most women expressed the absence of proper raw material supply assistance. A network of yarn banks with easy access to weavers need to be

build up. Tie-up with NHDC under a PPP mode could be helpful.

3. **Improve Credit Delivery:**
   Access to credit is an important missing link. The study have shown that most of the credit needs are met from informal sector, SHGs or MFIs. It is therefore important that the credit delivery is with minimum transaction costs and either piggy back on the SHGs or MFIs. There is also a need for coming up with handloom focus credit products which greater emphasis on working capital than term loan

4. **Focus on quality standards:**
   Standardization of processes and compliances with various regulatory requirements is key for the businesses to grow and thrive. The weavers needs to be trained in these aspects for coming out with quality products.

5. **Strengthen Common Infrastructure Facilities:**
   To improve the effectiveness of Common Facility Centers, there is a need to have micro units attached to the central hub on a hub and spoke model. This would improve access to the women weavers and make it sustainable. The central Hub would housed the design studio, digital design bank, yarn bank, dyeing unit, storage unit, marketing outlet etc.

6. **Scaling up marketplaces for handloom products**:
   As handloom are a major source of attracting for tourists, marketplaces like Delhi Haat, NEDfi Haat should be replicated in the capital towns of NER and also in the tier 2/3 cities. .

7. **Develop Comprehensive Database for the sector:**
   The latest available comprehensive data set on the sector available is the 4th Handloom Census conducted in 2019-20. To be able to regularly review the growth trends in the sector and make appropriate policies, there is a need to have more recent and updated data on the socio-economic indicators of the sector

MUSHROOM VALUE CHAIN

9. Status of Mushroom Sector:

In India, mushrooms are both commonly consumed and grown. In India, numerous edible mushroom species, including button mushrooms, oyster mushrooms, shiitake mushrooms, and others, are farmed. The most widely grown mushrooms in India are button mushrooms, sometimes referred to as white mushrooms or champignons.

At present, this sector has registered an average growth rate of 4.3% per annum *(Sharma, et. Al, 2017)*. Compared to other vegetables, per capita consumption of mushrooms is quite less, and data implies it is less than 100 grams per year. However, in the year 2016-17, Indian mushroom industry generated revenue of rupees 7282 point 26 lakhs by exporting 1054 quintiles of white button mushrooms in canned and frozen form. The recent production data shows that the share of button mushroom in India is maximum amounting to 73% is followed by oyster mushroom which contributes about 16% *(UCAR-DMR, Solan, 2017).*

There is an interesting trend in the area of mushroom cultivation. The total area for farming have been increasing every year. In the year 2015-16, the total area was 170 thousand hectares. While, in the year 2018-19, the area shot up to 230 thousand hectares. There is an increase in production as well. In the year 2014-15, India produced 51 mt of mushrooms. However, in the year 2018-19, production increased to 503 mt (*National Horticulture Board, 2018-19)*. (Refer table 1).

The minimum capital required for setting up a mushroom farm is Rs. 99,700. *(Directorate of Horticulture, Assam, 2022)*. The fixed capital cost is about Rs. 45,000 and the variable cost is about Rs. 54,300 (Refer table 3 and table 4).

Mushroom farming has the potential of providing with fair returns of more than two times of the cost of investment. Data from the Directorate of Horticulture highlights that the cost benefit ratio of mushroom framing is 1:2.6. (see more in table 5).

9.1 Status of Spawns:

There are very limited span companies in India. The spawn companies that are operating in a private capacity just multiply the spawn without focusing much on the quality. DMR, Solan has produced 11 new strains of spawns that are available at their facility. However, much needs to be done to increase accessibility and availability of the spawns throughout the country. The biggest advantage India offers is that of lower cost of production of spawns with low cost of inputs. Currently, Indian market demand is about 8000 to 10,000 of commercial spans. Out of this requirement, the share of spawn supplied from public organizations like the ICAR, Krishi Vigyan Kendra etc. is limited to less than 10%.

9.2 Status of market:

Marketing of mushrooms in India is not yet organized. It is the small system of producer selling directly to retailer or even though consumer, which has its own limitations. The production of mushrooms, mainly seasonal, it has also increased its marketing problems. Exploring the marketing option, adding value in increasing the shelf life of mushrooms, organizing and teaming up with other producers, identifying existing markets and trading routes can you help identify the gaps of marketing and ensure fair and profitable production.

The value of mushrooms in 2011-12 was Rs. 486 crores at an all India level (National Statistics Office, 2022).This has increased to Rs. 3894 crores in 2019-20. In Assam, the value of mushrooms as of 2019-20 is not available. Whereas, in West Bengal, the value stood at Rs 40 crores (Refer table 2).

9.3 Potential of mushroom in the country:

Although not a major producer cabana India cultivates all edible and medicinal mushrooms in one or other part due to its diversified climatic condition. India also has a good competition of both the technical and non-technical manpower return to operate the mushroom growing activities. Recycling of agricultural residues, which are available in huge quantities can effectively utilize the agro residues for production of protein rich food and plays crucial role in management of the agro-residues.

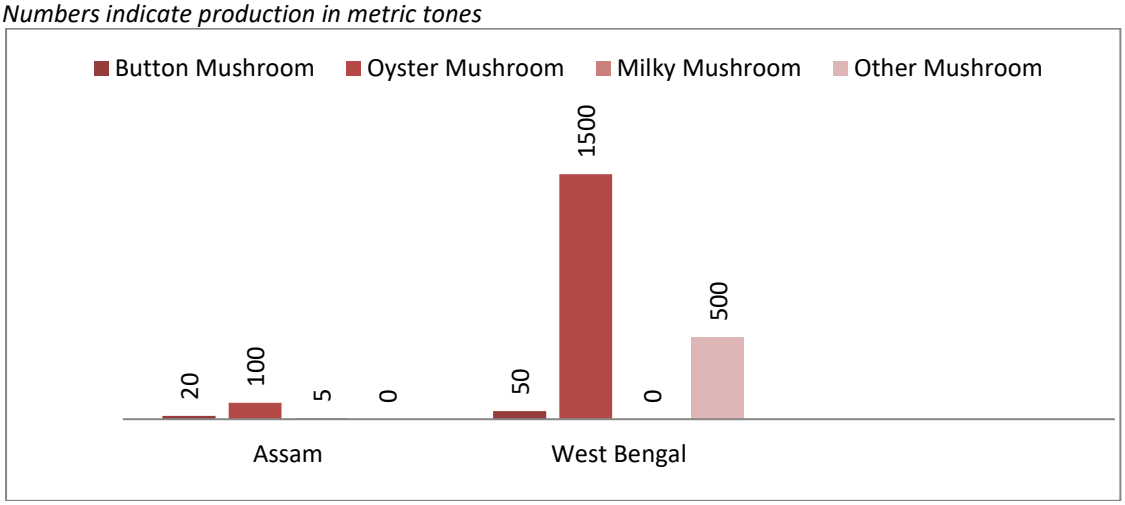
With a domestic population of more than 1.2 billion com India itself is a huge market for mushroom. The development of rapid infrastructure facilities and well organized distribution network provides the greater scope for marketing of visual products in order to meet domestic needs slash demands.

To be successful in both domestic and export market, it is essential to produce quality fresh mushrooms in mushrooms and fortified value added products at competitive rate without any agro chemical residues.

10. Geographical Distribution of Mushroom Value Chain

According to DMR, 2016 India produced a total of 129782 metric tons of mushroom each year. Out of these, Assam produces 125 metric tons and West Bengal produces 2050 metric tons each year. This is despite favorable climatic conditions for mushroom growth in these two states. *(DMR, 2016, Solan).* Production and supply has increased over the years to the current year.

Numbers indicate production in metric tones



Source: DMR, 2016

Participants from both the states are mostly Hindu. Only 2 women out them are Muslim. Majority of the respondent fall into General category (47%), followed by 32% of SC. ST and OBC category respondents constitute 11% and 10% respectively.

Majority (74%) respondents have Secondary level of education. Respondents who have graduate level of education is just 11%. Followed by 10% of them who have only primary education. Only 5% of them are Post Graduate.

Mushroom cultivation in a commercial scale is a relatively new activity and therefore most of them (around 40%) of the farmers have adopted Mushroom cultivation by imitating their friends and family. Another significant number i.e. 35% of them have taken to it after exposure visits. 5% of them have attended workshops. And 5% of them inherited as a part of family legacy.

Out of all the respondents 95% of them identify their business model as the Entrepreneurial one. 63% of them have not registered their enterprise nor do they have any license. 17% of them on the other hand, registered their business with Trade License. Very few of them have Udyami registration or other compliances like GST etc.

Access to finance: 83% of the respondents initially invested the business from their savings. 61% of the participants mention that Bank is the most preferred source of credit. Followed by SHG (33%).

Digital information: Only one respondent do not use a smartphone. 61% of the respondents uses digital methods. And 50% of them use digital payment for their enterprise.

Basket of Livelihood taken up by women in Assam & West Bengal
63% of them said that they are only involved in Mushroom cultivation as economic activity. 37% also do other economic activities such as agriculture and food processing.

11. Description of Existing Mushroom Value Chain:

Mushroom production in simple words is an indoor activity which is labour intensive and can be considered as a high profit venture that provide ample opportunities for gainful employment of women as well as small farmers, landless laborers, and unemployed youth.
The mushroom value chain and the business model followed in Assam and West Bengal in Annexure II
Mushroom value chain straddles across the two states i.e. West Bengal and Assam. There are a large number of mushroom producers in West Bengal. This mainly due to the very supportive role played by the State govt which has provided training, many labs producing spawns and also some support in building up the infrastructure for the farmers. There are also farmers in Assam which are involved with mushroom production. Farmers in West Bengal usually sell it to small traders. These small traders then sell it to Large trader. The large trader (see case study of Hemanta Nath, Annexure-II) usually does the packaging and labelling and sell it to various outlets like Malls, retail shops and also exports to neighboring countries like Bhutan etc. His monthly turnover is around Rs 6.0 lakhs.

12.Gaps in the mushroom value chain

12.1Barriers in terms of raw materials:

- The main nutrition of for the spawns and mushrooms are towards the lower part of the paddy straws. In Assam and West Bengal, paddy is procured from the top of the plants. A good harvester that cuts the paddy from the roots would help the mushroom growers for better quality and yields of mushrooms. Presently, manual labour is engaged to cut the paddy residue from the field which again leads to increase in labour cost.

12.2 Barriers in terms of production:

- Lack of spawn production centre is another major barrier for mushroom growers. There is only one mushroom spawn laboratory in Assam at the Directorate of Horticulture, Khanapara. Other than this, spawns are procured from local spawn dealers and commercially available spawns which gives very less final output.
- Farmers are dependent on West Bengal for spawns. This many a times leads to delay in delivery and further, production is decreased.

12.3 Barriers in terms of technology:

- Lack of dryer machines is another barrier in mushroom production. As the fresh mushrooms have short shelf life, small dry machines can be a solution to preserve them in a dried form. The dry mushrooms have longer shelf life and can be transported without ice-boxes. It can help mitigating the loss of fresh mushrooms in transit.
- There is very little technical training related to other variety of mushrooms like button mushrooms which has a lot of potential.
- Aggregation is a major barrier as the mushrooms come from a long distance across the states. Mushrooms are brought to the packaging centres by farmers and eventually, it is packed and supplied to Assam. This requires more efficient transport and cold-storages.

12.4 Other Barriers:

- Lack of ability to diversify and have more value-added products like sausages, momos, candy etc. will help in the development of this sector.
- Lack of professional ethics as one of the barriers. Especially for women, there are linguistic and cultural barriers to approach an institution for support.
- Lack of recipe preparation is another barrier in mushroom industry. The recipes are limited and need to be made more diverse.

12.5 Gaps associated with Entrepreneurial Drivel Model in Mushroom Value Chain:

It is to be noted that challenges and gaps in this sector are mostly related to procurement of raw material, post-harvest management, lack of finance and marketing.

Procurement of Raw Materials: All the participants of our primary survey stated that cost incurred to procure raw material is a challenge to them, along with unavailability of incentives/ subsidy for the same as they procure it privately. Transportation is another cost related to procurement.

Especially in the case of Assam, traders procure raw materials from West Bengal. The cost of raw materials like hay, straws, spawns and cylinder bags for packaging is cheaper in West Bengal compared to Assam. Hay is of a good quality in West Bengal as the harvester cuts the paddy plants from the roots. The lower part of paddy plants is suitable for mushroom growth for its rich nutrients. However, transportation costs increase for traders and farmers.

Unavailability of quality spawn. These are mostly produced in the KVK labs which are few and far between in Assam. In West Bengal these are available in more readily and hence the production also has increased dramatically in this state.

Access to Finance: 100% of the participants said that they do not get any subsidy. While 75% of them said that they lack information/knowledge related to access to finance and have taken no loans from banks.

Technology: The women have stated that dryer is one of the most required machines for them as it would help them to sell dry mushroom as well. But the price of this machine being high, it is difficult to procure it.

Labelling and Packaging: The respondents have mentioned that there is no facility nearly for cheaper and good quality product for labelling and packaging purpose.

Market: Mushroom Entrepreneurs from both Assam and West Bengal expressed that they lack market information as well as lack of online market. Moreover, they added that due to lack of digital skills/support/facilities they face problems in marketing.

13.Eco Players

13.1 Krishi Vigyan Kendra:

KVKs have been playing a major role in promotion of mushroom farming in both the states. As per findings from our primary survey, KVK have provided technical as well as advisory support to mushroom farmers in Assam. Also, drying machines have been provided, in some cases, to manage waste and increase their income.

There have been several success stories from KVK Cooch Behar center where women farmers have been trained and help them raise their income. (See more in Annexure II)

13.2 Traders: Mr. Hemanta Nath of Nalbari district of Assam have been trading mushrooms since 2012. He procures it mostly from the districts in West Bengal mentioned above. He supplies most of fresh mushrooms in Guwahati, Golaghat, Bodoland Territorial Region (Kokrajhar, Baksa, Chirang, Udalguri), Bhutan and Nagaland. 70% of his produce goes to Bhutan alone and remaining 30% is supplied to rest of the areas mentioned above.

More of the value chain and market overview in mushroom can be seen from the case study of Mr Hemata Nath, in Annexure II.

13.3 Mushroom Development Foundation (MDF), Assam:
It started in 1997 as an NGO to organize farmers in Assam for mushroom cultivation. It is now a registered society and plays a major role in organizing poor farmers to grow mushrooms and through specialized training help them raise their income levels. It now gives farmers a strong collective voice that then can negotiate for a minimum price at the market and request financial support from the state. MDF has developed systems for every point along the mushroom value chain: from spawn to market. To strengthen farmers' control over their crop and their market, Mushroom Farmers' Network was formed *(See more in Annexure II).*

They have adopted a cluster approach. Since 2010, MDF have developed 33 clusters in 28 districts of five northeast states. Each cluster has between 100 and 180 households. They train people, mostly marginalized farmers and women, on cultivation techniques, distribute spawns and later help them sell the harvest as well. The idea is to remove the middlemen so that their hard-earned profit entirely comes to them. The monthly income of the women farmers associated with MDF cluster is around Rs. 10000 to Rs. 12000 *(See more in Annexure II).*

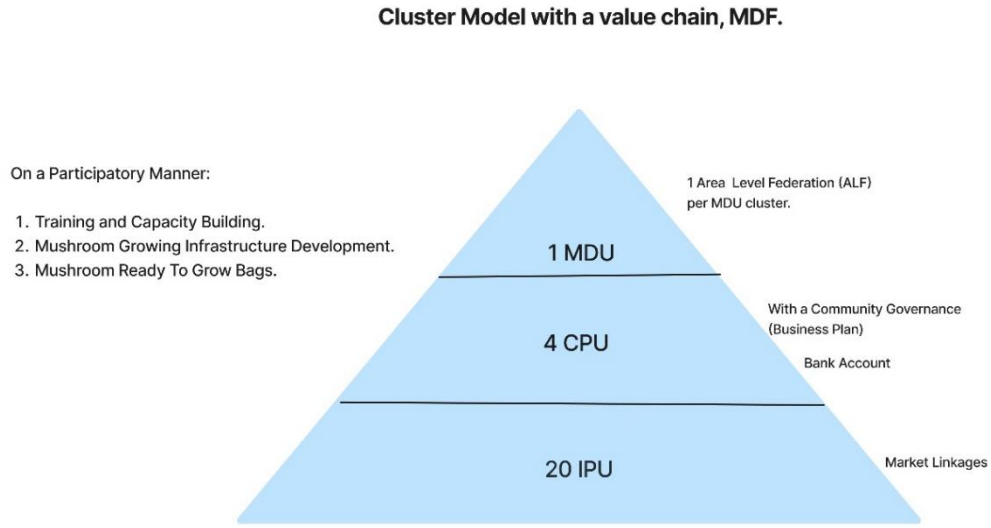


Figure: Cluster model with a value chain, MDF.

MDF has rolled out this model across states like Assam, West Bengal, Meghalaya etc. Each cluster has 25 members. All the members at Individual Processing Unit (IPU) are women. They are basically the workers who are engaged in preparation of mushroom bags, rearing the spawns and explore the local markets at their own level. These women members can devote only a portion of their time to the cluster due to cultural and family commitments. They facilitate the relationship between the Mushroom Development Unit (MDU) and IPU.

Members at the Central Processing Unit (CPU) are 4 in number. They comprise both male and female members. They engage in business plan, growth of the unit and to enhance efficiency of the cluster. Women who can commit larger part of their time to the cluster are involved in this particular segment.

The next is the Area Level Federation (ALF). It is also called Mushroom Development Unit. This is the main brain of the cluster from where the produce disseminates. There is 1 person who is involved and

he/she supervises the overall cluster and engages with the externalities. They procure fresh mushrooms from IPUs and send them to market players.

This model has been widely practised in several parts of Assam.

14.WAY FORWARD

Assam and West Bengal are ideally suited for production of varieties of mushrooms around the year. Development of requisite infrastructure in major production areas require special attention. The governments may consider the constitution of an independent agency like mushroom Development Board on the lines of Tea Board for holistic development of mushroom processing and marketing industry in the states. The state governments can also launch market intervention schemes like MSP to ensure price stability. Provisions for insurance coverage can be considered. Some of the solutions for developing this sector are:

- There is need for establishing spawn lab as it will allow consistent, high-quality spawn production, disease control, cost savings, and increased independence for growers.
- Furthermore, adequate training is of outmost need as it would help the rural women to learn the necessary skills and knowledge to successfully produce mushroom. Training related to understanding the biology and life cycle of mushroom, growing techniques, disease and pest management, and harvesting and processing etc. are required
- Standardization of storage management and logistics are also important for quality control as well as cost effectiveness. Without effective logistics management/cold chain management, the cultivation and distribution of mushrooms have been more challenging and less profitable.
- Building of collectives along the lines of Mushroom Development Foundation would help in providing reducing coost through aggregation as well as increase bargaining strength. So, Institutional building is critical.
- Lack of authentic data on various aspects of mushroom industry is a big handicap for developing future strategies and interventions. A centralized database of entrepreneurs, growers, farmers, market, demand and supply can be prepared by a nodal agency maintained by the state.
- Advertising campaigns should be on a larger scale so that people adopt consumption of mushrooms and bring mushrooms close to their plate.
- To ensure sustainable growth of mushroom production regular improvement is required for developing high yielding varieties. Research and development pertaining to this sector is very much vital for comprehensive growth.

The further growth of mushroom industry will depend upon increasing and widening of domestic market, creation of an effective marketing system, enhancing productivity level to remain competitive, promotion in non-traditional areas, diversification of mushroom cultivation by promoting varieties of mushroom in tune with market trends etc.

FLORICULTURE VALUE CHAIN

15. INTRODUCTION

15.1 Background of flower farming in India

Floriculture has been identified as a rising industry by Government of India and has accorded it with 100% export-oriented status. There has been steady increase in demand of flowers across the world. Today, this industry has been under high-tech activity placed under controlled climatic conditions inside greenhouses.

As per Horticulture Crops Statistics (2018-19), total area under flower crops in India was 303 thousand hectares. India stands second in the world after China in terms of area under floriculture. The report also mentions that that production of flowers is estimated to be 2910 thousand MT of which loose flowers accounted to 2263 thousand MT and cut flowers to 647 thousand MT.

APEDA figures say that the India exported 15,695 MT of floriculture products to the world worth of Rs. 575.98 crores in 2020-21. This figure has significantly increased in 2021-22 to 23,597 MT of floriculture products worth Rs. 771.41 crores. Fresh and dried cut flowers dominate floriculture exports in India. The major countries that imports floriculture products from India are USA, UK, Netherlands, Germany, UAE, Canada and Italy.

The northern districts of the state of West Bengal have huge potential to harness this industry. Darjeeling hill areas in general and Kalimpong in particular, have almost a century old tradition in floriculture. Historically, Kalimpong has always played a pioneering role in developing floriculture in India. The private nurseries in Kalimpong (more than 50 in number) were among the first to export floricultural products to USA, UK, Japan, Holland and other European countries. However, due to lack of infrastructure and certain other factors this region could not keep pace with the developments in other parts of India and world. Even in this scenario, these nurseries are generating a turnover of INR (Rs) 30 million per annum of which Rs 15 million is from exports (FOB value).

15.2 Flower farming in West Bengal

As per Government of West Bengal (2022), the total area under flower cultivation in the state was 26.054 hectares in 2016-17. The production was 71.27 tons. In 2020-21, the area increased to 29.315 hectares through production had slight drop at 70.92 tons. In 2016-17, the flower cultivation in north Bengal districts such as Jalpaiguri was 0.180 hectares. This has increased to 0.220 hectares in 2020-21. The total area under flower cultivation in north Bengal districts is 2.400 hectares. The north Bengal districts' annual turnover through flower trade is Rs. 1,000 crores, as per Siliguri Horticulture Society officials.

The state has 29,000 hectares of land dedicated to flower farming, according to the data provided by West Bengal State Food Processing & Horticulture Development Corporation Ltd, 2022. It produces around 77,246 metric tonne (MT) of loose flowers and 28,973 MT of cut flowers.

16 Women Flower Farmers in North Bengal: A Socio-Economic Profile

Floriculture has been a widely accepted economic activity taken up by rural women in north Bengal. As per our findings in our primary study, 55% of the women are involved in flower farming belong to Scheduled Caste, followed by General category (34%), Scheduled Caste (6%) and 5% women belong to Other Backward Caste. All the respondents receive support from their family and spouses. Their family/spouse support them with domestic work, in managing their enterprise, financial skills and procurement.

More than 70% of these women have received their education till senior secondary level. 27% of them have received primary education and only 7% of them have completed their graduation.

When it comes to digital empowerment, all the women interviewed during study have smartphones. But, only 60% of them use smartphones for mobile banking such as Phone Pay and Google Pay.

87% of the women are engaged with flower farming only and 13% of them are engaged in other economic activities such as agriculture and government service besides flower farming.

As per findings of our primary study, 45% of the total respondents have gained the idea for flower

enterprise from exposure visits such as fairs and exhibitions. A few of them have received the idea as a result of training from local NGOs and KVKs. Only 27% of the respondents have started their enterprise by imitating friends and neighbors. On an average, most of their enterprises are 10 years old.

98% of the respondents have made an investment of around Rs 40,000 to start their business. They have not availed any kind of loans or credit support from any financial institutions. They have invested in their enterprise from their own savings and from family members. This shows that women in North Bengal have adequate capital to start the business.

The majority of the entrepreneurs dedicate 2-4 hours daily to their work. 23% of them dedicate 4-8 hours to their work daily.

Story of Suchitra Basu

Suchitra Basu of Kudalipara village in Darjeeling district divides her time between attending to household chores and stringing the cut flowers that the farmers of her village provide. The farmers in her village bring flowers to her after plucking them from the fields. They also supply the strings for making the flower garlands. They tie 10-20 garlands in 3 hours and earn around Rs. 150 per day.

With more hours of work, income increases. However, it is not possible for most women as they have to look after their family and also do their household chores.

Basu's village Kudalipara, has 300 bighas of land under flower cultivation. It is known as the hub of marigold farming in the district. Needless to say, the flowers provide a livelihood to women like Basu in the 80 households of the village. Flowers are now finding a market in other states especially north-eastern states.

17 INPUT CHANNELS AND OUTPUT MARKETING CHANNELS IN NORTH BENGAL

a) Procurement of Raw Materials

In general, seeds, mother plants, rubber pipes, bamboo, manure, plastic bags, plastic pots, fungicide, agri-net, and sprayer are procured by the farmers. They procure the raw materials from market in Silliguri. All the respondents procure the raw materials from private players. However, transportation is a major cost during this process. 80% of the respondents procure raw materials from the business fund or farm income. 20% of them secure capital for raw materials from their own income or savings.

b) Products

53% of the total respondents produce only single products. This mainly includes flower plants. marigold and jarbera plants dominate this area. Other plants include orchids, succulents, bougainvillea, etc. Producers in Darjeeling and Kalimpong mostly produce flower sticks that comprises only jarbera flower. Additionally, they also produce fruit plants and forest plants. These are primarily final products. Out of the samples selected, none of them produces any value-added products. This is surprising as there is an increasing demand in value-added flower products such as dried flowers, both domestically and in abroad.

As far as wastage is concerned, all the respondents have indicated zero wastage from their enterprise. Additionally, all the respondents stated that packaging and labelling facility is not required for their final products.

Based on our findings, 1200 flower sticks are produced every month by one entrepreneur. 450 Kilograms of marigold and around 300 pieces of succulents are produced monthly.

17.1 Average Revenue and Cost Associated with the channel

a) Cost of Production

For small scale entrepreneurs, the cost of production ranges between Rs 5,000 to Rs 20,000. For medium scale flower farmers, the cost of production ranges between Rs 20,000 to Rs 50,000. And, for large scale farmers, the cost of production is more than Rs 50,000.

b) Storage of products

90% of the respondents do not require a separate facility for storing their products. They store it in their nursery itself or the place of production itself. 10% of the respondents have a separate storing

facility in the form of warehouse. The products are neither tested nor verified by any competent authority.

c) Income

48% of the respondents have income within a range of Rs. 20,000- Rs. 50,000 per month. 36% of them earn between Rs. 51,000- 1 lakh per month. 16% of them have an income of more than 1 lakh a month. September to April gives highest income whereas, June to August has the lowest income. This is due to rains, when the demand for flower plants decreases and seasonal flowers mostly bloom during winter season.

17.2 Access to Extension Services

The State Horticulture Department and KVKs provide training and advisory support in terms of finance. There are no fees for availing these services. However, the respondents have stated that these services are not sustainable. Most of the services are only one-time service. They strongly feel that besides training, support services need to be provided .

17.3 Technology

In a protected environment, suitable environmental conditions for optimum plant growth are provided which ultimately provide quality products. This technology can be of three types:

a**) Low-cost greenhouse:** This is made of polythene sheet of 700 gauge supported on bamboo with twines and nails. The temperature within this greenhouse increases by 6-10 degree Celsius more than outside.

b) **Medium-cost greenhouse:** With a slightly higher cost, this greenhouse can be framed with GI pipe of 15mm bore. This structure has a covering of UV stabilized polythene of 800 gauge. Cooling pad is used for humidifying the air entering the chamber. The greenhouse frame and glazing material have a life span of about of 20 years and 2 years respectively.

c) **Hi-tech greenhouse:** In this type of greenhouse, the temperature, humidity and light are automatically controlled according to specific plant needs. These are indicated through sensor or signal receiver. Boiler operation, irrigation and misting systems are operated under pressure sensing system. This structure is highly expensive, requiring qualified operators, maintenance, care and precautions. However, they provide the best conditions for export quality cut flowers and are presently used by large number of export units.

17.4 Other Services Availed

17.4.1 Transport

45% of the total respondents use mini trucks as mode of transportation. 25% of them stated that the middlemen themselves bear the cost of transport. 30% of them use their own cars, e-rickshaws and manual carriers for transportation of their products. For small scale farmers, the cost incurred is Rs 50-100 daily. For middle scale farmers, the cost incurred is an average of 200-400 daily. For large farmers, the cost of transport stands more than Rs 500 daily.

17.4.2 Social Security

Only 12 out of 30 women farmers are covered under social security schemes. However, their enterprise is not covered under any insurance schemes.

17.5 Market and Sales: Demand and Supply

Most of their produce are sold to retail and wholesale facilities. 16% of their produce is old to middlemen. While 22% of the produce is sold in local market and markets in Siliguri. 93% of the respondents say that they are engaged in inter-state trade to neighboring states such as Assam and Sikkim. None of the respondent mentioned about selling their products through any website or other digital platforms. 70% of the respondents prefer to sell it in retail and wholesale markets.

Our study shows that the demand for flowers is mostly seasonal in nature. Demand for traditional flowers such as marigold, jasmine, and rose is strong in states such as Kerala, Karnataka, Tamil Nadu, West Bengal. Demand is also season and festival specific. On the other hand, demand for modern flowers such as orchids and jarbera are concentrated in urban centres. However, 69% of the total

respondents stated that they cannot meet the demands as there is less supply. This shows that the market of this industry has huge potential in the coming years.
The Indian floriculture market size reached Rs. 231 billion in 2022, says IMARC Report, 2022. It is expected that the market will reach Rs. 460 billion by 2028, exhibiting a growth rate of 13.1% during 2023-28.

17.6 Access to Credit Services and Financial Services

17.6.1 Credit and Banking Services

100% of the respondents have stated that they have not availed any kind of credit facility for their enterprise. However, 100% of them they stated that they prefer banks for availing credit.
All the respondents have a savings bank account. But none of them have a bank account in the name of their enterprise.
The income from their enterprise is being kept in banks and they expressed it as the most preferred source of savings. The bank accounts are operated by the farmers themselves on a regular basis.

17.6.2 Rate of interest

i) MFI loans charge an interest rate of 18-24% per annum.
ii) SHG loan charge an interest rate of 3-5% per month. Since the loan size is small. They pay back the loans in a short period and hence do not feel the burden of the high interest.

18 PRIMARY ECOSYSTEM PLAYERS: INSTITUTIONAL INNOVATIONS UNDERTAKEN BY STATE AND OTHER INSTITUTIONS THAT CAN BE AVAILED BY FLOWER FARMERS

There are a number of initiatives and institutions associated with development of floriculture. These have been stated in the table below. (See more in Annexure III)

Area of Operation	Scheme/Institution/Initiative
Central	National Horticulture Board
	Agricultural Products Export Development Authority
	Dept. of Agriculture and Cooperation
	Floriculture Information System
	Integrated Development of Commercial Floriculture
	All India Coordinated Development of Floriculture Project
	Promotion of Joint Venture in Floriculture
West Bengal	West Bengal Accelerated Development of Minor Irrigation Project

Strategic Players

i) **Centre for Floriculture & Agri-Business Management (COFAM):**

The Centre for Floriculture & Agri-Business Management (COFAM), was initially conceived as a research project on horticulture under aegis of the Department of Biotechnology, North Bengal University. The idea behind this was to promote horticulture in a region where it was not practiced on a regular basis, despite favorable soil and climate. A detailed proposal was prepared and a request for funds was processed through the then Department of Food Processing, Government of West Bengal, to the Ministry of Commerce, Government of India. A grant of Rs. 2.74 crores was made available by the Ministry and the project was implemented in 2006. After the project period was over, the university considered it as one of the best practices and decided to continue its functioning under the Department of Biotechnology. Since then, COFAM has been undertaking demonstrative horticultural practices and extending core technology transfer to the growers and cultivators. At present the

practice of COFAM is successful in popularizing cultivation of organic cauliflower, strawberry and dragon fruit in Nepal, Bhutan and Assam—in addition to North Bengal—and is now going to declare two villages in GTA area as Organic Villages.

Role of COFAM in promotion of rural flower farmers in North Bengal

Looking at the potential of this region and realizing the existing constraints, University of North Bengal has set up a Center of Floriculture and Agri-Business Management (COFAM), in 2006, with initial support (2006-2011) from the Department of Food Processing and Horticulture (FPI&H), Government of West Bengal. This center placed under the Department of Biotechnology has been serving as an instrument for sustainable rural development through application of scientific and technological knowledge in horticulture sector and integrated farm management. The mandate of this Center is the transfer of technologies through on farm demonstration and training. Thus, the primary activity of COFAM is to cater services in the form of rendering practical courses to different target groups and entrepreneurs related and interlinked with the overall process of development of horticulture industry. Mass production of quality planting materials through conventional and micro-propagation technology is another important area where COFAM has curved a niche. Hands on training courses have been developed to empower the small farmers/growers of this region and to establish producer-consumer direct pathway applying proper information communication system as needed to address the competitive economy. COFAM is to undertake projects/programs to study, develop, standardize, implement, commercialize and popularize innovative and sustainable rural technologies with special emphasis on making traditional, rural enterprises more profitable and bring new income generating opportunities through induction of novel enterprises in rural areas.

ii) Siliguri Horticulture Society:

Story of Siliguri: Flower trade flourished with better connectivity.

With better rail connectivity, Siliguri serves as the gateway to north –eastern states, helping West Bengal's flower trade to flourish. Flowers such as marigold, jarbera, orchids are supplied to the north-eastern states of Assam, Meghalaya, Arunachal Pradesh and Manipur. The government is opening up rail routes in far-flung states such as Tripura and Manipur. Government of India has started superfast Express train connecting Manipur and Tripura via Assam. This super speed train helps flower traders reach new markets.

Sushil Biswas, a flower trader from Siliguri says that he used to send flowers worth Rs. 60,000- Rs 70,000 to Assam. Now, it has increased to over Rs. 1 lakh in the past few years. The roads in the two states are now in a better condition. Flowers can reach rural areas as well. He also supplies flowers to Delhi, Hyderabad and Bengaluru through air.

In the year 2022, Siliguri Horticulture Society has arranged a floriculture fair. It has been 25 years that this society arranges such fairs. In 2022, the fair has 78 stalls and generated around Rs 4 crores of business.

iii) **North Bengal Floritech**

This company serves as a one-stop solution for high-tech floriculture in Kalimpong region. It also serves north-eastern states such as Nagaland and Meghalaya. Utpal Banerjee, the proprietor of the company state that rural women in Kalimpong have huge potential in being flower entrepreneurs. It provides with poly-houses and green houses to rural farmers as a subsidized rate.

It provides saplings and seeds to the farmers in areas such as Kagey and Pedong at free of cost. They grow the flowers and sells it back to the company at 5 rupees per stick.

iv) **Genap India Water Solutions Private Limited**

Genap is the most trusted brand in the field of flexible water storage tanks which can be used to meet the water requirements in multiple segments such as Agriculture, **Floriculture**, Horticulture, Building Construction, Industry, Infrastructure, Rainwater Harvesting, Drinking water or for plain water conservation. These are admired for their long Life, quick installation, high resistance to UV rays, cost-

effectiveness and ease of relocating.

19 ANALYSIS OF FLOWER FARMING IN WEST BENGAL

19.1 Business Models in North Bengal

Out of total respondents, 90% of them have identified their business as entrepreneur model. 10% of them have stated that their flower farm follows a traditional model. Traditional model can be differentiated from entrepreneur model as in traditional model, the flowers and nurseries are cultivated at their household area only. In entrepreneur model, they have a separate farm that is in the form of a nursery or a greenhouse establishment.

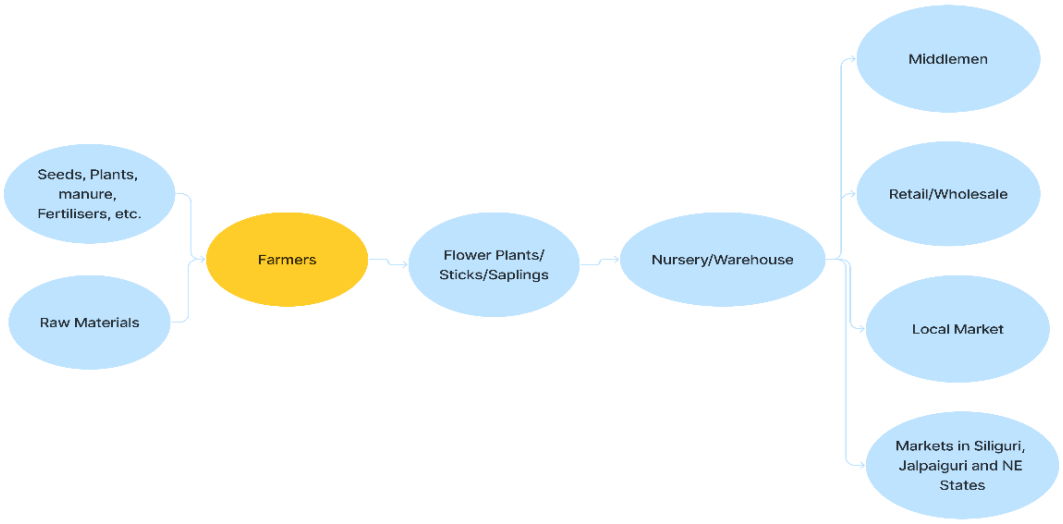


Figure: Entrepreneur Model

19.2 Support Required

28% of the respondents expressed that they require financial support followed by 27% who require training support. 27% of them responded saying that they require advisory support. 13% of them require technical support and 5% of them require market support.

20 CHALLENGES FACED BY FLORICULTURE INDUSTRY

In spite of having such favourable climate and market demand, floriculture in North Bengal still remains an unorganized sector despite its huge potential. Information gap regarding the economic potential of flowers, unavailability of technically sound manpower, lack of modern methods of production and protection, and total ignorance about the market are some of the important reasons that have made the growers reluctant to expand. Some of the challenges are stated below:

1) The schemes often adopted by the States are centralised and operation and execution of schemes becomes a nightmare in the district level. But, it is to be noted here that those States which have decentralized the operation of the schemes as per the guidelines have met with success.

2) Another important factor that is often becoming a hindrance in implementing these schemes is that the State's contribution in terms of money has been nil or negligible as for example the micro-irrigation schemes adopted under the NCPAH guidelines. Many a times, experiments and research conducted in the laboratories of Agricultural Universities and Research Institutes fail to reach the growers.

3) Operational problems surface more prominently in hilly areas where the terrain itself is not appropriate for structures like greenhouses. Precious time is wasted in levelling the slope to make it suitable for recommended greenhouse constructions and so on, that could be otherwise utilised for gainful cultivation. Lack of adequate electricity is a perennial problem along with insufficient water supply particularly in the summer months which arises due to not making use of rainwater harvesting during the monsoons. This directly hampers irrigation of crops.

4) Post -harvest management suffers due to the absence of proper cold rooms for storing the flowers after they are harvested. Many a times, there is no supply chain for flowers to be marketed to distant places. Due to the nonexistence of *mandis, which* are common in metros like Kolkata and Delhi, farmers mainly have to take recourse to door-to-door delivery of flowers. Farmers are deprived from fair prices as markets are not regulated. Thus, poor logistics constantly hamper the Government schemes from being implemented in the desired degree in this region.

5) Lack of cold storage facilities to store the flowers and with no wholesale market nearby forces the farmers to depend on middlemen. They procure the flowers at lower price and sell them at a higher rate to wholesalers.
6) The cultivation in the undulated hilly areas is burdened with lots of limitations. They are shallow in depth with presence of hardpans in the upper horizons, thus can't provide a good base to the crop plants. Often, these soils are acidic and damaging to the crop plants.

7) Owing to their undulating topography, the soils in these hilly areas were highly susceptible to erosion, especially due to the wrong cultivation practices such as Jhuming.

8) The operational holdings in these areas were very small and thus the mechanization of floriculture has been very limited till date creating the requirement for labor force and hard work. Due to non-availability of the superior planting material along with other inputs such as fertilizers and pesticides, there have been low crop yields.

9) Due to higher dependence on the monsoon rainfall, an only limited number of crops can be cultivated here and the crop diversification is of great need. In hills, the adoption as well as dissemination of modern technology by farmers is very poor as compared to plain as because of difficulty in transport and communications, leading to poor production and productivity, in addition to that farmers are forced to sell their produce in the price fixed by agents and middlemen. Sporadic attempts made by a few wealthy growers are far from being sufficient.

10) Even then, commercial floriculture in North Bengal is still practiced on small farms but the major constraints in flower production are poor access to quality planting materials and small range of varieties. The extension support in floriculture is weak.

13) Due to stumpy quality consciousness of the domestic markets, investments in Guaranteed Asset Promotion (GAP) and quality certification is negligible. Implementation of Integrated Pest Management (IPM) is on the lower side. Post-harvest management of floricultural products is extremely poor in North Bengal.

14) As because there is no established standards/grades for produce, the farmers follow the demands of the market. The packaging of floriculture produce is frequently unempirical and uses of paper cartons, bamboo baskets, jute bags are rampant. In the absence of organized market infrastructure for floriculture produce, the true potential of the market is not realized. However, flower growing is not gaining the popularity it deserves among the common farmers. The export orders require a voluminous and continuous supply of a particular flower. It will only be possible when the common

farmer will realize the potential of flower growing and accepts it along with their traditional cultivation.

Despite the challenges, the producers are having access to important commercial varieties in all major floricultural crops from leading breeders across the world. There has been fair enough access to production inputs of fertilizers (organic and inorganic) as well as plant protection chemicals. The use of formulations supplying trace elements as well as major nutrition elements, biofertilizers and biopesticides are on the increase. With the advent of protected floriculture, local companies got enthused in fabrication and installing greenhouses. Farmers are getting exposed to micro-irrigation (drip, sprinklers, and foggers). This is relevant learning and adoption as only 3.75% of the net cropped area is under irrigation in Darjeeling hills. Hence, rainwater harvesting should be a viable option for irrigation in the drier months. Drip-irrigation by gravity (Zero-energy irrigation) shall remain as the most sustainable method. West Bengal Government has declared North Bengal as an export zone for flowers and vegetables and providing support for promoting floriculture.

21 CONCLUSION AND RECOMMENDATION

This value chain analysis has identified areas for improvement to strengthen West Bengal's floriculture sector, including with a focus on enhancing decent work, job creation and sustainable growth opportunities. Based on the prioritization exercise outlined above, this analysis recommends focusing on recommendations which stand to have the greatest potential impact. These are:

1. Improve decent work conditions, inclusivity and gender balance across the value chain by raising awareness among producers and workers on social security, social dialogue, working hours and conditions, etc. This would expand the workforce by attracting more workers – especially women of the sector, while improving productivity and upholding India's commitments to decent work for all.

2. Create a local tissue laboratory in the districts of Floriculture for certain species that are currently imported, as well as the creation of new varieties, including from indigenous species, to improve cost-effectiveness, capacitate local production and encourage the diversification of plants. This would revolutionize the floriculture sector by reducing reliance on imported seeds and seedlings. It would also open opportunities for creating/ propagating new species for the local market, or even for export purposes.

3. Improve business, marketing and technical skills to improve the management of farms. This would revolutionize the floriculture sector by reducing reliance on imported seeds and seedlings. It would also open opportunities for creating/ propagating new species for the local market, or even for export purposes.

4. Leverage more advanced technologies on farms to upgrade current production systems. This will improve productivity and the efficient use of inputs, especially water.

5. Explore possibilities for an online floriculture marketplace through further study and investigation. This would revolutionize the floriculture sector by reducing reliance on imported seeds and seedlings. It would also open opportunities for creating/ propagating new species for the local market, or even for export purposes

6. Encourage the use of cooled storage and transportation, perhaps by supporting the Siliguri Horticulture Society to procure shared trucks. This would revolutionize the floriculture sector by reducing reliance on imported seeds and seedlings. It would also open opportunities for creating/ propagating new species for the local market, or even for export purposes

7. Improve conditions at the central auction market. It would also open opportunities for creating/ propagating new species for the local market, or even for export purposes

This value chain analysis finds that the women entrepreneurs in West Bengal **lack of leadership, business and high-end technical skills** in the floriculture sector is one of the primary root causes for current deficits. Another cause is a **lack of awareness** of the latest trends aimed at maximizing productivity, value and decent work conditions. On a positive note, West Bengal's relatively small floriculture sector benefits from close- knit relationships between producers and collegial relations with workers. If there is buy-in and commitment for skills development, a swift positive impact will quickly become apparent. Without addressing the skills gap, other recommended interventions – such as a local tissue laboratory, cooling in the value chain and an online marketplace – will struggle to enhance the growth of floriculture, job creation and decent work.

There is tremendous potential to unlock the value of West Bengal's floriculture sector, either through cost reduction (involving cooperative arrangements, economy-of-scale operations, and the deployment of technology) or through diversification (by creating a local tissue laboratory that revive and propagate indigenous species) and optimization (introducing technology to optimize the use of water and inputs). This value will serve local markets and pave the way for exports. The central auction market is also an important element that should also be addressed as soon as possible.

PIGGERY VALUE CHAIN

22. INTRODUCTION

22.1 Background of Livestock and Pig Farming in India

India is a home to one of the largest livestock wealth in the world. According to the *20th Livestock Census 2019*, total Livestock population of India is 535.78 million; there has been an increase of 4.6% from the 19th livestock census. Moreover, tribal women have been dependent on animal husbandry for their own income from time immemorial. It has huge potential to contribute to the state's economy in many ways including generating employment opportunities and additional income in the rural areas. It is also good part time earning for youths. Due to high fecundity rate, superior feed conversion efficiency, early maturity, short generation interval, and low investment in housing and equipment, offers opportunities for quick economic advancement for new entrepreneurs and socioeconomically disadvantaged segments.

