

# ENSURING FOOD AND NUTRITION SECURITY IN CLIMATE FRAGILITIES AND DISASTERS: THE 31 INSPIRING PRACTICES





This good practice compendium is an outcome of 'the Map and Exchange Good Practices (MEGP) Initiative' jointly led by National Institute of Disaster Management (NIDM) and United Nations World Food Programme. Climate change has significantly altered the disaster risk landscape in Asia. Disasters are more frequent and severe now and calls for urgent need to resort to more innovative approaches in disaster management lest it overwhelm the collective capacities of humanitarian agencies to respond to urgent humanitarian needs.

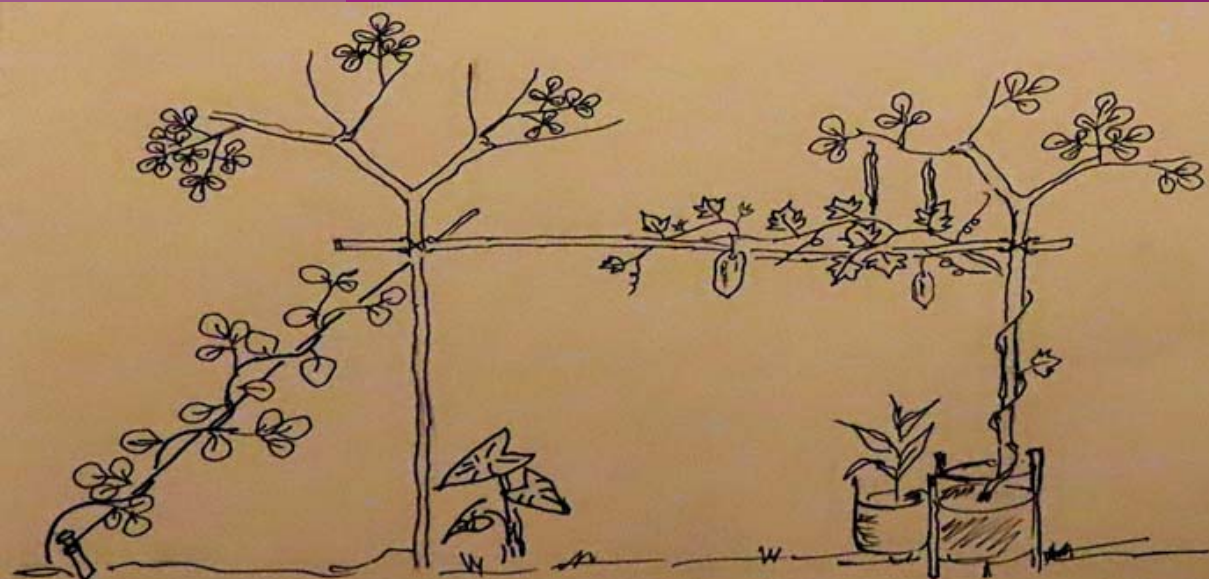
NIDM and WFP joined hands together to mainstream the agenda of food and nutrition security in India's emergency preparedness and response. Impacts of climate change and disasters on Food security and nutrition are significant. Disaster disrupts all critical dimensions of food security and nutrition, including physical and economic access, availability, and utilisation. Climate fragilities can lead to even more catastrophic and long-term impacts.

Knowledge sharing and co-learning platforms have great potential to fast-track policy and practice reforms. With sectoral focus on food security and nutrition, the MEGP initiative reached to a range of Asian stakeholders including grass root practitioners, NGOs, private sectors and government departments to identify proven solutions from across the spectrum of humanitarian, DRR and climate change adaptation.

This book collates good practices and innovative solutions that have succeeded in addressing complex problems around food security and nutrition and offers potential for replication and scale-up. The case stories illustrated here will interest range of audiences including humanitarian practitioners, policy makers, researchers, innovators, private sector, donor agencies and government officials committed to foster support to grass root innovations.

# Ensuring Food And Nutrition Security in Climate Fragilities And Disasters: The 31 Inspiring Practices

Map and Exchange Good Practices (MEGP) Initiative





## Ensuring Food and Nutrition Security in Climate Fragilities and Disasters: The 31 Inspiring Practices

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## FOREWORD

Climate change may be global, but its impacts are unequally borne by people across the world. Although, communities are at the receiving end of the detrimental climate change impact, decades of calamities have manifested how the most under-resourced are pushed into the abyss and thereby escalating their vulnerabilities. Further, disasters and crisis situations have their influence on the food systems across the globe and are among the most tangible repercussions of climate change. Being one of the most densely populated countries, India faces an even bigger challenge in terms of developing coping mechanisms and strategies to combat such humanitarian crisis. Although in India, the recent surge in the occurrence of disasters is being treated as a “wake-up call” to take appropriate actions against climate change, for many communities, hazards and disasters have been a part and parcel of their lives which makes their journey of survival arduous. Droughts and floods are amongst the most pervasive kinds of disasters in India that has directly affected our food systems. As per a recent report by Intergovernmental Panel on Climate Change (IPCC), it is envisaged that India would face strong heat-waves and erratic rainfalls more frequently in the coming years. The agricultural reparations due to these disasters account for almost 1/4<sup>th</sup> of the economic losses followed by food shortages.

India has witnessed some major famines since the 1300s, droughts since the 1900s coupled with cyclones, floods, epidemics and pandemics throughout which hunger and malnutrition have always been a constant companion. Food production, availability, and accessibility during such times is hampered and becomes an important factor contributing to the increased mortality rates. Indian Government as well as agencies like the United Nations have been working relentlessly to fight such crisis. The Sustainable Development Goal 2 and Goal 13 on Zero Hunger and Climate Action respectively lays down some very significant targets and indicators provoking us to re-think our actions towards sustainable use of resources.

Combating climate change and induced disasters as well as building resilience appears like a long-term vision, challenging and uncertain however, something that falls under our control is adapting towards the risks associated with these challenges. The Map and Exchange Good Practices (MEGP) Initiative as a result of the collaboration between the National Institute of Disaster Management (NIDM) and the United Nations World Food Programme (WFP) takes us through a journey of various strategies that different communities across Asia have applied so far to integrate the components of disaster risk reduction and emergency preparedness to mainstream food and nutrition security in the realm of Disaster Management.

(Nityanand Rai)

New Delhi  
25<sup>th</sup> May, 2022







**Maj. Gen. Manoj Kumar Bindal**  
VSM  
Executive Director



राष्ट्रीय आपदा प्रबंधन संस्थान  
(गृह मंत्रालय, भारत सरकार)

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## MESSAGE

Time and again, the risk associated to Climate Change have proved to be one of the most important drivers directly and indirectly impacting the lives and livelihoods of millions across the globe. Among the various implications of climate change and disasters, one of the worst affected is the process that underpins food security. In this regard, Case Studies have overtime facilitated in providing an all-inclusive and unbiased perspective by exposing the related on-ground situations. I would like to extend my sincere appreciation and congratulate the NIDM and WFP team for their initiative in mapping 31 such Case Stories from across Asia and bringing it out as a compendium.

For ages, India's strategy of responding to disasters came from a relief-oriented perspective. However, the recent Disaster Management Framework goes beyond rescue and relief strategies and also emphasises upon prevention, mitigation and preparedness. The Disaster Management Act, 2005 as well as the various Reforms and Initiatives in the Public Distribution System has laid down clear management and operational goals with demonstrated results.

Despite of these mandates, the unpredictability of a disaster risk often makes the coordination between the responders (both government and non-government) and the survivors tenuous. In terms of food security, the survivors often experience challenges like surge in food prices, lack of storage facilities, socio-cultural differences, unequal distribution of food etc. Therefore, the affected communities become the first responders formulating their own coping mechanisms to survive a crisis, emergency or a disaster.

The publication of this compendium identifies agencies, communities and individuals and their exertions in ensuring food security and nutrition in emergencies that are innovative and inclusive. It goes in tandem with the current Disaster Management Framework and will be a great source of reference to improvise and build upon the framework and related mandates. I would like to thank the various organizations and institutes who have contributed to this compendium and the communities whose struggle will pave way for revolutionary changes in the field of Disaster and Food Security.

(Manoj Kumar Bindal)





World Food Programme  
Programme Alimentaire Mondial  
Programa Mundial de Alimentos

SAVING  
LIVES  
CHANGING  
LIVES



## MESSAGE

I would like to congratulate the team at NIDM and WFP for publishing this inspiring report which recognises the extraordinary efforts taken by agencies and individuals in the last mile to improve food and nutrition security of the vulnerable communities affected by the shocks of disasters and climate change.

The direct impact of disaster and climate change on food security and nutrition is humongous. To achieve the SDG goal of zero hunger, a more scientific and innovative approach needs to be adopted across the spectrum of humanitarian, DRR and climate change action. This compendium succinctly brings some of the proven practices from across Asia and offers a great opportunity of learning and replication. The processes adopted under this initiative was to map and exchange good practices. The support from the humanitarian networks and alliances from Asia, in this endeavour, is commendable and affirms faith in the spirit of partnership and cooperation and we thank everyone for their engagement and contributions.

Amidst the current climate crisis, these innovative solutions, gives a glimmer of hope that a transformational change can be catalysed through such grass root initiatives and local actions which can inspire policy and practice reforms at national and global levels in building resilience of people most at risk of disasters. This also provides an opportunity for countries to contextualize and scale-up such initiatives that benefit their people the most.

This report will go as a useful tool not only for the practitioners working in the grass roots to help vulnerable communities build absorptive, adaptive, and transformative capacities but also for the policy makers committed to mainstream the agenda of food security and nutrition in humanitarian and climate actions across India, the region and global community.

WFP is committed to support, the capacity strengthening roadmap on food security and nutrition in Asia which culminated as a major area of discussion in the regional discourse led by NIDM, Government of India. Such platforms of co-learning bring greater depths in the collective endeavour of combating global hunger. The report may have captured stories only from Asia, but I am sure, it is going to ripple inspiration across the globe.

**Bishow Parajuli**

WFP Representative and Country Director, India



## — ≡ ≡ ≡ ACKNOWLEDGEMENT ≡ ≡ ≡ —

This compendium on “Ensuring Food and Nutrition Security in Climate Fragilities and Disasters: The 31 Inspiring Practices” is the outcome of NIDM’s collaboration with the United Nations World Food Programme (WFP) to foster support for good practices in Food Security and Nutrition.

The Map and Exchange Good Practices (MEGP) Initiative received a total of 55 applications. We extend our sincere thanks to each applicant who showed enthusiasm in participating and supporting this initiative. Your participation played a major role in making this initiative a success. Documentation of these learnings will be useful for the policy makers and practitioners who are committed to mainstream the agenda of Food security and nutrition in emergency response DRR and climate change adaptation

Our initiative was bestowed with an esteemed panel of Jury Members without whom this initiative wouldn’t have been possible. We would like to extend our gratitude to Mr. Hari Krishna (Mentor, MIT Climate Colab and UNSSDN), Mr. Shailendra Yashwant (Senior Advisor, CANSA), Maj. Gen. Manoj Kumar Bindal (Executive Director, NIDM), Prof Janki Andharia (Dean, Jamsetji Tata School of Disaster Studies), Mr. Nicolas Bidault (Senior Regional Advisor, WFP), Ms. Anusara Singh Kumar Wong (Regional Nutritionist, WFP), Mr. Arvind Betigeri (Senior Rice Fortification Officer, WFP) and Prof. Santosh Kumar (Head, GIDRR Division, NIDM) who firstly consented to be a part of this initiative and took out time in evaluating these applications Their support and guidance moulded this initiative to what it is now. It was an honour to have the jury members on board for this initiative.

We would like to extend our appreciation to networks including the U-Inspire Alliance, Sphere India and the Global Network of Civil Society Organisations for Disaster Reduction (GNDR) for their persistent support in popularising the “Map and Exchange Good Practices (MEGP) Initiative” and connecting us with many stakeholders across Asia.

We would like to sincerely thank Dr. Nuraini Rahma Hanifa (U-inspire Alliance), Ms. Shivangi Chavda (GNDR), Mr. Vikrant (Sphere India) and Dr. Hena Hejazi (Sphere India) for their cooperation and prompt coordination which helped us in reaching out to a large number of applicants within and outside the country.

We also extend our appreciation to Mr. Romi Mukker and Ms. Taru Bahl who helped us in shaping each case story to its current form. This compendium wouldn’t have been possible without their active coordination and support.

