Improving Climate Resilience Through Integrated Natural Resource Management

CJRF | Climate Justice Resilience Fund

Funded by
Climate Justice Resilience Fund

DRCSC

Implemented by
Development Research Communication and Services Centre

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This endeavor would not have been possible without the support of CJRF, their thoughtfulness towards the vulnerable section of society has led to this admirable collaboration. Their support has provided sustainable livelihood options for the people.

Additionally, we are grateful to the present local government and other line departments whom we could consult during the project implementation phase.

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Floating fish culture and vegetable garden

Executive summary

Climate change affects in a multitude of ways influencing the lives and livelihood of vulnerable people and the attributes of it are steadily increasing day by day. An increase in extreme weather conditions impacts agriculture and aquaculture production leading to inadequate nutritious food, and loss of livelihood. Improper use of natural resources results in damage to the ecosystem, biodiversity loss, and reduction of carbon sinks.

The climate resilience of the community focuses on the restoration of the ecosystem, ensuring food and livelihood of the climatically vulnerable communities in response to climatic crises and catastrophes through Integrating Natural Resource Management.

The project funded by the Climate Justice Resilience Fund, programed over four years (2018-2022) that have directly reached about 1600 most vulnerable marginalized families among small and marginal farmers, landless labourers, fishermen, and forest and river gatherers living in eight Gram Panchayats (GP) under four blocks of two districts in the Indian Sundarban. Indirectly it has reached few nonbeneficiary families and some activities like plantation have benefitted the villages as a whole. The project has motivated the communities to practice an integrated farming system that would strengthen food and livelihood security.

A systematic approach to asset creation through scientific management of livestock, and fishery with skill development initiatives enable them to grow vegetables in the period beyond the rainy season and may reduce this food insecurity where the women, children, and aged people suffer the most. It also aims to strengthen the knowledge regarding the substantial use of natural resources.

The report captures six action plans that incorporate different innovations, practices, and recommendations which appeared from the project Improving Climate Resilience. The action plans shape or delineates different innovative farming activities and climatic adaptive practices with essential principles that are embraced in this project.

For quite some time now, DRCSC has been working in the 4 targeted blocks for capacity building of grassroots NGOs. We have also surveyed to assess the climate vulnerability of the people and the scopes to make them more climate-resilient. A few models of integrated farming, community-managed common property resources, grain banks, nutrition gardens, farmer field schools, etc. were tried and tested and the results were published. A good rapport has been built between the community and local government, which have helped in implementing the activities in the proposed area for improving the resilience of the community. DRCSC considers that the initiatives taken under each action plan will be beneficial in the future over the region of Sundarban and in any wetland or flood-prone region of India. The action plan of the project can support designing policies and strategies for governmental policies that deal with marginal farmers and those who are adversely impacted by climate change.

Project Background & Justification of Project Sites

Spanning over an area of 10,000 km^2 (about 6,000 km^2 in Bangladesh and 4,000 km^2 in India), Sundarban is the **world's largest mangrove forest and is designated as a World Heritage Site by UNESCO.** The region is dominated by mangroves at the periphery and creeks with regular tidal influxes (Bhushan 2012). The Sundarban is flat lowland susceptible to the tidal waves along the 260 km shoreline of the Bay of Bengal. The habitat displays a significant variety of flora and fauna. Their land-based livelihoods are impacted by increasing saltwater intrusion, coastal erosion, loss of forest cover, rising sea levels, unpredictable monsoons, and extreme weather events. As a low-lying area, Sundarban experiences frequent storms and cyclones disrupting lives and livelihoods. Climate change adversely impacts men and women equally, but the suffering of women is out of all proportions.

High population density with a local population of ~ 4.37 million

85% people of the Indian Sundarban are marginal farmers having less than 0.4 ha of land

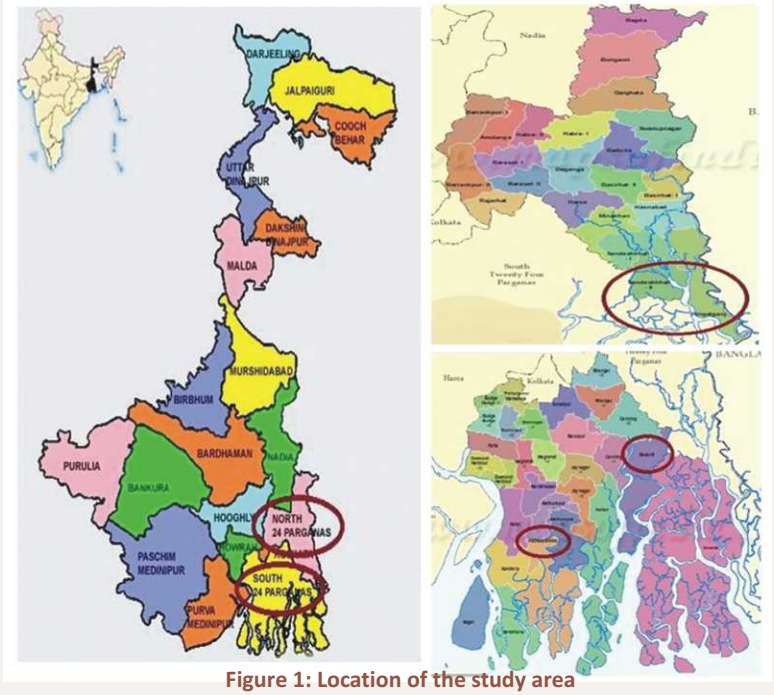


Figure 1: Location of the study area

Due to the unavailability of work in the village and poor return from agriculture, migration among male members is rampant. Women are left alone to fend for themselves and their children. They have to walk miles to fetch drinking water and firewood; take care of their agricultural land as well livestock, or work as agri-labourer for very minimum wages. The absence of gainful livelihoods compels them to wade through waist-deep water in rivers from early morning till afternoon (during low tide) to collect fish spawns and sell them to local agents for a very low price. Men and women venture into the creeks bordering the core forest area to collect crab, fish, honey, etc. and in the process, many of them get killed by tigers and crocodiles.

In May 2009, the district was hit by a high-speed cyclone named *Aila* and subsequent

rainfall which continued for two days. This created a disaster in 20 out of 22 blocks of the district. 10 out of 27 municipalities of the district were also severely affected.

Table: Detailed description of the study area

District	Block	Gram Panchayat	Village
N 24 Pargana	Sandeshkhali II	Bermujur I	Polepara, Dambalpara
		Bermujur II	Purba Jhupkhali
	Hingalganj	Sandelerbil	11 no. Sandelerbil, 14 no. Sandelerbil
		Dulduli	Ketarchak, Lebukhali Adibasipara
S 24 Pargana	Basanti	Majidbati	Godkhali Mokamberia
		Jyotishpur	Harekrishnapur, Purba Hatkhola Bhasapara
	Patharpratima	G-Plot	Krishnadaspur, Satyadaspur
		Brajaballavpur	Gobindapur Abad

Community members and farmers are positive to learn about sustainable agriculture that would enhance their livelihood with the betterment of soil and water in the area and that may also help decrease the rate of migration of male members from family for several months in search of livelihood.

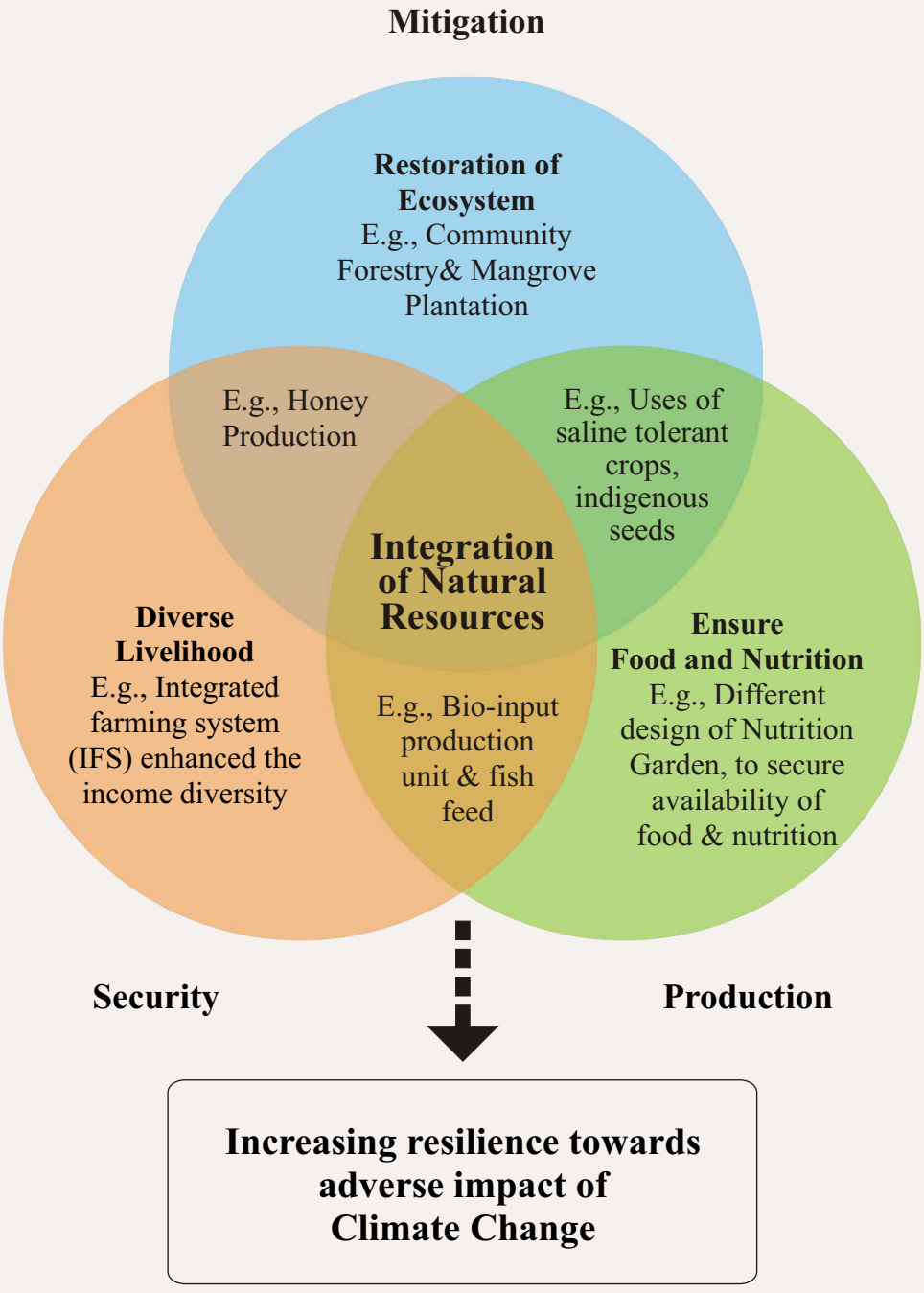
In conclusion, the farmers and their families in the targeted areas have a genuine need for some interventions to increase their earnings and make their agricultural activities more profitable in respect to climate change.

40% of the respondents said their food insecurity period lasted more than 6 months

Project Duration
2018-2022
Villages Impacted 13

40.5, 44.3, 38.0, and 49.3% of farmers, farm labourers, and landless labourers in Patharpratima, Basanti, Hingalgunj, and Sandeshkhali respectively had monthly incomes below ₹ 2000

Goals


Mitigation
Restoration of Ecosystem
E.g., Community Forestry& Mangrove Plantation
E.g., Honey Production
E.g., Uses of saline tolerant crops, indigenous seeds
Integration of Natural Resources
E.g., Bio-input production unit & fish feed
Diverse Livelihood
E.g., Integrated farming system (IFS) enhanced the income diversity
Ensure Food and Nutrition
E.g., Different design of Nutrition Garden, to secure availability of food & nutrition
Security
Production
Increasing resilience towards adverse impact of Climate Change

Objectives

Social

- Formation of **Mutual Co-operation Group (MCG) for strong community participation to acheive the common goal.**
- Strenghthen the community member through **capacity building, facilitating access to government schemes, helping in the realization of rights and entitlements, etc., and thus impact the lives and livelihoods.**
- **Active women participation** ensures empowerment and strengthening of their position in their households.
- Improvement of health and well being.

Economic

- **Linkages with financial institutions and insurances** enable farmers to cope with financial losses arising out of vulnerability from climate change.
- **Diverse income opportunity reduces the rate of migration and alleviate poverty.**
- The **group-based alternative income generation activities** generate supplementary income to tide over sudden climate shocks.
- **A livelihood-based approach to adaptation, developing the asset/ capital base of individuals/communities in a participatory way.**

Environmental

- **Ensure the environmental sustainability** by practicing **sustainable forestry & agriculture.**
- **Rise in species** as well as **ecological diversity** due to restoration of the ecosystem.
- **Reduction of food insecure period & presence of fallow land**
- **Promotion of organic farming, saline-tolerant crop, indegenous seeds, eco- friendly techniques and measures assist the ecosystem.**
- Reduction in environmental impact due to resilient infrastructure.

Action Point - 01

Create/strengthen local institutions that promote cooperation & manage community-based facilities

Introduction

The life and livelihood status of small & marginal farmers and the large battery of landless people cannot be improved unless they are united. The concept of helping others to help themselves was absent within the community.

RATIONAL		
Formation of Mutual Cooperation Groups (MCGs), to work in a communal way for common benefits	**The involvement of women in groups provides assistance to improve their livelihood and social status with understanding and ability towards climate adaptive measures.**	**Strengthening the local institutions in the community to sustain the initiatives, even after the project period.**

Description

Initiatives	Measures
1. PRA (Participatory Rural Assessment) Survey for selection of beneficiary	▪ The criteria for the selection of beneficiaries are the **wealth ranking of the residents, landless labourers, and women-headed residents.**
2. Formation of Mutual Cooperation Group (MCG)	▪ An MCG **comprises 10-20 women, who belong to the same social & economic background**. ▪ The members agree to participate in making **small savings regularly and meet at a definite interval**.
3. Strengthening the institution with proper training	▪ Training on **principles of framing rules & regulations, norms of keeping records, accounting principles, small savings-small credit, resolution of social conflicts, decision-making capacity, bargaining skills, and ways of realizing their rights.**
4. Formation of Clusters	▪ **Clusters are formed with 1-2 representatives from each MCG**.

Outcome

Total MCGs: 127

Total beneficiaries: 1624

- This has improved **decision-making power** and led a path toward **women's empowerment.**
- Life and livelihood of women have been **secured and diversified**; now they support their **families financially** & also share **knowledge of farming** as and when required.

Total Savings : Approx. ₹ 3887405

- Small but continuous monthly savings made them financially stable.
- Revolving the fund helped the members to share particular support among all.

Clusters: 8

Monthly savings: ₹ 50 to ₹ 100/ MCG

- Cluster have a savings for its **strengthening** and they have own Seed Bank where native **seeds are preserved, exchanged and sold among MCGs as well to outside.**

Community Seed Bank: 8

Seed Variety: 25- 30

- The seeds are collected from the beneficiary farmers and also from outsiders.
- Committees are formed in which few members are selected to take responsibility to sell the indigenous seeds in the local market and get a monetary return.

Monthly meetings: 1 to 2

- The regular meetings and training help the women to **improve their understanding of the impact of climate change and improve their resilience through integrated natural resource management.**
- The women beneficiaries are sharing their **knowledge and skill about climate adaptive models and spreading awareness and training others.**

Case Stories

The Group as an Institution

In February 2019, Nibedita Mahila Samity was formed based on contiguous inhabitancy in 14 no. Sandelerbil of Hingalganj block. The group conducts meetings twice or thrice a month depending upon the nature of the work. The main occupation of these households is agricultural work as marginal farmers and male members migrate to different states for various kinds of work. Each group member saves and contributes ₹ 50 each month in the MCG account.