Piggery requires a small amount of investment therefore is very much practiced in rural areas mostly in the form of backyard farming. The livestock sector contributes about 30–40% of the farm income by providing employment. However, as per the latest *Livestock Census, 2019*, pig population in India has been reduced to 9.06 million in 2019 from 10.29 million in 2012. Comparatively, In Assam, the pig population has shown an increase to 2.10 million in 2019 from 1.64 million in 2012. There is an increase of 28.30% in the state. In West Bengal, the pig population has again declined to 0.54 million in 2019 from 0.65 million in 2012. This shows a decline in population of 16%.

Despite this, pig farming contributes a good amount of farm income and is one of the more profitable ones. In modern times, this sector plays an imperative role in the economy of these two states. It however, it is largely unstructured. It is largely dependent on women and has huge potential to provide them with sustainable livelihood and entrepreneurship opportunities. The market for pig products along with pig value chain is also largely disorganized primarily because of the activities of value chain actors and service providers are not well coordinated. Rural women and potential rural women entrepreneurs, provided with adequate training and awareness can boost this sector and contribute a major chunk of their human resources to the larger economy.

Source: NBAGR

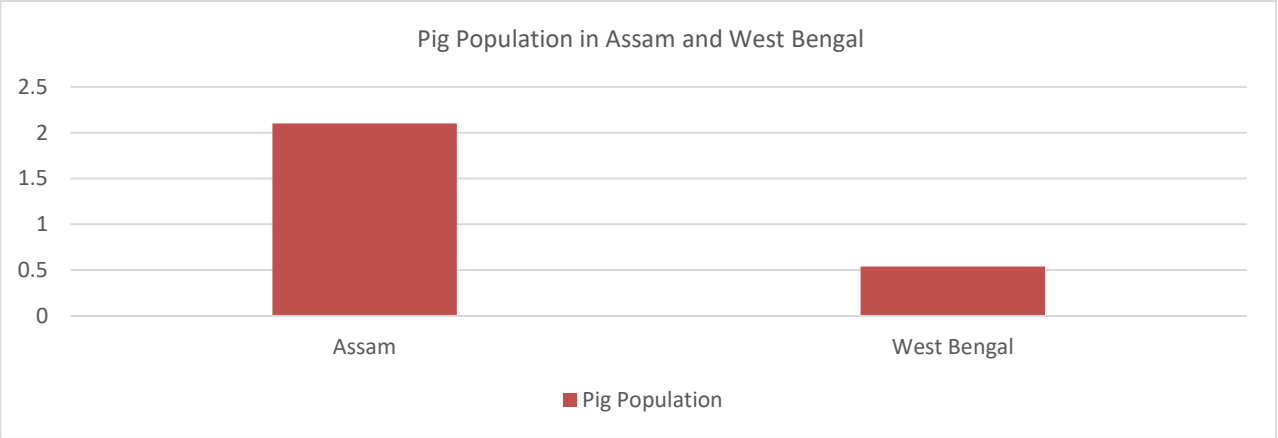
Sl. No	**Name of the Breed**	**Home Tract**
1	**Ghungroo**	**West Bengal**
2	Zovawk	Mizoram
3	Niang Megha	Meghalaya
4	Tenyi Vo	Nagaland
5	Agonda Goan	Goa
6	Nicobari	Andaman & Nicobar
7	**Doom**	**Assam**

In India, pigs are raised mostly by scheduled caste and tribes to maintain their social identity and traditional culture *(Stevenson 1954; Banik et al. 2019)*. This is also supported by our primary study where 63% of the respondents belonged to Scheduled Tribes. Pig production contributes significantly to the livelihood of most pig households *(Shyam et.al 2016*). Distribution of pig population across the country is not uniform, 70% of the total population is under traditional small holder methods which require a low input demand driven production system.

The National Bureau of Animal Genetic Resources has listed ten native pig species in India, including the Agonda Goan, Doom, Ghoongroo, Gurrah, Mali, Niang Megha, Nicobari, Purnea, Tenyi-Vo, and Zovawk. Similarly, Pig consumption is also not uniform in all the states. According to research by *Statista*, In India, pork consumption reached above 294 thousand metric tonnes in 2022. Compared to the previous year, there was a modest decline. Cultural differences also account for variations in the country of India's meat consumption tendencies.

22.2 Pig Farming in Assam and West Bengal

Assam has the highest pig population in India with 2.10 million pigs in 2019 from 1.64 million pigs in 2012. Piggery is one of the prominent animal husbandry activities. More than 90% of the populace being non-vegetarian, Pork is highly consumed in Assam. The activities are mostly carried out by Scheduled Tribes (ST), and some other backward classes (OBC) to generate income, accumulate capital and fulfil socio-cultural obligations (*Shyam et.al 2016*). As per the state government data of Assam it is estimated that the market of pig is about Rs. 582 crores, and it sells 194000 tons of pork in a year. 38.5% of total meat consumption in Assam are of pork. **The indigenous breed of Assam is Doom. The indigenous pig breed of West Bengal is Ghungroo.**



According to the Livestock Census Report, 2019, Baksa, Karbi Anglong, Sonitpur, Lakhimpur, Dhemaji, Kokrajhar, Goalpara, Kamrup, Sivasagar have high population of pigs. In most of these districts the population is characterized by mostly tribal people. Out of these districts, Baksa, and Goalpara are aspirational in nature *(NITI Aayog, 2022).*

According to West Bengal Comprehensive Area Development Corporation districts like Darjeeling, Kalimpong, Bankura Purulia and Nadia have the highest potential for pig production. **West Bengal does not have any aspirational districts** *(NITI Aayog, 2022*).

22.3 Number Women Pig Farmers in Assam and West Bengal: Socio Economic Profile

As per the report submitted by *All Assam Pig Farmers' Association* to Government of Assam in the year 2019, there are around 10 lakh pig farm households in the state. Among them, there are 2500 entrepreneurs. As stated by ILRI, majority of the small scale entrepreneurs and pig households in Assam are headed and owned by women.

In Assam, backyard pig farming techniques heavily involve rural women. According to a report by the International Livestock Research Institute, in Assam and West Bengal, 78% of the pig rearing tasks on farms are carried out by women. They hold about 64% share of control over the income from pig rearing. This is being supported by our primary study as well. There are however, no female private or public local veterinarians, butchers cum pork retailers, or Pig and Piglet traders.

Majority of the women involved in Assam and West Bengal are in the production stage of the value chain. Their participation in the other stages of the value chain diminishes as these activities are carried out in the rural places; there is a huge burden of household chores on them.

78% of them have started this activity as a part of family legacy. This is true as most of the Scheduled Tribe households across these two states thrive on backyard pig farming.

92% of them own their enterprise singlehandedly. When it comes to the operations, 98% of the workers in their enterprise are women and only 2 of the workers are male. They are mostly involved in sales and transport. Majority of them have hired part time workers for their farm. This again is dominantly women.

70.5% of the women associated with pig farming have received secondary education. This is followed by primary education which is 26%. 4% of the women are illiterate.

When it comes to use of digital payments and mobile banking, the figures are quite on the lower end. Only 18% of the total 50 respondents use mobile banking. Out of these, only 6 women use Google Pay and 3 women use Phone Pay for digital payments

Story of Jugalata Sutradhar

Mrs Jugalata Sutradhar, 39 is a pig farmer of Goalpara district of Assam. She has been involved with this economic activity since 2003. She started this enterprise as a part of family legacy and currently she is a full-time pig farmer. However, she invested Rs. 5000 initially when she took over the pig farming. She has availed a loan from an SHG in the year 2016 for her farm at an interest rate of 3%. She now holds a Gaon Panchayat Certificate for her farm.

She has 4 full-time workers and 4 part-time workers. All of them are women workers. As far as market is concerned, she prefers to sell it to middlemen as it is convenient for her. This saves her a lot of time for household chores and raising her children.

She is engaged for about 4-8 hours in her farm. She produces 12 piglets in every 6 months.

Her economic position has improved since the last five years. However, she faces certain challenges. Firstly, veterinary services in the district are poor. There is always a scarcity of pig vaccines. Secondly, there are no training facilities in the region. Although there are some strategic players like International Livestock Research Institute (ILRI) who facilitate trainings, much needs to be done. Third, scientific management of pig farms remains a major hurdle. Her farm workers often cater to traditional practices which are not very sustainable and leads to poor production.

The table below shows her monthly income out of the pig farm.

Income in Rupees

Initial Investment	Income	Variable cost	Profit
5000	25000	13000	12000

22.4 Basket of Livelihood taken up by women

66% the respondents from all districts stated that they are engaged in other economic activities apart from pig farming. Only 34% of them are engaged in pig farming alone. Some of the economic activities they are involved in comprises of tea stalls, broom making, goatary, mushroom, handloom, duck farm, tea garden workers and agricultural laborers.

22.5 Description of existing pig production systems in Assam and West Bengal

There are broadly 3 types of farming system in piggery sector: (See more in Annexure-IV)

a) **Intensive Framing System**; b) **Semi-Intensive Farming System**; c) **Scavenging System**

As per primary survey, more than 50% of the respondents follow the scavenging system of pig farming.

22.6 Challenges Associated with Scavenging System found During the primary study:

Most of the women pig farmers and other value chain actors have limited access to inputs, training, scientific farming, credit, insurance, financial services, and reliable output markets. This can be attributed to various constraints such as lack of local capacity building facility, platforms to address the challenges and lack of institutional strategies and policies to develop the piggery sector. There are other constraints such as poor access to market information, low farm-gate prices, active involvement of middlemen, limited agri-business development services, lack of trust among value chain actors and lack of institutional innovations. Please refer (Annexure-IV) for more details.

23. RESULTS OF SECONDARY AND PRIMARY STUDY

23.1 Input and Output Marketing Channels in Assam and West Bengal

a) Procurement of Raw Materials and Products

In general, feed such as grains, barn, and medical services such as medicines and vaccines are procured mostly from local markets. Piglets are also procured from local markets or middlemen functioning in their neighborhood. Weekly markets (*haat*) are one major source of procurement of feed and piglets as the prices are cheaper and they get quality products. Public source of procurement remains limited to basic vaccines in the veterinary hospitals. However, lack of vaccines and medicines in local veterinary hospitals remain a challenge. Transportation cost is the major cost of procurement as stated by the respondents. 51% of the respondents borrow from friends and family for procurement of raw materials followed by savings, business returns SHG loans and other sources.

Across all the districts, 44% of them produce only piglets. 38% of them produce pork and sell it to local market or middlemen. 18% of them produce multiple products such as pork, piglets, and fattener. Out of the total respondents, only 2 women produce fattener. Fattener is the intermediate product in pig farming. However, none of the respondents produce any value-added products such as bacon, sausages, etc. On an average, 8 piglets are being produced in 6 months. When it comes to pork, one farmer produces about 50-60 kilogram of pork per month. However, their products are neither tested nor certified.

23.2 Average Revenue and Costs Associated with the Channels, and Income Generated

The cost of production also remains similar in both the states. The farmers procure one piglet from local market at a cost of Rs. 1,000 and Rs. 1,200 from middlemen. The respondents state that the rearing cost including feed and medical services cost around Rs 1,500 per year. 82% of the farmers rear pigs at their backyard with little shed. 10% of them have traditional pig shed and only 8% of them have concrete pig sheds. Shelter remains a major challenge for women pig farmers across both the states. Packaging and labelling are not availed by the pig farmers. None of them have their own brand.

Majority of the respondents (72%) in all districts stated an income between Rs 10,000- Rs 20,000. 26% of the respondents earn between Rs 20,000- Rs 40000. Only 2% of the respondents earn between Rs 40,000- Rs 60,000. 1 kilogram of pork cost around Rs 350 in Assam. In West Bengal, 1 kilogram of pork costs between Rs 300 to Rs 350. In case of piglets, 1 piglet is sold around Rs. 3,500 (after 1 year of birth). Looking at the seasonality, October to March yields highest income. Months between July to September, the summer and rainy season yields lower income.

d) Market and Sales: Demand and Supply

They sell their produce largely at three different platforms namely local market, retail and wholesale, and middlemen. Almost 92% of the respondents prefer to sell their produce to middlemen. This is due to the prevalent social norm that women are not very comfortable to go to the market themselves. In this context, middlemen remain to be their target customer to sell both their final as well as intermediate products.

As far as the demand is concerned, most of the respondents stated that they cannot meet the market demand. Only 16% of the respondents stated that meet the market demand. Only 1 pig farmer is involved in inter-state trade, mainly Sikkim. 85% of the respondents stated that they analysis market situation while determining their selling cost**.**

23.3 Access to Extension Services

a) Veterinary Services

Majority of these women have a little access to veterinary services. Local veterinary hospitals are ill equipped with vaccines and medicines for pigs. Private veterinary medical shops are far from their locality and are quite expensive.

23.4 Access to Credit Services and Financial Services

a) Credit and Banking Services Availed by Pig Farmers

All the respondents have bank accounts in the form of savings account. However, no respondent has a bank account in the name of their farm/enterprise. 96% of the respondents' account is being operated by themselves. Of these, 50% of them use banking services once in a month. 16% of them also use mobile banking facilities such as UPI and BHIM.

38% of the pig farmers have availed credit from commercial banks for their family needs as well as for their enterprise. 24% of them have availed credit support from family members followed by SHGs which is 20%. 16% of the credit is availed from MFIs and 2% from money lenders.

In the last one year, 46% of the respondents have availed credit between Rs 25,000 to Rs 50,000. 33% of the respondent availed credit between Rs 10,000 to Rs 25,000. Additionally, 21% of them availed credit between Rs 50,000 to Rs 1 Lakh. Our study shows that the most preferred source of credit is commercial banks followed by family and SHGs.

b)Rate of interest

i) MFI loans charge an interest rate of 18-24% per annum.

ii) SHG loan charge an interest rate of 3-5% per month. They pay interest monthly and do not feel the heat of high interest burden as yearly interest.

23.5 Other Extension Services

Of the total respondents, 94% of them have received little or no support from any kind of institution. Only 6% of them have received support in the form of training and raw materials.

i) Service providers: For West Bengal, middlemen from Nepal, Rita Foundation, and Doha Foundation are the common service providers. These service providers, especially Rita Foundation and Doha Foundation are NGOs who provided the pig farmers with training services. The training is free of cost. Middlemen from Nepal operate in West Bengal who provide pig farmers with piglets at the cost of Rs 1,200.

ii) Social security**:** Majority of these farm women are not covered under any social security schemes. Only 6 of the respondents are covered under Old Age Pension schemes under the state governments.

23.6 Transportation: Women farmers face challenges in transportation from the place of production to market, which are unavailable or too costly. This is one major reason for selling most of their produce to middlemen as they come with their own vehicles to buy pigs and piglets. 44% of the women farmers do not avail transport facilities at all as they directly sell it to middlemen. Local mini-tempo, e-rickshaw and vans are the means of transport which are used by pig farmers to sell their produce in local markets. However, most of the them avail transportation only once in a month.

23.7 Rural Women Pig Producers and Their Participation in Marketing Channels

The functioning of the market is generally constrained by problems along the pig production-to-consumption value chain. This means that new kinds of institutional arrangements are needed to reduce costs of: transport, loading, off-loading, and access to market information. These constraints clearly justify the need to link smallholder pig farmers to markets through innovations that increase productivity, income growth, and overall economic growth.

Pig producers in Assam and West Bengal utilize various marketing channels. Some of the pig farmers engage in the marketing of live pigs, while others sell pig products in form of pork. Primary pig products include piglets, live pigs for breeding, live and pigs for slaughter. The market of inputs is also small, given that only a small proportion of smallholder women pig farmers is able to purchase and utilize inputs. These include: drugs, pesticides, and better quality feeds (maize bran, silver fish, etc.). Undoubtedly, the targeted flow of resources and technologies in the pig sector can increase market participation of poor smallholder pig farmers which largely comprises women.

24. PRIMARY ECOSYSTEM PLAYERS: INSTITUTIONAL INTERVENTIONS AND SUPPORT SERVICES THAT CAN BE ADOPTED BY WOMEN PIG FARMERS.

There are several schemes and incentives by the central government and state governments for promotion and development of Pig farming in the region. See more in Annexure IV

The table below lists the schemes and departments that overlook the promotion of pig farming by the respective governments.

Area of the Scheme	Name of the Schemes/Institutions
Central Government	1. Pig Development Scheme under National Mission for Protein Supplements
	2. All India Coordinated Research Project (AICRP) on Pig
	3. Mega Seed Projects on Pig
	4. National Livestock Mission
	5. ICAR-National Research Centre on Pig, Rani
Assam	1. Animal Husbandry and Veterinary Department
	2. Assam State Rural Livelihoods Mission (ASRLM):
	3. Assam Pig Breeding Policy, 2019
	4. Bodoland Pig Mission
	5. Policy for Private Investment in Promotion of Livestock Sector in Assam
	6. Financial Assistance for Piggery Farming with Hand holding Program
West Bengal	1. West Bengal Comprehensive Area Development Corporation (WBCADC)
	2. The West Bengal Livestock Development Corporation (WBLDC)
	3. Promotion of PPP model of Pig Farming by Government of West Bengal
	4. Krishi Vigyan Kendra

However, KVKs has been playing major role in training fig farmers in the state of West Bengal. This can be better explained by a study conducted by *G. Das et al. (2021)*.

Story of KVK Cooch Behar in training pig farmers and increasing their farm income

This is the story of KVK in Terai region and particularly Coochbehar district in increasing farmer's income through pig farming. KVK Coochbehar has conducted training programmes on scientific pig farming from 2017-2019 in terai region mainly Mathabhanga-II, Cooch Behar-II, Cooch Behar-I and Tufanganj-II Blocks. 60 Ghungroo piglets and 10 Large White Yolkshire piglets were distributed among 20 interested farmers for experimental purpose. Regular vaccinations were provided by KVK Cooch Behar. Technical support was more in the form of organized infrastructure. Pucca shelter, good drainage, quality feed, regular vaccination and mixed shelter were provided.

The cost of piglets, feed and other costs incurred by the KVK are stated below:

Breed	*Piglet Cost*	*Feed*	*Other cost (medicine, electricity, etc.)*	*Mortality rate*
Ghungroo	*2500-3000*	*3500-5000*	*1500-2000*	*3%*
Large White Yolkshire	*4000-4500*	*3500-5000*	*1500-2000*	*2%*

Source: Das et al, 2019.

The outcome are as follows:

a) 88.37% of the farmers who were interested were from the Scheduled Tribe. Of this, 33% comprised women.

b) The annual income of all the farmers have increased significantly.

Variables	*Farmer 1*			*Farmer 2*		
	Before	*After*	*Increase*	*Before*	*After*	*Increase*
Annual Income	*150000*	*360000*	*210000*	*110000*	*206000*	*96000*

Source: Das et al. 2019. Income shown are in Rupees.

c) Technical and infrastructure support has improved the socio-economic conditions of these farmers and influenced the annual income as stated in the table above.

25. GAPS IN SERVICE DELIVERY AND ACCESS TO INPUT SERVICES AND MARKETING SERVICES

The pig sector in Assam and West Bengal faces major challenges that continue to constrain its competitiveness. These include: the lack of organizational strategies to achieve economies of scale at farm level; poor access to market information; limited use of fair and meaningfulquality standards; shortage of skilled manpower in areas of value addition; the prevailing weak legal and regulatory framework that is also compounded by poor enforcement of foodsafety requirements; limited access to financial services for most smallholder farmers; poor husbandry and farm management practices; poor quality (adulterated) feeds and feeding practices; lack of genetic and breeding strategies; poor swine health due to African Swine Flu and other diseases, and: poor slaughter technologies. Nevertheless, the potential of piggery in the two states is increasing. The pig sector has enjoyed robust increase in production and consumption of pork in the last three decades that are vital for poverty reduction. However,there is a lot to be desired when it comes to access to services, and market for inputs and farm level output. (See more in Annexure IV)

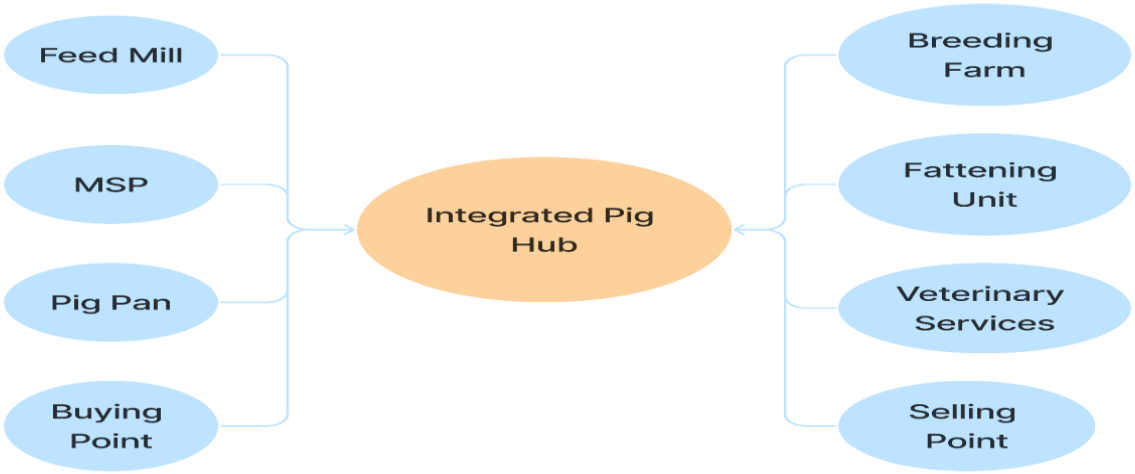
26. WAY FORWARD: BEST BET INTERVENTIONS

The main findings of this study indicate that there is a need for strategic players and stakeholders to build capacity of rural women pig farmers and other pig value chain actors. There must be a better service delivery and market functioning mechanism through strong supporting institutions. The institutions may also include interventions that create facilities to enhance pig and pork quality, link value chain actors, encourage collective marketing of pigs and provide exposure to rural women farmers. It is also important that women pig farmers are provided with start-up capital, business ideas, and grants.

1) Conducting capacity building programmes shall encourage systemic and institutional change in ways such as: market for pig products and inputs operate; actors and service providers along the value chain function; farm records are kept, and; resources utilized. Here, market-based incentives can be introduced and used to leverage the pigenterprise's contribution to value chain development. Appropriate and useful organizational models in the pig sector can be promoted especially in areas of linking pig farmers' organizations to large-scale traders and processors.

Several live pigs and pork hubs can be created, namely: (i) cooperative-structured pig hubs that are created through cooperatives. These can either be producer-led, retailer- led, or with consumer members. It has to have strong roots in pig farming that is owned and democratically controlled by its members: (ii) For-profit live pigs or pork hubs that aim at helping farmers to connect to a market outlet and sell their pig products in desired quantities. When pig farmers are helped with direct marketing of their products,this can exponentially expand business opportunities of other pig value chain actors, especially the processors.

During our interview with *Miss Runa Rafique*, a pig farmer from Assam, we gathered her idea of developing a pig farm model. She also calls it an integrated pig hub. All the extension services including market and sale are integrated to one area. This model is suitable for villages with higher concentration of pig farming. The figure below explains the model.



2) Establish collective action, linkages and coordination units along the pig value chain that suits differences in local characteristics. These can then be utilized as a basis to facilitate the emergence of reliable organizational models to enhance value chain coordination in a way that effectively promote variants of collective action among actors;use of contractual arrangement between pig farmers and other actors; efficient distribution pig products (and inputs) between different value chain actors, and; the operation of existing farmer and women groups.

3) Greater connectivity among the component nodes of the pig systems can therefore help reinforce closer linkages between (and among) economic and technological agents in thevalue chain. While the lack of agricultural financing and research skills continue to limit the emergency of commercial pig production in Assam and West Bengal, this can be altered, if new institutional structures are put in place to permit the effective symbiosis of knowledge search

with knowledge use.

4) Promote interventions that improve governance issues and active participation withinfarmers group and other value chain actors' groups. This can be in form of establishingreliable mechanisms for improving access to operating capital; effective strategies for risk management, and; enhancing the business skills of the pig farmers marketing groups. Here credit service providers and pig traders can be targeted with precise incentives andtraining in skills that limit exploitation of pig producers. The issue is about interventions that enhance, motivation, good moral behaviour, trust, and fair enforcement of exchangecontracts.

5) Promote pig value chains that are sustainable by attracting more direct participation ofthe private sector and other appropriate boundary partners that have a comparative advantage in the development of smallholder pig value chain operations in these two states.

6) A participatory market chain approach can be employed whenpiloting on "rural to rural", "rural to urban", and "urban to urban" pig value chain actors,in order to improve the quality of pilot testing, intervention outcomes, and impact on efficiency, effectiveness, welfare, and capability of actors in the wider pig value chain in the country.

7) Marketing sustainability and the stability of pig farmers' group can therefore be achievedwhen: the registration process of pig farmers and other actors' groups is very much simplified; value chain actors are able to forge strong relationships by learning from one another, and; the formation and operation of farmers and actors' group is quite smooth. This should be true even when there is a requirement of formal registration before accessing inputs and services. Pig traders can also be organized into buying cooperatives to enhance the coordination of other value chain actors from input traders, farmers to consumers.

8) Build advocacy capacity and alliances with "change agents" This may require effective dissemination of relevant information to various committed actors in the value chain. Thisimplies the need to explore and harness through research the potentials of linkages; partnerships; policy platforms, and; innovation platforms that can help exploit the potential in pig sector. Various incentives need to be put in place for smallholders to organize around marketing of a particular commodity as opposed to individual selling.

9) There should be advocacy to among others: develop a long-term vision for the pig sector; improve rural infrastructure; provide affordable extension services; distribute improved pig breeds; promote appropriate feeding practices; make credit markets accessible to thepoor; make relevant market information available to farmers; connect pig farmers to a wider pig value chain; create incentives that can stimulate willingness of diverse actors in research and learning institutions to actively participate in the innovation network, and; and ensure that the voice of farmers and other value chain actors is heard. These interventions can lower the costs for marketing pig products and can also create additional incentives for pig farmers to organize around pig marketing activity.

10) Innovation networks should also help to link local networks to international sources of information and resources; provide resources to strengthen innovation capabilities in private firms and civil society organizations and; build the capacity of actors or dedicatedorganizations that are willing to be catalytic agents through courses and mentoring; facilitate the formation of partnerships with the aim of triggering an increase in training human resources, exchange visits, meetings, and facilities; create incentives (in terms of change in mentality, management and culture) that stimulate willingness of diverse actors in research and leaning institutions to participate in these innovation networks.

11) Train and equip women pig farmers with grants and business skills to facilitate effectiveness and accountability in running their value chain activities as a business. Offering group members specialized training in technical and marketing skills can provide incentives to increase production and allow the group to be successful andsustainable in their value chain activities.

12) Promote the analysis of constraints and opportunities along the pig value chain. This information helps to map partners along the value chain and their individual strengths.An advisory board of key partners can be created to oversee the evaluation and improvement of the smallholder pig value chain in terms of smooth coordination of actors, performance, profitability, and upgrading.

13) Facilitate the emergence of active stakeholder policy advocacy forum that can influencepolicy reforms that are favourable to smallholder and other actors in the pig value chainsat district and national levels in Assam and West Bengal. The pig enterprise can effectively develop morein terms of productivity, product quality, and issues of food safety, when the governmentfinally chooses it to be among the priority agricultural commodities for public investment and value addition.

14) Pigs should be included among the priority agricultural commodities that are of strategic importance to the country. These are often drawn from an elaborate consultative process with stakeholders. The stakeholder policy advocacy forum should be encouraged to further advocate for the: improvement of storage facilities, slaughter houses, value chain investments in cold storage; modernized wet markets; improved buildings of butcheries, and; better communications and roads.

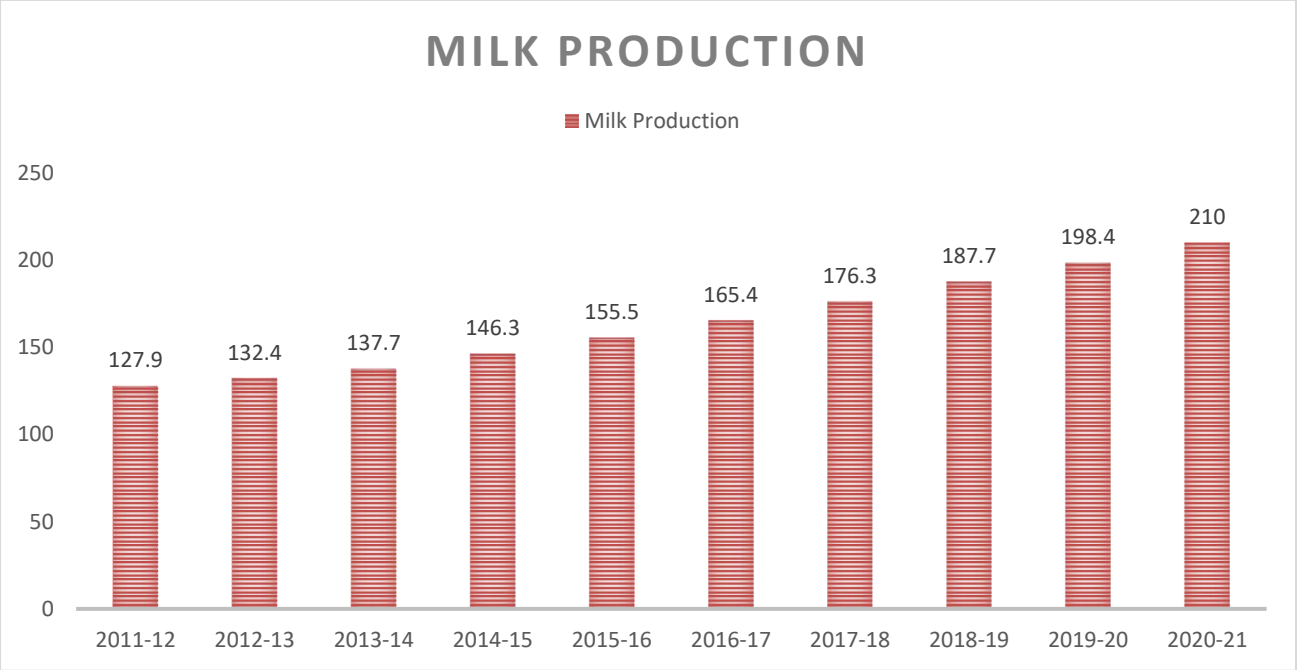
DAIRY VALUE CHAIN

27 INTRODUCTION

27.1 Background of Dairy Sector in India

The Indian dairy sector includes dairy animals—buffaloes, cattle and goats—in that order producing milk and supporting the livelihoods of nearly 70 out of 147 million of rural households. Milk is the main output of the livestock sector, providing 66.7% of the sector's total value, while meat and eggs provide 17.5% and 3.6%, respectively. Wool and hair are negligible (0.2%). Dung, which is used as domestic fuel and for fertilizer, is about 9% of the livestock sector's total output. Buffaloes, cows and goats contributed 53.4%, 43.2% and 3.5%, respectively, to total milk output in the year 2018.

Overall, the Indian dairy sector performed well over past years as it grew steadily and significantly. While government institutions did not really respond, improvements in the cooperative sector and emergence of the private sector in livestock production and dairying contributed to this growth. Government policies and guidelines, however, created an environment that is conducive to this further development of the sector. On the other hand, livestock production and dairying as a socio-economic instrument for growth that benefits the poor in rural areas has to a large extent disappeared from government policies. This is ironic, given that 90% of India's milk is produced in rural areas and smallholders account for 80% of total milk production.



Source: Annual Report, 2021-22, Ministry of Animal Husbandry and Dairying

27.2 Dairy in Assam

The dairy sector in Assam is weak and not very significant in the state's overall economy. Nonetheless, thousands of farmers keep cattle, buffaloes and goats from which they get milk, though often only in small quantities and rather irregularly, with distinct seasonal production differences.

Per capita milk availability in India increased over the past 10 years by about 27% to 280 g per day, a level recommended by various medical institutes. This availability is substantially lower in the state analysed as it is only 25% of the national level in Assam. Urban households spend around 70% more on milk and milk products than rural households, although urban household spending on food items has fallen below 50% of total household expenditures, while rural households still spend more than 50% on food. In both groups, expenditures for milk and milk products were 5–10%, while expenses for other livestock products were below 5%. Although expenditures for milk and dairy products remained more or less constant while overall household expenses increased, with increased purchasing power, households also spent more on milk and milk products in absolute terms.

The low development of the dairy sector is also reflected in the type of milk and dairy products available in the market. The informal sector dominates in rural areas where most milk is either directly consumed by producing households or in the village. Most of the milk is consumed in tea, while a small part is converted into local dairy products for two reasons—farmers produce only small quantities of milk as a marketable surplus and the small surplus does not attract any formal cooperative or private dairy actors, leaving producers to resort to home consumption and cottage processing.

Dairy consumption in urban areas provides a different picture, with a growing demand for quality liquid (pasteurized) milk and dairy products. Present formal milk processors in Assam are not in a position to meet this demand and therefore resort to imports from other states.

Total milk production from cattle and buffaloes in Assam of about 800,000 liters it grew during 2007–2011 by only 1.4%, another indicator of the weakness of the dairy sector. However, a closer look at the numbers is interesting—while the share of buffalo milk remained at about 13%, milk production from local cattle dropped by 7%. At the same time, milk produced with crossbred animals increased by 27% to about 230,000 liters. Despite low growth of the overall milk output, the shift towards increased dairying with crossbreds is a sign of potential in specific areas.

Dairying in many livestock keeping households in Assam remains a side business, though it is part of integrated crop–livestock farming practiced by the majority of smallholders. As part of the prevailing crop–livestock system, dairying is seen more in the context of smallholder livelihoods rather than as an isolated commercial undertaking. In this system, the entire household is engaged and it is not a surprise that women contribute more than their share to livestock management at the household level. More specialized and targeted dairy activities are found in Assam among communities that migrated into the state (Nepali, Bihari, Bengali) and among young people who took up dairy as a commercial enterprise.

The low performance of the dairy sector is further reflected in the low quality of services delivered in the fields of animal health, breeding and feed and fodder development. Although government structures are in place, their maintenance and operation are poor, with a low level of outreach. Interestingly, this vacuum is neither filled by cooperatives nor the private sector. The dairy cooperative sector is facing its own economic problems and lacks the resources to establish its own dairy input and service network on a large scale

As a result, the private livestock service delivery system with *gopalmitras* is not yet strongly established. Artificial insemination, though introduced to and accepted by a large number of farmers, is not really used, partly because farmers with local cattle and buffaloes prefer natural breeding with local bulls, partly because the quality of AI services is poor due to limited skills of the AI workers, but even more so due to low quality of the frozen semen.

Fodder cultivation on farms is limited because there is not a lot of land available where animals can graze and/or where local grasses can be cut. Although grazing and cut local grasses help feed animals, it may not be sufficient to produce substantial amounts of milk. As long as dairy is not seen as a separate, economically interesting option, animals will continue being fed in a 'low input' manner, which hardly considers the animal's feed requirements. The state of Assam's cooperative and private sector livestock feed industry, which concentrates on poultry rather than dairy cattle feed, is another indicator of the low priority farmers put on livestock feeding because they see high feed costs as not economically viable.

Of the seven identified dairy value chain paths, the organized sector is involved in only two paths through which only 5% of total marketed milk is handled. In addition, the organized sector handles imports, about 20% of the total milk in the market. While another 20% of milk is processed by the cottage industry into sweets, the remaining 55% of milk in the Assam market is sold as fresh, unprocessed liquid milk from producers directly to consumers (20%) or via different paths that involve informal dairy vendors (35%).

Rapid development of Assam's dairy sector may be difficult to achieve in the near future. To have an impact, any dairy development initiative in the state must address smallholder milk producers with their low quantities of surplus milk and irregular supply and must also include the informal dairy sector that handles more than 90% of the milk that local farmers bring as surplus to the market. Seeing dairy development as one element to improve smallholder livelihoods may rely on an approach that focuses on pro-poor livestock production and dairy development.

27.3 Milk Clusters in Assam:

The bright side of milk production in Assam, is presence of milk clusters all over the state developed under the AACP and RKVY program. There are 341 numbers of Dairy Co-operative Societies (DCS) and 396 numbers of Milk Producers Institutions in Assam. Cooperative model of dairy farming is widely popular in the state.

Based on the status of the district cooperative societies and the milk volume the following 5 districts are having higher number of women entrepreneurs:

(i) **Jorhat** (ii) **Golaghat** (iii) **Nagaon** (iv) **Darrang** (v) **Sonitpur**

Advantages of having DCS:

i) Higher awareness about the various dairy development schemes/programmes and avail more benefits from those schemes promoted by the Department.

ii) Large milk producers under DCS utilize entire milk produced from local cows forhome consumption.

iii) Through DCS, households sell the entire milk produced by the local cows to theconsumers at an average price of Rs.40.50/ltr. on monthly payment basis.

iv) The DCS households sell their marketable surplus of cross-bred cow milk to the dairycooperative societies and they realized assured and reasonable price.

The milk value chain as depicted below has RWEs mostly in the production stage. The remaining 5 components are looked after by the collective model of DCS and the collecting agency/marketing agency (in this case WAMUL)

Milk Production **Milk Collection** **Milk Processing** **Quality** **Marketing**

The essential sections of the facility for milk processing are given below:

a) Raw Milk Reception Dock (RMRD) - consisting of can conveyor, can washer, weighingbalance, dump tank, etc.

b) Processing Hall – installed with cream separator, chiller, homogenizer, pasteurizer andother related machinery.

c) Storage area- for milk storage tanks.

d) Products manufacturing area-depends upon the type of products, quantity of milkhandled and the machinery to be installed.

e) Packing area-for packing of liquid milk and other products.

f) Cold storage-for keeping the milk and milk products before sending to market.

g) Quality Control Laboratory-for testing the quality of milk and milk products.

h) Utilities area-for installing boiler, generator set, water treatment plant, maintenance andstore area for spares.

i) Effluent Treatment Plant area- for treating the dairy effluents before releasing tothe fields.

Case Study – RWE in Livestock Business (Press Trust of India)

Nayanmoni Bharali of Assam's Hojai started her venture of animal husbandry sixyears ago with just one cow. Today, she sells 80-85 liters of milk daily, earning arevenue of Rs 10 lakh per year. She is among the 6,800 women dairy farmers who have empowered themselveswith animal farming and scripted success for West Assam Milk Producers' Cooperative Union Ltd (WAMUL), the largest in the state.

Bharali, a member of Udali Bamungaon Dughda Utpadak Samabay of well-known Purabi Dairy, said she now is financially independent with her venture. "I now have 12 cows. I earned knowledge and skill to improve milk production through different training programmes, which were organised by Purabi Dairy. I am thankful to the cooperative for providing me a market to sell the farm's produce, which gives me an annual turnover of around Rs 10 lakh. I feel proud today as an independent woman dairy farmer," she said.

Another milk farmer Pranita Dutta, who is the president of Nalbari's Anantagiri MahilaDCS, claimed that WAMUL has uplifted her life and helped her and other entrepreneurs maintain a better livelihood. "Since my

association with the cooperative, I have been able to take care of myfamily and this has boosted my confidence," she said. Dutta also emphasized on the need to educate every woman so that they can build a strong foundation to become financially independent in the future.
West Assam Milk Producers' Cooperative Union Ltd managing director Satyabrata Bose said the entity celebrated International Women's Day on March 8 with a focus on 'Power of W-Women of WAMUL' to acknowledge and appreciate their contributions to the dairy sector. "They have come forward to break the bias, the theme of International Women's Daythis year. They play a crucial role across all the operations of WAMUL. Right from dairy farmers to various departments such as procurement, human resources, purchase, training and development, marketing, veterinary executive and operations at a liquid milk processing plant, women have made their contributions in every segment, helped WAMUL become the biggest milk cooperative in the region," Bose said. Of over 16,000 dairy farmers associated with the entity, 6,800 are women, hesaid. At least 18 of 28 female employees at WAMUL are in leadership roles in variousdisciplines, Bose added.

27.4 Women in Dairy: Socio Economic Profile

Majority of the rural women involved in the dairy value chain are from General category and Other Backward Caste. As per our findings in the primary study, 50% of the total respondents are from General category.

67% of the dairy women have started their enterprise as a part of family legacy. Rest 33% of them have started the enterprise by imitating friends and neighbors. However, none of the respondents have received any training or advice.

33% of the total respondents have identified their business model as entrepreneur model. Whereas 67% of them have follow traditional model which can also be said as informal model. Majority of them run the business singlehandedly.

Income

As per primary study, more than 70% of them earn more than Rs 10,000 but less than Rs 20,000. They follow traditional method (informal) of milk farming. Whereas, around 30% of them earn more than Rs 20,000. They follow collective model and entrepreneur model.

Need for enhancing milk production in Assam

Under Operation Flood 1, the West Assam Milk Union Ltd (WAMUL) was established in 1978. Initially it covered five districts of Assam, but since inception the milk union could not perform, and milk procurement dropped as low as 250 litres/day and finally closed for several years. In May 2008, NDDB took over its management, and after an engineering study the dairy processing plant was refurbished and in August 2008 it became operational. About nine milk routes were revived by promoting both Dairy Cooperative Societies (DCS) and Milk Producer Institutions (MPI). There is an emphasis on developing specific milk pockets such as the districts of Barpeta, Kamrup and Morigaon. At present, the union is able to procure 20,000 LPD in the lean season and 37,000 LPD in the flush season. The government of Assam has asked NDDB to submit a proposal for further development of the cooperative milk structure.

The union has ready market demand, but the core problem continues to be lack of milk, attributed to inadequate breeding services and lack of cattle feed. At present, the union is purchasing cattle feed from Uttar Pradesh and selling it at cost to members. Similar problems are faced by private dairies such as Prithvi. The core problem is lack of milk, and without more, it would be difficult to further strengthen the organized dairy sector in Assam.

Case study: Dairy farming in Assam villages

Villagers in Ganesh village of Mayang block in Morigaon district never thought that vendors from outside would sell milk in their village. Everyday two vendors come to the village and sell about 40 litres of milk. Such is the scenario in most villages in Assam. With the decline in availability of grazing land and labour at the family level, most households have stopped rearing dairy animals, and at present, only 50 of 150 households in the village rear cows. They produce 50 litres of milk that is sold in the village. There is only one progressive farmer who has started rearing crossbred animals and he gets about 25 litres of milk/day. A few years ago, five farmers tried rearing crossbred animals, but they stopped because they could not get access to healthcare

services. Incidence of diseases was high in crossbred animals and they required more labour at the family level.

27.5 Popular models in Assam

The dairy value chain in India can be split into three broad sectors—**cooperatives, private, and informal** *(ILRI, 2014)*. Cooperative and private dairies can be grouped as the organized formal sector. The main value chains and dairy channels are linked:

a) Benchmarking by cooperatives: Cooperatives continue to be the central players in the Indian dairy sector. The cooperative that operates in a particular area is able to benchmark the milk procurement price, especially where all three value chain sectors operate.

b) Preference to operate in milk surplus pockets: The organized formal sector is mainly present and dominant in pockets of milk surplus. Although the cooperative sector dominates in most milk surplus regions, liberalization of the dairy sector has led to increased competition from the private sector. Despite efforts by the organized formal sector, in most important milk surplus regions the informal sector was able to hold its ground.

c) Inadequate coordination among key value chains: There is little evidence of coordination among the key dairy value chain sectors and actors, although informal milk vendors and, to some extent private dairies, look at the cooperatives when it comes to fixing milk procurement prices. There is occasional coordination within the value chain to manage surplus and deficits of milk and milk products.

d) Efforts by the cooperative sector to support other value chain actors: Besides procurement of milk from farmers, cooperatives also invest to enhance productivity of the dairy sector, for example, by providing good yielding animals, access to breeding services, feed at cost or subsidized rates and animal health care services. Such efforts have strengthened dairy production and better-yielding animals. While similar systematic efforts have not been made by the other two key value chain sectors, they are able to harness benefits of such investments by the dairy cooperatives.

1.6 Livelihood of smallholder dairy producers in Assam

The profile of smallholder dairy farmers in Assam shows that families with less than two acres of agricultural land and landless households own about two or three cows, of which at least one is in milk. Even households with more land do not maintain significantly larger numbers of dairy animals. The agricultural production system is mostly subsistence and production mainly covers household needs. Traditionally the primary purpose of rearing of nondescript cattle was for draught purposes and dairying was not a major source of income. In a village of about 100 households, 60 rear dairy animals, mainly cows, of which 30 would be milking at any point in time. About five to seven households would have surplus milk of about 1 litre/day for marketing, however, in a few villages households rear crossbred cows. In Assam, animals were traditionally reared for draught and manure, but with mechanization and access to fertilizer, this trend has been slowly declining.

In the focus group discussions, farmers said men and women share the work of dairying, but most dairy activities at the household level (67%) are performed by women. Women performed these specific animal husbandry activities (percentage of women participating): a) Cleaning animals and shed (90%); b) Feeding (50%); c) Milking (70%); d) Healthcare and breeding services (20%); e) Marketing (30%); f) Decision making on the use of income from dairying (70%).

28 RESULTS OF SECONDARY AND PRIMARY STUDY

28.1 Products

Milk in Assam is traditionally used for making tea, including all economic groups in rural areas. In urban areas, liquid milk from peri-urban producers and pasteurized milk are consumed, and for those with higher disposable incomes, milk products such as paneer and cream are also consumed.

