SUCHANA
Ending the Cycle of Undernutrition in Bangladesh

European Union

UKaid
from the British people

Report on
SUCHANA SEMI-ANNUAL

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Prepared By
The Nielsen Company (Bangladesh) Ltd.

CNRS FIVDB Helen Keller INTERNATIONAL icddr,b iDE RDRS Bangladesh Save the Children WorldFish

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We would like to express our gratitude to Suchana Program for giving us the opportunity to conduct the Semi-annual Survey. Suchana has been a unique initiative in the development field which combined multifaceted intervention areas into one integrated package. It was both a challenging but rewarding experience for us to conduct this assignment for Suchana.

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It would be highly appreciable if the study findings and recommendations are duly considered and applied for improving the exiting situation and achieving the program objectives.

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List of Acronym

BHH	Beneficiary Household
BDT	Bangladeshi Taka
CAPI	Computer Assisted Personal Interviews
CDDS	Children Dietary Diversity Score
CNRS	Center for Natural Resource Studies
DAE	Department of Agricultural Extension
DoF	Department of Fisheries
FGD	Focused Group Discussion
FIVDB	Friends in Village Development Bangladesh
GO	Government officials
HDD	Household Dietary Diversity
HFIAS	Household food insecurity access score
HFP	Homestead food production
HH	Household
HKI	Helen Keller International
iDE	International Development Enterprise
IGA	Income generating activities
IP	Implementing partner
IPM	Integrated Pest Management
KII	Key informant Interviews
LOI	Length of Interview
MDD-C	Minimum Dietary Diversity for Children
MDD-W	Minimum Dietary Diversity for Women
MFI	Microfinance Institution
NGO	Non-government organization
PSA	Private Sector Actors
RDRS	Rangpur Dinajpur Rural Service
WDDS	Women Dietary Diversity Score
VSLA	Village Savings and Loan Association

Executive Summary

Bangladesh has significantly improved its poverty and food security status over the years. Still there is scope to improve nutrition and livelihood status at the rural marginal level. With this goal, focusing on children, women and adolescent Suchana project has started working since 2016 and will continue till 2022. The project design considered 5 pillars as a) improved nutrition governance, b) improved access and utilization of nutrition specific and sensitive services, c) better nutrition through improved economic status, d) increased knowledge, skills and power of targeted households in particular women of reproductive age and e) robust evidence of impact generated for scale-up.

The objective of the semi-annual survey is tracking the performance of phase-2 and phase-3 beneficiaries with a set of indicators for the senior management to take an informed decision. The key focus of these indicators is measuring the results under pillar 3 of Suchana and analyzing them to determine whether the program is on course to achieve its objectives.

This study followed multi stage cluster sampling and collected 2400 samples for quantitative analysis in total. Among the total sample, 1200 samples were collected from phase 2 and rest 1200 samples were from phase 3. All the quantitative data were collected using CAPI device. The study also conducted 32 FGDs, 18 KIIs with private actors, NGO officials, government officials, output sellers etc., 78 KIIs with market actors and 10 case studies.

The analysis found the percentage of beneficiaries that save in VSLA has increased significantly. Whereas around 20% beneficiaries were saving via VSLAs at the beginning of phase 2, now around 92% beneficiaries are saving via this channel. In case of satisfaction over inputs (regarding vegetables, fingerling, poultry, livestock.), around 87% beneficiaries were satisfied or moderately satisfied during the phase 2 (2018), whereas now around 92% beneficiaries are satisfied or moderately satisfied with the inputs.

Around 84% of respondents were engaged in homestead gardening and on average the production per household in a season is 68 kg observed in phase 2. The majority of the beneficiaries (98.4%) used at least one improved production technology. Pit cropping technology was adopted by 55% respondents in the phase 2 (2018) and now around 75% respondents are using pit cropping technology in phase 2. However, the percentage of using floating beds and tower gardens is relatively lower. The project can focus on building awareness regarding these technologies.

Uses of improved technology have increased significantly in case of aquaculture. The present study found that after one year of interventions, more than two-third (69%) of both IGA-aquaculture BHHs and HFP-aquaculture BHHs followed 'carp-poly culture using improved aquaculture practices' and those were 57.6% for IGA-ponds and 36.2% for HFP-ponds at the beginning. No respondents to use the traditional (natural) technology for fish farming whereas it was 29.4% for HFP-aquaculture and 2.6% for IGA-aquaculture. The average annual fish productions have increased in 86 Kg for IGA-aquaculture BHHs and 42 Kg for HFP-aquaculture BHHs at phase 2 working areas which were 38 Kg for IGA-Aquaculture and 26 Kg for HFP-aquaculture before the interventions.

The average number of poultry in phase 2 is 11 per household whereas at the phase 2 (2018), it was 5 for HFP poultry and 9 for IGA poultry. The usage of improved technology in case of poultry rearing has

also increased (66% in phase 2 (2018) and 73% now in phase 2 (2019)). More beneficiaries of phase 2 are now using hatching (Hazol) pot (46%) compared to that of phase 2 (2018) (22%). The effectiveness of awareness building regarding poultry rearing is conspicuous. The statement is true in case of vaccination as well. While 10% respondents used vaccination in phase 2 (2018), now around 43.6% respondents are using vaccination. The project facilitated the linkage between the vaccinator and beneficiaries that improved the vaccination practice of the respondents. This also reduced the mortality rate of the poultry from 38% in phase 2 (2018) to 29% at present in phase 2 (2019).

The analysis found that, the number of beneficiaries involved in livestock rearing during last six months has been proliferated. During the phase 2 (2018) around 59% respondents were involved in livestock rearing out of 191 beneficiaries. The number significantly engendered at the present survey and now around 88% respondents are involved in livestock rearing. Moreover, beneficiaries are now more aware of symptoms of diseases of livestock (98.5%) compared to that of phase 2 (2018) (81%). The average sales volume has also increased at present compared to phase 2 (2018). During the phase 2 (2018), average sales for HFP aquaculture was 4 kg and IGA pond fish culture was 7 kg. However, now average sales for HFP aquaculture increased to 8.28 kg and IGA pond fish culture to 19.23 kg per year.

Around 91.8% of cases, respondents purchased packaged seeds from the market. Although access to market has been increased over the year, around 57.9% respondents sold their produced goods in local market. Overall, 69.6% respondents are satisfied and 7.5% are very satisfied with the access to market among the respondents of phase 2.

The average HFIAS score has decreased for phase 2 (2.67) compared to the phase 2 (2018) status (in 2018 survey, it was 4.97 phase 2). Therefore, we can conclude that the food security status of phase 2 respondents has been improved over time. The study found that above half of the total 1200 respondents of phase 2 (56%) are within food secured category while at the beginning 14% respondents were within this group. Clearly the food security status of the respondents of phase 2 has been ameliorated. Severely food insecurity status has decreased as well by 6%. While 17% respondents were under severely food insecure category at the beginning of phase 2, now 11% respondents fall under this category.

The dietary diversity status of the respondents has improved compared to the phase 2 (2018). Whereas it was 30% (4 or more food group) now it is 43.8 percent. Regarding women's dietary diversity, 39 percent respondents are above the threshold of 5 or more groups that was 36 percent in the phase 2 (2018).

Women's access to market has increased over the time as **49% respondents reported that women took IGA decision during phase 2 (2018), now around 53%** women are taking decision regarding IGA expenditure. Women participation regarding buying input has improved (Phase 2 of 2018 was 36% and Phase 2 of 2019 was 48%).

Challenges & Recommendation

The study revealed that there are divergences in terms of knowledge and practice among the beneficiaries regarding adopting climate resilient technology, improved technology etc. Regular follow up mechanism may help in this regard to ensure practices. In case of aquaculture, multiple owner of the pond causes disputes among the shareholders as well as this impact on getting accurate data on

production-sales volume. Suchana project staff can find way out to resolve this. Respondents also stated that they faced difficulties to find good quality fingerling from the market, hence there is scope of work to connect beneficiaries with fingerling sellers both government & private. Female beneficiaries have low knowledge on fish farming, production and its processes; program team can focus on improving knowledge among beneficiaries.

As Sylhet and Moulvibazar are migrant prone areas, local people have apathy to crop cultivation who receives remittance. Thus a number of arable lands remain unused. Suchana program can provide training to the beneficiaries on how to utilize those lands, and can build awareness regarding cultivation or farming.

In terms of livestock, awareness rising on importance of vaccination amongst beneficiaries should be a continuous process; moreover, follow up on checking vaccination card can be implemented which will support with lowering mortality rate of livestock.

Considering socio-cultural context of Sylhet division, women participation in market has been improving gradually, there is plenty of opportunity to progress the situation. **Women corner** in local market can be a good solution. Suchana program has scope to improve the mortality rate of the livestock and poultry. Weekly (once a week) Para level market can be arranged by the beneficiaries.

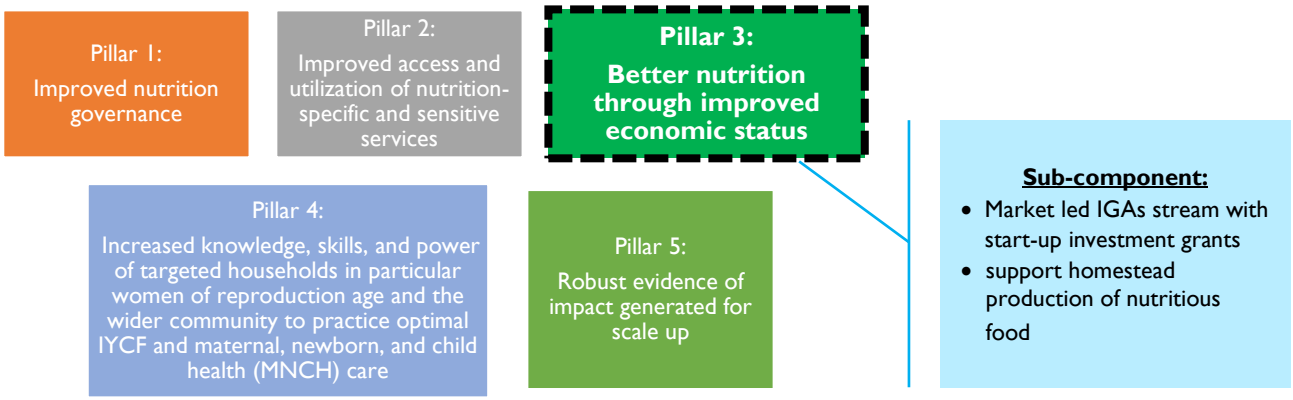
Suchana questionnaire length should be reduced precisely which will help to ensure data quality. Beneficiary training duration need to be extended, otherwise refresher training can be done over the year.

Chapter 1: Introduction

1.1 Background

Though Bangladesh has made impressive achievements in economic and social issues over the past decades, challenges still remain to retain under nutrition levels below the World Health Organization's (WHO) public health critical thresholds. The cost of Bangladesh for under nutrition is more than BDT 7,000 Crore (US$ 1 billion) as a loss of productivity every year[1]. A national study has shown that among all divisions of Bangladesh the Sylhet division has the worst situation in terms of stunting and minimum dietary diversity of children aged 06-23 months[2]. In case of appropriate infant and young child feeding (IYCF) practices of WHO and UNICEF, Sylhet has the lowest percentage of children (aged 6-23 months) feeding with IYCF minimum 3 practices[3]. Moreover, Sylhet is among the regions performing worst on access to drinking water and sanitary toilet; female education and nutrition[4]. Out of all the divisions, Sylhet has been found to have highest frequency of undernourished mothers and children as well as poorest-performing region overall according to the trends from 1996 to 2007[5]. In this context, the SUCHANA program is more than relevant in Sylhet and Moulvibazar districts to combat chronic under-nutrition and stunting.

SUCHANA: Ending the cycle of under nutrition in Bangladesh targets to diminish under nutrition and stunting in children in Sylhet and Moulvibazar, Bangladesh. It is a five (5) year program, aiming children under two and women of reproductive age (15-45 years) in the districts of Sylhet and Moulvibazar in Sylhet Division. Suchana has been implementing in the project locations under five pillars:



1 Howlader, S. R.; Sethuraman, K.; Begum, F.; Paul, D.; Sommerfelt, A. E.; Kovach, T. 2012. Investing in Nutrition Now: A Smart Start for Our Children, Our Future. Estimates of Benefits and Costs of a Comprehensive Program for Nutrition in Bangladesh, 2011–2021.PRO-FILES and Nutrition Costing Technical Report. Washington, DC: Food and Nutrition Technical Assistance III Project (FANTA), FHI 360
2 Bangladesh Demographic and Health Survey, 2017-2018, Ministry of Health and Family Welfare.
3 BBS, SID, MoP, WFP. 2014. Undernutrition Maps of Bangladesh 2012.
4 BBS, SID, MoP, WFP. 2014. Undernutrition Maps of Bangladesh 2012.
5 Mohsena, M.; Goto, R.; Taylo, N. M. 2015. Regional Variation in Maternal and Childhood Undernutrition in Bangladesh: Evidence from Demographic and Health Surveys. WHO South-East Asia Journal of Public Health. July–December, 4(2)

Among the five pillars, Pillar 3 – "**Better nutrition through improved economic status**" – is the key focus of the performance tracking survey which is known as "**semi-annual survey**". The first sub-component of **pillar 3** is the implementation of market-led income-generating activities (IGAs) stream with start-up investment grants. The second component under Pillar 3 was designed to support **homestead production** of nutritious food (HFP), primarily, for domestic consumption, but also to support income generation by selling surplus produce.

Operational partners of Suchana are Save the Children, International Development Enterprises (IDE), WorldFish and Helen Keller International (HKI), where the Program is being implemented in Sylhet and Moulvibazar by CNRS, RDRS, and FIVDB; and Impact Assessment Partner- ICDDR.B.

1.2 Study Objectives

The main objective of the semi-annual survey is tracking the performance of phase-2 and phase-3 beneficiaries with a set of indicators for the senior management to take an informed decision. The key focus of these indicators is measuring the results under pillar 3 of Suchana and analyzing them to determine whether the program is on course to achieve its objectives. For phase 2 beneficiaries this survey will also be used to track progress from previous semi-annual surveys.

The specific objectives of the semi-annual survey were:

- To report results against some of the relevant performance indicators included in the Suchana logical framework that highlights the efficiency and effectiveness of IGA interventions of the project
- To examine the relevancy of IGAs in the context of climate resilience, inclusiveness, and gender
- To determine the impact of IGAs in the improvement of livelihood of Suchana beneficiaries
- To generate evidence to create discussion among the consortium to ensure interventions can be re-calibrated as required for maximum impact on the ground. This feedback loop will enable management to 'course-correct' from an informed position.

Chapter 2: Methodology

2.1 Study Area & Target Population

Suchana is working in **20 Upazilas** of Sylhet and Moulvibazar district. Every year the project works with new beneficiary households from the new Union within same Upazila. Currently, Suchana is working with **158,228** beneficiary households in **105 unions** in 3 phases[6]. The semi-annual survey has been conducted to track performance of commenced intervention in the target location for phase-2 and phase-3. In total the study has been conducted in **7 Upazila** and **22 Unions** those were selected randomly. The names of the Upazila in Sylhet district are Gowainghat, Zakiganj, Osmaninagar, Golapganj, Dakshin Surma. The Upazila in Moulvibazar district is Kulaura and Moulvibazar Sadar.

The primary respondents included IGA beneficiaries (On/Off-farm), and Non-IGA/HFP beneficiary households; whereas secondary respondents comprised of GOB officials (district, Upazila, and Union level staff of DAE, DLS, and DOF), NGO officials (IPPC, UPC, UC, FF of implementing partners) for the study.

Primary respondents	Secondary respondents
• On-farm and off-farm income generating activities (IGA) beneficiaries • Non-IGA/HFP beneficiary households	• Government officials (District, Upazila, and Union level staff of DAE, DLS, and DOF) • NGO officials (IPPC, UzC, UC, FF of implementing partners), and • Private sector agents (include vegetable seed retailers, paravet, fish fingerling hawkers, chick suppliers, vaccinator, output retailers, collectors, whole sellers, output traders, etc.)

2.2 Study Approach

The study utilized both primary and secondary sources of data. Therefore, the sources of data have been stated below:

- **Primary data** from the target group of the project collected data using a mixed-method approach of both quantitative and qualitative methods.
- **Secondary data** related to the **relevant literature and reports** have been reviewed with guide tool preparation and provided insights for writing reports. The secondary data source included however not limited to the project documents, previous report, annual survey report data, national report and reports/past evaluation.

6 Phase means people who were included under intervention chronologically considering union, inclusion with poor and very poor beneficiary households

A. Quantitative Approach

The main focus of the quantitative survey was to measure the key outcomes of Suchana interventions such as adoption of improved technology, use and access of quality inputs, increase in production and profit, consumption behavior of the beneficiary households, marketing strategy adopted for selling surplus production, gender transformation in terms of household workload sharing and decision making, access to finance, market linkage, women role in decision making for IGAs, change in business practice and knowledge, household income and expenditure, mortality rate of the poultry livestock and aquaculture, food security status etc. The study interviewed respondents from both phase 2 and phase 3.

Quantitative Sampling

This round survey followed the 2018 survey design in terms of methodology and sample size determination formula. The number of beneficiary households for phase 2 and phase 3 is 61,081 and 49,205 respectively. To have a statistically significant result of the survey for known population size in intervention area, the sample size for this survey has been calculated using the below calculation for each phase:

$$n = [\frac{(Z_\alpha + Z_\beta)^2 * (S_{d1}^2 + S_{d2)}^2}{(X_2 - X_1)^2}] * D$$

Where,

- n = required minimum sample size per survey round or comparison group
- D = design effect for cluster surveys (use default value of 2) = 2
- X1 = the estimated level of an indicator at the time of the first survey or for the control area
- X2 = the expected level of the indicator either at some future date or for the project area such that the quantity (X2- X1) is the size of the magnitude of change or comparison-group differences which is desired to detect
- Zα = the z-score corresponding to the degree of confidence with which it is desired to conclude that an observed change of size (X2- X1) would not have occurred by chance (statistical significance), = 1.282 and
- Zβ = the z-score corresponding to the degree of confidence with which it is desired to be certain of detecting a change of size (X2- X1) if one actually occurred (statistical power) = 0.84.
- sd1 = standard deviation
- sd2 = standard deviation

Here, the values for D, sd1, sd2, X1, X2, Z_α, Z_β are 2, 103371, 141712, 103030, 142181, 1.282 and 0.84, respectively. Using all these values, the formula produces 420 as the sample size for IGA on-farm beneficiaries, 180 for off-farm IGA for, 300 for HFP aquaculture and 300 for HFP poultry in each phase. In total the study thus collected 2400 samples and the distribution of samples are as follow:

Table 1: Sample Distribution for Quantitative Approach

Location	IP	IGA/ HFP	Phase 2	Phase 3	Total
Sylhet	FIVDB	IGA On-Farm	134	138	272
		IGA Off-farm	66	62	128
		HFP Aquaculture	100	100	200
		HFP Poultry	100	100	200
		Total	**400**	**400**	**800**
	RDRS	IGA On-Farm	128	118	246
		IGA Off-farm	72	80	152
		HFP Aquaculture	100	101	201
		HFP Poultry	100	101	201
		Total	**400**	**400**	**800**
	Total	IGA On-Farm	262	256	518
		IGA Off-farm	138	142	280
		HFP Aquaculture	200	201	401
		HFP Poultry	200	201	401
		Total	**800**	**800**	**1600**
Moulvibazar	CNRS	IGA On-Farm	157	159	316
		IGA Off-farm	43	41	84
		HFP Aquaculture	100	100	200
		HFP Poultry	100	100	200
		Total	**400**	**400**	**800**
	Total	IGA On-Farm	157	159	316
		IGA Off-farm	43	41	84
		HFP Aquaculture	100	100	200
		HFP Poultry	100	100	200
		Total	**400**	**400**	**800**

Sample Selection Procedure

In this study, the highest administrative unit is District and the lowest administrative unit is village. Suchana program team provided list of intervention Upazilas, Unions & Villages. At first, 7 Upazilas were selected randomly from the 2 districts; afterwards Unions were selected randomly from each Union under both Phase 2 & 3. Villages were selected randomly which would serve as a primary sampling unit (PSU) for this study. Nielsen selected locations from Sylhet and Moulvibazar district; 7 Upazilas and 22 Unions from each Phase (2, 3).
Sampling frame of beneficiaries under the villages was provided by program team. Targeted beneficiary households were the primary contact point.

Although the list was provided by the project team, we have used screening criteria by Phase (2 or 3), IGA (On-Farm, Off-Farm), HFP (Aquaculture/Poultry), Implementing Partners (CNRD, RDRS, FIVDB); in order to ensure that the right respondent was selected for the survey. Screening question was also included in the survey tools.