AT A GLANCE

Nibedita Mahila Samity

Year of formation : 2019
Group Member:15
Main Occupation: Agriculture & Labour

Monthly Savings	₹ 22,650 (₹ 1,510×15)
Revolving Fund	₹ 7,275
Bank Interest	₹ 1,319
Total Balance	₹ 31,244

All meeting decisions are resolute and the discussion in the meeting comprises savings collection, inputs to be supported, interventions individual or group-wise, etc. MCG decides in the group meeting which resource to be supported and to whom based on what they have currently.

The agricultural inputs such as seeds, samplings, etc. are exchanged among the group members. They even startedinter-lending/ loaning among themselves. Being part of the cooperation group of DRCSC, all group members got various input supports like seeds, vermi pit, neem oil, organic manure, livestock, fish, etc. They timely contribute the revolving funds to the group account. The

Nivedita MCG members with CJRF project Co ordinator & Community Mobiliser

economic status of each household has improved which was earlier not possible before the formation of the group.

Those who have land, have applied for the Kisan Credit Card (KCC). The members of the group have **received group strengthening training where they have learned about maintaining records, bookkeeping, resolution, cash book, etc**. This has increased active participation in maintaining the books of accounts. The group is collectively maintaining the seed bank and also started income generation activity with sheep rearing.

Being a part of the mutual cooperation group with monthly group savings the beneficiaries have become stronger and self-reliant. The group members believe the formation of the group as an institution is also **helping them to raise their voices for the promotion of organic farming, plantation, facilitating access to government schemes, access to rights and entitlements, etc.** The revolving fund created at the group level develops a practice among the target households for acquiring loans and paying back within the group. This helps them to sustain the activities in long run.

The capacity building and awareness programs organized for the beneficiaries imparted knowledge of farm management techniques, control over native seeds and other inputs, and promotion of indigenous breeds of small ruminants and fish varieties that are resilient to climate change. **In the future, most of the members are confident about becoming community resource persons and training others about climate resilience agricultural models and also improving the sustainability of the group day by day.**

According to the members of Nibedita Mahila Samity MCG, "We receive and attain much more than what they contribute to the savings or local contribution".

Group Strengthening Training

Group is Unity & Unity is Strength

Sathi MCG, Harekrishnapur, Basanti

"*We will continue our group activities till our strength persists, just like today,*" says Rupali Mondal, an active member of **Sathi Mutual Cooperation Group** of Harekrishnapur village under Jyotishpur GP and Basanti Block of South 24 Parganas, West Bengal. On 16th May 2019 the group was formed with **12 members** from seasonal agriculture labour-based and marginal farmer households. Presently, their saving is ₹ 21,600 (₹1800×12= ₹21,600) where they save ₹ **50 monthly per head**, and the **total balance is ₹40,187** till date, including interest, revolving fund, and other group income. The members of this group meet at least once a month or more based on the requirement. **They gather their savings, discuss about input support and cluster meetings, collect and exchange native seeds, and disseminate learning from exposure visits or any training, workshop, etc.** Monthly they update Resolution Copy, Cash Register, Savings Copy, Lending Register, Personal notebook, Bank Passbook, and MCG Seed Bank register as a part of group strengthening.

"We are saving, planting, growing, and consuming with joy after group formation. Previously we would gossip in our leisure time but now we mainly focus on gardening, rearing, and planning business from it"

Nirabala Chowdhury

Nirabala has earned **₹2000 approximately from selling pakora of water spinach from her Nutrition Garden**

Beneficiaries are strengthened, self-sustained, and socio-economically strong to support their family in crisis

11 out of 12 members got handholding training for saving soil and seeds, preparation of manure, soil testing, growing a multilayer nutrition garden, managing pests, and rearing indigenous breeds of small birds and animals. "*Now we can guide our family members in farmingafter being trained,*" says Basanti Mondal. Two members got group strengthening training and became skilled in maintaining accounts and all records (group registers). Two members in this group are eligible as Community Resource Persons (CRP) having the quality of leading power and knowledge dissemination capacity. Each member saves native seeds but few can grow surplus and deposit them at their MCG-managed Seed bank.

MCG members with their Seed Bank

All group members are very much integrated and

Monthly meeting of MCG members

concerned for each other. No conflict arose within the group till date. If one fails to save a month's savings, others cooperate and deposit that in the bank; in turn that beneficiary submits her part within a given time. Beneficiaries are content regarding the formation of MCG; they became strengthened, self-sustained, and socio-economically strong enough to support their family in crisis. "*We use our savings for family purposes in need if our husband fails to do*," says Kajal Mondal. According to Saraswati Chowdhury, "*Previously women were not allowed to participate in outside activities, but now we can go and join due to the formation of this group*".

Women have their own opinion regarding important decisions in their households and family members are also slowly accepting their participation. "Now I can have loan to fulfill my requirement. Due to the Revolving fund, our loan capacity increased along with total savings. Each of us is engaged in business from garden items" said Basanti Mondal. Four members of this MCG participated in Block Level Workshop to share their experiences of the journey from vulnerability towards sustainably.

Cluster Seed Bank is One of the Primary Community Resources

Name of the MCG: *Diganta Satyakormi Mahila Vikas Sangha*
Year of formation: *July 2020*
Village covered: *Satyadaspur and Krishnadaspur villages of G-Plot Gram Panchayat*
MCGs Involved: 21
No. of beneficiaries: *267*
General body: *22 members*
Core committee:*7 members from concerned MCGs*
Saving: *₹100/month per MCGs*
Main occupation: *Agricultural workers, Farming, and Pisciculture*
Activities in Cluster Seed Bank:

i. Preserving and saving about 30 varieties of native seeds.
ii. To ensure that seeds are effectively stored, the seeds are adequately dried and kept in a clean, well-ventilated, and dark area.
iii. To verify the quality of the seeds, the members themselves germinate and cultivate the seeds and also sell the saplings to outsiders from their nursery.
iv. Maintaining stock registers, sell-purchase registers, etc.
v. The seeds are sold in the local markets where two members of the committee take the responsibility to market the collected and saved seeds. Post covid, the demand for indigenous seeds has increased and people are keen on buying the seeds locally from the seed bank.
vi. The group members also sell organic vegetables in the local market apart from indigenous seeds.


Two in-charges of Cluster Seed Bank


Diganta Satyakarmi Cluster Seed Bank

Table: Seed Varieties in the year 2020-2021

Sl.No.	Seed varieties	Quantity	Purchase (₹)	Sell (₹)	Profit (₹)
1	Sour sorrel	1kg	250	400	150
2	Small fenugreek	1kg	300	400	100
3	Tomato	200gm	120	200	80
4	Yardlong beans	500gm	300	500	200
5	Spinach	10kg	1300	1500	200
6	Beans	2kg	700	900	200
7	Red amaranth	2kg	1000	1300	300
8	Leaf amaranth	1kg	500	650	150
9	Indian spinach	2kg	1200	1500	300
10	Coriander	10kg	3000	4000	1000
11	Bottle gourd	100gm	30	50	20
12	Ash gourd	50gm	15	25	10
13	Lablab beans	200gm	100	150	150
14	Yardlong beans (Lafa)	100gm	120	150	30
15	Okra	2kg	1200	1500	300
16	Sesame	5kg	600	800	200
17	Green gram	4kg	440	550	110
18	Water spinach	3kg	750	1000	250
19	Cucumber	500gm	1800	2500	700
20	Bitter gourd	200gm	240	330	90
21	Pumpkin	500gm	500	650	150
22	Ridge gourd	200gm	200	250	50
23	Sesbania	1 quintal	2500	3000	500
24	Black gram	5kg	350	400	50

Seed varieties of 2021-2022

Types of Seeds: 31

Quantity of Seeds: 212 kg 750g

Purchase Value: ₹ 21,090

Selling price: ₹ 27,187

Profit amount: ₹ 6,097

Seed Sold: In market, in MCGs, and to the other farmers

Sour sorrel, Small fenugreek, Tomato, Yard long bean, French beans, Spinach, Red amaranth, Khosla, Malabar spinach, Coriander, Bottle gourd, Ash gourd, Hyacinth bean, Yard long bean, Sesame, Green gram, Water spinach, Cucumber, Ridge gourd, Snake gourd, Bitter gourd, Pumpkin, Ridge gourd var. Potol (small), Dhaincha, Bitter jute, Sweet jute, Black gram, Okra, Yam, Taro, Ginger

Impact of community seed bank to mitigate the challenges of climate change in Sundarban

Community seed banks help farmers to **access seeds for growing crops** during the next season or use them **in emergency seed supply** when their crops are damaged or destroyed, for example, due to flooding. Seed diversity is enhanced and **additional income is generated when seeds are exchanged** and sold to neighboring communities. Diversification of crops is also highly important in terms of people's food security because it reduces the risk of total production failures and contributes to strengthening communities' resilience.

Through a community seed bank, farmers play a key role in the development, maintenance, and promotion of agro-biodiversity, in particular women given their traditional roles in selecting and savingseeds as well as in raising awareness on the diversity of traditional varieties among all members of acommunity.

An average of 28-30 varieties of vegetables, pulses, oilseeds & cereal crop seeds have been preserved in the seed banks.

Cluster Meeting

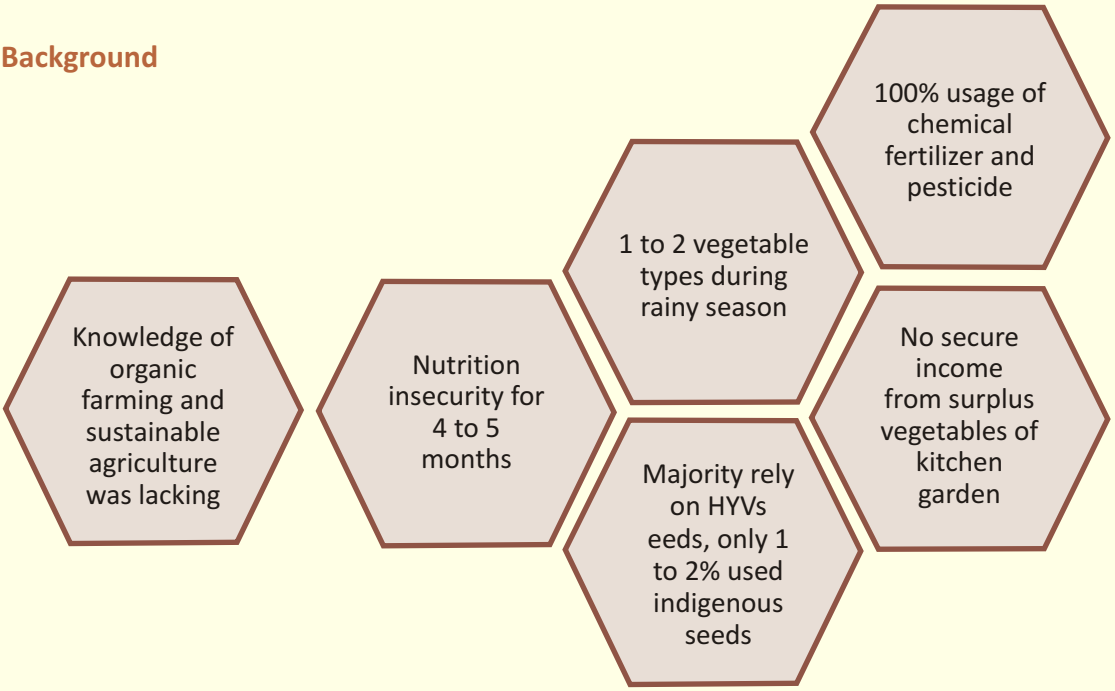
Action Point - 02

Ensure a supply of nutrition-rich food throughout the year by a combination of seasonal, semi-perennial and perennial plants as well as the rearing of small birds, animals, aquatic plants, and organisms

Introduction

Climate change aggravates food and livelihood insecurity where women and children suffer the most. Knowledge to address the problem with available resources was not present among the beneficiary households. The people in the area were not aware of the impact of the use of chemical fertilizers and pesticides. This entire situation can only be improved by sharing experience, enhancing knowledge base, handhold training, and skill on sustainable agriculture. Supply of nutritious vegetables, fruits and animal products round the year improve nutrition status of a community.

Background



Rational

- **Food Security:** The development of a multi-tire nutrition garden reduces food insecure periods and the impact of climate change.
- **Nutrition Security:** The fresh supply of vegetables secures the nutrition intake of the family.
- **Environmental Quality:** Saving indigenous variety seeds provides a stable food supply, improves disaster preparedness, and also preserves the culture. It enhances the ecological production systems, micro environments, and a rise in biodiversity.

- **Economic Benefits:** Nutrition garden helps in savings and increases livelihood opportunities.
- **Support of Livestock Farming** is provided to enhance nutrition, diverse income, & excellent source of manure.
- **Ecosystem Services:** The presence of diverse (native breeds) plants and animals all over the year regulates nutrient cycling, water cycle, etc.

INTERVENTIONS

Small Nutrition Garden is encouraged to withstand the vagaries of nature. Women are capacitated to grow plants having high nutrition value, heat & salinity tolerance, low water demand and easily savable seeds.

Support of livestock farming is provided to enhance nutrition, diverse income, & excellent source of manure

Support is given to **produce compost, vermicompost, liquid manure, and other organic fertilizers** using household wastes, garden sweepings, etc., and make use of bio pest repellents.

Rainwater harvesting: Storing rainwater for irrigating gardens, growing Azolla, mudfish, feeding livestock, and **trellis** is raised over the structure for growing creeping vegetables.

Living fence with non-browsable bushes, herbs, trees, and hedgerows are introduced in the nutrition gardens.

Saving own seeds: Preservation of native seeds at the household level for conservation of biodiversity and also using in vulnerable time.

Training & capacity building: Capacity building sessions, exposure visit, & training imparts **farm management techniques importance of a smokeless kitchen, safe drinking water, three color foods in the daily food plates, the best procedure of cooking, etc.**

Sub-systems of Nutrition Garden Models:

Nutrition Garden:
NG + Vermi compost Chari

Model Nutrition Garden:
NG+ Azolla Vermi pit + Livestock support

Integrated Nutrition Garden:
NG+ Azolla Vermi pit + Hen house + Rainwater Harvesting

Intervention Output:

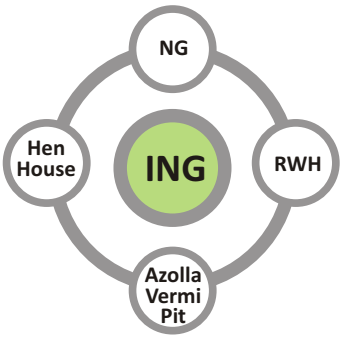
General Garden: 927
Model Garden: 207
Integrated Nutrition Garden: 33
Nutrition Garden Training: 97
Rainwater Harvesting Model: 110
Food secure period: 8 to 9 months
Azolla- Vermi pit: 244
Smokeless Chula: 811
MCG level Seed Bank: 105
Backyard poultry support: 30

Benefits

- Targeted small and marginal farmers have **diversified and stabilized production and income sources by adopting improved production techniques, concepts, and management**.
- **The food insecure period has been reduced** to some extent. According to the beneficiary, it will reduce to zero in near future.
- **Salinity-tolerant local variety seeds** ensure nutrition uptake of the vulnerable community and can be saved easily for the next season. These seeds are proven to be climate change resilient.
- **Growing low water demand and heat-tolerant crops in a Circle bed** can supply minimum food to the family in the hot-dry period (March-May) when the soil becomes extremely saline.
- **Saving and growing native variety crops protect them from climatic shocks**.
- **The use of Vermicompost and other manures enriches soil health, fertility, and productivity by reducing salinity as well as increasing the permeability of the clayey soil** of Sundarban. Mulching holds soil moisture that also reduces salinity and finally turns into compost.
- **Mix cropping** helps in the prevention of pest attacks and ensures nutrition uptake of that family.
- In cyclone and flood onward situation only root and tubers (**strategic crop**) remained alive at the NGs to secure some food of the family. During the month of February - April when all Ravi crops are harvested, water scarcity emerged as a threat to cultivation, only carrot, beetroot and turnip (root vegetable) can be kept within garden soil for constant and secure food supply.
- **Rooftop Rain Water Harvesting (RWH) has been very useful for the irrigation of nutrition gardens** and drinking water of livestock in the saline zone.
- **Smokeless Chula enables healthy cooking indoors and reduces the consumption of firewood** leading to less release of CO_2 into the atmosphere. The women do not have to go far for the collection of firewood and it reduced the drudgery among them. It **reduces carbon emissions and indoor air pollution**. It is a healthier way of cooking and protects women and young children from health hazards.
- **Trellis and Sack cultivation are proven successful in flood and space constrains situations**, hence becoming popular too. **Raised bed** saves standing crops in sudden and heavy rainfall.
- Rearing a local breed of small cattle and birds **ensures protein supply, enhances household income, supplies excellent manure, and prevents the outbreak of diseases even in climate vagaries**. The **stronger and improved animal shelters** protect the living assets in natural calamities.
- **Beneficiaries are able to provide training on climate adaptive models and designs to improve the resilience of the community against climate change.** Their knowledge and skills gained help and inspire others. The members earn from the nutrition garden regularly and share indigenous seeds, tools, knowledge, etc. among villagers. Few women farmers have become competent **Women Farmer Trainers (WFTs)** and **Community Resource Persons (CRPs)**.