Liquid milk and a range of dairy products are available in rural and urban areas of Assam. Availability as well as consumption patterns vary among different population groups, in particular between the rural and the

urban populations. Fresh milk is supplied to vendors and consumers as pure whole milk or adulterated with water; the latter often depends on the price the customer is prepared to pay. Pasteurized milk is mostly available in urban areas through formal dairy marketing outlets. A sizable amount of pasteurized milk is also available through imports from neighboring states. Pasteurized milk is available in sachets in the form of double-toned milk, toned milk, or standardized milk.

Assam produces indigenous milk products such as curd, paneer, and ghee. Most of these products are generally consumed by the milk-producing households and very little is sold in the market. Ice cream, curd, paneer, and ghee are also produced in small quantities by the organized sector and sold in local markets. Milk powder, dairy whitener and UHT milk are procured from outside the state and sold in urban areas.

For a more detailed view of dairy consumption in Assam, data were collected from a few households to study family expenditures for milk and milk products as part of their overall food expenses. The major food expenditure was cereals, followed by non-vegetarian food items and milk. Of total food expenses, 9%was spent on milk and 20% on non-vegetarian food and eggs.

Rural Assam in general consume about 0.5–1 litre/household per day. Of the total consumption, more than 50% is consumed in tea. Sometimes milk is converted into curd and consumed at the household level. Non-milk producing households purchase paneer from vendors.

Milk consumption of an average income urban family of five is about 15 litres/month. There has been no significant change in liquid milk consumption during the last five years, but recent trends showed increased consumption of products such as paneer, ghee and curd. In Guwahati, there is a growing demand for packaged pasteurized milk, and demand for UHT milk, unbranded paneer, and demand for branded curd and ice cream is increasing. Guwahati has a number of recently established sweet shops that prefer to buy milk from regular vendors. Compared to other states, prices of milk and milk products are high. Liquid milk is sold at Rs. 60/litre. In Guwahati, the major city in Assam, packet milk is 40%of milk sales, whereas it is 5–10% in other major towns in Assam.

28.2 Production of value-added products

There are two major product directions in the dairy value chain, traditional dairy products and high-end products. Five processes deal with traditional products:

a) Cultured products—dahi, misti dahi, , buttermilk etc.

b) Fat rich products—ghee, butter and cream;

c) Acid heat coagulated products—paneer and channa; the latter is the key input to prepare different kinds of sweets such as rasgulla or gulabjamun;

d) Milk-based puddings and desserts that are commonly used during festival seasons.

e) The main high-end products are milk powder, baby food, table butter, ice cream, cheese, nutritive beverages and chocolate.

28.3 Access to Credit

Agricultural credit is disbursed through a network of commercial banks, regional rural banks and cooperatives. In Assam, however, this is very poor despite the presence of district dairy cooperatives. Our primary survey shows that bank loans are negligible.

MFI loans charge an interest rate of 18-24% per annum. SHG loan charge an interest rate of 3-5% per month. They pay interest monthly and do not feel the heat of high interest burden as yearly interest.

There is low demand for livestock credit from farmers with cows, but there is an emerging demand from rural youth and women in some areas that are moving into dairy. Even for the youth, access to credit is difficult because finance institutions are not keen to provide credit for milk animals. Past experience of finance institutions with lending money for dairy cattle was very discouraging because more than 90% of farmers who received loans did not repay them.

Farmers generally do not repay loans with the hope that someday their loan will be waived by the government. Some farmers who borrowed money to rear crossbred cattle were not successful because they lacked experience and had little technical support. Those with experience, however, do not have ready access to credit.

Access to subsidy-linked credit is also limited. Some farmers involved in dairying use subsidy-linked credit through Employment Guarantee Mission (EGM). Assam Livestock Corporation is facilitating schemes related to dairy, which includes identification and training of beneficiaries.

Credit is nearly absent for other dairy value chain actors. Even the organized sector did not make much effort to facilitate links to credit. Pruthvi dairy, a private company in Guwahati, developed a mechanism in collaboration with the State Bank of India to provide loans to farmers to establish dairy units. The venture did not work, primarily because after borrowing money, farmers never supplied milk to the dairy. Currently, WAMUL is planning to link cooperatives with banks for animal loans.

Realizing the importance of dairy for employment generation, the Assam Livestock Development Corporation (ALDC), with support from the Employment Generation Mission (EGM), started promoting dairy farming by involving rural youth as entrepreneurs. The corporation facilitates subsidy-linked credit schemes under EGM and provides technical back-up, training, and AI services through the State Animal Husbandry Department. ALDC intends to develop 10 milk producing clusters involving 150 beneficiaries each to create a sizeable quantity of surplus milk. It has plans to facilitate installation of bulk milk coolers with support from the Dairy Development Department, and collect marketable surplus milk from beneficiaries. In addition, further links from farmers to processing units will be developed. The outreach of such a scheme that involves rural youth, however, is limited. Considering the market demand in villages and small urban centres, it may be worthwhile to further promote dairy enterprises involving rural youth, but with more intense outreach, although it may be ambitious to develop organized dairy processing facilities when there is low marketable surplus at the village and cluster levels.

There are limited efforts to provide credit to dairy farmers because repayment has been such a problem, but there could be access to credit through a formal sector in the state that can vouch for repayment by dairy farmers.

28.4 Genetic Improvement

Genetic improvement is essential to increase milk productivity, but to achieve their potential, bovines need ideal feeding, both bulk and nutritional components. Due to the decline in grazing areas and high cost of concentrate feeds, rearing high-yielding milk animals is becoming costly. The concept of rearing heifer calves as future replacements and to keep dry cattle until the next calving is losing focus because it does not seem viable for backyard dairies. Commercial dairy farmers replace their milk animals once they are dry and buy new ones. In recent years, fewer smallholders are rearing cattle or buffaloes for milk production, perhaps because they have limited ability for risk, insurance coverage is weak, fodder resources are scarce and feed is becoming more expensive.

28.5 Veterinary Services

The state animal husbandry department of Assam is the single largest service delivery organization in the state to render health and related extension services, including planning, input production, procurement and delivery, enabling implementation, monitoring, training, extension and MIS. However, their service delivery leaves much to be desired. The scheme of para vets promoted by SESTA could be a good model.

28.6 Insurance

A centrally sponsored livestock insurance scheme was introduced by GOI in 100 selected districts. Under this scheme 50% of the premium is borne by farmers and the remaining 50% and administrative costs are borne by the government. The scheme is tenable for a maximum of three years and restricted to two animals /beneficiary. However, as per our primary study, none of the respondents were covered under any insurance.

28.7 Assam Milk Market:

There were three Milk Unions in Assam, covering most of the districts of the State, i.e. EAMUL, CAMUL and WAMUL. However, only WAMUL continues to remain operational. The NDDB is managing the WAMUL since April 2008. During 2015-16, the Union reported an average milk procurement of 21,783 kg per day with a

peak procurement of 32,813 kg per day covering 3,894 dairy farmers organized in 169 functional milk producers‟ cooperative societies.

NDDB continue to manage West Assam Milk Producers' Cooperative Union Limited (WAMUL) popularly known as Purabi Dairy. During 2018, WAMUL procured 32,540 kg of milk per day having around 4.3 per cent Fat and 8.3 per cent SNF from 12,365 dairy farmers through 224 milk collection centres. The average milk procurement price paid by WAMUL to its associated dairy farmers was 36.00 per kg.

During 2018-19, WAMUL sold around 54,000 litres of packed liquid milk per day under the brand 'Purabi' besides selling paneer, sweet curd, plain curd and ghee. WAMUL attained a growth of around 9 per cent over the previous year. Seeing the turnaround of WAMUL over the last decade under the management of NDDB, the tripartite agreement signed on 05th February, 2019 between NDDB, WAMUL and Government of Assam got further extended by a period of three years till May 2021.

Dairy Cooperatives' Cold Chain Infrastructure capacity in March 2019 was 20 TL of BMC and 60 TLPD Dairy plant. The "Purabi" market is primarily in Guwahati.

Dairy India 2007 reported that about 50% of the total milk produced is consumed as liquid milk. Over time the percentage has slowly increased.

Butter: Butter production has increased from 130,000 tin 1991 to 570,000 by 2004 with an average compound growth of 12%. Only about 1.1% of the butter is white butter for the table. An estimated 75% of total butter production comes from the unorganized sector.

Ghee: Ghee is the largest commodity among all milk products. When compared to growth of the butter market, the ghee market is growing slowly but steadily. The size of the ghee market has doubled from 1991 to 2004, with an annual compound growth of 6.5%. Three-fourth of the ghee produced in the country comes from the Traditional Milk Sector (TMS).

Milk powder: The market potential for milk powder stands next to ghee and butter. In the past, milk powder had a larger market compared to butter. Production of milk powder increased from 150,000 tonnes in 1991 to 235,000 tonnes in 2001, with annual compound growth of 6%.

Malted food: The market for this commodity is much smaller compared to ghee, butter and milk powder, but the market for malted products is larger than for cheese and condensed milk. The production of malted milk food has increased from 41,000 tonnes in 1991 to 68,000 tonnes 2001.

Condensed milk: The market for condensed milk is small and growth is slow. Production increased from 8000 tonnes in 1991 to 12,000 tonnes in 2001, with annual compound growth of 4%.

Cheese: The cheese market is very small. Cheese production in the country has increased from 2500 tonnes in 1991 to 8000 tonnes in 2001, with annual compound growth of 12.3%.

Ice cream: Ice cream has grown faster in recent years ever since AMUL entered with branded ice cream. Per capita consumption of ice cream increased to nearly 250 ml/year.

Most private sector players collect milk from villages by establishing milk collection centres (MCC), from which milk is transported to a Bulk Milk Chilling Unit (BMCU). At the MCC level a commission agent is tasked to collect the milk daily and send it for processing. Payment to producers is similar as cooperatives.

29 PRIMARY ECOSYSTEM PLAYERS: INSTITUTIONAL INNOVATIONS UNDERTAKEN BY STATE AND OTHER INSTITUTIONS THAT CAN BE AVAILED MILK PRODUCERS

There are several schemes, incentives and institutions at the central and state level that overlook promotion of dairy sector in Assam. They are listed in the table below. (See more in Annexure V).

Area of Operation	**Scheme/Institutions/Initiatives**
Central	1. Dairy Entrepreneurship Development Scheme
	2. Strengthening Infrastructure for Quality and Clean Milk Production
	3. Intensive Dairy Development Program (IDDP)

Assam	1. Establishment of Milk Processing Plant at Dhemaji under CM's special package
	2. Establishment of 13 units of Commercial Dairy Farm in Dhemaji District under C.M.'s special package
	3. Establishment of District Dairy Development Office with farmers training center in the state
	4. The Artificial Insemination (AI)

30 CHALLENGES

1. Low productivity and poor genetic potential of indigenous cattle

The productivity of the indigenous breed of the state is very low as compared to the country's average. The levels of productivity are far low from registered milk cattle breeds of India e.g. Sahiwal, Gir, Red Sindhi, Tharparkar, Kankrej etc.

2. Less per capita availability of milk

Due to the low production potential of the animal, the per capita availability of milk (133 gm/day) in the state is below the national average (394 gm/day. Sikkim and Bihar have the same per capita availability of milk (251 gm/day) and together stands at first in the eastern region while other states are much lesser as compared to national average.

3. Less milk production in Assam

The production level of Assam is still very low. The contribution in National milk production pool by 4 eastern states namely West Bengal, Bihar, Jharkhand and Odisha is only 10.90 percent, whereas, contribution of all the eight north eastern states namely (Assam, Manipur, Meghalaya, Tripura, Nagaland, Mizoram, Tripura and Sikkim) is meagre 0.77 percent. This suggests that there is lot of scope for improvement in those states in dairy sector. Thus, proper thrust should be given in the enhancement of milk production to have vibrant dairy sector in these states.

4. Inadequate availability of feeds and fodder

Availability of accurate data on analyzing feed and fodder deficiency are also a challenge for the planners and policy makers. The share of land for cultivation of green fodder crops is hardly 5 per cent of the gross cropped area leading to crucial availability of feed supply to the animals. There is decline of about 10 lakh hectare land due to diversion in non-agricultural activities since 2004-05 and thus land for agricultural use is shrinking continuously. Hence, option remains to increase in productivity of feeds and fodder per unit land area to sustain increase in livestock population.

The feed related problems in Assam is alarming. Mitigating scarcity of dry fodder and managing availability of green fodder round the year is a serious challenge for the livestock keepers as majority are marginal and small holders unable to produce and store livestock feed and forage and face acute shortage during certain seasons. Problems encountered during transportation and storage that affect the quality of feed and forage and poses serious threat to animals.

5. Limited numbers of chilling centers and chilling capacities in Eastern states

For development of dairy sector, the milk chilling capacity of a particular state become very important. As milk is a perishable commodity, chilling facilities provide required time span for transporting milk to value addition facilities. Limited numbers of chilling plants and their inadequate capacities crippled the chances of value addition of milk and thus in turn affect the forced consumption of liquid milk.

6. Under developed cooperative structure in the Assam

The milk cooperative societies are not functioning in full scale in the eastern states of India. The number of dairy cooperative societies in, Assam is, 355 respectively. All other NE states had less than 100 milk cooperative societies. Moreover, the milk processing capacities of the dairy milk federation is very poor. To prosper the dairy sector in the state, dairy cooperative societies should be increased in the village level, so that dairy farmers get remunerative and reasonable price of their produce based on quality. These will in-turn motivate dairy farmers to produce more milk and the dairy sector can be improved.

7. Inadequacy in livestock housing, veterinary health care services and extension mechanisms

The housing management and health care management system is still not an important proposition for majority of the farmers Assam. Farmers in the state free their animals in the night and only search out their animals whenever they require milk or other animal product.

Among various livestock diseases, incidence of Brucellosis, haemo-protozoan diseases like Theileriosis (26%) and Babesiosis (9%) are quite prevalent in Assam. Among viral diseases, incidence of FMD is quite high. For example, loss due to FMD in Assam was 7.35 crores per year in the state (Govt. of Assam, AH & Veterinary, Directorate of AH & Veterinary, 2017-18). Development of infrastructures like veterinary hospitals is time consuming and financial implications are also a concern.

31 OPPORTUNITIES IN DAIRY SECTOR IN ASSAM

There are 4500 private AI cum health workers in the state that provide breeding and health services to milk producing farmers in different locations. Institutionalizing this system with ongoing welfare schemes under dairy development to provide professional support and ethical supervision could enhance performance of these workers. Most farmers face recurrence of FMD even after vaccination. The department could not resolve the issue, maintaining that the cold chain is perfectly managed, no gaps were identified with vaccinations and no new FMD strains were identified. However, there is a need to study the issue in a systematic way, including vaccine production, procedures, and storage, as well as re-examination of the FMD strain typology and analysis of efficacy.

Infertility and repeat breeding problems are on the rise. Several contributing factors were reported and may need further examination:

a) Increased exotic blood level due to non-adherence of breeding policy coupled with poor management of animals by farmers;

b) Increased heat stress that changes the reproductive physiology of the animal, including an in-depth study to analyze heat tolerance levels of crossbreds with different blood levels;

c) Mineral deficiency;

d) Unhygienic procedures and adoption of poor techniques by AI workers; and

e) Frequent attacks of FMD and theileriosis as predisposing factors for infertility.

32. WAY FORWARD

Considering the high cost of feed there is a need to develop a participatory technology development (PTD) approach to develop low-cost feeding strategies and try them in the field. Except for a few households in a village that cultivate fodder, most farmers feed local grasses at a level of 95%. If dry fodder is included, it may be 5–30% but varies with animal and conditions—pregnant or milk-giving stage, agro climatic condition, etc.

Understanding the importance of these local grass species in feeding dairy animals is important to identify potential and further use as fodder.

Large numbers of small-scale processors produce different cottage products that can be supported through promotion of technologies that enhance product quality. Support can be planned in partnership with other institutions and private companies, including local fabricators. The local fabricator may be able to support decentralized processing equipment, including best practices related to hygienic processing. This would enhance the quality of milk products and also reduce losses from spoilage often encountered by village-based cottage processors.

TEA VALUE CHAIN

33. INTRODUCTION

33.1 Tea in Assam and West Bengal

India is the 2nd largest producer of tea in the world and accounts for the highest tea consumption globally. Around 80% of the total tea produced in India is consumed by the domestic population. The study on consumption of tea in India was last carried out by Tea Board of India in 2007. In spite of having a big domestic consumption base, the per capita consumption figures in the country are low when compared to global standards. A study on the domestic consumption of tea in the country was undertaken by Tea Board of India in order to understand the consumption trends and purchase behaviour of the consumers in the Indian tea market. The findings of the study is expected to identify the potential of this industry in Assam and West Bengal and especially to boost and promote rural women participation.

As per Tea Board of India, tea consumption in India is skewed towards the Northern and Western parts of the country with the percentage contribution from the Northern states accounting for 32 %, while that from the Western region accounting for 31%. The relatively low consumption belts of East (including North East) accounts for 19% while the Southern States contributes towards 18% of the total domestic consumption of tea. While there had been an increase in per capita consumption compared to that estimated in the last survey, the overall per capita consumption figures seem to be low when compared to global benchmarks. There is also a significant spread in the per capita consumption figures in urban and rural India. Given the current per capita consumption figures, there is potential for increasing the per capita consumption and the overall consumption.

33.2 Overview

The "*Tea Board of India*" is a statutory body set up under the Tea Act, 1953, to promote the Indian tea industry. It is under the administrative control of the Ministry of Commerce and Industry, Department of Commerce. It comprises of 31 members drawn from parliamentarians, planters, tea companies, exporters and trade union representatives. It has certain regulatory functions such as issue of Exporters' License, Tea Waste License and Tea Warehousing License. The Tea Board takes many initiatives to promote tea market, tea production and improve the quality of green leaves and made tea, including through subsidies to tea cultivation.

Currently, the industry employs more than three million people and contributes around 3% of Indian GDP. In 2017-18, the Indian tea industry recorded its highest ever production as well as export figures:

- the total tea production was 1.325 million tonnes, an increase of 74,500 tonnes (+6%) compared to the previous year.
- the total quantity of tea exported stood at 256,000 tonnes (an increase of 13% compared to 2016-17), corresponding to a value of 786 million USD.

India produces some of the world's finest teas due to the diversity of its microclimates, mainly in the states of Assam, West Bengal, Tamil Nadu and Kerala (**80% of total harvest is accounted by Assam & West Bengal**). In these regions, tea farm ownership is fragmented: large-size plantations account for roughly 20% of the total number of tea producers while some 80% of the farms have less than 8 hectares. These small tea growers have seen their contribution rising in recent years: between 2014-15 and 2017-18, their share of India's tea production has risen from 34% to 47%.

In India, there are 2310913 tea gardens with a total area of 619773.70 hectare, out which 1567 tea gardens are from organized sector spreading area of 421460.70 hectare and 229526 gardens from small tea growers in a total area of 198313-hectare land. In Assam and West Bengal there are 123177 and 37608 total tea

gardens respectively. Out of 123177 tea gardens of Assam 762 are from organized sector and 122415 from small tea growers. Organized sector tea gardens have a total area 232961.73 hectare and small tea growers occupy 114848- hectare land. In West Bengal, organized sector tea gardens consist of 114479.37-hectare area and gardens under small tea growers consist of 37608-hectare area.
Assam holds 56% and West Bengal holds 26% share of total tea from Estate sector in India. While in Small Tea Growers sector, Assam produces 46% and West Bengal produces 33% of India's total STG sector produce.

33.3 Areas with higher potential of tea cultivation: Potential Districts
According to Statistical Handbook, Assam 2021, **Tinsukia has the highest area under tea cultivation 57,008.79 ha and it is the highest producer of tea which is about 81.31 mn kg.** Dibrugarh consists of 53,380.89 ha area under tea cultivation and also the second highest producer of tea which is about 63.68 m.kg. Whereas, Sivasagar has the highest average yield of tea which is 2,736.44 kg/ha which is more than twice of the state's average yield which is 1098 kg/ha. However, the crop declined 11 per cent in Assam in June 2022 at 76.87 million kg from 86.37 million kg in the same month of previous year.
West Bengal, the eastern Indian state produced tea amounting to over 163 mn kg in fiscal year 2022. Tea is primary cultivated in the North Bengal districts such as Cooch Behar, Jalpaiguri, Alipurduar, and Darjeeling. Darjeeling tea which is famous for its special aroma is grown in the **Darjeeling district** of this eastern state. **Over 1.5 mn kgs of this tea was produced in 2022**.

33.4 Description of existing tea cultivation systems and Tea Value Chain
The Tea Value Chain is described below:

1. **Seed Bari**: for tea seed collection and distribution. Most large tea estates have their own seed bari. Toklai Research Center is also providing seeds to Tea Estates and Nurseries
2. **Tea Nursery**: There are new opportunities for rural women entrepreneurs to establish their own nursery and supply plants to small tea growers (STGs) and to large tea estates also.
3. **Plantation**: The main raw material is the tea plant and plantations are the major source of tea leaf. The STGs are mostly organic and large tea estates are generic ones.
4. **Processing**: The processing is either manual at small levels. STGs usually make orthodox tea manually. For large scale productions there are Bought Tea Leaf Factories which make machine made orthodox tea, CTC tea and Green Tea.
5. **Packaging**: There are small packeting companies and large tea packeting companies. Usually the large tea estates have their own packeting and brand. With availability of packaging material and machines, small packeting companies have also come up who do the job work.
6. **Marketing**: The marketing is at two levels – bulk wholesale market through the Auction Centers and brokers. The other is retail marketing using own packets and omni channels.

As far as Tea enterprise is concerned, the individual models (entrepreneurial model) are more successful in Assam and West Bengal so far. Collective models aren't there. The tea enterprises are mostly STG (Small Tea Growers) Model particularly in case of rural women entrepreneurs (RWEs). However, **The Tea Board as such doesn't recognize separately RWEs or as such Women Entrepreneurs.** Everyone who is in the Tea Business is a Tea Planter or a Tea Processor. The STGs are seen as Small Tea Growers and no separate category of women entrepreneurs was found in the secondary research material. In addition, Women Entrepreneurs from urban centers are looking mostly at the retail end and entering in the marketing segment in a niche manner with differentiated approach.

33.5 Challenges associated with this model of tea enterprise

1. Knowledge: Tea is a highly regulated and structured sector. The complete knowledge of the entire business is gathered as the journey progresses. This at times leads to delay in expected outcome and development of the enterprise.

2. Plantation: The landholding in most cases are family land or land taken from the forest land or under the ceiling. The knowledge of plantation and its management is an area where the STGs need support. A significant number of STGs are preferring to remain organic for better value. The issue of pest control, erratic rainfall, irrigation, labourers and burden of facilities as per Plantation Act are major concerns for STGs. For example, the wage rate is an area of dispute when it comes to STGs and LTGs (Large Tea Gardens); the regulator applied same wage rate for tea labourers.

3. Production: Barring a few most of the STG are selling the tea leaf to the bought tea leaf factory or to the large factories (if they are around). The price points are stagnant for decades and does not capture the market dynamics. Therefore, the fixed income results in low application of capital in the garden.

4. Marketing: Significant number of STGs are making organic black tea or handmade tea. There is an association the Organic Small Tea Growers of Assam which helps their members market to boutique tea buyers in the domestic market and through international buyers. The production is very small for STGs to tap the Tea Auction and established networks.

5. Compliances and Regulations: While the large tea gardens have to comply with strict regulatory formats laid out by the Tea Board and Tea Auction Centre, the STGs largely find it very cumbersome.

33.6 Women Tea Entrepreneurs in Assam and West Bengal: A Socio-Economic Profile

According to the Labour bureau of India 2008-09 India has 50% of men and 50% women working in the tea gardens. Labour Bureau of 2014 states that Assam has the highest number of women workers in the field of tea workers in India. And according to the various issues of Tea statistics, tea board of India, there are 51% of women and 47% of men in the tea gardens of West Bengal.

Primary study reveals that all the RWE associated with tea belong to Hindu religion. In Both the states, majority of the respondents belong to Scheduled Caste (58%). 32% of the total respondents belong to General category, 6% belong to Scheduled Tribe and 4% belong to Other Backward caste.
This highly contrasts with the women in the tea leaf plucking part of the value chain in tea gardens. Almost all the women in plucking belong to Scheduled Tribe category. Interviews with various stakeholders also stated the same.
All the respondents identified their business model as entrepreneur model. As tea is a structured enterprise, there is no traditional model in this industry.
When it comes to the idea to start the business, 65% of the respondents have stated that their business idea from by imitating, 29% of the women got the idea of tea enterprise through exposure visits, and only 6% of them have been doing it as family legacy. As far as business license is concerned, none of the participants have registered their business. All the respondents have been running their enterprise single-handedly. There is no shared ownership.
22% of the have secondary level education. 49% of them have received education till 10^{th}. Only 29% have only been to primary school.

33.6.1 Nature of Workers

52% of the respondents stated that they have around 20-35 part time workers at the plucking stage. 9% of them have nearly 100 part time workers at their estate.39% of them have hired 1-15 part time workers. When it comes to full time workers, all the respondents have 2-5 full time workers at their enterprise.

33.6.2 Basket of livelihood taken up by women

55% of the women are engaged in other economic activities, mostly agriculture. This is followed by family ration shops, local eateries, etc.

Case Study - Deepsikha Konwar – Organic Assam Tea Nursery

Deepshikha Konwar, native from Dehradun, Uttarakhand grew up in a very humble background. She is a graduate engineer in aircraft maintenance and worked with IndiGo Airlines, Quality control department at Delhi for around 7 years. Upon getting married in Assam she saw a place full of resources and opportunities for growth. At her in-laws place in Golaghat she saw people engaged in their small business. Most of the people using their lands for cultivation of bamboos, bananas, rice paddy farming, fisheries, small tea gardens or multiple nurseries they were using their resources for income. This environment of freedom and being your own boss motivated her too!.

After a few frequent visits to Assam, she spoke with her family that rather than doing a regular job, she wanted to start her own business. She found support and motivation from her family. Some of her neighbours were engaged with plant nursery sector but it lagged in system and quality. After a little discussion with them and some experienced people in the industry Deepshika started her own tea and agarwood nursery. She is a planter and a wholesale supplier of tea and agarwood saplings.

Deepshika, started her business in October 2021 with the investment of around Rupees 5 lakh. She did UDYAM and GST registration for her company "Organic Assam" as wholesale supply of live plants, Tea and other agri- products. The plants started getting ready by May 2022 on their own land of 2.5 bigha. Nursery sector attracted her because it has the potential of growth. Average life of a tea plant is around 30 to 40 years. Most of the tea estates are old and are in need of fresh plantation. Although Tea estates have their own tea nurseries but it is not that cost efficient for them to manage their nursery on their own. So, they prefer to buy the saplings from commercial nursery. Same goes for agarwood also. It is really high in demand. The demand of agarwood market is very high and supply is very less. In different states, Government is also running agarwood plantation programs, apart from this many tea estates are also planting agarwood as a shed tree too.

Organic Assam has collaborated with other nurseries in its surrounding area, and are able to take the advance orders in big numbers. On its small land, Deepshika could produce only 5 lakh saplings, with collaboration she can scale up the volume up to 20 lakhs. People are also happy since they can now produce as per the advance order and market demand. They are no more worried about selling the saplings to few middlemen at cheaper price.

Deepshika uses different digital platforms like Facebook, WhatsApp and Google for marketing and break the monopoly. She could reach the customers directly and this was the win-win situation for everyone.

Deepshika learnt her lessons early. Initially, she made some hasty decisions, for few months in between there was no new order. She panicked and sold some plants at very low price. She received her first order of 50,000 saplings from Suntok Tea Estate – Nazira, Jorhat but after delivery of 12,000 plants that order didn't continue as the plants were not fully matured and they required the fully matured saplings for plantation. That's how she learnt that plants should be at least 12 inches and 6 months old. After few good orders from Suola Pvt Ltd and Fatemabad tea estate she recovered her investment very soon. She currently is preparing to meet the demand of around 6 lakh tea plants from Rungamati Tea Estate the order will be delivered between march and April.

In future she is planning to do the contractual nursery for tea estates, wherein any tea estate that is planning its expansion will give an advance order to the private nursery and as per their requirement, they provide all the raw material(seed or cutting) with some advance money; Organic Assam will deliver saplings as per the requirement. She is also looking forward to start her own tea packaging and distribution. She wants to become the bridge between Assam and Uttarakhand, her two homes.

In Deepshika's words, 'it is never too late for what you might have been. Being a woman sometimes it becomes hard to balance work and family and have to make some sacrifices too. But when the time is right, do whatever you can with all you have, wherever you are. We have to recognise the resources around us to turn it into a business opportunity. When you start something on your own, you become your own boss. The satisfaction of bringing some change in people's life and building something of my own is success for me. It is a very small journey with lot of learnings. I have a long way to go, my bags are packed and direction is set. My journey will be better as I am more prepared'.

34. RESULTS OF SECONDARY LITERATURE REVIEW AND PRIMARY STUDY

34.1 Production

Key mode of production is Bought Tea Leaf Factory or any large factory. A few of the STGs make home based black tea or organic hand-made tea.

Assam has a larger share in production of tea by STGs (45.89) compared to West Bengal which is 33.89% (see table 3, and table 4). (*Nandini Medhi, an STG from Assam produced 10 lakh kgs in last three years).*

34.2 Average Revenue and Cost Associated with the channel

Cost of Production

According to the primary survey, the cost of production per bigha comes around Rs.1500 to Rs.3000. There is certainly a lot of scope in this industry with the STG and can be considered for deep interventions.

Income

Secondary sources are silent on the annual household income. However, average land holding is 2 acres of the STGs as per published data. The Tea Board recognizes STGs up to 25 acres. The average productivity is 4000 kg/ acre of land with low or no overhead expenditure the income with Rs. 16/kg of leaf (though the latest prices are in the range of Rs. 25/- per kg).

The STG annual income (as per 2 acre criteria) can be estimated at Rs.1,28,000/-. There is no separate income for women as the STG income is family income. This is also supported by our primary study. It states that majority of the entrepreneurs earn between Rs. 10,000- Rs. 20,000 monthly.

As per findings from our primary study, 92% of the source of initial investment remain to be family and their own savings. This is true for both the states.

34.3 Support Services

The Bought Tea Leaf Factory and most of the mid-sized factories source re- conditioned CTC machines and machinery for Green Tea or Orthodox tea. The packaging machines are also not from the first world. The reason is high capex and high cost of capital. The factories undertake modernization based on the generated income and cash flows. Some fabricators and machinery suppliers are in Dibrugarh including representatives from Chinese companies are operational from Dibrugarh and Tinsukia. The suppliers are available locally. For the factory there is loan and working capital available. As the machinery and factory premises can be hypothecated the Banks do provide loan against primary security, collateral security and additional personal guarantee and such risk mitigation measures that is used in other asset financing/project financing. Ideally the public sector banks are providing the funding. The new private sector banks or NBFCs are not providing any such funding for the Tea sector. From primary study, we gathered that only one of the respondent have taken training from Tea Board of India.

34.4 Support Required (technology)

Women led enterprises are mostly in the STG category and they are making niche items which do not use very high-tech machinery rather they use traditional skill sets and handmade tea. However, in the plantation area there is some help provided by the Toklai Tea Research Institute which provides the tea plants and nursery help also the training and capacity building by partnering with the STG Associations. There is further need for technology to improve the yield of the plants, make them more pest resistant. Particularly because the organic practices that is followed by the STGs are not very effective on pest controls. For example, the helopeltis is a pest which cannot be controlled by using organic practices.

34.5 Market and Sales: Demand and Supply

The tea industry is witnessing stiff competition from cheap imports and climate change issues hitting productions and increased inflationary pressures to maintain the huge assets by large tea gardens and the burden of welfare activities. Therefore, there is a need to bring more reforms and support for the tea sector. At the same time there should be more inclusive support and incentives for the STGs to enable them to come up to the quality and standards of those of LTGs.

For Tea, the market is pretty structured. The traditional route is part of the product is marketed through **auction**. Small amount of high value and niche products are picked by the buying houses or brands directly. Yet the mass market products are a blend of the Auction product and products from the mid-sized factories. With 80% of the production getting consumed in the domestic market, the competition is stiff and margins are very narrow. The Organic tea and Darjeeling tea are in an altogether different range of market. The tea tasting and broker houses play a significant role in fixing the threshold prices. Some numbers of experimentations are underway where the start-ups are creating and opening new markets. That still is a very small segment. The large segment of the STGs still are not price makers they are perennially price takers. Only in some instances where the leaf quality is good and there is need to meet production gap the STGs are price makers. Still in the last 15 years the tea leaf prices have gone up from the price band of Rs.13-16 per kg to Rs. 23-25 per kg. The overhead costs have gone up and with inflationary pressures and regulatory compliances the cost of productions for mid-sized factories and large factories the final product prices have remained flat.

In our primary survey, majority of the respondents stated that they unable to meet market demand. Only 1 of the participants said that they could. There is an interesting trend in supply of the respondents. As 26% of

them said they supply sufficiently while 74% said that they currently do not enough supply. Only 13% of the respondents are engaged in interstate sales.

34.6 Access to credit services and financial services

Secondary sources are silent in terms of access to credit for RWE in tea industry. However, primary study reveals that family is the first and most important source of financial mobilization. The current banking system requires that when a woman borrower is borrowing the money, the co-borrower should be her husband or father or any male member of the family (un-written code). There is hardly any subsidy available for the women led tea enterprises therefore, Tea Board is planning a 1000 crore program for handholding. There is a focused financial support services required at a lower rate of interest and with long gestation period. Alongside the funding component there is a need to ease norms for insurance as well.

There are hurdles for accessing finance by women and other tea entrepreneurs as the plantation is considered as agricultural activity, majority of the tea estates do not have proper land records and supporting land documents for collateral security. For the large tea gardens the leased land poses problems of mortgage, therefore there is a need for easing out the financial sector to help the tea sector grow. The banks also look for financial recourse in the face of default and so they want to take more security. However, the banking and financial sector need to look at the cyclical nature of the tea sector to devise long term loans and cash flow-based lending with appropriate risk mitigation measures in place.

35 PRIMARY ECOSYSTEM PLAYERS: INTERVENTIONS BY THE TEA BOARD AND STATE GOVERNMENTS

The Government policies enabled the proliferation and growth of STGs in the Tea Sector. The Large Tea Estate also leverage the leaf availability from the STGs and are able to meet the production gap. There are steps initiated by Tea Board which is helping keep a database of the STGs and recently there is a support program drawn up for Rs. 1000 crore. However, this remains limited to only influential and large growers that comprise of all men. There are still a lot of convergence required for improving processing, production, sourcing, transportation, licensing and other compliances. As mentioned earlier, there is no recognition of women STGs separately, there are no schemes and incentives focusing on developing women tea entrepreneurs. As per our primary study, there are no training facilities for tea farming in the states as well.

36. WAY FORWARD: POTENTIAL OF TEA AND BEST BET INTERVENTIONS

1. **Huge domestic market**

The Indian tea is out of competition in the international market because the Kenyan tea is cheaper. In India, tea is widely consumed by all section of people- poor and rich, old and young, men and women across all communities and in all the states. India is also the biggest consumer of tea, but has more potential, as per capita consumption of tea is still lower than other tea consuming countries. Thus, the tea industry should exploit a huge domestic market that annually consumes 1,000 million kg or 80% of tea produced in India, the largest tea producer of black tea in the world. The consumption volume of tea in India was approximately 1.2 billion kilograms during the financial year 2022. Consumption of this hot beverage has increased consistently throughout the years.

2. **Scientific tea production**

The quality of the tea production is affected by the micro and the macro climate. By maintaining the required shades to the tea leaves, maintaining the proper drainage system and keeping the soil pH in the acidic range. This will reduce the risk of severe diseases and pest. Preventive measures should be adopted to avoid severe attack of pest and disease. The small scale growers are ill- equipped with scientific management practices,

so they should be well trained with the scientific management practices. To reduce the dependency on chemical fertilizers, we can use In-house composting, green manuring, mulching, biofertilizers etc. Some of the ways to control pest and diseases under Integrated Pest Management (IPM) involves, neem based formulations, predators, pheromone traps, etc. The interval between the spraying and plucking must have a gap of 4-5 days to control the pest and disease to avoid pesticide residues in tea.

3. **Climate smart tea production**

To counteract with the climate change, the industry has to adopt irrigation and drip irrigation, rain water harvesting, drought and flood- resistant planting materials. The efforts should be based on the environment restore by better resource management.

4. **Mechanisation of plucking**

The labourer shortage can be overcome by using the mechanical plucking machines. It is perceived that the method of mechanical plucking reduces one by third dependency on laborers. In order to improve the tea quality, the oxidation in the tea leaves should be controlled and there should be a speedy weighing and transportation of tea leaves to factory.

5. **The cooperative bought tea leaf factories**

There are many structural changes in the tea industry over a period. The new model in the tea industry such as the small tea growers and brought leaf factories lowers the cost of production. The government should promote brought leaf tea factories in the cooperative sector. Especially in non- traditional area, there is an increase in the toe area.

6. **Reducing cost by using renewable energy**

Tea industry should adopt renewable energy on a large scale, to reduce the overall cost of tea production. Power cut is a common problem in India. In general, the tea gardens have plenty of biomass in the vicinity, which can be use in bio gas gasifier to obtain energy which is an addition to the existing technology. The renewable energy is much suitable for the small and the medium scale industries. This energy can be used in the generation of electricity for factory, gardens, charging pumps and sprayers, mechanical plucking machines, social welfare etc.

At the policy level, there has to be concerted dialog and efforts for providing “support and system” to encourage women entrepreneurs and rural women entrepreneurs. Tea Board will have to learn from the startup culture and other support programs to encourage the RWEs to take up tea business in a sustainable manner.

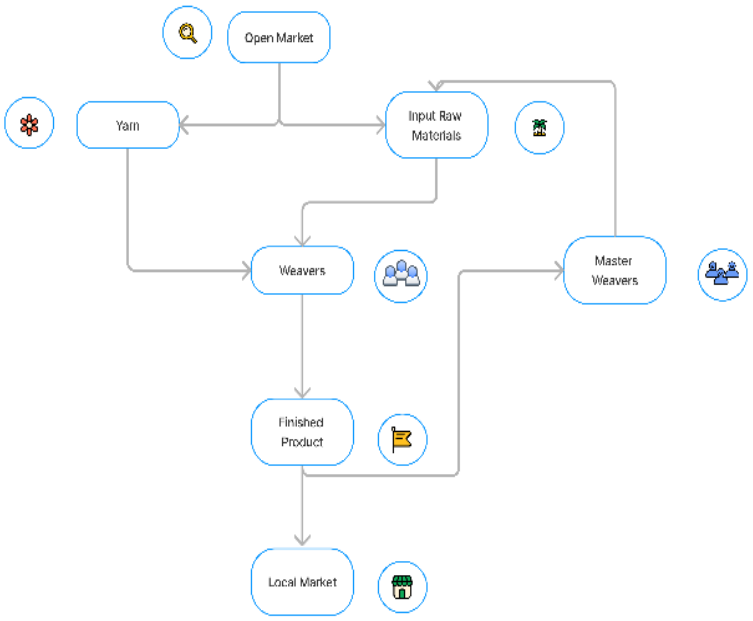
ANNEXURES

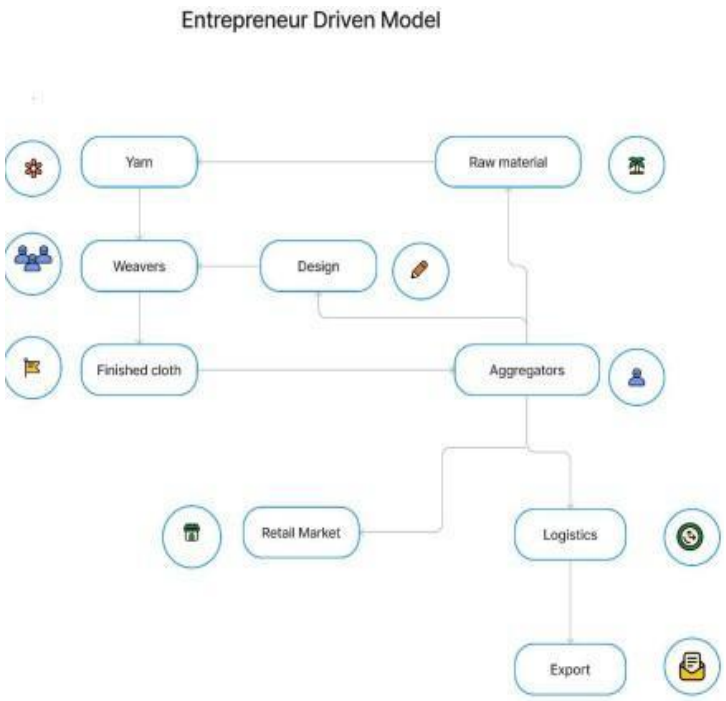
ANNEXURE I

SWOT Analysis of Handloom Sector

Strengths:	Weakness:
1.Large number of weavers Hereditary skills Flexibility in production Small batches of production Reservation of products Great demand of the produce in national and international market	Low level of technology Poor production through Co-operative High cost of production Lack of adequate fund Inadequate raw materials High rate of illiteracy amongst the weavers Lack of sufficient training to adapt with market 8. Lack of proper marketing of produce
Opportunities:	**Threat:**
Demand in rural, urban, and foreign market Favorable Govt. policy Possibility for product diversification Support from society Scope for infusing professionalism and skill	Presence of power loom and mill sector Competition for raw materials Presence of middlemen Changes in consumer taste and fashion Inconsistence in Government programmes and policies

Traditional Driven Model





Gaps associated with Traditional/Livelihood model are as follows:

i) More than 95% of the respondents have stated that old tools and machineries are one of the major challenges in the production process. 67% of them point out about the lack of information regarding new tools and how to operate it as another gap. 98% of them mention the cost of tools as another barrier.

ii) Access to Raw Materials: Government sources for procurement of raw materials are not the most accessible ones, as 98% of the respondents mention that they procure it from other sources such as local market etc. Raw materials required in handloom are basically yarn (cotton, Eri, acrylic), weaving tools etc. Almost all the participants state that there is no support from the government in terms of raw materials. 91% of them mention cost of procurement is one of the gaps. while 87% mentions how there is no available subsidy and incentives available for them.

iii) Labeling and packaging: Moreover, there lies lack of support in labeling and packaging in the process of production, as 61% of the women consider the quality packaging problem exists because of difficulty to access service providers. Whereas 35% of them consider it to be a costly process. Most of the respondents mention that they face business skills to run the business. 77% mentioned operational skills. 77% of them state that they lack communication skills. Whereas 64% lack management skills.

iv) Access to credit: All the respondents of the primary survey acquire bank accounts and handle the bank accounts by themselves. However, none have a bank account registered in the name of their business. 81% of the participants state that they lack information when it comes to access to credit. Where 69% of them say that there is lack of funding support as well as the interest rate seems to be high for them and there is no proper subsidy for them. 31% of them find access to credit as a complex process to understand.

Another major problem related to finance has been highlighted by Shri Ameet Barua, entrepreneur/trainer involved in the handloom sector.

According to him, "*Unlike other industries where machinery is themajor component of investment, handloom iscloser to a retail outlet model. Meaning the major chunk of finance is for stock – cocoons,yarns, finished stock but for this instead of providing a term loan which has a lower interest rate, working capital loan at a higherrate of interest is given.*" He illustrated a case, which is as follows: A rural artisan has 2 looms at their home. He/she reels their own silk purchasing the cocoons from the market. He would need 1,60,000 cocoons in hand to reel the required yarn, would need about 20 kg of reeled yarn on both the looms which will be ready for weaving and another 20 kg of yarn for the weft. The resultant production time to make it into finished textile will be about 2months. Simultaneously he/she will need a further stock of cocoon and yarns to be processed so that between productions there is no lag while the first batch of production is being sold at the market. This can be better explained by the following example:
If we take Mulberry,

Cocoons = 25 kgs @ 3500 = 87500/-
Warp yarn in loom = 20kg @ 7500 = 300,000/-
Weft yarn =20 kg @ 7500 = 300,00
Textile stock = 600 meters x 2000 = 1200000/-

While machinery cost will constitute roughly about 200,000/- maximum working capital requirement will be roughly 20 Lakhs which is
10 times the machinery cost. Thus, the problem is, due to the high requirement of working capital. The business model for the handloom sector is very similar to that of retail business where stock is the major component. It is very similar to most other core rural enterprises like agriculture, vermi compost, poultry, fisheries etc. This issomething that both the government and financial institution needs to factor in to make the business sustainable.

v) Market: 90% of them said there is lack of market information. 87% of the women identified unavailability of a proper market (local and urban) as one of the market gaps. 56% of them said they cannot reach out to new markets, while 72% of them said there is lack of online market.

vi) Poor state of skills: Data from secondary sources reveal that there are many areas in terms of skills where rural women handloom workers fail to comply (see table 4)

Collective Driven Model Case Study on Grameen Silk Producer Company Limited (GSPCL):

About GSPCL:

Grameen Silk Producer Company Limited is a non-government company, incorporated on 02 Mar, 2012. The registration number is 10958. It is located in Chaygaon Block of Kamrup (Rural) district of Assam. It's a private unlisted company and is classified as a 'company limited by shares' by the Ministry of Corporate Affairs, Government of India. The company is majorly involved in manufacturing of Eri since the last 12 years. Initially, in the year 2002 the firm started as a project under Tata Trust. The name of the project was 'Golden Weavers Project'. Therein, around 5000 spinners and weavers were involved in the silk manufacturing process. With the support from Grameen Sahara, a development facilitating organisation based out of Chaygaon, in the year 2012, the project got registered as a non-profit company under the Ministry of Social Justice and Empowerment. Currently, the company has 851 shareholders. The shared capital of the company as per January 2023 stands at Rs. 37,65,000 Lakhs.