Sampling plan of the semi-annual survey at a glance are as follows:

Sampling plan
• Selection of Upazilas, Union & Villages Randomly • Collecting **Beneficiary list** from iDE; the list was available by HFP-Poultry/Fisheries, IGA categories. • Samples distributed in each district by the desired beneficiary categories • District level sample size was distributed by Upazila & Union level→ **afterwards** up to the smallest category • After selection of **PSU (villages),** Total number of BHH **split into several sub-categories as per sectors (Poultry, Aquaculture, IGA On-farm & Off-farm etc.)** • From **each sub-category, BHH** selected through **systematic random sampling** • **District → Upazila → Union → Village → Para/ Mahalla** • A screening criteria was used before selection of the respondents • Some additional villages were selected randomly as buffer locations

Data Collection Technique

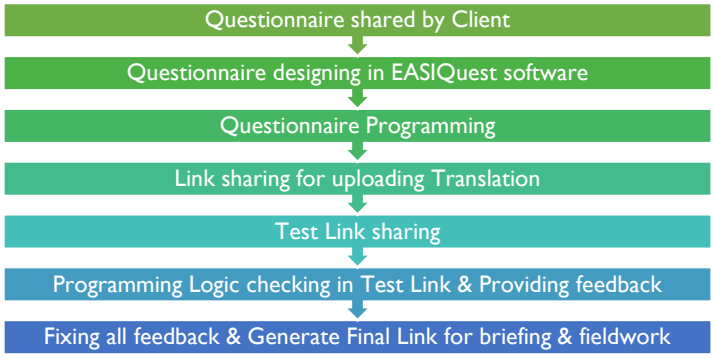
The study adopted the **quantitative technique** of face to face interviews (F2F) with the project beneficiaries both women (age: 15–45 years) and adolescent (age: 15–19) years. Data collection was done in computer assisted personal interviews (CAPI). The benefits of CAPI are as follows –

- ✓ Data was collected through CAPI Devices (Tab/ Laptop)
- ✓ Data was automatically stored in Nielsen server once transmitted at day end.
- ✓ Data would be checked on regular basis
- ✓ GPS tracking was done

Computer Assisted Personal Interview

Nielsen did the **data collection** in CAPI. Once the questionnaire was finalized, it was designed in software Easiquest by the core research team and submitted to programming team for programming in confirm IT platform. Once the **programming** was done, the core research team checked the flow and logic of the questionnaire and provided necessary feedback to programming team. The **link** was also be submitted to client for review. It took around 12 days to finalize the programming of the questionnaire as the questionnaire length was long and logical complexity.

Nielsen shared the **1st 100 datasets** with client for review. Feedback on dataset received from client and operation team was immediately briefed to field team to avoid error. Once the fieldwork started, minor changes required in the questionnaire programming were incorporated within 1st two days of fieldwork.
Nielsen also shared **500 datasets** with client



along with draft tables on key indicators and **syntax**.

Qualitative Approach

The **qualitative approach** helps us to capture **evidence of changes** taken place among the BHHs and related stakeholders; corresponding stories and reasons could be determined from qualitative survey. Multiple techniques were employed for collecting qualitative data from the target respondents as following:

- ❑ Focus group discussion (FGD)
- ❑ Key Informant Interview (KII)
- ❑ Case studies

❑ ***Focus group discussion (FGD)***

Focus group discussions were undertaken with beneficiary groups under the different program intervention areas like HFP-Poultry, HFP-Aquaculture, and assorted IGAs. The real-life story evidence helps understand and contextualize instances of **improved work process**, a systemic change in **service delivery system**, and **institutional development** etc. that are helping the BHHs to gradually overcome poverty and food insecurity. It also emphasized **indirect changes** occurring within the communities through intervention either observed within the HH or within community.

The discussion guide has been used as tool for FGD. In total the study conducted **32 FGDs** with the beneficiaries of different IGA and HFP groups phase-wise. The average length of group discussion was around 80-100 minutes. Nielsen has recruited experienced moderators for FGD from moderator panel. Moderators, who have experience of social research, conducted FGDs with farmers; One-day training was done with the moderators; discussion guide was thoroughly explained to them with examples and mock sessions.

The male female ratio of the moderators was 50-50. In total 4 enumerators were deployed and they worked around one month time period. There was a note taker and a moderator in each FGD session. All the responses were recorded and note taker took the notes. After transcription of the records, content analysis of the findings was done by the research team.

- ✓ **Target group**: Beneficiaries
- ✓ **Tool**: Discussion guide
- ✓ **LOI**: 80 – 100 Min
- ✓ **Average no. of participants**: 6-8 participants
- ✓ **Sample size**: 32

Table 2: Sample Distribution- FGD

Tools	Name of sub-group	Sample size for the Phase-2		Sample size for the Phase-3		Total
	Category	Sylhet	Moulvibazar	Sylhet	Moulvibazar	
FGD	HFP-Poultry	2	1	2	1	**6**
	HFP-Aquaculture	2	1	2	1	**6**
	IGA On-farm	3	2	3	2	**10**
	IGA Off-farm	3	2	3	2	**10**
	Sum	**10**	**8**	**10**	**6**	**32**

- ***Key Informant Interview (KII)***

Key Informant Interviews (KII) were conducted with different stakeholders of the program, including **Government** and **NGO** officials and **private actors.** In addition to helping understand the level of familiarity with the programme objectives and technical approach, these discussions also helped to identify the changes in **work process, service delivery system,** and **institutional development** which have occurred over the period of implementation, and highlight **current challenges** and **recommendations** given by institutional actors operating in the system Suchana is trying to influence**.** The results have been supplemented to the interpretation of the quantitative findings where needed.

- Government officials included (District, Upazila, and Union level staff of DAE, DLS, and DOF)
- NGO officials included IPPC, UPC, UC, FF of implementing partners organizations of Suchana project
- VMF, Peer Leaders, vaccinators, and nursery operators were also covered as stakeholders
- Private sector agents (include vegetable seed retailers, paravet, fish fingerling hawkers, chick suppliers, vaccinator, output retailers, collectors, whole-sellers, output traders)

A well-designed **Discussion guide** was used as tool for KII. In each phase, **6 KIIs** were conducted with Government officials and another **12 KIIs** will be conducted with NGO (Suchana technical and implementing partners) officials. As private actors group is large assuming at least 10 private actors will be interviewed for each category; there might be overlap among the private actors. Overall **100 KIIs** have been conducted with different private actors.

The minimum length of the one to one discussion was around **35-45 minutes**. Nielsen recruited experienced moderators from moderator panel for KII. **One day training** was undertaken with the moderators, during which, the discussion guide was explained in detail utilizing examples and mock sessions. A pretest was given to apprehend the quality of moderation skill followed by feedback sessions. During that session, minor translation changes were required. The data analysis procedure followed content analysis from audio transcription (in Bangla) and summarization from content analysis.

- ✓ **Target group**: Multiple stakeholders under the project
- ✓ **Tool**: Discussion guide
- ✓ **LOI**: 35 – 45 Min
- ✓ **Average no. of participants**: 1 participant
- ✓ **Sample size**:

- GOB officials: 6 KIIs
- Partner NGO officials & project officials operators: 12 KIIs
- Private actors: 100 KIIs

Sample distribution of key informant interviews are given below -

Table 3: Sample Distribution – Key Informant Interview

Tools	Name of sub-group	Sample Size - Phase-2		Sample size - Phase-3		Total
	Category	Sylhet	Moulvibazar	Sylhet	Moulvibazar	
KII	GOB officials	3	3			6
	NGO officials	3	3	3	3	12
	Private actors [10 actors from each of the 4 sectors; HFP-Poultry, HFP-Aquaculture IGA-On-Farm, IGA-Off-Farm]	32	26	21	21	100
	Sum	**38**	**32**	**27**	**27**	**124**

The distribution of **100** market actors is provided below -

Table 4: Sample Distribution – Market Actors

Name of sub-group	Sample size - Phase-2		Sample size- Phase-3		Total
Market actors	Sylhet	Moulvibazar	Sylhet	Moulvibazar	
RETAILERS					
Vegetable seed retailers	6	6	6	6	**24**
Feed retailers	5	3	3	3	**14**
Paravet	5	3	3	3	**14**
Vaccinator	6	4	5	5	**20**
Fish fingerling hawker	2	2	1	1	**6**
PSA (Metal, ACI, Renata etc.)	2	2	0	0	**4**
Sub-total-A (Retailer)	**26**	**20**	**18**	**18**	**82**
OUTPUT TRADERS					
Vegetable seller	1	1	1	1	**4**
Poultry seller	1	1	0	0	**2**
Fish seller	1	1	0	0	**2**
Goat/sheep	1	1	0	0	**2**
Bamboo craft	1	1	1	1	**4**
Pati craft	1	1	1	1	**4**

Sub-total-B (Output traders)	**6**	**6**	**3**	**3**	**18**
Grand Total	**32**	**26**	**21**	**21**	**100**

- ***Case studies***

The case study component included success stories derived from beneficiaries to collect evidence-based changes observed in their life due to the program intervention. In total 10 **Case studies** were collected by the study team. The minimum length of discussion was around **35-45 minutes.** As before, Nielsen recruited experienced moderators from moderator panel for collecting Case studies.

- ✓ **Target group**: Beneficiary
- ✓ **LOI**: 35 – 45 Min
- ✓ **Average no. of participants**: 1 participant
- ✓ **Sample size**: 10 Case studies [5 in each phase]

2.3 Recruitment and Training

After completing the pilot test, 7-days briefing session was held in Sylhet, during which the enumerators were provided training using the finalized training curriculum. Partner organizations were present during the process so they could convey detailed programme knowledge and insight to the enumerators. Enumerators training were conducted for 7 days long. Nielsen recruited in total 45 enumerators for the field briefing, and finally a panel of 35 was selected for the final fieldwork. The training was done methodically and utilizing an interactive, practical approach. A day-long pretesting was done in Dakhshin Surma.

- Introduction
- Importance of the survey
- Research Methodology
- Sampling
- Questionnaire Briefing
- Field visit
- Question & answer session
- Mock test
- Final Briefing

Household Survey: For the quantitative survey, 25 field investigators (FI) and 5 field supervisors (FS) (male and female) were deployed to complete the survey in 28 days (including travel days). Among them there was 1 female FS and 8 female FIs. For every 5 investigators, 1 supervisor was deployed.

Training	Days
Quantitative: FI-FS Training	5
Quantitative: FI-FS Pretesting questionnaire	1
Feedback, Review & mock session	1

Enumerators training schedule- Quantitative survey: 29 August to 5 September 2019

Data collection period: The fieldwork period for the Suchana semi-annual survey was started on 7th September and ended on 15th of October 2019.

Image:

Enumerator's training Session in Sylhet, August 2019

Similarly, 2 days long moderators and note-takers' training will be provided for Qualitative study in Nielsen Head office; 1-day classroom & 1-day in the field.

Training	Days
Qualitative: Moderators & Note-takers Training	1
Qualitative: Moderators & Note-takers - Pretest	1

Enumerators training schedule
Qualitative Survey

11 -12 September 2019

Qualitative Data Collection: For the qualitative data collection, 6 field investigators (FI) were deployed to complete the survey in 27 days (including travel days). The fieldwork period was from **16** September to 12 October.

Image: Fieldwork

2.4 Quality Control Mechanism

Quantitative approach QC

Nielsen has a permanent team of Quality Auditors (QA) who work independently and report directly to Top Management. During the Suchana semi-annual survey, in addition to the normal quality control measures, the QA team back-checked and spot-checked the field work of Field Interviewers (Data Collectors), Field Supervisors and Field Controllers in the following way:

- **Real-time database** was checked and researchers or field controllers disseminated feedback immediately to the interviewers.
- Using length of interview of the data QC team, Researchers and field managers checked and followed up interviewers to keep the length of interview in same alignment.
- Interview **start-end** time and call back data was captured, using this **QC team monitor**.
- **GPS was captured** that helped to understand the enumerator team visit in the exact location.
- **Screen Shot of location in Google Maps** has been taken before starting the interview as a part of the contingency. It was consistently checked by the field manager.
- Client also got the dataset of the first **100 completed interviews** followed by **500 completed interviews** and provided their feedback which minimizes data collection error.
- Separate QC team was deployed to ensure data quality. QC team conducted accompany check, back check thoroughly using a checklist.

Nielsen monitoring layers are as follows -

SL no.	Structure of Monitoring Cell	%
1	Accompany Check by Supervisors	5
2	Study database is checked on **daily basis** & provided instant feedback to FSs/FIs if any	100
3	Physical Back check **(5% will be re-interviewed the following day)**	20
4	Field Controller check	10
5	Independent Quality Auditing team check	20
6	Researchers check	10
7	Field Coordinators check	10
8	Over phone check	25
9	Questionnaire submitted to Data analysis team for coding open ended; The team checks the data thoroughly and if any mismatch is found it will go for back check and over phone check	10

Qualitative approach QC

- ❑ Recruitment team is comprehensively briefed about the key objectives of the study and the respondent criteria with extensive details
- ❑ Formulated screener questionnaire for initial screening to check all major respondent criteria
- ❑ Screener interview prior to the fieldwork session to double check criteria and gauge creativity and responsiveness
- ❑ If a respondent did not appear to meet the criteria, he or she was replaced with a buffer respondent

- ❑ If multiple respondents did not meet the criteria, the entire session was cancelled and rescheduled
- ❑ The research or client representative was encouraged to pass memos to the moderator to ensure that all questions are answered and all points are covered
- ❑ Thorough Audio recording listening & providing feedback in time
- ❑ Transcription reading by the researchers & providing feedback in time.

2.5 Data Analysis

❑ Quantitative Data Analysis

The quantitative data analysis followed the below steps –

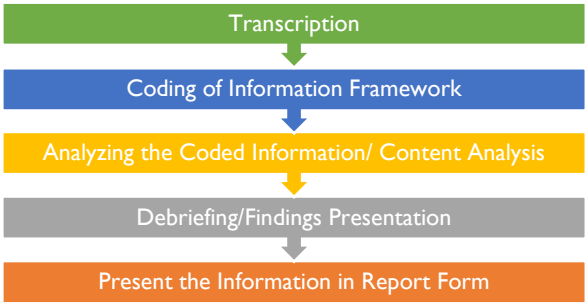
- The filled in questionnaires were considered as the source of **raw data** and for effective and accurate analysis and quality output generation the following activities have been done on the surveyed data
- **Data transmission**: Filing filled in a questionnaire that has been transmitted in the **server regularly** at day end and daily checked by field coordinator, researchers for consistency and took immediate action.
- **Coding**: Open-ended responses were coded **and later included in the Raw database**
- **Primary data trend analysis: Ist five days** or a week data have been analyzed with **predesigned syntax** to review findings
- **Analysis plan**: Researchers shared data **analysis plan** with Data Analysts, afterward they prepared well-organized **syntax** based on the analysis plan. **The analysis plan** was **shared with client** and finalized once received **feedback** from client during end of fieldwork. **Foxpro** and **SPSS** software were used to write syntax.
- Mostly Nielsen internal data analyst worked for these specific activities,
- **Data validation:** Validated via checking data using **secondary benchmarks** data, field experience to ensure that the information gathered from different data sources is clean, accurate and in a standard format.
- **Clean Database:** Nielsen shared a **clean complete database** with client once finished. The client provided feedback on the database
- **Draft Table:** Generated and shared with the client for their feedback on data. Based on their feedback, data has been cleaned and final tables were generated as per analysis plan and prepared **draft report**.

The data analysis has been carried out using SPSS as per the tabulation plan. Clean data of Phase-2 has been summarized, and results have been compared with the results of the previous survey. On the contrary, phase-3 data has been analyzed as a baseline for future comparison. The data analysis has been segregated into descriptive, bivariate, and multivariate regression analysis.

❑ Qualitative Data Processing

Qualitative Findings has been analyzed after data collection following the process mentioned below:

- ✓ Got to know the data to identify the main issues
- ✓ Identification of focused issues of analysis
- ✓ Categorization of information without using numerical code
- ✓ Analytical framework was designed based on discussion guide



The qualitative analysis process followed the flow-chart given aside-

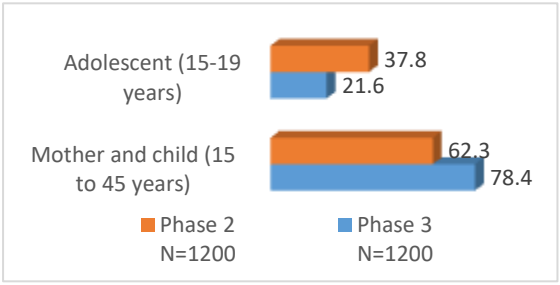
Chapter 3: Demographic Analysis

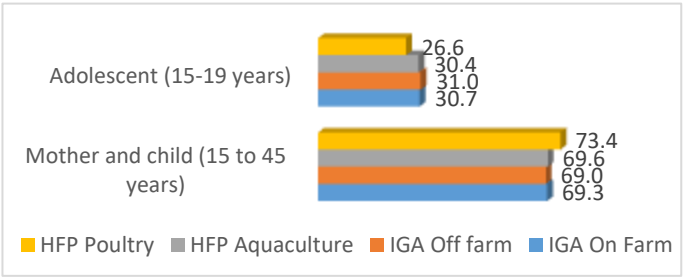
The beneficiaries of Suchana project are divided into two major groups, mother and children group aged between 15-45 years and adolescent cohort aged between 15-19 years. The semi-annual survey reached 62% of mother and children group and 38% of adolescent group in Phase 2.

Table 5: Sample distribution in different categories

Sample Segregation Category	Samples
Phase Wise	
Phase 2	1200
Phase 3	1200
Total	**2400**
Implementing Partner Wise	
FIVBD	800
RDRS	800
CNRS	800
Total	**2400**
Women and Adolescent Group Wise	
Women and Children (15-45 years old)	1688
Adolescent (15-19 years old)	712
Total	**2400**
IGA/HFP Wise	
IGA On Farm	834
IGA Off Farm	364
HFP Aquaculture	601
HFP Poultry	601
Total	**2400**

Figure 1 Beneficiaries group by Phase and by HFP, IGA (in percent)

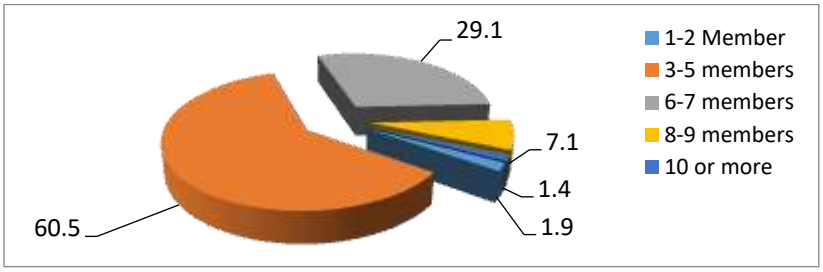




3.1. Household Size

In Sylhet and Moulvibazar region, the average family size is slightly larger than other regions. Suchana Semi Annual Survey reflected similar findings. The average family size of the beneficiaries' household is 5.22 in phase 2 and 5.18 in total. The majority (61%), of respondents were found to have 3-5 members in their households, about 29% 6-7 members, and 7% 8-9 HH members.

Figure 2 Size of the household of the respondents (in %)



3.2. Age distribution of Beneficiary Household

The study captured the age of all the household members of the respondents. Through interviews with 2400 Suchana beneficiary HH the program reached 12425 people. Out of which Phase-2 reached about 6258 people within 1.5 years program intervention. Age proportion by different age groups is portraying national age distribution of Sylhet division. The analysis revealed that around 23.6% are children who are aged between 1-10 years. Adolescents (10-20) and working-age groups (21-40) grabbed 60% of the overall sample that indicates adequate supply of labor force in the labor market. Adolescent (Age 10-20) proportion is 30% and about 28% household members are adult working people aged 21-35 years. 17% members are aged between 40 & above years.