Lastly, the development of this compendium in digital format wouldn’t have been possible without Shri Surendra Thakur, Consultant & Admin Incharge (NIDM) and the NIDM printing team. We extend our sincere thanks to Mr. Santosh Tiwari (Librarian), who is heading the printing team as well as Ms. Sonali Jain (Jr. Consultant) and Ms. Karanpreet Kaur (Jr. Consultant) for their patient coordination and support for moulding the compendium into its current format.





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## INTRODUCTION

### Background

Climate change is among the leading causes of rising global hunger<sup>1</sup>. Needless to say, the World is experiencing higher frequency and intensity of climate induced disasters, posing a greater threat to humanity. More than 80% of food insecure people in the world live in disaster prone and degraded areas. Hunger and food insecurity are one of the major impacts of disasters as it creates impediments including economic and physical access to food, its availability and stability of supplies. With the significantly rising climate fragilities and on top of it the projected impact of pandemics such as Covid-19 on food security and nutrition, it will be difficult to chase the 2030 goal of zero hunger sans aid of disruptive innovations and approaches.

Asia is more exposed to physical climate risk than other parts of the world. In the absence of adaptation and mitigation, as per an estimate, by 2050, 600 million to 01 billion people in Asia will be living in areas with a nonzero annual probability of lethal heat waves. The region may also experience more than 5% grain yield decline relative to today, in absence of adaptation and mitigation measures<sup>2</sup>. Thus, making the region even more vulnerable to food insecurities due to climate change.

It is important for countries like India, with a diverse climatic zones and exposure to disaster risks, to take adequate measures for mitigation. The effort to ensure food security and optimum nutrition during disasters have been carried out over the years and there are plethora of existing solutions and forgotten practices which can potentially address complex problems at the grass roots. Rather than reinventing the wheel, such solutions can always be adapted and adopted to reap quick dividends in these times of climate emergency.

### Structure of the MEGP initiative

The National Institute of Disaster Management (NIDM), India and the United Nations World Food Programme (WFP) India together launched “the Map and Exchange the Good Practices (MEGP) initiative for Food Security and Nutrition in Climate Fragilities and Disasters. The initiative aimed to fosters support for good practices in Food Security and Nutrition for its replication and scale-up by providing a bridge platform for diverse stakeholders including key Government departments. The objective of the initiative was (a) to establish a platform that enable learning exchange, replication and scale-up of proven practices in the field of food security and nutrition and (b) improved institutional capacities for food security and nutrition response in emergencies.

The initiative invited stakeholders from civil societies, NGOs, academia, private sector, Government agencies and others from across Asia to share their proven solutions with

<sup>1</sup> FAO, IFAD, UNICEF, WFP and WHO. 2018. The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition. Rome, FAO.

<sup>2</sup> McKinsey Global Institute. 2020. Climate risk and response in Asia. 2020

demonstrated results in field to submit their entries through an online application under following categories:-

1. Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters
2. Improving Emergency Preparedness and Response - Food Security and Nutrition

In addition to above categories, it was stated that the application should fit into one or more of the following sub-categories:-

1. Inclusion: (Leaving no one behind. Solutions that target the most marginalised)
2. Thematic Relevance: (Food Security and Nutrition in emergency)
3. Governance: (Responsive system of Governance and Management aimed at food and nutrition security)
4. Community Engagement: (Active participation of the community; community leadership)
5. Use of Technology (Innovative use of technology addressing food security and nutrition, including improved availability, access, stability and utilisation).

## Methodology

### Eligibility Criteria

The organizations and practitioners from Governmental or non-governmental or multi-lateral and private sector were encouraged to participate with a case story of the intervention that has been Conceptualized and implemented in some geography. Solutions at conceptual stage were not considered eligible. The entries were invited from within Asia.

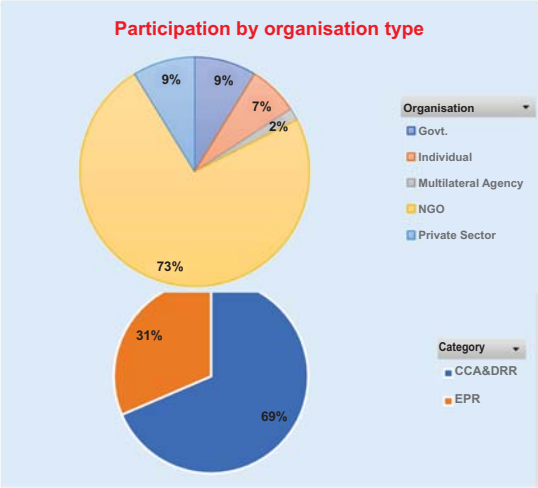
The initiative further emphasised that the solutions and good practices must be compliant to the core humanitarian principles of humanity, impartiality, independence, and neutrality and should adhere to widely accepted codes of conduct, commitments and core standards. It also aimed at documenting forgotten practices particularly the traditional and indigenous community practices and tried to reach out to practitioners, organisations and individuals who are working for the revival of such practices to share their experiences through this initiative.

### Outreach Strategy

In addition to the usual channels of online dissemination including the NIDM websites, twitter, facebook and other portals for disaster management community, outreach strategy was also planned to reach out to wide range of stakeholders. Orientation meetings for civil societies and NGOs in Asia through Global Network of Civil Society Organisations for Disaster Reduction (GNDR); Orientation meetings for Humanitarian networks through Inter-agency group and the Sphere network, virtual meetings for youth and young scientists through U-inspire alliance and state governments and government stakeholders through regional consultations.



A total of 54 valid entries were evaluated. Applications were received from 05 countries with most the application from the Indian subcontinent. Out of these applications, 31 solutions are included in this compendium. The compendium also includes an additional story from WASH which indicates potential synergies with other thematic sector including F&NS. 73 percent of the application were received from the NGO sector and around 69 percent from category one and 31 percent from category two.



**Evaluation Methodology**

Evaluation of the application were done by an esteemed panel of juries which included a very distinguished panel members with significant contribution in Asia, in the field of Humanitarian, DRR and Climate Change Adaptation. The distinguished panel members drew experience of working in different sectors including from government, academia, NGO and UN agencies. The details of the panel of jury members are annexed.

**Evaluation criteria**

The applications were reviewed on the following evaluation parameters: -

SN	Evaluation Parameters	Description
1	Thematic Relevance	Food and Nutrition Security in Climate fragilities, Disasters and Humanitarian response focusing on availability, access, utilisation and stability
2	Innovation	Novel, offers new solution to a vexing problem, fills a major gap, improves on an existing solution, acceptable in socio-cultural context
3	Practicality	Result oriented, simplicity, Cost effective , User acceptance, Return on Investment

4	Inclusion	Targeting most vulnerable & marginalised/ excluded group; adaptable and accommodative, Gender Sensitive
5	Impact	Demonstrated Results (output to impact); evidence/ indicators. Solves a complex problem
6	Sustainability	Replicable model, acceptance, integration, cost effective

### Evaluation Phases

1. **Pre-screening:** Pre-screening of all the received applications were done by the project team based on the thematic relevance, review of evidence presented by these case stories and review of validation links provided by the applicants which included project photographs, reports, published articles, data sources etc. Based on the pre-screening, 31 stories were recommended to the panel of juries for a detailed evaluation.
2. **Evaluation by Juries:** based on the recommendations from pre-screening phase, Jury members were requested to evaluate the 31 stories on the agreed evaluation parameters. Based on the cumulative scores, 08 finalists were shortlisted.
3. **Finalists' presentations:** based on the cumulative scores from the juries, 05 finalists from category one and three from category 02 were invited for a presentation and discussion with the panel of juries. Following the presentation and discussion, the juries, recommended one case story from each of the two categories for the juries' award.
4. **Validation:** validation were done at two stages. All applicants were requested to share atleast three validation sources for their work, which could be report, published articles, field photographs, datasets or any other acceptable evidence for validation. At the pre-screening stage, these validation links were reviewed by the project team, based on which the applications were shortlisted for further evaluation. The second stage include the ground validation, which was done for the two winning applications recommended by the Juries for the Juries' award. These applications were, "the Mangrove food bar - Philippines" and "the sack gardening - Bangladesh." The ground validation for these two stories were done by WFP team through field visit and interaction with the project team associated with these applications.



## CATEGORY - 1

**Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters**







## Sack gardening in flood prone areas of Northern Bangladesh

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Bangladesh



*A simple yet promising agricultural innovation in vulnerable households of flood-prone areas of northern Bangladesh promises abundant agri produce and diet diversity for those who lack arable land and space for gardening.*

### Target population

Floods are a common phenomenon in the char lands of northern Bangladesh. Their frequency and intensity are increasing as a consequence of climate change. In recent years, four to five spells of floods occurred in most char areas with prolonged inundation period. Resultantly, huge tracts of field crop and homestead vegetables got damaged and farmers lost food and money.

In 2018, sack gardening was introduced in villages of Teesta River Basin where RDRS is implementing the REE-CALL 2021 project with the support of Oxfam. As part of the initiative, 20 demonstration plots were established in seven villages of Kaunia Upazila of Rangpur district where villagers experience severe flooding every year, facing difficulty growing vegetables in the monsoons in cropland and homestead. Initially 20 women farmers were selected from 17 groups with each farmer preparing five bags in April/May to grow mostly creeping/climbers and herbaceous vegetables that were harvested June onwards to meet the family's requirements and earn an extra income by selling in the market.



## Problem

Every successive year, villages in Northern Bangladesh get inundated with floods. Lives are lost, cattle destroyed and livelihoods impacted. Ready crops get washed away, pushing families in a vicious cycle of debt, hunger and disease. For marginalised agricultural communities surviving on seasonal vegetables, floods are the worst weather demons. A single flash flood can devour their hard-earned labour, leading to a rise in price of vegetables and compromising their nutritional security. During monsoon months, losses get further magnified when crops are destroyed and there are national-level shortages.

Due to climatic changes, the entire riverine belt has been prone to frequent flooding. In 2020, three phases of floods damaged standing crops on 42,055 hectares of land leading to production losses of 1,49,416 tonnes of crops worth Tk 499.16 crore in Rangpur agriculture region (BSS, 2 November 2020). This had a ripple effect on price of vegetables across the country with supply chains disrupted. Communities struggled to find solutions. While some migrated from areas where riverbank erosion was severe, others elevated their homesteads. However, there still remained thousands with nowhere to go and were consigned to a life of poverty and despair.

## Solution

Sack gardening is a solution to lack of arable land and spaces that get impacted during floods. All they have to do is fill a bag or sack with soil and place a hollow cane, bamboo or plastic pipe in the middle and fill it with rocks or brick chips and small stones. Presto! the bag turns into a 'bag garden' while a scientific principle converts the pipe into a cost-effective watering system. Once the area around the cane gets filled with soil and organic fertilizer it gets pulled up, letting stones fall out of the bottom and get entrenched in the middle of the dirt. The can is placed atop the rock centre and refilled. By piercing few holes in the sides of the bag, air filters in to let the plant breathe. Fresh or transplanted seeds are inserted into the holes and the hung garden owner settles down to wait and watch his/her seeds sprout and grow.

## Results

The result of initial 20 demonstrations of sack gardening keeping availability of nutrient rich vegetables in monsoon period was remarkable. The cost of each plot was less than Tk. 1,000, but its production was more than what the family needed. So, each family sold additional vegetables to neighbours and local market valued at approximately Tk. 3,000.

The concept of sack gardening brought immense hope and promise at a time when communities were drowning in the maze of floods and their aftermath. It assured a low cost-high yield value proposition, addressing multiple concerns. It is seen as an innovative and simple technology that offers a magic bullet solution for those who do not own arable land and lose available spaces post floods. At homestead level, it provided a raincoat against unpredictable rains and ensured stock of grains did not run out. It brought with it hope, wherein they could now see themselves transitioning from being poor and landless to being more prosperous and healthier.

## Replicability

Building on this success, the following year, in 2019, about 60 demonstrations, including 20 from the previous year were established in 20 villages. Each family earned a handsome average of Tk. 4,000. In the third consecutive year, in 2020, RDRS replicated sack gardening in the Sustained Opportunity in Nutrition Governance (SONGO) project funded by EU. It was implemented in six Upazilas of Kurigram and Gaibandha. A total of 162 demonstrations were established in 18 Unions with excellent results. In 2021, over 1000 farmers adopted sack gardening with support of the project and Department of Agriculture Extension. In another project, the Transboundary Flood Resilience in South Asia, 216 demonstrations in 24 flood prone unions of Kurigram and Lalmonirhat districts adopted the concept benefitting over 400 farmers.