Growth of the FPO:

Initially, Grameen Silk Producer Company started off with producing only Eri yarn. However, after 2012, a Delhi based company supported them with design and market. Now they have tie up with them as well as with local traders. Gradually they shifted to weaving and started producing products such as sador mekhela, gamusa, jackets, etc. Mostly they opt for natural dying process. Buyers also provide their own design. Now, they expertise in producing Eri-Yarn, Mekhela sador, Thaan (plain cloth), Eri shawl, Nehru Jackets, etc.

Village Centers of GSPCL:
There are a total of 22 centers in Chaygaon block. A

Profile of the weavers and spinners:
People at the upper end (Chief Executive Officer, Centre Manager), are men. The rest of the employees and workers are women. In total there are 300 active workers (180 spinners, 120 weavers); all female. Most of them are part-time workers contributing 2-3 hours a day. Only 8 of the workers work as full time weavers at GSPCL.

A centre manager overseas the functioning of the centre. He/she also facilitates communication between the spinners and the FPO. 1-3 villages comprise one centre. An average of 120 spinners works at each center.

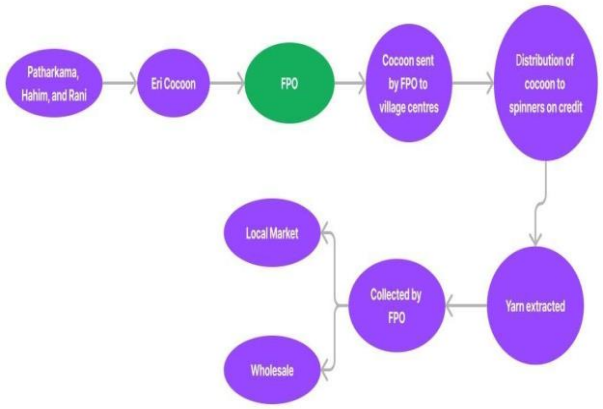
Profile of the weavers and spinners:
People at the upper end (Chief Executive Officer, Centre Manager), are men. The rest of the employees and workers are women. In total there are 300 active workers (180 spinners, 120 weavers); all female. Most of them are part-time workers contributing 2-3 hours a day. Only 8 of the workers work as full time weavers at GSPCL.

Nature of Workers:

Demand and Supply:
There is tremendous demand for eri products: saree, stole, gamusa, mekhela sador. Ahimsa silk concept; allows silk to be manufactured without harm to the beings that created it. Bhutan and Nepal consume a huge number of Eri Silk products for religious purpose. But only 10% of the demand is being met.

Mostly, silk products are sold outside the state. The demand of cotton products at the local market is relatively higher than silk products.

Functioning of the FPO



Eri Cocoon is procured from Patharkama, Hahim, and Rani. They aggregate the cocoon at their FPO and later, distribute it to the village centers. The center manager distributes the cocoon to the women spinners associated with them. Spinners take the cocoon on basis of credit from the FPO. These are done on basis of the time that a spinner is willing to give in a month. On an average, it takes 14 days to extract one kilogram of yarn. On completion of this term, FPO collects it from the spinners by deducting the credit amount. Rest of the money is given to the spinners as their income. Later, the FPO sells the yarn to local markets, wholesale market and as and when demand arises.

Cost of procurement:
Note: One single packet of Eri cocoon weighs 250 grams. Eri insects feed on the leaves of Erapaat, (most healthy), keseru, simolu alu (tapioca).

Rs. 950 per kilogram, (June-October; best quality of cocoons).
Rs. 800 per kilogram, (November-May)
Rs, 95,000 per quintal (average).

Technology Used:
Paddle cum Motorized Machine is used by the spinners which is provided by Central Silk Board to the FPO at a subsidized rate. The FPO later distributes it to the female spinners at their centers. Till now, 800 machines have been provided in the 22 villages. Moreover, Warping drums and Jacquard looms are also utilized in the FPO.

Income of weavers/spinners:
Income of Rs. 25,000 annually: part time workers.
Income of Rs. 36,000 annually: full-time workers.

Turnover and net Profit of FPO for the last 3 years:

Year	*Turnover*	*Profit*
2019-2020	*70,97,000*	*70,000*
2020-2021	*1,24,00,000*	*7,47,000*
2021-2022	*86,00,000*	*1,52,000*

Quality and Pricing of Yarn:

Quality	*Weight*	*Price (In Rupees)*
A Grade	*1 Kilogram*	*1200*
B Grade	*1 Kilogram*	*800*
C Grade	*1 Kilogram*	*700*

Market:

Type of market	*Areas*
Local Market	*Bijoynagar*
Outside region	*Bihar, Delhi, Bengaluru*
Other	*Own showroom*

Challenges in the FPO:

Technology:
Need for more innovation Spinning machine (RSTRI) Paddle cum Motorized Machine.
Lack of looms for weaving (only 22 jacquard looms).
Only 8 looms currently at the FPO: products are sold by the FPO directly.
Lack of warping drums.
Designing takes time.

Infrastructure:
Lack of infrastructure for eri cocoon rearers as the women belong to poor households. (in-house rearing of eri).

Wastage:
Moisture loss leads to decrease in weight; borne by FPO. For instance, 1 quintal of yarn has loss of 300-500 grams of loss due to release of moisture. This is particularly true in case of Bihar. 20% loss due to release of moisture.

Other challenges: spinning and weaving are directly
related to agriculture. So as that during sowing season which falls during June-July and harvesting season December-January leads to lowest participation of workers in spinning and weaving activity.

Potential of the women workers in Chaygaon:
Women are ready to take up weaving and spinning as a full-time work, provided they are given the training, awareness, and motivation.
Many women work as factory workers due to lack of other opportunities. They have the skill for weaving and spinning.

Out of 20, at least 5 women will take up spinning and weaving as full-time work. There is a huge potential in women for cocoon rearing as well.

Support availed:
Inter cropping method to encourage Eri rearing; Training provided by Grameen Sahara.
Jacquard Looms from Central Silk Board.

Recommendations by the FPO:
Need technological intervention to increase productivity. This will lead to increase in income.
Awareness and exposure that women can be successful.
Need full time workers.

Story of Meenakshi Das

Meenakshi Das, a 40-year-old spinner of village Takaradia of Kamrup (rural) district of Assam. She has been associated with the GSPCL and has been engaged in the task of weaving since 2002. She was initially motivated by Grameen Sahara, Chaygaon to take up the task of spinning. She spins for an average of 3 hours a day. She also supports the ASRLM in conducting surveys at her village as an additional source of income. She runs her center which was given to her by the FPO. Currently, due to harvesting season, only 15-20 women are engaged in spinning process.

She procures eri cocoon from the GSPCL at a rate of Rs. 950 per kilogram. It takes her a month to produce 1 kilogram of yarn. 1kilogram cocoon gives 800 grams of yarn. 20% goes as wastage. She later sells the yarn at GSPCL. Her monthly profit stands at Rs. 3000.

She avails the local banking facility to save her income. She also has a Recurring Deposit which she operates herself.

Das mentions that depreciation of technology, especially spinning machines are a concern. A solar powered spinning machine was provided by SELCO-India. However, it has its own demerits. This indicates that improvement needs to be cone in case of working capital.

Another woman, Aroti Das, age 65 who works at the centre of Meenakshi, mentions about similar challenges. She adds that servicing of machines and technology upgradation can enhance productivity. Mrs Aroti also mentions that lack of cocoon is another big challenge for the spinners. This is very much in line with the challenges of supply put forward by the GSPCL.

Entrepreneurial Driven Model Case Study: Story of Mary Devi

Mrs. Mary Devi is a successful women entrepreneur from Assam and have been conferred with 'Best Entrepreneur in North East' award by the Finance Minister of India Smt. Nirmala Sitharaman. Beginning in a small village in Dhemaji,this Mising woman has touched heights which is an encouraging and motivating factor for rural women and rural people in general. Today, she is known for her work and business model and for providing employment to hundreds of rural women in Assam. She has recently been a member of the prestigious ASSOCHAM (The Associated Chambers Commerce and Industry of India)

The formative years:

It started in the year 2007. She, along with her husband, decided to open an online portal where she could sell her products. It was the first online shopping portal in Northeast India. Only handloom products were displayed there. She used to procure images of the finished products from local vendors, expo, and even wholesale shops. Demand for products started rising. However, with rising demand, there was a problem. By the time she went to collect products from the vendors, or shops, online by procuring it for vendors/shops etc.Learning from this she came up with the idea of producing and selling her own products. She decided to begin her production with a group of weavers in her home district, i.e Dhemaji. As demand was high,she sold her products also through social media platforms such as Facebook and WhatsApp. The encouraging sales led her to open a retail shop (boutique) in Guwahati. She also wanted to increase production and productivity. She therefore decided to have a power loom unit at Morigaon. Initially, she invested a sum of Rs 70000. And subsequently applied for a loan of Rs 5.0 lakhs from NEDfi. She was sanctioned and disbursed a loan of Rs 5 lakh within one month in the year 2017. And so, within one month she had the showroom ArtexD opened in Ganeshguri (a prime locality) in Guwahati with two power loom units, initially. She currently has 15 power loom units at Morigaon with 300 sq.ft area. A few workers are also provided with accommodation facilities in the campus.

The demand for her products is very high and she hardly has any stock of finished products. She vigorously uses online platforms like Facebook, WhatsApp and IndiaMart are her major marketing channels. She partially procures the raw materials from local vendors and villages from the district of Dhemaji.

During the years, 2017-2020, her average monthly income stood up to 6 lakhs. Till date, her turnover for the last 3 years is slightly more than 2 Crores.

Expansion stage:
In order to expand; in 2020 she approached NEDFi for another loan of 10 lakhs. Her Laon was approved within a month as her CIBIL score was very good. In the same year, UCO Bank approached her and offered her a CC loan amount of 10 lakhs in exchange for a bank account in their bank. However, she did not take the loan, but she opened a business account in UCO Bank.

Size of the unit:
Its carpet area is 3000 sq. ft. and has 15 power looms functioning. A few workers are provided with accommodation facility in the campus.Currently, the Morigaon unit has an employee of 20 people out of which 17 are female and 3 male workers. It includes allied workers as well. Employees are not paid on a salary basis. It is per finished product produced and they earn on an average of Rs 10000 a month on a regular basis. One mekhela sador takes four to five daysin a month, for which they get Rs 2000 per finished product. One women weaver brought a scooty in EMI and all their children go to schools, both in government and private sector.

She has maintained the handloom status for the weavers in her home district i.e in a village called Mikirgaon in Dhemaji district of Assam. These weavers are paid in cash. They use traditional shuttle looms and weave at home. They were initially provided with the raw materials and get their payment after finishing the required amount of final product. It is Rs 2000-Rs 3000 per mekhela sador, depending upon the fabric used. Currently, she does not provide with the raw materials to the weavers. They procure them on their own and sell it to Mrs Devi on a slightly higher price. This provides the weavers with some additional income.

Marketing:
On an average, 10 mekhela sador is produced in a month along with other products. It depends on the amount of demand but in the last three years, 2700 sets of mekhela sador have been produced. Other items that are currently produced are mising gamusa, fulam gamusa, kurta, mufflers, shawls, scarfs and traditional jewellery for both men and women. Traditional clothes of all the major tribes are being produced such as Dokhona, Miri Kapur, Mising Dresses and so on. Pure Nuni, Nuni by Cotton, Mulberry Silk, Paat, Muga, Pure Tusar and Pure Cotton.

Future Plan
She is planning to adopt the village of weavers in Mikirgaon, Dhemaji where there is a potential of about 200 women weavers alone. She has already begun the process where a Special Purpose Vehicle (SPV) has been established and functions as a cooperative society. It is a registered society under Societies Registration Act, 1860. She purchased a plot of land, one bigha in the village at an amount of Rs 3 lakhs to set up her second industry on similar lines of Morigaon. 50 looms will be set up along with a few traditional shuttle looms. However, she plans to set up additional infrastructure which will have a vendor's meeting room and a display showroom to put up her sample of work. She also plans for a small museum within the premises for tourists who keep interest in traditional weaving and encourage the idea of handloom. She will approach NEDFi for another loan in this regard. Additionally, she plans to include garments for male and children. She has been targeting the national markets (as she calls it) for this purpose. Also she plans to produce wall hangings, curtains and room decors by giving them a handloom and traditional touch. She also plans to produce saree in her Dhemaji unit on the lines of Tantuja, a handloom business unit based out of West Bengal. Marketing is a tough challenge as marketplace for handloom are scarce and there is a need for more platforms where traditional handloom products can be sold. Primarily, she has been selling her products through social media platforms, which is Facebook and WhatsApp. Along with this, her own website called www.artexdirect.com has played a vital role. She has often collaborated with fashion shows where she provides them with the traditional clothes in return for an advertisement, display and promotion at the events concerned. Recently, IndiaMart, another online shopping site, has come forward and showed interest in doing business with them. Apart from this, Amazon and Flipkart are their constant online marketing partners. Expo, handloom melas and any other opportunities are being utilized by her to promote her products. Even local news channels such as D-News promote
her showroom.

As she sells her products through online giants like Amazon and Flipkart, she gets orders from throughout the country as well from countries such as Singapore, Abu Dhabi, China and the United States. There are tourists from all over the country who visit her boutique/showroom and provide positive feedback. This acts as a constant motivation for her. Although the pandemic has caused some losses she has managed to cope up with it. She says, "Hosake kobo gole, khoti hoise kintu bakir tulonat kom hoise", which means to be honest, there was loss but relatively less compared to others. Apart from a few orders, most of the demands were met online and delivered after the lockdown was eased.

Challenges for running the business As a woman, she was not encouraged initially. Later, with the support of her husband and his help she came forward and set up the startup. As far as her operational challenges are concerned,she highlights a few:

i) Education of women weavers: Since most of them have received little formal education, they tend to misunderstand the demands and expectations of their employer. Their idea of measurements are traditional, which is 'by hand'. At times, they weave longer or shorter as they are not aware about standard measurements in meters, feet or inches. This is one challenge that she has been facing since the establishment of their units. However, they have excellent weaving skills which she highly values

ii) Constraint of time: Weavers in the villages tend to work based on their mood. This leads to delay in delivery of final products in time and receive cancellation of orders.

iii) Lack of motivation among weavers: Once they receive the payments, they are reluctant to return to work. Only when they exhaust their previous wage, they return to work.

iv) Procurement of raw materials: This becomes a concern as she does not get content quality of yarn supplied by the vendors. She plans to produce her own raw materials at her unit.

v) At times, to meet customer demand, she procures finished products from local vendors.
vi) Raw materials are generally procured from vendors in fancy bazar. At times, weavers themselves get them from their home where they rear mulberry leaves along with the insect.

Interventions/Schemes:

The Indian government has introduced various schemes and made interventions to preserve therich heritage of the Indian handloom industry and promote its culture. A brief analysis of the some of the major programmes introduced over the years by the government is provided below.It may be noted that the various initiatives taken by the government are directed towards areas such as cluster development, availability of credit, promotion of exports, supporting environmental compliances, provisions of social welfare schemes for weavers, infrastructure development, availability of raw materials, brand building, marketing and R&D

The following table provides an update on the Government of India's development programs / schemes and their impact (period of 2017-18, upto December 2017)

Scheme	Objective	Progress/Outlay/Funds Released	Progress/Beneficiaries Impacted
Weaver Mudra Scheme	ConcessionalCredit	₹ 271.62 crores *	52059 weavers*
Block Level Cluster projects	Financial Assistance	₹ 22.87 crores**	43 block clusters sanctioned in the country**
Handloom Marketing Assistance	Marketing		126 domestic marketing events sanctioned ***
E-Commerce	Marketing	21 companies involved***	₹ 16.77 crores of sales achieved***
Indian HandloomBrand	Marketing	1007 registrations issued***	₹ 296.69 crores of sales achieved***
Handloom Mark	Marketing	9.85 crore labels sold and 19663 registrations issued***	
Yarn Supply Scheme	Raw Material Availability	₹ 162.07 crores**	
Export Promotion	Enhancing exports		Participation in 18 international events during 2016-17****
Geographical Indication of goods	Legal protection and prevention of unauthorised use		57 handloom products registered under GI*
Handloom Weavers Welfare Scheme	Welfare Scheme		5.32 lakh weavers enrolled under MGBBY 144294 weavers enrolled under HIC****
Comprehensive Handloom Cluster Dev Scheme	Cluster Development	Rs 28.5 Crores	

Source: TARI Research Team 2018

National Handloom Development Programme (NHDP)

The objective of the programme is holistic and integrated development of handloom industry and welfare of weavers. The programme supports weavers, both within and outside the cooperative fold including Self Help Groups, NGOs etc. towards credit design inputs, technology upgradation,marketing support and skill upgradation. The major components of the scheme are as follows:-

a) Concessional Credit for handloom sector through the Weaver Mudra Scheme

The scheme was launched in September 2015 with the aim to provide loans at concessional interest rate of 6% for a period of three years. Also, money margin assistance to a maximumof ₹ 10000 per weaver and credit guarantee for a period of three years is provided by the scheme. The scheme has benefitted over 52059 weavers and a loan of ₹ 271.62 crores was sanctioned under the name of Weaver Mudra Scheme.

b) Block level cluster projects:

A cluster in the block is eligible to avail financial assistance up to ₹ 2.00 crores for Common Facility Centre (CFC) including Common Service Centre (CSC), engagement of textile designercum marketing initiative, construction of common and individual work shed, appointment of Cluster Development Executive (CDE), technological and skill upgradation. Also financial assistance up to ₹ 50.00 lakh is available for setting up of dye house at district level. 43 block clusters have been sanctioned in the following states during the year 2017-18

c) Marketing Assistance: The aim of the scheme is to create an environment conducive to marketing of handloom products. Eligible agencies include state handloom corporations, apex cooperative societies, primary handloom weaver's cooperative societies and national level handloom organizations whose annual turnover does not exceed ₹ 30 lakh. A sum of ₹ 40.96 crores wasreleased during the financial year 2016-17. Some of the initiatives as a part of this assistance are:

Handloom Marketing Assistance: The objective is to provide direct marketing platforms to weavers and handloom organizations to sell their products to the consumers. During the year 2017-18, 126 domestic marketing events have been sanctioned upto December 2017.

d) E-commerce: In order to provide direct marketing platform to the weavers / artisans, 21 leading ecommerce companies have been engaged for online marketing of handloom products. The sale of ₹ 16.77 crores has been achieved through e-marketing uptoDecember 2017.

e) Promotion of Indian Handloom Brand (IHB): The brand was launched in 2015 to create a niche market for premium handloom products. It is given only to premium and authentic handloom products. A total of 1007 registrations have been issued under 113 products upto December 2017 and the sale of the IHB products have been ₹296.69 crores.Also, measures such as brand awareness, brand building, campaign, open door policy fore-marketing, partnership with retail stores on Pan India basis and launch of special product lines by major retailers are being taken to promote the IHB.

f) Handloom Mark: The Textile Ministry was entrusted with the responsibility of issuing the Handloom Mark as a guarantee for genuine handwoven product. The initiative entailsseveral benefits to the sector and support its development by promoting handloom products in domestic as well as international market, providing assurance to the consumers about genuineness of the product, improving international marketing linkages, strengthening supply chain, improving price realization and earnings of the handloom weavers. A total number of 9.85 crore of labels have been sold and 19663 number of registrations have been issued upto September 2017.

Yarn Supply Scheme:

The scheme is implemented by Government of India through National Handloom Development Corporation with an objective to make all types of yarn available at the Mill Gate Price to the weavers. As per the scheme freight is reimbursed and 2% depot operating charges are given to depot operating agencies. Further 10% price subsidy on hank yarn is also provided under which 10% subsidy is applicable on cotton, domestic silk and woollen yarn with quantity limitation. NHDC has opened 10 yarn depots cum warehouses so as to ensure timely supplies to the users on cash basis, besides taking care of individual weavers who need yarn in small quantity. The amount of fund released during the period 2017-18 amount to be ₹162.07 crores.

Handloom Weavers Welfare Scheme

This scheme is an amalgamation of two schemes which are described below:

Mahatma Gandhi Bunkar Bima Yojna (MGBBY): The scheme is implemented through LICof India with an objective to provide insurance cover to the handloom weavers both incase of natural, accidental death and also on the occasion of total or partial disabilities. The enrolment under the MGBBY was 5.32 lakh during 2016-17 and a sum of ₹10.99crores was paid as scholarship covering 1.66 lakh beneficiaries.

Health Insurance Scheme (HIS): The scheme covers the weavers as well their families including the ancillary workers. Pre-existing diseases as well as new diseases are coveredand a sizeable portion is allotted for outdoor patients (OPD).

Structure courses provided by the research and training institutes of CSB targeted to train 130 in 2019-20 and successfully trained 121 persons. in the year 2020-21 it targeted to train 150 people and were successful in training 109. For the year 2022-23 it has targeted to train 250 persons, to which 31 persons have been successfully trained till September 2022. Farmers Skill Training, Technology Orientation Programmes, Capsule & Adhoc Courses and Exposure Visit and training in seed sector aimed to provide training to 10025 persons in the year 2019-2020 and achieved to train 8100. For the year 2020-2021 the target was 6865 and it trained 6454. For 2021-2022, the target was 6570 and it achieved 6196. Whereas the target to train in the year 2022-2023 is 6538, out which they have successfully trained 1860 upto September,2022. Other training programmes provided by the central silk board has been able to train more people than the target. Under Skill Training and Enterprise Development Programmes, 717 in 2019-20, 780 in 2020-21, and 953 in 2021-22 were trained. Upto September 2022, 391 people have been trained. (see table 6 and 7)

For the year 2020-21, total number members enrolled were 261, for 2021-22, 360 were enrolled and upto the 2nd quarter of 2022 222 people have been enrolled. Total number of silk mark labels sold in the year 2020-21 were 24.86, in the year 2021-22 it was 30.42, for the 2022-2023 upto the 2nd quarter 20.67 silk marks have been sold. Awareness programmes including exhibitions, fairs, workshop, road shows for the year 2020-21 were 324, for the year 2021-22 it was 497 and upto September 2022, it is 307.

Handloom Export Promotion Scheme

The objective of the handloom export promotion scheme is to assist the handloom co-operative societies, corporations/apex and handloom exporters to participate in international events,buyer-seller meets and to ensure availability of the latest designs, trends, colour forecasts. The assistance is given for export projects, participation in international fairs & exhibitions and setting up of design studios. During 2016-17, various handloom agencies participated in 18 international exhibitions with the assistance under NHDP.

The Geographical Indication of Goods

The Geographical Indication (GI) of Goods provides legal protection and prevents unauthorized use of these by others. Financial assistance has been provided to various states/agencies for registration under GI. So far, 57 handloom products have been registered under GI act.

E-Dhaga App

In order to enhance the effectiveness of the yarn supply, the National Handloom Development Corporation (NHDC) launched Enterprise Resource Planning (ERP) system and e-Dhaga mobile app in the year 2016. The mobile app enables transparency by allowing the weavers to place their orders directly on the app and accordingly make online payments for the same. The status of theshipments is also available through the app and the app is available in ten languages. The app is helpful to the weavers as they can now access information anytime and anywhere. They can alsoview yarn stock in NHDC's depots, warehouses and CFCs, product catalogue and the supplier list. Thus, the app is important to address individual concerns of weavers such as availability of raw material, delays in supplies and ensuring stocks in depots.

Comprehensive Handloom Cluster Development Scheme (CHCDS)

The scheme was introduced to develop mega clusters located in clearly identifiable geographic locations and which specialize in specific product (s). The nature and level of assistance to each cluster is need based and includes the components that are necessary for meeting the objectives, such as, technology upgradation, product diversification, raw material bank, credit, market development, forward and backward linkages, social security, and physical infrastructure, among others.

The broad objectives of the scheme are as follows:-

- To empower handloom weavers and build their capacity to enhance competitiveness of their products in domestic as well as global market in a sustainable and reliant manner
- To facilitate collectivization of handloom weavers and service providers for procurement, production, marketing and other support activities to promote sustainable growth and diversification
- To give proper thrust to design development through creation of design studio and involvement of professional designers
- To involve professional market chains and marketers to identify the items of production to meet the changing demands of the market
- To provide requisite support/linkages in terms of adequate care and technical infrastructure, technology, product diversification, design development, raw material banks, marketing & promotion, credit, social security and other components that are vital for sustainability of weavers engaged in handloom sector
- To provide for development of handloom cluster in an inclusive and holistic manner in an environment of empowered and participative decision making
- To encourage convergence
- schematic assistance and support services from various schemes and programmes of various government and other agencies in the cluster to optimize resource utilization for betterment of the livelihood, quality of life of handloom weavers and increase income level of the weavers
- Public Private Partnership (PPP) model in the form of collaboration between the Government, beneficiary weavers & their group, financially creditworthy & commercially linked marketing enterprises and the financial Institutions.

Other schemes and initiatives

Other welfare measure in the interest of the weaving community include provision of education facilities to the children of handloom weavers wherein MoU was signed with IGNOU and National Institute of Open Schooling (NIOS) to provide customized educational service to the weaver for which ministry provides 75% of the fee in case of SC, ST, BPL and Women weaver families. Also, efforts have been to increase the outreach to the weavers by setting up Community Service Centres (CSC) where there is timely delivery of essentially utilities, social welfare schemes, healthcare, financial, education services, exhibition and marketing support to the weavers.

Besides other marketing initiatives, a Handloom Haat has been set up at Janpath, New Delhi to provide permanent marketing infrastructure support to the handloom agencies of various states. Internet connectivity at the Common Facility Centres, linkages with tourism, awards and recognition for the craft, introduction of the National Handloom Day, organization of 'Hunar Haat' in various states, opening of crafts museum and trade facilitation are some of the other measures taken by the government to support the weaving community and other stakeholders who are a part of the industry.

Government of Assam launched 'Swarnirbhar Naari', which literally means "Self-reliant Woman" an initiative of the handloom and textiles department, which aims to empower the indigenous weavers of the state and to provide financial support to the weavers' families. Under the scheme, the government has decided tom procure handloom items directly from the indigenous weavers without involving any middlemen through a specially developed 'Swarnirbhar Naari' web portal. Sualkuchi Institution of fashion Technology was established to provide in-house training to weavers and unemployed youth across the state.

The central government RSBY Scheme for Handloom Weaver Family as welfare scheme. Government of West Bengal provides Mahatma Gandhi Bunkar Bima Yojana and Old age Pension to weavers as welfare schemes.

Tables

Table 1: Production Quantity and Production Value of Eri Products in span of 6 months *(Survey period : 16th November2019 to 10th March 2020. Values are based on responses of sample of weavers interviewed)*

	Eri Fabric (Yardage) Qty in Sq.Mtr Value in Rs.	Eri Sawl (Men) Qty in Number Value in Rs.	Eri Sawl (women) Qty in Number Value in Rs.	Eri Mekhela Qty in Number Value in Rs.	Eri Chadar Qty in Number Value in Rs.	Eri Mekhela chadar Qty in Number Value in Rs.
Jorhat	720 Sq Mtr Rs.4,77,438/- *(By 64 weavers , i.e 25.30% weavers surveyed in Jorhat district)*	420 No Rs.19,24,600/- *(By 219 weavers , i.e 86.56% weavers surveyed in Jorhat district)*	1300 No Rs.28,18,249/- *(By 219 weavers , i.e 86.56% weavers surveyed in Jorhat district)*	-	-	-
Kamrup	16,553.66 Sq Mtr Rs.1,73,55,500/- *(By 158 weavers , i.e 60.77% weavers surveyed in Kamrup district)*	7,816 No Rs.1,54,58,000/- *(By 197 weavers , i.e 75.77% weavers surveyed in Kamrup district)*	1911 No Rs.28,78,000/- *(By 108 weavers , i.e 41.54% weavers surveyed in Kamrup district)*	1,814 No Rs.37,02,000/- *(By 161 weavers , i.e 61.92% weavers surveyed in Kamrup district)*	2000 No 48,27,000/- *(By 164 weavers , i.e 63.08% weavers surveyed in Kamrup district)*	1,794 No Rs.78,22,000/- *(By 121 weavers , i.e 46.54% weavers surveyed in Kamrup district)*
Majuli	*(By 22 weavers , i.e 26.19 % weavers surveyed in Majuli district)*	*(By 5 weavers , i.e 5.95 % weavers surveyed in Majuli district)*	*(By 62 weavers , i.e 73.81 % weavers surveyed in Majuli district)*	*(By 20 weavers , i.e 23.81 % weavers surveyed in Majuli district)*	*(By 64 weavers , i.e 76.19 % weavers surveyed in Majuli district)*	*(By 64 weavers , i.e 76.19 % weavers surveyed in Majuli district)*
Lakhimpur	*(By 18 weavers , i.e 8.29 % weavers surveyed in Lakhimpur district)*	*(By 28 weavers , i.e 12.90 % weavers surveyed in Lakhimpur district)*	*(By 98 weavers , i.e 45.16 % weavers surveyed in Lakhimpur district)*	*(By 9 weavers , i.e 4.15 % weavers surveyed in Lakhimpur district)*	*(By 126 weavers , i.e 58.06 % weavers surveyed in Lakhimpur district)*	*(By 122 weavers , i.e 56.22 % weavers surveyed in Lakhimpur district)*
Sivasagar	1,328 No Rs.31,18,199/- (By 78 weavers , i.e 43.33 % weavers surveyed in Sivasagar district)	1,328 No Rs.31,18,199/- (By 78 weavers , i.e 43.33 % weavers surveyed in Sivasagar district)	*1,328 No Rs.31,18,199/- (By 78 weavers , i.e 43.33 % weavers surveyed in Sivasagar district)*			

Sonitpur		*395 No Rs.13,47,000/- (By 35 weavers , i.e 94.59% weavers surveyed in Sonitpur district)*	*394 No Rs.12,09,000/- (By 35 weavers , i.e 94.59% weavers surveyed in Sonitpur district)*	*46 No Rs.1,77,000/- (By 8 weavers , i.e 21.62% weavers surveyed in Sonitpur district)*		

Source: Diagnostic Study on Weaver's need in respect ofEri and Muga Silk, IIT Guwhati 2019

Table 2: Production Quantity and Production Value of Muga Products in span of 6 months

	Muga Fabric (Yardage) Qty in Sq.Mtr Value in Rs.	Muga Mekhela Qty in Number Value in Rs.	Muga Riha/ Chadar Qty in Number Value in Rs.	Muga Mekhela-chadar Qty in Number Value in Rs.
Jorhat	692 Sq Mtr Rs.34,15,500/- *(By 37 weavers , i.e 3.85% weavers surveyed in Jorhat district)*	266 No Rs.14,29,000/- *(By 59 weavers , i.e 23.32% weavers surveyed in Jorhat district)*	188 No 14,36,000/- *(By 52 weavers , i.e 20.55% weavers surveyed in Jorhat district)*	155 No Rs.22,93,000/- *(By 34 weavers , i.e 13.44% weavers surveyed in Jorhat district)*
Kamrup	1,524 Sqr Mtr Rs.77,82,000/- *(By 19 weavers , i.e 7.3 % weavers surveyed in Kamrup district)*	4,045 No Rs.2,86,30,000/- *(By 55 weavers , i.e 21.15 % weavers surveyed in Kamrup district)*	-	4,045 No Rs.10,02,04,995/- *(By 55 weavers , i.e 21.15 % weavers surveyed in Kamrup district)*
Majuli	230 Sq Mtr Rs.11,33,900/- *(By 30 weavers , i.e 35.71 % weavers surveyed in Majuli district)*	161 No Rs. 7,95,000/- *(By 30 weavers , i.e 35.71 % weavers surveyed in Majuli district)*	Chadar: 56 No 3,15,500/- Riha: 138 No Rs.6,90,000/- (Chadar by 14 weavers , i.e 16.67 % weavers and Riha by 29 weavers , i.e 34.52 % weavers surveyed in Majuli district)	64 No Rs.9,13,000/- (By 18 weavers , i.e 21.43 % weavers surveyed in Majuli district)
Lakhimpur	310 Sq Mtr Rs.15,50,000/- *(By 20 weavers , i.e 9.22 % weavers surveyed in Lakhimpur district)*	2,310 No Rs. 1,06,50,500/- *(By 182 weavers , i.e 83.87 % weavers surveyed in Lakhimpur district)*	Chadar: 1,309 No Rs.69,50,500/- Riha: 609 No Rs.29,52,500/- *(Chadar by 167 weavers , i.e 76.96 % weavers, and Riha by 84 weavers , i.e 38.71 %*	571 No Rs. 81,73,000/- Gamocha: 435 No Rs.11,04,500/- *(Mekhela-chadar by 84 weavers , i.e 38.71 % weavers and Gamocha by 33 weavers , i.e 15.21 % weavers*

Sivasagar	320 Sq Mtr Rs.16,03,200/- *(By 18 weavers , i.e 10% weavers surveyedin Sivasagar district)*	702 Nos Rs.32,69,000/- *(By 78 weavers , i.e 43.33% weavers surveyed in Sivasagar district)*	Riha: 702 Nos Rs.34,11,720/- *(By 78 weavers , i.e 43.33% weavers surveyed in Sivasagar district)*	85 No Rs.16,41,500/- *(By 9 weavers , i.e 5 % weavers surveyed in Sivasagar district)*
Charaideu	371 Sq Mtr Rs.22,62,600/- *(By 43 weavers , i.e 40.19 % weavers surveyed in Charaideu district)*	774 Nos Rs.36,06,840/- *(By 86 weavers , i.e 80.37 % weavers surveyed in Charaideu district)*	Riha: 1,043 Nos Rs.59,14,600 *(By 86 weavers , i.e 80.37 % weavers surveyed in Charaideu district)*	22 No Rs.5,35,000/- *(By 10 weavers , i.e 9.35 % weavers surveyed in Charaideu district)*
Biswanath	-	100 Nos Rs.4,65,000/- *(By 11 weavers , i.e 7.64 % weavers surveyed in Biswanath district)*	-	-

Source: Diagnostic Study on Weaver's need in respect ofEri and Muga Silk,IIT Guwhati 2019

Table 3: Table below shows availability and requirement of looms and equipment with percentage of weavers surveyed in the following districts:

District	Traditional Loom		Fly Shuttle Frame Loom		Semi Automatic Loom		Jacquard machine	
	Traditional Loom Availability	Traditional Loom Requirement	Fly Shuttle Frame Loom Availability	Fly Shuttle Frame Loom Requirement	Semi Automatic Loom Availability	Semi Automatic Loom Requirement	Jacquard Availability	Jacquard Requirement
Jorhat	94.8%	0	9.4%	88.1%	0	53.7%	0	17.00%
Kamrup	77.3%	62.3%	21.9%	30.7%	0	28.4%	1.92%	94.23%
Majuli	90.4%	10.7%	19%	95.2%	0	0	3.57%	100%
Lakhimpur	95.3%	5.9%	21.6%	92.1%	0	2.7%	6.45%	99.08%
Sivasagar	95%	0	6%	94.4%	0	0	5.56%	93.89%
Sonitpur	97.2%	0	2.7%	94.6%	0	2.7%	2.7%	97.2%
Charaideo	90%	7%	33%	80%	0	0	5%	95.3%
Bishwanath	97.2%	0	2.7%	87.5%	0	1.3%	2.78%	97.22%

Source: Diagnostic Study on Weaver's need in respect of Eri and Muga Silk, IIT Guwhati 2019

Table 4: Skill of Weavers

District	Traditional Looms			Fly Shuttle Frame Looms		
	Skill Level (%)			Skill Level (%)		
	Unskilled	Semi-Skilled	Skilled	Unskilled	Semi-Skilled	Skilled
Jorhat	8.7	68	23.3	90.5	5.5	4.0
Sivasagar	4.4	0	95.6	95.6	0	4.4
Charaideu	11.2	23.4	65.4	67.3	19.6	13.1
Majuli	28.6	45.2	26.2	81	3.6	15.5
Lakhimpur	11.5	30.9	57.6	80.2	1.4	18.4
Biswanath	2.8	82.6	14.6	97.2	0.7	2.1
Sonitpur	2.7	97.3	0	97.3	0	2.7
Kamrup	25.8	36.2	38.1	78.1	0	21.9
Average Percentage	11.96	47.95	40.10	85.90	3.85	10.26

Source: Diagnostic Study on Weaver's need in respect of Eri and Muga Silk, IIT Guwhati 2019

Table 5. : Displaying the membership in cooperatives, self-help groups and Producer Company:

State	Cooperatives	Self Help Groups	Producer Company Total	Total	% in cooperatives	% in SHGs	% in Produce Compan	
Assam	54809	165500	32767	1269506	4.3	13.0	2.6	19.9
West Bengal	30954	29618	11586	542557	5.7	5.5	2.1	13.3
India	397399	303959	117859	3144839	12.6	9.7	3.7	26.0

Source: 4th Handloom census, 2019-2020

Table 6: Training by Central Silk Board

Training Courses	2019-2020		2020-2021		2021-2022		2022-23 (upto sep,2022)	
	Target	Achieved	Target	Achieved	Target	Achieved	target	achieved
Structured Courses (PGDS, Mulberry & Non-Mulb. Courses & Intensive sericulture training)	130	121	150	109	150	75	250	31
Farmers Skill Training, Technology Orientation Programmes, Capsule & Adhoc Courses and Exposure Visit and training in seed sector	10025	8100	6865	6454	6570	6196	6538	1860
Other Training Programmes	4050	4560	1490	1434	1030	1740	480	1126
STEP	1545	717	860	780	710	953	952	391
Training under SRC			2500	3301	2650	3199	2900	362
Total under Silk Samagra	15750	13498	13225	12804	11110	12163	11120	3770

Source: CSB, 2022

Table 7: Achievements of the Training Programme by Central Sik Board

Particulars	2020-21		2021-22		2022-23(upto 2nd quarter)	
	targets	Achieved	targets	achieved	targets	Achieved
Total No. of new Members enrolled	130	261	200	360	275	222
Total no of silk mark labels sold	15	24.86	20	30.42	27	20.67
Awareness programmes/ exhibitions/fairs/workshop/road shows	240	324	300	497	600	307

Source: CSB, 2022

Table 8 : Distribution of handloom workers based on Gender:

	Gender			
State	Female	Male	Transgender	Female %
Assam	1179507	104089	285	91.9
West Bengal	368864	262555	28	58.4
India	2546285	975733	494	72.3

Source: 4th Handloom Census, 2019-2020

Table 9 : Nature of engagement (fulltime and part time):

State	Full Time	Part Time	Total
Assam	279508	1004373	1283881
West Bengal	416742	214705	631447
India	1788765	1733747	3522512

Source: Handloom Census, 2019-2020

Table 10: Displaying of number of handicraft establishments by nature :

State	Rural				Total			
	Perennial	Seasonal	Casual	Total	Perennial	Seasonal	Casual	Total
Assam	60652	6902	2593	70147	80596	7656	2871	91123
West Bengal	175513	25896	8739	210148	285628	34467	9998	146138
All India	947874	134854	34533	1117261	1662174	169160	42290	1873624

Source: 6th Economic Census

Table 11: Shows weaver Households reporting average production of major fabric per weaver per day (in meters). Inclusive of both urban-rural areas:

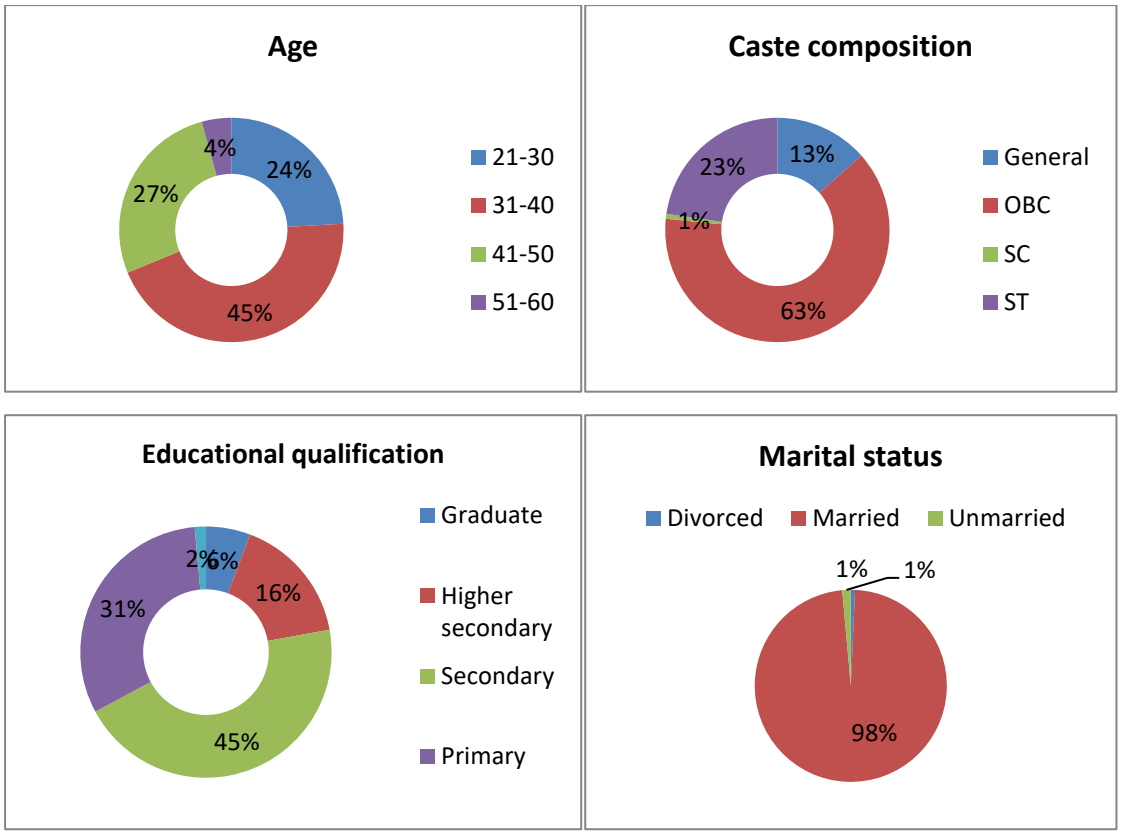
State	Location	Average in meters
Assam	Rural	5.09
	Urban	5.89
Haryana	Rural	12.56
	Urban	32.26
Punjab	Rural	14.87
	Urban	23.29
Rajasthan	Rural	24.79
	Urban	16.36
Sikkim	Rural	23.82
	Urban	0
Tamil Nadu	Rural	9.95
	Urban	8.74
West Bengal	Rural	7.74
	Urban	7.22

Source: 4th Handloom Census, 2019-2020

Primary Data Analysis

- Number of RWEs interviewed: 141.
- Raw materials involved: weaving tools, yarn, design cards, natural dye, and eri cocoon
- Average initial investment: 5,000-50,000

Background information



- A majority of the RWEs in this value chain attributed family legacy (92%) as the as the reason for joining business. Only 3% were inspired by exposure visits, 19% decided to set up business by imitation of others taking up entrepreneurship around them, 24% mentioned they decided to take up entrepreneurship in this value chain after receiving training.
- 49% respondents allot 4-8, and 51% allot 2-4 hours on production.
- 33% respondents reported being involved in other economic activities such as beekeeping, livestock farming, agriculture, and tailoring.
- For 67% respondents, handloom is their sole area of economic activity.
- 33% respondents have started their enterprise less than 10 years ago, 54% have been in this value chain between past 10 to 20 years, 12% have been in the business for more than 20 years, 2 individuals have been engaged in this value chain for more than 30 years.

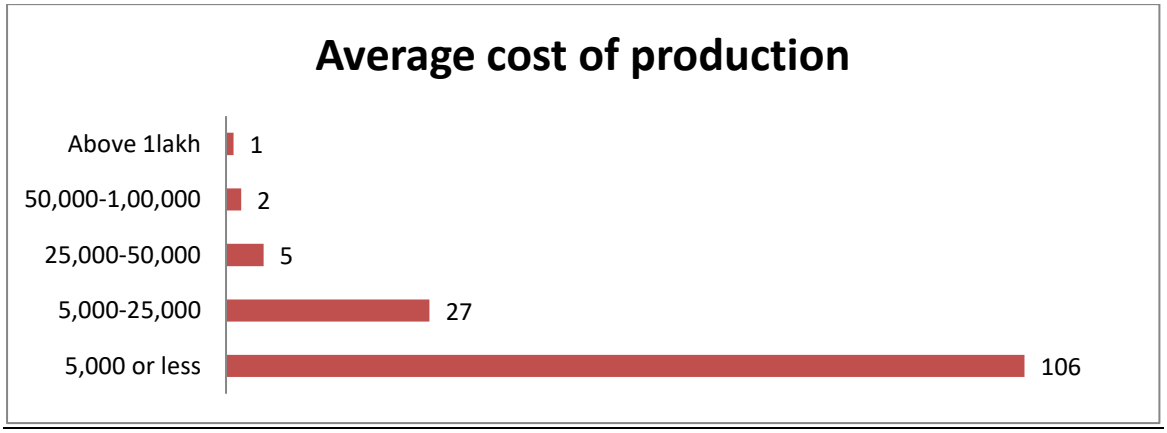
Standardisation practices

- Only one RWE in this value chain reported having a GST licence.
- 137/141 do not have license and have not registered business.
- 4/141 have Udyami registration. Of these, 1 has attained trade licence and Handloom and Textile registration with help of Antaran (Tata Trusts).
- Only 2/141 have reported having their product tested.
- Only 1 individual RWE reported their product has been certified.