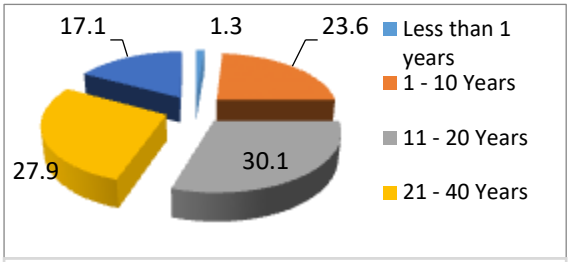


Figure 3 Age distribution of the household members

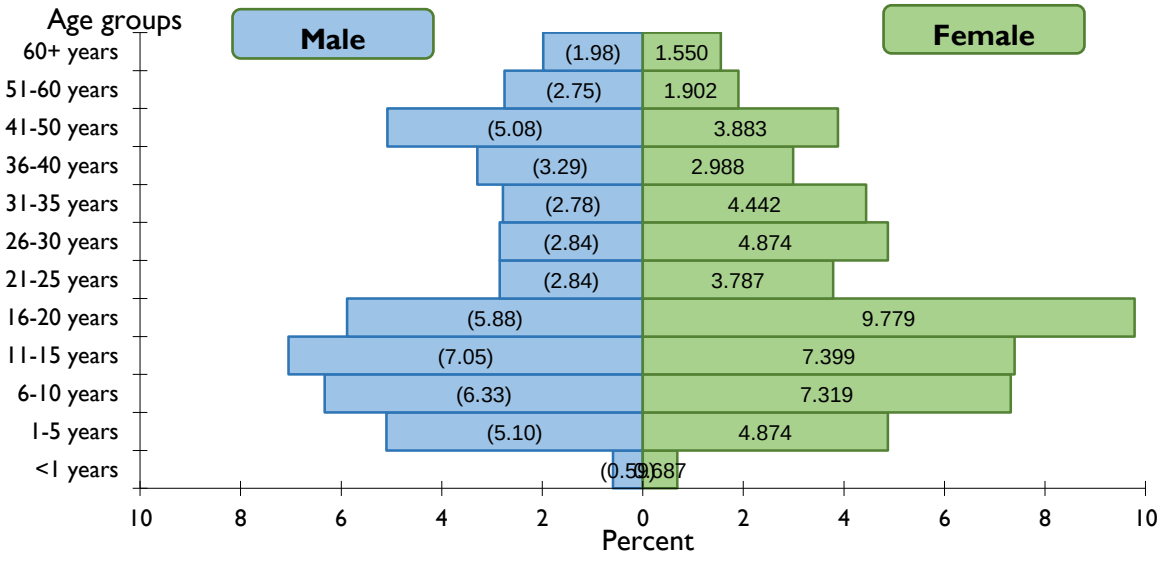


Figure 4 Age distribution Pyramid of the BHH

3.3. Status of Disabilities at Household

In case of disabilities, the study had a threshold in terms of age, as after 60 people usually lost their capability of working thus they were excluded during analysis. People of aged less than 50 were considered under the study. About 2.4% of the total household had disable members. The major disabilities are trouble related to seeing, hearing, walking or climbing steps, remembering or concentrating, self-care and communicating etc. Among the disable, nearly 1.6% had some sort of physical difficulties like seeing, hearing and walking.

Table 6: Status of disabilities of the household members

	Phase 2 (in %)
Difficulty seeing	0.5
Difficulty hearing	0.3
Difficulty walking or climbing steps	0.8
Difficulty remembering or concentrating	0.3
Difficulty self-care (washing all over or dressing)	0.3
Difficulty communicating	0.3
N/A	97.6

3.4. Income of the Household

Major occupations of chief earner of the beneficiary HH are daily labor (51%), poultry farming (8.2%), foreign remittance (7.6%), fixed-job (supervisory/clerical, 7%), agricultural production (12%), grocery shops (6.7%) and vegetable trading (5%). Some other sources of income are petty trading, fish farming, internal remittance and fish trading.

As per HIES 2016, BBS data average monthly income per HH is BDT 15,988. In phase 2, the average monthly HH income is reported as BDT 11,899, which is lower than the national average income but higher than the average at Phase 2 in 2018 (BDT 11,337). IGA off-farm beneficiaries have a higher average income (BDT 12,026) compared to other groups, as seen in the table below. The majority of the households (95.8%) earned more than BDT 50,000 in the past six months, while around 3.6% earned between 40,001-50,000 BDT. In contrast, average monthly household income of phase 3 is BDT 11,576. Future surveys will show how this figure changes over time. The study also calculated household income in last one year. Analysis found that, around 95% respondents of phase 2 (2019) have income greater than or equal to BDT 107459. HFP poultry beneficiaries fall under this category mostly (96.5%) followed by HFP aquaculture (95.8%), IGA on farm (95.1%) and IGA off farm beneficiaries (94%).

Table 7: Average Income of the beneficiary household

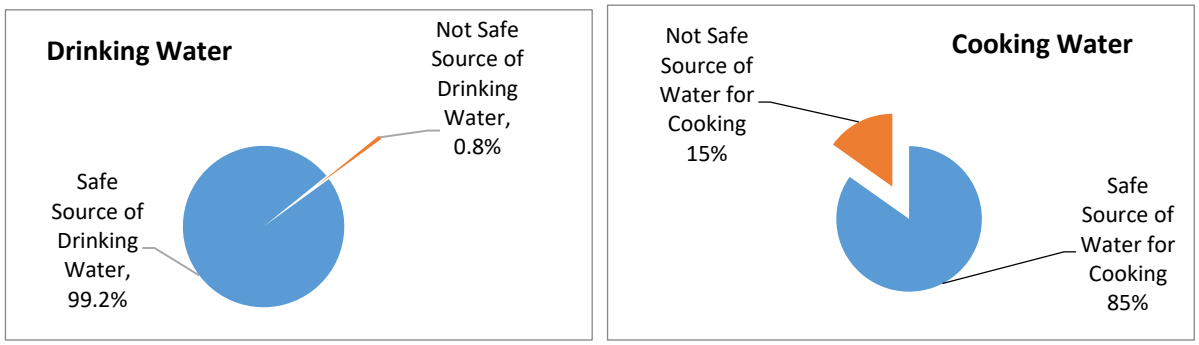
	IGA on farm N=834	**IGA off farm N=364**	**HFP aquaculture N=601**	**HFP poultry N=601**	**Phase 2 (2019) N=1200**	**Phase 2 (2018) N=1209**
Average **monthly** income of the household in BDT	11502	12026	11850	11776	11899	11337
Income of household in the last six months (BDT)						
25001-30000 BDT	0.1		0.2			
30001-40000 BDT			0.2			

	IGA on farm N=834	IGA off farm N=364	HFP aquaculture N=601	HFP poultry N=601	Phase 2 (2019) N=1200	Phase 2 (2018) N=1209
40001-50000 BDT	3.7	5.2	3.7	2.5	4.2	
More than 50000 BDT	96.2	94.8	96.0	97.5	95.8	
Income of household in last one year (BDT)						
Greater than or equal to BDT 107459 per year	95.1	94.0	95.8	96.5	94.8	
Less than BDT 107459 per year	4.9	6.0	4.2	3.5	5.3	

3.5. Access to safe water and improved sanitation

Beneficiary HH has access to pure drinking and cooking water. The majority of the respondents (97%) used safe sources of drinking water. Safe source of drinking water includes piped water in HH, tube-well, protected dug well and protected spring. Around 99% respondents of each of the phases have access to safe sources of water for drinking. In contrast, in terms of cooking water, the scenario is a bit different. Around 85% of the total respondents have access to safe water for cooking.

Figure 5 Sources of safe water for drinking and cooking (percent)



Overall improved sanitation usage practices show slightly better trend compared to national data 47.8%.[7] Criteria for 'improved latrine' segment include: ring/slab with water seal and weak/strong shelter; latrine with water seal, strong shelter and running water or with sewerage facility. Around 59% people said they have some form of improved latrine while 41% people reported that they still have a basic latrine. As for the positioning of the latrine, 46% respondents have the latrine attached to their dwelling, 15% respondents have it somewhere inside the yard, while 37% respondents have it outside their yard.

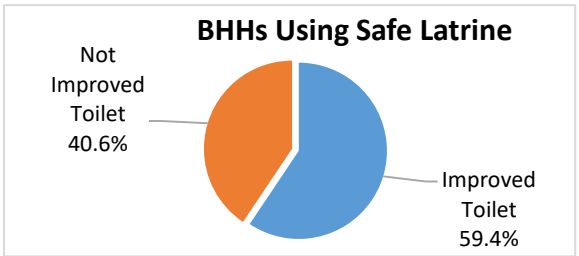


Figure 6 Sanitation facilities (percent)

[7] Bangladesh Demographic and Health Survey, 2014

Comparing with phase 2 (2018), sanitation facilities have improved within the year. While 52% beneficiaries had access to improved sanitation facilities in the 2018 survey, this figure is now 59%. Although the program does not provide any physical intervention, the percentage improved due to continuous awareness activities performed by the program. However, there is still scope for the Suchana program to focus on improvement of the sanitation of the beneficiaries.

Chapter 4: Study Findings

4.1 Savings and Fund Utilization Behaviour of HHs

Suchana project focuses on growing savings behavior among its beneficiaries. In this regard, it developed awareness on savings generation and offered membership within VSLA. The current study identifies the status of HHs' savings behavior and utilization of funds from different sources to observe the effectiveness of the project interventions. Here the study discusses the outcomes of its analyses in two different sects – one is savings behavior and other is fund utilization behaviour.

Savings Behaviour of HHs

In analyzing the overall savings behavior among the sampled respondents it is found that for Phase 2 the percentage of savers in any group is 53% in 2019. Saving practices has increased over the period. However, it is very much encouraging that the number of VSLA savers with respect to total savers has been increased three times in Phase 2 for 2019 than that of 2018. The figure shows the percentage rates for the year 2018 and 2019 as 20% and 92% respectively. Considering absolute number of savers we have found that it increased three times from 2018. On the other hand, in case of Phase 3 VSLA savers percentage is the second-highest (39%) after the micro finance institution (MFI) savers (52%) among 241 total savers in 2019.

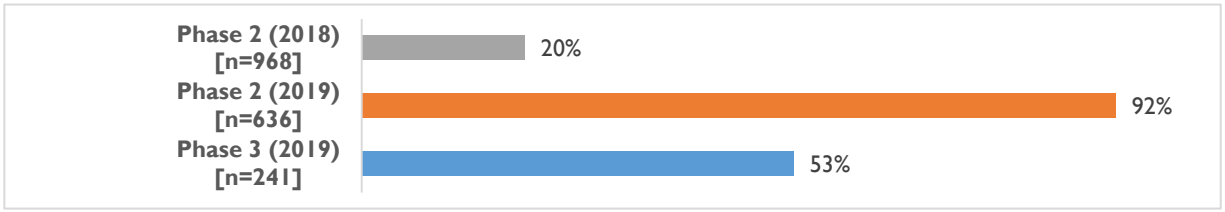
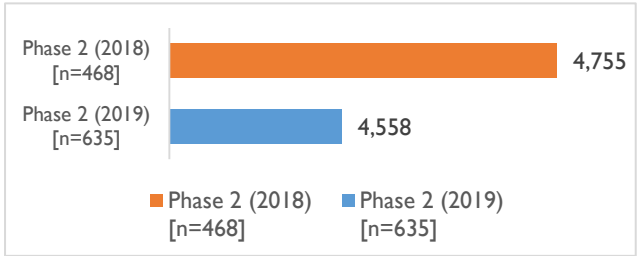


Figure 7: Percentage of BHHs that save their money in the VSLA

In case of Phase 3 the percentage of saver in 2019 is 20% of the total respondents.

In developing savings behavior it is important to know the amount of savings a saver has. The study has calculated for Phase 2 (2019) the average savings amount of a saver with respect to the types of savings group or instrument like Suchana savings group, commercial bank, micro finance institution (MFI) or others. The study has found that amongst the saver the maximum average savings amount is BDT 11,500 in commercial banks while the lowest amount is BDT 464 in Suchana savings group; while the average savings of a saver in MFI is BDT 3,264. The average savings amount in Bank, MFI & VSLA group varies as there is mandatory minimum amount of ceiling for

Figure 8: Average amount of saving in other sources (in BDT)



both commercial banks and MFI groups. However, the savings pattern for Phase 3 (2019) is similar to Phase 2 (2019).

If we consider only the VSLA savings amount in Phase 2 (2019) then the study has found that IGA On-Farm beneficiaries have the highest average savings (BDT 450) while HFP Aquaculture beneficiaries have the lowest average savings (BDT 362). Interestingly, in case of Phase 3 (2019) the average savings amount is highest for IGA Off-Farm category (BDT 260).

Table 8: Average savings of VSLA group

		Phase 2					Phase 3				
		IGA On-Farm	IGA Off-farm	HFP Aquaculture	HFP Poultry	Total		IGA On-Farm	IGA Off-farm	HFP Aquaculture	HFP Poultry
Amount of money saved from Suchana saving group (VSLA)	Up to 200 tk	19.2	16.2	21.8	22.0	19.9	55.1	30.4	42.3	55.2	48.0
	201-500 tk	59.3	56.6	59.4	53.9	57.6	40.8	69.6	53.8	44.8	49.6
	501-1000 tk	14.5	19.2	16.5	19.9	17.0	4.1		3.8		2.4
	1001-2000 tk	5.1	8.1	1.5	2.8	4.3	-	-	-	-	-
	More than 2000 tk	1.9	-	0.8	1.4	1.2	-	-	-	-	-
	N	214	99	133	141	587	49	23	26	29	127
Average Money		**450**	**415**	**362**	**392**	**410**	**217**	**260**	**234**	**201**	**224**

Considering savings amount, if we classify this into different ranges it is found that average savings in VSLA BDT 410; which is 450 and 415 for IGA on farm and off farm respectively followed by for HFP aquaculture and poultry the amount is 362, 392.

Considering all types of savings groups or instruments as well as all categories of beneficiaries overall average amount of savings by a saver may give an important picture of savings status in the field. Then the overall average savings by a saver had been calculated for Phase 2 (2018) as BDT 4,755 while in the same way it has been calculated for Phase 2 (2019) as BDT 4,558 which is slightly less than the previous year. The comparison for two years has been shown in. The amount for Phase 3 (2019) is much less as BDT 2,993.

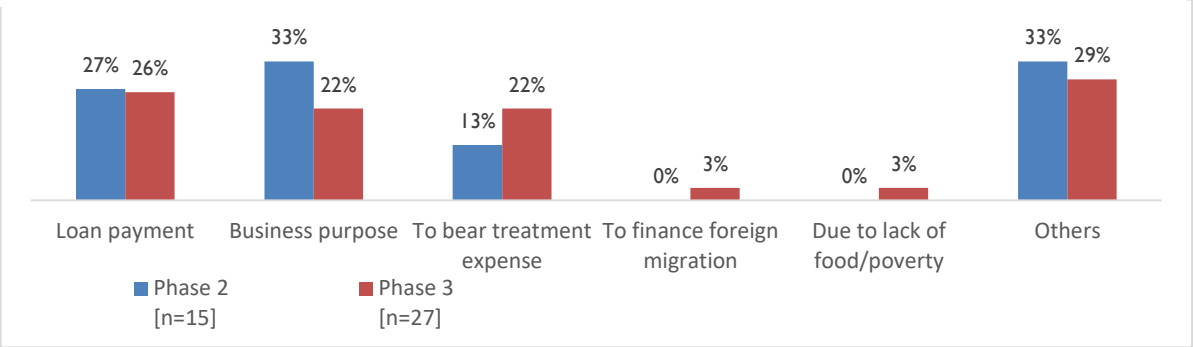
Access to Finance & fund utilizations

The study examined the fund utilization pattern of beneficiarias in the event of having withdrawing an amount from their savings or taken a loan. The study found a very low percentage of Phase 2(2019) respondents having accessed such funds (2.4% of 636 savers) while it is slightly higher (11.2%) for Phase 3 (2019). The result for Phase 2 (2019) is not comparable with that of Phase 2 (2018) as the information collection pattern is different for these two years. In 2018 the loan receivers' information had been

gathered only while in 2019 the savings are withdrawn and loan received information has been collected jointly. Though two results are not comparable it raises some interesting questions as well.

In Phase 2 (2018) among total respondents (1205) about 43% had taken a loan from different sources while in Phase 2 (2019) among total savers (636) only 2.4% has taken loan or withdrawn savings that seems impractical. It may be concluded that the respondents, however, were not free to share willingly the real state as they perhaps conscious that true state would be an obstacle for getting their future financing.

Figure 9: Percentage of BHHs that take loan or withdraw any money from the savings in last 6 months by purpose, 2019



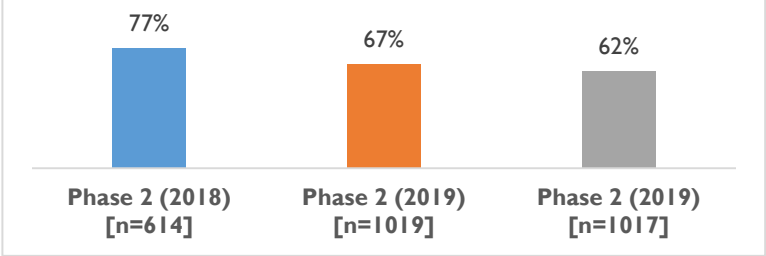
When getting funds either from loan or from savings it is much important to analyse in which purpose the fund has been used. The study observed that the maximum utilization of the funds was for business purposes while loan repayment and medical expenses were another important use. Some other mode of fund utilizations were installing water pump in HH, building or repairing house, vehicle purchase (easy bike/rickshaw/van) and legal expenses.

4.2 Access to Quality Input and Satisfaction Level of HHs

This section focuses on the accessibility of the beneficiary households (BHH) to input market actors and good quality inputs. This includes BHHs' accessibility to good quality seeds, fertilizers and pesticides (e.g., vermicomposting), fish feed and medicine, livestock and poultry, other off-farm IGA inputs which are needed for their income generating activities and homestead production.

The study has found that the percentage value of accessibility to quality inputs in Phase 2 (2019) is 67% while in Phase 2 (2018) was 77% which was higher than the 2019 survey. It shows a declining trend, hence there will be scope of improvement.

Figure 10: Percentage of BHHs that have access to quality

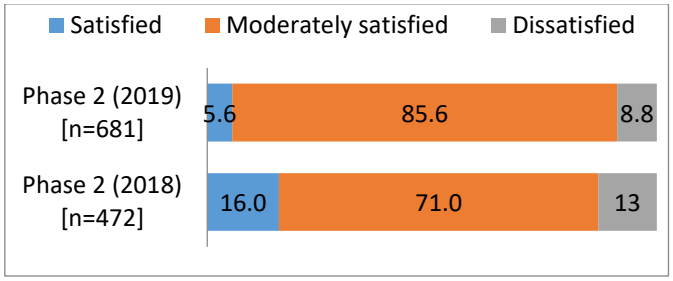


Qualitative findings shows that, beneficiaries are using seeds and other inputs from their own produces resulting lower usage of access introduced by the program.

In Phase 3 (2019) the accessibility to input rate is 62%.

The study has examined the satisfaction level of beneficiaries for input quality. Levels of satisfaction have been changed over the period which is reflected in Phase 2 (2019) compared to Phase 2 (2018). The study has found that higher level of satisfaction among the beneficiaries has been declined from 16% in Phase 2 (2018) to 6% in Phase 2 (2019); and while moderately satisfied group number has been increased to 86% in Phase 2 (2019) from Phase 2-2018 (71%). Here one thing should be concluded with importance that though beneficiaries from both satisfied and dissatisfied categories have been transferred to moderately satisfied, the rate of transfer is higher from satisfied level than that of level of dissatisfied which may be a point of consideration under the program. In Phase 3 (2019) among the total respondents 5.3% beneficiaries responded as satisfied with input quality.

Figure 11: Satisfaction of BHHs over input quality

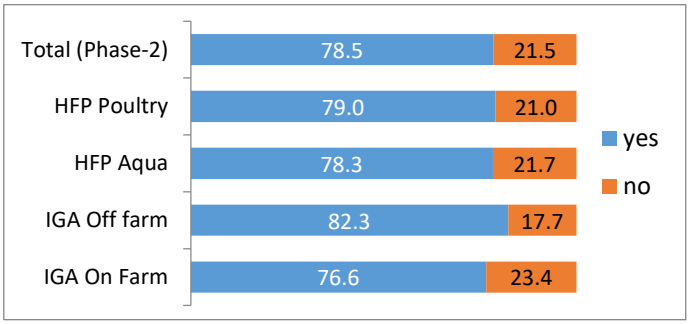


4.3 Farming Practice and Adaptation of Improved Production Practice

Suchana project has the objective to improve the livelihood, nutrition, food security status of the beneficiaries and the HH. In this regard, the project provided different interventions to proliferate the production volume of the HHs.

HOMESTEAD GARDENING

In this survey rate of having homestead garden has been increased for Phase 2 (2019) as 79% in comparison with Phase 2 (2018) as 64%. Here the training from Suchana staff on homestead gardening may be a factor of this increase. In the case of training, 96% of total respondents received training on



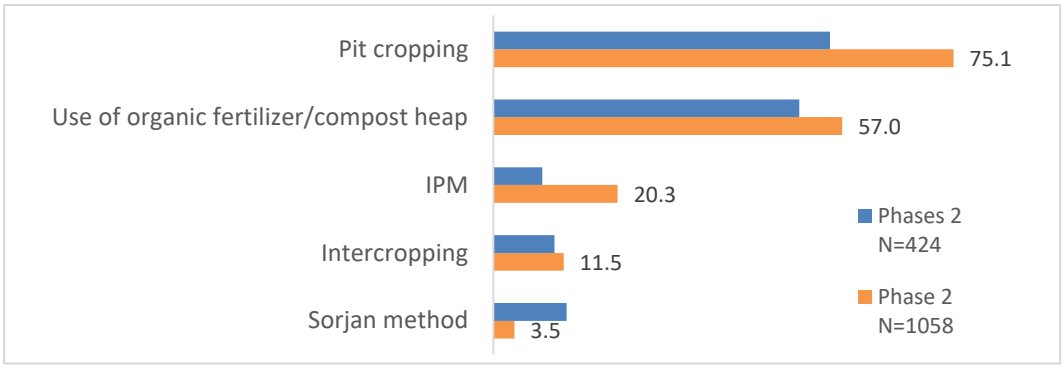
homestead gardening in Phase 2 (2019) while the rate is 90% in Phase 3 (2019).