As in any new activity, there have been challenges in adoption and adaptation. An unexpected level of flood and heavy rainfall meant families getting uprooted. In such a scenario, finding a safe home for the hanging sack/bag/pot was a complex task. Choosing the right plant or vegetable in consultation with agricultural extension agents was important but not all families could build rapport due to language and other barriers. Even when the plant gained a firm foothold in the bag or pot there was fear of it being washed away in the next flash flood or being devoured by cattle. The onus of protecting their sack garden therefore fell on the family. Seeing the success of those who managed to grow and benefit from their produce was a motivating factor for families still struggling to get the process right. Women particularly became adept at managing this latest addition to their extended kitchen and homestead area.

What made this concept unique is its replicability. Anyone in the char lands of Northern Bangladesh can benefit from hung gardens. They can be adopted by those who do not have enough arable land or have lost their earmarked agricultural space due to flooding. With hung gardens gaining popularity and creating an aspirational value that is within the reach of humble farmers, the desire to relish a good harvest is now a reality, even for those worst affected in a climate change crisis.

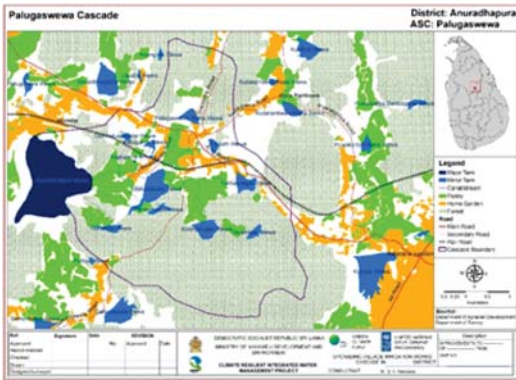


## Save The Planet: Then Lives and Livelihoods - A Case Study of Climate Smart Agriculture in The Dry Zone of Sri Lanka

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Sri Lanka



*An abandoned cascade-based, environment-friendly and integrated land-use model has helped restore the abandoned cascade ecosystem, emerging as a novel adaptation technique to combat the ever-changing threat of climate change and to increase paddy production by 60%*

### Target population

Sri Lanka’s dry zone contributes to the production of nearly 70% of its rice. Farmers in Sivalakulama and Palugaswewa cascades of Anuradhapura district struggled for generations adapting to changing climate and to paddy production, which is increasingly threatening food security. The deterioration of the tank ecosystem, which was a great adaptation intervention in ancient times, is contributing to this decreasing trend in food production.

In 2017, a multistakeholder effort restored the two cascades to secure availability of irrigated water for cultivation in the dry period, securing livelihoods and supplementary food needs in the long run while ensuring the ecosystem’s sustainability. The approach was piloted with a target group comprising 1,703 small-scale farming families of Sivalakulama and Palugaswewa cascades. Most farmers were initially sceptical of the downscale weather advisory system-based cultivation practices and expressed their inability to bear the cost of adapting to new technologies. The project however provided financial support and brought a wealth of knowledge that can now be passed on to future generations<sup>3</sup>.

### Problem

The tank cascade system, built in ancient times, was a highly effective method for paddy cultivation in the dry zone giving it the reputation of being the Granary of the East. These were one of the most efficient water management systems in the world where water was stored, preserved and used for agricultural purposes. The system was managed through

<sup>3</sup> Climate Resilient Integrated Water Management Project | UNDP in Sri Lanka

ancient customs which unfortunately deteriorated over time. Many small tanks within the cascade system got damaged and abandoned. With rapid population growth, economic and market changes, modernisation and development pressures, land use pattern in the dry zone underwent rapid change leading to encroachments. With commercialisation, indigenous and sustainable agricultural practices got replaced with intensive and environmentally-unfriendly agricultural practices. Good water governance practices too disappeared, leading to acute water security.

### **Solution**

A tank cascade system-based, environmentally friendly and integrated land use model emerged as a perfect solution to restore upper catchment areas of the selected tanks in Palugaswewa and Sivalakulama cascades. Preliminary discussions and participatory rural appraisals were conducted with villagers engaging in cultivation in upper catchment areas with and without proper land ownership along with relevant authorities and departments. Consensus was arrived at and demarcation of catchment areas done. As a result, nearly 410 acres were restored with plantation of forest tree species.

A multistakeholder engagement brought together the farmer community, farmer organisations, civil society representatives and government technical and administrative institutions who adopted a holistic approach with seamless integration of roles and responsibilities. Perennial crop varieties were added to bring back the green cover of catchment areas. Cultivation of short-term varieties, promotion of soil conservation methods and zero tillage practices were some of the climate change adaptation practices introduced to improve the soil condition. Chemical fertilizers got replaced with organic fertilizers and modern and efficient irrigation technologies such as drip irrigation systems with solar water pumping. Cultivation in poly tunnels was taken up to utilise vertical spaces. A downscaled weather advisory system was brought in to facilitate improved cultivation decisions. Farmer societies and other community groups were mobilised and their capacity was built to take collective water management decisions.

Scholars of ancient technology have affirmed inter-societal transfer of technology between the hydraulic regions of Sri Lanka and South India in pre-colonial times. Indeed, it is a template for revival of traditional cascade tanks for achieving food security. Moreover, weather advisory service-based crop management, climate smart technologies such as solar water pumping systems, irrigation technologies and crop insurance schemes offer attractive potential for replication in the region.

### **Results**

The new model successfully packaged the traditional cascade system that relied mostly on water management for its output, with other practices, technologies and systems. This helped tackle changing climate around the efficient water management such as downscaled weather advisory system-based cultivation practices, introduction of climate resilient crop varieties and organic agriculture, crop insurance and multi-cropping.

The restoration of the two cascades contributed to food security with potential to secure future generations of small farmers. More than 39% income of farmers saw a rise since 2018. The adoption of ecological farming practices enhanced vegetable and fruit



production by nearly 50% with nearly 27 kg vegetables and fruits being produced by each farmer on monthly basis. More than 352 acres of encroached land was restored with 69,000 perennial fruit trees and 47 km of erosion control bunds resulting in reducing soil erosion in 237 acres of agricultural lands in direct catchment areas of the tank cascades increasing their water retention capacity. Finally, the supply of irrigated water to 1,624 acres of paddy lands led to production of 3,340 tons of paddy in each cultivation season.

A simple intervention like issuance of agricultural advisories and weather forecasts mitigated challenges posed by climate change and rainfall variations, improving cropping intensity in the tank cascade system from 0.8 to 1.47. Use of solar water pumps brought about significant reduction in greenhouse gases. Active participation of marginalised groups such as women, specially challenged people and children ensured the process was owned by the community. Local farmer markets that got established were linked to private buyers through forward sales agreements creating a win-win for all.

### Replicability

There was initial resistance on part of farmers and government officials to adopt the new agricultural models and technologies. They were not entirely convinced about basing their cultivation decisions on downscaled weather advisory systems. Awareness and exposure sessions combined with capacity building and introduction of risk minimising measures such as crop insurance alleviated their concerns.

The cascade system based environmentally-friendly integrated land use approach was novel to small holder farmers who had for generations engaged in conventional farming practices. It rekindled native wisdom where scholars of ancient technology affirmed inter-societal transfer of technology between hydraulic regions of Sri Lanka and South India. Going forward, the same can be replicated in tank systems dotting South India given the dispute between Karnataka and Tamil Nadu over the Cauvery waters and revive thousands of abandoned tank cascade systems that exist in Sri Lanka and South India.

Practices such as weather advisory service-based crop management, climate smart technologies such as solar water pumping systems, irrigation technologies and crop insurance schemes can be replicated with these comprehensive and integrated models that offer holistic solutions to sustainably restore cascade eco systems for food security.



## Women Champions as Organic Change-makers in PDS Public Affairs Centre

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*While building a resilient and disaster-proof Public Food Distribution System women self-help group champions from within the community adopted the “3A Framework of Awareness-Advocacy-Action” to question gaps in PDS and strengthen food security of the marginalised population.*

### Target Population

Extreme climatic conditions, disasters and global pandemics impact all sections of society. However, it is the marginalised population comprising of cardholders of Annyodaya Anna Yojana or AAY (2 crore families and below poverty line of BPL (21 crore families) who are among the first to be affected. Since most BPL & AAY cardholders are solely dependent on Fair Price Shops (FPS) for their food and nutrition requirements, any leakage and gap in the system threatens their food security most. Limited access and knowledge to digital sources create limitations in their ability to escalate grievances during humanitarian and other disasters.

In Karnataka, one crore households comprise of BPL cardholders and 10 lakh AAY cardholders who account for 14% of the total state beneficiaries belonging to priority

households. Given the role women self-help group (SHG) members play as key drivers of change in the PDS, the intervention was implemented in 30 districts of Karnataka to empower marginalised communities so they could voice their concerns through systematic channelling.

### Problem

The PDS is known to suffer from an inefficient redress system which has maximum impact on marginalised households, threatening their food security severely. There was a lack of opportunity in the current system to voice concerns of the 'poorest of poor' beneficiaries. The scenario either remained the same or worsened, aggravating food insecurity of nearly 23 crore families across the country.

In case of natural disasters or a global pandemic, addressing grievances of these marginalised households then becomes a priority that can be effectively mandated by champions from within the local setting. A systematic process of training and awareness generation among them can be ensured through a cadre of trained Citizen Monitors.

### Solution

Empowering communities to undertake effective monitoring and redress of grievances through consultation and advocacy with stakeholders is a proven solution to address legacy issues in democratic institutions like PDS.

The Public Affairs Centre (PAC) designed an intervention that aims to create and utilise champions from the community for a sustainable citizen monitoring process. PAC's initiative in 30 districts of Karnataka brought in a community-led citizen monitoring approach empowering a community which had the ability to participate as equal stakeholders and not as mere beneficiaries

PAC adopted a "learning by doing" model aligned with its mission statement. It aimed to improve and institutionalise citizen-centric governance in all aspects of public service delivery. The project followed a systematic "3 A Framework of Awareness-Advocacy-Action" which had a comprehensive consultative process with all stakeholders in the service delivery spectrum to ensure interventions that were designed were duly backed by support.

PAC's approach tested three models of citizen monitoring across Karnataka. Citizen Monitors were elected in community meetings and trained on relevant regulations concerning PDS entitlements of ration cardholders. Accordingly, they checked FPS for compliance with government regulations, sharing information, if found short. Periodic monitoring visits were conducted to measure progress of compliance to norms. Among the three models of Citizen Monitoring Action Team (including men and women), Citizen Vigilance Committees (government selected) and women's SHGs, it was found that Citizen Monitors comprising members from SHGs elected by the community were the most effective route in improving functioning of FPS.

Community-led monitoring processes were designed to improve awareness among beneficiaries about their entitlements, increased adherence to standard protocols by FPS owners and an active engagement with government officials. The intervention



implemented by PAC was driven by an innovative process that entailed beneficiaries driving change through systematic monitoring of community engagement and advocacy. Simultaneously, a mutually beneficial relationship was built between the community, FPS owners, Food & Civil Supplies Department officials and women SHG members.

The PAC team factored in initial reluctance from women SHG members. This was resolved through outreach programmes and community meetings. Another barrier of resistance from FPS owners was addressed by following a systematic approach of consultation and mediation with local Government bodies and Food and Civil Supplies Department officials. The barrier related to political interference on account of well-connected FPS owners hindered performance of women SHG members and could not be mitigated by PAC team.

### Results

The “3 A framework” enhanced the voice of marginalised community members to demand their right to entitlements and ensure compliance to the government mandate of operating and maintaining FPS. This related also to government-mandated outlets where food grains and kerosene were distributed. PAC’s intervention helped bring about a change in behaviour of different stakeholders. Initially, 90% FPS owners were non-cooperative but through informed education, by women SHG members, they realised they were part of a greater cause that would impact lives of lakhs of beneficiaries. Thereafter, the SHG team’s advocacy with the Government supported the process. It also improved access to food entitlements to 101,826 beneficiaries across the state.

The project identified more than 716 community champions of which 600 were women. Qualitative interviews with 360 Citizen Monitors showed that 303 women and 54 men wanted to continue as monitors. The women monitors ensured FPS were shifted to safer places and made accessible for women. Ensuring involvement of concerned stakeholders led to a belief in the project’s scalability and sustainability. PAC developed a detailed Implementation Manual for transfer of knowledge for Citizen Monitors using the Training of Trainers (ToT) model.