Case Stories

From Salinity Towards Sustainability



Name of the MCG: *Rajanigandha*
Name of Beneficiary: *Drapadi Haldar*
Year of formation: *June 2019*
Location: *Harekrishnapur vill., Jyotishpur GP, Basanti Block*
Main occupation of the beneficiary: *Agricultural worker*

Drapadi Haldar, wife of Sahadev Haldar resides in a vulnerable zone bordering Sundarban and experiences frequent storms and cyclones disrupting lives and livelihoods. She is illiterate but with lots of hardship and struggle she has managed to provide higher education to her two children. The livelihood depends on seasonal work under MGNREGA and daily wage laborers in other fields.

Water availability during rabi season is a huge challenge due to the lack of rainfall so she preserves the rainwater in the rooftop rainwater harvesting tank to use the water in the lean season for 1-2 months and also, grows carp fish in that tank.

The salinity of soil and water results in food and nutrition security and it had become difficult to arrange even two times meals for the family.

Contributions: She has been supported with **agricultural inputs, vermi-azolla pit, a rooftop rainwater tank, and a hen house** resulting in the integration of inputs with each other in her one Katha (1.65 decimal) of land.

Drapadi Halder on her garden

ING of Drapadi Halder, Harekrishnapur, Basanti

She attended **handholding training on nutrition gardens, mixed cropping system, climate resilient models, preparing organic manure, seed preservation, etc.** This training has brought a major **change in her agricultural pattern** and she has realized the importance of growing and consuming organic crops and improving her natural resources (pond, crops, and small livestock) to maintain a sustainable livelihood. Drapadi prepares organic manure like *Amrit pani,* liquid manure, vermicompost, etc., and uses in her garden and paddy field. She cultivates Azolla and feeds the hens and chicks. She shares her knowledge and skills with others.

Benefits: Throughout the year she gets vegetables and does not depend on market food. She gets organic food from her garden; eggs from hens and fishes from both pond and rainwater harvesting tank and also sells the excess in the market. She preserves indigenous seeds from her garden like ridge gourd, pumpkin, green spinach, turmeric, sponge gourd, etc., and exchanges are done with the group members. The intervention of an integrated nutrition garden has improved their food security and income along with the environment and economic benefits.

Table: Production and Income details from ING (2019-2022)

Year	2019		2020		2021		2022	
Description	**Rabi (Oct-Jan)**	**Kharif (Jun-Sep)**	**Rabi (Oct-Jan)**	**Kharif (Jun-Sep)**	**Rabi (Oct-Jan)**	**Kharif (Jun-Sep)**	**Rabi (Oct-Jan)**	**Kharif (Jun-Sep)**
Amount (Rs) and Consumption	₹ 650 (32.5 kg)	₹ 770 (35kg)	₹ 1000 (50kg)	₹ 2354 (107kg)	₹ 1056 (48 kg)	₹ 1407 (67 kg)	-	₹ 1596 (84kg)
Sell	₹ 810 (40.5kg)	₹ 1199 (54.5kg)	₹ 1240 (62kg)	₹ 880 (40kg)	₹ 3344 (152 kg)	₹ 2835 (135 kg)	-	₹ 4047 (213 kg)
Total income and production	₹ 1460 (73kg)	₹ 1969 (89.5kg)	₹ 2240 (112kg)	₹ 3234 (147kg)	₹ 4400 (200kg)	₹ 4242 (202kg)	-	₹ 5643 (297 kg)

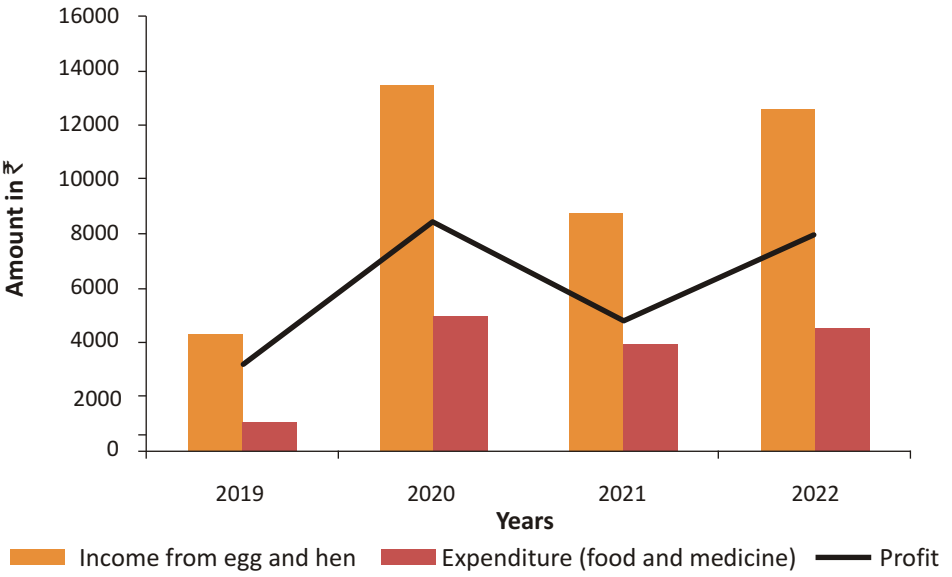


Figure: **Profits from animal products**

Since the intervention, the monthly income of Drapadi increased from ₹3500 to ₹5500.

Environmental concern: She believes climate change causes adverse impactson the people residing in the vulnerable zones of Sundarban as they are prone to the hazardous effect of climate change. Cyclone Amphan had caused damage to the crops, aquatic life, livestock, and shelter but the climate-adaptive techniques of growing crops in raised beds or circle beds, mulching, intercropping techniques, and sack cultivation saved some of her garden vegetables.

Plan: In the future, she wants to **convert her nearby wasted land into fertile land for her nutrition garden** so that she can grow more varieties of vegetables and improve her income. She believes **she can train and create awareness of climate resilience models as a community resource person** so that others can also learn and replicate them to bring sustainability.

Drapadi Halder with her hen house

Integrated Nutrition Garden Helps Migrant Get Back Home

For years Pritilata Mondal resides at Katarchak village of Dulduli gram panchayat with her husband and son. She is a gardener for years but her skills and abilities towards a better way of gardening and sustainable agriculture improved after the project intervention.

She has one bigha of homestead land and 2.5 bighas of paddy land where she cultivates paddy. Before the project intervention, she was not aware of organic farming methods and climate-resilient agriculture. So the production of crops from her garden was less due to the use of chemical fertilizers and it also worsen the soil quality. Her husband Tuhin Mondal used to migrate to other places for work but now after the project intervention, he is back as they are gaining sufficient income from the sale of surplus vegetables and animal products.

Table: Vegetable production and its amount from the nutrition garden (2020-2022)

Description	2020	2021		2022
	Rabi (Oct-Jan)	Rabi (Oct-Jan)	Kharif (Jun-sep)	Kharif (Jun-sep)
Consumption & distribution	₹ 2170 (110 kg)	₹ 1890 (93kg)	₹ 2610 (144 kg)	₹ 3120 (156 kg)
Sell	₹ 575 (40 kg)	₹ 365 (22 kg)	₹ 2600 (70 kg)	₹ 360 (18 kg)
Total income and production	₹ 2240 (112kg)	₹ 2255 (115kg)	₹ 5210 (214 kg)	₹ 3480 (174 kg)

Pritilata was supported with a rainwater harvesting tank, vermi and azolla pit, hen house, and other agricultural inputs such as seeds, lures, traps, saplings, etc. to integrate the components of sub-systems and establish an integrated nutrition garden model. **This ING model has benefitted Pritilata and her family to a great extent. The water from the rainwater harvesting tank is used during the lean months and the preparation of Vermicompost helps her to grow organic crops and does not depend on the market for buying compost. She practices the methods of mulching, climate-resilient practices, mixed cropping, trellis farming, etc. which she learned in the training provided under the project.**

Pritilata Mondal at her ING

Table: Income from animal products during 2020-2021

Animals	Eggs consumed	Amount (₹)	Egg sold	Amount (₹)	Flesh consumed	Amount (₹)	Animal Sold	Amount (₹)
	30	180	50	300	7kg	2300	2 Males	1000
	30	1500	-	-	-	-	6kg	1800
	-	-	-	-	-	-	5kg	2250
	-	-	-	-	-	-	5 (cygnet)	3500
	-	-	-	-	35kg	4900	--	
Total	**60**	**1680**	**50**	**300**	**42kg**	**7200**	**-**	**8550**

Since the intervention, she does not buy vegetables, or animal product from the market rather she sells agricultural produces, fish, egg, etc. in the local market and earns a satisfactory income. **The ING model changed her livelihood positively as she is getting more production of crops by integrating the sub-systems of agriculture and livestock.** The nutrition intake of the family has improved and Pritilata's hard work empowered her to become independent in life as she manages the monetary returns from the agriculture and allied agriculture produces. She is confident about her skills and keen on becoming a trainer to train the other women and beneficiaries. At present, she has preserved the seeds of a*sh gourd, amaranth, ridge gourd, beans, hyacinth bean, etc.* and exchanged the seeds with the group members.

Pritilata Mondal with her poultry eggs

Integrated Nutrition Garden Garden Develops Resilience of Flood Affected Farmer

Sushama Das, a 24 years old lady from Patherpratima was astonished to know about the multiple uses of Azolla at NG (Nutrition Garden) training. The alternative and seasonal shifting of nutrition garden with hen grazing area attracted her to develop an ING from a general garden. On 17th May 2020, she decided to receive all three components of ING with LC ₹ 8,900 and returned ₹ 7,575 as a Revolving fund within one year. After the cluster formation at G-Plot, Sushama herself agreed to take care of Cluster Seed Bank as a member of her village and started promoting native vegetable seeds saved by 21 MCGs at G-Plot. Parallelly, she was applying all sustainable techniques learned from NG training organized by DRCSC under the CJRF project. These approaches improved soil health and the overall production of her garden. "Soil became loosen from a clayey texture. Plants grow slowly but live long which helps to understand the dynamics of cultivation. Chemical fertilizers would grow plants and vegetables rapidly but neither the plants nor the vegetables persist long, whereas my plants and vegetables do not perish. My family gets diversified benefits from this garden for the long run". This family does not face food insecurity.

Vulnerability:

1. Low land garden at home-stead is flood prone.
2. Source of drinking water is far from HH.
3. One small pond of sweet water at homestead.
4. Clayey and saline soil

Sushama harvests rain water from her rooftop and stores it in an RWH (Rainwater Harvesting) tank which she uses to water plants and saplings as well as feed livestock (9 goats, 3 cows, and 14 hens). This model made her resilient to dry period's as well saline floods. According to Sushama, there is a need for little change at the collection point of rain water; a mesh and a cover are required for the collection of clear rain water.

A constant supply of eggs ensures their nutrition intake daily. Native variety breed of hen is climate resilient and feeds on locally available food. The permanent hen house provides protection in storms, floods, and from animal attacks. Sushama sells eggs, chicks, and hens along with vegetables, spices, fruit, seeds, and saplings in three markets of G-Plot weekly for 6 days. She is in charge of the Community Seed Bank and saves 25 to 30 types of native variety seeds among which lablab bean varieties are rare and plenty. Profit from seeds is about ₹ 5000 in each season where she invests ₹ 25,000- ₹ 30,000.

Challenges:

1. Cyclone Yash flooded the entire garden (2021)
2. Hen house tilted due to cyclonic storm of Amphan (2020)
3. Shed of Vermi-Azolla pit flew away.
4. Saline water intrusion in the pond and death of aquatic life..

Table: Cost of ING components

ING Components	RWH	Hen House	Azolla Vermi Pit	Total
Foreign Contribution (₹)	9428	13447	7425	30,300
Local Contribution (₹)	2300	4500	2100	8,900
Revolving Fund (₹)	2357	3362	1856	7575

Table: Details of Strategic Crop (Roots & Tubers) and spices during 2020-2021

Name of Strategic crop and spices	Self-Consumption (in kg)	Distribution (in kg)	Sum amount (₹)	Sell (in kg)	Rate/ kg	Total amount from surplus selling (₹)	Total Productiona (in kg)	Total amount (₹)
	15	0	450	0	30	0	15	450
	28	0	420	0	15	0	28	420
	6	0	600	0	10	0	6	600
	6	0	420	0	70	0	6	420
Total	**55**	**0**	**1890**	**0**	**-**	**0**	**55**	**1890**

Table: Details of Pre kharif (February- May) crops during 2020- 2021

Varieties of vegetables grown	Self-consumption (in kg)	Distribution (in kg)	Sum amount (₹)	Sale (in kg)	Total amount from surplus selling (₹)	Total production (in kg)	Total amount from NG in pre-Kharif (₹)
Bitter gourd	3	1	120	0	0	4	120
Cucumber	5	1	150	0	0	6	150
Chili var Dhani	1	0.2	96	0	0	1.2	96
Brinjal	4	0	120	0	0	4	120
Amaranth var. Tikamaris	3	0.5	70	1	25	4.5	95
Malabar spinach	7	3	150	5	75	15	225
Water spinach	3	1	60	1	15	5	75
Okra	5	1	120	2	40	8	160
Pumpkin	30	3	825	5	125	38	950
Total	**61**	**10.7**	**1711**	**14**	**280**	**85.7**	**1991**

Table: Details of Kharif (June- Sept.) crops during 2020- 2021

Varieties of vegetables grown	Self-consumption (in kg)	Distribution (in kg)	Sum amount (₹)	Sell (in kg)	Total amount from surplus selling (₹)	Total production (in kg)	Total amount from NG in pre-Kharif (₹)
Water spinach	3	1	60	0.5	8	4.5	68
Tika Amaranth	5	0	100	3	60	8	160
Malabar spinach	20	3	345	10	150	33	495
Okra	9	4	156	18	216	31	372
Ridge gourd	12	2	112	19	152	33	264
Snake gourd	10	3	78	12	72	25	150
Yard long bean	8	2	150	6	90	16	240
Brinjal	7	1	104	9	117	17	221
Pumpkin	13	6	342	27	486	46	828
Bitter gourd	4	2	48	7	56	13	104
Bottle gourd leaf	5	3	160	5	100	13	260
Total	**96**	**27**	**1655**	**116.5**	**1507**	**239.5**	**3162**