Procurement

- The raw materials involved in this value chain are weaving tools, yarn, design cards, natural dye, and eri cocoon. Other than raw materials, transportation and commute costs form a major part of cost of procurement.
- Respondents were asked to pick one or more sources of procurement. 76% reported they source material from private entities, 32% procure raw materials from public sources.
- The capital for procurement of raw materials is rarely financed from savings (11.42%). Majority of the respondents take loans from friends and family (88.57%), with just 3/141 reporting taking formal loans.

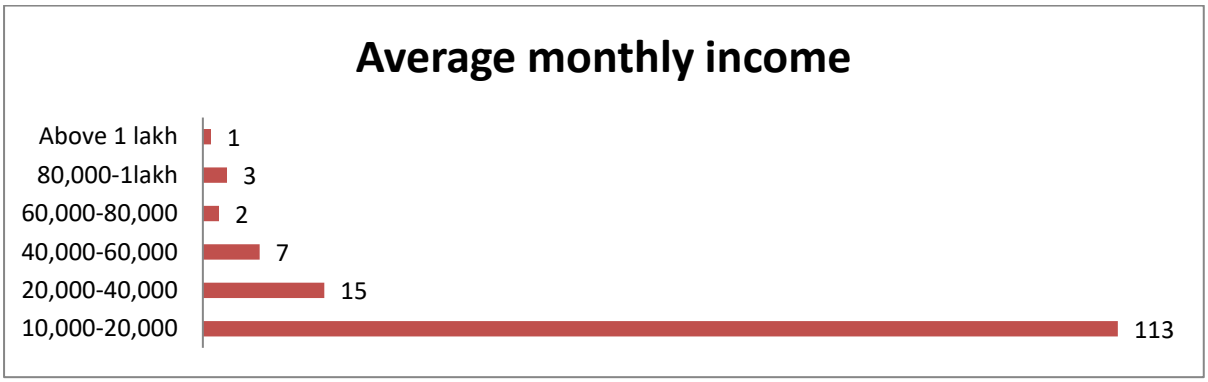
Production

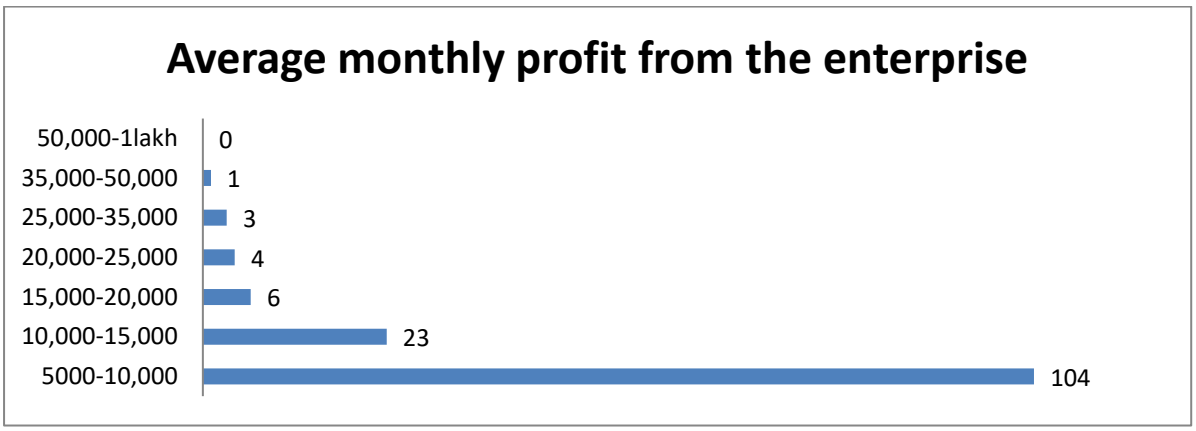


- Only 17 RWEs in this value chain are engaged in the production of a single item. 86% respondents produce a varied mix of handloom items like cushion covers, stoles, dupatta, traditional attires, etc.
- 98% respondents in this value chain produce final products, 12% also produce intermediate products.

- In terms of production quantity, the range was set in different units to accommodate the nature of production. 84 (60%) RWEs produce less than 100 metres, 52 (36.87%) produce between 100-200metres, 2 (1.42%) produce about 200 metres. 2 respondents reported their monthly yield in the number of *mekhela* and *sador* they are able to produce- they each produce about 10 sets. The respondent (1/141) from the sericulture sub value chain was clubbed with this value chain and their yield was reported in terms of yarn and pupa produced in kilos – 20kg yarn, and 10 kg pupa.
- Due to the diverse nature of products in this value chain, the cost of production had a wide range of INR 400 to 1,20,000.
- 75% (106) RWEs spend less than 5000 in cost of production. The quantity of production is largely less than 100 metres for this section. The goods chosen for production are *gamosa*, handkerchief which require relatively lesser investment than apparel.
- Only 19 (13.47%) respondents produce value added products.

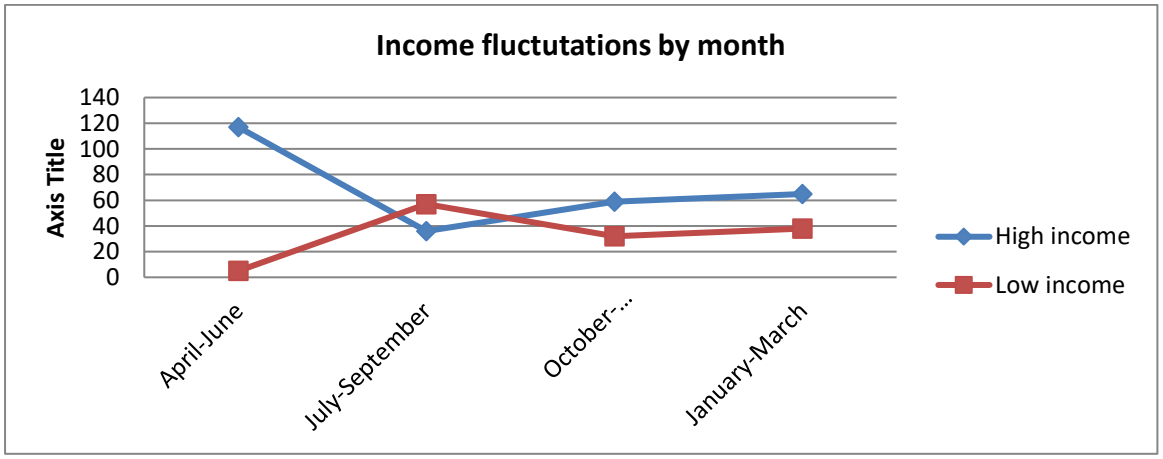
Income

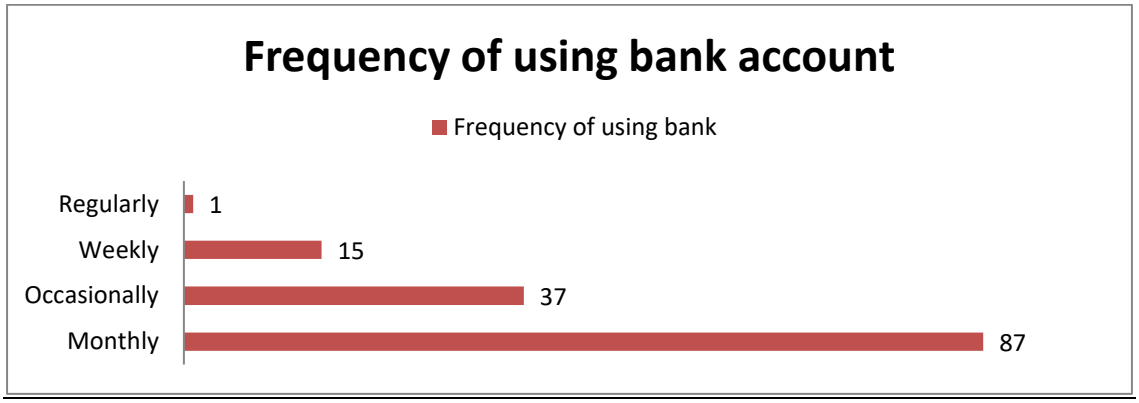




- At 80% (113) most RWEs in this value chain earn an average monthly income of 10,000-20,000. 11% earn between 20,000-40,000; 5% earn 40,000-60,000; 4% earn more than 60,000 with just one RWE earning more than 1 lakh.

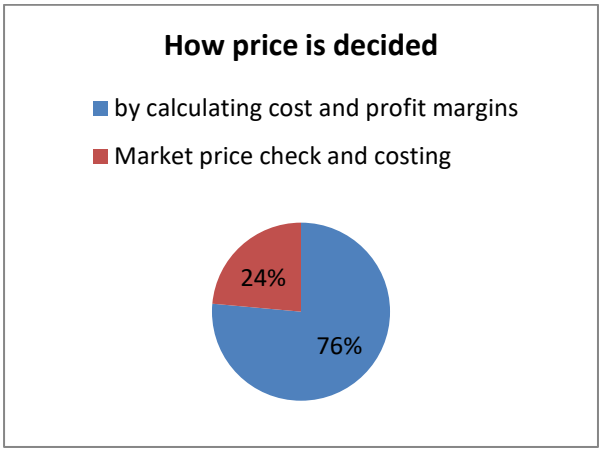
- Similarly, 74% RWEs are trapped in the lowest average monthly profit margin of 5,000-10,000. 16% earn an average of 10,000-15,000 in profit, 4% earn 15,000-20,000 in profit, 3% earn 20,000-25,000 in profit, 3% earn more than 25,000 but less than 50,000 in profit.
- The value chain undergoes income fluctuations through the months with April-June seeing higher income.
- The months of July-September sees a fall in income.

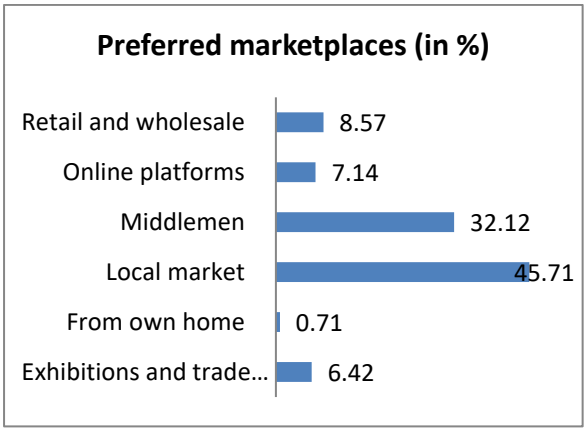


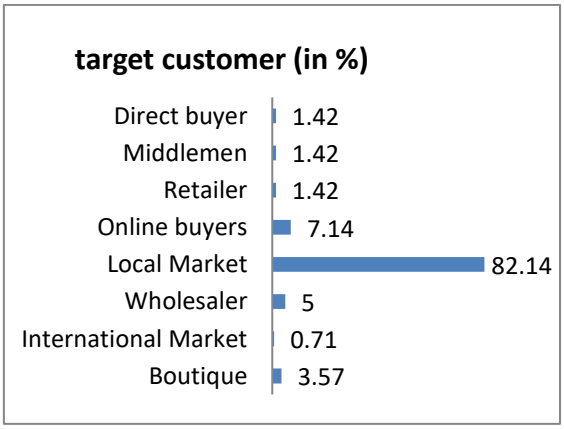


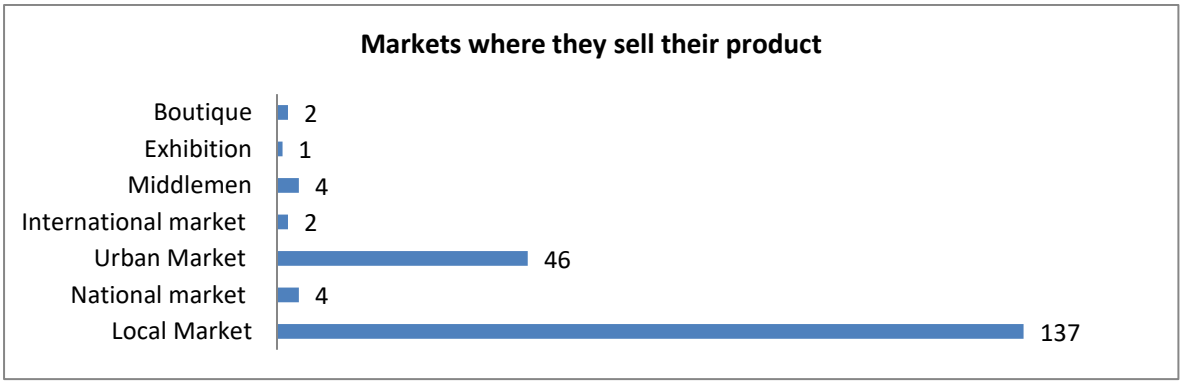
- All respondents have a personal bank account but none of the respondents have a bank account for their enterprise.
- 10 respondents (7.09%) reported letting their family operate their bank account.
- Respondents were asked about one or more locations they prefer to utilise to save money- 135 (96%) prefer saving their money in bank, 67 (47.5%) prefer saving at home, 10% prefer saving in cooperatives.

Markets



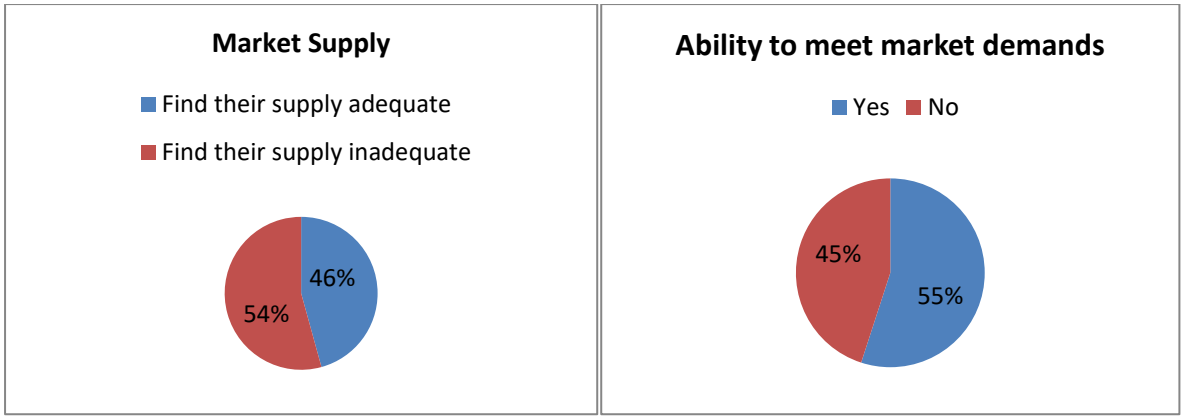






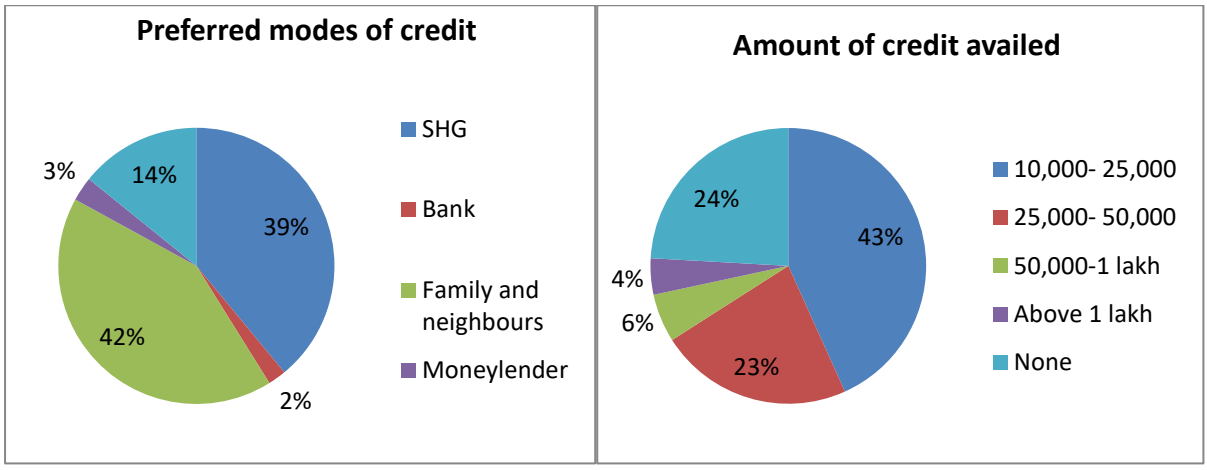
- Majority of the RWEs sell their handloom products in local markets.
- 76% of the RWEs base their pricing on cost and profit margins. There is much scope for understanding the different stages such as design and consumption to drive decisions on market pricing.
- Only 5 RWEs (3.54%) have their own brand.
- Only 5 RWEs (3.54%) are involved in interstate sales.
- Packaging and labelling: Across the handloom value chain in Assam, packaging and labelling is not commonly prevalent. Few mentioned the existence of local service provider, but have found them difficult to access.

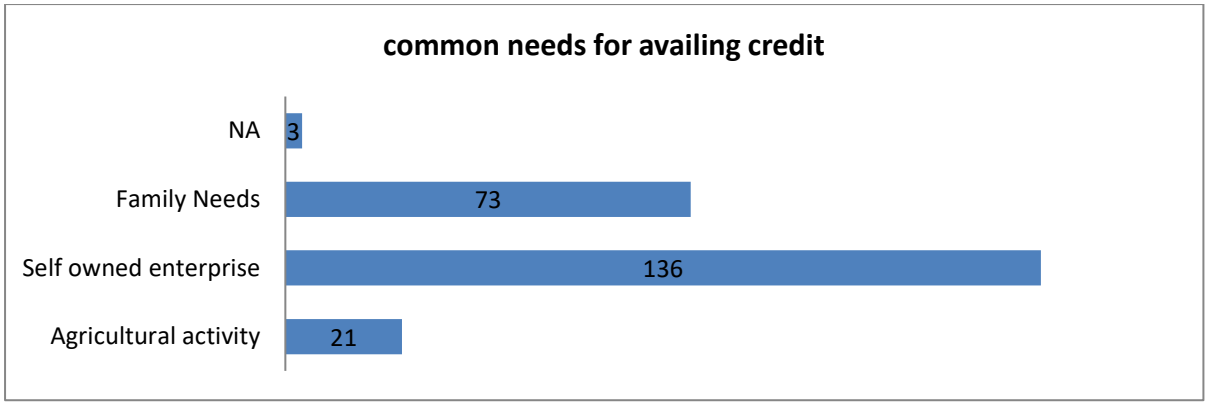
- Only 1 RWE has ventured into selling in the international market.
- Constraints: Difficult to access the transporter (Target customer international); packaging and labelling options are inadequate.

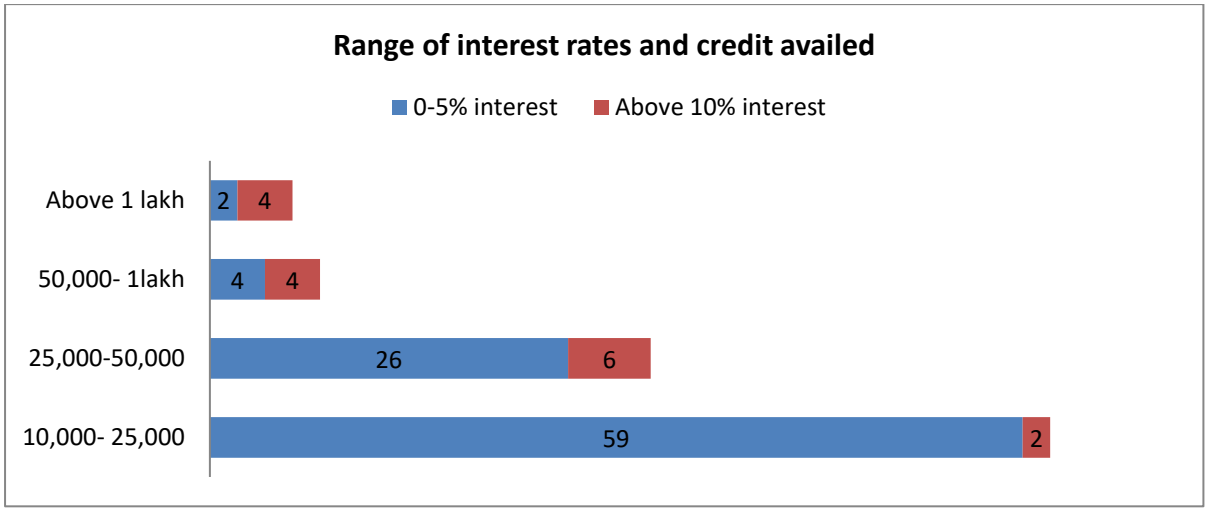


- The RWEs were asked to self-assess if they find their supply adequate, and if they are able to meet market demands. With 54% reporting their supply inadequate and 45% finding themselves unable to meet market demands, this value chain offers opportunities to make adjustments in scale of production by recruiting workers, upgrading production technologies, etc. – all of which requires financial support

Credit facilities

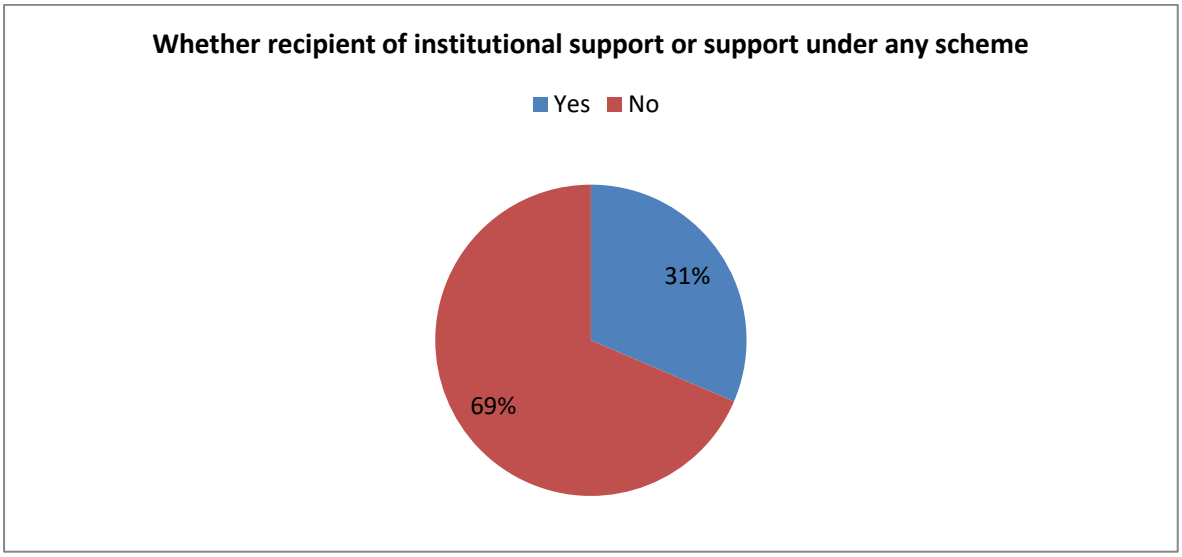






- The preferred mode of credit among RWEs in handloom sector is predominantly from informal sources. 42% prefer taking loans from family and friends, followed by 39% from SHGs, MFI (14%). 3% also consider taking loans from moneylenders. Only 2% reported banks as the preferred mode of credit.
- 24% had not taken any loans. A majority of the respondents had taken loans in the range of 10,000-25,000 at 0-5% interest.
- Rate of interest and number of beneficiaries seems to be inversely related to the amount sought for loan.
- The most common needs for availing credit are for developing one's enterprise (96.42%) and family needs (52.14%). Some also request loans for subsistence agricultural activities (15%).

Support services

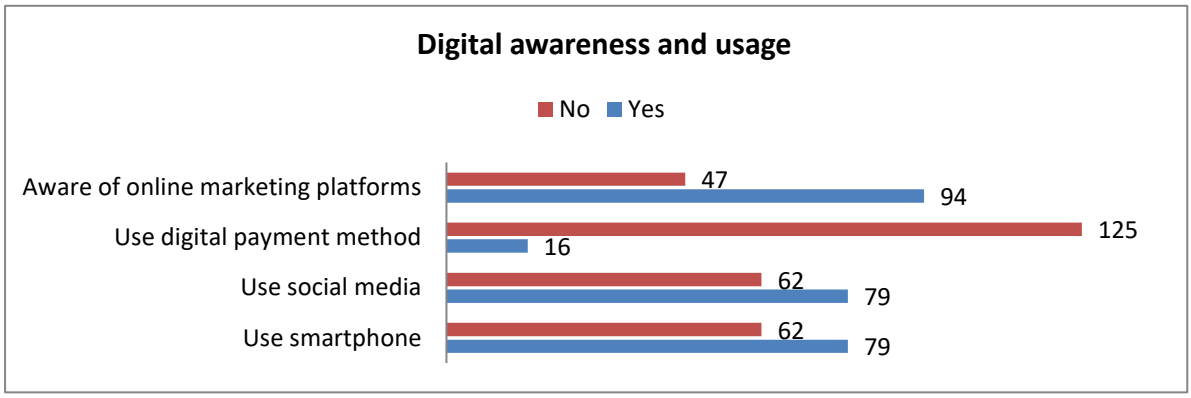


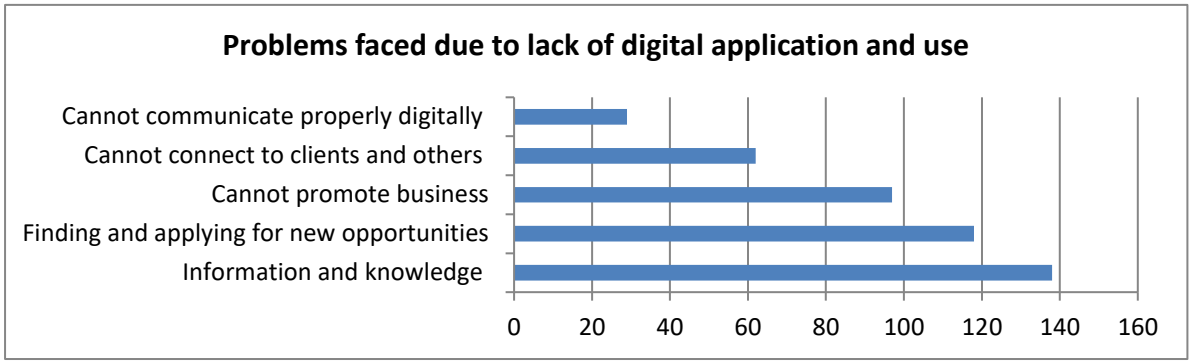
- The source of information about the support services has largely been friends and family.
- The nature of support has entirely been of technical and advisory in nature.
- 91% of those who received training see it as sustainable.
- The trainings were imparted free of cost.
- Some of the service providers active in in this domain are Tata Trusts-Antaran, Bandhan Kendra, Centre for Microfinance and Livelihood (CML), Crisil Foundation, Grameen Sahara, Handloom Department, Seven Sisters Development Assistance (SeSTA), and Indian Institute of Entrepreneurship (IIE).
- 48% of all interviewed RWEs engaged in handloom sector are not covered under any social security scheme.
- 97% of all respondents in handloom from Assam want financial support, 94% want technical, 71% want advisory support.

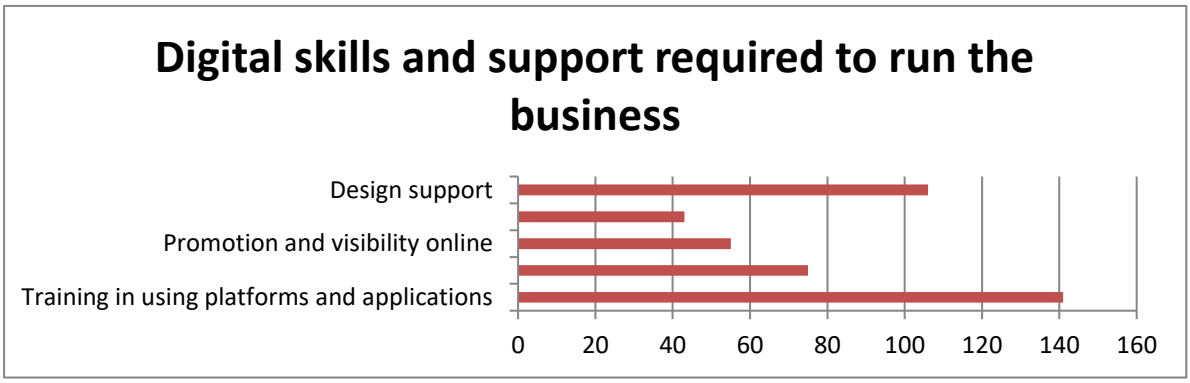
Transportation

- The respondents were asked about one or more mode of transport of final produce to the destination for sale. 71% (100) preferred buses, 26% (37) prefer other local transport, 5% (7) use their own vehicle, 2 individuals sell from home, and 1 individual courier their product.
- In terms of frequency, 39% (55) avail transport monthly; 61% (85) avail transport weekly.
- 74% (103) spend between 70-250 on transportation per month, 20% (29) spend between 250-500, 3% (4) spend more than 500. The highest amount reported is 3000 a month from using a combination of bus and personal vehicle for transportation. For courier, the individual RWE spends around 2,500 a month.

Digital information

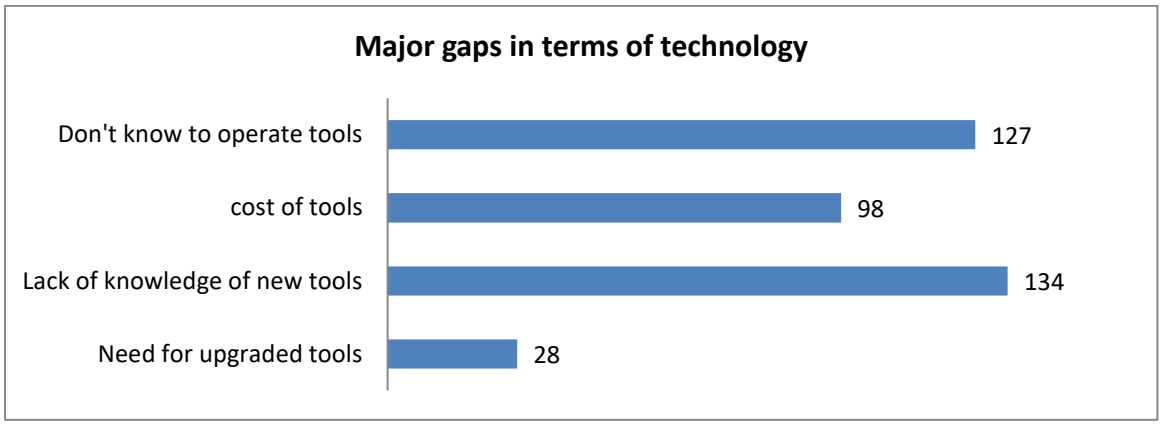




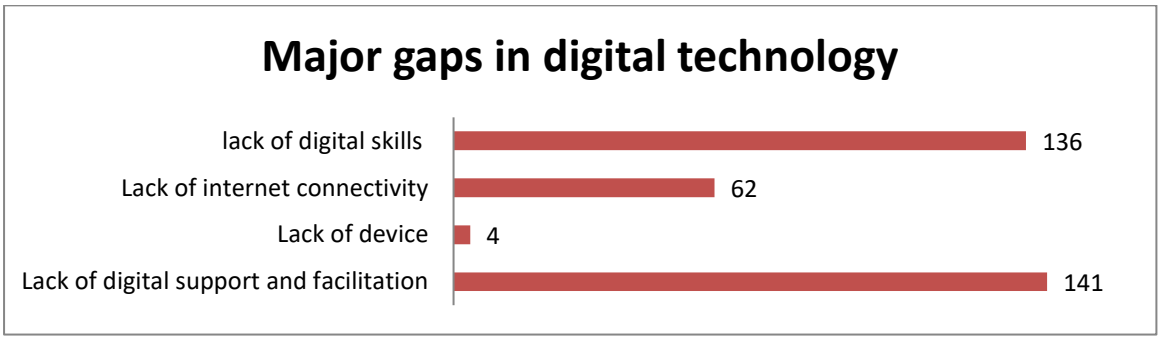


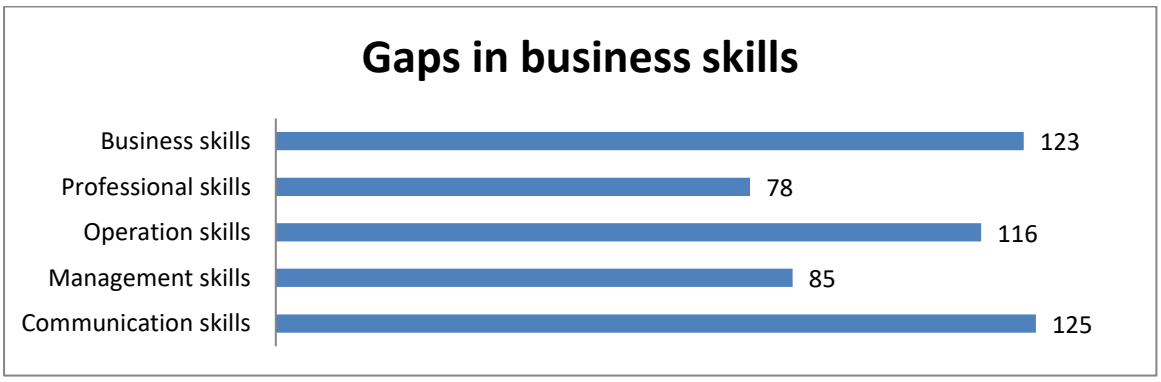
- The use of digital methods is at a nascent stage in this value chain.
- All RWEs interviewed feel the need for training in using digital platforms.
- The RWEs require design support to build their digital presence,
- The use of ICT in the enterprises is close to non-existent.
- 88% do not use digital payment for their enterprise.
- 44% RWEs do not use smartphone.

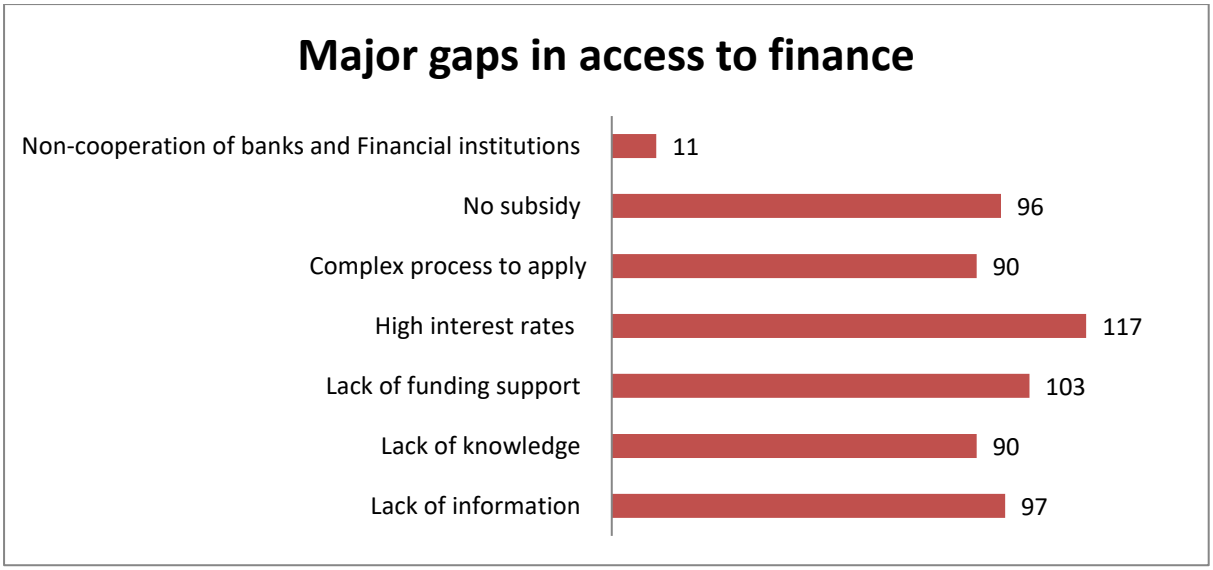
Challenges



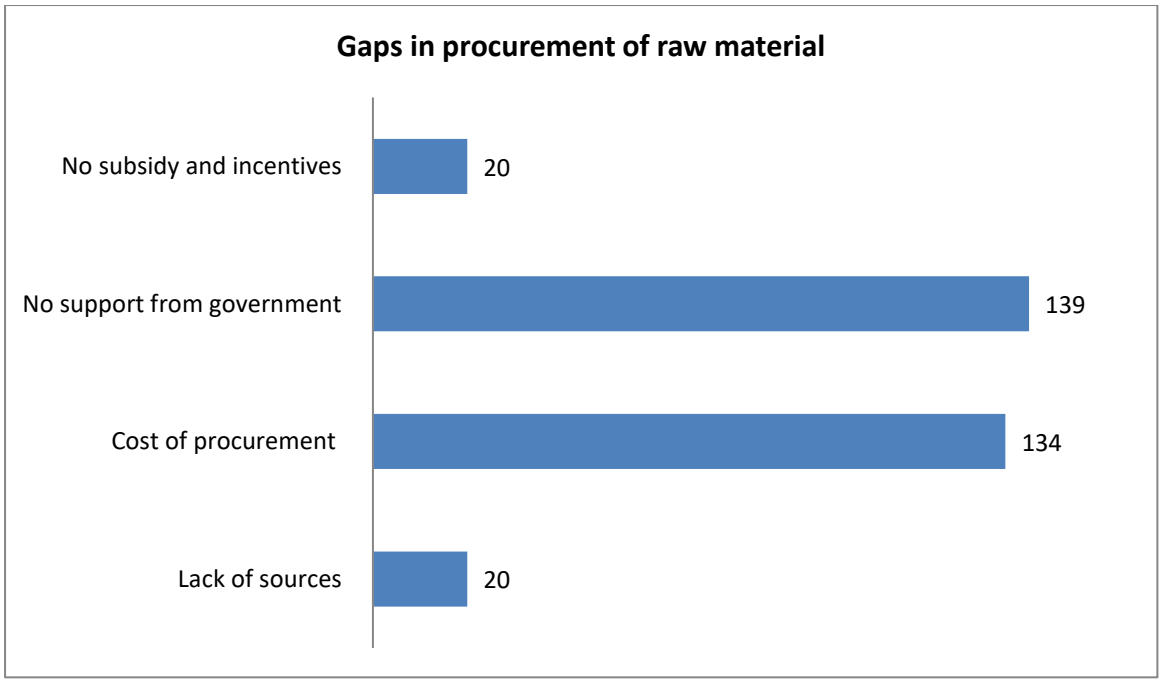
- There is a need for upgrading production tools in this value chain. This will require financial and training support.
- There is a lack of digital support and facilitation ecosystem to cater to the needs of RWEs and skill them to be able to digitally manage their enterprise.
- The RWEs assessed themselves as requiring better communication skills (89%), business skills (88%), operation skills (82%), and professional skills (56%).

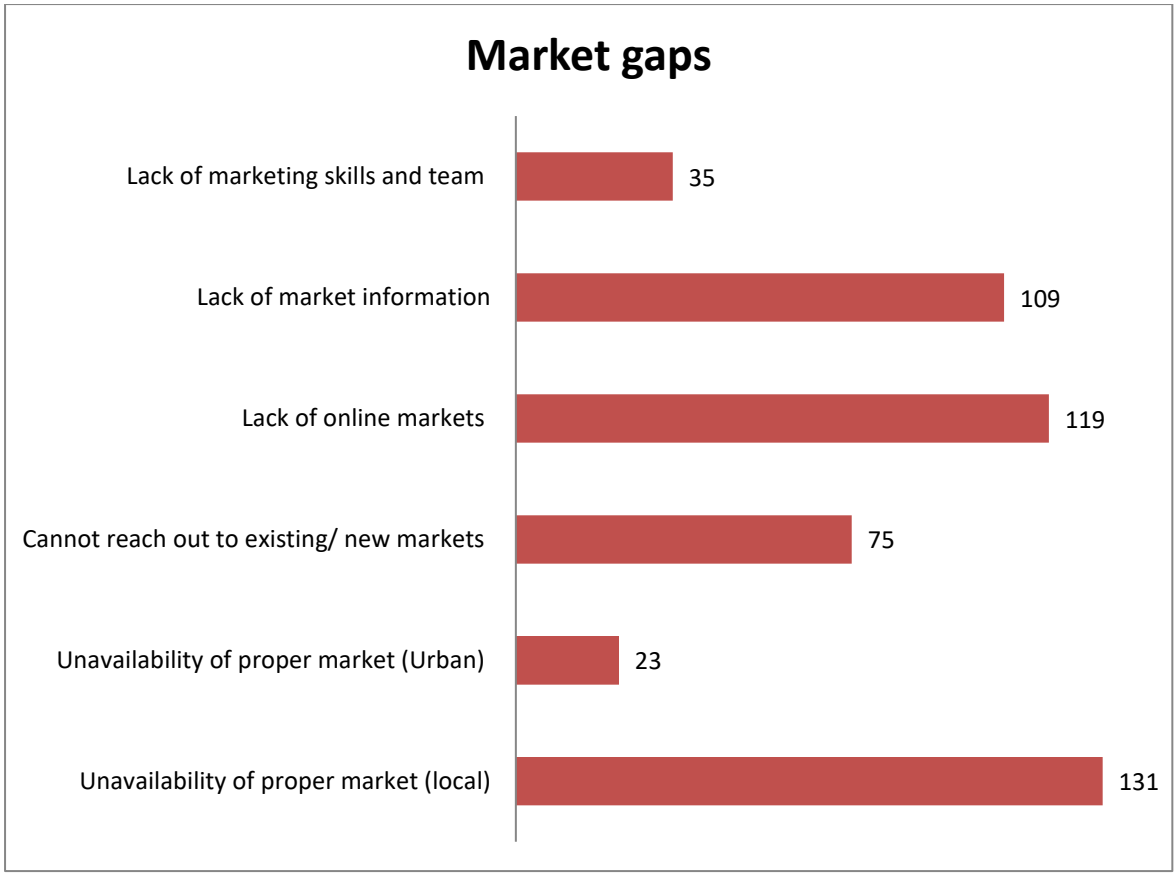






- This value chain is marked by a high incidence of personal loans from informal sources. Some of the major deterrents in accessing finance are the high interest rates (83%), lack of information (69%), complex process to apply (64%), and no subsidy (69%). 11 respondents noted that banks and financial institutions can be non-cooperative.
- The respondents reported a need for government support in procurement of raw material. The cost of procurement is major challenge. 20 RWEs also reported a lack of sources.

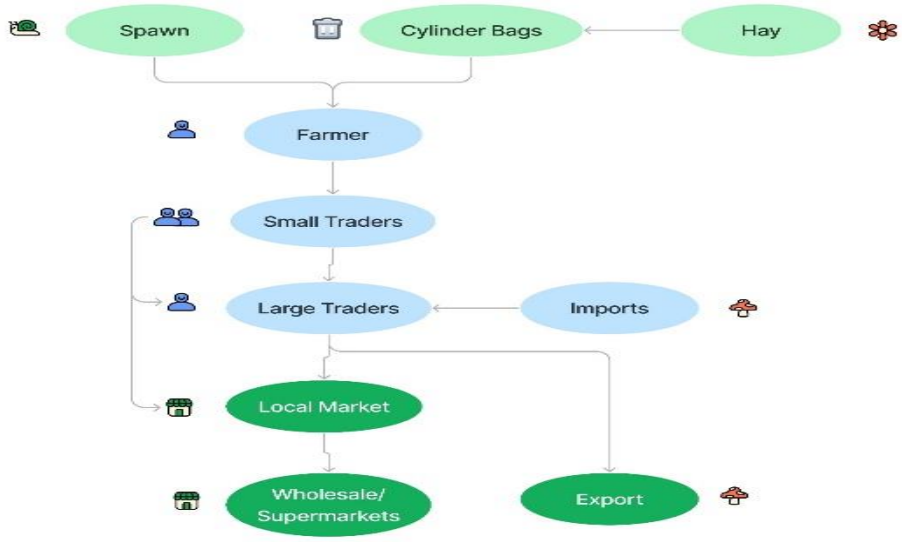




- A majority of the RWEs in this value chain end up selling their products in the local markets but have found it difficult to access proper markets at the local level.
- A major gap the RWEs reported was the lack of market information. There is also an opportunity to assist RWEs in the value chain in finding online markets.

ANNEXURE II

The mushroom value chain and the business model followed in Assam and West Bengal



Central Government Interventions

Mission for Integrated Development of Horticulture:

Horticulture Mission for North East and Hilly States (HMNH) Government of India is implementing the Horticulture Mission for North East and Himalayan States (HMNH), as a sub scheme of Mission for Integrated Development of Horticulture (MIDH). Mushroom farming is extended assistance as per the revised cost norms for mushroom production unit, spawn making unit and compost making unit. Both public and private sector are eligible for financial assistance. The cost norms & pattern of assistance under HMNH are briefly given below *(NABARD, 2020*):

(i) **Production Unit: Rs 20 lakh/unit**: The financial assistance to the extent of 100% of the project cost for public sector and 40% for private sector for meeting the expenditure on infrastructure as credit linked back ended subsidy is provided.