Additionally, the SHGs ensured food was distributed to all beneficiaries during the first wave of COVID-19. They inspected the allotment, lifting and offtake of food commodities by checking status quo across project districts. Further, women SHG members ensured migrant workers received their monthly ration all through the COVID-19 induced lockdowns.

### Replicability

SHG members became key drivers due to a peer-driven sense of responsibility towards the community and increased awareness of their entitlements. The outreach with Government officials and their support emboldened a sense of ownership for the intervention amongst women champions and ensured self-sustenance of the initiative post withdrawal of PAC.

## **CATEGORY - 1**

Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters

The initiative ensured an equitable approach and led to the training of 76% Citizen Monitors from disadvantaged communities as citizen champions who can now monitor their own FPS. PAC developed a training manual and Standard Operating Procedure (SoP) which was well tested and proven to be easily replicable in resource-intensive settings. Since the initiative was spearheaded by women SHGs, it becomes easier to adapt and replicate where ever there are similar SHGs.



# Reviving Millets





## Millet based mixed farming: Coping up with weather extremities

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Rayagada and  
Koraput Odisha



*Revival of millet based mixed farming in Rayagada and Koraput districts of Odisha helped address issues of malnutrition in tribal communities, reducing their vulnerability to climate change. A 'People-led approach' used traditional knowledge to also preserve seed varieties.*

### Target Population

Rayagada and Koraput districts represent some of the most backward regions of Odisha. Most villages are inhabited by 637 Pajara and 84 Kandha tribal families whose livelihood is dependent on upland agriculture and local wage labour. Their dependence on rainfed farming makes them vulnerable and food insecure. Women and girl children are most impacted since they shoulder a large burden of household chores like fetching water, collecting firewood and doing routine housework while facing discrimination in access to food and facilities. Most children are malnourished and tend to drop out of school early to support their parents by earning cash/wage.

Milletts are one of the oldest and most versatile sources of food in tribal areas. They need less water and grow in less fertile soil, in high temperature and erratic rain conditions. They have a high source of nutritional value and address the issue of food insecurity and malnutrition with ease.

Millet based mixed farming was experimented with different slopes via farmer groups and seed banks. Cross learning sessions organised for cultivating resilient crops like milletts with pulses, oil seeds and tubers showed potential to meet food and nutrition requirements.



## CATEGORY - 1

Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters

Different type of Mixed millet farming as per different slope of the land		
Crop	Acres/Farmers	Quintal
Jowar+Bajra+Maize	78/123	578
Little Millet+Red Bram	67/298	663
Little Millet+Oil Seed	56/89	203
Finger Millet+Cow Pea+Jowar	89/112	216
Little Millet+B&G Gram+Vegetables	97/126	339
<b>Total</b>	<b>387/545</b>	<b>1999</b>

Name of the Millet	Period of cultivation	Period of Harvesting	Seeds available with the seed Bank members Local names
Little black/Barnyard Millet (Suan)	Last week of May	November	Horu Kohoda, Jinjari Kohoda, Munya Kohoda, Koturu Kohoda, Jorutotili and Teya Kohoda
Foxtail/Italian Millet (Kangu)	June	November	Teya Arka (small size) and Kaja Arka (Big Size)
White/Great Millet Sorghum (Janha)	June	December	(Big size) Dasara Janha, Teha Janha, Deru Janha, Depla Janha and Parti Janha (Small Size) Setra Janha, Katia Mata/Keba Janha and Anda Janha
Ragi/Mandia	June	September, November	(3 months) Hikiritoya, Kumdateya Dasara Mudu, Manji, Palu Teya, Korkati Teya, Kodiagoti, Dipka (6 months) Janbu, Modoi muskori, Gangara, Sonadei, Kara, Koduru, Kerenga
Pearl/Spike Millet/Bajra Kuya, Ganthia)	June	November	Kuya/Ghantia
Guduji (Local name) Millet	June	November	Guduji

### Problem

Rayagada and Koraput districts are dependent on rainfall for cultivation and have suffered setback due to weather extremities, delayed rains, long dry spells and deficit rainfall. Due to continuous dry spell and delayed monsoon, land becomes dry and difficult to plough. Lack and delayed precipitation delays sowing time, crop growth and production. Regular cleaning of steep hills till the hilltop without ridges for Podu cultivation has exposed the landscape and caused soil erosion and drop in crop diversity.

Farmers are not getting rain during May and June and due to a continuous dry spell and delayed monsoon, the land turns dry and difficult to plough. Late precipitation delays sowing time and crop growth. Add to this, forest coverage decreased and so has availability of seasonal fruits. These issues are now threatening food security, life and livelihood of tribal families. Although millet is the main food through the year, it is sold at the time of

cash need too. Due to lack of effective marketing facilities, needy families sell the produce to local buyers who come to the village and collect the crops from the farmers post harvesting offering a relatively lower price as compared to Minimum Support Price (MSP) declared by the Government. Heavy rainfall seen for days at end causes erosion of topsoil of upland as these are unbounded and the seeds get washed away at an early stage, causing reduction in crop production. Early exit of rain and late arrival of winter limits the scope of Ravi crops causing decrease in forest coverage and increase in cashew plantation.

### Solution

The Indo-Global Social Service Society through local NGO partners IDS and EKTA took up millet-based nutrition sensitive mixed farming in 24 villages in 2014 with the goal of reducing climate change vulnerability by promoting nutrition sensitive millet based mixed farming. Later in 2016 and 2018 another 24 villages were added in both districts.

A “People-led approach” was followed with experimentation, demonstration and replication as key strategy. Emphasis was on cultivating land with mixed crops like millets, pulses, oil seeds and tubers having potential to cope with climatic fluctuations. A participatory village resource appraisal process was conducted with a weather calendar with specific crops for each season through specially formed farmers’ groups and seed committees. Focus was on promotion of knowledge of traditional agricultural practices suitable and sustainable for the landscape and ecology. Handholding support was provided on millet based mixed farming with training and field visits in critical times when field operations were in progress. Regular exchange programmes were organised on seed multiplication, composting and bio-pesticide preparation and seed collection.

*“Millet farming does not require money. It is such a relief that we do not have to take a loan to buy seeds and chemicals. Even children have knowledge and information on how to grow millets and consume them. During the lean period when PDS rice was not available at home, it was millets, tubers, leafy vegetables and forest foods that come to our rescue. Millet gives us energy to climb hills and keep us well fed. In comparison to rice, millets also have more fibre.”*

**Sita Saunta and Sali Saunta  
of Ledriguda**

### Results

In 2016, millet based mixed farming was taken up with 407 famers in 148 acres providing a yield of over 718 quintals. An additional 180 kg of food grains consisting of cereals, pulses, oilseeds and vegetables were made available at household level helping family have access to another three to four months of nutritious food.

In 2018, more than 456 farmers cultivated different kinds of millets with pulses and oilseeds spread across 156 acres in 18 villages. Seed Society members preserved 34 traditional varieties of millet seeds, pulses, and vegetable seeds. Apart from using for personal consumption they donated to needy families too. Seed committees arranged 14 types of millets, sorghum and bajra and three types of pulses and two types of maize seed for demonstration.



### Replicability

Niraniguda VAT members identified a patch of 20 and allowed 11 landless tribal families to initiate farming activities and undertake cashew plantation. Convergence with MGNREGA was made for land development activities. To combat water scarcity, 11 families dug a channel of nearly 2 km from a perennial source to divert water from a stream to their field. The soil and water conservation department in March 2021 laid pipelines for the diversion and for drinking water supply. In 2018, VAT developed a village level micro plan which included construction of a check dam in Jhumuka for supporting agriculture on un-irrigated land, land development activities and linkages with social security schemes. Rs 4 lakh was sanctioned under Gopabandu, Gramina Yojana for construction of a farm pond in the village. Once constructed, around 20 families will be able to irrigate their land.

Several factors contributed to the success of these traditional knowledge farming practices that were appropriate and sustainable for the landscape and ecology. Development of a micro plan with regular interface with frontline workers will ensure transfer of knowledge and technical support that will help these families in times to come.



## Farming and Technology Development to Support Sorghum (Sorghum bicolor L.)

Drought-tolerant staple that can strengthen resilience to global warming in eastern Indonesia

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*Future climate change and global warming events pose major threat to growth, consumption and livelihoods of rice eating and selling populations living in resource constrained eastern Indonesia. Prioritising sorghum as an alternate staple is a solution with potential for scalability.*

### Target Population

Indonesia is highly vulnerable to climate change impacts, including extreme events such as floods and droughts, and long-term changes from sea level rise. Most impacted communities are those living in eastern Indonesia. Those areas are characterised by low rainfall, dry soil and prolonged drought seasons, including Lombok and East Nusa Tenggara islands. In these harsh climatic and environmental conditions, the vulnerable populations are mostly rice growing and consuming families. Owing to incoming global warming disasters, farmers here find it difficult to do rice farming since the climate is not suitable for rice production and over the years, the volume of rice grown has dipped drastically.

### Problem

Indonesia is one of Southeast Asia's most vulnerable countries currently threatened by disasters related to climate change and global warming. One imminent impact of these unpredictable weather events is their ability to reduce the availability of Indonesia's main staple which is rice. In the coming years there is greater risk of the impact of climate

change leading to more droughts that will end up reducing the size of land that can be used for paddy fields and push up the prices of rice, making it unaffordable. Those who would be most affected are people residing in eastern Indonesia majority of whom are already poor and on the fringes. They will suffer a double blow, in that they will neither be able to grow rice nor buy rice.

### **Solution**

A solution to provide alternative staples to rice to vulnerable populations in dry eastern Indonesia is by using sorghum (*Sorghum bicolor* L.). Several agricultural technology-based solutions that have currently been applied to expand the farming and accessibility of sorghum relate to modelling area suitability for sorghum farming with a view to increase the success of sorghum production. This is done by determining the area that has a suitable climate and soil for large-scale sorghum farming. The solution here is through a multipronged effort that includes development of a customised sorghum grading machine, ensuring nutrition enrichment and entering into a partnership involving local farmers and food companies.

The uses of sorghum as alternative staples have been implemented in three stages, including the scientific and practical. Based on scientific data, sorghum has nutrition values comparable to rice. The nutrition values of sorghum for calories (cal.), protein (g), fat (g), carbohydrate (g), water (%), fibre (%), Ca (mg), P (mg), and Fe (mg) were in following order of 332 cal., 11 g, 3.3 g, 7.3 g, 11.2 %, 2.3 %, 28 mg, 287 mg, and 4.4 mg. The development of customised sorghum grading machine resulted in machine good performance and effectiveness.

To make sorghum grow in a harsh environment, the project started with modelling which area would be most suitable to grow so that it could be planted based on empirical evidence. Besides, proposed sorghum farming was also supported by a customised sorghum grading machine to increase the economic value of sorghum and practicability of the solution.

A different agricultural technology is used which is mainly for processing and storing sorghum. This is quite different from rice since sorghum has husks that are quite difficult to open. In order to support and increase the use of sorghum, a special sorghum grading machine is customised which will in turn increase the selling price of sorghum and generate a profit for the farmers. Currently, sorghum is used only for its leaves with no significant value. The sorghum seed processing will help generate sorghum flour that has more economical and nutritional value.

### **Results**

The capacity of the sorting/grading machine was able to achieve 400 kg of sorghum/hour with the efficiency of sorghum's seed uniformity around 86.25%. For field stages, the sorghum development practice implemented a partnership known as Rural Community Participatory Approach to increase productivity of sorghum.

In the piloted area of Lombok village, enriched sorghum strain targeting is being planted in dry soil which has been developed and has succeeded in increasing sorghum productivity with ranges of 6 - 7.5 tonnes/Ha.