Figure 12: Practices of homestead gardening

As the homestead gardening rates have been increased for all categories of beneficiaries the study examined how many vegetables a beneficiary produces at the same time. This is why the question was to the beneficiary at the moment of survey how many categories of vegetables exist in the garden. It was revealed that in Phase 2 (2019) almost 37% of the garden holder beneficiaries have three or more than three categories of vegetables in the garden while the rate is almost 31% in Phase 3 (2019). What is mentionable here is that in both Phase 2 (2019) and Phase 3 (2019) most of the gardener beneficiaries have two categories of vegetables – the rates are 36.9% and 48.9% respectively. This may be an impact of receiving training on homestead gardening. However, the study found that among the total respondents in Phase 2 (2019) almost 96% have received training on homestead gardening from Shuchana Staff while the rate is 90% in Phase 3 (2019).

In case of Phase 3, 73% of the beneficiaries are practicing homestead gardening.

Figure 13: Production method used by the respondents (percent)



Besides receiving training, technology uses may be another factor in the production of variety types of vegetables. Then the study examined whether there are any changes in technology uses from Phase 2 (2018) to Phase 2 (2019) and the study has found that among 5 major technologies uses like use of organic fertilizer/compost heap, pit cropping, intercropping, IPM and sorjan method rate of uses for all the technologies except sorjan method has been increased in Phase 2 (2019) than that of Phase 2 (2018). Not only this, in Phase 2 (2019) new types of technology uses have been adapted like seed storage (49%), using flood-resistant varieties (14%), using drought-resistant varieties (11%) and sac garden (10%). Example of homestead gardening are shown below -

- Homestead gardening in plastic crate &
- Vermicomposting

More than half of the respondents (54%) reported that they did not have any major problems during last month in their vegetable production. However, more than a quarter of respondents (26%) informed that they did not have available pesticides for their vegetable production. This is an area that could be explore further by the program. Other problems that the beneficiaries had to face are natural causes in most cases like excessive raining, flooding, and water logging which may be due to seasonality facts.

Table 9: IGA/HFP wise problems faced by BHHS with vegetable production in last 6 months (%)

Problems	Phase 2	Phase 3
No major problem	53.8	50.1
No available pesticide	25.5	27.6
Excessive raining	19.4	20.5
Water logging	8.8	12.7
Flooding	7.8	10.0
Lack of quality seeds	7.7	7.8
Drainage problem	3.1	5.2
Excessive drought	2.6	3.2
Lack of time	2.4	2.0
Irrigation problem	1.2	1.6
Excessive cold	0.3	0.2
Others	2.8	1.8
N/A	4.2	5.1
N	1,058	1035

Homestead gardening practices (Bottle Gourd, Pumpkin, Basella etc.)

AQUACULTURE

In addition to the horticulture and other common nutritional interventions from Suchana, 44,256beneficiary households have received support on nutrition sensitive aquaculture and fisheries since the learning phase (operational from April, 2016) to phase 3 (up to October 2019). Around 12,439 BHHs have received similar interventions from phase 2 unions those were started at the beginning of

2018. Both the IGA-pond and HFP-pond households were surveyed during semi-annual survey, however, no demo-pond households were surveyed during current semi-annual surveys.

Table 10: Progress of nutrition sensitive aquaculture and fisheries activities

Sl	Type of Activities	Phase 2 (2018)	Phase 3 (2019)
1	HFP- Aquaculture & Fisheries	9,867	10,318
1.1	HFP- Aquaculture	8,066	3,203
1.2	HFP- Integrated Aquaculture & Fisheries	1,801	7,115
2	Demo[8]- Pond-Aquaculture	283	116
3	IGA- Aquaculture & Fisheries	2,289	1,575
3.1	IGA- Aquaculture	1103	446
3.2	IGA- Fisheries	1186	1129
4	**Total**	**12,439**	**12,009**
4.1	Exclusive Aquaculture	9,452	3,765
4.2	Integrated Aquaculture & Fisheries	2,987	8,244

The following table represents the average pond size and water area of ponds managed by respondent households. This indicates that the pond sizes were very similar in both the two studies of two categories of beneficiary households.

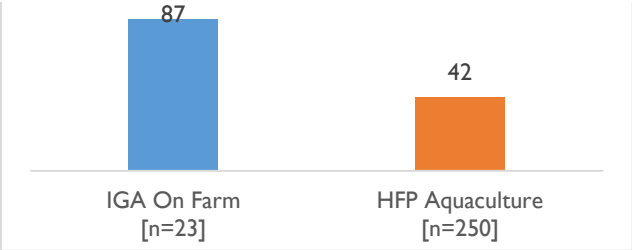
Table 11: Average pond size and water areas of the sample households

Pond area	HFP-Aquaculture			IGA-Aquaculture		
	Phase 2 (2018) n=179	**Phase 2 (2019) n=250**	**Phase 3 (2019) n=161**	**Phase 2 (2018) n=28**	**Phase 2 (2019) n=23**	**Phase 3 (2019) n=21**
Pond area in decimal (with dike)	12.0	12.5	14.5	10.9	11.1	9.0
Water area in decimal (without dike)	9.6	9.5	11.3	8.7	8.6	7.1
Pond area per respondent household	6.0	5.4	5.8	6.6	7.5	6.8

According to IGA/HFP wise data indicates that BHHs related with HFP aquaculture activities on average the amount of fishes produced per household is 42 KGs and IGA on farm related households have produced on average 87 KGs per year beneficiary household (BHH).

[8] **Demo-pond-** Demonstration pond is a community based resource center to show the results from the improved technologies and practices related to fish and horticulture for other beneficiary and non-beneficiary households within the communities along with the local service providers and market actors. It is also using as a learning center for organizing practical trainings, coaching, and linkages events for beneficiary households on improved technologies. In long run, it will also play as a local source of quality inputs and information for the community members.

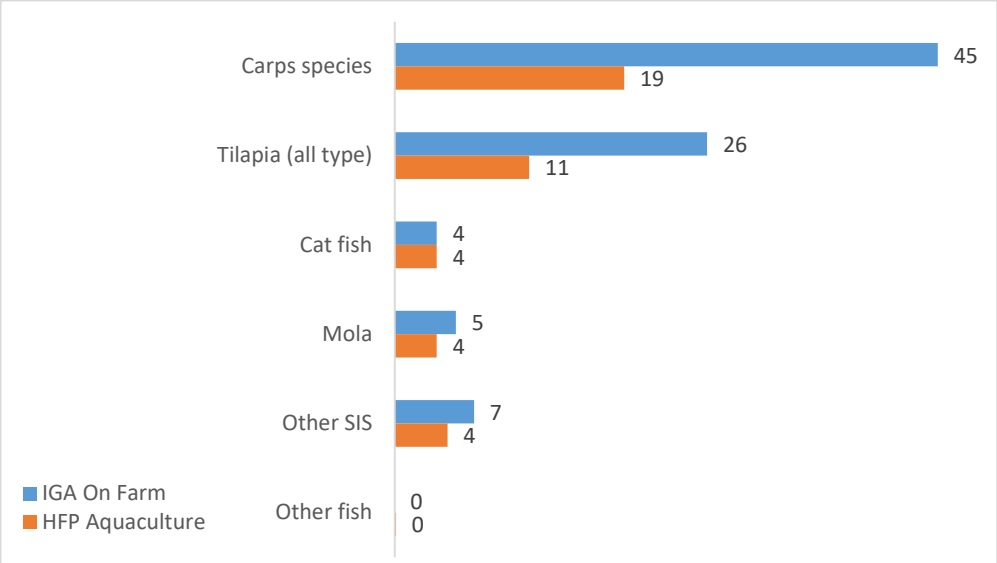
Figure 14: Average production (in kg) of a household per year by IGA/HFP



Fish Farming, done by beneficiary

On average the amount of Carps species received per household-related with IGA aquaculture activities are 45 KGs and household-related to HFP aquaculture activities are 19 KGs. On average 26 KGs of Tilapia, 4 KGs of Catfish, 5 KGs of Mola and 7 KGs of other SiS (small indigenous species) are harvested by IGA aquaculture related BHHs in phase 2. Whereas, on average 11 KGs of Tilapia, 4 KGs of Catfish and 4 KGs of Mola and 4 KGs of SiS are harvested by HFP aquaculture related BHHs.

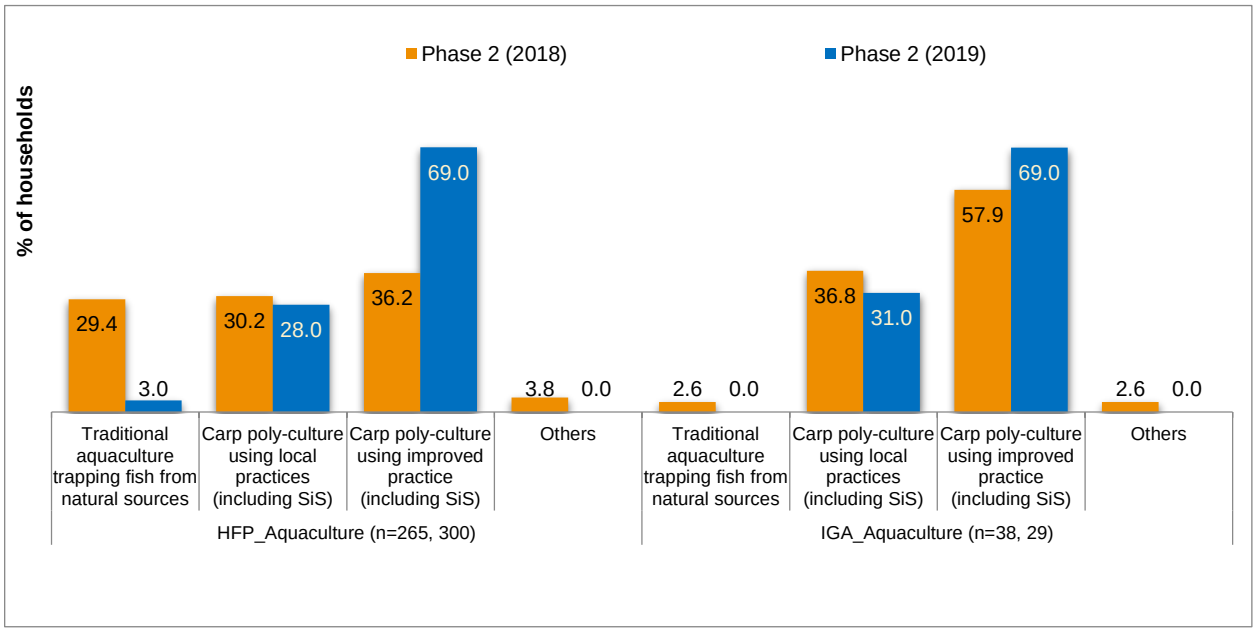
Figure 15: Average amount of fishes received per BHHs (in KGs) by fish type and IGA/HFP wise activities Phase 2 (2019)



The changes and practices in terms of technology uses in aquaculture are major concern of Suchana program. There is a positive sign of changes have been found that the beneficiaries are moving towards improved technology uses from traditional practices. After one year of receiving the interventions from Suchana, more than two-third (69%) of both IGA-pond and HFP-pond owners followed 'carp-poly culture using improved aquaculture practices' and those were 57.6% for IGA-ponds and 36.2% for HFP-ponds at the beginning of the interventions. Around one-third of both the categories of the BHHs followed 'carp-poly culture using local practices' and that was slightly reduced compare to the phase 2 (2018). 'Traditional aquaculture trapping fish from natural sources' was reduced in zero for IGA-ponds

and 3% for HFP-ponds those were almost a third (29.4%) for HFP-ponds and only 2.6% for IGA-pond. Therefore, it can be concluded that the respondents are adopting the project learnings in their production quickly regarding aquaculture.

Figure 16: Usage of technology in aquaculture (in %)

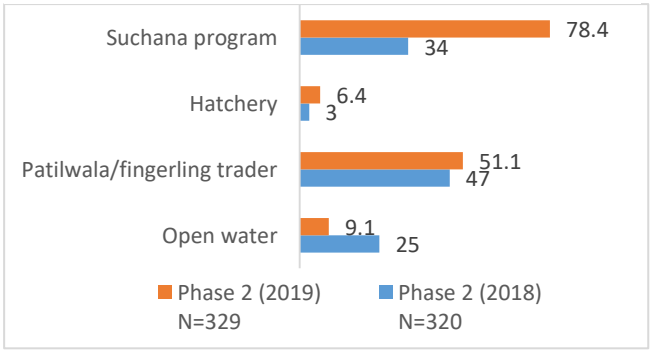


Usually, 'traditional aquaculture trapping fish from natural sources' consists of only taking opportunity to use water from open sources like haor, beel, river, and cannels during monsoon or flood season, and harvesting the fish during the dry season after flood. This method includes no other improved practices in 'carp polyculture using local practices', farmers released small, less expensive and less quality fingerlings. Usually, they do not prepare the pond following the recommend practices; do not use necessary feed and other improved practices. On the contrary, 'carp poly culture using improved practices' is using the improved technological practices at all the levels starting from pond preparation, using limes and fertilizers, stocking quality fingerling from reliable sources, and ensuring regular feeding practices through maintaining water quality. To make it more nutrition sensitive through preserving mola and other small indigenous species (SiS), Suchana recommend removing harmful fish like boal, shol, gozar etc using the netting instead of any materials like rotenone. Ultimately, the beneficiary households are adopting the project learnings to increase their fish in their production quickly regarding aquaculture.

Fish Farming, done by beneficiary

Source of fingerlings collection is a challenge of fish production in aquaculture. In that case, the fingerlings collection rate has been reduced from traditional sources in 2019 than that of 2018. The study has found that the rate of fingerling collection from Shuchana program has been incredibly increased – more than doubled (78%) in Phase 2 (2019) than that of in Phase 2 (2018) as 34%. Interestingly, the collection rate from Patilwala or fingerlings trader has increased to 51% in Phase 2 (2019) from 47% in Phase 2 (2018) while the collection rate from open water source has been notably decreased to 9% in 2019 from 25% in 2018. The scenario may be explained for more scope of study in two points. One, collection from fingerling traders has been increased while rate of hatchery source has been increased a little bit. That means the beneficiaries are lack of availability of improved sources of fingerlings. Two, there may be special interventions of fingerling supplies from Shuchana program for which the rate of collection from Shuchana program has significantly increased. If the source will be available then what will be the alternative may be an issue of future thinking.

Figure 17: Sources of fingerling (percent)



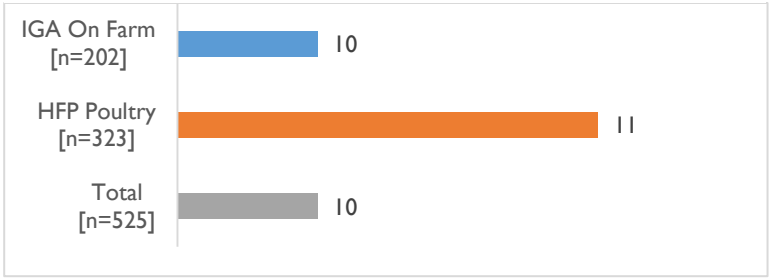
Our study has found that there are some major challenges in fish culture. Among the fish farmers in the study, only 30% responded that they did not have any problem in cultivation which is low. On the other hand, the study has found that the respondents mentioned as the more important challenges like lack of money (36%), joint ownership of the ponds (30%) and high turbid water during flood and rainy season (24%) in Phase 2 (2019). The picture in Phase 3 (2019) is almost indifferent. Therefore, the program may take it as its future thinking.

POULTRY

We found that the overall total population of 525 beneficiaries has, on average 10 poultry per household. In Phase 2 (2019) on average the number of poultry per household is 11 and in Phase 3 the number is 9.

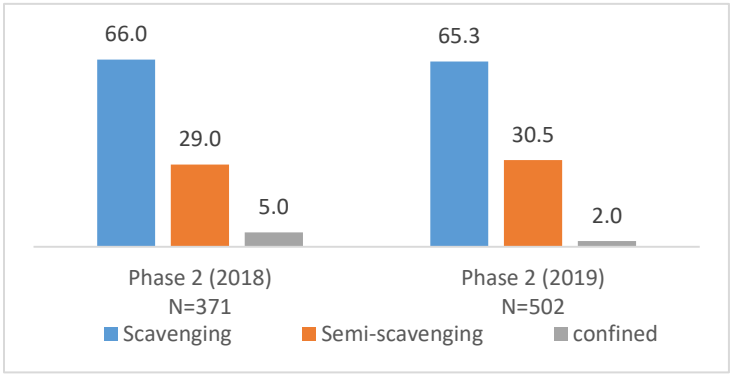
Poultry Farming

Figure 18: Average number of poultry per BHHs (in Units)



The analysis of the study has found that BHHs are moving to the improved technology from traditional scavenging. The rate of usage of semi scavenging in Phase 2 (2019) has been increased to 31% from 29% in Phase 2 (2018). According to the findings, beneficiaries are adopting program facilitated technology however, at a slower rate. Some beneficiaries also initiated turkey rearing in consort with hen and duck. The situation is not so different in Phase 3 (2019).

Figure 19: Usage of technology in poultry (percent)

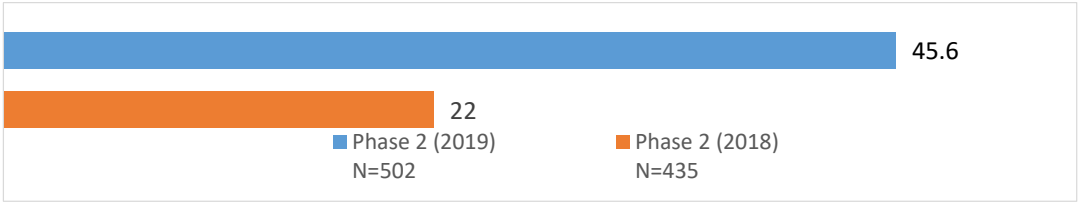


Turkey Farming

The study has also found that BHHs are now more caring about the sheds for the poultry. In phase 2 (2019) more than 70% of respondents shed are sound roof as well as ventilated while the rates in Phase 2 (2018) were 29% and 18% respectively.

The uses of hatching pot have an upward trend. For an example, the study has found that in Phase 2 (2019) the rate of using hatching pot for incubating eggs is 46% which is very much encouraging in comparison with Phase 2 (2018) that was 22%; but in Phase 3 (2019) the rate shows 24% because of different interventions time period (Phase 3 intervention for poultry was operational during March, 2019).

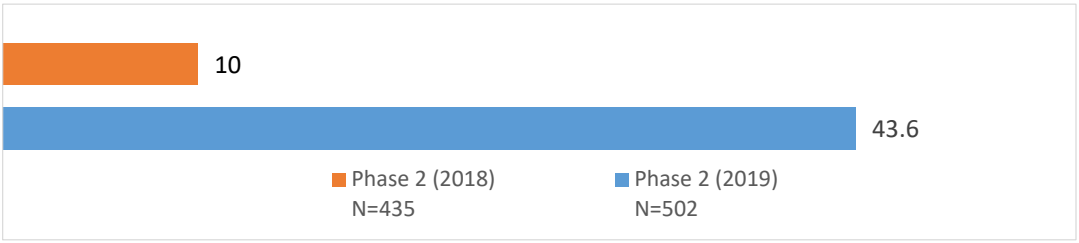
Figure 20: Usage of hatching pot for incubating eggs (percent)



Vaccination practices in poultry

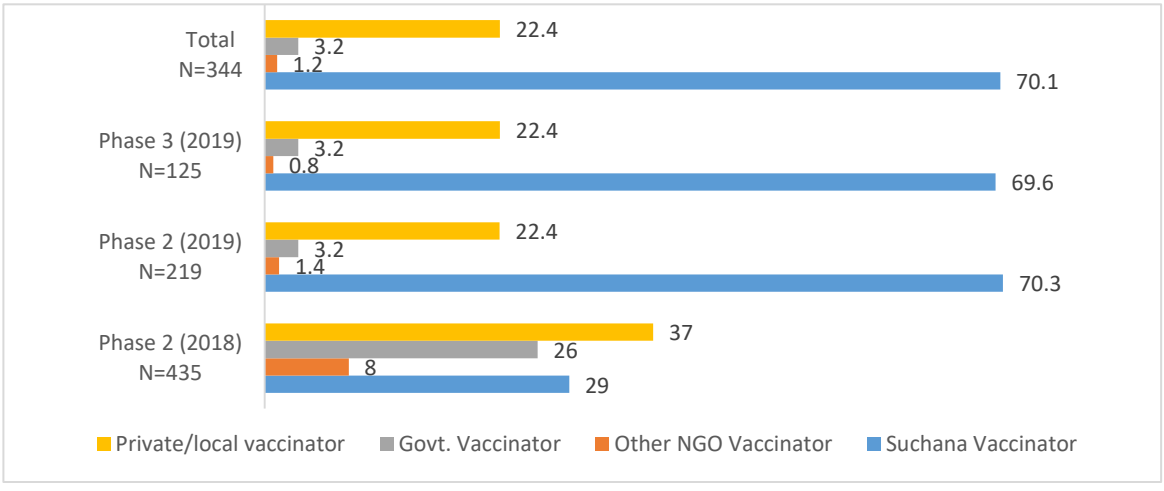
During 2018, around 10% of respondents reported that they vaccinated their poultry. The present study identified that the situation has improved with around 44% respondents of phase 2 (2019) reported that, their poultry was vaccinated. The percentage of the respondents who vaccinated their poultry is 23%. In case of phase 3, around 24% respondents vaccinated their poultry.