Table: Details of Rabi (Oct- Jan) crops during 2020- 2021

Varieties of vegetables grown	Total production				Total amount from surplus selling (₹)	Total production (in kg)	Total amount from NG in Rabi (₹)
	Self-consumption (in kg)	Distribution (in kg)	Sum amount (₹)	Sell (in kg)			
Raddish	3	1	40	0	0	4	40
Spinach	5	0	75	0	0	5	75
Red amaranth	8	0	120	0	0	8	120
Turnip	15	2	170	0	0	17	170
Bitter gourd	2	0.5	90	0	0	2.5	90
Brinjal	2	0	40	0	0	2	40
Tomato	5	1	120	0	0	6	120
Coriander leaf	1	0.5	45	0	0	1.5	45
Beetroot	1	0	30	0	0	1	30
Okra	5	1	150	0	0	6	150
Total	47	6	880	0	0	53	880

Table: Details of animal products during 2020- 2021

Eggs (in numbers)					Flesh/Meat (in kg)					Total amount from small animal product (₹)
Self-consumption	Sum amount (₹)	Sell (in numbers)	Amount from selling the product (₹)	Total production	Self-consumption (in kg)	Sum amount (₹)	Sell (in kg)	Amount from selling the product (₹)	Total production	
100	500	50	250	150	15 (Chicken)	2215	30	4500	45 kg +150 eggs	7465
-	-	-	-	-	chicks	-	30 pcs	1500	-	1500

ING of Sushama

Beneficiary details:

Name: Sushama Das (26 y/ F)

MCG: Dipshikha Swanirvar Goshthi

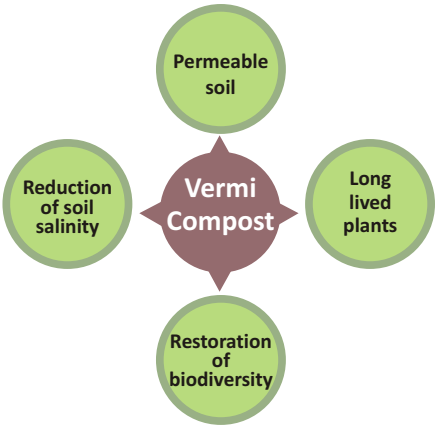
Village: Krishnadaspur

Family Member: 6

Children: 1 daughter

Family Occupation: Farming

Vermi Reduces Vulnerability



Amrita Das a 26 years old house wife lives in Satyadaspur village of G-Plot, a remote island of Sundarban (Pathepratima, South 24 Parganas). Like other villagers, she used to work for family and children at home, seldom few amounts of the surplus crop, saplings she would sell among neighbors and in market shops. In 2018 she engaged herself in Rani MCG as a beneficiary under the CJRF project of DRCSC and participated in all the training programs. She started gardening with a new vision of sustainable farming and developed her garden as a Model Nutrition Garden (MNG) in May 2019. As an MNG component she received Azolla-Vermi Pit with FC ₹7025, expends 2000 as LC, and returned Revolving Fund ₹1756 within 5th June 2020. 1st time Amrita prepared about 100 kg of primary compost within her Vermi compost pit (6ft*3ft*2ft) in two and half months which was made of paddy straw, garden waste, and peels, gobar water, soil in 3:2:1:0.5 ratio. Then 250 vermi (200 pieces as FC and 50 pieces as LC at the rate of ₹ 0.5) were introduced in the system that turned the compost into vermi compost within 2 months.

ING beneficiary Amrita Das, Satyadaspur, Gplot

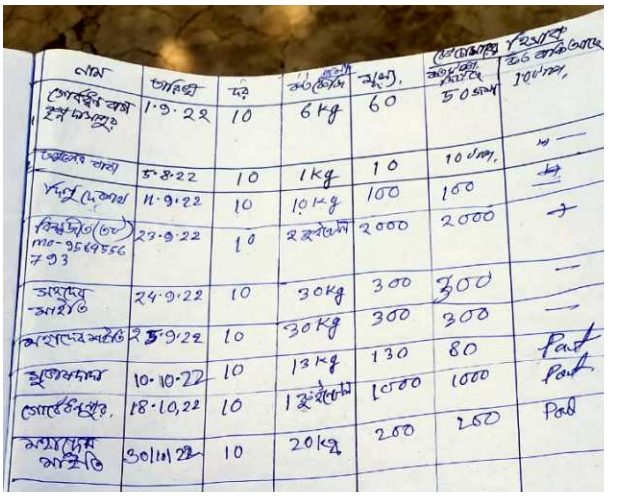
From then on Amrita has been using this vermi compost in her 5 to 10 Katha land three to four times in a year, and 100 kg to 150 kg per season. The clayey soil became permeable after its use. Plants survive for longer days for this fertilizer and crops persist for long compared to chemical farming products. Gardens as well as field crops became safer, healthier, and more nutritious. The surrounding environment and its biodiversity get rid of the poisonous effects of industrial chemicals without curbing the production quantity. Vermi compost reduces the salinity of Sundarban soil to a great extent. After the first year, native variety seeds, vermi compost, and sustainable techniques jointly enhanced the production of her MNG and she gained so much surplus crop that compelled her to sell items directly in the market for the first time of her own. Day by day she has increased by-products for sale like native seeds, saplings, chicken, fruit, etc. “In 2020 I started selling only in Chandmari ghat bazar but now at the end of 2022 I have extend my business in threemarkets of G-Plot (Toter Bazar, Sabuj Bazar, and Chandmari

Ghat) and send my husband to Bonoshyamnagar market of the neighboringK Plot island. 6 days in a week throughout the year we sit inmarkets to keep in touch with my customers. Nowadays my husband is helping me in this business, if I fail to attain any market, he runs there to sell" Amrita shared with a smile.

On 5th August 2022 Amrita sold 1 kg of vermi compost at ₹10, 1st time from her pit to a farmer. In the period of the last three years, she remained successful to increase the number of vermi in her pit to lakhs from only 250 pieces; she never bought or brought earthworms thereafter from anywhere else. With this increasing population of Vermi, Amrita planned to promote this ecofriendly manure to farmers' fields too. She bought two large cement tubs for its multiplication from her earnings (₹2,960). "Now vermi compost is prepared early for a large population of my workers i.e., Vermi," Amrita said with a confidenceof smile. In September 2022, she sold ₹276 kg of vermi compost to farmers for Betel vine and earned ₹2760; in addition to this, more 30 kg of compost she used for rabi crop plantation in her garden. Now she has a continuous production of this compost to use or sale anytime.

Own Vermi Compost tank of Amrita

Amrita is in charge of Diganta Satyakarmi Cluster Seed Bank of G-Plot where she buys native seeds from MCG level Seed Banks of ₹25,000 to ₹30,000 for one season and gains about ₹5,000, in turn, deposits some percent in Cluster savings account. About 30 varieties of native crop seeds including some rare ones, she is saving and promoting at her own interest. Several times she shared her experience gladly in various government and NGO workshops, seminars, meetings, and Farmers' conventions and learned more.



Vermi compost selling details of Amrita

This progressive story of Amrita not only impresses us but also encourages village women to think of life and livelihood sustainably.

Date	Quantity of vermi - compost sold (kg)	Amount earned (₹)	Sold to whom	Comments
01/09/2022 to 30/10/2022	410	4100	Local Farmers	Sold for betel vine

Native Seeds for Sustainable Agriculture

Saraswati Mahila Samity at 14 no. Sandelerbil village established a group-based seed bank. They maintain stocks and records of the seeds preserved, exchanged, and sell to outsiders. All 16 members of the group save indigenous seeds from their nutrition garden. At present they have maintained a stock of coriander, red amaranth, okra, spinach, pumpkin, taro, yam, ridge gourd, bottle gourd, yardlong beans, etc. Around 20-25 varieties of seasonal seeds are stored from which the exchange among the members is done and also sold in the market. The seeds are collected from the beneficiary farmers and also from outsiders.

Saraswati MCG members with project Coordinator & Community Mobiliser

The regular training and follow-up by DRCSC, the members are cultivating crops in the organic method and do not depend on the market for the purchase of seeds. The training on seed savings and preservation helped them to understand the methods of storing and preserving seeds. The exchange of seeds is done among the members of the group which was earlier not possible before the establishment of the seed bank. They believe that these indigenous seeds give good production of crops, and improve the resilience towards climate change.

Saraswati MCG members with their Seed Bank

One of the group members says “We are preserving and saving the traditional seeds so that it does not get disappeared.” In both the Rabi and Kharif seasons, indigenous seeds are sold for Rs 6000 to Ankuralaya, a community seed bank in Hingalganj. The income from seed selling is saved in their group account. The seeds help them in crises period and during climatic hazards when the crops get damaged and these seeds help them to cope with the situation.

To maintain its sustainability, they want to improve its seed-saving habits and increase its volume so that it can sell traditional seeds in larger quantities to the local market or outsiders.

Table: Details of Saraswati Mohila Samity MCG level seed bank for 2020-2021

Seed types	Quantity of seed exchanged	Amount	Quantity of seeds sold	Amount earned by selling	Total quantity	Total amount	Quantity remained in stock	Amount
16	10kg 30g	₹750	8kg 110g	₹3680	19kg 140g	₹4482	1kg	₹50

Table: Details of Saraswati Mohila Samity MCG level seed bank for 2021-2022

Sl. No.	Seed varieties	Quantity of seed exchanged	sum amount (₹)	Quantity remained in stock	Amount (₹)	Total quantity	Total amount (₹)
1	Ridge Gourd	10 g	60	100 g	60	110 g	120
2	Ash Gourd	20 g	6	100 g	30	120 g	36
3	Sour Sorrel	50 g	20	50 g	20	100 g	40
4	Red Amaranth	50 g	20	100 g	40	150 g	60
5	Bethua	100 g	30	100 g	30	200 g	60
6	Bitter Gourd	50 g	30	50 g	30	100 g	60
7	Lady finger	-	-	100 g	50	100 g	50
8	Yard Long Bean	-	-	50 g	20	50 g	20
9	Black Gram	-	-	500 g	40	500 g	40
10	Pumpkin	10 g	6	50 g	30	60 g	30
	Total	**290 g**	**172**	**1200 g**	**350**	**1490 g**	**516**

Indigenous Seed Builds Resilience to Climate Hazards

The Borokachari Mutual Cooperation group of Godkhali village established group based seed bank on January 2020. The stock of indigenous seeds stored in the seed bank is produced from their nutrition garden. They maintain the stock registers to maintain the record of seeds sold and exchanged.

Seed-saving practices allowed them to cultivate and save a large number of different varieties of seeds that have been able to adapt to different environmental conditions. Local varieties of indigenous seeds make them more stable for withstanding climatic variations, pests, diseases, and other stress. The rabi season seeds saved in the seed bank are spinach, sour sorrel, red amaranth, malabar spinach, bottle gourd, pumpkin, beans, bitter gourd, sponge gourd, ridge gourd, okra, potol, jhinge, amaranth, dhonche, etc.

The exchange of surplus seeds happened among the group members in times of need and requirement. These seeds serve best during climatic hazards and crises period. The group members believe that natural and man-made threats lead to the extinction of indigenous seeds, and hence they want to protect the seed. Indigenous seeds give good crop production and can be preserved and saved for a longer duration, unlike hybrid seeds.

Seed Bank Borokachari MCG, Godkhali, Basanti

The selection of seeds as well as seed savings, storage, and exchange are based on training given by DRCSC earlier before the intervention they used to buy hybrid seeds from the market and did not know the sustainable agriculture methods. But now seeds are mostly exchanged and no more dependent on market seeds.

The climatic hazards like Amphan and Yaas cyclone damaged their nutrition garden crops and at that period the seeds from their seed banks helped them to avail the seeds and cultivate them in their nutrition garden. In the future, they want to save and preserve and sell seeds in more quantity so that they can sell those seeds in the market in volume. Also, they want to increase the varieties of seeds to be stored at the seed bank.

According to them restoring seed saving is important in the context of climate change and the need to reduce biodiversity loss.

Table: Details of seed quantity of 2020-2021

Sl. No.	Seed varieties	Quantity of seed exchanged	Total quantity	Sl. No.	Seed varieties	Quantity of seed exchanged	Total quantity
1	Spinach	600 g	2 kg	7	Beans	500 g	500 g
2	Sour Sorrel	1.3 g	1.5 kg	8	Bitter gourd	600 g	600 g
3	Red amaranth	400 g	400 g	9	Okra	600 g	700 g
4	Malabar spinach	800 g	1 kg	10	Sponge gourd	500 g	800 g
5	Bottle gourd	600 g	1 kg	11	Ridge gourd	500 g	600 g
6	Pumpkin	700 g	800 g	12	Snake gourd	400 g	600 g

Total Quantity: 10kg 50g, Total Amount: ₹4517, Sold: 2kg, Selling Amount: ₹1200

Few native seed varieties

Preserving Indigenous Seed from Disappearing

MCG name: Doyel Mahila Samity
Village: 11 no. Sandelerbil
GP: Sandelerbil
Block: Hingalganj
MCG members: 13
Date of intervention: April 2019

MCG level Seed bank Of Doyel, 11 no. Sandalerbil, Hingalganj

"Amader desi beej hariye gache (our indigenous seeds are disappearing)" said one of the members of Doyel Mahila Samity who has taken the initiative to collect and save the traditional seeds. With support of DRCSC, a group-level seed bank was formed on April 2019, with the involvement of 13 members of the group. They got training on seed collection, saving and preservation which has improved their knowledge and skill to safeguard the indigenous seeds against their possible extinction.

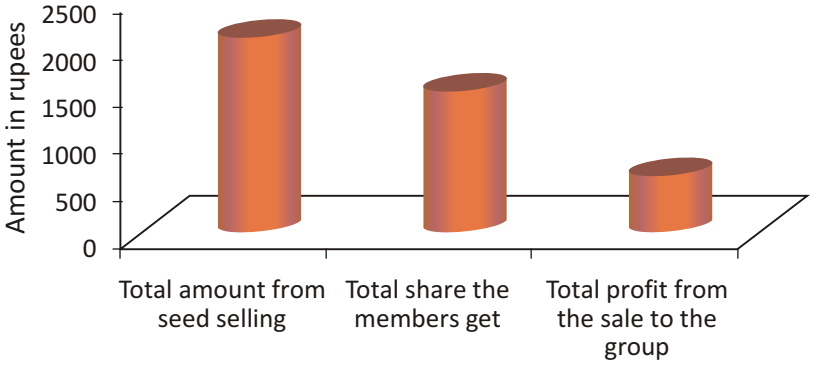


Figure: **Profit and share from seed**

Before the intervention of seed preservation supported by DRCSC, the group members could not able to save and store seeds much and they used to buy the seeds from the market. Now after the intervention, the group maintains the register in which the details of the seeds are mentioned with selling, and exchange details. The seeds are sold to the local seed bank Ankuralay and also to our project beneficiaries locally. The exchange and savings of seeds are done within the group in 3-4 months after harvest from their land and garden. The seeds are collected and preserved from 50gm to 1kg in quantity. The group members preserving the seeds at the group base seed bank and selling to outsiders get some share of the profit out of the selling amount, and the remaining amount gets deposited to the group account. In the past Kharif and rabi seasons from 2019 to September 2020 seeds sold locally.