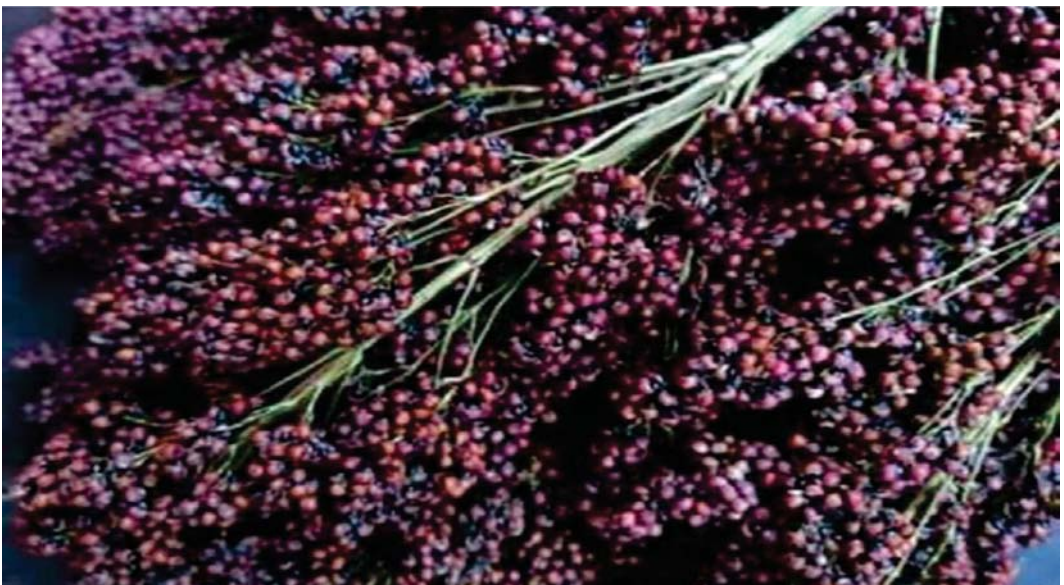


### Replicability

Global warming is a threat looming large, not only over eastern Indonesia but the entire country. Using sorghum as an alternative to food replacing rice has the potential to be upscaled at a national level and to be replicate in other islands too. The most important potential of sorghum as an alternative food relates to its adaptation characteristics. In comparison to rice, sorghum has wider adaptation and is more tolerant to warmer climate and dry soil which during global warming situations is harder hit.

The success of using sorghum as an alternative drought tolerant crop replacing the current staple of rice depends on two drivers of change. One relates to the prevailing policy framework in the country. Presently it is not a priority and it is therefore suggested to take it up at the national level and encourage and promote sorghum as a staple resource similar to rice. The policy should regulate entire aspects of national level sorghum farming, including land use and farming planning, supply chain, and distribution aspects. The second driver refers to markets. With the country being largely a rice consumer, there has been high dependence on rice which limits the acceptance of sorghum as an alternative staple. Effort must be made to immediately create and grow demand and market for sorghum at the national level so that it can be accepted widely by the community.

Several barriers affect the implementation of sorghum use. For one, available lands provided and designated for sorghum farming are currently decreasing due to threats caused by settlements and other developments. Secondly, sorghum is still not prioritised as a main crop leading to slower uptake in demand, visibility and acceptance. This impacts the price it commands in the market too, making it unattractive for farmers to adopt. The proposed farming and technology development to support sorghum is considered novel since it can increase the productivity of crops mainly in dry soil where other crop species can grow and adapt.



## Revival of Minor Millets - Nutri cereals

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*Farmer families have traditionally grown minor millets but its productivity and area under cultivation has been decreasing over last couple of decades. This can be revived with low cost, agro ecology-based package of practices that was recently tried in North Maharashtra.*

### Target Population

The poor and vulnerable tribal farmer families of North Maharashtra can be found mostly in hilly areas where there is high rainfall. Most of them are small and marginal landholders and in spite of high volume of rains, their farming remains entirely rainfed. The main crops which they grow include kharif, paddy, ragi, varai (minor millets), khurasani (oil seed), urad (pulses) and such. Paddy is the only crop sold in the market while most other crops are for home consumption. Therefore, less production of these crops has a direct impact on their food security and nutritional security. More than 2000 farmers across three districts were included as part of the project implemented on the plots owned by them.

### Problem

Tribal farmers of Nashik district in Maharashtra have been growing Finger Millet Ragi for generations. But recently they have been experiencing low productivity due to diseases. Finger Millet is generally grown on the slopes. This crop can withstand vagaries of nature. Earlier farmers were growing this with home seeds. Though this is part of the local staple food, productivity was dipping that they were unable to grow even for their family needs. But since production had reduced, they were buying cereals like rice and wheat for daily needs. Hence it was making a dent on their poor earnings too. They wanted to grow this crop but found their efforts were in vain. The problem of having a decreasing area under minor millets or productivity had to be addressed for better food security and nutritional security. Minor millets are known to be sturdy crops which can withstand extremes of rainfall and temperature better than most other cereal crops. Increase in productivity is the first step to increasing its area under cultivation. Simple changes in present cultivation practices with new Package of Practices increased productivity two-fold. This low cost, organic fertilizer, agro-ecology-based Package of Practices has been the basis of farmer's trainings across Maharashtra.

### Solution

Pragati Abhiyan NGO formalised the 'Package of Practices' which included change in cultivation practices, use of home-made organic manure and disease management. The NGO worked with over 2000 farmers directly on their farm plots in three consecutive Kharif seasons. The area covered included seven blocks across three districts of Maharashtra. During this period, farmers were trained in identification and management of pests, insect or fungi attacks on crops at different times of the crop cycle. They were trained in making

and using organic fertilizers. New cultivation practices like nursery bed, line sowing and seed treatment were introduced and adopted.

All farmers, young people, the elderly and women showed interest in learning these new methods and adopting them. They experienced increase in productivity and in many cases doubled their average. The Tribal Development Department of Government of Maharashtra supported the endeavour with funds which was crucial for such a scale. The team of trainers and field workers who inspite of COVID-19 and the lockdown continued to visit villages and farmer's plots in Kharif seasons played the vital part of knowledge sharing.

As is the case with any on-field demonstration, extreme weather conditions in all three Kharif seasons was important to factor in variations in yield. During dry spells, some facility for protective irrigation was necessary. But farmers who were part of the project did not possess the means for it. They had to be ready to accept new practices in place of older traditional practices. They were requested to do half their plots in their own way and only half in the new way. This was good for convincing them and sharing risks. Minor millets have a cultural importance too, so continuing those traditional practices helped build rapport.

### Results

The project is implemented on the plots owned by these framers. They use home seeds and sow on sloppy farm plots. It started with seed treatment using Bijamrut. Traditionally this entailed growing a nursery on a small patch which was readied after burning twigs, fry leaves, dry dung and such. Instead the project team suggested making nursery beds to reduce labour days considerably. After this, line sowing was introduced with specific distance on transplantation whereas earlier they used to broadcast. On this nursery bed and post transplantation, farmers were asked to adopt Jivamrut application. They were told to spray their plants with neem spray every two weeks as a preventive measure from disease. To tackle the issue of weeding they introduced cycle weeders which reduced the drudgery of women.

Farmers were guided on selection of seeds for the next season and on how to store it. From pre-monsoon to post-harvest, trainings were provided to more than 2000 tribal farmer families, across 93 villages of 7 Blocks of 3 districts in Maharashtra. Along with trainings, exposure visits were organised and primary processing units of threshing set up in cluster of villages.

The novelty of the project lies in its design of the Package of Practices which is tailored for the region and its people. It succeeded in keeping costs low, not increasing labour days, using local materials while preparing organic fertilizers and ensuring increase in adaptability.

### Replicability

After higher productivity was experienced by farmers, many from nearby villages and blocks reached out to understand the new Package of Practices. A scoping study with 20 other organisations is being done who are part of the RRA network ([rainfedindia.in](http://rainfedindia.in)) to



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understand type of minor millets grown across the state, how they reduced and whether farmers wanted to revive it. These same organisations showed interest in reviving minor millets in their field area. Based on type of millets and agro climatic geographies a plan is being devised for replicating the experience. A specific training programme for farmers will be the basis of this upscaling.

This can be taken across the state with help of civil society organisations and state governments. For any work related to farming, farmer families have to be part of the process. Many young people showed interest in learning and trying. This was pivotal for success of such programmes. Moreover, there was good support available from Revitalising Rainfed Agriculture Network ([rainfedindia.in](http://rainfedindia.in)) that helped design the package and trainings. The network has organisations working in other States and their experiences have been helpful.

## Reviving millets to ensure food and nutrition security amongst the tribal poor

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*Over three years, a millet revival initiative in Odisha reached 7000 households in 269 villages helping tribals grow millets in 3200 hectares of land. Farmers were guided on forming two Producer Companies, raising their millet growing area, using improved agriculture practices to boost production.*

### Target Population

The millet revival initiative targeted small and marginal tribal women farmers in two blocks of Boipariguda and Kundra of Koraput district in Odisha. The small and marginal tribal farmers, especially women farmers are malnourished and poor. As per NFHS-4, 51% women in the age group 15-49 years are anaemic, three out of four children who are below 5 years are stunted and one out of seven wasted in Odisha. Poverty in rural Odisha is 35.69% against the national average of 25.70%; and much higher in tribal regions including Koraput (78%).

### Problem

In Odisha, 74% of the total gross cropped area is rainfed, and 47% of the total area is upland. In tribal regions more than 60% of the land is upland and only 11% of the area irrigated. Tribal farmers are accustomed to growing paddy in the upland with traditional agronomic practices including broadcasting method and shifting cultivation. The production of paddy in the upland is prone to poor harvest resulting in low yield leading to food insecurity and nutritional deficiency. Before implementation of the programme small and marginal farmers grew paddy in the uplands and few farmers grew millet using the broad casting method, resulting in low yield rates for crops.

### Solution

Millet is a traditional staple food of the tribals which is resilient to a variety of agro-climatic adversities. The community has control over its seed, inputs, knowledge and practices. The nutritional and commercial value of millets, has been receiving increased attention of the urban population and was therefore seen as a way of addressing issues of food and nutrition security and economic self-sufficiency of tribal households.

In July 2018, THE Centre for Youth and Social Development (CYSD), in partnership with the Odisha Millet Mission (OMM), WASSAN, Producer Groups, and small and marginal tribal farmers, launched the "Promotion of Millet in Tribal Areas" programme. Its goal was to improve nutrition at the household level through revival of millets in farms and on plates. The pilot was based on a participatory multi-stakeholder consultative approach that brought together key government departments, academic and policy-development institutions, activists, farmer collectives and NGOs.

A cluster-based approach was followed to reach out to farmers, promoting processing facilities at village and block level, encouraging household consumption of millets through celebration of local millet based food cultures, and rigorous monitoring of implementation partners and processes. Capacities were built on package of practices (SMI, line transplantation, line sowing, nutrient and paste management, seed conservation, selection, purification, and multiplication; promotion of indigenous seed varieties through Participatory Varietal Trials and organic farming, inter cropping, integrated farming (Millet + horse gram + foxtail + leaf vegetables; farm field/ frontline demonstration (agronomic practices, seed preservation, use of bio manure); v) recipe preparation & consumption (millet khiri and ladu etc.).

Custom hiring centres used technology to build access to marketing with special focus on realisation of the minimum support price (MSP) while also facilitating Multi Actor Platform including Producer Groups and government bodies like the Government Agricultural Technology Management Agency (ATMA), Ministry of Micro, Small & Medium Enterprises (MSME) and TDCC. Civil Society and research agency (NCDS) added to the effective implementation of the programme and to taking the initiative forward.

### Results

Awareness levels of the community towards production and consumption of millet saw drastic change. Initially, tribal farmers were unwilling to grow millets using improved agriculture practices such as SMI, line sowing, and line transplantation. Soon they realised that the use of agronomic practices and machinery not only helped in scaling production but reducing drudgery of women during weeding. They began to appreciate the use of organic manure to cultivate millets and begin using the same.

Farmers in rain-fed areas switched from rice crops that consume a lot of water to millets which are known to be nutrient-rich and weather-tolerant. They also changed their planting model from mono-cropping to mixed and inter-cropping helping reduce the interference of intermediaries on product purchases and emergency sales of millet crops. They began selling their products in the government Mandi. The MSP for their millets increased from Rs. 1900 in 2018 to Rs 3377 in 2021. This boost encouraged more farmers to cultivate millets in uncultivated and upland areas. In 2018, millet was cultivated in 256 ha of land, followed by 657 ha in the second year, 1969 ha. in the third year, and 3200 ha. at present. The millet yield rate in the area increased three times.

The value of the produce per farmer household increased from Rs. 3652 in 2016-17 to Rs. 12,486 in 2017-2018. The value of the produce per Hectore also increased from Rs. 9443 in 2016-17 to Rs. 20,710 in 2017-2018.