(ii) **Spawn making unit: Rs 15 lakh/unit**: The financial assistance to the extent of 100% of the project cost for public sector and 40% for private sector for meeting the expenditure on infrastructure as credit linked back ended subsidy is provided.

(iii) **Compost making unit: Rs 20 lakh/unit**: The financial assistance to the extent of 100% of the project cost for public sector and 40% for private sector for meeting the expenditure on infrastructure as credit linked back ended subsidy is provided.

The other schemes also provide assistance for post-harvest management covering collection, pre-cooling unit, cold storage, refer vans, marketing infrastructure etc., which can be availed for mushroom sector.

National Horticulture Board (NHB):
NHB deals with the schemes relating to establishment of commercial production as well as projects on post-harvest management and primary processing of products are eligible for assistance as per approved cost norms. The projects for establishment of integrated production unit on Mushroom are extended financial assistance as credit linked back ended subsidy @ 50% of project cost limited to Rs.37.50 lakh in Hilly areas. The Board also supports Post Harvest Management projects relating to Pack House, Refer-Van, Retail Outlets, Primary processing etc. for horticulture produce in project mode as credit linked back-ended subsidy @ 50 % of project cost limited to Rs.72.50 lakh per project in hilly areas.

Agricultural& Processed Food Products Export Development Authority (APEDA):
APEDA was established by the Government of India as a premier organisation assisting in development of export in agricultural and food products in country. A number of schemes have been taken up by APEDA for providing assistance for various beneficiaries/ organizations including R&D, Infrastructure Development, specialised transport units, assistance to exporters / producers, Quality Development etc.

Ministry of Food Processing Industries (MOFPI):
The schemes relating to agriculture, horticulture and food processing are being implemented covering Technology Up-gradation, Establishment/Modernization of Food Processing Industries. In hilly states including NE region, grant–in–aid up to 33.33% of the cost of plant & machinery and technical civil work is provided. The Ministry implements another scheme for construction of Cold Chain, Value Addition and Preservation Infrastructure. The scheme for Mega Food Parks (MFPS) has been launched to provide adequate/excellent infrastructure facilities for food processing along the value chain from the farm to market.

Directorate of Marketing & Intelligence (DMI):
The DMI aims at bringing integrated development of marketing of agricultural and allied produce in the country. Besides other schemes, it implements scheme for development/strengthening of Agricultural Marketing Infrastructure, Grading and Standardization to develop marketing infrastructure in the country to cater to the postharvest requirements of production and marketable surplus of various farm products. The scheme may cover functional infrastructure for collection, drying, cleaning, grading, standardization, SPS (Sanitary &Photo-sanitary) measures and quality certification, labeling, packaging, value addition facilities etc. Mobile infrastructure for post-harvest operations like refrigerated vans used for transporting agricultural produce to maintain cold supply chains are also eligible for assistance under the Scheme.

Small Farmer's Agriculture Consortium (SFAC):
Small Farmer's Agribusiness Consortium (SFAC), a registered society, functioning under Department of Agriculture and Cooperation, Government of India is operating scheme for Agribusiness Development through venture capital assistance and project development facility. The Venture Capital Scheme aims to promote investments in Agri-business projects with the participation of nationalised banks. The venture capital for agribusiness up to 10 % of the total project cost or 26% of the total project equity or Rs. 75 lakhs, whichever is lower is made available for the projects in NE & Hilly states. In special cases, higher venture capital can also be considered by SFAC. The Project should provide assured markets to farmers'/ producer groups.

North East Centre for Technology Application and Research (NECTAR), Shillong:
NECTAR is an autonomous body of Department of Science and Technology, headquartered in Shillong. In collaboration with Mushroom Development Foundation (MDF), Guwahati, it has helped with financial and technical assistance to women who are willing to do mushroom cultivation. The project was titled as 'Sustainable Livelihood with Mushroom Cultivation in Dimoria Block, Assam'. NECTAR has funded MDF to train 100 women in Dimoria. MDF has established 4 clusters and each cluster now has 25 women. The project is highly successful as these women are in a better economic position now.

North East Institute of Science and Technology (NEIST):
NEIST, Jorhat is a constituent establishment of the Council of Scientific and Industrial Research, a premier R&D organization of India, which has a chain of laboratories across the country. It has been closely working with stakeholders for mushroom development in Assam. It also provides technical support and training to mushroom workers. Recently, in collaboration with MDF, it has provided spawns to the women farmers of Golaghat.

Protein Food:
Protein Food is a registered proprietorship registered under Ministry of Food Processing Industries, Government of India. This firm carries out the following functions:

- Spawn production in its fully equipped laboratory and production facility at the Department of Agriculture.
- With modern processing infrastructure for mushrooms including packaging and marketing facilities.
- 100% buy back arrangement and technology support for farmers procuring spawns.
- Commercial mushroom growing unit since 1997.
- Developing effective spawn and mushroom supply chain management system.

Krishi Vigyan Kendras
KVKs have been playing a significant role in mushroom farming. They provide technology like dryers and also builds awareness and skills on the scientific process of growing mushrooms. They also impart knowledge on value addition in mushroom which eventually fetches higher prices. They have courses specifically targeting women where they train them and provide resources for mushroom cultivation. KVKs have been active both in Assam and West Bengal in promoting mushroom cultivation.

Krishi Vigyan Kendras and their support to mushroom growers in Assam:
Several studies show an active role played by KVKs in promotion of mushroom promotion, especially targeting women. Almost all the entrepreneurs that we surveyed and are associated with mushroom cultivation have been trained and provided other services in mushroom production *(See more in Annexure II).*

Krishi Vigyan Kendras and their support to mushroom growers in West Bengal:
As in Assam, the KVKs has been strongly involved in production of mushrooms in West Bengal. Several studies point out to the success stories of the KVKs in mushroom production and its impact on the income of the women households *(See more in Annexure III).*

State Government Initiatives:

Assam State Livelihood Mission

Value Chain Development for Mushroom Cultivation: This is a project of Assam State Rural Livelihoods Mission (ASRLM) since 2018. It aims to resolve gaps in scaling up the mushroom cultivation with innovative approach and provide an alternate source of protein to rural households. It is implemented in two blocks namely Chandrapur and Dimoria in Kamrup district. The intervention includes training in scientific cultivation of mushroom, construction of 4 numbers of Mushroom Demonstration Units (MDUs), 32 common processing units and 160 individual processing unit which is under progress.

2.3.2Multiple Livelihoods Project: Under this project, ASRLMs is promoting multiple livelihoods project which includes multiple livelihood activities like mushroom cultivation, piggery and weaving. This work is carried out in Kokrajhar Development Block. The intervention is working with SHGs and providing them training on livelihood activities as well as financial literacy. They are then provided with Revolving Fund of Rs. 15000, Community Investment Fund (CIF) of ₹50000 and a Bank Loan of ₹1,00,000.

Mushroom Spawn Production Laboratory:

One of the major barrier in mushroom production in the lack of spawn production laboratory in Assam. Although there is a public laboratory which is located in Khanapara, Guwahati, which provides not only spawns but also technical support to the farmers such as chaff cutter and hand sprayers and grow poly bags. These items are supplied together as Mushroom Production Kit to the growers. This falls under the Directorate of Horticulture, Assam. However, its performance leaves much to be desired

Tables

Table 1: Area of mushroom cultivation at an all India level.

The area is in thousand ha; production is in thousand mt

Mushrooms	2014-15	2015-16	2016-17	2017-18	2018-19
Area	NA	170	183	198	230
Production	51	436	459	487	503

Source: National Horticulture Board, 2018-19.

Table 2: The state wise value of output of mushroom at the national level: in lakhs

Rs. In lakhs

State	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Assam	546	546	NA	NA	NA	NA	NA	120	NA
WB	137	137	137	137	0	137	137	1639	4097
All India	48678	29099	24825	32705	242132	253119	272032	308202	389398

Source: National Statistics Office 2022.

Table 3: Showing fixed capital for setting up mushroom farm.

Amount in rupees

Fixed Capital	Amount (In Rs)
House	**30,000**
Chouka	**6,000**
Drum	**2,000**
Polyethene sheet	**1,000**
Sprayer	**700**
Plastic Bucket	**600**
Machete	**200**
Sealing machine	**3,400**
Physical balance	**1,500**
TOTAL	**45,000**

Source: (Directorate of Horticulture, Assam, 2022)

Table 4: Showing working capital for setting up mushroom farm.

Amount in rupees

Working Capital	Amount (In Rs)
Paddy straw 3 trucks @Rs 7,000/truck	**21,000**
Polyethene bag, 2400 Nos	**4,800**
Spawn 1500 packets	**22,500**
Wood (fuel)	**3,000**
Pesticide	**1,000**
Packaging bag	**2,000**
TOTAL	**54,300**

Source: (Directorate of Horticulture, Assam, 2022)

Table 5: Table stating the economic benefit and potential of mushroom cultivation.

Cost in Rupees

Room Size	25 ft x 15 ft x 8 ft
Capacity	400 bags (at a time)
Crop duration	2 months
Total number of bags produced in a year	400 x 6= 2400 bags
Production per bag	2 kilograms
Total production in a year	2 x 2400= 4800 kilograms
Considering 5% loss in production	240 kilograms
Net production	4800-240= 4560 kilograms
Selling price	80 per kilogram (raw)
Total selling price	4560 x 80= 3,64,000
Total expenditure	99,700
Total profit (yearly)	3,64,000-99,700= 3,64,300
Cost benefit:	**1:2.6**

Source: Directorate of Horticulture, Assam, 2022.

Krishi Vigyan Kendras and its role in Assam

During our primary study we gathered that, Mr. Prodip Das of Baba Mushrooms ad well as Mr. Imdadul Mazid of Sky Mushrooms have received knowledge and technical support from KVKs in their respective areas. A mushroom dryer has also been provided to them for drying mushrooms which leads to less wastage and better market price.

Another study by Sarodee Baruah (2021) of Assam Agricultural University, Jorhat highlights that KVK in Tinisukia conducts frontline demonstration programmes among farmers including rural youth and farm women in the villages. This is to make them aware about the scope of mushroom farming in employment generation.

A study in Nalbari (Mazumdar et. Al, 2020) about impact of training by KVKs reveals that income of the women mushroom growers have been increased and they are in a better economic position. Dolerani Das Haloi of Banekuchi Village cultivates Oyster Mushrooms and have sold around 81.4 quintals from 2016-20.

ear	**roduce sold (in quintals) per year**	**ncome in Rupees (annually)**
016-17	.5	?4,000
017-18	.3	;5,580
018-19	.4	?0,550
019-20	.2	;2,000

Source: Mazumdar et. Al, 2020.

The table shows that the production and income both have increased as a result of strategic planning and right training by KVC.

Source: KVK Knowledge Network, Kahikuchi, Kamrup

Another woman from Barjhar village, Nalbari, Diji Deka Nath has been trained by KVK. She alone produces 30 quintals a year which is sufficient for her household to run and meet the needs of her family.

'ear	**'roduce sold (in quintals) per year**	**ıcome in Rupees (annually)**
!016-17	.3	ł0,000
!017-18	.7	'9,950
!018-19	.4	)7,400
!019-20	.0	)0,000

Source: Mazumdar et. Al, 2020.

In this case too, KVK training has helped Mrs Deka to improve her economic condition and move towards self-reliance.

300 women in Nalbari have taken up mushroom cultivation after getting support and training from KVKs. They have a sustainable source of livelihood now. Since economic position has improved, it has led to better health conditions and their children receive quality education.

Krishi Vigyan Kendras and their support to mushroom growers in West Bengal

As in Assam, the KVKs has been strongly involved in production of mushrooms in West Bengal. Several studies point out to the success stories of the KVKs in mushroom production and its impact on the income of the women households.

A study by *Anjali Sharma (2018)*, an officer at the KVK Uttar Dinajpur district of West Bengal highlights some of the aspects related to mushroom production in terms of market linked technology, subsidiary income and nutritional security of farm families.

NABARD and KVK Uttar Dinajpur have brought all the SHGs, Farmers' Club and individual farmers to form Producers' Organisation. This led to channelization of mushrooms to a bigger market such as Silliguri, Nepal and Bhutan.

Uttar Dinajpur was one of poor and disadvantaged districts of West Bengal. The average daily per capita rural income was only Rs. 10.34 (Sharma, 2018). Although located in a very advantageous position of the country in terms of geography, as it is well connected to Nepal, Bhutan, Bihar and Kolkata. It was in 2011-12, KVK have started working on this sector and conducted a baseline survey for mushroom cultivation. There were only 2-3 running units and majority of people were not aware of this farming. For creating awareness, KVK have started publishing articles and campaigns at the village level. Emphasis was given on production as well as creating some market linkages for mushroom as two blocks of Uttar Dinajpur district were so near from national and international markets of Nepal and Silliguri. They also had the potential to cater the needs of Sikkim, Darjeeling and Bhutan.

KVK initially trained 25 farmers including women who later started their own units with technical and training received from the same. Small scale mushroom production represented an opportunity for farmers interested in an additional enterprise and was speciality option for farmers without land. After production, they sold it to local markets. Later on, SHGs and Farmers' Clubs started producing mushrooms on a larger scale and catered the big markets through middlemen. Then, they came forward as Producers' Organisation and increased the production and channelized to bigger markets and international markets. This ensured them better price on return.

The farmers also adopted technology among their units. KVC made the growers familiar with fungi life cycles, hygiene and sterilisation in developing successful growing environment. They were also trained in the post-harvest handling and processing aspects as well. Being endowed with favourable climate support, KVK played an important role in aggressive endeavour in linking prospective individual growers as well as identified SHGs with the enterprise building process on mushroom with due. Forward linking support for market promotion for the same.

Another study by *M.K. Biswas (2014)* on Birbhum, district of West Bengal highlights about how the Department of Plant Protection, Visva Bharti, Shantiniketan have trained 100 village women in the aforesaid district.

Biswas says that empowerment in the context of women's development is a way of defining, challenging and overcoming barriers in a woman's life through which she increases her ability to shape her life and environment. It is an active, multidimensional process which should enable women to realize their full identity and power in all spheres of life. In addition to their role in agricultural production, women are gainfully employed in agri-based allied activities like dairying, animal husbandry, poultry, goatery, rabbitry, beekeeping, floriculture, horticulture, fruit preservation, post-harvest technology, value added food products, etc. Cultivation of edible mushrooms is one of the most economically viable processes for the bioconversion of lingo-cellulosic wastes (*Bano et al., 1979; Biswas et al., 1997; Cohen et al., 2002)*. Mushroom growing is one agricultural activity in which women can play a vital role.

The climate of Birbhum district is very much congenial for cultivation of oyster mushroom and it can be cultivated more or less throughout the year. Almost 70% people of Birbhum district belong to small and marginal farmers and landless laborers. Their income level is quite low for a sustained livelihood. In order to raise their family income mushroom cultivation was considered to be an alternative source of income.

Role of Mushroom Development Foundation and its contribution towards mushroom farming in rural Assam:

- MDF established a new economic system to bring together marginal farming community and poor vendors in the rural areas for gaining better negotiating power in the market on a sustainable basis.
- MDF taps the potential of rural women and utilise their time and skills to grow mushroom from bio-waste. For instance, he forwarded a yay where women can grow mushroom from waste of banana tree through a process called Vermiculture.
- The MDF has provided training to more than 100,000 people on mushroom cultivation.

In an interview held with Mr. Pranjal Baruah, the founder of MDF, he stated that 7/10 people in a developed country consume mushrooms. A single person consumes 14 kg of mushrooms every year. He decided to imbibe this culture in India. This shall also help in mitigating the food security of the country and meet the future crisis for food.

Initial Investment

- He started the business by initially investing Rs75000 from his savings.
- He received a loan of Rs 2,50,000 loan from National Skill Development Corporation in the year 1995.

Production and production cost:

- On monthly basis MDF produces 4 quintal of spawn which gives 2 tonnes of mushroom a month. He mentioned that they produce 25 to 30 tonnes mushroom annually.
- From spawn to packaging, it costs about Rs 60-80 per kilogram.

Workers' Profile:
Female workers comprise of 90% of the workforce in the production process across all his clusters. 10% of the workforce are men. They are confined to logistical chains and transportation.

Income of the workers:

- Monthly income of all the workers across the value chains is between Rs 10,000-12,000.
- Annual turnover stands up to Rs 30 Lakhs.

Institutional Support:

- Indian Council of Scientific Research: It provided initial technical support and knowledge to MDF in exchange of Rs. 15,000. This helped MDF in increasing production and quality of the mushrooms.
- Assam State Rural Livelihood Mission: ASRLM facilitated market for MDF by inviting them and organised a stall at a trade fair. This give them an impetus where the stall earned Rs. 12 lakhs in just 13 days. Another event, SARAS mela in Guwahati held in 2016 exhibited value added products such as mushroom pickle, candy, pitha, rasgulla, momo and many more dishes. They generated a revenue of Rs. 1 lakh in 12 days. The response and demand for mushroom recipes was very satisfying, says Mr. Baruah.

Potential districts identified by Mr. Baruah:
He mentioned that **Nalbari, Kamrup Rural, Kamrup Metro, Morigaon, Kokrajhar, Chirang, Baksha, Udalguri** are some of the districts where mushroom cultivation have been done is a large scale. Women especially have taken up farming in these districts.

Future prospects:

- Planning to open a start-up named 'Sfurti'. This brand will promote products like mushroom candy, pickle, sausages, laddoo and momo.
- To make mushroom close to people's diet.

Cluster model of MDF:
This is a comprehensive model suitable for developing a cluster along with a value chain, says Pranjal Baruah (2022).

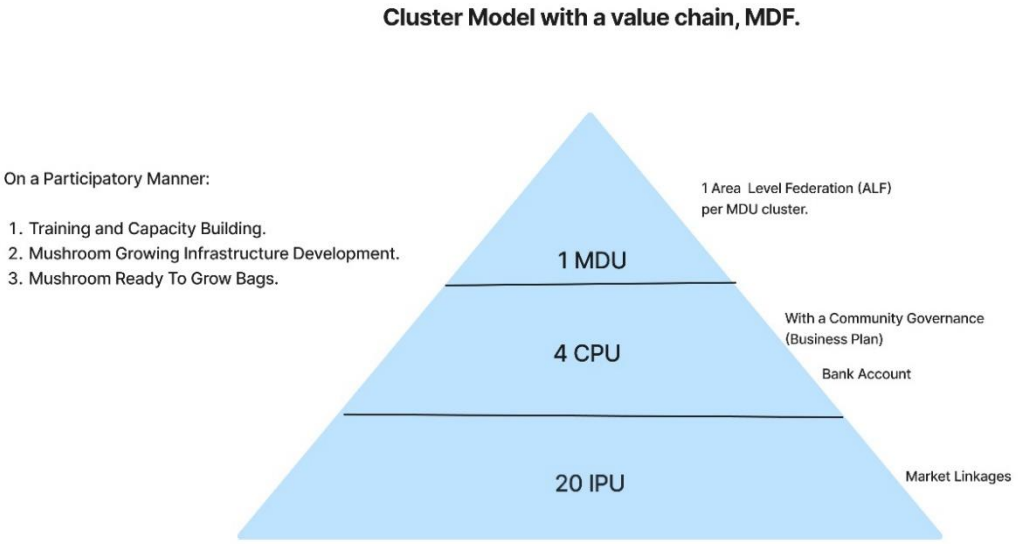


Figure: Cluster model with a value chain, MDF.

This model is followed across clusters in 4 states covered my MDF namely Assam, West Bengal, Meghalaya and one more. Each cluster has 25 members. All the members at Individual Processing Unit (IPU) are women. They are basically the workers who are engaged in preparation of mushroom bags, rearing the spawns and explore the local markets at their own level. These women members can devote only a portion of their time to the cluster due to cultural and family commitments. They facilitate between the Mushroom Development Unit (MDU) and IPU.

Members at the Central Processing Unit (CPU) are 4 in number. They comprise both male and female members. They engage in business plan, growth of the unit and to enhance efficiency of the cluster. Women who can commit larger part of their time to the cluster are involved in this particular segment.

Third, it's the Area Level Federation (ALF). It is also called Mushroom Development Unit. This is the main brain of the cluster from where the produce disseminates. There is 1 person who is involved and he/she supervises the overall cluster and engages with the externalities. They procure fresh mushrooms from IPUs and send them to market players.

MDF is developing a complete industrialisation cluster model for mushroom cultivation for the Democracy Republic of Congo to be implemented by the African government over five years for sustaining 1,00,000 people, says Mr Baruah

Women Empowerment Through Mushroom Cultivation with Institutional Support.

Aroti Devi is a mushroom farmer from a lush countryside of Golaghat, Assam. She has been a paddy-field farmer until she found the alternative of mushroom cultivation. It has ensured a sustainable livelihood and transformed them rom quite homemakers to 'empowered farmers'.

Training and institutional support:
Mushroom Development Foundation (MDF) has come forward to help Aroti Devi and more like her in Golaghat. They made women aware of mushroom cultivation and its potential to make them economically sustainable. North East Institute of Science and Technology (NEIST) has workled closely with MDF and today the hardworking wives and mothers have taken to mushroom cultivation in a big way.

Income:
"Ever since I have learnt mushroom farming, there is an assured sum - no matter how small - that I am able to bring home every month. At least I can now plan something concrete for the future of my children," says a woman who harvests up to five kilos of mushroom on a particularly good day.

Like Aroti, her neighbour, Jyoti Moni Das can't stop smiling these days. Her earnings from the mushroom bags she has nurtured over the last one year have given her tremendous happiness and peace of mind. *"I, along with several other women from my village, who are part of a self-help group, have been trained in mushroom cultivation by the MDF. Over the last 12 months or so I have made Rs 40,000. My mushroom bags have truly been a boon for my family,"* she remarks.

Potential of mushroom farming:
"Unlike in other parts of India, where mushroom cultivation needs good investment as it has to be produced in an artificially controlled environment, this is not the case in the northeast. The region is naturally blessed," says a representative of MDF. According to him, Assam is well-suited for growing oyster mushrooms that require an optimum temperature of 20-30 degree Celsius, while button mushrooms, which thrive in 10-20 degrees, are perfect for Arunachal Pradesh, Meghalaya, Nagaland that are at a higher altitude. Shitake mushroom, one of the most expensive varieties, sprouts at a temperature of 15 degrees Celsius and is ideal for a state like Manipur.

Case Study on Hemanta Nath

Mr. Hemanta Nath of Nalbari district of Assam have been trading mushrooms since 2012. He procures majorly from the districts in West Bengal mentioned above. He supplies most of fresh mushrooms in Guwahati, Golaghat, Bodoland Territorial Region (Kokrajhar, Baksa, Chirang, Udalguri), Bhutan and Nagaland. 70% of his produce goes to Bhutan alone and remaining 30% is supplied to rest of the places. We shall now look into the value chain and spawn to market overview of Mr. Nath's mushroom trading.

Recognition:

- National Award named Progressive Mushroom, 2022 has been awarded by the Directorate of Mushroom Research, Solan, Himachal Pradesh.

Institutional support:

1. Krishi Vigyan Kendra:

He received his initial training and technical support from a local KVK in Nalbari. Assam in the year 2012.

2. Directorate of Mushroom Research, Solan, Himachal Pradesh:

After training from DMR, he has received a grant of Rs. 4 Lakhs. He also got a dryer machine from DMR. He is now a master trainer in mushroom cultivation.

3. Prime Ministers Employment Generation Programme (PMEGP):

He recently received a subsidy loan of Rs. 5 lakhs for a dryer machine under PMEGP for his unit in Nalbari.

4. Production and Procurement:

- 1.5 quintals a day at his unit named 'Stuti' in Nalbari, Assam (Prior to training of workers pre-COVID).
- His unit comprises of 20 farmers and has a mushroom processing facility as well. It has a mushroom dryer which he received from KVK, Nalbari.
- He procures 40-50 quintals of fresh mushroom a day from North Bengal districts.
- Winter season is better for cultivation of mushrooms. Yield and quality is much better than mushrooms grown during summers.
- He also imports Shitake Mushroom from Thailand. It has good demand in Nalbari. (Meghalaya produces 40,000 tonnes of Shitake Mushroom alone and exports it to Japan).
- Dried mushrooms are processed at bis own facility and being sold at the local market, confined to Nalbari and Guwahati as of now.
- He is also associated with two mushroom clusters and procures from them whenever there is a need to supply in the local market: vendors, supermarkets and malls.
- Routine based production is followed as per market demand. This is to prevent surplus mushrooms in the market which will eventually reduce the price of mushrooms.

Cost of Production:

- Rs 40-60 per kg is the cost of production from spawn to edible size and packaging. Additional cost includes transportation and labour which eventually leads to a cumulative of Rs 80-90 per kg. Transport cost is higher in Assam by Rs. 5 per Kg along with ice-packing.

Demand and Supply:

- He mentions that Nalbari district alone has a demand of 1 quintal per day.
- As per suppliers from West Bengal, Assam and some parts Tripura alone requires 10 tonnes of fresh mushroom per day. Guwahati and Tinisukia in Assam consumes large amount of fresh mushrooms.
- Most of the mushrooms are Oyster Mushrooms. But, demand for Button Mushrooms have been increasing in Assam now.
- Local produce has more demand as the mushrooms that are procured from outside the state are transported in thermocoal ice-boxes. This at times comprises with the quality of the mushrooms.

Income:

- Fresh Mushrooms are sold at Rs 120-140 per Kg in Assam. He sells about 150 quintals a month in Assam and Tripura. His turnover for a month is Rs 21,00,000.
- His profit margin per kg of fresh mushroom is Rs 40. He earns a profit of Rs 6,00,000 in a month.
- He sells about 30 kg of dry mushrooms a day at the cost of Rs. 800-1000 Kg. However, it has high production cost as 10 kg of fresh mushroom give around 1 kg of dry mushroom. He earns about 9,00,000 a month from dry mushrooms.
- Price increases in summer season as there is less production due to hot weather.

Future plans:

- Focus on the market of South Asia such as Dubai.
- There is hardly any competition at least in the next 5 years which gives him an opportunity to have a more string hand over the mushroom market.

Barriers faced by Hemanta Nath
Initial cost for setting up a mushroom farm:
1. Fixed Capital:

- 12*12 room comprising of bamboo/concrete walls and tin shed.
- This room can host 400 cylinders of mushroom spawns.
- Agro-green net can be utilised to prevent insects inside the unit.
- Dryer (can be availed from KVKs).

2. Variable Capital:

- 1 cylinder consists of straw and spawns which costs Rs 50-60.

Outcome:

- Every day, one can harvest around 100 kgs of fresh mushrooms.

Case Study on Pradeep Das

Pradeep Das, of Baba Mushrooms, is a mushroom farmer have been growing them since 2014. He started initially with 100 cylinders. He received his training from Mushroom Development Foundation mentioned above. He is now a master trainer in Krishi Vigyan Kendra, Kahikuchi. He has also been trained by Directorate of Mushroom Research, Solan, Himachal Pradesh. Currently, he has more than 1200 cylinders at his unit.

Figure: Baba Mushroom Farm, North Guwahati.

His unit comprises a total of 15 workers. 10 of the workers are female who are involved in the production process. All of these women are hired on part time basis as per demand. 5 of the workers are male who are involved in the transportation process and procurement of hay and spawns from the local market.

Figure: Women workers of Baba Mushroom Farm.

Production and cost of production:
Milky mushrooms are his primary produce, followed by oysters and button mushroom. He produces a total of 84 quintals a year. He produces oyster mushrooms in winters. Pink mushrooms and milky mushrooms are produces in summers at his farm. He also produces value added products such as mushroom powder, pudding, fritters and pickles.

The production cost is around Rs 50-60 per cylinder for all the categories of mushroom. Adding to transportation of the spawns and the final produce to the market, production cost rises to around Rs 80 per cylinder.

Income:
He sells oyster mushrooms at Rs 200 a kilogram; pink mushrooms at Rs 300 a kilogram; milky mushroom at Rs 400 a kilogram. He mainly sells it in the local market. He also supplies to the supermarkets in Guwahati.

The table below shows the production and income of a year: It is inclusive of the production cost.

pe mushrooms	**ıount produced in kilogram**	**venue generated (in rupees)**
ster	**00**	**)0,000**
ık oyster	**00**	**)0,000**
lky	**00**	**50,000**
tal	**00**	**,60,000**

Table: Income of Das, Baba Mushroom.

Das also produces compost out of mushrooms. This helps him in mitigating loss of mushrooms while production as well as transit. He earns a lump sum amount of Rs 75,000 a month from mushroom compost alone.

ANNEXURE III

Central Government Institutions and Initiatives

i) **National Horticulture Board**: This organization support farmers to establish flower business in the country. It also helps in development of hi-tech commercial floriculture in identified belts and make such areas vibrant with floriculture activity, which in turn will act as hubs for development of floriculture. It also facilitates development of modern post-harvest management infrastructure as an integral part of area expansion projects or as common facility for cluster of projects.

ii) **Agricultural Products Export Development Authority (APEDA):** This organization help entrepreneurs with cold storage facilities and freight subsidies. It is a nodal agency for promotion of agro exports including flowers and have introduces several schemes for promoting floriculture exports from the country. These relate to development of infrastructure, packaging, market development, subsidy on airfreight for export of cut flowers and tissue-cultured plants, etc. The 100% export-oriented units are also given benefits like duty free imports of capital goods. Import duties have also been reduced on cut flowers, flower seeds, tissue-cultured plants, etc. Setting up walk –in cold storage has been allowed at the international airports for storage of export produce.

iii) **Dept. of Agriculture and Cooperation:** it is the nodal organisation responsible for development of floriculture sector. It is responsible for formulation and implementation of national policies and programmes aimed at achieving rapid agricultural growth through optimum utilization of land, water, soil, and plant resources of the country. Production of cut flowers for export is also a thrust area for support.

iv) **Floriculture Information System:** This is a part of Agro-Industrial Information System, where agricultural information is generated, transformed, consolidated, received, and delivered to target groups. It is a platform for floriculture information and knowledge sharing and exchange for floriculture-based research and development for target groups and stakeholders. The stakeholders are Government of India sponsored floriculture related organizations, NGOs, FPOs, etc. It serves as an information and knowledge system for floriculture research and development at a country level aiming for strengthening, coordinating and increase agricultural production and improving performance of floriculture community and industries.

v) **Integrated Development of Commercial Floriculture:** It aims at improvement in production and productivity of traditional as well as cut flowers through availability of quality planting material, production of off season and quality flowers through protected cultivation, improvement in post-harvest handling of flowers and training persons for a scientific floriculture. State governments have set up separate departments for promotion and development of the sector in their respective states.

vi) **All India Coordinated Development of Floriculture Project:** This is a network of about 20 centres that focus on areas of crop improvement, standardisation of agro-techniques including improved propagation methods, plant protection and post-harvest management.

vii) **Promotion of Joint Venture in Floriculture:** Attracted by the huge potential for the growth of floriculture and active participation of private sector, Government of India has shown keen interest in developing joint ventures. Indian entrepreneurs in Floriculture sector usually run medium sized business. They look up to joint ventures as a turn-key collaboration where they depend on the foreign companies to set up the projects and supply the inputs with buy-back arrangements. However, in recent years, top Indian corporates namely Reliance, IT, Tata Tea, Essar Group, Bharati Group, and Thapar Group have ventured into the Floriculture industry.

Joint ventures are successful when service provider ties up with Department of Horticulture on a PPP model on government land. An MOU is signed between two parties regarding the same. For instance, a MOU has been signed between DHO, Jaintia Hills and North Bengal Floritech on Thadlaskein Horti Hub. The hub is on government land, under the DHO, the service provider has set up a Centre of Excellence(CoE) for cut flowers which are suitable to be grown in that region. Facilities such as farmers' training centre, farmers' hostel, flower collection centre and grading and sorting rooms have been set up by the DHO, who made a onetime payment to the Service Provider for setting up the infrastructure for cultivation of cut flowers mentioned above. The Service Provider, on its part, invests in transfer of technology for the cultivation of these flowers, as well as, in the farmers' field when smaller units are given to the farmers by the DHO.
This **'Hub and Spoke'** model for Jarbera flower in particular at Jaintia Hills, where a Joint Venture has been established between the Service Provider and the DHO under the Department of Horticulture, has proved to be a grand success so much so that this district has been declared as the Gerbera district of Meghalaya. Every year at least twenty farmers are added to the long list of spokes which fall under this Joint Venture. The Service Provider has a MOU for the transfer of technology, setting up of infrastructure and most importantly, purchase of flowers from the farmers. The DHO is the monitoring agency. Hence, it can be observed here that a Joint Venture has been successfully established between a Service provider and the Department of Horticulture on government-land whereas the farmers/tribals are indirectly under the umbrella of this MOU between the Service Provider and DHO. So it is beneficial for both the Service Provider and the farmers and their success has led to the farmers finding an attractive alternative source of income which was absent with the traditional way of living. Success of such a venture lies in the fact that progressive farmers have been encouraged to start investing their own money rather than wait for government subsidies. This is beneficial for the Service Providers as well since they do not suffer from the insecurity of losing out on the investment they make on such projects as the Government is a partner to such a Joint Venture.

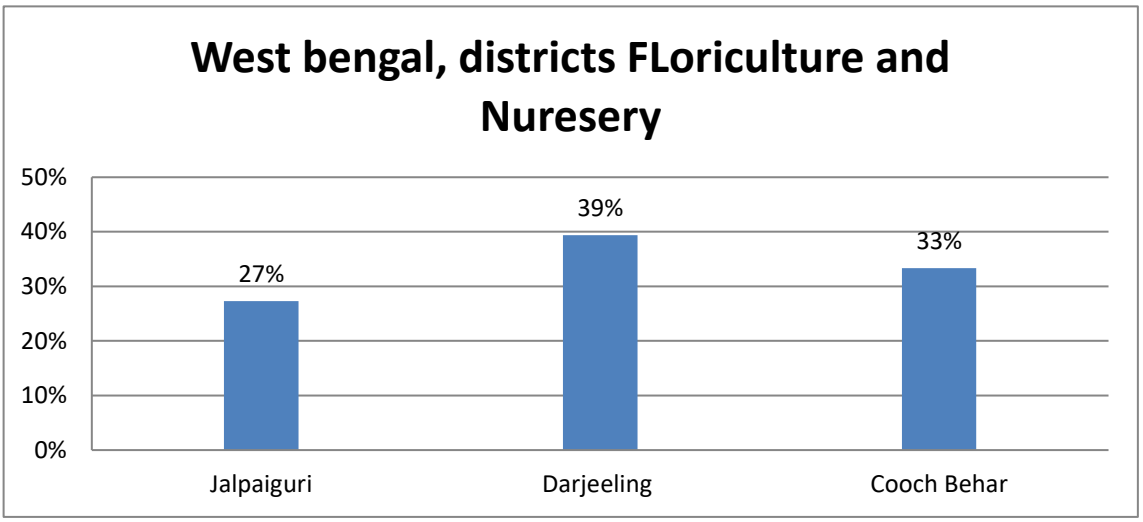
West Bengal Schemes and Institutions

a) West Bengal Accelerated Development of Minor Irrigation Project (WBADMIP)
This has undertaken 40 Minor Irrigation schemes in the districts to channelize water from the perennial springs towards water scarce agricultural lands. These 40 schemes once completed will be operated and managed by the community represented by Water User Associations. To make sure the WUAs maintains inclusion, access and equity in the future, its members are empowered through various capacity building programs on water management as well as exposure tours to the farms of progressive farmers from other WUAs.

Besides the 40 Schemes, Project has also taken up the constructions of five Water Silos that will support 24 Hi Tech Floriculture units on Garbera and Carnation cultivation. The water Silos are pre-fabricated steel water storage tank with a capacity of 25,000 litre each. Water from the silos will be delivered through pvc pipes that will feed the drip system fit in each of the 24 polyhouses of size 96 Square meter each.

Findings from Primary Study

During the survey, there were 33 respondents RWEs in the state of West Bengal who has engaged in Floriculture and diary. There are three districts that are focused in the sample, Darjeeling has 13 RWEs respondents, Cooch Behar has 11 and Jalpaiguri has 9 RWEs. Based on the data there are important variables are highlighted and discussed below-



1. Procurement:

Procurement of raw materials for Floriculture and nursery involves manure collection, pots, seeds of plants, saopoline and other medicinal techniques to take care of the plants. With regards to procurement of raw materials, RWE responds that 11/33 of them collect manure from the local market, 11/33 collect seeds of plants, and 11/33 responds that they require pots, sapoloine and other materials for the floriculture and nursery practice. All the respondents 33/33 responds that they acquired the raw material from private sources, and they also 33/33 responds that other costs of procurement rather than the above-mentioned is the only transportation. It is also important to highlight how they have secured their capital for procurement in the ongoing business, 25/33 responds that they have secured their capital for procurement from their business sources, and 8/33 responds that they have secured capital for procurement from their own income.

2. Production

It is also important to observe how RWEs produce their products, when RWEs were asked what types of products they produce, the response was 16/33 ie 48% responded that they produce multiple products and 17/33 ie 52% of REWs responds that they produced single products. The monthly production is in different modes as some of them have multiple products and the items produced are not similar, 5/33 i.e., **15 %** RWEs responded that they produce below 250kgs of manure for plants in a month, 17/33 i.e., 52 % of them responds that they produce lesser than 1 lakhs of plants in a month, those who can produce more than 1 lakhs of plants is 4/33 i.e. **12%** and RWEs who has practice ***Kuri chain*** of flowers is 7/33 i.e., **21%** of the total RWEs who engaged in Floriculture and nursery.

Analyzing in terms of the costs of production of floriculture and nursery value chain practice by RWEs it is observed that, 13/33 which is **39%** of them responded that they have spent below INR 5000 per month for the costs of production, 6/33 ie **18%** of them responds that they spend INR 8000 to 15000, 9/33 ie **27 %** of them respond that they have spent INR 20000 to 45000 and 5/33 ie **15%** of them spend INR 1 lakh to 2.5 lakhs for the costs of production on a monthly basis.

When RWEs ask about their products and how it is different from the competitors **6/33 ie 18%** of RWEs responded that the size of the flower, single producer in the area and quality are the criteria that make difference to the competitors. While **27/33 ie 82%** of them responded that they have no differentiation in the product from their competitors.

3. Income

RWEs who engaged in floriculture have a different income which is linked with the kind of and amount of production they have made. Looking at their income level RWEs who an income of INR 10000 to 20000 is 11/33 ie 33%, then 5/33 IE 15 % of them respond their income is between INR 20000 to 40000, 6/33 ie 18% of them responded to INR 40000 to 60000, 5/33 ie 15% of RWEs respond that their monthly income is between INR 60000 to 1 lakh, and the highest monthly income is above 1 lakh which has 6/33 ie 18% of the total respondents among the floriculture practices. The income is slightly seasonal, it has higher from the month of September onwards 18/33 ie 55% responses and from October to April 12/33 ie 36% responses. Other is not predictable which has 3/33 i.e., 9% of the RWEs respondents.
When asked about operating their bank account, 99 per cent of them used bank accounts for their enterprises, when asked who operates their bank account the response to only self is only 5% and 85% 28/33 of them responded self; family in operating their bank account.
Mobile banking is also important in factors which is ore convenient in and faster way of transactions when RWEs were asked whether they have used mobile banking 15/33 ie 45% of them used mobile banking, while a majority of them 18/33 ie 55% of them did not use mobile banking.

4. Market

It is observed that RWEs who are engaged in floriculture and Nursery in West Bengal sell their products from markets, middlemen and retail wholesale. When asked where they have sold their products **27/33 i.e., 82%** of them respond that they have sold in the local market, **3/33 i.e., 9%** of them through middlemen and **3/33 i.e. 9 %** of them sell in retail and wholesale. When asked the most convenient way of selling their product, 8/33 of them respond local market, 7/33 respond middlemen, and 18/33 of them respond wholesale market. And RWEs in this value chain none of them have their own brand. According to their response, their target customer 15/33 of them responded to wholesales, 7/33 of them responded to middlemen, 9/33 of them response local markets and 2/33 of them responds they want to link to the nearest town or NE states.
All RWEs ie 33/33 responds they could not meet the market demands, and 23/33 responded that there is no adequate supply in this value chain. 4/33 engaged in interstate marketing and 29/33 ie are confined within the states of West Bengal. When it comes to price fixing the RWEs have two criteria, the first is the market price and check the costing 11/33 respond to this, calculate the costs and profit margin 22/33 responds to this in terms of fixing the price of their products.

5. Credit and support services

In terms of credit Bank is the most preferred source of credit. 31/33 of them responds Bank was their preferred source of credit and 2/33 of them responded they did not receive any credit so far.

Support services are required by almost the RWEs, when they were asked if they have availed any institutional support only 5/33 respond that they have received it and 28/33 respond they did not receive support from any external sources, 5 RWEs received support from the government, and they received in financial, training and technical advisory. All of them 33/33 felt the need for any such support in their sector, and then ask the kind of support required 2/33 required financial support, and 23/33 of them requires technical, advisory, training, and financial. 5/33 required marketing, and technical support, and the remaining requires technical, market, advisory, financial & training 3/33 of them respond for this. The requirements are almost similar in all the responses.

6. Transportation

Transportation is important in this sector as it required a heavy mode of goods and services for RWEs in West Bengal who are engaged with Floriculture and Nurseries. 20/33 responds that they used a Truck, bus or carrier for transporting their products, 5/33 responds that their customer arranges it and 8/33 used their own vehicle or motorcycle. The majority of them use to hire heavy load carriers to transport their products in this value chain.

Then 19/33 responds that they used daily and 11/33 responds regularly and 3/33 RWEs respond to used transport on a weekly basis. While discussing the costs for transportation, 17/33 responds that they pay lesser than INR 250 per day, 5/33 respond they didn't bear the cost the middleman used to pay for this and 8/33 respond that they have spent INR 300 to 1500 daily.

7. Digital information

Most of the RWEs who are engaged in this sector have smartphones 32/33 respondents, and social media is used by 31/33 respondents, and when asked the reason for using the platforms 29/33 responds for leisure and connecting people and 4/33 used it for business and leisure.

Digital payment method is used by 16/33 ie 48% of the total respondents in floriculture and Nursery, among the 48% who used digital payment 9/16 of them used the **Google pay** application and 7/16 of them used **Phone Pe** application for digital payment method.

5/33 i.e. only 15% of them used digital payment methods for their enterprise and when ask about digital payment in the enterprise 16/33 responds that they have used digital payment for their enterprise and 17/33 of them did not use the digital payment for their enterprise. The majority of the are aware of online marketing and most of them are 32/33 i.e., 99% of them faced problems due to a lack of digital applications. The kind of problems faced due to the lack of digital applications is that they could not promote the business 3/33 faced this problem, information and knowledge; could not promote the business is 14/33 Then next problems like cannot connect to clients, information and knowledge, new opportunities and others 16/33 ie about 48% response of the RWEs. Most of them respond that kind of skills required in this value chain are market and communication, training using platforms, online marketing, promoting visibility etc.

8. Challenges

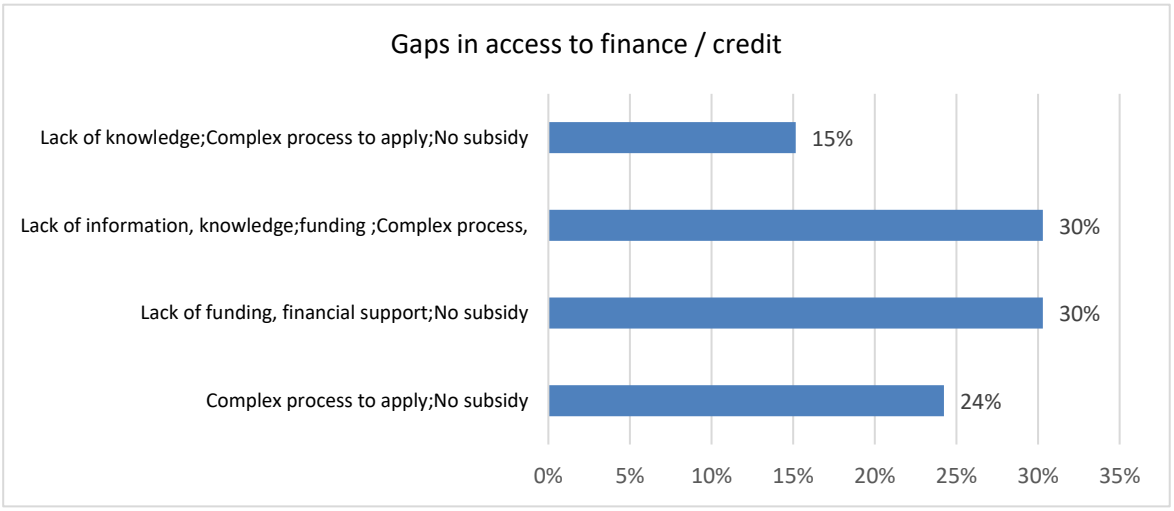
There is a challenge in all levels of engagement, the 91% of RWEs respond that they have faced challenges in the business.

There are major gaps in terms of technology including costs of tools and training for seed production which is about 36%, 15% of them didn't know how to operate tools and 42% lack of knowledge and 6 % did not have any ideas about technology.