Figure 21: Usage of hatching pot for incubating eggs (percent)



In 70% cases, the poultry bird was vaccinated from Suchana vaccinator in phase 2, while during 2018, 29% respondents reported about Suchana vaccinator. However, in phase 3, around 70% cases, respondents went to Suchana vaccinator for poultry vaccination. In addition, 22% cases respondents in each phase went to private/local vaccinator and 3.2% respondents in each phase went to government vaccinator for poultry.

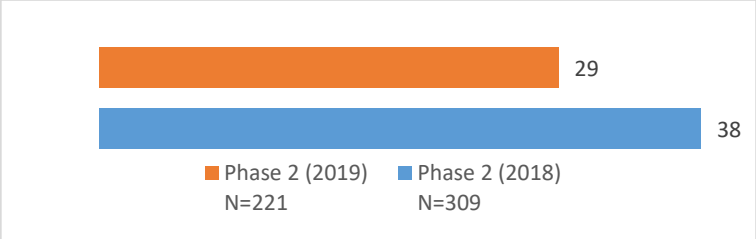
Figure 22 Sources of vaccination (percent)



Poultry Mortality

The mortality rate was calculated considering the number of poultry died in the last six months in numerator and total number of chicken/duck in the denominator. As per analysis, the mortality rate of poultry for phase 2 (2019) is 29%. The mortality rate ameliorated than the phase 2 (2018) (38%). Participants of focused group discussion stated that they had good access to vaccination and other services that helped them to take good care of the poultry. In addition, key information from the service providers showed the same result as well.

Figure 23Mortality rate of the poultry (percent)

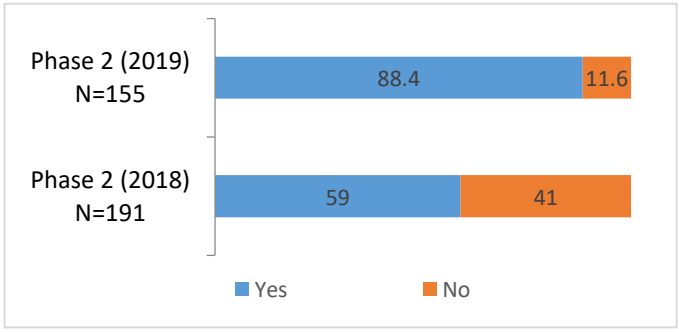


While the vaccination rate has increased by almost 33% the mortality rate has been declined by only 9%. In this case, the study has concluded that the full process of vaccination should be reviewed carefully whether there is any lack of effectiveness of the vaccination. One more thing to take notice that the study has found that almost 36% of respondent in Phase 2 (2019) responded the lack of medicine and vaccination is a major problem they faced in poultry rearing which rate has been shown in Phase 3 (2019) as 46%.

LIVESTOCK

Analysis revealed the number of beneficiaries involved in livestock rearing during last six months has increased. During the phase 2 (2018) around 59% respondents were involved in livestock rearing out of 191 beneficiaries. The number significantly increased as of the present survey with around 88% respondents are involved in livestock rearing.

Figure 24 Beneficiaries rearing livestock



In the case of livestock rearing, it is important to understand the symptoms of the diseases of the livestock. Otherwise, the owner may not be aware of the vulnerability and the risk factors of the rearing. During the first half of phase 2, around 81% respondents knew about the symptoms. However, the situation has improved and almost all the respondents (99%) know about the symptoms of the diseases of livestock.

Livestock Mortality

The mortality rate during the phase 2 (2018) was 12%. However, the mortality rate has been increased at the end period to 28%. The calculation considered the number of sheep/goats died in last six months divided by the total number of goats/sheep in last six months. In this regard, qualitative analysis showed that people's awareness regarding livestock rearing has increased and they are practicing it in their daily life. Despite this improvement, the mortality rate was beyond control. Perhaps beneficiaries were not acting timely. For example, they may take the goat/sheep to the vaccinator however delayed to do so. A significant number of goats/sheep's died immediately after distribution because the selected vendor purchased a large quantity of product in a single day for meeting procurement and distribution compliance of Suchana and they did not follow proper quarantine method that resultants the higher mortality of goat/sheep due to lack of adaptability with climate of Sylhet region. Low response to vaccination for livestock might be another reason to increase mortality of livestock. Awareness raising on importance of vaccination & ensuring knowledge into practices (vaccination) among beneficiaries and proper quarantine before distribution would be effective measure to reduce livestock mortality.

Figure 25 Beneficiaries understanding the symptoms of diseases regarding livestock (percent)

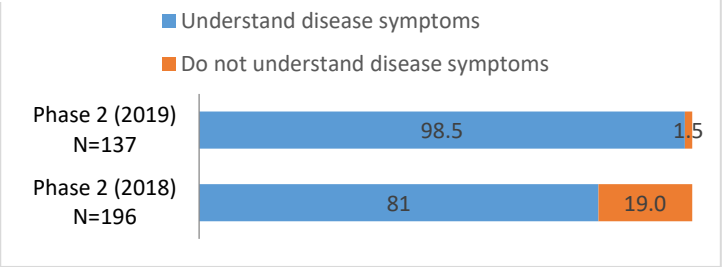
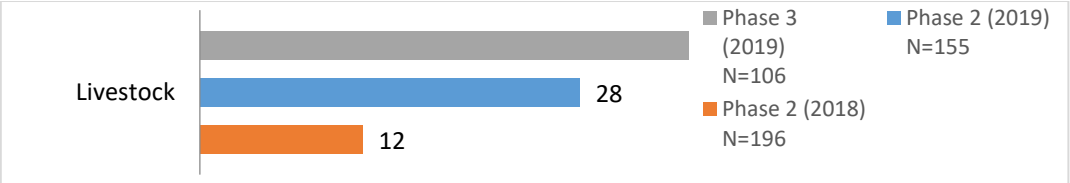


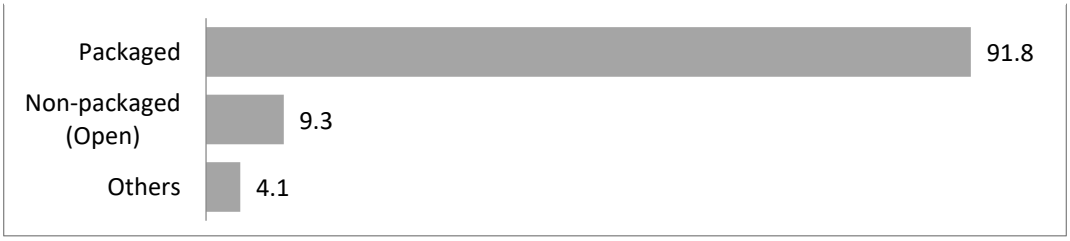
Figure 26 Mortality Rate of the livestock (percent)



4.4 Access to Market

This section is about the accessibility of markets including the accessibility of BHHs to output market for selling their produce, their sales channel, and market actors. In the beginning, beneficiaries received seeds from Suchana project for cultivating vegetables. The majority of BHH produce was consumed by the family and only sold some part if there was surplus. The majority (90%) of respondents procured packaged seeds for vegetable gardening.

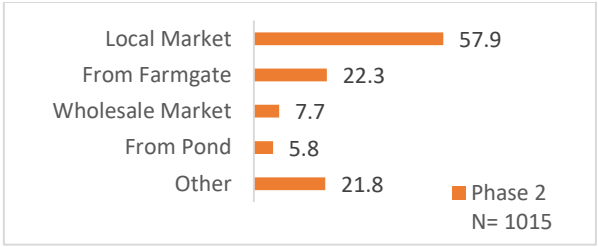
Figure 27 Types of vegetable seed purchased (percent)



A noteworthy proportion is still using traditional non packaged seed (open); which is about 9.3%. Across different categories of beneficiaries IGA on Farm, HFP Aquaculture, HFP Poultry the practices of purchasing seed observed uniform which is 89% at least. This demonstrates change in practices in terms of seed purchase among beneficiaries due to the project intervention.

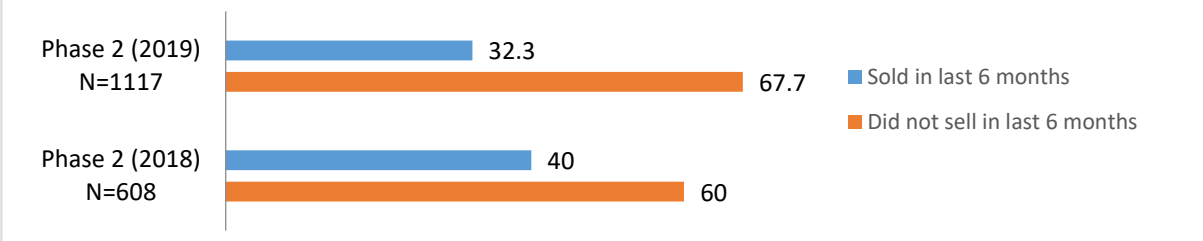
Above half of the total respondents (Phase 2) sold their produced goods in local market and almost 20% sold their goods from their farm's gate. In phase 2 about 58% of beneficiary households sold produce in local market and 22% from their farm's gate. Only 7% of the BHHs sold their produced goods in wholesale market. Similar findings have been found in case of Phase 3.

Figure 28 Produce selling point (Percent)



Nearly one third of the BHH (32.3) said they sold produces in the last 6 months in this survey, whereas it was 40% in 2018 survey. Qualitative data and impact of climate change revealed that early monsoon flash flood in Apr-Jun'19 and water logging were the key reasons which impacted on sales activity of the beneficiary.

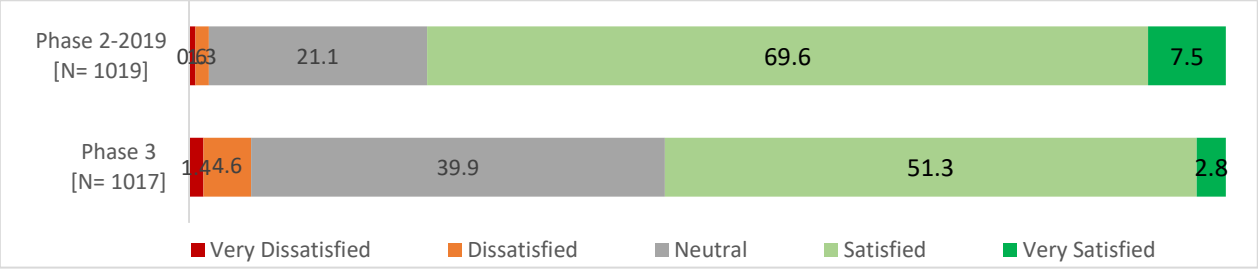
Figure 29 Sales Volume (%)



A significant proportion of the BHHs in Phase 2 are satisfied or very satisfied with the price of produces. About three forth of the BHHs are satisfied or very satisfied (77%) with the price of produces from the output buyers at present. Program intervention raised awareness among the beneficiaries on farming techniques, buying improved quality inputs which yields higher produces. In addition, Suchana program facilitated collective sales, collection point in locality, MoU with output traders and bringing output sellers as well as producers together. This intervention reduced the time cost and other overhead cost that ensured good price for produces even though the product price remained unchanged. However, as

the price of the products was not increased commensurate to beneficiary's expectation, some of them were dissatisfied in accordance.

Figure 30 Level of satisfaction with the price of produces from the output buyers at present (percent)

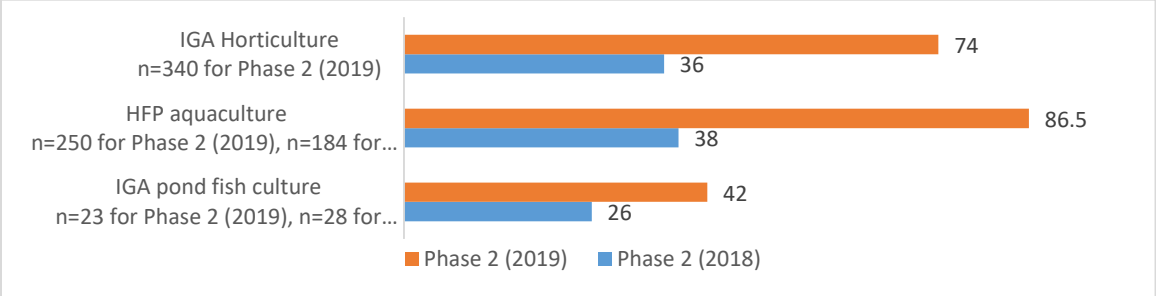


In case of Phase 3, about 50% are satisfied and almost 40% are neutral about the price of produces they get from the output buyers at present.

4.5 Increase in Production

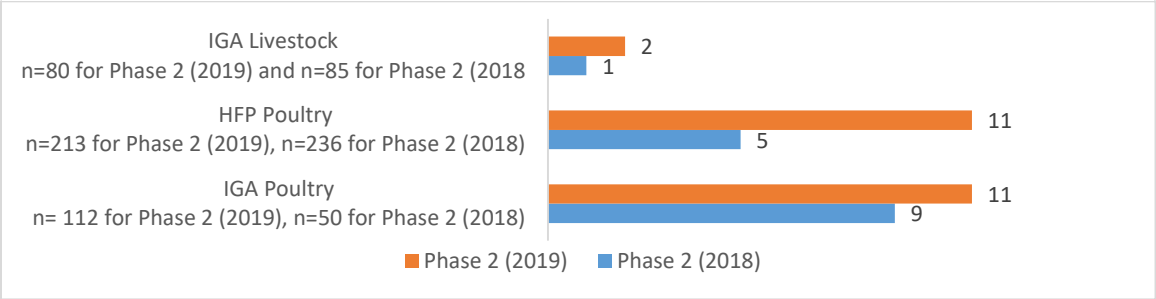
Overall production in aquaculture and vegetables have been increased in phase 2 (2019) compared to that of the phase 2 (2018). In the phase 2 (2018), the average production for IGA pond fish culture was 38 kg that has been increased to 86. Likely, HFP aquaculture production increased from 26 to 42 kg and horticulture production increased from 36 to 74 kg.

Figure 31 Average amount of production per BHH (kg)



The average amount of poultry and livestock production has been proliferated in 2019 of phase 2 compared to the 2018. The present average production of IGA and HFP poultry is 11 while it was 9 and 5 respectively during phase 2 (2018). This is an indication that, the beneficiaries are adopting the improved rearing techniques. Especially, in case of livestock, although the mortality rate has been found higher than the phase 2 (2018), the average amount of production has increased. Qualitative findings supported this findings as respondents stated that, they use vaccination and go to other service providers in case of livestock rearing (unit in numbers).

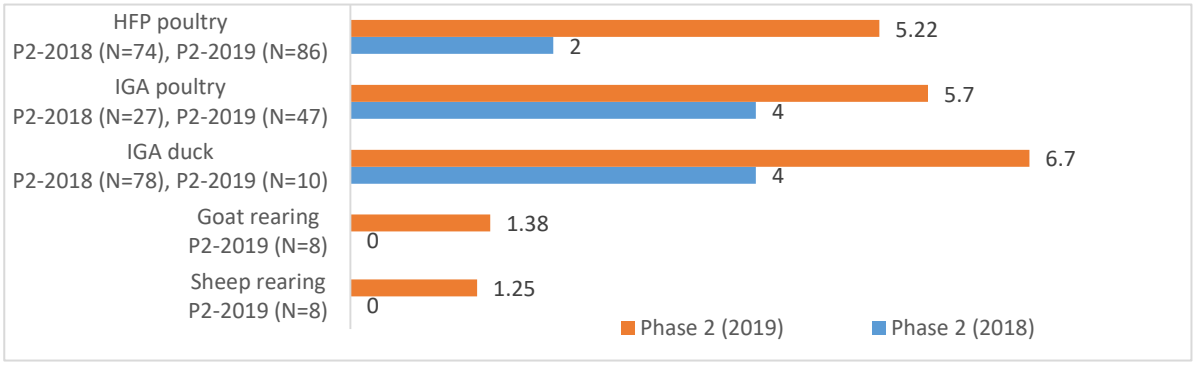
Figure 32 Average amount of production per BHH (kg)



4.6 Increase in Sales Volume

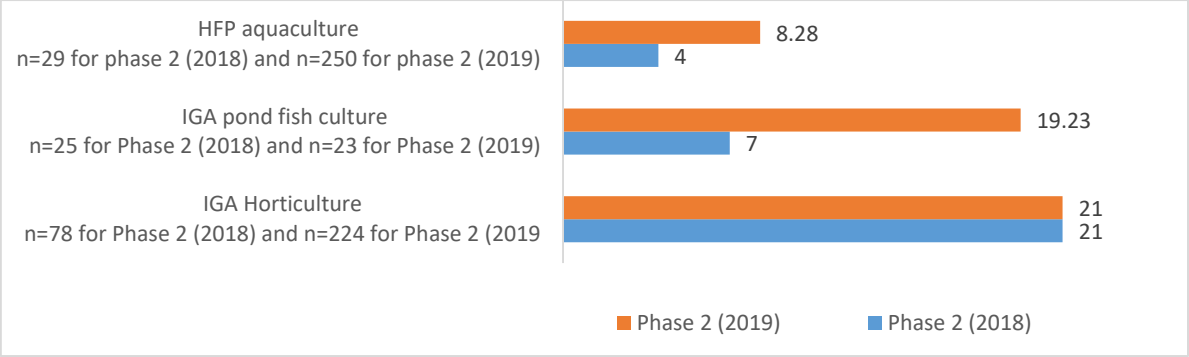
The average number of sales of poultry and livestock has been increased. During the beginning of phase 2, the average selling amount of HFP poultry was 2 per household whereas now it is 5.22. The trend continued in case of IGA poultry and IGA duck. The household who was involved in goat and sheep rearing did not sale any livestock in the phase 2 (2018). However, the condition has been ameliorated and on average, households are now selling one goat and sheep respectively. Again, the production practice, improved access to market and access to private actors are the catalyst for this scenario. If the project intervenes more to control the mortality rate of livestock, average selling may increase among the beneficiaries' household.

Figure 33 Average number of sales (poultry and livestock) per BHH (unit)

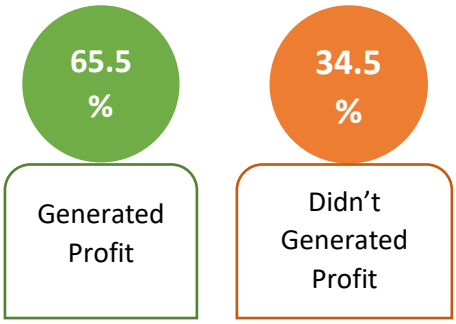


The study analyzed the average sales of the aquaculture and horticulture as well. Although in case of IGA horticulture the scenario has been unchanged, in case of HFP aquaculture and IGA pond fish culture, the average sales has been increased more than double compared to the starting of phase 2. During 2018, average sales of HFP aquaculture per household was 4 kg while in 2019 the average sales amount is 8.28 kg in phase 2. The trend is similar in case of IGA pond fish culture while it was 7 kg during 2018, now average sales per BHHs in phase 2 (2019) is 19.23 kg. Suchana intervention has done remarkable progress in case of aquaculture. Respondents of the FGD reported that, heavy raining hampered the vegetable production during past few months and may be this is the reason for unchanged average amount of sales of vegetables.

Figure 34 Average number of sales (aquaculture and horticulture) per BHH (kg)



Of the 278 samples assigned to off farm, 139 were assigned on phase 2. The Analysis found that, around 65.5% respondents generated profit via off-farm activities. On the contrary, in Phase 3 (2019), among 139 samples, around 58.3% respondents generated profit via off farm activities. Suchana project provided training on different IGAs relating to off farm activities. In addition, the project also provided inputs and linked up the beneficiaries with different market actors, output buyers etc. These were the major catalyst, found via qualitative findings, to improve the profit generation from off-farm IGA activities.



4.7 Household Food Security and Measurement of Food Access

Over the years, the poverty rate of Bangladesh has been decreased significantly after independent. In 2016, around 12.9% percent of people were below lower poverty line whereas, during 1972, around 82% people were under poverty line (BBS, 2019).[9] The study found that higher food security influences lower levels of poverty significantly in the case of Bangladesh.[10] Suchana project has the objective to improve the nutrition and food security status of the household by different interventions. Therefore, the study intended to identify the food security status of the respondents to analyze the changes over time. To commensurate with the previous study, present study used HFIAS Measurement of Food Access that is widely used worldwide.