Few members of Doyel MCG, 11 no. Sandalerbil, Hingalganj

Table: Details of seeds in Kharif and Rabi seasons from 2019 to September 2020

Sl. No.	Seeds preserved	Seed quantity (g)	The total amount from seed selling (₹)	The total share the members get (₹)	Total profit from the sale to the group (₹)
1	Red leaf amaranth	500	160	135	25
2	Ash gourd	30	10	9	1
3	Pumpkin	200	160	120	40
4	Okra	450	315	157	158
5	Sesbania	100	8	5	3
6	Cowpea	100	50	40	10
7	Snake gourd	12	7	6	1
8	Cucumber	20	40	20	20
9	Chenopodium	330	66	49	17
10	Spinach	5k	1000	750	250
11	Sour Sorrel	800	160	120	40
12	Tomato	60	80	60	20
	TOTAL	**7 kg 602 gm**	**2056**	**1471**	**585**

Table: Seed Bank data of Doyel Mohila Samity MCG for 2020- 2021 & 2021-2022

Year	Seed Types	Quantity of seeds sold/ exchanged	Amount earned by selling (₹)	Total quantity (₹)	Total amount	Quantity remained in stock	Amount
2020-2021	14	9kg	1750	9kg 71g	1790	71g	40
2021-2022	9	250 g	120	122kg 250g	4220	122 kg	4100

Importance of indigenous seeds

The group members follow the ideology of growing organic fruits and vegetables in the garden for a long time as they believe indigenous seeds provide more nutritious and healthy food by the use of organic manure, increase yield, prevent disease, taste better, etc.

Traditional seeds are easily stored in the seed bank compared to hybrid ones, give good production and resilient to the climatic condition of Sundarbans. Seed banks considered as seed libraries helped to deal and tackle the crises and losses faced by climatic hazards like Bulbul and Amphan cyclones. Indigenous seeds have drastically reduced their dependency on market, as seeds storage in secured group base seed banks can be retrieved when crops disappear.

Challenges faced

Initially, the storing of seeds was a challenge as it was getting infected by insects but later with the knowledge, they overcome the problem by storing them safely with charcoal and neem leaves so that it doesn't get damaged or infected. They are now aware of the appropriate moisture and temperature required for storage to keep them viable over a long time.

Seed bank resilience to the climate change

The seed bank offers resilience to the communities to withstand challenges of the climate change. The crops are getting extinct due to climate change; this can avert unforeseen emergencies. Diseases quickly wipe out the crops but the seed bank preserves crop diversity. Seed preservation is a form of crop insurance to reduce the risk and threat due to habitat loss, climate change, pollution, and pest.

The prospect of seed preservation

The group members conduct meetings once a month to discuss improving the preservation and promotion of more seed varieties. They believe that it will help the group and the members to get strengthened and also achieve the social and economic aspects. They believe that seed preservation will improve access to diverse selection and storage of locally adapted crops that are getting disappeared due to catastrophic loss.

Safe Chulha Saves Vision

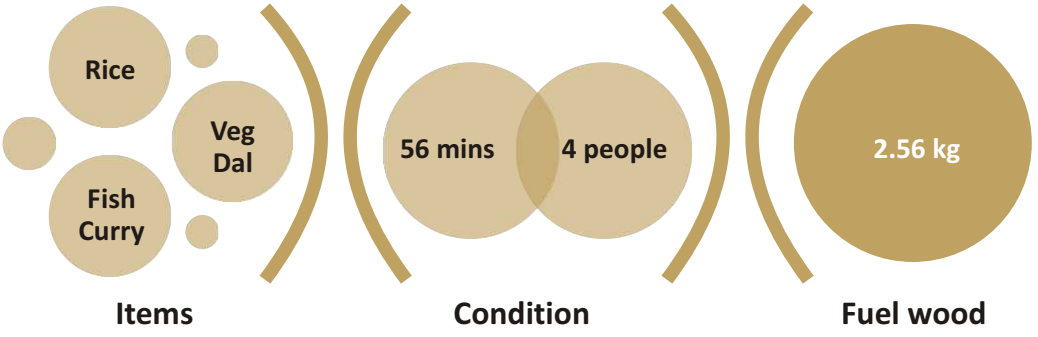
In February 2022, Basanti Mondal of Sathi MCG at Harekrishnapur village of Basanti received a Smokeless Chulha from the CJRF project to continue her cooking safely. At that time, she was suffering from a severe eye infection out of kitchen smoke alike other village women. Monthly she used to spend money for the treatment and was advised a spectacle for its protection too. Moreover, the vessels and cooker would become so black that can not be removed easily; shoot covered the entire kitchen; shortness of breath, burning of skin and dresses, etc. made those days too hard to deal with. "Now my vision is clear, I do not need any medicine and spectacle for my eyes. This oven made me so happy that I forget those painful days," said Basanti with a satisfactory smile.

Smokeless Chulha, Basanti Mondal, Harekrishnapur, Basanti

Along with other beneficiaries, she explained the endless utilities of this smokeless oven, "We did not get rid of eye irritation and shortness of breathing previously for cooking in a conventional oven but this smokeless chulha solved all those serious problems. Even the heat out of this oven is extremely low for sensation. This oven not only saves fuel but also saves our time of cooking. For its 2-oven design, I can cook rice and two other dishes at a time using the low and high flame oven." There are four members in the family of Basanti Mondal, now she gets leisure time after cooking to spend with the children and nutrition garden.

Now she developed an idea to build a smokeless chulha by her own which she will use to guide neighbors or relatives for their health benefit. Basanti heard some negative impressions about the taste of food cooked in smokeless chulha but her experience curbed it after cooking and consuming a meal.

Smokeless Chulha (Double Oven)



Conventional Chulha (Double Oven)

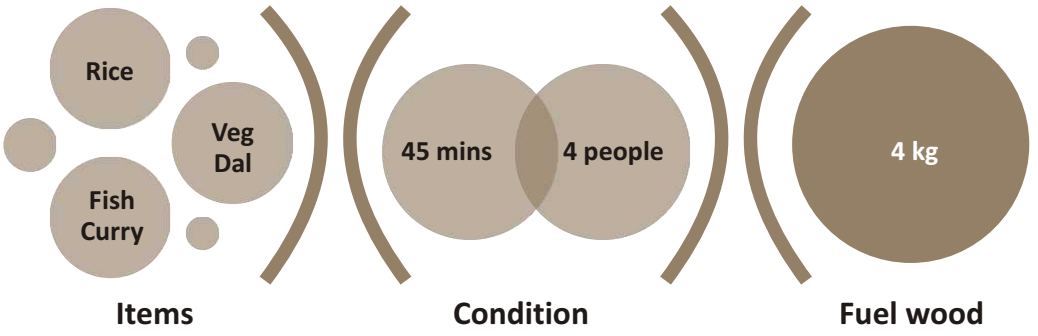


Table: Item and quantity of cooking

Items	Quantity
Rice	1 kg
Veg Dal	300 g
Fish Curry (with potato)	500 g

"Now my vision is clear, I do not need any medicine and spectacle on my eyes. This oven made me very happy that I forget about those painful days," Basanti said with a satisfactory smile.

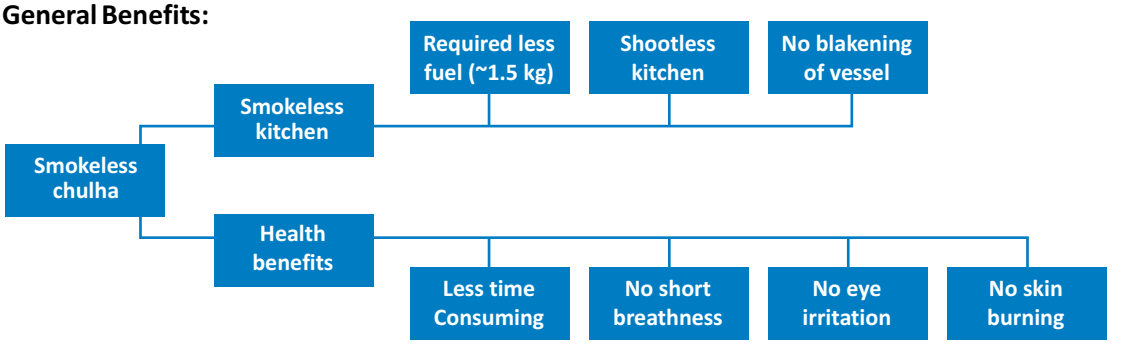
Chulha Without Smoke, Kitchen Without Shoot

Beneficiary Name: Nilima Patra
Age: 36 years
MCG: Sindhu Swanirvar Gosthi
Village: Gobindapur Abad
GP: Brojoballavpur
Block: Patherpratima
District: South 24 Parganas
Family Members: 3

Previously used**: Conventional Oven**
Health issues: **Eye irritation, sleeping disturbance, cough, breathing trouble, heat sock, and skin burning.**
Other issues**: Blackening of vessels and kitchen, sooty kitchen, high cooking time.**

Date of intervention**: 17/12/2020.** FC**:** ₹ **400.** LC: ₹ **100.** RF: ₹ **100**

General Benefits:



Smokeless chulha, Nilima Patra

Technology shared by Nilima Patra:

1. The outlet pipeline sucks all the smoke outside the kitchen.
2. At the entrance of this pipeline, there is a small hole near the oven that controls the heat of this system. If this becomes large a little all heat will pass out through the pipeline.
3. In this chulha, the flame exerts within the confined area of the oven increases heat at the base of the vessel. In contrast, the flame of a conventional oven spreads outside more that burns skin rather.

Regular care:

1. The pipeline (6 ft) should be cleaned weekly once using date palm leaves from the outlet, otherwise,the shoot congests the outlet route of smoke that returns and turns off the flame.

Economic and social benefit:

1. Nilima learned to create this model of smokeless chulha and replicated it at 13 HHs till date including herself.
2. These HHs include some non-beneficiary families that indicates the multiple utilityof smokeless chulha.
3. She earned 100 and later 200 for each replica (₹ 150 × 12 = ₹ 1800 approx).

"I carefully noticed the design during my handhold training and applied 1st time in my kitchen. Later designed for neighbors' as per their request" Nilima Patra.

Action Point - 03

Bio-diverse and Integrated Farming System in Rice Fields

Introduction

The beneficiary households grow only the monsoon paddy. Climate change-induced erratic rainfall, cyclones, storms, saline flood, and inundation have caused paddy production uncertain. Families having no farmland depend either on fishing or working as agricultural labour. Uncertainty in agriculture triggers migration. Farmers are mostly dependent on markets for HYV seeds, which show less climate tolerance. Farmers cannot save these seeds for future use.

- Food insecurity 4.7-5 months
- Mono- cropping (paddy)
- Use of less climate tolerant seeds

Why the need of applying a Bio-diverse & Integrated Farming System?

Stable and improved farm productivity through diverse production units

System that has inherent resilience to withstand climate shocks

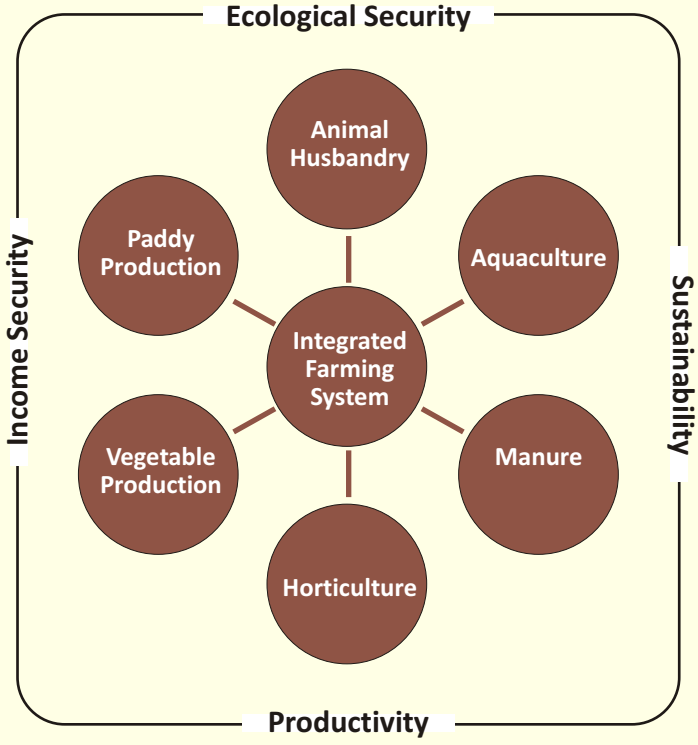
Increase in income through surplus production

Increase in food insurance months

Improve the nutritional status of the family

Initiatives for bio-diverse and integrated ecological farming system:

Integrated Farming System (IFS) is an important ecologically sustainable method that integrates natural resources and combines farming with animal husbandry, aquaculture, and forestry that partially solve the issue of food products as well as climate change. IFS improves food security, livelihood generationand productivity.



Outcome

- **IFS Model:** 103
- **IFS training:** 82
- **Excavation of farm pond:** 94
- **Livestock support:** 869
- **Aquaculture support:** 417

- The IFS and the Sorjon technique of growing crops have **improved production drastically**. The earning has been **enhanced for inclusion of allied agricultural products such as livestock, aquaculture, etc.**
- **The targeted small and marginal farmers have diversified and stabilized production sources** by adopting improved production techniques, concepts, and management. **The total amount of food production by all IFS units is much more than the paddy grown in the entire field.**
- The **shift from the use of chemical fertilizer to organic manure, growing indigenous crops with a high salinity and heat tolerance, and the use of indigenous breeds of livestock and aquaculture** added an advantage not only towards mitigating and adapting to climate change but also various other factors.
- A bio-diverse Integrated Ecological Farming System **stabilizes crop production** of a field rather than a mono-crop rice field. Multi-crop production enriches the nutrition status of the family where it was impossible from paddy.
- Waste of one unit is useful to another which **reduces input** cost, year after year. **Market dependence minimizes for input in the field along with incurred costs**. **Integrated Pest Management (IPM)** and the use of bio pest repellents reduce or curb the use of chemical pesticides in gardens that are beneficial to their health and the surrounding environment.
- **Local breed of livestock is highly resilient to climate change** and the cost of rearing is comparatively low. **They can survive on locally available natural food** (fodder). Revenue income increased to some extent from proper livestock rearing.
- **Pond** in this model **stores water for dry period and pisciculture**. It **recharges ground water** for future. Keeping a **mix of sweet and saline water fish varieties** in ponds has **reduced the chance of loss in saline flood** until they were flooded away.

Pond excavation

Case Stories

Integrated Farming System Towards Sustainability

Binata Mondal resides at 14 no. Sandalerbil of Hingalganj block. She is a part of the Unayan Mahila Samity group formed by DRCSC. For 9 years she is residing in this village where she and her family work as marginal farmersin their paddy field, not in a designed and systematic way.

Before DRCSC's intervention, she used to apply chemical fertilizers in her paddy field and other crops. Her land size consists of 33 kathas and a pond of 7 kathas which she uses to cultivate fish. She is a part of DRCSC's programs where she learned and got various input support to improve her integrated farming system. From the project, she got the support of a vermi/Azolla pit, compost, fish, manure, traps, strategic crops, seeds, and saplings.

She cultivates paddy and other crops seasonally and grows different kinds of fruit trees on the dykes, trellis over the roof and pond. The fruit wastes are converted into manure and used in the crop field. She learned to make compost, and preserve seeds in the various handholding training. For a long time, she is using indigenous seeds and also contributing to the group-based seed bank and selling the surplus in the market. The production has increased throughout the year and she has developed a strong market link where she can easily sell the surplus of vegetables, fruits, animal products, and seeds. Hence, she and her family doesn't depend on market food.

Binata Mondal at her IFS- vegetable garden

IFS beneficiary Binata Mondal, 14 no. Sandalerbil, Hingalganj

During the Yaas cyclone, Binota's land shaping model of an integrated farming system reduced the risk factor of getting damaged and it was easily sustained in the heavy rainfall and is considered to be an appropriate model in such situations. The only challenge she faces is the water crises during May and June.