Digitally there are gaps in terms of skills and lack of devices, support, and facilitation where 36% of them respond to these challenges and poor internet connectivity and lack of support also responded by 6% among the RWEs.

There is a lack of business skills like management, operational, professional and communication skills among these professional communication and management skill requirements responded by 61% of the respondents.

In terms of access to finance credit, RWEs respond to many issues, there are issues like the complexity of the process, no financial support and no subsidy, lack of knowledge and lack of information.



In terms of procurement of raw materials, most of them respond to problems about the costs, support from the government i.e., 79% and lack of sources and no support response by 21% of the respondents. The market gaps are observed as RWE could not reach out to the existing or new market which is the main issue, and they respond to this issue is 64% lack of an online market is also responding by 33% of the RWEs and 3% of them respond to lack of market information. Finally, all the RWE respondents in this value chain are willing to collaborate to address those issues.

ANNEXURE IV

Interventions/Incentives/Institutions/Schemes

1 Central Government Institutions and Initiatives:

i) Pig Development Scheme under National Mission for Protein Supplements

The Department of Animal Husbandry Dairy and Fisheries Mission, Ministry of Agriculture Government of India, implemented a national mission for protein supplements in India including Assam and West Bengal. This shall be implemented as a sub-scheme of Rashtriya Krishi Vikas Yojana. The main objective of the scheme is to promote availability of high-grade, persuade piglets to grading and multiplication units. The main features of the scheme include:

a) The scheme earmarked Rs.4.5 crores in Assam for establishing 1 Pig breeding nucleus unit and 18 satellite field breeding units. The scheme provided Rs. 1.80 crores in West Bengal for establishing one pic breeding nucleus unit. The total fund for the scheme was 40 crores.

b) Establishment/strengthening of 16 Pig Breeding Nucleus Units in selected states with proven potential.

c) Nucleus center will have 0-8 Satellite Field Breeding Units. Each nucleus center will produce 5,000 breeding piglets per year for distribution to the satellite units and other farmers for breeding purposes.

d) Piglets produced at these satellite units will be fattened for meat either at these centers or at the units of other beneficiaries.

e) 100% grant as subsidy shall be provided for different activities under the scheme.

ii) All India Coordinated Research Project (AICRP) on Pig: This project started during Fourth Five-year plan, with the aim to:

a) analyzing the effectiveness of supporting breeds under ideal managerial conditions that have produced a significant amount of data on exotic pigs.

b) The private sector, NGOs, farmers associations, and cooperative societies were among the numerous stakeholders that were discussed in the programme.

c) However, the centers were unable to increase and disperse the number of suggested pig varieties due to a restricted pig population and infrastructure. At present there are 15 AICRP Pig centers.

iii) Mega Seed Projects on Pig: The Mega-seed Project on Pig is overseen by the National Research Centre on Pigs. The project was started with the intention of producing and providing top-notch swine germplasm to the nearby farmers. Its objective includes:

a) Capacity building in institutions to produce more than 900 quality piglets in each state to meet the goal of covering 300 farm families annually with high-quality pig production and Launching gender-friendly pro-poor growth through improving pig husbandry.

b) Piglets of a higher caliber were created as part of this experiment and given to farmers.

c) Improved variety piglets totaling 1388, 2268, 2877, 2851, and 3664 numbers were produced for distribution in 2010–11, 2011–12, 2012–13, 2013–14, and 2014–15, respectively.

iv) National Livestock Mission: The National Livestock Mission (NLM), which was established in the fiscal year 2014–15. It aims to:

a) Increase the quantity and quality of livestock production systems.

b) Increase the ability of all stakeholders.

c) The program's emphasis is on entrepreneurial development as well as breed improvement for pigs, sheep, goats, and poultry, including the production of feed and fodder.

v) ICAR-National Research Centre on Pig, Rani: This institute have been taking steps for breed registration of indigenous germplasm in collaboration with ICAR-National Bureau of Animal and Genetic Research, Karnal.

2 Government Institutions, Interventions and Policies in Assam Associated Pig Farming

i) Animal Husbandry and Veterinary Department

Animal Husbandry and Veterinary is one of the major departments of Government of Assam. The Department is responsible for matters relating to livestock production, preservation, protection from disease and improvement of stocks and dairy development. It also looks after all matters pertaining to fishing and fisheries. The Department plays a vital role in socio-economic development of the rural mass in particular and the state as a whole and has substantial contribution towards GDP growth. This department plays major role in pig farming in the state. Some of the aims pertaining to this are:

a) To popularise small ruminants and piggery farming.
b) Popularization of artificial insemination (AI) services through doorstep delivery system.
c) To render extension services in order to provide self-employment opportunities amongst unemployed youth, women and under privileged of the state.
d) To increase crossbreed livestock population through induction and upgradation programme.
e) Expansion of extension services involving private AI workers such as 'GOPAL MITRAS'.
f) Training Departmental personnel as well as farmers for skill development and upgradation and familiarisation with recent advancements in various spheres in the field of Animal Husbandry & Veterinary.

ii) Assam State Rural Livelihoods Mission (ASRLM):

Under ASRLM, Producer Groups (PG) AND Producer Collectives will be formed for farm, off farm and non-farm sector mainly where there is possibility of aggregation, collectivization, value addition and organized marketing. The Livelihoods support person will facilitate the farm, off farm and non-farm Producer Group activities. Livestock activities are limited to domesticated animals such as cattle, small ruminants like goats, sheeps, piggery, poultry raised in an agricultural setting to produce commodities such as food, fiber and labor. As piggery, small ruminant like goats and sheeps and poultry rearing are more prevalent among poorest section of the community, priority would be on promoting them.

iii) Assam Pig Breeding Policy, 2019:

The Assam Pig Breeding Policy, 2019 has been formulated by Animal Husbandry and Veterinary Department. According to the department, at the core of all interventions is the breeding that aims at genetic improvement of germplasm for enhancing productivity, production efficiency and profitability. By providing livelihoods and food security, pig sector can ensure sustainable growth of the state. This is achievable only if a directional state pig breeding policy is in place, and measures are taken for its implementation. Major changes at two levels are inevitable. Conservation and genetic upgradation of the pig germplasm in one hand and on the other hand, changeover to intensive system without jeopardizing the zero-input system of pig rearing by the resource poor farmers.

iv) Bodoland Pig Mission:

The main objective of Bodoland Pig Mission

a) To make Bodoland a piggery hub.
b) To produce 1 lakh kg for a day which are directly associated with 30,000 households in breeding and rearing activities.
c) To provide pig breeding facilities, supply of quality feed at competitive prices, veterinary services, Enhancement livestock identification, insurance facility development of value chain and market linkage.

v) Policy for Private Investment in Promotion of Livestock Sector in Assam:

The Policy for Private Investment in Promotion of Livestock Sector in Assam aims to provide:

a) Subsidy to small farmers, medium farmers and large farmers for the project cost in a Farm excluding the cost of the land.
b) Subsidy on pig breeding farms with exotic breeds.
c) Subsidy on pig breeding farms with indigenous breed.
d) Capital subsidy to processing units in the private sector.
e) Capital investment subsidy for cold storage units in the private sector.
f) Subsidy for establishment of plant and machinery to set feed mill.

vi) Financial Assistance for Piggery Farming with Hand holding Program:

Financial Assistance for Piggery Farming with Hand holding Program is provided Under Mising Autonomous Council, the primary strategy of this assistance was to:

a) Give 100% assistance of subsidy to any beneficiary for developing self-reliant rural entrepreneurs and economic growth.
b) They aimed to provide training on certain important aspects of peak wearing from a commercial point of view such as hygiene medicines, feed management and motivation for pig breeding rather than wearing it for meat.

3 Government Institutions, Interventions and Policies in West Bengal Associated with Pig Farming

i) West Bengal Comprehensive Area Development Corporation (WBCADC):

Under this umbrella corporation, there are four number of pig breeding units. They are in Darjeeling (Siliguri-Naxalbari Project), Bankura (KVK Sonamukhi), Purulia (Saharjore Project) and Nadia (Haringhata).

Breeds	**Projects**
Large white Yolkshire	Siliguri-Naxalbari Project
Ghungroo	Siliguri-Naxalbari Project
T&D	KVK Sonamukhi; Saharjore;Haringhata

The capacity of these units range from producing 50 to 200 piglets per annum. In the year 2021, WBCADC Siliguri-Naxbari Project supplied piglets to different Development Boards of Hilly region like Lepcha Development Board; WBCADC Haringhata Project Supplied Piglets to Animal Resource Development Department of different districts such as Hooghly, Nadia, Birbhum, North 24 Pargana and Jalpaiguri.

WBCADC is currently working with the production of location specific and climate friendly breeds. For instance, Large White Yorkshire and Ghoongroo at Darjeeling district, T&D and Ghoongtoo at Nadia, Bankura and Purlulia districts. Besides the establishment of WBCADC's own pig farms, the attempt has been taken to establish Pig Breeding farms at the SHG levels in the villages with the financial assistance from RKVY. In near future, more and more Projects may be taken under Pig Breeding programme. Production of quality- piglets in the WBCADC Projects is gaining much priority.

ii) The West Bengal Livestock Development Corporation (WBLDC):

The main objective of this organisation is to execute Livestock Development Projects of Central and State Government Authorities including Government Undertaking, Corporation scheme or any other development schemes of those authorities and to construct, build, equip, and maintain either on its own behalf or as a nodal agent of Government or semi-government authorities including District Boards, Panchayat Samities, Panchayats, Farm for Cattle, goat, sheep, pig, chicken, birds of all kind and make provisions for preparation and preservation of products and by-products arising there from in normal or scientific process, procedure and method.

It also facilitated beneficiaries to carry on the business as trader, dealer, seller, exporter, importer, agents of the products of agriculture, farming, diary horticulture, floriculture, sericulture, pisiculture, including sea foods, marine products, processed fish, meat, pork, products, eggs, poultry products, protein foods, milk, cream, butter, cheese, ghee, sausages, fruits, roots, vegetables, honey, or other substance made from all or any of them and of drinks, except alcoholic drinks, beverages produced from such products whether fresh, dehydrated, canned or otherwise and other derivatives of all kind.

iii) Promotion of PPP model of Pig Farming by Government of West Bengal:

Government of West Bengal has eyed exports from the north Bengal district of Jalpaiguri. Motinagar, a small village in the district has been chosen as the site for establishing the farm. As per the Chairperson of West Bengal Livestock Development Corporation (WBLDC), Anantadeb Adhikary, West Bengal has invested 3 crores to establish the pig farm. Currently, 100 white pigs are being reared. Routine medical check-ups and vaccines are being administered by the local veterinary hospital. A 10,000 litre water reservoir has also been established at the farm site. WBLDC plans to export its first batch of piglets to Nepal and Bhutan along with neighbouring states of Sikkim and Assam.

4 Strategic Players

i) International Livestock Research institute (ILRI):

This apex institute works for livestock research and provide with guidelines for policy making to state governments. Its mission is to ensure food security and improve nutritional security. It also aims to reduce poverty in developing and underdeveloped nations through efficient research and safe and sustainable us of livestock. Pig farming is one of the main focus of ILRI. It has also published many reports concerning pig farming in Assam as well as West Bengal.

Participation of women in Pig Farming and Focus of ILRI:

Women in India play a very significant role in small holder farming system. Mostly they rear small sized animals such as pig, poultry, and the income out of it remain with them. In other factors, such as income from large animals such as cows and buffaloes remain with the men. Although it is a very small amount, it gives them economic empowerment to make family planning and meet their own needs.

ILRI has been focusing on Capacity Building Programme to increase women's participation by at least 50%. In these regard, it has framed a strategy to train officers at district, block and village level. They further train rural women who has the potential for pig farming and cater those women who are already involved in this economic activity. It has put forward a bottom-up method of training process. The training programmes shall be held in local primary schools, clubs, etc.

Dr. Deka stresses upon the fact that right kind of training and knowledge is essential for real empowerment of women in pig farming. Also, the training must be affordable and accessible.

Gaps Found During Primary Survey

1 Technology:

47% of all the respondents have expressed that there is lack of knowledge when it comes to technology in pig farming. 15% of the women stated that they lack operational skills in terms of technology. 38% of the respondents expressed high cost of technology.

2 Digital Platforms:

27% of the respondents stated that they lack digital devices such as smartphones to run their business. 38% of them stated that there has been no support to bridge this gap. Additionally, 35% of the respondents expressed lack of digital skills.

3 Gaps in Digital and Mobile Banking

Almost all the respondents have stated challenges in access to digital banking. Moreover, there are issues such as lack of information on mobile banking, virtual interaction with clients and digital communication. 36% of the respondents stated that they lack information and knowledge regarding mobile banking followed by gaps in promotion of business in digital platforms (26%), interaction with customers (23%) and digital communication (15%).

4 Business Skills:

22% of the respondents face professional skills in running their enterprise. 27% of them expressed concerns in terms of operational skills. 21% of them stated that they lack communication skills. 29% of them lack management skills. Whereas only 1% respondent expressed gaps in terms of financial skills in running their enterprise.

5 Access to credit

34% of the respondents expressed lack of information in accessing credit services. 7% of them said that they have no access to any kind of subsidy. 15% of them said that the process of accessing credit itself is a complex one. 15% of them were unaware of any kind of fundings available for them. 10% of them stated non-cooperation of banks and other financial institutions. Whereas 19% of them expressed that the interest rates are high for availing credit.

6 Procurement of raw materials:

32% of the respondents expressed that the cost of raw materials is high. 30% of the responses say that there has been no government support in terms of providing raw materials for pig farmers. Another 30% of the responses say that there is no subsidy for raw materials. 8% of the pig farmers have difficulty in access to raw materials.

7 Market gaps

26% of the respondents say that there is no regular sale in the markets, both local and urban markets. 20% of the respondents stated that they have little access to new markets that are coming up. 16% say that there is no facility of e-markets. 18% of them also added that they lack market skills. Additionally, 20% of the responses indicate lack of market information.

8 Diseases

African Swine Flu remains a major threat for pig farmers in general. Entrepreneurs have gone through a rough patch in their business due to African Swine Fever, in recent times. Entrepreneurs such as Runa Rafique also points that after the after the pandemic in 2020, the African swine fever outbreak has killed almost all their animals.

9 Other challenges:

43% of the respondents stated that veterinary services remain a major concern. 49% of them expressed lack of training facilities for pig farming. 8% of them said that there is a need of market support for them.

Popular Models Of Pig Farming

1) Intensive Farming System: In the intensive farming system, it is expensive to create facilities. These farms are applicable for large commercial seed farm. All Scientific approaches are possible in this system for production of safe food (pork). Pigs are confined to the pigsties and have no access to outside. Reproductively and productivity of pigs in this system are relatively more because of the high quality management, proper breeding, health care and quality feed. This can be termed as an entrepreneur model of pig farming. As per primary study, **only 25% of the producers follow this model**.

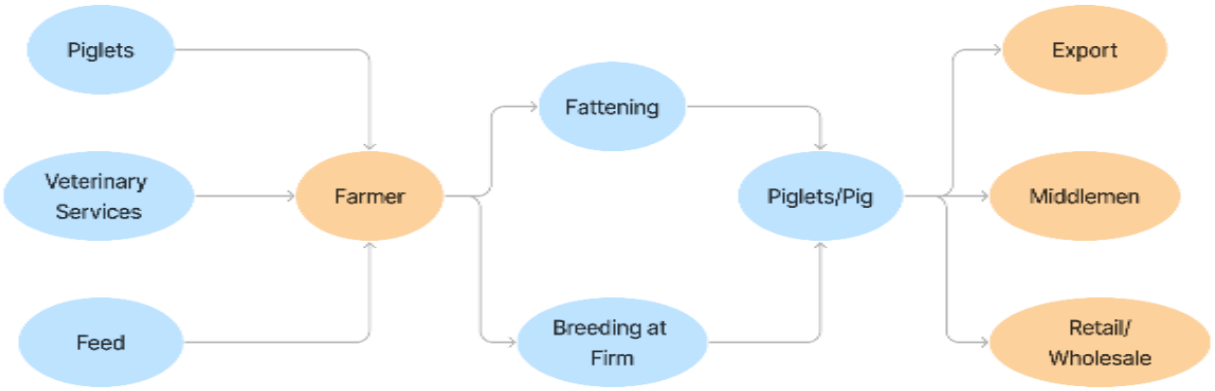


Figure: Intensive Farming Model

2) Semi-intensive Farming System: Rural areas where pig rearing is considered as livelihood, this system is more prevalent. This system of rearing is a modified Scavenging system. Pigs are generally kept in strong enclosures either made of wood or strong fencing materials. Need a sizable area for the pigs to move about freely. Small wooden huts are occasionally offered inside the fence as shelter. Pigs are typically allowed to graze and are given a little amount of a balanced diet. Tapioca, kitchen/hotel/market trash, etc., which are readily available locally, are utilized as the main diet. Sows are moved to distant locations to prevent piglet mortality. In terms of breeding, management, and health care, the scientific system of rearing falls short. **Only 2% of the respondents identifies their enterprise as semi-intensive system**. This system is little popular in these two states.

c) Scavenging System: It is both the conventional way of raising pigs and the most basic one. Pigs are left on themselves to search for food using discarded items such as kitchen waste etc. This system does not require any such sort of management. The pigs under this system have very poor growth and the occurrence of disease is high. The size of the piglets born under this system is small. **This can be called as traditional model of pig farming.** Primary study reveals **that 58% of the women pig farmers follow this model**.

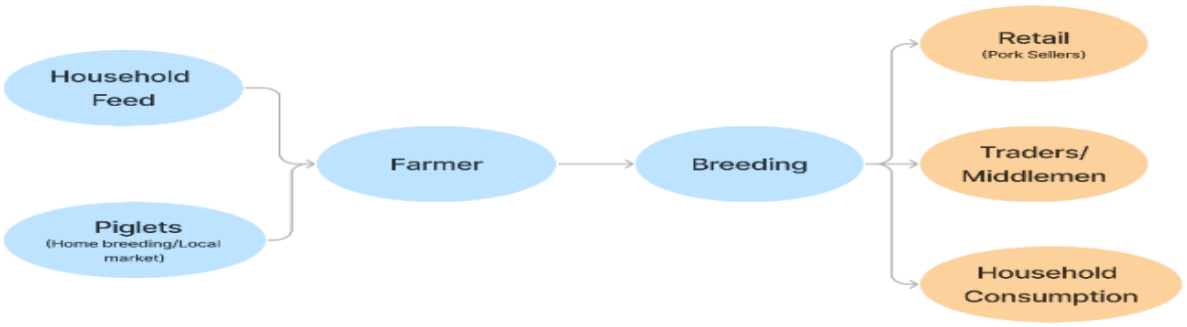


Figure: Scavenging Model

Major Challenges

i) Shortage of Feed and Feed Crops:

There is a big gap between the requirement and availability of feed and feed crops in Assam, particularly when it comes to pig. Maize is an important feed ingredient of pig feed. As maize cultivation is not very popular in Assam, its market price is high and availability is low. This result in higher cost of quality pig feeds affecting profitability and price of pork. It is imperative to locally produce or arrange supply of sufficient good quality feed and feedcrops for efficient utilization of genetic potential of pig and for sustainable improvement in productivity. Emphasis on maize production in Assam is a need. In addition, however, attention has to be paid for sufficient production of other major feed ingredients including locally available low-cost feeds.

ii) Low Productivity of Indigenous Pigs:

The indigenous Doom pig of Assam and the other non- descript local pigs are adaptable to local climate as well as the traditional scavenging mode of zero- input system of pig rearing. However, these pigs are very poor performer in terms of body weight and prolificacy, making them unsuitable for profitable commercial venture. Although it is achievable,improvement of the indigenous pigs through scientific selection as pure breeding stock is timeconsuming with an uncertainty factor. The challenge is to conserve the local indigenous pigs (although unprofitable) in one hand and also to take parallel measures for propagation of crossbreds/upgrades of exotic improved breed(s) with local as well as pure exotic breed(s) of proven credential in Indian condition.

iii) Pig Health:

A large number of infectious and metabolic diseases that are prevalent in Assam have serious implications on pig productivity, export potential and safety and quality of pig products. Beside, many of these diseases have zoonotic importance. Prevention and control measures of these diseases need to be strengthened. Shortage of veterinarians and para-veterinary staff is a constraint that needs attention for action. Facilities including mechanisms for diagnosis, treatment, tracking and prevention of the diseases need to be strengthened. Adequate infrastructure for ensuring bio-security,proper quarantine systems and services to prevent the ingress of diseases across the states and national borders need to be in place.

iv) Pig and Environment:

Climate change and global warming may have serious implications on the pig sector. These may be manifested in the form of heat stress, scarcity of quality feed and feed crops, and changes in epidemiological pattern of vector borne diseases etc., ultimately leading to reduction in production and therefore, economic losses. Mitigating the impact of climate change, calls for critical appraisal of the situation on continuous basis and advance planning. Following mitigation measures would be required to reduce the impact of climate change. The research on impact of climatic change on pig production and measures required tomitigate the same would be strengthened.

v) Knowledge Gap at the level of primary producer:

Most of the pig producers of the state being small and marginal farmers, their capacity and understanding required to absorb the latest technologies in modern line is limited. Strengthening of the extension machinery and easing out access to institutional finance are essential.

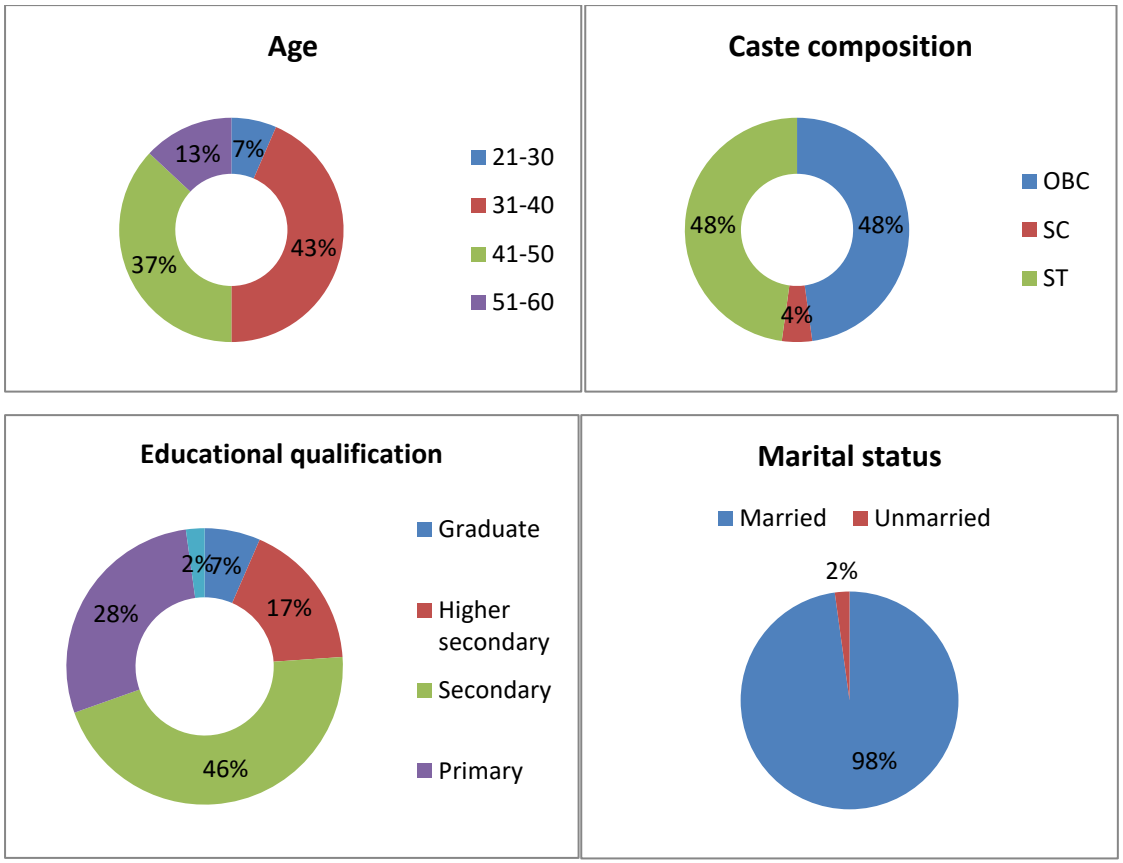
vi) Inadequate Infrastructure for Marketing, Processing and Value Addition:

The pig sector is handicapped by inadequate marketing and processing infrastructure as a result of which the primary producers do not get remunerative price most of the time. Major share of marketable surplus of pig products are not handled by organized processing industry, resulting in reduced price realization by farmers and post production losses and wastages. Establishment of slaughter houses in strategic locations aimed at humane and hygienic slaughter, scientific processing and packaging for value-addition of products is an important requirement. Attention may be paid to marketing, strengthening of infrastructure.

Brief of Findings from Primary Study: Livestock including Piggery

- Number of RWEs interviewed: 46.
- Average initial investment: 5,000-50,000

Socio-Economic Profile



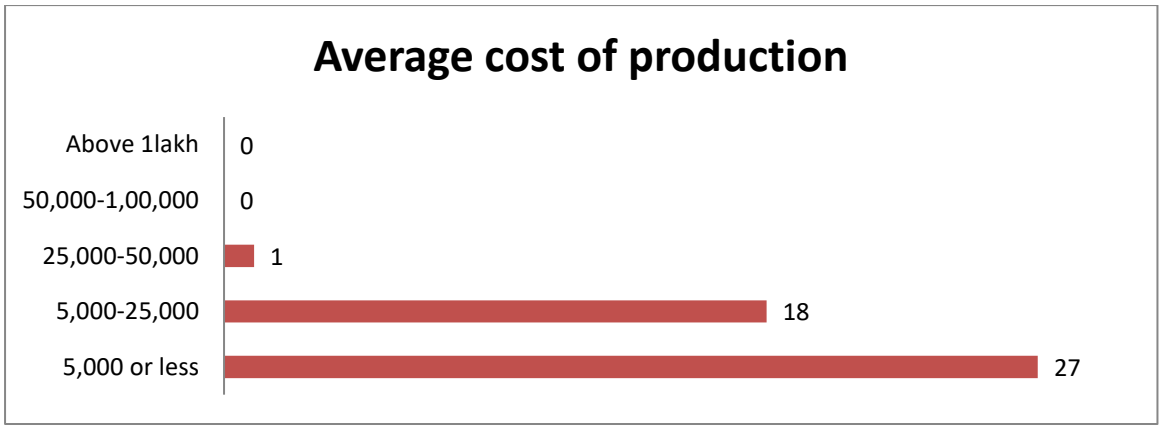
Standardisation practices

- No RWE in this value chain reported having a GST licence.
- Only 1 RWE in this value chain reported having a licence- a trade licence.
- Testing and certification of product is not prevalent in this value chain.
- 1 RWE reported getting their livestock checked by private veterinarian at the time of procurement.

Procurement

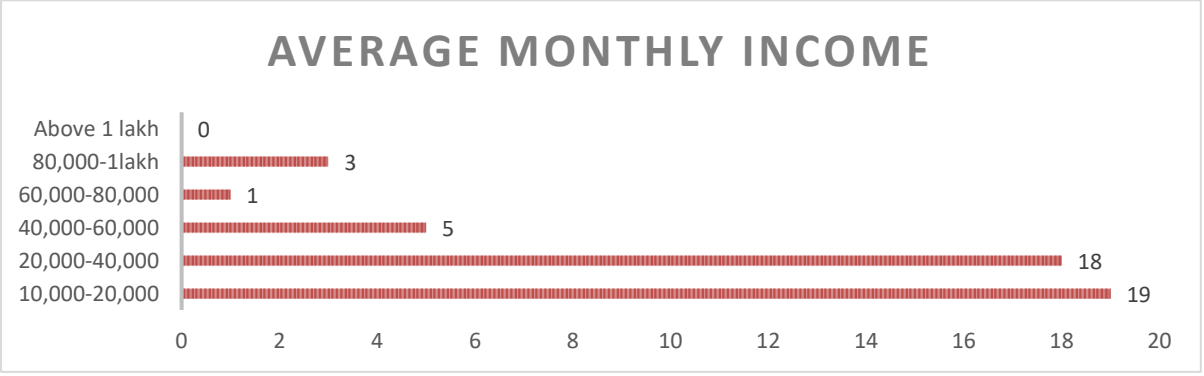
- The raw materials involved in this value chain are feed, medicines, and young animals and piglets. Other than raw materials, transportation and commute costs form a major part of cost of procurement.
- Respondents were asked to pick one or more sources of procurement. 44/46 reported they source livestock and materials from private entities, 4 procure some raw materials from public sources.
- Several RWEs (46%) are able to finance the procurement of raw material from their savings. 1 respondent uses credit from bank or MFI, 22 (48%) borrow from friends and family, 2 respondents did not state the source of their loans.

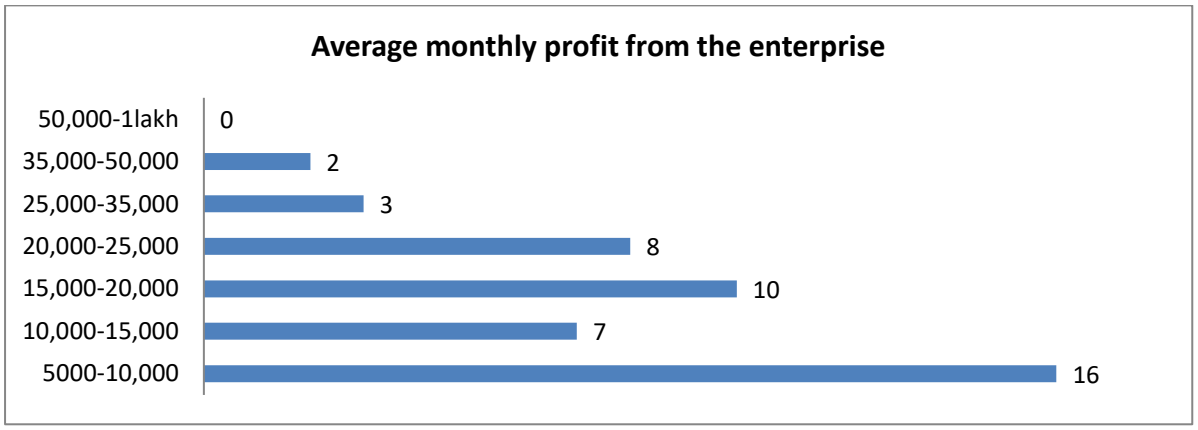
Production



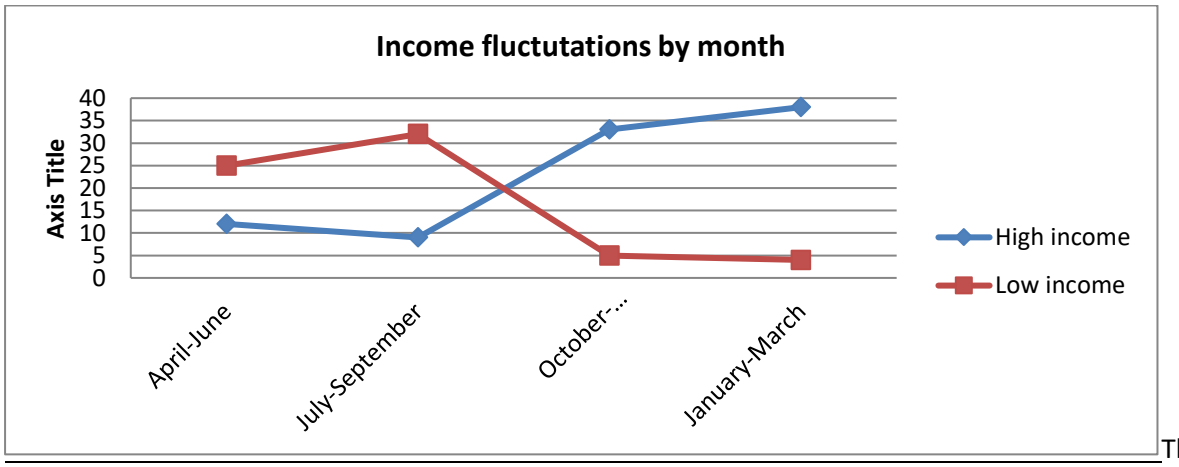
- 26 RWEs (57%) in this value chain are engaged in the production of a single item. 20 (43%) respondents produce a varied mix of livestock products such as piglets, fatteners, egg, meat, chicks.
- 22 (48%) respondents in this value chain intermediate products, 25 (54%) produce final products.
- In terms of production quantity, the range was set in different units to accommodate the nature of production. 19 RWEs produce less than 15 piglets per year, 5 RWEs produce 30-100 piglets per year. 1 RWE listed 45kgs in production of pig fattener. 15 RWEs listed their production in terms of kilos of meat produced per month- 10 RWEs produce 1000-1200 kgs meat per month, 4 RWEs produce 100-250 kgs per month
- The cost of production in this value chain ranged between INR 500 and 30,000.
- 57% (26) RWEs spend less than 5000 in cost of production, 16 (35%) RWEs spend in the range of 5,000-15,000. 2 (4%) RWEs spend 20,000 per month on production costs , and 1 (2%) RWE spends in the range of 30,000 per month on production costs.
- None of the RWEs in this value chain produce value added products.
- 3 RWEs reported wastage of 5-10 kgs meat during production, transportation, or storage phase.

Income

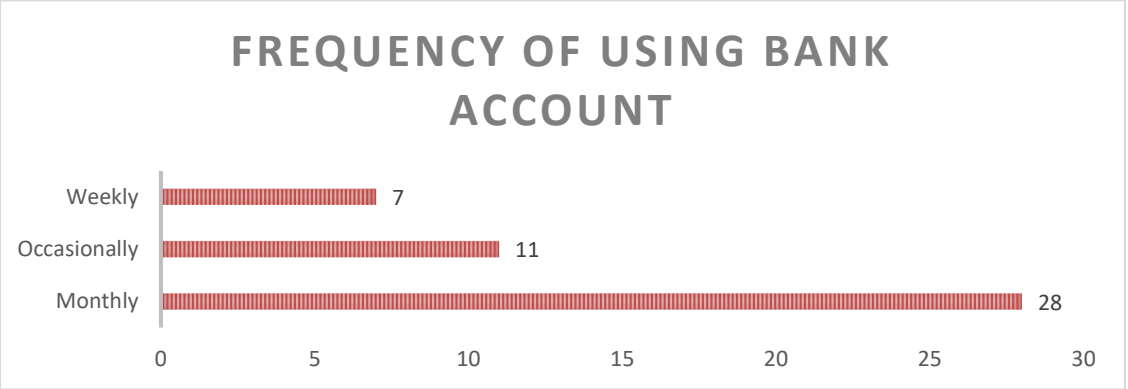




- 41% (19) RWEs in this value chain earn at the lowest bracket of income of 10,000-20,000; 39% earn 20,000-40,000; 11% earn 40,000-60,000; 2% earn 60,000-80,000, and 7% earn 80,000-1,00,000 a month.
- Similarly, 35% RWEs are trapped in the lowest average monthly profit margin of 5,000-10,000. 15% earn an average of 10,000-15,000 in profit, 22% earn 15,000-20,000 in profit, 17% earn 20,000-25,000 in profit, 11% earn more than 25,000 but less than 50,000 in profit.
- The value chain undergoes income fluctuations through the months with January to March seeing higher income.

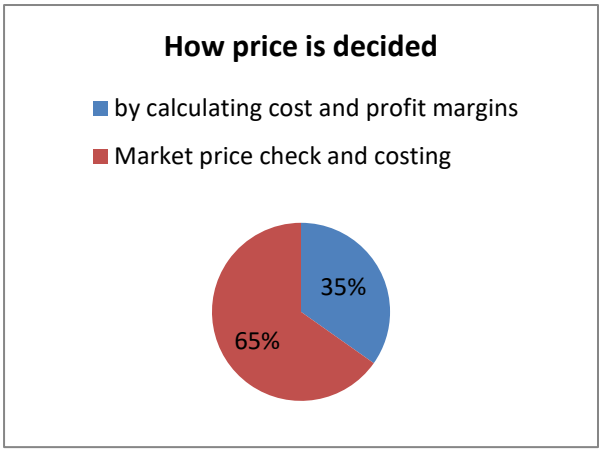


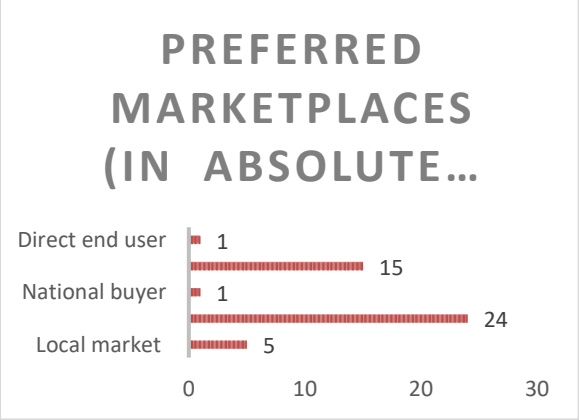
- The months of July-September sees a fall in income.

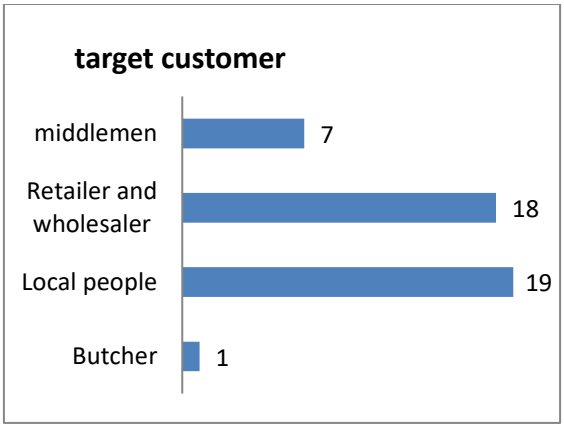


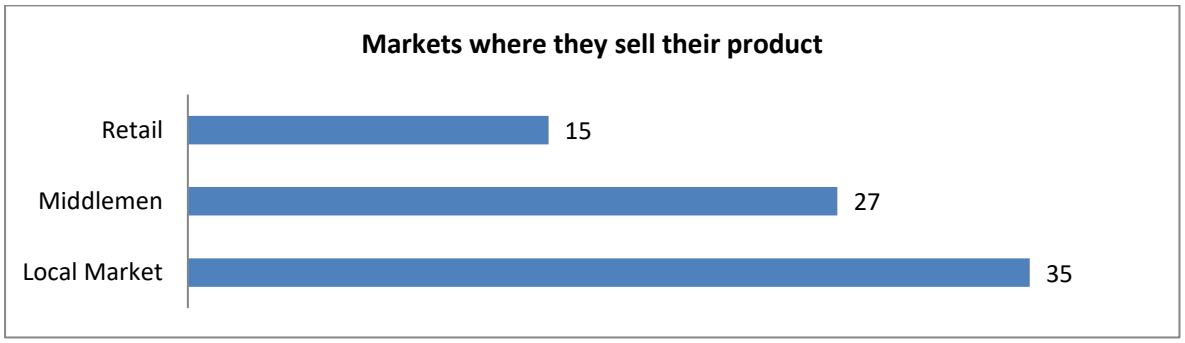
- All respondents have a personal bank account but none of the respondents have a bank account for their enterprise.
- 1 respondent (2%) reported that their business partner operates their bank account, 6 (13%) RWEs let their family operate their bank account, 98% (45) operate their own bank account.
- Respondents were asked about one or more locations they prefer to utilise to save money- 41(89%) prefer saving their money in bank, 15 (33%) prefer saving at home, 6 (13%) prefer saving in cooperatives.

Markets









- Majority of the RWEs sell their livestock products in local markets.
- 65% of the RWEs base their pricing on cost and profit margins. Only 5 RWEs (3.57%) have their own brand.
- No RWEs in this value chain are involved in interstate sales.
- Packaging and labelling is completely absent in this value chain.

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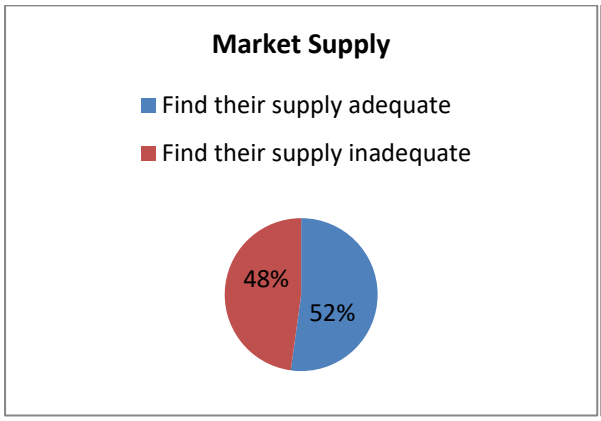
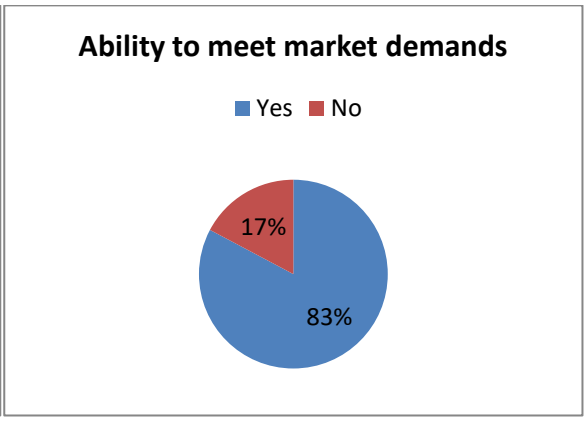
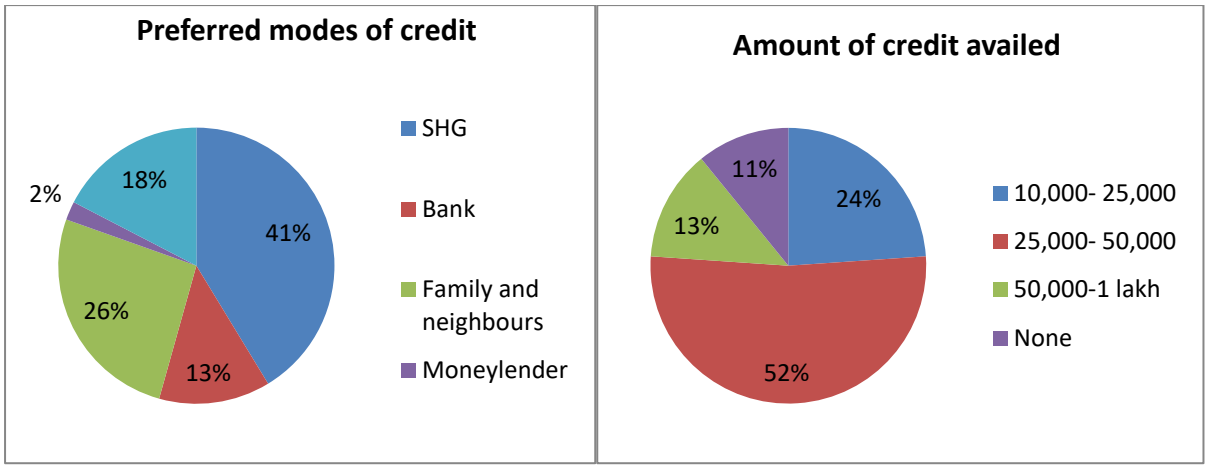
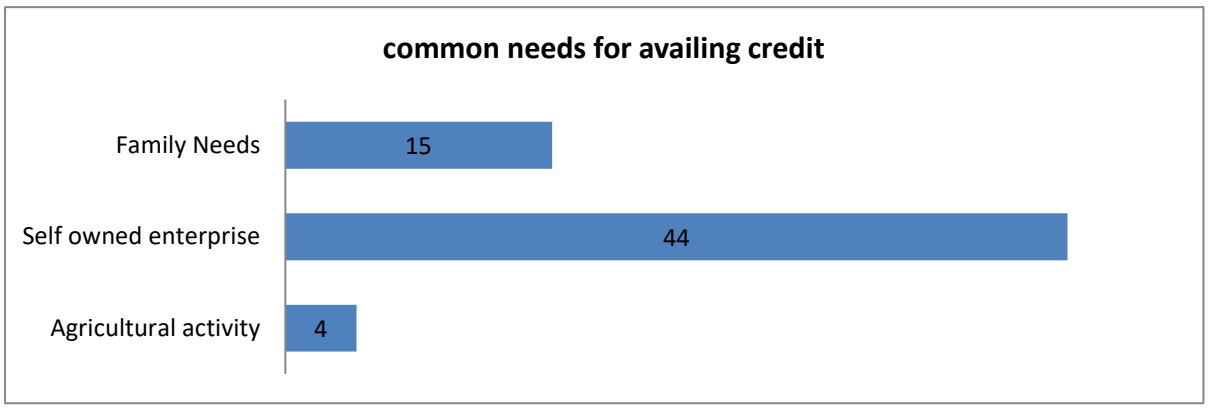


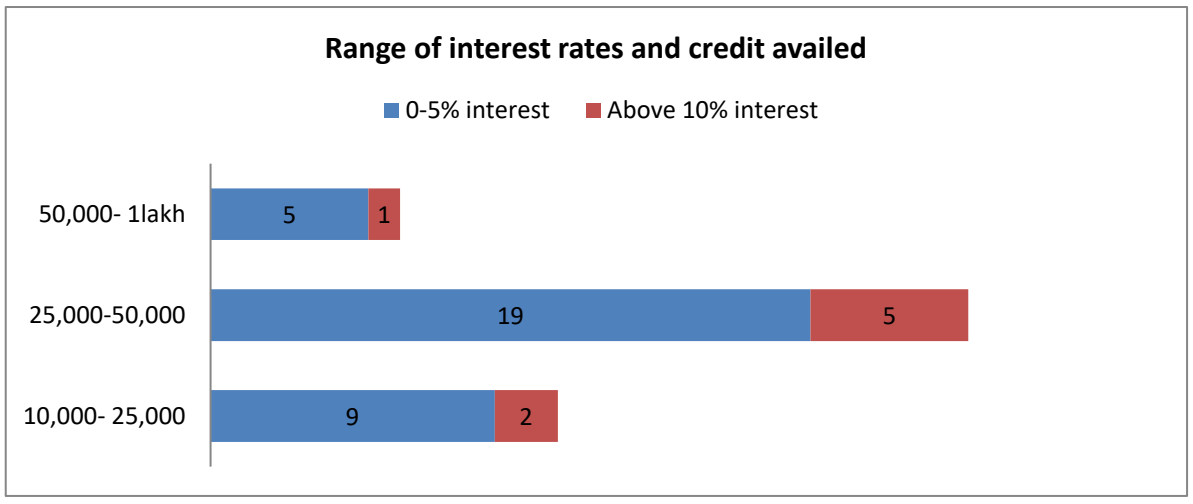


- The RWEs were asked to self-assess if they find their supply adequate, and if they are able to meet market demands. With 48% reporting their supply inadequate and 17% finding themselves unable to meet market demands, this value chain offers opportunities to make adjustments in scale of production by increasing the number of workers, adopting newer technologies, etc. – all of which requires financial support.