Food access measurement consists of 9 sets of questions and respondents rate based on their context. According to the Household Food Insecurity Access Scale (HFIAS) calculation, the larger the score of the HFIAS, the higher food insecure the household is, vice versa.[11] In addition, according to Household Food Insecurity Access Prevalence (HFIAP) there are four different categories the household falls under

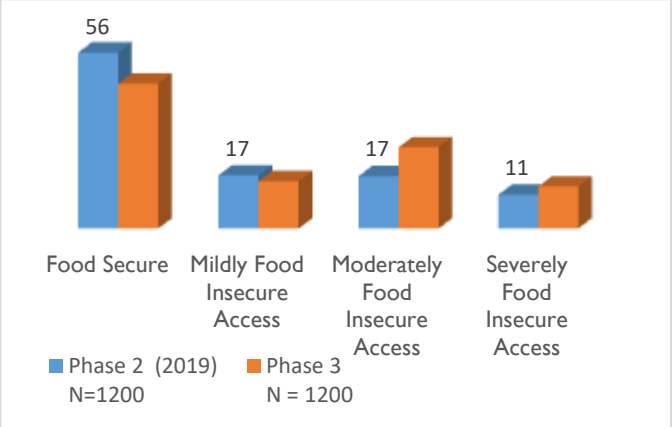
[9] Statistical Year Book (2018), Bangladesh Bureau of Statistics.
[10] https://bea-bd.org/site/images/pdf/080.pdf
[11] Coates, J., Swindale, A., & Bilinsky, P. (2007). Household Food Insecurity Access Scale (HFIAS) for measurement of food access: indicator guide. *Washington, DC: food and nutrition technical assistance project, academy for educational Development*, *34*.

namely 'food secured', 'mildly food insecure', 'moderately food insecure' and 'severely food insecure'. This study calculated both to identify the status of food security of the respondents.

The overall average score of the 2400 respondents is 3.21. The average score of the phase 2 (2019) is 2.672 while phase 3 is 3.753. The average score decreased compared to the phase 2 (2018) status (during phase 2 (2018) it was 4.97). Therefore, we can conclude that, the food security status of phase 2 respondents has been improved over time.

The study found that around 56% of the total 1200 respondents of phase 2 are within food secured category while at the beginning 14% respondents were within this group. Clearly the food security status of the respondents of phase 2 has been engendered. Severely food insecurity status has increased as well. While 17% respondents were severely food insecure at the beginning of phase 2, now 11% respondents fall under this category. In case of phase 3, around 46% are within food secure category, 15% have mildly food insecure status, 26% are moderately food insecure and 13% are severely food insecure. Based on the analysis, the intervention of Suchana project is helping to improve the food security status of the beneficiary households.

Figure 35: HFIAP Category (percent)



4.8 Minimum Dietary Diversity

Suchana project focuses on improving the nutrition status of the beneficiaries. In case of Bangladesh, people hardly have access to proper nutrition and healthy dietary diversity. Instead of focusing on the household level alone, the project focuses on the nutrition status of mothers and children as well. The study followed the dietary diversity calculation based on USAID's Food and Nutrition Technical Assistance (FANTA III) and United Nation's Food and Agriculture Organization's calculation (2016). [12] The dietary diversity was calculated focusing on 3 groups: a) household dietary diversity, b) minimum dietary diversity for women and c) minimum dietary diversity for children aged 6 to 23 months.

4.8.1 Household Dietary Diversity

The study collected household food intake data in the last 24 hours. In total, the participants responded to 24 categories of food that they had in last 24 hours. However, based on the FANTA calculation the study considered the food intake of the household in 12 groups. They are:

1. Cereals	4. Fruits	7. Fish and seafood	10. Oil/fats
2. Root and tubers	5. Meat, poultry, offal	8. Pulse/legumes/nuts	11. Sugar/honey
3. Vegetables	6. Eggs	9. Milk and milk products	12. Miscellaneous

[12] FAO, F. (2016). Minimum dietary diversity for women: a guide for measurement. *Rome: FAO*.

Analysis shows that, the average dietary diversity of the household is 7.22 and the average household consumption diversity is 7.31 in phase 2 and 7.14 in phase 3. Moreover, in phase 2, the dietary diversity for mother and child group (15-45 years of age) is 7.31 and adolescent group (15-19 years of age) is 7.28. In contrast the scores are 7.23 and 7.21 respectively for mother and child group and adolescent group.

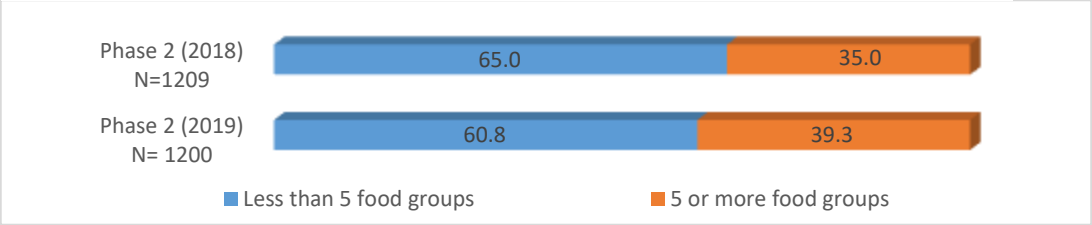
4.8.2 Minimum Dietary Diversity for Women

According to the calculation of FANTA guideline, minimum dietary diversity of women is a binomial indicator count 'yes' in case of consuming 5 or more than 5 food groups and 'no' in case of consuming less than 5 food groups. The food group is divided into 10 groups containing the following:

1. Grains, roots and tubers	6. Eggs
2. Pulses	7. Dark leafy greens and vegetables
3. Nuts and seeds	8. Other vitamin A rich fruits and vegetables
4. Dairy	9. Other vegetables
5. Meat, poultry and fish	10. Other fruits

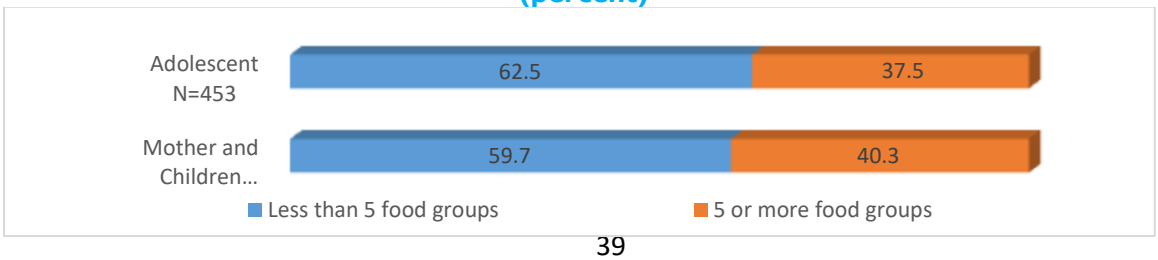
The respondents were asked about the food intake of the women of 15-45 years in the last 24 hours. The model is designed for women of reproductive age. Although the respondents mentioned about 21 food items those were aggregated to 10 food groups based on the guideline. In total, around 37 percent of the total respondents consumed more than or equal 5 food group while 63 percent respondents are still below the threshold. Although there is still scope to improve the dietary diversity status, the situation is improving gradually. In phase 2, around 39 percent respondents are above the threshold of 5 or more groups that was 35 percent in the phase 2 (2018). Therefore, the project intervention is effective in case of improving dietary diversity so far. On the contrary, 35 percent respondents of phase 3 consumed 5 or more food within last 24 hours.

Figure 36: Minimum Dietary Diversity for Women (percent)



Suchana program targets to improve the nutritional status of the women and children (15-45 year) group as well as adolescent (15-19 years) group. Analysis found that, 39% respondents consumed 5 or more food in last 24 hours in case of phase 2. Among them, 40% are within mother and children group

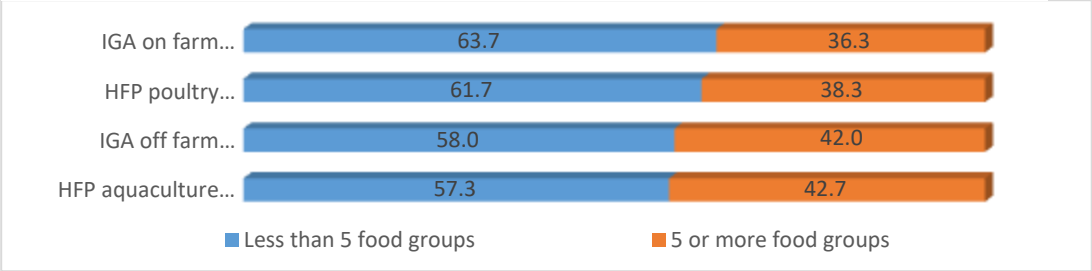
Figure 37: Minimum Dietary Diversity for Women by Women/Adolescent group (percent)



while 38% are in adolescent group.

The study also calculates the dietary diversity of women (in percent) based on the IGA/HFP segregation. Analysis in phase 2 shows that, 43% respondent of HFP aquaculture consume 5 or more food group followed by 42% of IGA off farm group, 38% of HFP poultry group and 36% of IGA on farm group. In case of phase 3, around 35% respondents consume 5 or more food group. Among them, 41% are in HFP aquaculture group, 34% in IGA off farm, 33% IGA on farm and 32% HFP poultry group.

Figure 38: IGA/HFP wise Minimum Dietary Diversity for Women (percent)



Following figures represent that, the percentage of household where women consume at least 4 food including vitamin A rich fruits and vegetables as well as at least one animal flesh food. Analysis found that, the percentage of BHHs taking 4 or more food as well as vitamin A rich fruits and vegetables reduced from 34% (2018) to 27% (2019) in case of phase 2. However, the animal consumption has been increased more than double. In phase 2 (2018), one third (33%) respondents took 4 or more food including at least one animal and now around three fourth (74%) respondents are consuming 4 or more food including at least one animal food during last 24 hours. This huge transition in meat may be the catalyst for marginal rate of substitution for vitamin A rich fruits and vegetables. Overall transition of 4 or more group and at least one mean with vitamin A rich fruits and vegetables has been improved significantly as well. During the starting of phase 2 (2018), around 11% BHHs reported to consume 4 or more food by women including vitamin A rich fruits and vegetables and meat. The percentage improved to 19% in phase 2 (2019).

Figure 39: At least 4 food groups consumed by women including at least one animal (percent)

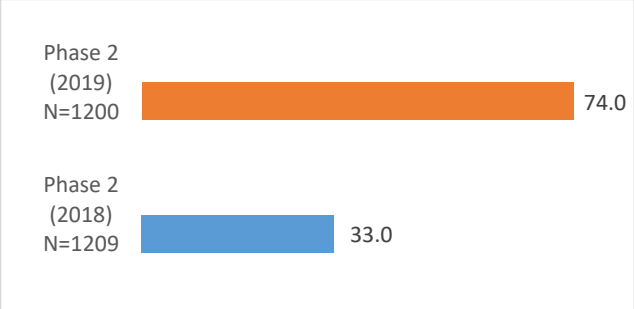


Figure 40: At least 4 food groups consumed by women including vitamin A rich fruits and vegetables (percent)

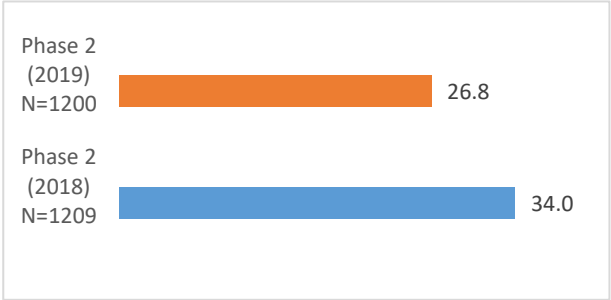
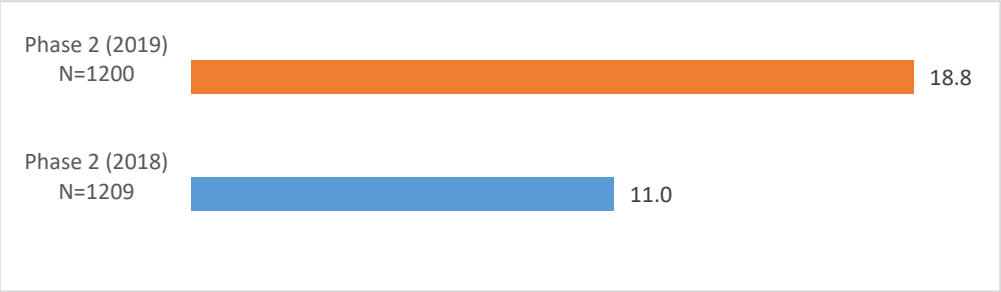


Figure 41: At least 4 food groups consumed by women including both vitamin A rich fruit and vegetables and least one animal (percent)

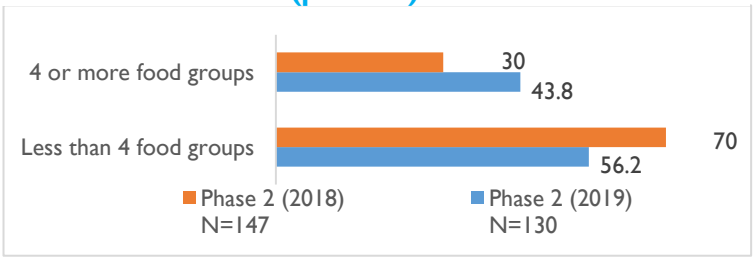


4.8.3 Minimum Dietary Diversity of Children (6 to 23 months)

To improve the child nutrition Suchana project is intervening in different sectors. However, it is important to identify the status of the dietary diversity of children (6 to 23 months of age) to identify the effectiveness of the intervention in this regard. Like household and women dietary diversity, children's dietary diversity is also calculated according to the FANTA guideline. The food group for the children is as follows:

1. Grains, roots and tubers 2. Legumes and nuts 3. Dairy products 4. Flesh foods (meat, fish, poultry and liver/organ meats)	5. Eggs 6. Vitamin A-rich fruits and vegetables 7. Other fruits and vegetables

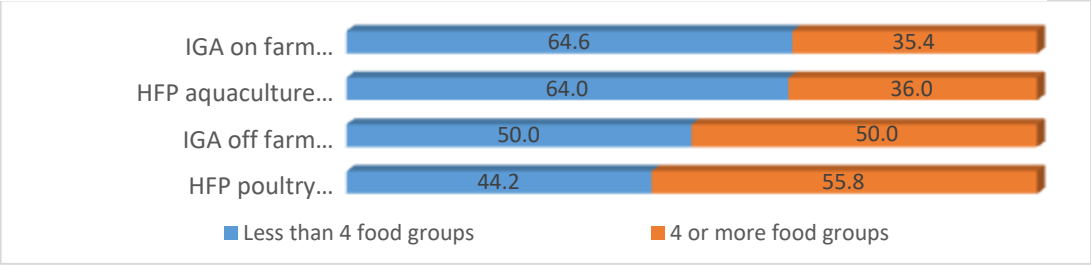
Figure 42: Minimum Dietary Diversity for Children (percent)



The calculation guideline is different for the children compared to household and women dietary diversity. Among the 7 food groups, the threshold is 4 or more food groups. The study found that in total 43 percent of total 319 households were found to have children to take 4 or more food within last 24 hours. In case of phase 2 (2018) it was 30 percent which increases now in phase 2 (2019) to 43.8 percent. In phase 3, indicator shows that, in around 41.3 percent household, children aged between 6 to 23 months take at least 4 food groups within 24 hours.

In case of IGA/HFP segregation, analysis found that, HFP poultry respondents consume more '4 or more food' (56%) compared to that of others in case of phase 2. In case of IGA off farm, half of the respondents (50%) reported children consuming 4 or more group followed by HFP aquaculture (36%) and IGA on farm (35%). In case of phase 3, 37.1% of IGA on farm, 44% of IGA off farm, 52% of HFP aquaculture and 35% of HFP poultry households reported to take 4 or more food by the children.

Figure 43: IGA/HFP wise Minimum Dietary Diversity for Children (percent)



4.9 Women's Access to Market

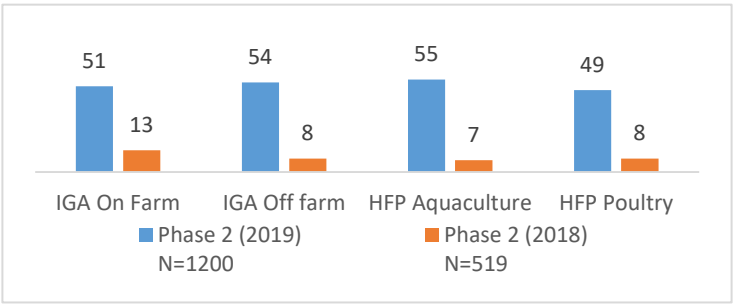
This section explores the status of Suchana beneficiaries in terms of their participation in income generating activities (IGAs) and their decision-making capability. In order to understand the role of females in specific stages of IGAs, the respondent beneficiaries were asked to identify the individuals who mainly perform a particular task involving the particular IGA and participate in decision making. From the qualitative findings we found that women are more aware of their IGA activities than before and this was possible due to Suchana intervention. In total, the survey interviewed 1688 women of reproductive age and children group and 712 of adolescent group.

Women buying inputs from the market:

We have the information on phase 2 and phase 3, where there is a percentage of women bought the inputs from market by themselves and also the percentage of women who bought the inputs from market with the help of other people. Bellow the table and the figure show that in phase 2 the less percentage of women bought inputs from market directly by themselves than phase 3.

In phase 2, a total of 1200 women were interviewed who were farmers of IGA on-farm, IGA off-farm, HFP aquaculture, and poultry. Among the farmers, 48% female farmers said that they have purchased the agricultural inputs by themselves and 52% said that with the help of other people they have bought the inputs. Here 49% IGA on-farm, 46% IGA off-farm, 45% HFP aquaculture and 51% of HFP poultry female farmers said that they have bought the inputs directly from market by themselves.

Figure 44: Women buying inputs from market (percent)

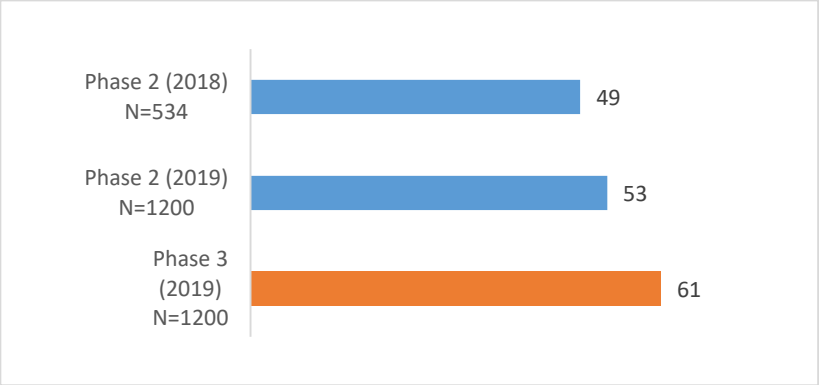


In phase 3, a total of 1200 female farmers were interviewed to identify their involvement with market. Among them 55% female said that they have purchased the agricultural inputs from market directly by themselves and remaining 45% said that with the help of other people they bought the inputs from market. Where the IGA on-farm farmer was 55%, off-farm farmer was 56%, HFP aquaculture was 50% and HFP poultry were 57% who bought the inputs from market directly by themselves.

Women Making Decisions on IGA Expenditure

Suchana project has sole focus on empowering women in case of decision making regarding household chores and beyond. Therefore, the project continuously conducts awareness and other interventions to ensure that. Our study found that, during the phase 2 (2018), 49% women had decision making role in case of IGA expenditure. The situation has improved and now around 53% beneficiaries take decision regarding IGA expenditure by themselves or jointly with husbands.

Figure 45: Women making decisions on IGA expenditure



4.10 Systemic Change

Systemic change refers to impact on markets and livelihood. Generally, systemic change is defined as a transformation of elements or components of a system by changing underlying reasons in a sustainable manner. Small farmers depend on market systems to obtain necessary inputs, products, and services as well as to sell their produce. A market system consists of direct market players such as farmers and traders, suppliers such as input companies and the regulatory environment such as government agencies.

All these actors shape the market system. Inclusive market systems ensure that everyone, including smallholder farmers, participates. In this case, the assumption is that changes in scale, autonomy, resilience, sustainability, and inclusivity will define the market system change for horticulture, poultry, livestock and aquaculture subsectors in the program targeted area and enhance a market platform and enabling environment that would sustain changes brought by an initiative. Market system change is the most effective strategy for intervention to sustainably improve the undernutrition and poverty situation of the BHHs. With systemic change beneficiary households would experience a better market environment and service platform for their productive activities provisioned by the market system itself. In the context of Suchana, the outcome of Phase 2 is shown below, where the characteristics of the market system that BHHs are engaged in are considered against four different IGAs. Here, the indicators are defining the market system characteristics only for the BHHs. Additional information on input/output retailers and related government service providers is also discussed but is not part of the indicators assessed.