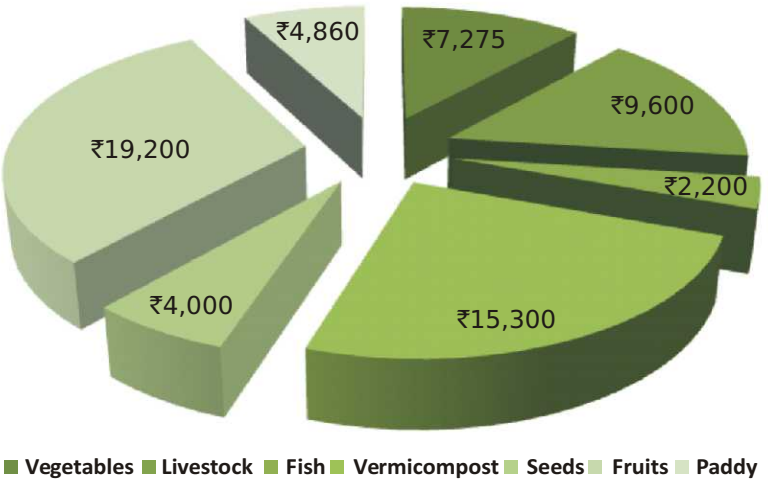


Figure **: Total amount of production in 2021 Kharif**

Table: Quantity and amount earned from surplus production

Year	Egg sold	Amount (₹)	Vegetable Sold (kg)	Amount (₹)	Fish sold (kg)	Amount (₹)	Fruit sold (kg)	Amount (₹)	Livestock sold (kg)	Amount (₹)
2021-2022	1750	10,500	1551	33,510	168	20,670	840	15,680	12 hens, 3 sheep	3,150, 12,000

Table: Production details of various crops (2021-2022)

Sl. No.	Sources	Production	Amount (₹)
1	Vegetables	2078kg	46225
2	Livestock production	2020 eggs, 12 birds, 3 sheep	27270
3	Fish	317kg	47750
4	Vermi compost	1500kg	12000
5	Seeds	5kg	600
6	Fruits	934kg	18920
7	Paddy	180kg	3750
8	Azolla	1500kg	-

The income from the field is spent on the education of her children, medical expenses, and other things. No inputs or seeds are purchased from the market. The IFS system of growing crops and becoming self-reliant improves the protein intake of the family. She believes that she is eligible to become a community resource person in the future so that she can train others to replicate similar models to improve the socioeconomic status of the family. In the future, she is willing to improve her land with better soil management techniques and improve the hen house.

Binata Mondal and her Azolla Vermi Pit

SORJON TECHNIQUE: Development of Monocrop Rice Field to Multicrop Diversified Field

Fatema Laskar resides at Godkhali village in Masjidbati GP of Basanti block used to grow only monsoon paddy which was uncertain due to erratic rainfall, cyclones, storms, saline flood, etc. She used to cultivate paddy with HYV seeds in 8 Katha of her land which showed less tolerance to climate change and the return or profit was very less. The family had to depend on the collection of shrimp and migration for work as daily labour which has been stopped during this Covid time. This had given rise to food and livelihood insecurity and it was difficult for the family of seven to manage two times meals.

As part of Modina MCG, she got handholding training from DRCSC on the Integrated Farming System where she was trained and nurtured on reshaping of farmland named as Sorjon technique in which various vegetables and aquatic life are introduced that enabled her to stabilize and improve the farm productivity much more than paddy grown earlier in the entire land. Systems of raised beds are constructed 165ft in length, 35ft in breadth, and 3.5ft in depth ditches where vegetables are cultivated practicing mixed cropping on the top of the bed while trellis supports the creeper vegetables over the ditches and fish cultivated in the ditches.

DRCSC supported Fatema in designing the farmland into the sorjon technique model and provided various agricultural inputs and fish support. She maintains the record of production and selling of vegetables season-wise. According to Fatema, the raised bed gets submerged during monsoon still suitable for growing crops accompanied by carp fish culture in the channels. While during dry seasons, pond water is used to irrigate vegetable crops under the Sorjan farming method. The entire system has the inherent resilience to withstand climate shocks.

Sorjon technique of farming has given her a better way of living her life as she does not have to depend on market food. The mono-cropping cultivation of rice converted into the multi-cropping of various varieties of vegetables organically. She motivates and teaches others the technique and helps in planning and designing the technique. Earlier from mono-cropping paddy cultivation, her yearly income was ₹ 2000 but after resigning the model into the Sorjon technique and growing vegetables twice - thrice, her income improves to more than ₹ 10,000 annually.

During the year 2020 in Kharif and rabi season, after consumption and distribution of her garden vegetables, she harvested and sold vegetables like bitter gourd, cucumber, green spinach, ridge gourd, yam, cauliflower, brinjal, etc. for ₹ 12925 and her net profit is ₹ 10050. The production and selling of carp fish earned her ₹ 1800. She planted trees like papaya, banana, and drumstick on the bunds for better production.

Sorjon Beneficiary Fatema Laskar, Godkhali, Basanti

Goat as a Family Resource

Namita Chaudhury belongs to a landless family and resides with her two sons and her husband at Harekrishnapur village of Basanti block. Her children migrate to different states for work and livelihood. Last 25 years she is staying in this village and since then the main occupation of the family was daily labor in other's agricultural fields. She is a part of the Aila Mutual Cooperation Group formed by DRCSC under which she had been supported with a Black Bengal breed of female goat as livestock support to diversify the income sources and improve the livelihood sources.

She believes indigenous breeds withstand climate stress and are resilient to climate change. In two and a half years, the production increased from one goat to fourteen livestock. Goat rearing has proven to be low investment activity with a high and consistent monetary return.

Table: Detail of monetary return from goat rearing

Year	2019-2020	2021	2022
Income (₹)	-	32,500	21,000
Expenditure (₹)	500 (LC), 500 (RF)	7,500	3,100
Profit (₹)	-	25,000	17,900

Namita is happy and satisfied with livestock rearing activity. She takes her livestock animals to graze in nearby fields and during crises she provides straw, and wheat to feed the animals. Vaccination is regularly given to protect against diseases and animal suffering.

Namita Chowdhury, Harekrishnapur, Basanti

To bring sustainability in her livelihood and income sources, she wants to improve the production of goats in future. Hence, she is reluctant to sell the female goats in the market and convert her goat-rearing activity into a business model. For a family like Namita's, goat rearing has proven to be reliable livelihood insurance. Raising the goat is an income generation activity that has increased the income and improved the nutrition for poor households mainly landless in remote and ecologically vulnerable areas like Sundarban.

Livestock Support (Goat)

Intervention: Livestock Support - Goat (May 2019)
Beneficiary name: Menoka Haldar
MCG name: Binapani Mahila Samity
Place: Ketarchak, Dulduli, Hingalganj


Menoka Halder and her goats

Menoka Haldar and her family of four reside at the extreme of the river embankment in Katarchak village. She is landless and very few vegetables are grown on her small homestead land due to the salinity of soil and water. Her livelihood entirely depends on shrimps and spawns collection from the river. Her life and livelihood were in distress as they were unable to meet their daily needs.

Being a part of Binapani Mahila Samity, in May 2019 she was supported by indigenous breed of goat called Black Bengal as an asset that plays an important part in the lives of vulnerable and landless families. She believes that the indigenous breeds are best suitable in the local areas and they are highly resistant to extreme climatic events and outbreaks of diseases due to climate change.

Menoka is happy to get the goat support, she takes good care and responsibility for feeding, medicines, and vaccine properly at the interval of every three months. Soon the number of goats increased as it gave birth to four kids each time. A year later she sold two male goats for ₹ 5600 and utilized the money for household expenses and buying a net for fishing.

Menoka has prepared improved and stronger shelters with wood and asbestos as she believes they reside at the risk zone of river embankments and often they face the extreme and adverse effects of storms and cyclones. The rearing of the goat provided Menoka and her family a source of nutrition and also helped her to enhance their household income. The manure is used at her homestead to improve the soil quality for growing vegetables.

Menoka believes providing proper medicines and vaccinations to small ruminants is an important part of livestock rearing as it improves food, nutrition, income, and sustainability. She is left with five female goats which she intended to increase the number through reproduction and selling in the market.

Table: Income expenditure statement

Year	2019-2020	2021	2022
Income (₹)		5,500 (2 males, 9 kg)	1,500 (1 female, 4 kg)
Expenditure (₹)	LC 650 RF 300	100 sterilizations 500 medicine 2400 fodder	Medicine 1,250 Wheat 2,100
Profit (₹)		21,500	1,850

Livestock Support (Hen)

Livestock plays an important role in the lives and livelihoods of landless and vulnerable women of Sundarbans. These women and their families suffer the most due to no customized capacity-building programs and alternative income-generation opportunities for women. One such MCG member is Saraswati Das from Kothabari village of Hingalganj Block. She is a landless woman and her livelihood is dependent on fishing from a nearby river. Even the family does not migrate to other places for work. Saraswati Das has five daughters and there was a situation when it was very difficult to get her daughters married due to financial distress condition. Looking into her vulnerability situation, DRCSC supported her with seven (Male: 2, Female: 5) indigenous hens to improve food nutrition and livelihood security. They play a major role for the rural poor and marginalized section of the people concerning their subsidiary income and also provide them with nutritious chicken eggs and meat for their consumption. The indigenous breeds of chicken can tolerate harsh environmental conditions and withstand climate stress.

Saraswati Das with her hens

Table: Details of poultry products

Month	No. of chicks sold	Selling amount (₹)	No. of death	Eggs consumed	Amount (₹)	No. of egg sold	Amount (₹)
December 2021	14	560	-	22	132	10	60
January 2022	16	800	-	13	78	17	102
February 2022	18	1080	-	27	162	30	180
March 2022	10	600	-	10	50	18	90
April 2022	-	-	19	3	15	35	175
May 2022	10	550	-	25	150	170	1020
June 2022	20	1000	2	15	90	135	810
July 2022	15	750	3	20	120	125	750
August 2022	12	600	-	18	108	137	822
September 2022	-	-	10	12	72	99	594
October 2022	9	1125	-	-	-	-	-
Total	**124**	**7065**	**34**	**165**	**977**	**776**	**4603**

In stock: 4 hens, chicks: 9, Yearly Expense: approx. ₹ 500 for vaccine and medicine

So in one year, the production of hen increased from seven to seventeen. Some of them are consumed and some chicks are sold in the local market. Around 250 eggs were sold in a year. **This livestock support has diversified the income opportunity of the family and improved nutrition security.**

Saraswati feeds the hens with locally available food and does not incur any cost or expenditure and no challenges in hen rearing are faced by her. The income earned from the hens and eggs is either spent on livelihood purposes or kept in the bank. She doesn't buy egg or hen from the market instead she sells or distributes them among relatives or neighbors.

She is very happy with the production and the income sources and is thankful to DRCSC for the support. **Her prospect is to improve the production of the chicken so that she can sell them in the market for a fair price which will improve their income and also consume to improve their**

Permanent hen house

Pig Rearing – A Livelihood Option for Landless

Beneficiary: **Kankana Sardar (41y)**
MCG: **Krishna Swanirvar Gosthi**
Village: **Gobindapur Abad**
GP: **Brojoballavpur**
Block: **Patherpratima**

Landless — **Vulnerability** — **Flood affected**

2020

Support given on: **June 2020**. No. of Piglet: 1. Sex: **Male** Age: 1 **month**. FC - **₹1400** Weight: **2 kg**.
Sold at: **₹8000**. Age: **9 months**. Weight: **50 kg**.
Expenditure: LC (**₹400 medicine**), RF- (**₹350**), Sterilization (**₹100**), Vaccine (**₹100**),
Feed : ~ **₹50**/day for **8 months**

2021

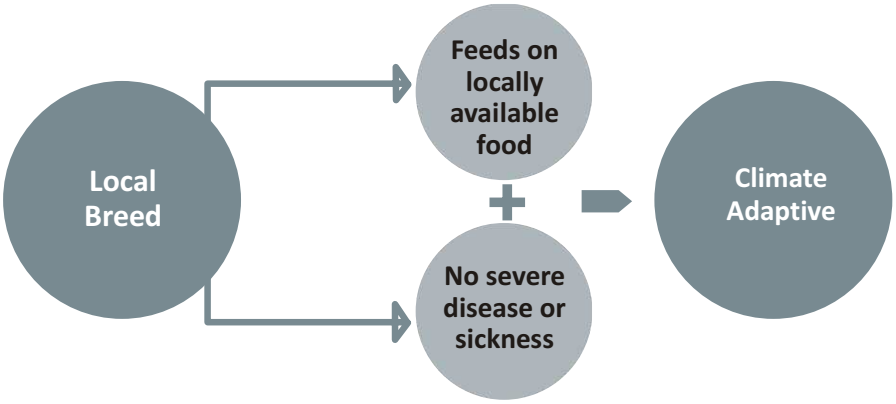
Bought: **2 piglets**. Sex : **Male** Age: **2 months**. Total Cost: **₹4000**.
Sold at: **₹20,000**. Duration or rearing: **9 months**. Weight: **50 kg**.
Expenditure: Sterilization (**₹100**), Vaccine (**₹100**), Feed : ~ **₹50/day per head**

2022

Piglet: **1**. Sex: **Male**. Age : **3 months**. Weight: **10 kg**.
Expenditure: Sterilization (**₹ 150**), Feed: ~ **₹50/day**.

Kankana Sardar with her piglet

Benefit:



Challenges:

1. The collection of feed is time-consuming and its preparation is so hectic.
2. Though the shed was permanent it collapsed in a cyclonic storm.

A native Pig breed

Women Farmer Trainers (WFT)

Tumpa Mondal became a Community Resource Person (CRP) at the end of the CJRF project. At present,she is the president of the Akash Cluster and a Women Farmer Trainer in Hingalganj. From birth, she has been living in 14 no. Sandelerbil of Hingalganj and belongs to a marginal family. Her husband migrates in search of livelihood to other states. Being skilled and equipped Tumpa became able to grow surplus vegetables in a nutrition garden, grow fruit trees, and rear native hens and goats that ensure stability in earning. She also takes care of their MCG level Seed bank and exchanges native seeds about 12 types of her own.

"I have gained experience, interest and courage in course of providing training."

She carries all the saved seeds from their seed bank to Hingalhanj town for selling in Community Seed Bank "Ankuralay".

With her own experience and will power Tumpa started motivating villagers towards sustainable agriculture and would get a chance to deliver training to the local govt. workshops. A new way of earning is explored from her knowledge and presentation skills. For the last 4 months, she is engaged in the Dipanjali project as a "Resource Farmer" and earns ₹400/training. "Last month I have earned ₹2800 for providing training, now I can afford my expenses from this and do not ask from my husband."

Table: Details of Tumpa's savings

CJRF Account (Nivedita Mahila Samity)	₹ 50/month
CJRF Cluster A/C (Akash)	₹ 50/yearly
Anandadhara A/C	₹ 50/month
Samajik Surakha Yojona	₹ 50/month
Laxmi Bhandar Scheme	₹ 1000/month

Tumpa is providing training to women villagers

Tumpa Mondal is training women beneficiaries

WFT Rina

- Self Help Group (SHGs) trainer for accounts handling under National Rural Livelihood Mission (NRLM).
- CJRF WFT trainer for Capacity Building (record maintenance) where she earns ₹ 500/training.
- Rina could not grow vegetables on low land previously but after project intervention, she raised the land by digging a pond under the guidance of CJRF field staff. Now she doesn't buy vegetables from outside, rather sells the surplus.
- She is in charge of their MCG-level Seed Bank.