### Replicability

Seeing the benefits of millet use and acceptance by the community, the local government food distribution programmes like the public distribution system (PDS), Mid-day Meal Scheme (MDM), SNP and Integrated Child Development Services (ICDS) included it in their basket of products/grains.

## CATEGORY - 1

Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters

Being a resilient crop, millets offer protection from a variety of agro-climatic adversities. Its rich nutritional value has further increased its demand in the market. The pilot has shown tremendous potential for promotion of indigenous seed varieties through Participatory Varietal Trials. The community has control over the seed, inputs, knowledge and practices. By bringing key government departments, academic and policy-development institutions, activists, farmer collectives and development NGOs together, a clear way forward has been outlined.

Seeing how the pilot 'Promotion of Millet' impacted nutritional outcomes and income enhancement of tribal poor contributing to SDGs 1 (End poverty); SDG -2 (End hunger, achieve food security and improved nutrition); and SDG - 12 (Ensure sustainable consumption and production patterns) has in many ways given millets a new lease of life and value add to the crop portfolio of the tribal poor.





# Resilient Farming Models







## Model Agriculture Production Clusters stimulate growth in the farm sector and double farm income of marginalised farmers

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*Agriculture Production Cluster programme improves their livelihood conditions with effective convergence between community institutions promoted under a CSO-Government initiatives.*

### Target Population

Agriculture is the main source of livelihood for a majority of Odisha's population where 83% land is in the marginal and small category. The Agriculture Production Cluster (APC) programme targets 100,000 small and marginal farmers representing socio-economic marginalised households comprising mostly tribal and Dalit communities across 40 blocks and 12 districts in the highland region of Western Odisha.

Considering that 84% of working-age (15-60 years), rural women are engaged in agriculture and yet barely 13% own land and lack a voice in decision-making within the households, the APC addresses the concerns of socio-economic marginalised farmers by improving their livelihood while addressing food security challenges and ensuring sustainable diversification of livelihoods by caring for 750 agri-entrepreneurs, 650 producer groups and 30 APCs.

## Problem

Indian agriculture is symptomatic of the predominance of subsistence agriculture. This is due to low agricultural productivity, which leads to low returns, low income, low savings, and lower opportunities to reinvest (Sreekanth et. al. 2017, p. 241).

To address various aspects of agriculture, from input procurement to market links, the government is promoting agricultural cooperatives (FPOs). These FPOs are created to strengthen land consolidation among marginal farmers while integrating them into an agricultural value chain. Consequently, agricultural production clusters have been launched to stimulate growth in the agricultural sector with the aim of sustainable doubling the income of 100,000 small and marginal farmers in the 40 backward blocks, tribal and Dalit-dominated regions of western Odisha. The APC programme is based on the partnership between the state and CSOs and addresses the problem of scale, longevity and resource mobilisation, which is endemic to typical social programmes run by CSOs.

## Solution

The Agriculture Production Cluster (APC) programme offers CSOs a unique opportunity to work with the government, while addressing the problem of scale, longevity, and resource mobilisation, which is significantly endemic to typical social programmes run by CSOs.

The APC is intended to stimulate growth in the agricultural sector by sustaining a double in income and combating the food insecurity of 100,000 marginal farmers in the highland regions of the state, which have become susceptible to climate change in recent years. The APC's interventions include the establishment of an irrigation system on 16,000 hectares of land by using existing and new infrastructure in the region to prevent groundwater exploitation.

Other initiatives include growing of high-value crops on 20,000 hectares of land; promoting organic pesticide control and reducing/halting the use of chemical fertilizers in 40% of the project areas. It also includes building 650 producers' groups, 30 agricultural production clusters, and grooming 750 market-connected agri-entrepreneurs as value chain enablers in addition to developing market routes in the region.

Under the APC programme, the Producer Groups (PG) and Producer Companies (PC) are created by the CSOs, but the state government is responsible for the overall implementation of the programme. Accordingly, the APC Project is based on a convergence mechanism with the eight departments of Directorate Horticulture, Agriculture and Farmer's Empowerment Department, OLM, Directorate of Animal Husbandry and Veterinary Services, Odisha Lift Irrigation Corporation, Odisha Agro Industries Corporation Ltd., Agricultural Promotion and Investment Corporation of Odisha Ltd. The involvement of these line departments facilitates smoother implementation of the programme with stronger accountability.

Together, they are working to create irrigation infrastructure, undertake agricultural mechanisation and set up relevant livelihoods' infrastructure. Considering variability of rainfall and inadequate irrigation facilities in the APC programme area, the CSOs worked with communities to set up irrigation structures after introducing the APC programme.

## Results

The APC project was originally intended to collect 100,000 farmers into producers' groups

and producer companies, but in the third year of the project, it succeeded in reaching its initial target. According to latest figures as many as 101,575 farmers in 40 backward blocks of Odisha were mobilised in 393 Gram Panchayats covering 2,187 villages.

56,133 acres of land were brought under cultivation of high-value crops, with 50,441 farmers gaining access to farm mechanisation. The promotion of livestock farming was regarded as an important component of the programme that was primarily supporting landless farmers.

51,456 farmers were brought under improved livestock farming and 35,141 farmers were brought under non-pesticide farming practices to inculcate climate-resistant agricultural practices among beneficiaries. The Government of Odisha and the Bharat Rural Livelihoods Foundation, through its CSO partners, regularly collected field data to record the status of implementation, which is uploaded to the official APC website. A dashboard is maintained in which data is constantly updated and uploaded.

The APC project offers CSOs a unique platform for working with the government. The partnership between the State and CSO has managed to effectively use the vast resources of the State along with technical experience and expertise of CSOs. Community buy-in for government-supported projects is also much higher. The APC project shows how community institutions promoted under a CSO-Government initiative serve multiple purposes and have greater acceptance and legitimacy from both the community and local government institutions.

### Replicability

Realising the enormous potential of FPOs, the central government announced in its 2016 Union Budget the creation of 10,000 FPOs by 2023-2024 to boost farmers' income and address food insecurity concerns. Accordingly, the Odisha government adopted the APC model to address the insecurity in nutrition and livelihoods of farmers in the state.

While convergence between the APC project and CSOs holds the key to success, there is feedback around reasons why the collective sharing of responsibility by the government and CSOs is difficult to achieve and how there has to be greater advocacy with the government for ensuring programmatic success. The solution therefore lies in CSOs being provided with a seat at the policymaking table. Also, since APC relies on enhancing income of farmers through collectivisation of women farmers into PGs there is a lot of weightage assigned to the role these farmers collectives can play in an institutionalised manner. Hence, an FPO fulfils the task of enhancing collective bargaining and reducing input cost. Both these objectives are critical to ensure farmer welfare as they are alienated from receiving fair pricing for their crops and having to pay high input cost to ensure their production.



## Gharbadi, a Perennial Source of Nutritious Vegetables for a small farmer's household

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Kalahandi  
Odisha

*Traditional farming method taken up in Odisha saw 500 families learning to produce variety of vegetables in their backyard using climate resilient nutrition sensitive approach involving women and youth; in the process they addressed food & nutrition insecurity during COVID-19.*

### Target Population

The droughts and flash floods which are frequently seen in the rainfed area of Kalahandi district of western Odisha impacted the production of paddy crops undertaken by the marginal and small farmer households in the area. The Indo Global Social Service Society (IGSSS) piloted the Gharbadi model with 500 women in Karlamunda Block of Kalahandi District, acquainting them with techniques to help them produce and consume clean, green, safe and nutritious vegetables round the year.

### Problem

Kalahandi is popularly known as a heat zone due to its high temperature and long dry season. Traditionally, this area has been prone to droughts which in recent times has seen an increase in frequency and severity with the drying up of water sources. The resultant water shortage forced small, marginal farmers and landless families to take up extensive crop damage resulting in nutrition food insecurity. These households even began to find it difficult to sustain their backyard nutritional garden, which was the only source of nutrition to their families.

The project was designed keeping women farmers in mind but most farmers resisted women being given a role in the decision making related to their farming system. Also farmers were deeply engrained in their use of chemical input-intensive farming by agro-input suppliers. Many lacked information on natural way of mulching without using plastics. Most villages also found it hard to procure drought tolerant seeds and saplings. They had limited awareness and assets for use of waste water and kitchen waste as a potential source of irrigation and organising of compost was commonplace. Their fears and concerns revolved around not having any vegetables from their fields and backyard making them question where they would go to get food for their families.

### Solution

IGSSS developed the Gharbadi model of food and nutritional security based on traditional household practices of cultivating backyard vegetables gardens. Organising around 500 women to undertake a refined form of backyard nutritional garden in homestead land to produce and consume clean, green, safe nutrition vegetables throughout the year.

Participatory Vulnerability Assessment Campaigns (PVAC) were organised with lead women and youth farmers on benefits of season-specific multiple vegetable cultivation on small



plots of homestead land. To address the issue of irrigation, household wastewater was collected and channelised to the garden through a low-cost drip irrigation system. Organic manure with household kitchen waste and bio-pesticides was used and a 10-step process followed including pre-assessment, knowledge exchange, production plan, resource mapping, mobilising technical support, garden development, pest management, water management, production assessment, networking and demonstration. This model slowly diversified nutritionally-rich foods all through the year, increasing purchasing power from savings on food bills and enhancing income from sales of garden products for each of the families.

### Results

The Gharbari model is a simple way to redesign the same backyard vegetable garden using a climate-resilient nutrition sensitive approach so that small plots of land can provide clean, green, fresh and nutritious vegetables round the year with little expenditure. A properly designed and managed 400- 600 square feet of Gharbadi model can provide 0.8 to 1.2 kg seasonal vegetables and fruits daily. These are a source of carbohydrates, protein, minerals and multi vitamins. Besides self-consumption, women began sharing vegetables with guests and neighbours in lean time and nearly 200 households ended up with saving Rs. 6000 - Rs.9000, nearly 7% of their annual earning

Gharbadi cultivation was started to get clean, green and fresh vegetables throughout the year using homestead land and household waste water by 500 farmers in 10.3 acres of land. The “learning-by-doing” approach was used to gather practical knowledge with regard to developing the model in every household through preparation of seasonal crop plan, seed and sapling collection, seed purification, preparation of compost and bio fertilizer, land preparation, sowing, planting, natural mulching, integrated pest management, water management etc.

Women were guided on growing as many as six to 21 varieties of vegetables in summer and winter. What was surplus after their own consumption was sold in the market. During July 2020 to July 2021, as many as 256.8 tonnes of mixed vegetables were produced. The Gharbadi cultivators could brave through the COVID-19 lockdowns when transportation was impacted and shops and markets closed. They had access to fresh vegetables and could expand their choice by sharing/bartering amongst themselves.

### Replicability

Gharbadi is a low-cost climate resilient, safe and nutrition food production model suitable for all rainfed and drought prone villages. This model is best suited for landless and marginal households, that have no suitable land for nutritional vegetable cultivation. The returns are attractive for a farmer who is able to properly design, cultivate and manages own Gharbadi on a say 400- 600 sqft land and see it yield 0.8 to 1.2 kg of seasonal vegetables and fruits on a daily basis all 365 days in a year. By bringing about these results, the Gharbadi cultivation has shown how it can contribute to the fulfilment of SDG goals 1, 2, 3, 12 and 13.

## **CATEGORY - 1**

Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters

Being a low-cost climate resilient model it has a less input support cost which is mostly to cover expenses related to drip-irrigation. It is an organic model that can be easily implemented at homestead level and be duly promoted by government departments, civil society organisations and corporate social responsibility agencies. This model's efficacy and replicability are based on the fact that it draws on traditional knowledge and available resources found in every household making it easily acceptable and therefore scalable. With regular interfacing with frontline workers of line departments, it was easy to mobilise technical inputs and support. The biggest advantage of the Gharbadi system has been the securing of families from natural disasters and any other setbacks that impact their ability to source good quality and affordable vegetables.

## CATEGORY - 1

Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters

# Integrated Rice Fish Culture (IRFC) for Food Security despite Emergencies

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*The Integrated Rice Fish Culture Unit for coastal farmers is designed to combine pisciculture with paddy, vegetables and fruit trees in one acre of land. The unit which is surrounded by a raised bund on which trees are planted protects them from cyclones and flooding.*

### Target Population

Coastal Odisha is prone to cyclones and floods which have profound impact on food and nutrition security. Coastal populations feed primarily on rice and fish. The calamities adversely impact paddy fields and consequent stresses on fishing and water quality to reduce volume of fish catch. IRFC combined rice and fish cultivation with vegetable cultivation, duckery and horticulture trees to provide all-round nutrition. The project worked with farmers and fishermen living in coastal areas of Jagatsinghpur, Kendrapara, and Puri districts in Odisha. Women-headed households were prioritised and among them small farmers with one acre of land were chosen to participate in the pilot.