Credit facilities



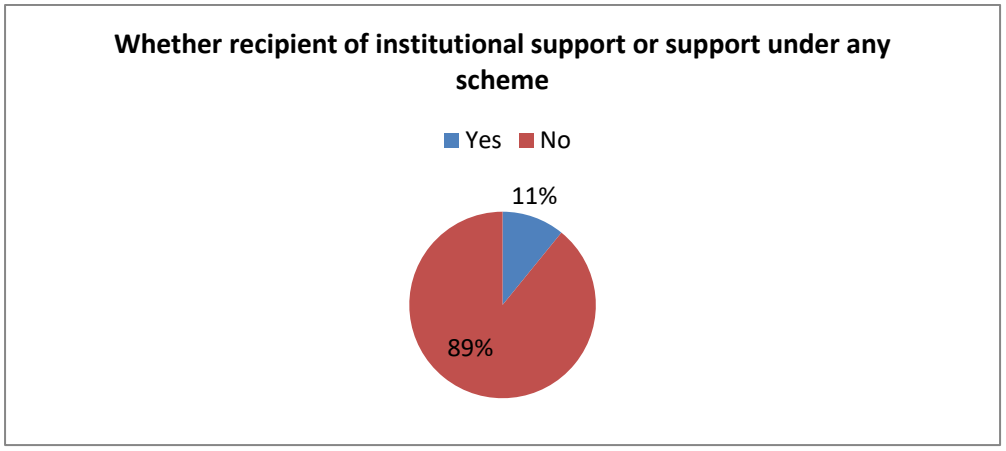




- The preferred mode of credit among RWEs in livestock value chain is largely SHGs (19). 12RWEs prefer asking for credit from family, 8 RWEs prefer MFIs , 1 RWE also mentioned money lenders.
- 11% (5) had not taken any loans. A majority of the respondents had availed credit in the range of 25,000-50,000 at 0-5% interest.

- The most common needs for availing credit are for developing one's enterprise (96%) and family needs (33%). Some also request loans for subsistence agricultural activities (9%).

Support services

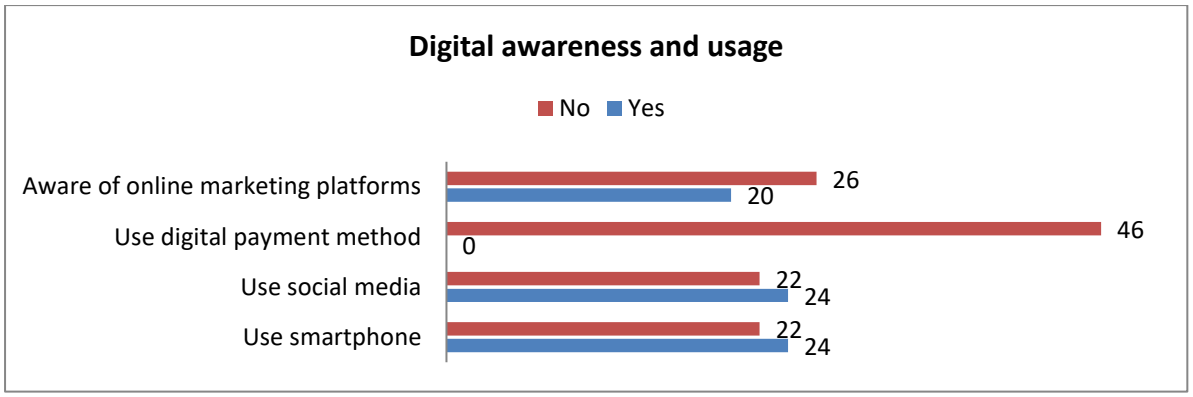


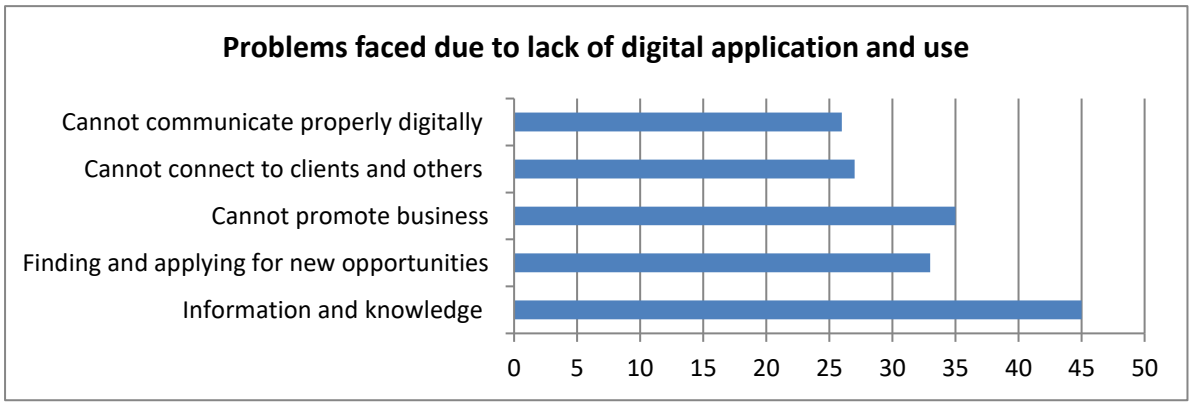
- 5 RWEs in this value chain reported availing support services.
- The source of information about the support services has largely been via office.
- The nature of support has been financial (2/5), training (5/5), technical (1/5)
- All 5 RWEs who availed support services see it as sustainable.
- The trainings were imparted free of cost.
- Some of the service providers active in in this domain Seven Sisters Development Assistance (SeSTA), Indian Institute of Entrepreneurship (IIE), Doha Foundation, Rita Foundation, ICAR-National Research Centre on Pig located in Rani, Veterinary department.
- 57% (26)of all interviewed RWEs engaged in livestock value chain are not covered under any social security scheme.
- All RWEs in this value chain reported needing support services. 32 (70%) want advisory support, 40 (87%) want technical support, 46 (100%) training support, and 46 (100%) financial support.

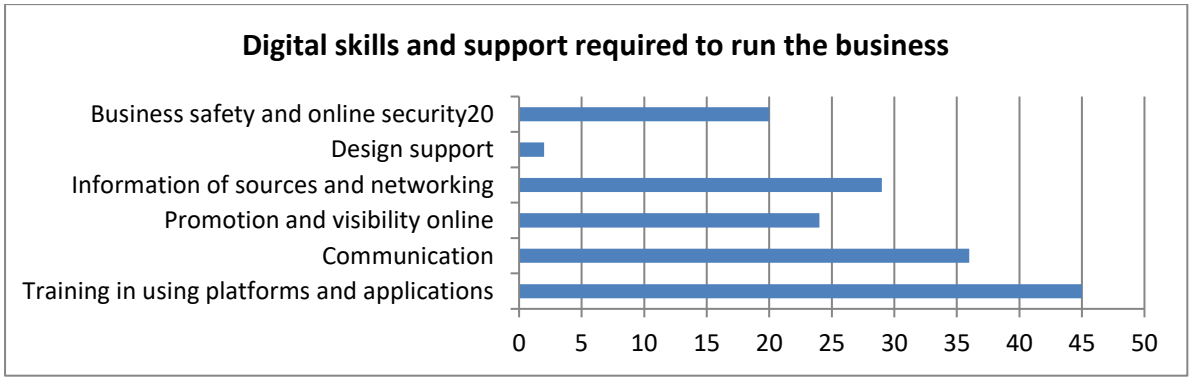
Transportation

- The respondents were asked about one or more mode of transport of final produce to the destination for sale. 5(11%) preferred buses, 6 (13%) employ auto van, 17 (37%) use their own vehicle, 10 (22%) use hired vehicles, 5 (11%) individuals sell from home, and 1 (2%) RWE uses truck/carrier.
- In terms of frequency, 91% (42) avail transport monthly; 9% (4) avail transport weekly.
- 59% (27) spend less than 500 on transportation, 14 (30%) spend between 500-1500, 1 respondent each spends 2,000 and 3,500.

Digital information

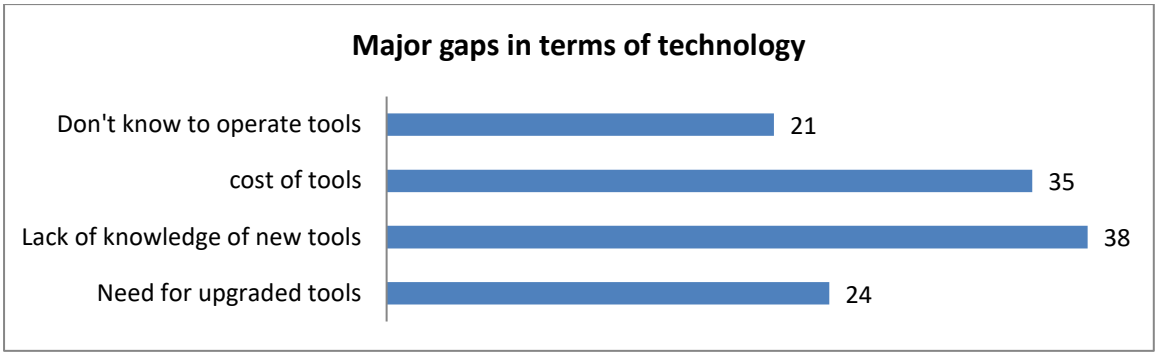




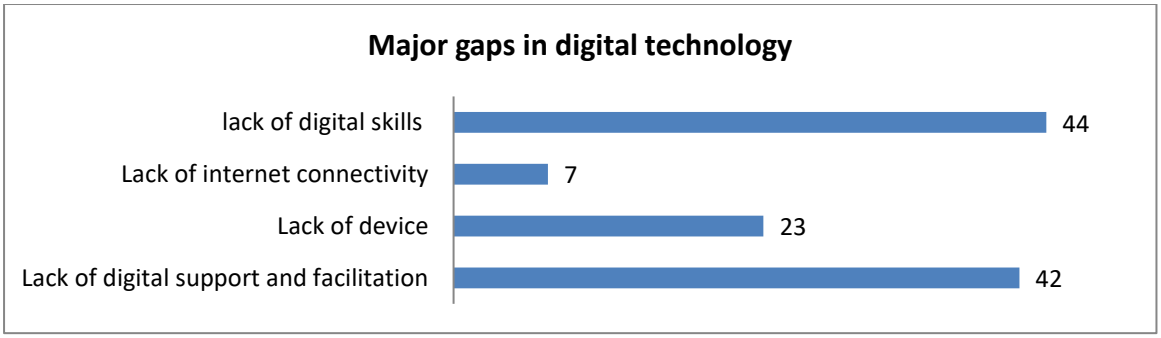


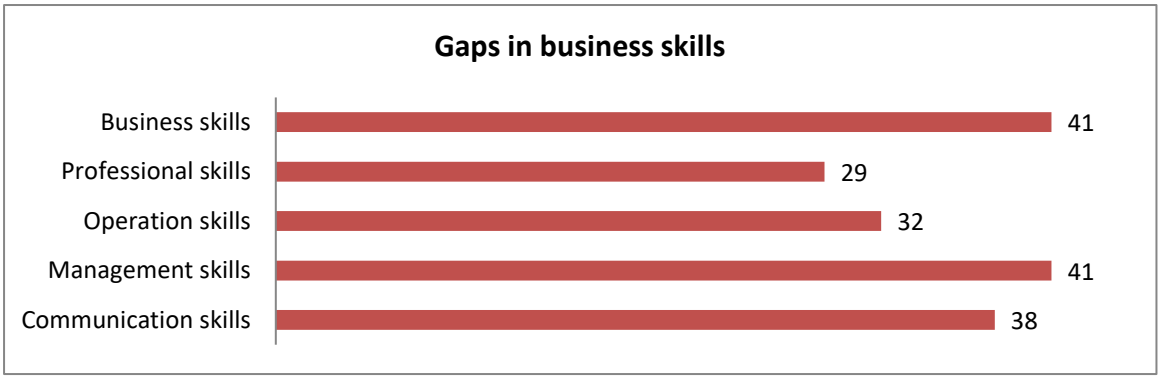
- The use of digital methods is at a nascent stage in this value chain.
- None of the RWEs use digital payments method for their enterprise.
- Most RWEs interviewed feel the need for training in using digital platforms.
- The RWEs require information of sources and networking to be able to meaningfully utilise the internet to better their list of alternatives.
- The use of ICT in the enterprises is close to non existent.

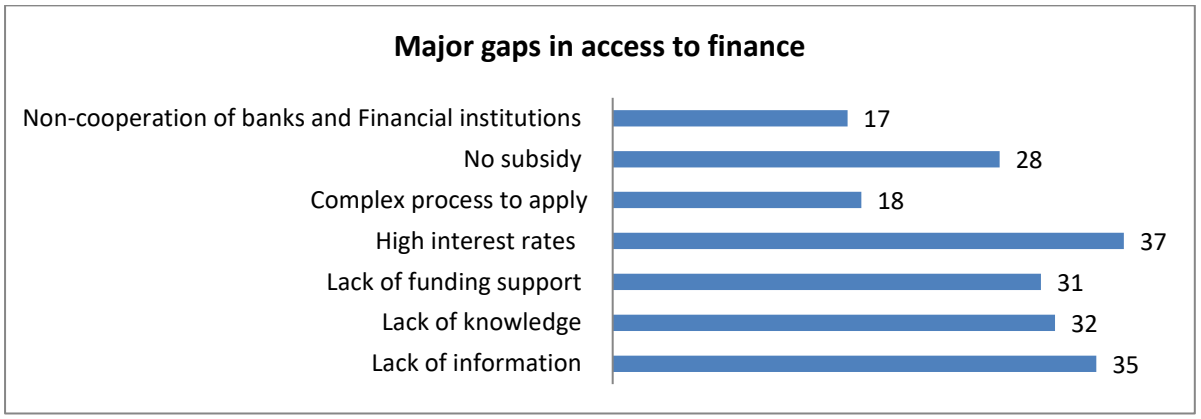
Challenges



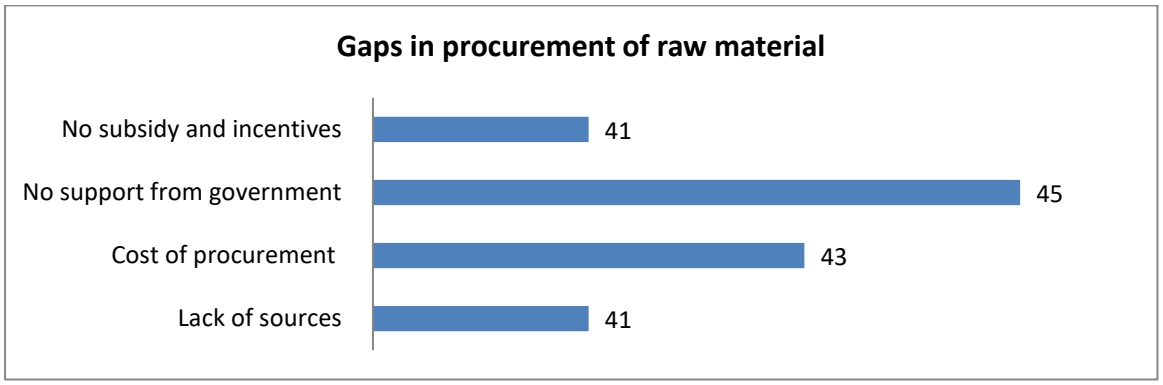
- The biggest challenge in this value chain is posed by outbreak of contagious diseases.
- There is a need for incorporating new research and tools in this value chain to increase production. This will require financial and training support.
- There is a scope for licensing and certification mechanism prioritising the health of livestock.
- There is an opportunity to skill the RWEs in value addition, packaging and labelling to help them access a steady source of income from one part of their production.
- There is a lack of digital support and facilitation ecosystem to cater to the needs of RWEs and skill them to be able to digitally manage their enterprise and reach new markets.
- The RWEs assessed themselves as requiring better communication skills (83%), business skills (89%), operation skills (70%), and professional skills (63%).

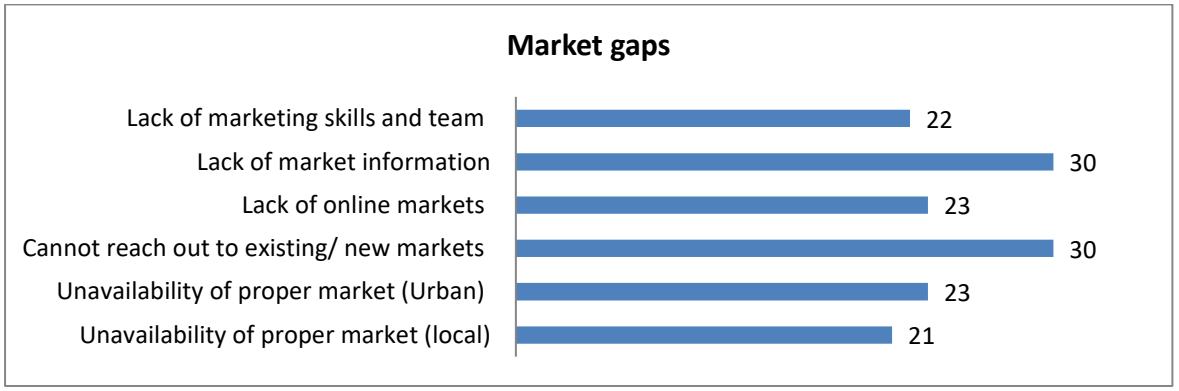






- This value chain is marked by a high incidence of personal loans from informal sources. Some of the major deterrents in accessing finance are the high interest rates (80%), lack of information (76%), lack of knowledge (70%), lack of funding support (67%), no subsidy (61%), complex process of applying (39%). 37% (17) found financial institutions to be uncooperative.
- The respondents reported a need for government support in procurement of raw material. The cost of procurement is major challenge. 89% (41) RWEs also reported a lack of sources.





- A majority of the RWEs in this value chain end up selling their products in the local markets.
- A major gap the RWEs reported was the lack of market information.

ANNEXURE V

Dairy Development Initiatives
Central Government Initiatives

At present, GOI is providing assistance under the **Intensive Dairy Development Program (IDDP)** to promote dairy in backward and hilly areas and in districts that received less assistance under the OF program. Under the scheme called **Strengthening Infrastructure for Quality and Clean Milk Production**, GOI aims to improve quality of milk and milk products for domestic purposes and the international market. One scheme provides Assistance to Cooperatives, while the **Dairy Entrepreneurship Development Scheme (DEDS)** scheme promotes private investment in the dairy sector. Besides these schemes, efforts have begun under the **National Dairy Plan** to improve productivity of animals and milk production in India.

1) Dairy Entrepreneurship Development Scheme (DEDS)

The primary objective is to generate self-employment opportunities in the dairy sector, covering activities such as enhancement of milk production, procurement, preservation, transportation, processing and marketing of milk, by providing back ended capital subsidy for bankable projects. The scheme is being implemented by National Bank for Agriculture and Rural Development (NABARD)

Priority shall be given to projects being implemented in a cluster mode covering dairy farmers/ Women in SHGs, Cooperatives and Producer Companies including creation of facilities of processing, value addition and marketing of milk produced in the cluster. Priority may be also be given to the beneficiaries from the categories of Scheduled Caste, Scheduled Tribes, landless, small, marginal and BPL category farmers alongwith farmers belonging to drought and flood affected areas of the country.

Initiatives by State Government

1) Establishment of Milk Processing Plant at Dhemaji under CM's special package

The primary objective is to establish one 5000 LPD Dairy Plant in Dhemaji District of Assam.It project provides for 100% Grant in Aid against the cost of following components for establishment of 5000 Dairy Plants. Additionally, the project also proposes to install pasteurization units, cream separators, packaging machines, refrigerator units, etc.

2) Establishment of 13 units of Commercial Dairy Farm in Dhemaji District under C.M.'s special package

Project Objective: To promote establishment of a Commercial Dairy Farm in Dhemaji District of Assam.

Project Provisions: The project provides for 100% Grant in Aid against the cost of 10 Lakh project cost for establishment of medium scale commercial dairy farm comprising of 10 CB cattle.

3) Establishment of District Dairy Development Office with farmers training center in the state:

Government is currently initiating various development activities under Dairy Development sector in the districts of Golaghat and Majuli. These two districts have small-scale milk producers who have the potential to meet the required increased demand in milk and milk products in growing urban centers where there is a demand. Due to agro climatic condition, production potential is high.

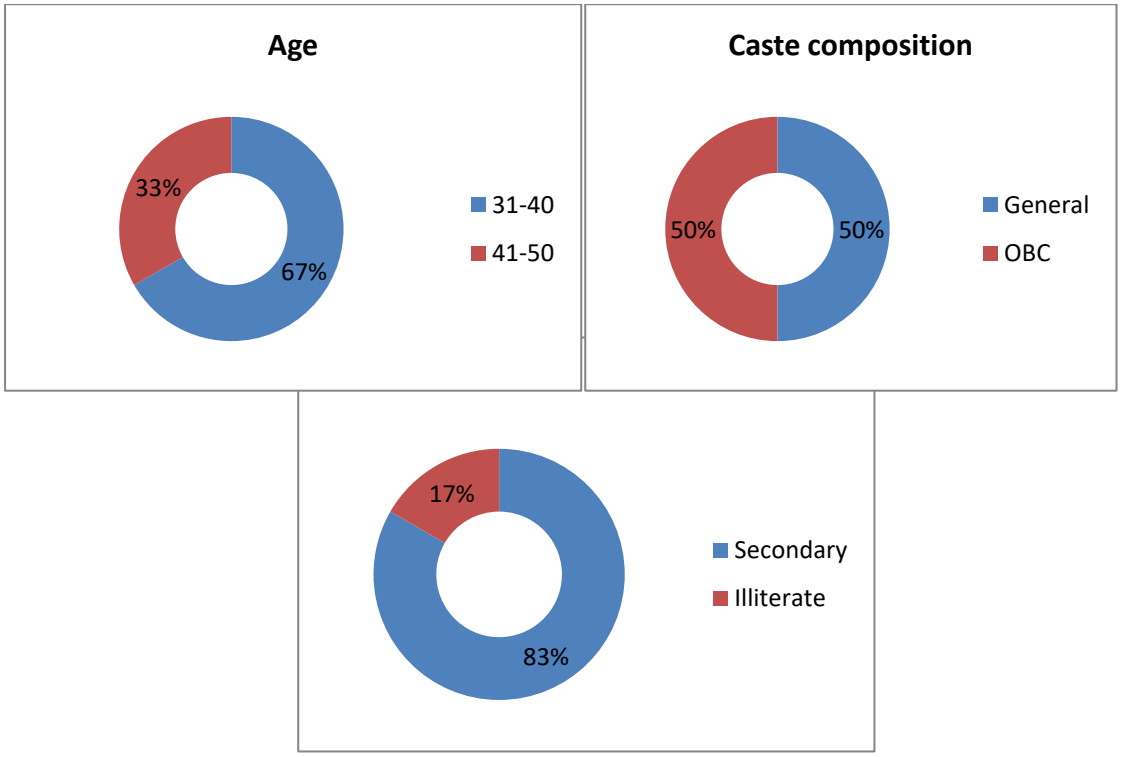
4) The Artificial Insemination (AI)

Programme and animal health care services amongst the rural dairy farmers of the state taken up by the Animal Husbandry & Veterinary Department. But improvements are required for integrating small holders and smallholder groups in the production chain and marketing chain. The main objective is to attract small holders into the supply cycle is to provide increased returns for their produce to stimulate production and encourage uptake of improved technologies. This applies marketing of milk from farm level where hygienic quality and safe milk is encouraged to be produced and marked right up to consumer level. This will also encourage value addition and other effective and adaptable technologies by organised groups of producers who collectively can take up the activities. It will also improve the livelihood of dairy farmers through organizing them in to Dairy Cooperative Societies and providing them both forward and back ward linkages in order to make them more competitive and to give them remunerative price for their produce. It will also look at ways and means to improve the existing traditional milk markets

Findings of Primary Study

- Number of RWEs interviewed: 6.
- Raw materials involved: straw, feed, medicine
- Average initial investment: 5,000-50,000

Background information



- 4 respondents (67%) were in this business due to family legacy, 2 (33%) chose this value chain by imitating others.
- 1 respondent (17%) allots 4-8, and 5 respondents (83%) allots 2-4 hours on production.
- 3 respondents (50%) reported being involved in other economic activities such as livestock farming, goatery.
- For 50% respondents, dairy is their sole area of economic activity.
- 50% respondents have started their enterprise less than 10 years ago, 50% have been in this value chain between past 25-30 years.

Standardisation practices

- No standardisation measures are undertaken by the respondents in this value chain.
- The measures surveyed are testing and certification of product, registration and licensing of business, procurement of GST.

Procurement

- The raw materials involved in this value chain cattle feed and medicines. Other than raw materials, transportation and commute costs form a major part of cost of procurement.
- All respondents procure cattle from private sources.
- At 5/6 majority of the respondents take loans from friends and family (83%), 1 respondent mentioned being able to use their own savings.

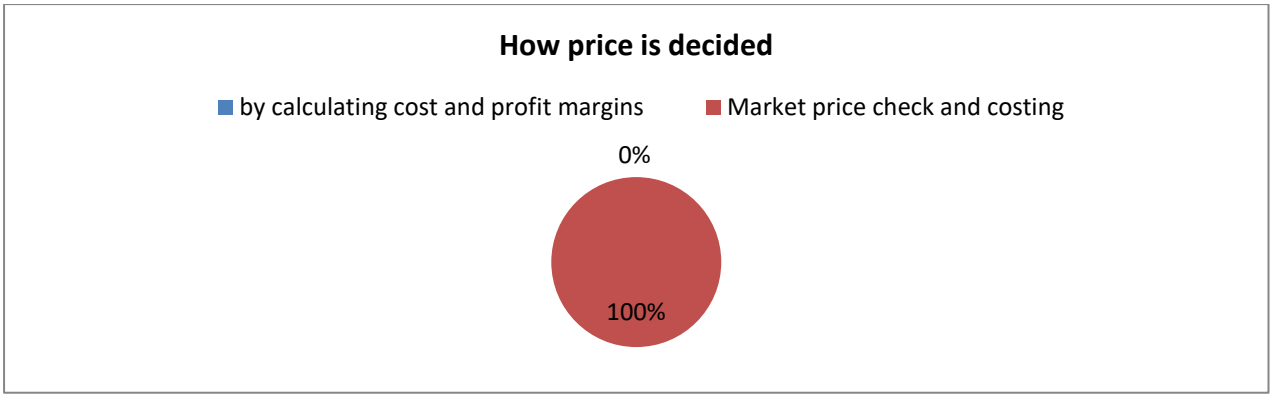
Production

- All respondents in this value chain produce intermediate products- raw milk which they sell in the local market.
- In terms of production quantity, the range of production was between 60 litres and 1,500 litres.
- Only 1 respondent (17%) produces value added products. Their products are curd, cream and paneer. They spend around 50,000 in cost of production owing to diversity in products as well as scale of production (1,500 litre).

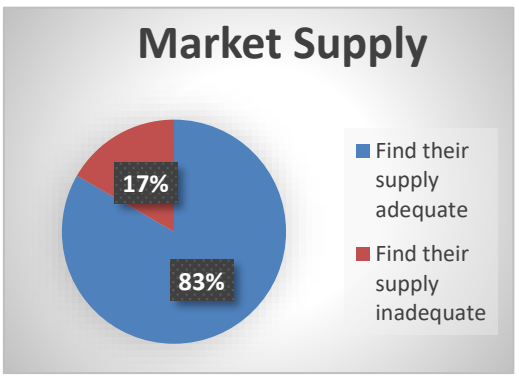
Income

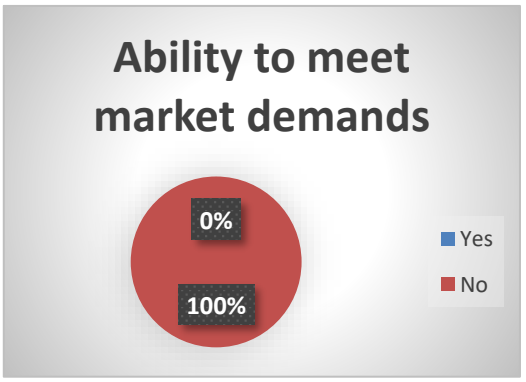
- 4 RWEs (67%) in this value chain earn an average monthly income of 10,000-20,000. 2 RWEs (33%) earn between 20,000-40,000.
- Similarly, 67% RWEs are trapped in the lowest average monthly profit margin of 5,000-10,000. 1 RWE earns an average of 10,000-15,000 in profit, 1 RWE earns 25,000-35,000 in profit.
- The profit margins are directly related to scale of production and cost of production.
- The value chain undergoes income fluctuations through the months with January-March seeing higher income.
- The months of October-December sees a fall in income.
- All respondents have a personal bank account but none of the respondents have a bank account for their enterprise.
- All respondents operate their bank account themselves.
- Respondents were asked about one or more locations they prefer to utilise to save money- all 6 (100%) prefer saving their money in bank, 1 RWE (17%) also prefers saving at home.

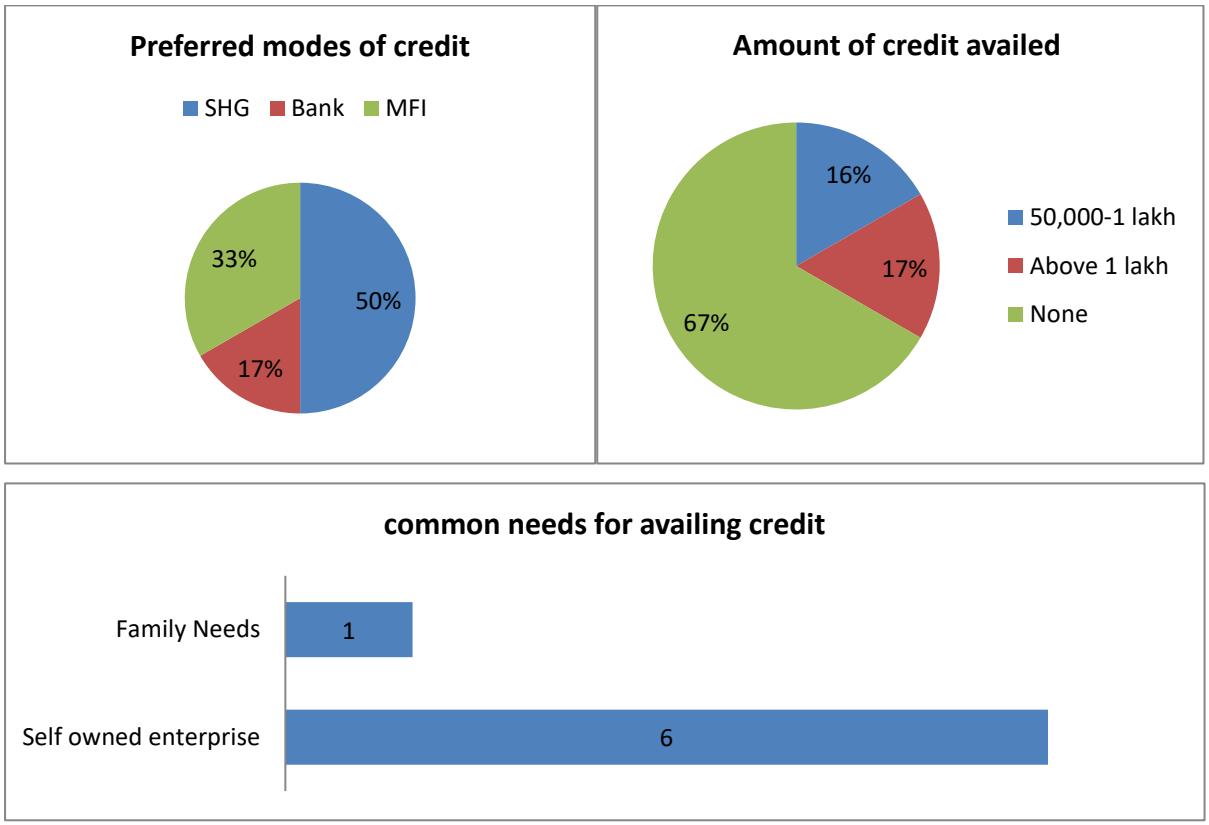
Markets



- All RWEs in this value chain sell their products in local markets.
- All interviewed RWEs base their pricing on cost and profit margins.
- No RWEs in this value chain have their own brand.
- No RWEs in this value chain are involved in interstate sales.
- All RWEs in this value chain sell their product in the local market.
- The one RWE with distinctly larger scale of production (1,500 litres) in comparison to the rest of the RWEs in this value chain make use of the retail and wholesale networks and middlemen to find markets.
- Packaging and labelling: Across the dairy value chain in Assam, packaging and labelling is not commonly prevalent.
- Constraints: marketing, cold storage options are inadequate.
- The RWEs were asked to self-assess if they find their supply adequate, and if they are able to meet market demands. With 17% (1/6) reporting their supply inadequate and 100% finding themselves unable to meet market demands, this value chain offers opportunities to make adjustments in scale of production by upgrading storage facilities, recruiting workers, upgrading production technologies, etc. – all of which requires financial support
- **Credit facilities**







- The preferred mode of credit among RWEs in dairy value chain is predominantly from SHGs (3), followed by MFI (2) and bank (1).

4 RWEs had not taken any loans. 2 RWEs had availed credit for a sum above 50,000; at an interest rate above 10%.

- The most common needs for availing credit are for developing one's enterprise (100%) and family needs (17%).

Support services

- None of the RWEs engaged in this value had availed any kind of support services.
- 5 (83%) of all interviewed RWEs engaged in dairy value chain are covered under social security schemes.
- The respondents feel the need for financial, technical, training, and advisory support.

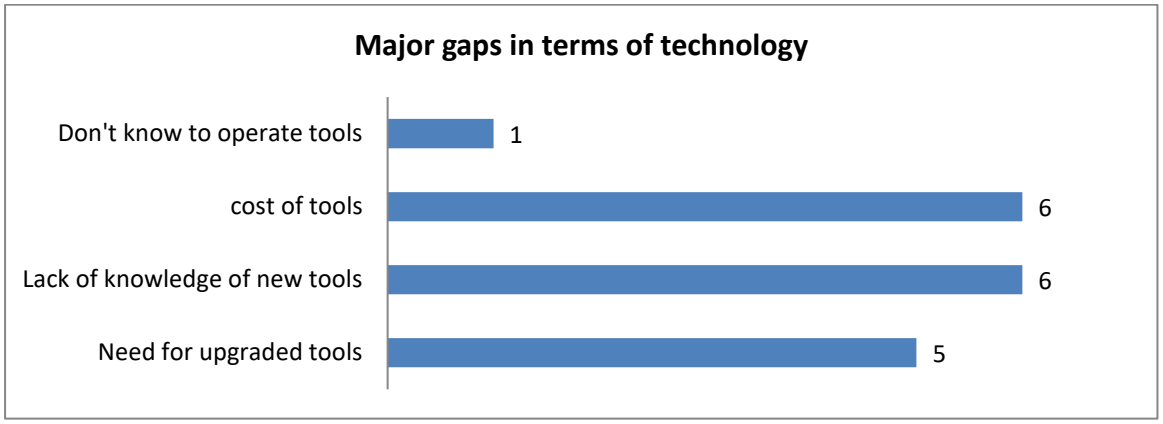
Transportation

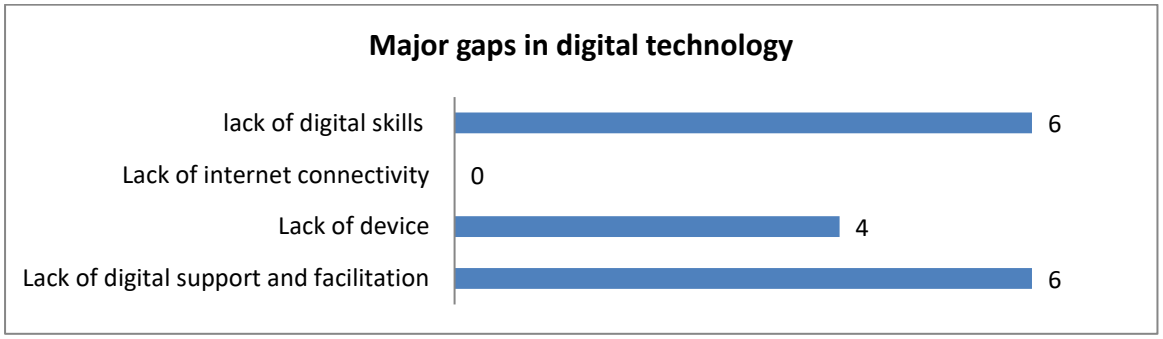
- The respondents were asked about the mode of transport of final produce to the destination for sale. 3 RWEs (50%) sell their produce from home and do not have to bear transportation charges in this phase. The rest use their own vehicle at minimal charges.

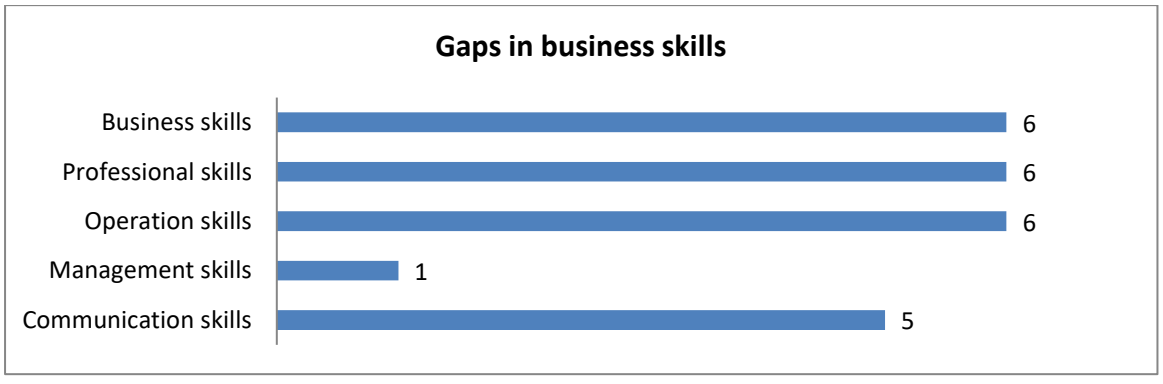
Digital information

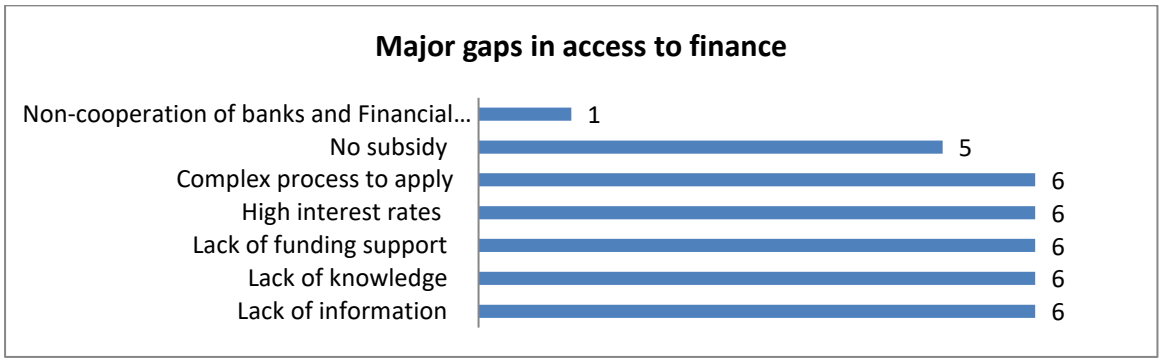
- The use of digital methods is at a nascent stage in this value chain.
- 3 of the interviewed RWEs do not use smartphones, social media, and are not aware of online marketing platforms.
- None of the RWEs in this value chain use digital payment methods for their enterprise or otherwise.
- None of the RWEs use any digital application for their enterprise in this value chain.
- All RWEs acknowledged facing problems due to lack of digital skills and would like to receive training in using platforms and applications to be able to digitally manage their enterprise.

Challenges








Major gaps in access to finance
Non-cooperation of banks and Financial...
No subsidy
Complex process to apply
High interest rates
Lack of funding support
Lack of knowledge
Lack of information
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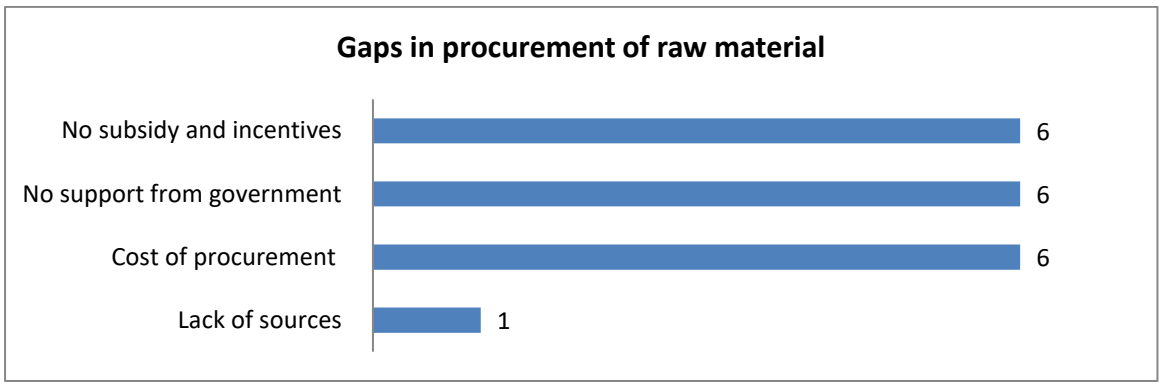
Gaps in procurement of raw material
No subsidy and incentives
No support from government
Cost of procurement
Lack of sources
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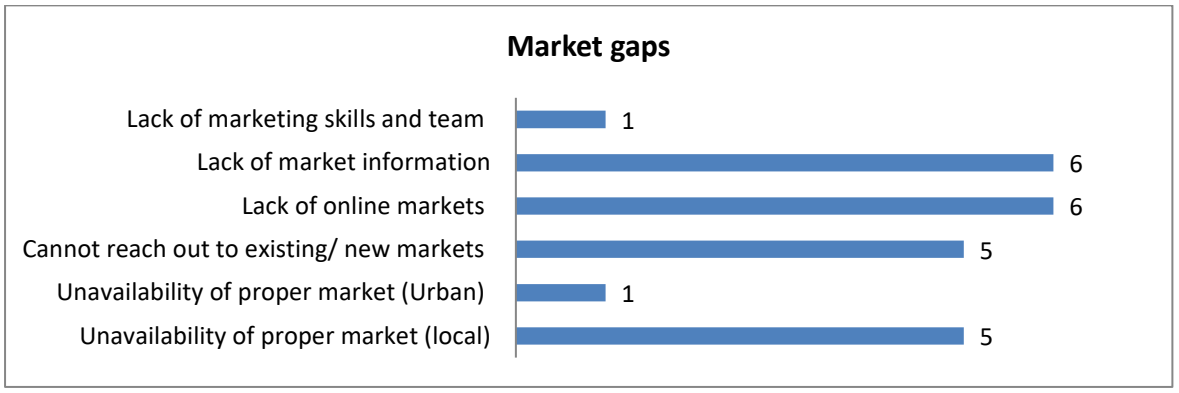
Market gaps
Lack of marketing skills and team
Lack of market information
Lack of online markets
Cannot reach out to existing/ new markets
Unavailability of proper market (Urban)
Unavailability of proper market (local)
1
6
6
5
1
5

ANNEXURE VI

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