Name	Rina Mondal
Age	37 years
MCG	Koheli Mahila Samity
Village (GP)	11 no. Sandelerbil (Sandelerbil)
Block	Hingalganj
Family Members	5
Children	2 (1 daughter, 1 son)
Family Occupation	Veterinary Doctor and Paddy farmer

"I have sold Pumpkins from my garden at 1600 and bought 10 lt Mustard oil for cooking."

Training on Circle Bed preparation

Handhold training on liquid manure preparation

Action Point - 04

Group-Based Income Generation Initiative

Before the initiation of the project

The people of Sundarban have uncertainty of their livelihood, whether a land-based income-generating source or an aquaculture-based source of income. This uncertainty of living conditions triggers people, especially men migrate to different places in search of income. The money they send home is highly irregular. Women and children with hardly any skill or support are compelled to engage in risky livelihoods like collecting fish spawns or in illegal forest mining.

Rational

Income Generation Programme (IGP) is a group-based program towards a systematic approach to asset creation through scientific management of livestock, and fishery with skill development training to enable and empower women.

Diversifying the livelihood sources to cope with climate-related shocks and improving the socio-economic status of women.

Description

To achieve the target, DRCSC has developed certain initiatives that benefit the people in long run for sustainable livelihood.

Initiatives	Benefits
1. **Breeding units of native varieties**	■ These varieties are of **better climate resilience** and **low maintenance cost** and can earn better profit.
2. **Feasibility study**	■ To access **the market demand and supply of products.** ■ Determine the **actual & potential production of each member** ■ Assess the **potential sales value of the group's surplus produce.**
3. **Skill development sessions**	■ These enable the beneficiaries **to undertake different activities for better livelihood pportunities.**
4. **The market for organic products and forming a network of organizations**	■ Established a **pro-poor market for organic products**. ■ **The producer group is acquainted with the markets. The individual entrepreneurs & the IG units function under these groups to sell the products in the market.**

Outcome

I. The group base Income Generation Programme (IGP) led toward the socio-economic upliftment of the beneficiary. **The landless and marginal women are empowered** now to become **entrepreneurs with their natural resources** and the IGP initiative caters to the need of the beneficiaries in terms of monetary requirements. It also provides them with the **decision-making power** to diversify their income sources.

Type of IGP

Goatry	Poultry
Pig Rearing	Sheep Rearing
Aquaculture	Paddy

II. Participation in **IGP improves the socio-economic status of women** and **diversifies their livelihood sources** so that the target population does not fall back to a lower poverty threshold due to climate-related shocks. This has **enhanced the accessibility to financing, market, and business development** of landless and marginalized women.

No. of IGPs: 20
Beneficiaries involved: 150
Training arranged: 11

III. The involvement of sellers in a group-oriented venture has led to the unification and strengthening of the group members and has made them **skilled and equipped enough to sustain their life in vulnerable situations**. They can handle finance and market linkages for their products.

IGP sheep rearing , Hingalganj

IGP Poultry, Bermajur, Sandeshkhali

IGP goat rearing, Hingalganj

IGP Paddy & Aquaculture, Krishnadaspur, Gplot

Case Stories

Pig Rearing – Initiative for Livelihood Opportunities

The members of **Saraswati Mahila Samity** are either landless or marginal farmers whose livelihoods were in vulnerable states. Landless beneficiary families depend on fishing or work as agricultural labour. Uncertainty in agriculture triggers the migration of men. The money, they send home is highly irregular. **Women and children with hardly any skill or support are compelled to engage in risky livelihoods like collecting fish spawns or in illegal forest mining**. One year based on the interest and scope, DRCSC intervened to mobilize the Saraswati Mahila Samity group members **to involve in a pig rearing activity as an income generation program in 14 no. Sandelerbil village of Hingalganj block, North 24 Pgs.**

Saraswati MCG, 14 no. Sandalerbil, Hingalganj

So from the organization, they got the **support of five indigenous pigs, its shelter with some investment**. The women members of this group are mainly tribal families and they believe pig rearing is there in their culture they rely on the indigenous breeds for disease resistance, low maintenance cost, and resilience to climate change. Breed selection plays an important role in mitigating and adapting to climate change resulting in high production.

The cooperation among the women members is quite understanding as they have taken the role of feeding the pigs daily and routine-wise. The support of five pigs by the organization had increased to **20 pigs in one year** and **13 pigs they sold for ₹ 19,100** in the local market. The marginal women farmers and landless women families are empowered now to become entrepreneurs with their natural resources and the IGP initiative caters to the need of the beneficiaries in terms of monetary requirements which was earlier not possible.

The women who were dependent on their husbands now have become **decision-makers for their livelihood sustainability**. The entrepreneurship ability has been improved and is benefited from the output. **They have their business in their hand with a lot of interest and inclination to developing entrepreneurship**. **The production system improved substantially by using strategic inputs, value-addition, and careful marketing to harness potential, productivity and profitability. For marketing their resources and addressing other challenges, these group members regularly conduct meetings to make their initiative a successful business so that their livelihood is sustainable**. They also share ideas and set examples for others to replicate like their business model.

Table: Income expenditure statement

Year	2020-2021	2021-2022
Income	₹ 26,200	₹ 13,000
Expenditure	₹ 15,840	₹ 7,500
Profit	₹ 10,360	₹ 5,500

The project support has a greater impact on bringing change among the beneficiary groups. **The support includes facilitating the business development and establishment with financial investment in input support of materials and skill development training.** The group members themselves take extra care and responsibility to take care of their enterprise like providing proper food and medicines to the animals to avoid any risk of loss. They are made skillful in the preparation of food and storing them for a lean season to meet the demand. They were made aware of improved management practices such as breeding calendar, production, profit from the sale, health calendar, and efficient marketing to gain a reasonable return.

From feeding the animals to selling them in the market, give them a sense of self-reliant attitude and monetary return.

Pig rearing of Saraswati Mohila Samity

From Vulnerability Toward Enterprise Model

Intervention: Income Generation Programme (IGP -Pig rearing, May 2019)
Group Name: Abhiyan Mahila Samity
Place: Lebukhali Purba Para; Dulduli GP, Hingalganj Block

Abhijan MCG, Nebukhali, Hingalganj

The members of the **Abhiyan Mahila Samity belong to a tribal caste** whose livelihood depends on the collection of fish spawns, mono-cropping with minimum land size, and uncertainty in income triggered the migration of men for labor work. They are resided in the vulnerable zone of the river embankments, prone to natural and climatic hazards and their livelihood and food security largely suffer.

In a situation like this, DRCSC intervened with the idea of the **Income Generation Programme** which is group base program by mobilizing the beneficiaries to help them to get engaged in a group-based income generation initiative for **the indigenous breed of pig rearing** with the support of CJRF New Venture Fund.

Amra Adivasi, shukor palon bhalo pari (We are tribal, we know pig rearing quite well) said Sabitri Munda. The decision for the startup of the indigenous pig rearing as an IGP model was purely taken by the group as they believe they have the skills and expertise in pig rearing as some of them rear pigsindividually too. Even **they believe indigenous pigs have high tolerance capacity, are disease resistant, and can be easily reared with low maintenance and requirement of treatment as compared to other livestock animals like goats or sheep.**

The members were provided with skill training on pig rearing by an expert to enable them to acquire the skill that enabled the beneficiaries to undertake the improved practices like breeding calendar, production, efficient marketing strategy, medicines, feeding, etc. to improve their business and sustainability. The demand and rate for indigenous pigsare high in the local market and the training and their expertise with proper follow-up and guidance by DRCSC has enhanced their accessibility to financing, market, and business.

The pig feed consist of mostly rice husk and wheat which is available through ration and sometimes brought from the market in case of scarcity. **The group conducts monthly meetings and takes mutual decisions among the group themselves on promotion and upscaling it to the larger business model for the bright prospect of this program. Their future strategy is to increase the pig production, income from their livelihood and improve their savings by depositing in the account so that it can be utilized for emergency purposes.**

Table: Income-expenditure statement

Year	2020	2021	2022
Income	₹ 5,200	₹ 15,200	₹ 21,400
Expenditure	LC ₹1,700, others ₹ 600	Negligible	Negligible
Profit	₹ 2,900	Approx. ₹ 15,000	Approx. ₹ 21,000

Table: No. of pigs at initial and current time

Sl. No.	Particulars	Details
1	Pig support by DRCSC on 08/05/2019	Numbers: 10 Amount: ₹9,700
2	At present number of pigs exist	11

Challenges faced: The pig shelter got adversely affected by the Amphan cyclone and initially mortality or loss of a few animals happened due to an animal attack.

Empowerment and self-reliance: The return or income from the sale empowers these women to become self-reliant by selling their animals in the local market at a high rate. They are utilizing the amount for the purchase of household assets and other purposes. The **socio-economic status of women is improving** which helps them to diversify their livelihood sources so that they do not fall back to a lower poverty threshold due to climate-related shocks. The IGP resulted in meaning and transformative for the group at the local level, diversifying their income sources and improving their resilience.

IGP members of Abhijan MCG

Action Point - 05

Protecting life, livelihood, and environment through community plantation, regeneration of natural habitats of animals, birds, insects, etc., vulnerable zone mapping, and dissemination of disaster warnings and awareness

Introduction

Increased cyclones and storms are eroding the embankments. Collecting spawns of shrimps and trash fish from submerged mangroves is destroying the mangroves and adversely affecting the ecosystem. Originally the coastal area of the Bay of Bengal in India had mangroves covering 4,20,000 hectare area in 1987 as per government data, and in 1997 it has reduced to 2,12,300 hectares. It is also relevant to note that out of the total mangrove cover in India, 60% is in Sundarban. Also, there used to be at least 30 common species which have now reduced to a maximum of 12-15.

Factors for mangrove reduction:

- Adversity of climate change
- Extension of human settlements
- Overharvest of firewood
- Catching of shrimps and prawns

Impact of mangrove reduction:

- Rise in intensity of natural calamities like cyclones, storms, etc.
- Loss of life and livestock
- Widespread damage of agricultural production
- Loss of habitat, property and shelter

Rational

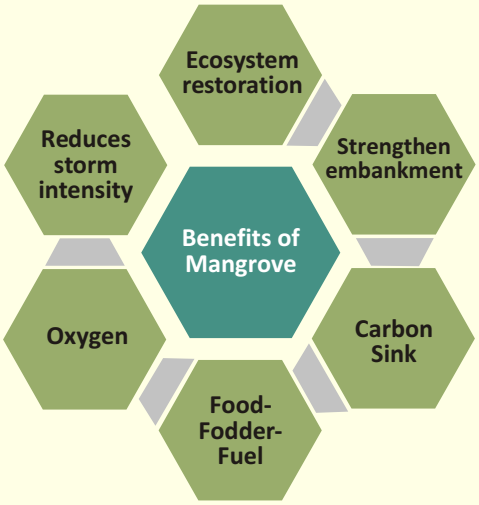
Mangroves protect the coastlines; the waves lose their power as they pass through dense mangrove forests which offer protection from storms, cyclones, etc. Mangroves forest helps to protect from the devastating effects of extreme weather due to climate change.

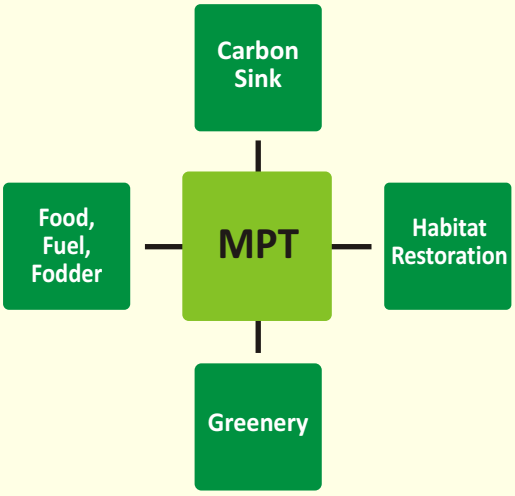
Social forestry removes and stores carbon from the atmosphere, preserves soil, slows heavy rain, and reduces the risk of flooding. It enhances the air quality and mitigates the climate change effect.

Plantations help in protecting the lives and livelihoods of the families living on the islands by reducing the erosion rate of embankments. Strengthened embankments helps in reducing the loss of assets, planting new seeds and saplings of mangrove, settling the floating seeds to grow.

Description

Interventions	Measures
1. Plantation and regeneration of mangroves according to their varieties to supplement livelihood and reduction of climatic shocks	▪ Mangrove varieties with **high salinity tolerance are planted at the level closest to the river.** ▪ Salinity-tolerant mangrove varieties that produce **firewood, fodder, housing & furnishing material, materials for making agricultural & other implements, and food for the community are planted on the upper level**. ▪ Locally suited **multipurpose trees were planted on the back side of the embankments and fodder trees were planted on the inner side**. ▪ **Women groups are formed and capacitated** to negotiate with the local govt. to make protection rules, use, and sharing of produce. ▪ **Regeneration of back mangroves and plantation on mud flats** to check the breaching of the embankment. ▪ The groups are facilitated to raise saplings in their **Nursery.**
2. Formation of Disaster Management Committee consisting of men, women, youth, Panchayat members, and block disaster management officer	▪ This committee is **responsible for preparing a Disaster Preparedness Plan** for identifying evacuation routes, immediate shelters, drinking water sources, rescue operations, food storage, sanitation & health in a participatory way and also for making people aware of the need for disaster preparedness and training them on the measures to be adopted. ▪ They use all locally available systems like public address systems, display boards, etc. for dissemination of early warning. ▪ **Capacity-building sessions** are organized to strengthen the committee.
3. Awareness among the community	▪ **Awareness** is raised among the school children, youth, women, & community through awareness camps, village meetings, fairs, exhibitions, leaflets, graffiti, display boards, video shows, etc. ▪ IEC materials like charts, posters, handouts/ leaflets/ booklets, films, etc. are prepared. These are displayed in prominent places in the village. The film is to show at village fairs and official events. ▪ **Participatory tools are applied for identifying the more vulnerable and comparatively safer zones** in each village and the **safer evacuation routes are identified** to aware the villagers. ▪ **The awareness sessions are focused on the gender sensitivity of those in power** – males in the family, Panchayat members, govt. officers etc. especially at the time of extreme climatic events. ▪ Women in particular are made aware of their **rights to claim entitlements** during a disaster.





Outcome

THE FOREST AT A GLANCE

Total Plantation Area
19,639 ha Mangrove & 5.682 ha MPTs

Total Planted Trees
10,000 MPTs & 54, 700 Mangroves saplings, 21200 Mangroves seeds

Species Varieties of Mangrove
Sundari, Gorjon, Bine, Kakra, Goran, Keora

Native MPT Species
Arjun, Sisoo, Jarul, Blackberry, Tamarind, Neem, Mahogany, Sesbania, Babul, Subabul, Guava, Kadam, Jujuba

Community Members
276

Protection Group
27

- The frequent heavy cyclone and storms adversely affect our project areas by eroding the embankments and increasing the risk of saltwater intrusion, coastal erosion, loss of forest cover, and loss of life and livelihood. **Though these plantations are not older than 3-4 years, they are binding soil. Hence dams, agricultural fields will get protection from drowning.**
- **The MCG members identify the saline varieties species of mangroves and salt-resistant multipurpose trees and prepare nurseries that in the future will protect them from climate change effects.**
- Some arid, saline zones became greener for MPTs, beneficiaries grow some seasonal crops with the saplings that they consume. This program jointly reduces pressure on the forests for construction and firewood harvest.
- The groups are facilitated to manage the plantation starting from raising saplings to protecting them from external factors. The plantation of mangroves and social forestry is very much necessary for the reduction of emissions.
- The awareness programs and mitigation strategies help to withstand climate shocks. The indigenous varieties of seeds and crops have proven effective even after the cyclones which are often faced by our vulnerable communities. We learned that regular coordination and rapport with the local political officials are required for the successful implementation of the project.
- Awareness and sensitization among the targeted groups are

School Awareness Programme: 6
Environment Day Celebration: 10
Water Day Celebration: 7
Earth Day Celebration: 7
Mangrove Day Celebration: 5

important to bring sustainability among targeted groups. For this, we learned that regular follow-up and monitoring are required by the field staff to bring understanding among our beneficiaries for the success of the project.