The project helped them utilise small land holdings for productive use. The design of the model protected them from cyclones and low-level floods. Agriculture workers benefitted by participating in the process and local fish vendors found produce to sell. Organic

produce particularly received a good market and found ways to add to their income. Women's complete participation and adaptation was a major achievement.

### Problem

Coastal districts of Odisha are located in the Bay of Bengal which is a climate change hotspot. The area is increasingly subject to cyclones, floods, high temperatures, sea incursions and salinity issues. Prior to the intervention, the farmers undertook paddy cultivation and ventured to the sea for fishing. But natural calamities impacted their livelihoods and many got pushed into debt or were forced to abandon work and experience food insecurity. To address these recurring problems, the programme team designed adaptation models called "pilot options" to help the community adapt to climate change.

### Solution

After considering many options, the system of Integrated Rice Fish Culture (IRFC) was chosen as a viable risk diversified and climate resilient livelihood option by community members. This had potential to satisfy both rice and fish needs of the family and to an extent, those of the village. The model (that survived Cyclone Phailin), designed with help from an agricultural institute, based on one acre of land offered protection against cyclones and floods, ensuring livelihoods and providing for food and nutrition needs of the locality.

The multi-tier IRFC unit model was designed as a composite unit involving a pond/water hole adjacent to a patch of land. The structure involved building a pond/water hole and a trench around the one-acre plot. The mud excavated from digging was used for a raised bund around the plot. The pond/water hole served as a pisciculture unit while land was used for cultivating paddy. The water needs for paddy were met from the pond and the fish released in it were channelised through the trench to feed on insects and pests on the water covered fields and to fertilise the field with its droppings. The bund was used to plant horticultural and fuel wood trees.

Unutilised land portions were used for growing vegetables, greens and creepers. Duckery helped in serving the nutrition needs of the family by providing eggs and meat. The ducks helped in pest reduction and the field also benefitted with their droppings. Each IRFC unit had a vermi-compost unit to provide its organic manure needs. The use of indigenous saline and flood tolerant paddy varieties added to resilience of farmers making the model viable.

### Challenges

The initial investment by owners of the farm was high considering a pond had to be dug/renovated and land work to shape the land and cut trenches was required. This was expensive and difficult for a vulnerable family which had little or no support. To keep down costs, the owners supported by the programme were advised to take support of MGNREGA scheme. However the system of delayed payments led to labourers demanding instant payment from land owners. The unit was labour intensive and required diversified farming skills that could not be expected from one and all. As there were various components in the IRFC one had to run from one department to another to get support from government institutions. There was no one window clearance to help. Going forward, the model would

need to be examined and accepted by the government departments and supported with specific single window schemes.

### Results

Trees planted on raised bunds protected them from cyclones and low-level flooding. The farmers choosing this option could get up to 4.5 times return of investment. Even during Cyclone Phailin they could retrieve more than the cost. The solution was implemented in 3rd and 4th years of the five-year programme as an improvement over an earlier pisciculture and vegetable garden concept. A total of 37 units were supported in three districts and replicated by four farmers within the programme period. Components of the pilot were adapted widely among pond owners of the districts.

The practice of obtaining fish from inundated paddy fields is old in coastal Odisha. However, use of chemical inputs in agriculture made it impossible for life forms to survive. The concept of IRFC is innovative, in that both rice and fish would be available from one acre of land. The vermi-compost pits provided organic inputs while addition of other components like vegetables, horticulture trees and duckery added synergy. The practice of raised bunds, planting of horticultural trees thereon and adoption of indigenous saline and flood tolerant paddy varieties rotated every year to increase productivity and make the model climate and disaster resilient. The components added to the fertility of soil, and took care of fertilizer and pest control needs of the unit. While input costs reduced, productivity of both fish and paddy increased as the fish found space to move around and the paddy benefitted from the fish and ducks.

### Replicability

The pilot has huge potential for replicability and scalability along entire coastal regions of India that face similar threats from climate change. The model is easily constructed in just one acre of land and requires minimal labour if the trench model is used. Once constructed, its yearly maintenance is low and inputs can be easily arranged from the locality or agriculture/horticulture/animal husbandry departments. The local Krishi Vigyan Kendras can also provide knowledge inputs and the entire family can participate in the process.

Successful farmers can turn into community resource persons and help in replication. People desirous of replicating can visit the models and interact with farmers. Constructing a vermi-compost unit meets both fertilizer and bio-pesticide needs. Encouraging farmers of the region for exposure visits can ensure scale while the model can serve as a standby unit for big farmers.

The model needs innovative farmers who can become drivers of change. Various aspects of the model are fine-tuned by owners. Farmers have included flowering and medicinal plants and benefitted. Involvement of family members ensures that the farmer can take up other livelihoods and add to the family income. In regions where climate change induced calamities are frequent, farmers can now readily pick up this model and engage themselves with lucrative results.



## Ensuring Food and Nutrition Security in Rural Maharashtra

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*Food and Nutrition Security (FNS) was ensured for farmers from six villages in rural Maharashtra through promotion of crop planning, kitchen gardens, multi-layer farming, food demonstrations, child growth monitoring and Hb camps, rallies and competitions.*

### Target Population

Small and marginalised farmers from villages that dotted the districts of Ahmednagar, Dhule and Jalna districts in Maharashtra were supported with technical know-how to grow a variety of vegetables and horticultural crops throughout the year. A major burden of coping during a disaster was felt by women who had to shoulder the responsibility of ensuring that the family's food and nutrition needs were met with. They had to manage of their diversity and nutrition even as they strived to become more self-reliant, better-equipped and resilient, especially during periods of crisis. Through them men, adolescents and children were reached in project areas along with farmers who were guided to adopt the FNS model of sustainable agriculture to meet the food and nutrition requirements of their households.

### Problem

Agriculture is a major livelihood source for approximately 59% rural households in India. Food availability, accessibility, utilisation and stability are issues of concern as they are driven especially by the market, prevailing government policies and recurring climate variabilities. The entire population of rural Maharashtra was in some way affected by issues related to food security which was mainly dependent on the government public distribution system (PDS), government programmes like Integrated Child Development Scheme (ICDS), school mid-day meal (MDM) and market purchases. This made availability and nutrition of households dependent on external agencies to fulfil their food and nutritive needs possible.

These areas have been plagued with problems relating to loss of agrobiodiversity, dominance of mono-cropping, increased cost of cultivation and following a diversified diet pattern. There has been a great deal of mental stress on women for preparing healthy dishes, loss of traditional recipes, malnutrition and lack of awareness regarding importance of food and nutrition.

### **Solution**

To meet this challenge of meeting all the nutritional requirements without disturbing their livelihoods and income, the Watershed Organisation Trust (WOTR) has been implementing food and nutrition security initiatives in Maharashtra and few other states through the promotion of multilayer farming, backyard kitchen gardening, crop planning method and promotion of nutrition literacy amongst the rural community.

As part of the project, 15 farmers were selected per village from Ahmednagar, Dhule, Jalna districts and the FNS model was replicated with these farmers. The FNS model was promoted with 100% contribution from farmers and technical support from WOTR. Local and indigenous varieties of crops were identified followed by crop planning and setting up of the kitchen garden and a multilayer farming to minimise the risk of failure of a single crop.

WOTR encouraged farmers to cultivate demonstration plots to let them know about the multilayer farming system and its benefits. Demonstration plots motivated other farmers to take up this initiative. Exposure visits also gave them an opportunity to view examples of plots and to interact with farmers to know more about multilayer farming. Awareness rallies and small competitions were held for the women to keep them motivated.

WOTR made farmers aware of the current status of FNS, malnutrition, crop planning and multilayer farming. Food demonstrations were held and child growth monitoring for 0-5 years and Hb camps organised in addition to rallies and competitions to generate awareness on food and nutrition security. Guidance was provided to parents even as food recipes helped increase dietary diversity. Vegetables/fruit crops were grown employing organic and sustainable methods in multilayer farms which were rich in vitamins, etc.

Focus of the intervention was on nutrition literacy and how local communities could be made aware of how to use what was readily available to bolster their nutritive intake. Identify and Conservation of indigenous crop varieties, different kinds of food combinations and preparations and taking up easy-to-grow cereals, pulses, vegetables and fruits throughout the year with no substantial financial burden helped meet household level nutritional requirements, with improved dietary diversity and an increase in food sovereignty and nutrition.

### **Results**

WOTR has been promoting multilayer farming among small, marginal and large farmers in 13 blocks of eight districts in Maharashtra, directly benefiting over 1000 households. There was a dramatic reduction in anaemia cases. This initiative was implemented for the community with their participation at a very low cost. The change in cropping system from mono-cropping to diversified cropping was possible owing to community participation only and ownership of their actions.

## CATEGORY - 1

Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters

The diversified cropping pattern provided multiple benefits to small, marginal and large holder agriculture families who could now cultivate a wide range of crops and enjoy the yield through the year. This contributed to an improved agrobiodiversity maintenance and sustainability of all FNS activities

The selection of 150 farmers from six villages to take part in the initiative was on the basis of their land holding size. Soon farmers realised the benefits from their personal experience and began to share their experience and lessons learnt.

### Replicability

This solution can be replicated in all regions and depending on local climatic conditions, cereals/pulses/vegetables/fruits plants can be selected. In the course of implementation, the project team's biggest challenge was to convince farmers to become part of the project and use their new-found knowledge to play an active part of the agrobiodiversity movement. Also, to work with a large group of farmers who had enrolled. They were explained the importance of each kind of food, provided vitamin charts and food demonstrations to encourage farmers to prepare and consume healthy and tasty dishes.

Group and individual meetings were organised to explain FNS to farmers who had been inducted into the programme. Training was provided to male and female farmers preferably from the same family to encourage active participation and informed decision making. Individual plots were mapped giving all necessary information for making informed decisions regarding crop planning and multilayer farming. Identification of sources of local and indigenous seeds was taken up and these were sowed with the help of elderly in the villages. Demonstration plots were readied to showcase successful implementation of activities.

Having experienced the benefits of crop planning, multi-layer farming, kitchen gardening and enhanced crop and dietary diversity in normal times and during the COVID-19 lockdown, farmers were convinced that nutrition literacy was an important tool for building climate resilient food systems. With this conviction, they continued to work in the same way, planning and choosing crop varieties, based on their climate conditions.





## CATEGORY - 1

Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters

### Dayalbagh - Achieving self-sufficiency in organic production Followers of the Radhasoami faith create a thriving mega organic food production enterprise

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*Exhibiting a unique blend of scientific and traditional methods, 'faith agriculture' in Dayalbagh is all about food production undertaken in a holistic way and looking at food security including safe production and distribution of food for humans and animals.*

#### Target Population

Dayalbagh which means "Garden of the Merciful" is located in Agra, western Uttar Pradesh where followers of Radhasoami faith reside. Faith agriculture is of great value to this religious community who practice the virtues of working with soiled hands. People from all economic backgrounds come together to undertake organic production of all that they plan and wish to consume. They actively engage at different points in the chain of food security - from food production to food distribution - while ensuring no food gets wasted. Food items from their fields are sold at a price lower than the market making it accessible and affordable for all.

In the year 2014, the Ministry of New and Renewable Energy approved and committed to support the development of Dayalbagh as a Green Campus, thus turning it into an 'eco-village'. In collaboration with SPHEEHA NGO, Dayalbagh undertakes tree plantation every monsoon, to raise forest cover which can further enhance this concept.

## Problem

Haphazard urbanisation, pollution, destruction of ecosystems and use of carcinogenic chemicals in food production due to lack of sufficient knowledge are an inevitable reality of modern city living. Risky and unhealthy tools of food production contribute to ensuring safety standards of the food that is produced. Residential buildings and colonies have sprung up on most of the lands surrounding Dayalbagh. Despite its ruthless destruction of ecosystems, Dayalbagh is demonstrating environmental preservation through large-scale organic farming and food production.