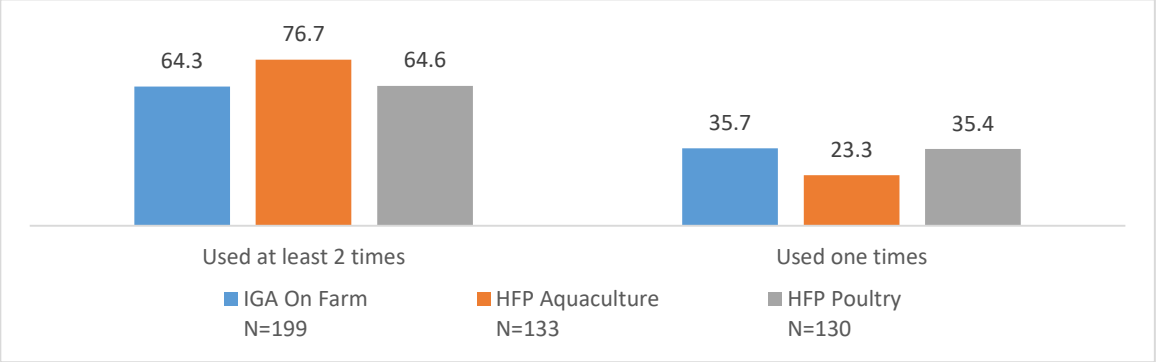
Market System Characteristics	Unit of analysis	Indicator	Phase-2 (in %)	Phase Phase-3 (in %)	Total
Scale	**LBA**	**LBA reaching out their targets**	-	-	-
Autonomy	Household	Adopted improved production technologies	68.0 (N=462)	45.3 (N=468)	56.6 (N=930)

Market System Characteristics	Unit of analysis	Indicator	Phase-2 (in %)	Phase Phase-3 (in %)	Total
	Market actor	**Market actors improved their business skill**	62.8 (N=43)	62.9 N=35	62.8 (N=78)
Resilience	Household	Production after climatic shock due BG approach	44.1 (N=136)	-	44.1 (N=136)
	Market actor	**Market actors benefitted through pub-pri and networking**	75.0 (N=4)	91.4 (N=35)	88.5 (N=78)
Sustainability	Household	Reinvestment in production	34.8 (N=1019)	11.3 (N=1017)	23.1 (N=2036)
Inclusivity	Women of Household	Decision making power of women	97.7 (N=43)	85.7 (N=35)	92.3 (N=78)
	Market actor	**Market actor offers women and BoP (Base of Pyramid) customer friendly services**	34.3 (N=239)	29.8 (N=168)	32.4 (N=407)

4.10.1 Autonomy

Autonomy is defined here as a continuation of the improved production technologies without program support, but directly with the support of private sector and public sector actors. Beneficiaries were asked whether they want to continue or have the willingness to use the program promoted products, services, technologies, and good production practices without the program support or facilitation in future.

Figure 46: Used improved technology (percent)



According to the analysis in phase 2 among 199 respondents 64% of respondents used improved technology at least two times in IGA on-farm while 36% used one time. In case of HFP aquaculture, among 133 respondents 77% respondents used at least two times and 23% used only one time. HFP poultry used by 65% respondents at least two times while 35% used one time (with 130 respondents). Among total 462 beneficiaries, 68% used at least two times improved production technology while 32% used only one time improved production technology.

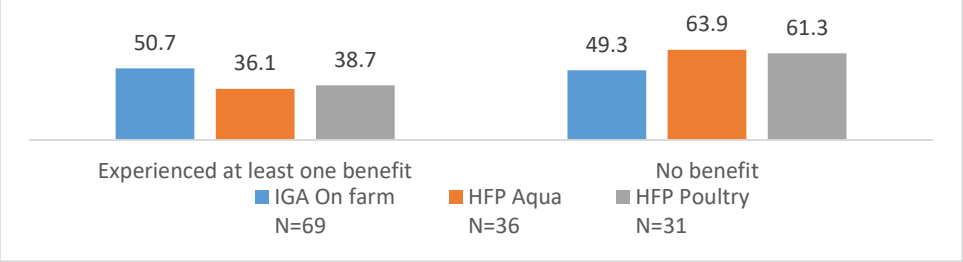
In phase 3, among total 468 beneficiaries 45% used at least two times improved production technology and 55% of respondents used only one time improved production technology. Using IGA on-farm technology, among 174 respondents 40% used at least two times and 60% used for only one time. Interviewing 151 farmers of aquaculture, 54% used two times and 46% used only one time. Among 143 respondents of poultry, 43% adopted at least two times improved production technology and 57% used only one time.

4.10.2 Resilience

Resilience denotes the capacity of the BHHs and other stakeholders to continue with their productive activities after any climatic shock or natural disasters. To know how resilient BHHs have become, respondents were asked whether they think that they will be able to resume and continue production and sale after climatic and economic shocks.

To identify the effectiveness of the Business Group (BG) approach in phase 2 total 136 beneficiaries were interviewed. Here, around 51% said that they have experienced at least one benefit in phase 2, and remain 49% said that, they did not have any benefit. In case of HFP aquaculture and poultry, 36% and 39% respondents were benefited by Business Group Approach.

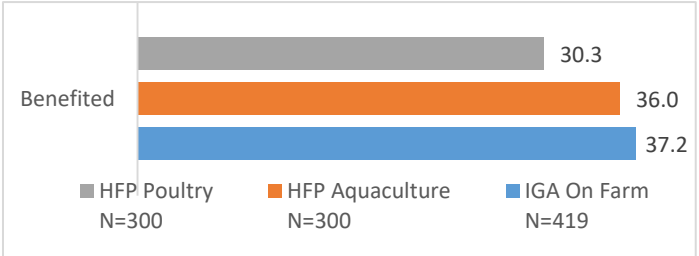
Figure 47: Benefited through business group (percent)



4.10.3 Inclusivity

The concept of inclusivity is defining the ability of the women from the BHHs to benefit from the market system by engaging in production and earning income from sales. In order to know this, women were asked whether they are able to make decisions regarding IGA-related issues.

Figure 48: Women got benefited through market linkage (percent)



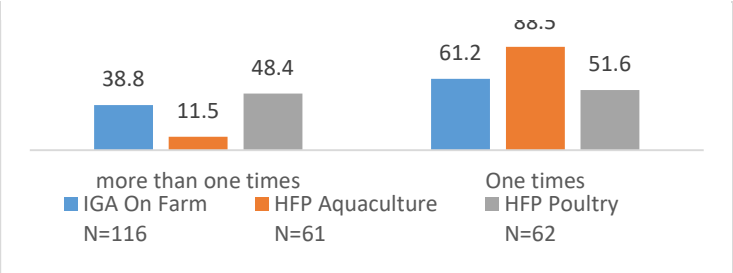
From the analysis, we can say that, in phase 2, among 1019 women about 35% were benefited and the remaining 65% of respondents said that they were not benefited from the market linkage through Suchana. An IGA on-farm, 37%, HFP aquaculture 36% and HFP poultry about 39% women said that they were benefited.

4.10.4 Sustainability

Sustainability for productive businesses is defined as the capacity to run a profitable business or production in the long-term through the cyclical process of reinvesting in their ventures for further growth and income. BHHs were asked whether they have the capacity to reinvest in the program promoted products and services for the continuation of using improved production technologies.

In phase 2, a total 239 farmers were asked as they are investing back into their IGA business or not. Here 34% said that they have invested back at least two times where 66% said that they have invested back only for one time into their IGA business.

Figure 49: Consistently investing to IGA (percent)



In phase 3, a total of 168 farmers were asked about their investment in their IGA business. Here about 30% said that they have invested back more than one time and 70% said that they have invested back only for one time. The following figure explains the situation more.

4.11 Climate shock and Resilience

4.11.1 Climate Shock

Sylhet region is renowned for heavy rainfall and 'kalboishakhi' storm that usually remains above average country rainfall. In October, although this is not a rainfall prone season, average rainfall of Sylhet was 342 millimeter.[13] The scenario exacerbated in case of flash flood and water lodging. **Around 71% respondents of phase 2 reported that they received warning prior to any climate shock**. In contrast, 65% respondents of phase 3 reported similarly. The study found that majority of the respondents (43%) experienced stress due to natural disaster to some extent. Among them, in most of the cases (62%), respondents mentioned storm and heavy rainfall. In addition, they also mentioned flooding (46%) followed by waterlogging (34%), flash flood (19%), draught (9%), etc.

[13] http://www.ffwc.gov.bd/ffwc_charts/rainfall.php

Table 12: Types of disaster faced by the respondents (% multiple response)

Type of the disaster	IGA on farm N=359	IGA off farm N=162	HFP aquaculture N=269	HFP poultry N=236	Total N=1026
Flooding	46.0	42.6	45.7	47.0	46.0
Water lodging	34.3	38.3	28.6	31.8	34.3
Soil erosion	3.6	4.3	1.1	3.4	3.6
Drought	9.2	6.8	7.1	7.6	9.2
Flash flood	19.2	27.2	31.6	23.3	19.2
Storm and heavy rainfall	59.3	59.3	64.7	64.4	61.9

Suchana project facilitate climate resilient production technology so that, households can cope up with the natural disasters. In case of homestead gardening, majority of the respondents (80%) adopted climate resilient technology. However, the more respondents of phase 2 (82%) adopted climate resilient technology that phase 3 respondents (79%).

Analysis found that, off farm IGA beneficiaries adopted climate resilient technology for homestead gardening (84%) more than other beneficiaries. Around 81% HFP aquaculture beneficiaries followed by 80% on farm beneficiaries and 78% HFP poultry beneficiaries adopted climate resilient technologies for homestead vegetable production.

The study team identified the climate resilient technologies that the households adopted regarding aquaculture. According to the following figure, around 82% respondents of phase 2 adopted at least one climate resilient technology. In contrast, HFP aquaculture beneficiaries (76%) adopted more climate resilient technology than IGA on farm beneficiaries (73%).

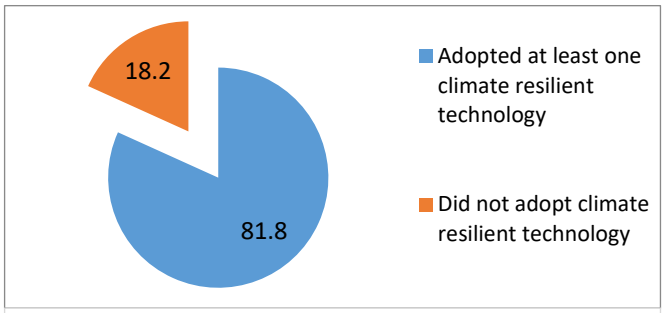


Figure 50 Household's adoption of climate resilient technology regarding aquaculture (percent)

Chapter 5: Significance Test on Indicators

Significance Test

The study considered the indicators of the program and conducted test of significance to identify whether the indicators outcome changed significantly or not after the program intervention.

The comparison of the indicators considered the value of Phase 2 (2018) and Phase 2 (2019). The number of samples is given for each of the indicators. The hypothesis is as follows:

Null hypothesis: $H_0: \hat{p} - \hat{q} = 0$

Alternative hypothesis: $H_1: \hat{p} - \hat{q} \neq 0$

The null hypothesis stated that, the project intervention has no effect on the major indicators and the alternative hypothesis stated otherwise.

The formula for the significant test is as follows:

$$Z = \frac{\hat{p} - \hat{q}}{\sqrt{\hat{p}}(1 - \hat{q})(\frac{1}{n_1} + \frac{1}{n_2})}$$

Where, $\hat{p}$ is the value of the indicator of Phase 2 (2018),

$\hat{q}$ is the values of the indicator of Phase 2 (2019),

n_1 is the sample of Phase 2 (2018) for the respected indicators and

n_2 is the sample of Phase 2 (2019) for the respected indicators.

The test considered 5% and 10% level of significance for comparing the indicators. Analysis found that, the null hypothesis was rejected for all the cases. Thus the difference between the indicators from phase 2 (2018) to present study was significant and the project intervention is significantly improving the status of the beneficiaries of the Suchana program.

Dietary Diversity of the BHHs

Indicator Description	Change	p-value	Level of Significance	Comment
Percentage of reproductive age women had 5 or more food group	Increased	0.047	Significant at 5%	The dietary diversity status for children has increased significantly. The project intervention has significant impact on improving the dietary diversity
Dietary diversity of children age 6-23 months age took 4 or more group	Increased	0.009	Significant at 5%	

Women Empowerment and Decision Taking

Indicators	Change	p-value	Level of Significance	Comment
Percentage of women buy input directly from the market	Increased	0.001	Significant at 5%	Suchana program has different intervention for women empowerment. The program also facilitates market access for the beneficiaries' women. According to analysis, the percentage of women buy input directly from the market has increased significantly at 5% level of significance from the Phase 2 (2018). Women are now making decision on IGA expenditure more than before due to project intervention (at 10% level of significance).
Percentage of women make decision on IGA expenditure	Increased	0.067	Significant at 10%	
Beneficiaries linked to output buyers	Increased	0.078	Significant at 10%	To improve women participation in the market and sales, the program linked the beneficiaries with the local output buyers. More beneficiaries are linked with the output buyers compared to phase 2 (2018) survey due to direct program intervention, which is significant at 10% level of significance.

Production, Inputs and Savings

Indicators	Change	p-value	Level of Significance	Comment
Percentage of registered BHHs accessed quality inputs from private actors	Decreased	0.002	Significant at 5%	Access to quality input facilitated by the program has been decreased. The results is significant at 5% level of significance. Beneficiaries initially received input from the Suchana program. Later they produced the input of their own. Therefore, they did not accessed to the input from private actors introduced by the program.
Percentage of BHHs that are member of savings group introduced by Suchana (VSLA)	Increased	0.001	Significant at 5%	Beneficiaries of the program have engendered savings behavior facilitated by the program. The change is significant at 5% level of significance.
Percentage of BHHs with home garden	Increased	0.001	Significant at 5%	Suchana provided training and seeds for homestead gardening to the beneficiary households. The number of households engaging to homestead production has been increased significantly over the period.
Poultry Vaccination	Increased	0.001	Significant at 5%	In case of vaccination, poultry vaccination has been increased significantly (5% level of significance)

Food Security

Indicators	Change	p-value	Level of Significance	Comment
Food Secure	Increased	0.001	Significant at 5%	In case of food security, the program intervention is significantly ameliorating the food security status of the beneficiaries. The test result shows that beneficiaries are more food secured than previous year considerably at 5% statistical level of significance. The status of severely food insecurity, moderately food secured and mildly food secured group has been diminishing significantly as well.
Mildly food secure	Decreased	0.001	Significant at 5%	
Moderately food secure	Decreased	0.001	Significant at 5%	
Severely food insecure	Decreased	0.001	Significant at 5%	

Chapter 6: Qualitative Study Findings

On Farm Beneficiaries

The on farm beneficiaries of the project received goat, sheep, poultry (duck and chicken), fingerling and vegetable seeds. Some beneficiaries did not receive the product directly, rather received money, via bkash, from the program to buy inputs. Beneficiaries used project promoted channels and sources due to various reasons. The main reason is, the channels are always ready to resolve any problems regarding their poultry, livestock or aquaculture. They are cheap and easily accessible as well. The quality of inputs (especially seeds) is very good and high yielding. To recapitulate, respondents were very satisfied with the access to input. They gained knowledge regarding inputs and other materials as well.

At first, Suchana program provided the input to the beneficiaries therefore beneficiaries did not have to finance their IGAs. Later the beneficiaries managed finance from various sources. Some of them managed finance from family members. In addition, some of the beneficiaries managed finance by selling the produces, own savings etc. They sold eggs, vegetables, duck, chicken, livestock etc. for further financing.

The participants of the focused group discussion stated that they go to livestock and fisheries department in case of any diseases of the poultry and livestock. In addition, they are aware of the local vaccinators. All this knowledge they gained from the training session. The beneficiaries are aware of the use and availability of pesticides regarding vegetable and crop production. The representative of Suchana is always within the reach of the beneficiaries in case of any emergencies.

Usually, households consume produces to ensure dietary diversity, nutrition, and food security. However, beneficiaries sell the surplus of their production. In most cases, beneficiaries sold the produces to other adjacent households. Moreover, sending gift to other family members is also a practiced custom. All the participants agreed that they gained profit by selling poultry and livestock. "If our neighbor buys from us, we do not need additional costing for selling that leads to profit", said one respondent. The case of aquaculture is also the same. However, in some cases, fish were taken to the local market to sell. In these cases, women barely go to the market places, despite taking decision regarding selling and production. The local people are also comfortable to purchase from the Suchana beneficiaries. They have good faith in the products of the beneficiaries. In addition, beneficiary's family members take the products to local market and during the 'hat' days, they usually get good price of the products.

In terms of decision making, the situation has been ameliorated compared to previous years. Now, beneficiary women have bargain power within the family. They can take decision regarding homestead production, poultry and livestock rearing by them. Some of them make the decision jointly with their husband, father, brother and other family members. However, very few of the beneficiaries are comfortable with sale products in the local market. One adolescent participant in the focused group discussion said, "I can buy my own book by selling eggs and poultry. This is very helpful for me and I can bear most of my educational expenses by myself".

Beneficiaries are now self-depending and confident that, they can contribute to the family significantly in terms of dietary diversity, nutrition, and food security. Suchana program arranged several awareness-raising training. Attending those training, women, and adolescents became aware of nutrition and dietary

diversity. They even disseminate the knowledge with their neighbours and other family members to raise awareness. "I am aware of nutrition and try to cook 4 to 5 types of food a day for my family", said a women beneficiary who had a baby of 2 years old. In addition, Suchana project built awareness regarding savings behavior of the beneficiaries. On-farm beneficiaries mentioned about saving in VSLA. Moreover, beneficiaries adopted climate-resilient technologies that proliferated the production. Consequently, higher production leads to gain profit.

IGA Off Farm

The beneficiaries of IGA off-farm received fish larvae, big fish, fishnet, dried fish, commodity for grocery shop, bamboo and skep, etc. All the interventions were given once and worth BDT 8000. The respondents received training regarding their respective IGA as well. The input was collected by the Suchana officials from the local markets nearby and then disseminated to the beneficiaries. In addition, seeds for vegetables and training regarding homestead gardening were given to all the beneficiaries. Before Suchana intervention, respondents had to take 'mohajoni loan' from the community level lender at higher interest rate. In this regard Suchana project significantly helped the beneficiaries. One respondent from FGD said -

> "As I had to take loan to buy inputs under very strict conditions, I did not engage in any production activities despite having knowledge in this regard. Then representatives from Suchana provided me with the inputs totally free of cost. This made me enthusiastic to engage in production"

In addition, respondents stated that Suchana intervention helps them to increase income and contribute to the education of their children. Many of the IGA off-farm beneficiaries have savings now and some of them are maintaining DPS savings.

In case of further financing, respondents had access to finance from different sources. They used the revenue from selling for further investment. A respondent said, "My husband was convinced of my capability of the production. Also there was local demand in the community of my bamboo craft. Therefore, he gave me more money to proliferate the production volume". However, in the case of market access, women still have apathy to go to market to sell products. It is not the culture of the community. In most of the cases, husband takes the produces to the local market and sale despite selling decision come from the women. A participant added that "When my husband is too busy to sale in market, my son used to sale those in the local market". There is a problem regarding market place. To sale any product, beneficiaries are required to pay rent for the market place that reduces the profit which is very discouraging.

The beneficiaries get help from the Suchana officials and trainers in case of any emergencies. Although some of them went to public and private actors for different cases, the practice is hardly common in the community.

NGO and Project Officials

Suchana project has an elaborate focus on the livelihood and nutrition status of the beneficiaries. The project provided training on different IGA activities based on previous experience of the beneficiaries.

To build awareness, the project frequently arranges meeting to the community level. The intervention has major focus on homestead gardening, aquaculture, livestock, poultry as well as off-farm activities. The beneficiaries are selected from women of reproductive age and adolescent.

Suchana project believes that increase in income improves the nutrition, dietary diversity and food security status of the households. However, there are some barriers to smooth intervention. Lots of community people are expecting to be involved with the program however, the capability of the project is limited. Local influential and political people sometimes create pressure in member selection. "We sometimes get pressure and even threat to select beneficiaries. Affluent households also try to involve with the project although we inform them about the financial ceiling regarding beneficiary selection, said one representative. There are few cases where acrimony is visible between beneficiaries and non-beneficiaries of the community. Religious and social taboo makes the women participation in the market parochial. These barriers occurred due to lack of education. In case of aquaculture, several numbers of owners of pond create problem for project implementation. In addition, there were some cases where beneficiaries lost their enthusiasm as their livestock died prematurely. The project found it difficult to reach out the intervention in the Haor areas.

The implementing officials informed that, in some cases, despite having training from Suchana project, people tend to use the old technology. It is challenging to divert them to improved production practice. The project can take further steps to improve the production practice behavior among the beneficiaries.

Beneficiaries are now more aware than before regarding food security and dietary diversity. They provide feedback to the Suchana representative on how they are planning their dietary diversity and maintain nutritious food habits. Most people thought that improved nutrition is a costly thing however, receiving training from Suchana and getting different interventions, they are now aware of their capability to ensure proper nutrition by themselves. "Women are very conscious to maintain proper diversity and nutrition for the household members. They felt the urgency and became proactive when they realized that, they could ensure proper nutrition and food security all by themselves. The project really performed well regarding nutrition, dietary diversity, and food security," said one representative. Beneficiaries are adopting the climate-resilient technologies, however, few beneficiaries are not capable of adopting due to lack of spaces.