- Climate Youth Action Group (CYAG) members regularly celebrate events that create awareness among the villagers about climate change and its effect. They make people aware of climate adaptive livelihood and other resilience measures by showing IEC (Information Education & Communication) materials.

Climate Youth Action Group was formed **to ensure the livelihood protection of climate-affected communities in Sundarbans** and **to restorate the ecosystems through active intervention**. The objective of CYAG program is to provide opportunities for real-life learning and practical knowledge with a focus on other life-based skills like observation, inquiry, analysis, self-reflection, communication, etc. They actively facilitate and advocate villagers to get benefit from the Panchayat.

CYAG: 12
Total CYAG participants: 224
Age group of participants: 14-20 years

The Climate Action Youth Group celebrate World Water Day, World Environment Day, Earth Day and Mangrove Day through cultural events like Drawing Competition, Quiz Competition, Street Rally, and Cycle rally, giving a valuable speech on the 'environmental components' to sensitize the participants on 'ecosystem services'. The program attracted the attention of the community in large numbers. It was expected that the same would have an impact on the overall awareness level of the villagers regarding the usage and maintenance of tube wells. It is also anticipated that the messages reiterated through the dissemination would help in bringing about positive change in the standards of good practices among the villagers.

The group organized mass campaigning through IEC material, rallies, and tree plantation along with the community at three blocks Basanti, Hingalganj, and Patharpratima. CYAG members also aware the community on disaster preparedness, like providing early warning.

CYAG at Block Level Workshop

World Water Day celebration

Case Stories

Tress for Multipurpose Benefits

In the 2019 Sonartori MCG of Krishnadaspur village at G plot of Patherpratima, South 24 Parganas showed their interest in the plantation of Multipurpose Trees beside the main road of Majher Colony, their area of living with a few objectives of getting fuel, fodder, shade, and greenery. With the prior permission of Panchayat Pradhan and under the assistance of DRCSC field staff, 12 members of this group started growing a nursery of locally available plants on 15th May 2019. After three months on 15th August 2019, they prepared the soil and started planting 700 saplings in a week. The entire road on both sides was guarded with a net and bamboo for protection.

Cyclones Bulbul, Amphan, and Yash hit them again and again with cyclonic storms or saline floods, or salt showers. Each time members took care of the growing saplings and the net protection. But livestock consumed a lot of saplings, nets, and bamboo had been stolen several times. Later three times gaps have been filled in this linear plantation. So many times, beneficiaries quarreled with the livestock holders when they intentionally send livestock for grazing. Few villagers removed saplings from the row. The majority of the neighbour was against this plantation due to some irrelevant issues. Moreover, watering the saplings in a dry period was a great challenge as members used nearby canal water which is a common resource of the community.

Sonartori MCG members at site

Recently Alstonia plants are infected somehow and their growth has been restricted.

Yet the Woodlots are well foliaged and 7 to 12 ft tall now depending on species, at the end of 2022. Birds became common visitors to this plantation. It checks soil erosion in the canal and acts as a carbon sink. This new fuel and fodder source reduced pressure not only on Mangroves but also on the drudgery of village women for harvesting these from far. The shed of these trees and the breeze provide comfort on hot summer days. MCG members are further planning for food and fruit tree plantation for birds, livestock, and own.

- **Species planted**: Arjun. Mehagini, Jarul, Sisoo, Gama, Subabul, Kadam, Chatim, Banana and Sonajhuri
- **Occupation of beneficiary HHs**: Agricultural labour, Farming, Pisciculture, etc.
- **Area of plantation**: 0.386 ha
- **No. of saplings planted**: 700
- **Survival rate:** 50%

MPT nursery

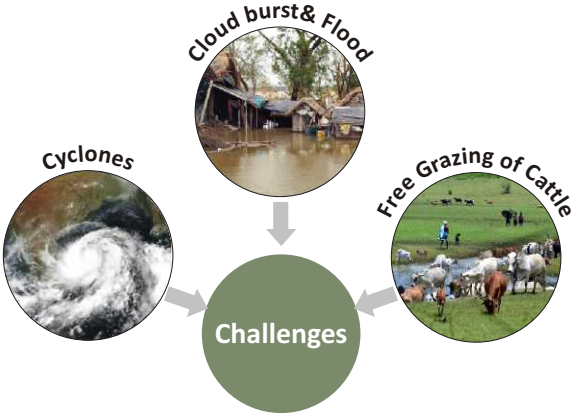
Mangrove Mitigates Environmental Threats

Village 14 no. Sandelerbil	River bank of Raimongal	GP Sandelerbil	Block Hingalganj	District North 24 Parganas

Table: Mangrove plantation details

Name of the MCG	Year of Plantation	Area	Species	Saplings & seeds planted	Height	Survival count	Current	Utility
Asibofire Mohila Samity	Aug 2019	10 bigha	Baine, Kakra, Garjan, Golpata, Keora	17000+5000	1 ft	90%	15-20 ft	Fuel, Fruit (Keora, Golpata), fodder, self propagation
Saraswati Mohila Samity	June 2020	1 Bigha	Baine, Kakra, Garjan, Keora, Goran Golpata	1500	5 ft	33%	10 ft	NA
Saraswati Mohila Samity	June 2021	1.5 Bigha	Baine, Kakra, Garjan, Golpata, Goran	2000	1 ft	80 %	2 ft	NA

Action taken so far:



Mangrove plantation

Mangroves Protect Life and Livelihood from Climate Shock

14 members of the Barakachari Mutual Cooperation Group planted 2000 no. of mangrove saplings at the bank of River Bidyadhari in the year 2020 to strengthen the embankment in the context of rising sea level and to prevent destruction from repeated cyclonic storms. Within 2 days plantation was completed. On an average of 2 ft long Byne, Kankra, Sundari, and Bakul saplings were chosen for this activity. They asked permission from Panchayat for this. The entire area of 1.27 ha was given protection by net and bamboo. "*To save our Aila Bandh we planted mangroves,*" said, Jayesree Mondal, a member of Barakachari MCG. The main sources of income of these beneficiary HHs are agricultural labor, pisciculture, migratory labour, and farming. "*Our farmlands, some of our huts are in vicinity to this Aila Dam. If we can protect the dam, our homestead and farmland will be saved*," said Kausulya Bhunia.

Challenges faced:

- During the time of plantation, their feet were cut in glass bottles of hard drinks thrown on the river bank.
- Goats and lamb consumed some of the growing saplings.
- Net and Bamboo were often stolen by villagers.
- Fishermen destroyed some saplings for their activity at the river bed.
- Due to Venami culture, fishery ponds were built up in some areas destroying young mangroves.
- Cyclones Yash and cloud bursts washed away some saplings.

Output:

- After the loss of so many saplings, Panchayat recruited staff for its protection.
- The river embankment has been strengthened.
- New saplings emerged from the tide and grew all together; they got protection from the net support.
- Now the saplings are about 4 - 5ft tall.
- 80% of saplings survived.
- Species Sundari could not survive probably due to increasing salinity levels in Sundarban rivers.

Mangrove nursery

Action Point - 06

Dissemination of Results and Learning

Introduction

Propagation of knowledge, learning, and its implication leads to the complete success of any projects or interventions. The team of DRCSC converts the implicit knowledge of thefield into explicit knowledge which can be shared and reflected upon to improve the effectiveness of the project and develop a set of guidelines and good practices for our partners, local govt., NGOs, INGOs, and other organizations working in the region so that it does not become an isolated example. Dissemination of knowledge and learning from the project is useful so that it can help others to learn and do instead of extending the initiative by increasing households through another project. The State government often seeks our input on climate-resilient agriculture models for small landholders. The success of these initiatives depends on how credible our knowledge management effort is.

Rational

Participation and sharing of successful measures that contributes towards the climate resilience of vulnerable households.

Meetings are **organized at village and block levels for sharing of knowledge outcomes**.

Measures are taken to aware and educate the community and officials that they can adopt the good practices.

Holding **state-level seminars** and release of **public reports** and to help in shaping development solutions and discourse.

Initiatives

1. Sharing of knowledge outcomes at village and block levels
2. Organizing different inter-state and inter-country meeting
3. Network of grass-root organizations and people's organizations in Sundarban
4. Knowledge products and Website development
5. Mid-term and end-term evaluation plan

Outcome

I. **A good rapport** is built with the respective line departments, other NGOs, reporters, environment experts, etc.

II. **Network meetings** are organized with village representatives, local government officials, PRI members, beneficiaries, etc. The meeting includes an update on the project activities through presentation and discussion on the good practices, knowledge and skill sharing, achievements, etc.

III. The **local government officials showed their interest** in our work and also expressed their views on the effects of climate change which is regularly hit by the various climatic hazards in our working areas.

IV. The beneficiaries also shared their understanding of climate change issues and how the project is helping them to build the resilience of the community and protect them from climatic risks.

V. **Eight clusters** have been formed in the 2 districts and each supervises & manages community resources such as the community seed bank etc. They get involved in helping government projects in the area, especially for environment conservation, frontline mangrove plantation, etc. They look after assets and facilities created and provide various services to MCG members.

Network meeting: 19
Block Level workshop: 4
Exposure visit: 3
Exchange visit: 17
Wall writing: 50

VI. Empowered MCGs **spread awareness** regarding the causes and impacts of climate change and the possible ways to build climate resilience to the communities living in the hamlets much beyond their periphery.

VII. Throughout the project, the team has tried every possible opportunity for propagating the work and spreading the message of climate-resilient livelihood and saving natural resources.

Wall writing project village


Network meeting

Rally on block level workshop


Exchange visit

Farmer's Voice

Renu Halder

Bhasapara, Basanti, South 24 Pgs

We resided in a wet, saline land where good production of crops was impossible, but after keeping faith in organic manures without using chemical fertilizers the land is now changed and we are producing nutritious, tasty vegetable & other crops.

I am an inhabitant of Bhasapara village in Jyotishpur Gram Panchayat of Basanti Block, South 24 Pgs., West Bengal. The village is situated near Bidyadhari River; hence saline flood & other natural hazards are very common. We carried on to live our life with small patch of homestead land & agricultural land by cultivating vegetables and paddy with hybrid seeds and chemical inputs.

In 2011, I became a part of Mutual Cooperation Group of DRCSC and received trainings on sustainable & ecological farming. I got sensitized about different methods of organic cultivation, sustainable techniques, bio-pest repellent methods using locally available materials. The local level personnel from the organization continuously motivated me and I took the challenge of cultivating vegetables in my 0.3 acre of land without chemicals. I was supported with compost, vermi-compost to apply in the garden and also collected farmyard manure to add in soil before planting seeds. The seeds which we plant are all indigenous and supported either from the organization or saved by us. In the paddy field I applied wood ash and pond slime to remove the salinity in the soil.

Meanwhile, after having discussion with the personnel from the organization and taking ideas we have developed a technique and changed the shape of our land of 0.165 acre. In this land we have developed drains and pond and in between that raised lands are there for cultivating vegetables. The drains and ponds are used for fish cultivation. We have developed this model for last 1.5 years and cultivated vegetables round the year. Most interestingly, we got to know about the effective use of trellis over the drains as well as use of land embankments for utilizing every space optimally. We have planted radish, kohlrabi, spinach, red amaranth, beetroot, lablab beans, ridge gourd, pumpkin, bottle gourd, tomato, okra etc. We also planted taro in the border along with yardlong beans, chili, brinjal etc. In the lands we have applied cowdung & FYM collected from nearby areas. In the drains & ponds mainly *tilapia* fishes and Indian Major Carp (IMC) like *rohu, catla* etc. are cultivated. We have learned to use mulch with straws, leaves etc. which will decompose further in monsoon and keeps moisture off in summer months as well. The utility of applying such kind of technique like cultivating vegetables in raised beds, pisciculturein drains, using trellis, cultivation in sacks, use various pest repellent methods etc. reflect in overall crop production. The integration helps to develop many subsystems, where if any one subsystem fails, we can get production from other system.

In addition, I grow azolla in cement made container which is utilized for fish feed and chicken feed as well. I have one cow, 7 ducks and 22 chickens. I got the support for Hen house too.

I am now able to grow, sell, distribute and consume various crops. Last year I got profit of approx. ₹ 5000/- from vegetables and ₹4000-5000/- from fishes. I want to disseminate skills & techniques with other people. Further we need to conserve and produce a greater number of saline tolerant crop species for long term production.

Farmer's Voice

Sonamuni Munda

Lebukhali, Hingalganj, West Bengal

My 3 sons have to stop their education due to severe cyclonic storm Aila. I resided near the embankment of river Kalindi and often natural hazards put us in stressed condition.

I belong to Adivasi family & did not have much exposure on farming. I live with husband in a small place at Lebukhali village surrounded by rivers. My sons are working in Kolkata. My husband occasionally migrates to Karnataka during paddy transplantation and also in Kolkata for daily wage labour work. We did not have any farm land. My living condition was vulnerable to natural calamities. During heavy rainfall, river water overflows and enters into my homestead. Frequent cyclones destroyed many fruit trees. The garden soil and pond water are very saline. There are uncertainties of rainfall and soil gets hard and tough for cultivationduring the summer.

After the cyclone Aila, fortunately I involved with Development Research Communication and Services Centre (DRCSC). Me and my fellow neighbours, spending our life facing many difficulties, eventually motivated to form Mutual Cooperation Group (MCG)and exposed to several kinds of trainings and capacity building sessions due to regular engagement with personnel from the organization.

I used to cultivate vegetables in my 5 katha (0.08 acre) with chemical fertilizers, pesticides, hybrid seeds and focused on mono-cropping with one or two vegetables. After getting training and attending handholding sessions I started to develop my garden following sustainable agriculture techniques since 2018. I planted the seeds in the raised beds prepared in the garden and practice mixed cropping, used the multitier concept with trellis, land dykes, use of container or sacks etc. Further I got oriented about preparing compost manure and using different pest repellent methods like neem oil, solution from tobacco leaves etc. I tried my best to use the best available space in my homestead to cultivate a mixed variety of leafy & fruit vegetables, legumes, pods, herbs,spices, roots & tubers etc. for monsoon and winter season.

During the winter months there is shortage of water for cultivation. As the soil is saline in nature the garden area become uncultivable. To cope up with this I have installed rain water harvesting structure in 2018. The water harvested in the structure is used to irrigate winter vegetables and further catfish is also cultivated in that structure.

In addition to the vegetable garden I have 6 nos. of hen and 10 nos. of pigs respectively. My family is rearing pigs and hens since long time.I got support to develop house for hen rearing. The good part is, earlier the hens are exposed to various diseases when roaming outside the home. But in the shelter the occurrence of disease is minimized. I have learnt to culture azolla (a kind of aquatic weed) which is a good source of feed for the hens. After feeding azolla, the laying of eggs get better.

Now I do not need to buy any vegetables from market and consume only safe, nutritious vegetables from my own garden. Even eggs, meat are also consumed from house. In the surroundings there are no such vegetable garden and unfortunately during the peak harvesting time, the vegetables are stolen from my garden. I am happy that in a small place I raise the garden and arrange food on my own, but as the soil is saline, it requires more time to wipe out the salinity. More mud soil and slime is required along with compost to recover the fertility of the soil.