The representative of the project officials have some suggestion as follows:

- Increase the duration of the training.
- Increase manpower for project implementation. Disseminate the responsibilities to more people so that, individual pressure is lessened.
- Arrange meetings more frequently.
- Provide the intervention in the second year rather than in the first year.

Government Officials

The government officials reported that the nutritional level is lower in the Sylhet and Moulvibazar areas, especially for the people who lived under poverty line. The people of the haor areas are more vulnerable. In addition, as a number of people are living abroad the households are less interested in farming practice resulting lower food production in this locality. Government has many initiatives to reduce poverty commensurate with the 7th 5 years plan. People are entitled with various safety net programs such as VGD, VGF, EGPP, VGR, TR, freedom fighters allowance, widow allowance, old

allowance etc. Government also provides free vaccination to livestock and poultry, free seeds, training, conduct development programs etc. However, there various barriers to implement the programs such as, political pressure, lack of manpower and budget, failure to create awareness despite of several initiatives. In this regards, Suchana program is doing well. Beneficiary selection of the project is very effective and smooth. The program is also doing well in case of nutritional status of the pregnant women and adolescent girl. Beneficiaries of the project are women and adolescent and they are being engaged in farming as well as different income generating activities. The program has goodwill among the community people. One of the government officials stated that "Sometimes a number of Scuhana beneficiaries come to my office for several facilities. It is really good to see their awareness they achieved from the program." Government officials are invited to the meetings held in the community organized by Suchana project. Program personnel maintain continuous liaison with the government and share their learnings. In addition, government officials help in case of providing training.

"Suchana program can increase the quantity and intensity of the training session", said one official. The program still has scope to intervene more in haor areas; Especially increasing the practice of floating or tower garden, crate or sac gardening, providing free seeds etc. In addition, more scopes are available to work with the tribal group, health care services, education, promoting bio-gas, improving the quality of livestock provided from the program etc. One of the government officials suggested providing more poultry instead of goat right now.

Government officials reported sudden flood, heavy rainfall and thunder strike as common natural calamities in the locality. In case of climate adaptive resilient, the program can facilitate planting trees to prevent thunder strikes, introduce fast growing seeds, cage fishing etc.

Private Sector Actors

The semi-annual survey conducted KII with private actors like ACI, Metal Agro Ltd., Lalteer Seed Ltd., Sea Trade Fertilizer, etc. The private sector actors collect inputs directly from their own RND department or from foreign countries. They sell through dealers and retailers to the marginal farmers of the village. Usually, the private sectors do not face shortage of supply. However, some delays regarding mode of transaction, transportation, etc. cause the delayed supply. These organizations attended meeting with the beneficiaries of Suchana and based on the demand, provided inputs two or three times in a month. Representatives of market actors ensured that their purchasing system is too easy for everybody.

The private sector actors mentioned that they provide high quality product. However, high yielding hybrid crops have the highest demand. Although farmers are the final users of the product, organization sold products via dealers and VMFs. One of the respondents said that "We encourage beneficiaries of Suchana. They can maintain relationship with us by attending the meeting. However, some of the beneficiaries do not continue the relationship".

Arranging meetings with the farmers is tough job. The availability of farmers is a major issue in this regard. In addition, due to social and religious impediments, in most cases, women were unable to attend the meeting. In case of future of the industry one of the respondents mentioned that "Farmers should get proper price of the product. Only then the industry will thrive." In addition, there are a number of arable lands are not cultivated now. It is important to utilize the lands.

Over the last 2-3 years, there are some changes in the scenario. For instance, farmers are using seeds from their own production more rather than purchasing from the market, women participation is increasing gradually, modern technologies are imposed, etc. The supply of seeds in the market has also been engendered. The memorandum of understanding with Suchana program through iDE has been beneficial for the beneficiaries. If this continues, it would help to uphold the socio-economic status of the beneficiaries. The present program is undoubtedly beneficial for people. The program should enlarge its scope of work.

Output Seller

The output sellers are the suppliers of the input materials of the beneficiaries of the Suchana project. They supplied chicken, duck, goat, sheep, vegetable seeds fishing nets, fingerling, etc. to the beneficiaries of the Suchana program. They were aligned with the program by attending meetings, training programs. They also provided training on livestock and poultry rearing as well as supplied free medicine. Representatives of the Suchana project generally place order to seller, take the products and then pay the bill. Output sellers are interested to provide the service until the buyers are interested. At present, more inputs are available at lower price. Output sellers are always ready for helping the beneficiaries. One of the respondents said that "We always welcome the beneficiaries to come to us by themselves with their products. By continuous collaboration, beneficiaries will get idea regarding future market prospects and help them to produce more products".

Chapter 7: Conclusion

Suchana program is performing well to ensure food security and improved nutrition of the beneficiary households. The program intervention regarding homestead gardening, aquaculture, poultry and livestock helped the beneficiaries to increase production thus ensuring better nutrition and income status. Moreover, different market intervention enabled the beneficiaries to sale produces and it reflected in the study findings. However, beneficiaries and different stakeholders of the project placed some recommendation which will improve the program intervention mechanism are discussed below.

a. There is a gap between knowledge and practice by the beneficiaries. Qualitative findings found that, despite having training regarding improved and climate-resilient production techniques, a number of beneficiaries does not follow in daily practice. Increasing regular follow up practice can be beneficial in this matter.
b. Suchana project has scope to empower women more in case of engaging them in IGA activities more. Historically, project intervention areas are vary restricted for women. Although women are making decisions in case of homestead gardening, livestock, and poultry inside home, they have rare interaction with the local market. They take the decision however do not involve in direct communication with the market. Awareness building among the community can be a better solution for this.
c. There are many households in Sylhet and Moulvibazar that has migrants in abroad. They receive remittance and do not engage in any production activities. There are a number of arable land in these areas that can be brought under production. There is no way but to aware people in this regard.
d. The mortality rate should be a prime focus of the project intervention. The study found that goat mortality rate is higher in the project areas. It is important to identify the possible reason and resolve the problems. A more improved quality goat can be provided by the project. Especially, the livestock should have to be adaptive to the climate of Sylhet and Moulvibazar region.
e. In terms of livestock, awareness raising on importance of vaccination amongst beneficiaries should be a continuous process; moreover follow up on checking vaccination card can be implemented. This will resultant low mortality rate of livestock.
f. Key challenges in aquaculture are collection of quality fingerling as well as shared pond owner. Suchana program has scope of work to raise awareness on where to get quality input for fish farming and connect beneficiaries with input supplier.
g. In case of access to finance, very few people take a loan from VSLA. It is important for the beneficiaries to get access to finance to engender the production. The project can enhance the activities to get easy finance for the beneficiaries.
h. The project has no intervention regarding medical assistance. However, analysis found that, people took loan from VSLA for treatment purpose. Project can focus regarding medical treatment of the beneficiaries. Regular health check-up (blood pressure, diabetic disease etc.) can be introduced.
i. Beneficiaries are much dependent on the Suchana representatives. People prefer the public and private stakeholders mostly in case of livestock, aquaculture and poultry products. It is important to increase collaboration between beneficiaries and other private and public stakeholders. This practice should be started before ending the project. Otherwise, the gap between the actors will be the catalyst for apathy of the beneficiaries regarding their production activities.

j. The collaboration of the output sellers and beneficiaries can be improved more. People of the project area have apathy to sale produces. With the improved collaboration, beneficiaries can be interested to proliferate the production and thus sales.
k. In every local market or in community, a women corner can be established. Here, all the women sellers will sit together. It will be beneficial in three ways. First, the beneficiaries and local female producers will be encouraged to sale by themselves. Secondly, local women will feel comfortable to buy their necessary products from this women's corner. The last case is, beneficiaries have to pay rent for the market place and this women corner can reduce the rent payment.
l. The duration of the beneficiary training need to be longer. Otherwise refresher training can be done over the year.
m. Beneficiaries complained about availability of pesticides & safe way to use it. Project can take this into consideration.
n. According to government officials, more palm trees can be planted as a precaution for thunder strike.
o. Suchana project has numerous intervention and activities. It would be better to conduct the study focusing on key indicators by reducing questionnaire length.

Indicators at a Glance

Indicators at a Glance Phase 2 (2019) and Phase 2 (2018)

Indicator Name	Phase 2 (2019)	Phase 2 (2018)
1. Percentage of registered BHHs accessed quality inputs from private actors	Accessed quality inputs = 68.8% N=1019 Satisfied = 5.6% moderately satisfied = 85.6% N=681	Access to quality inputs = 77% N=614 Satisfied = 16% moderately satisfied = 71% N=472
2.Percentage of BHHs that are member of savings group introduced by Suchana (VSLA)	Member of savings group = 92.3% N=636	Member of savings group = 20% N=968
3. Beneficiaries linked to output buyers	Linked with output buyers = 30.9% N=1019 Fully satisfied = 15.9% Moderately satisfied = 70.2% Dissatisfied = 14.0% N=315	Linked with output buyers = 28% N=166
4.1 Percentage of BHHs with home garden	BHHs with home garden = 83.8% N=1200	BHHs with home garden = 64% N=634
4.2 Percentage of BHHs adopting climate resilient livelihood options	**Aquaculture:** Adopting climate resilient livelihood option = 89.7% N=330 **Homestead gardening:** Adopting climate resilient livelihood option = 81.8% N=1058	
4.3 Percentage of BHHs practicing good production technology	**Aquaculture:** At least one production technology : 100% N=329 **Vegetables:** At least one production technology : 98.4% N=1058 **Poultry:** At least one production technology : 98.4% N=502 **Livestock:** At least one production technology : 100% N=137	
4.4 Percentage of BHHs received early warning and preparedness for upcoming disaster	Received early warning: 70.8% N=1200	
5. Average volume/number of	**Aquaculture:**	

Indicator Name	Phase 2 (2019)	Phase 2 (2018)
production per season per BHHs	Average: 67 kg N=273 **Vegetables:** Average: 68 kg N=984 **Poultry:** Average: 11 (unit) N=325 **Livestock:** Average: 2 (unit) N=80	
6. Percentage of BHHs increased sale volume/number	Sold in last six months = 32.3% N=1117	
7.1 Percentage of BBHs generating profits from IGA	**Off farm:** Generated profit: 65.5% N=139 **Livestock:** Generated profit: 14.4% N=118 **Poultry:** Generated profit: 20.9% N=430 **Aquaculture:** Generated profit: 76.6% N=265 **Vegetables:** Generated profit: 100% N=248	
7.2 Percentage of BHHs who have income	Income Range: 25001-30000 = 0 30001-40000 = 0 40001-50000 = 4.2% More than 50000 = 95.3% Average monthly HH income = BDT 11899 N=1200	Average monthly HH income = BDT 11337 N=1209
7.3 Percentage of food insecure households according to HFIAS	Food secure = 55.8% Mildly food insecure = 16.8% Moderately food insecure = 19.7% Severely food insecure = 10.8% N=1200	Food secure = 14% Mildly food insecure = 27% Moderately food insecure = 40% Severely food insecure = 17% N=1209
8.1 Percentage of reproductive age women had diversity food	5 or more food group = 39.3% N=1200	5 or more food group = 36% N=1209
8.2 Average household dietary score	Average = 7.31 N=1200	
8.2.1 Dietary diversity of children age 6-23 months age	4 or more food group = 43.8% N= 130	4 or more food group = 30% N= 147
9.1 Percentage of BHHs using sage water for drinking and cooking purpose	Safe Source of water for drinking = 99.2% Safe source of water for cooking: 84.8% N=1200	
9.2 Percentage of BHHs using	Improved toilet = 59.4%	Safe latrine = 52%

Indicator Name	Phase 2 (2019)	Phase 2 (2018)
safe latrine	N=1200	N=120
10.1 Percentage of women buy input directly from the market	Self = 47.9% N=1200	Self = 9% N=436
10.2 Percentage of women sales their produces in the market directly	Self = 41.1% N=1200	
10.3 Percentage of women make decision on IGA expenditure	Women taking decision = 52.9% N=1200	Women taking decision = 49% N=534
10.4 Percentage of women making decision on selling products	Women taking decision = 40.2% N=1200	
10.5 Percentage of women have control over income	Women taking decision = 49.5% N=1200	
11.1 Percentage of BHHs received vaccination/treatment services from local service providers	**Poultry:** Received vaccination = 43.6% N=502 **Livestock:** Received vaccination = 52.3% N=155	**Poultry:** Received vaccination = 10% N=435 **Livestock:** Received vaccination = 79% N=196
11.2 Average mortality rate reduced per BHHs in last six months	IGA livestock = 28.1% HFP poultry = 25.5% IGA poultry = 32.1% Poultry total = 28.7% Total mortality rate = 28.7%	IGA livestock = 12% Poultry total = 38%
MSC-2 Percentage of on farm BHHs who adopted at least one improved production technology	Used at least two times = 68.0% N=462	
MSC-3 Percentage of market actors improved their skills	Improved business skill = 62.8% N=43	
MSC-4 Percentage on farm BHHs through business group	Experienced at least one benefit = 44.1% N=136	
MSC-5 Percentage of market actors benefited through linkages facilitated by Suchana	Benefited = 86.0% N=43	
MSC-6 Percentage of women under on farm group who got benefited through market linkage	Benefited = 34.8% N=1019	
MSC-7 Percentage of women and BoP (base of pyramid) customer friendly services	Provided friendly services = 97.7% N=43	
MSC-8 Percentage of on farm BHHs consistently investing back into their IGA business	More than one time = 34.3% One time = 65.7% N=239	

Indicators at a Glance: Phase 2 & 3

Indicator Name	Phase 2 (2019)	Phase 3 (2019)
1. Percentage of registered BHHs accessed quality inputs from private actors	Accessed quality inputs = 68.8% N=1019 Satisfied = 5.6% moderately satisfied = 85.6% N=681	Accessed quality inputs = 61.9% N=1019 Satisfied = 6.7% moderately satisfied = 83.7% N=630
2.Percentage of BHHs that are member of savings group introduced by Suchana (VSLA)	Member of savings group = 92.3% N=636	Member of savings group = 51.9% N=241
3. Beneficiaries linked to output buyers	Linked with output buyers = 30.9% N=1019 Fully satisfied = 15.9% Moderately satisfied = 70.2% Dissatisfied = 14.0% N=315	Linked with output buyers = 30.0% N=1017 Fully satisfied = 4.6% Moderately satisfied = 55.7% Dissatisfied = 39.7% N=305
4.1 Percentage of BHHs with home garden	BHHs with home garden = 83.8% N=1200	BHHs with home garden = 81.9% N=1200
4.2 Percentage of BHHs adopting climate resilient livelihood options	**Aquaculture:** Adopting climate resilient livelihood option = 89.7% N=330 **Homestead gardening:** Adopting climate resilient livelihood option = 81.8% N=1058	**Aquaculture:** Adopting climate resilient livelihood option = 61.3% N=344 **Homestead gardening:** Adopting climate resilient livelihood option = 78.8% N=1035
4.3 Percentage of BHHs practicing good production technology	**Aquaculture:** At least one production technology : 100% N=329 **Vegetables:** At least one production technology : 98.4% N=1058 **Poultry:** At least one production technology : 98.4% N=502 **Livestock:** At least one production technology : 100% N=137	**Aquaculture:** At least one production technology : 100% N=345 **Vegetables:** At least one production technology : 98.7% N=1035 **Poultry:** At least one production technology : 98.8% N=519 **Livestock:** At least one production technology : 100% N=68
4.4 Percentage of BHHs received early warning and preparedness for upcoming disaster	Received early warning: 70.8% N=1200	Received early warning: 64.6 N=1200
5. Average volume/number of production per season per BHHs	**Aquaculture:** Average: 67 kg N=273	**Aquaculture:** Average: 72 kg N=184

Indicator Name	Phase 2 (2019)	Phase 3 (2019)
	Vegetables: Average: 68 kg N=984 **Poultry:** Average: 11 (unit) N=325 **Livestock:** Average: 2 (unit) N=80	**Vegetables:** Average: 60 kg N=944 **Poultry:** Average: 9 (unit) N=200 **Livestock:** Average: 2 (unit) N=10
6. Percentage of BHHs increased sale volume/number	Sold in last six months = 32.3% N=1117	Sold in last six months = 21.0% N=1116
7.1 Percentage of BBHs generating profits from IGA	**Off farm:** Generated profit: 65.5% N=139 **Livestock:** Generated profit: 14.4% N=118 **Poultry:** Generated profit: 20.9% N=430 **Aquaculture:** Generated profit: 76.6% N=265 **Vegetables:** Generated profit: 100% N=248	**Off farm:** Generated profit: 58.3% N=139 **Livestock:** Generated profit: 1.9% N=54 **Poultry:** Generated profit: 4.8% N=463 **Aquaculture:** Generated profit: 72.3% N=173 **Vegetables:** Generated profit: 100% N=214
7.2 Percentage of BHHs who have income	Income Range: 25001-30000 = 0 30001-40000 = 0 40001-50000 = 4.2% More than 50000 = 95.3% Average monthly HH income = BDT 11899 N=1200	Income Range: 25001-30000 = 0.2% 30001-40000 = 0.1% 40001-50000 = 3.1% More than 50000 = 96.7% Average monthly HH income = BDT 11576 N=1200
7.3 Percentage of food insecure households according to HFIAS	Food secure = 55.8% Mildly food insecure = 16.8% Moderately food insecure = 19.7% Severely food insecure = 10.8% N=1200	Food secure = 45.9% Mildly food insecure = 15.0% Moderately food insecure = 25.8% Severely food insecure = 13.3% N=1200
8.1 Percentage of reproductive age women had diversity food	5 or more food group = 39.3% N=1200	5 or more food group = 34.9% N=1200
8.2 Average household dietary score	Average = 7.31 N=1200	Average = 7.14 N=1200
8.2.1 Dietary diversity of children age 6-23 months age	4 or more food group = 43.8% N= 130	4 or more food group = 41.3% N= 189
9.1 Percentage of BHHs using sage water for drinking and cooking purpose	Safe Source of water for drinking = 99.2% Safe source of water for cooking: 84.8% N=1200	Safe Source of water for drinking = 96.6% Safe source of water for cooking: 87.5% N=1200
9.2 Percentage of BHHs using	Improved toilet = 59.4%	Improved toilet = 57.8%

Indicator Name	Phase 2 (2019)	Phase 3 (2019)
safe latrine	N=1200	N=1200
10.1 Percentage of women buy input directly from the market	Self = 47.9% N=1200	Self = 54.7 N=1200
10.2 Percentage of women sales their produces in the market directly	Self = 41.1% N=1200	Self = 40.6% N=1200
10.3 Percentage of women make decision on IGA expenditure	Women taking decision = 52.9% N=1200	Women taking decision = 60.5 N=1200
10.4 Percentage of women making decision on selling products	Women taking decision = 40.2% N=1200	Women taking decision = 39.3% N=1200
10.5 Percentage of women have control over income	Women taking decision = 49.5% N=1200	Women taking decision = 47.3% N=1200
11.1 Percentage of BHHs received vaccination/treatment services from local service providers	**Poultry:** Received vaccination = 43.6% N=502 **Livestock:** Received vaccination = 52.3% N=155	**Poultry:** Received vaccination = 24.1% N=519 **Livestock:** Received vaccination = 35.8% N=106
11.2 Average mortality rate reduced per BHHs in last six months	IGA livestock = 28.1% HFP poultry = 25.5% IGA poultry = 32.1% Poultry total = 28.7% Total mortality rate = 28.7%	IGA livestock = 36.3% HFP poultry = 30.6% IGA poultry = 45.5% Poultry total = 38.9% Total mortality rate = 38.8%
MSC-2 Percentage of on farm BHHs who adopted at least one improved production technology	Used at least two times = 68.0% N=462	Used at least two times = 45.3% N=468
MSC-3 Percentage of market actors improved their skills	Improved business skill = 62.8% N=43	Improved business skill = 62.9% N=35
MSC-4 Percentage on farm BHHs through business group	Experienced at least one benefit = 44.1% N=136	
MSC-5 Percentage of market actors benefited through linkages facilitated by Suchana	Benefited = 86.0% N=43	Benefited = 91.4% N=35
MSC-6 Percentage of women under on farm group who got benefited through market linkage	Benefited = 34.8% N=1019	Benefited = 11.3% N=1017
MSC-7 Percentage of women and BoP (base of pyramid) customer friendly services	Provided friendly services = 97.7% N=43	Provided friendly services = 85.7% N=35
MSC-8 Percentage of on farm BHHs consistently investing back into their IGA business	More than one time = 34.3% One time = 65.7% N=239	More than one time = 29.8% One time = 70.2% N=168

Annexure

Link:Annexure_Final Report (Revised)_Suchana_SemiAnnualSurvey_12Jan2020_V5.pdf

Annexure_Final Report (Revised)_Suchana_SemiAnnualSurvey_12Jan2020_V5.docx