## Solution

The agricultural operations in Dayalbagh are largely organic. Use of chemicals is minimum with strict prohibition on use of herbicides and pesticides. At any given time, only half the recommended quantity of fertilizers is used in its crops and soil fertility is maintained with compost, vermicompost and green manuring with crop rotation between leguminous and non-leguminous crops.

Other than switching to organic methods of food production, in the context of mechanisation, presently, DAI has 10 tractors, 2 rotavators, 1 barseem cutter, 5 threshers, 1 potato planter ad digger, 1 laser guided land leveller, 5 disc harrows, 1 oil expeller, 1 cane crusher, 1 rice huller and polisher, 1 pulse mill, 4 trucks and 8 trolleys, automatic seed-sowing machine. The demand for healthy and reliable agricultural practices has motivated botanists and experts to introduce productive organic methods and tools of agricultural practices. Farmyard manure, compost and other preparation from cow dung is also used extensively as fertilizer for plants.

While there is scope for further mechanisation, it has so far been avoided to provide room for community engagement. Additionally, there are pole-mounted solar panels installed in agricultural farms to light up working areas. For conservation and sustainability, water from Yamuna River and Sewage Treatment Plant (STP) is used. The DAI works on the recommendations of the Scientific Advisory Committee, which meets every two months and addresses pressing issues of the previous months. The system successfully engages hundreds in field work every morning and evening after congregational prayers with followers carrying out weeding, harvesting, and threshing. There are other organised groups like fodder party, gull party, herbal party, horticulture party, and wood-chopping party who contribute with their human effort. Food security practices of Dayalbagh are uniquely embedded in community engagement practices at large.

## Results

Dayalbagh produces a wide range of food crops on 1250 acres of agricultural land for a population of approximately 4000 people. Organic ways of production are executed with exhaustive research and parallel and continuous analysis by accomplished agriculturists and scientists who facilitate a reliable and sustainable practice of food production. Food security and food production practices of Dayalbagh are uniquely embedded in community engagement practices at large. This means thousands of men and women, from all walks of life, diverse economic backgrounds and age groups, not only till and toil with their hands, but also reap equal benefits earned by the sweat of their brow.



A healthy balance has been struck between manual labour and green technology. Additionally, the continuity of these practices is ensured across generations with the Education Policy of Dayalbagh Educational Institute (DEI) highlighting the importance of agricultural operations as an essential element of the education system of the Institute. What is commendable is that even during the difficult phase of the COVID-19 imposed lockdowns, this active involvement of people of all ages in food security practices was not halted or abandoned.

### Replicability

Food security practices in Dayalbagh are unique because of community engagement and well-regulated local governance. The system functions well because of smooth coordination and understanding between the several sub-systems in place. Based on the Dayalbagh model, voluntary service-based agriculture is also practiced in some of its colonies in places like Vishakhapatnam in Andhra Pradesh. With development and acceptance of a structure in place, these practices are replicable. Organic farming and zero-budget farming come with their set of challenges. Should these practices be replicated across several geographic locations, the scope of improvement in these practices will also widen while celebrating India's diversity.

There have been some challenges, like food production in Dayalbagh began on an undulated scrubland, which was levelled and made arable with manual land-leveling equipment. When organic farming began, there was not enough production to begin with and to meet the demand, some vegetables were bought from the outside. When farmyard manure was used as a natural fertilizer, the growth of weed increased, making it difficult to differentiate between plant and weeds and this was therefore stopped. Also, people who work in the fields are mostly untrained in agricultural activities. Thus, many times, weeding or threshing is not up to the mark, resulting in improper growth of the plant. To improve this, volunteers are instructed on what to do.

Ultimately for the residents of Dayalbagh who are united by spirituality and brotherhood their joy knows no bounds when other cities across the country/world draw lessons from their community driven organic agriculture production-consumption model.



## Nutritional Kitchen Garden (An effective solution to improve nutritional status in Narayanpur)

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*Since 2011, Ramakrishna Mission Ashram in association with UNICEF India has been working to improve nutrition in Orchha block of Chhattisgarh, where malnutrition was tackled through Nutrition Rehabilitation Centres and household kitchen gardens.*

### Target Population

The present Nutritional Rehabilitation Centre (NRC) programme of Narayanpur was implemented in Orchha block in the state of Chhattisgarh. This is a hilly region with a dense forest covering a population of 34,000 across 209 villages. Some of the terrains are covered by the Ramakrishna Mission Ashram (RKMA) which has been providing services since 2011. Together with UNICEF they have been working with mothers and children (from - 5 years of age) to improve their nutrition status.

### Problem

Narayanpur district is highly vulnerable from an equity point of view since over 50% of its habitation is dominated by Primitive Vulnerable Tribal Groups (PVTGs) and the situation is further compounded due to left-wing extremism (LWE). As a result, the district remains largely gripped under an emergency situation. Specifically, the Abhujmarh region of Narayanpur district in South Chhattisgarh has been a difficult area to access and is also inhabited by 'Hill Marias', one of the most primitive and vulnerable tribes.

Due to extremely difficult topography, villages are scattered and within them are hamlets which are equally apart with limited communication amongst themselves and poor connectivity with the outside world. The impact of continued poor access due to difficult terrain, and a deteriorating security situation has meant poor coverage for primary and

healthcare services. This has resulted in severe undernutrition among children and child mortality, with extreme vulnerability to diarrhoea, malaria, pneumonia, and skin ailments.

The tribal community followed several undesirable practices with serious consequences on pregnancy outcomes and nutrition status of children, such as isolating adolescent girls during menstruation. In the case of pregnant women, it was common to make them endure unattended and unsupported delivery practices and post-delivery segregating the mother from the newborn for the first 3-5 days. This was followed by delayed initiation of breastfeeding and expressing off first milk (colostrum) and delaying complementary feeding. Poor hygiene practices were observed due to contaminated water sources and lack of water. Many families had not adopted developmentally appropriate early childhood care and development practices.

Treating moderate and severe acute malnutrition (SAM) children during the critical stage of life between conception and age two was critical to break the intergenerational transmission of poverty and undernutrition.

### **Solution**

The NRC provides institutional care for children with acute malnutrition and promotes their physical, mental and social growth while building the capacity of primary caregivers in the home-based management of malnourished children. It provides a platform where sick children with malnutrition are managed in hospitals whereas children without disease are given feeding advice and regularly measured and monitored in the community by facility health staff (FHW) and others.

It guides the setting up of nutritional kitchen gardens at the household level and building capacities of primary caregivers on the preparation of low-cost nutritious diet from locally available food ingredients, developing feeding habits and time management in mothers, and imparting knowledge of developing kitchen gardens. Most importantly, NRCs offer follow-up services to reinforce change in behaviour and monitor improvement.

Screening for malnutrition is done in the community as well as by Health Staff who measures weight and height in a given population. Management of these severely malnourished children does not require sophisticated facilities and equipment or highly qualified personnel. Here, each child is treated with care and affection. Each phase of treatment is carried out by trained and dedicated health personnel. When this is done, the risk of death is substantially reduced and the opportunity for full recovery is improved. Thus NRC serves as a bridge between hospitals and home care.

### **Results**

Various stages followed at NRC cover early identification of health care needs; counselling; referral; support at the facility; counselling; and follow-up. The number of children screened at the NRC increased dramatically from 2011 to 2020 with nearly 88% cured children. Out of the three NRCs run by UNICEF, the one in Orchha was ranked amongst the best in India. Kitchen gardens were taken up to promote dietary diversity. People were encouraged to produce vegetables by creating kitchen gardens at homes as well as in Anganwadis. Vegetables like beans, spinach, bottle guard, pumpkins, bitter gourd, were



grown in abundance. More than 500 such kitchen gardens were created at the household level. This intervention has proven to serve as a tool for improving the health and nutrition of entire families while empowering women from rural areas.

### Replicability

To break the intergenerational transmission of poverty and undernutrition, children at risk must be reached during their first two years of life. The practice to fight against malnutrition can be implemented anywhere in India as well as in other countries as this plays a vital role in reducing malnutrition.

The project in the Naryanpur district provided greater clarity on common assumptions, risks, and contingency measures. For instance, it was clear that even if the security scenario in the area did deteriorate and project staff experienced issues of access, the implementing partner would negotiate with non-state actors for a resolution. The risk posed due to the deterioration of the security scenario in the region with an increase in the intensity of civil-strife may lead to a situation where project staff is not allowed to visit target areas. In 2018, work in all three NRCs was hampered for over two months due to state elections and a rise in conflict. A similar situation was seen during the 2019 national elections.

The work accomplished with the local implementing partners will contribute to strengthening contingency measures, especially with respect to ensuring uninterrupted delivery of services and building rapport and acceptance within the community. Overall, strengthening the NRC shows a great deal of influence in improving the nutritional status of children and mothers.

During the project period of 2011 to 2020, children in the 0-5 years age group were reached for several important nutrition-related indicators.

- 70, 198 children in the age group of 0-5 years
- 11, 489 children in the SAM category
- 12, 167 children in the MAM category
- 6267 children admitted at NRC
- 71.295% of children cured at NRC



## Kitchen Garden- A sustainable model for food security and nutrition

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*The strategy of having personal kitchen gardens at the household level engaging women farmers in Dholpur district of Rajasthan where they self-produced fresh vegetables and greens has emerged as a sustainable model to tackle hunger and malnutrition.*

### Target Population

Household kitchen gardens in rural resource-constrained settings have proved to be extremely efficacious in both providing a source of income and meeting the nutritive needs of the family. In the Dholpur district of Rajasthan, in 15 villages, 2625 households, population of 13997 (7463 males and 6534 females) were part of the target groups that were introduced to the concept of kitchen gardens. The households comprised mostly poor farmers holding less than four bigha land, women community, and SHG members, pregnant and lactating mothers, households with adolescent children as well as severely underweight children.

### Problem

Rajasthan is a water deficit state which covers 10.5% of the country's geographical area but shares only 1.16% of its water resources. It is the driest state with nearly 70% (2/3rd) are classified as an arid and semi-arid region. The present water resources of Rajasthan are not enough to supply the needs of the population, who are agriculture dependent. Lack of water resources and surging climate change impacts food production through agriculture and subsequently result in malnutrition of the community. Rajasthan is likely to experience a water shortage due to an overall reduction in rainfall. It also has the



maximum probability of occurrence of drought with recurring droughts in 3-4 years in a cycle of 5 years. Vulnerability to climate change is closely related to poverty, as the poor have fewer financial and technical resources. Communities dependent on climate-sensitive sectors such as agriculture and forestry and those holding marginal land are facing severe food shortages. This is fast creating a fragile economic structure with undernutrition leading to long-term health effects, including cognitive and growth deficits and reduced immunity to infections.

### **Solution**

The kitchen garden model is a rural transformation programme aimed at providing nutritious, organic, and diverse fresh vegetables to marginal rural families throughout the year. Kitchen gardening has been used as a medium to introduce the consumption of nutritious food in the community. In 2019-2020, SPECTRA established kitchen gardens by encouraging women households to take it up within their household unit.

As part of the nutrition programme "SU-POSHAN" supported by IGSSS for the marginalised population, capacity building and training were provided in several sustainable income-generating options. Each of these had the potential to improve the lives of farmers while creating a healthy environment for the betterment of malnourished children and anaemic women through monitoring, holding of health camps, awareness camps, and training on different aspects related to setting up and managing their kitchen gardens.

These training and awareness programs on food nutrition and implementation of kitchen gardens helped households to avail themselves of a variety of vegetables for consumption. This resulted in overall active health, proper growth of children with brain development for age, drop in disease, and enhanced knowledge on nutrition. It helped manage the availability of vegetables/fruits during the COVID-19 lockdown period and increased the intake of fresh vegetables that were now easily available and sourced almost free of cost from the home itself. Kitchen gardens in these instances fulfilled basic needs by helping families grow more vegetables and generate income by selling those products in the markets.

### **Results**

The women in the SHGs were highly motivated to develop their own kitchen garden. They are now able to provide a healthy diet for their family without splurging money on vegetables from the markets. The initiative is ensuring 100% saving on vegetable expenses. Each of the 680 families reached savings of approximately Rs 55-65/day on average, adding to an approximate saving of Rs 2000 a month/family. Pesticide/insecticide-free vegetables can now be cultivated and consumed. These are a lot healthier for upcoming generations as vermicompost produced by farmers is replacing other pesticides and fertilizers.

The income of small-scale farmers and homeless families increased through the adoption of diversified and innovative kitchen gardening. As a result, the nutritional status of women and children too greatly improved. SPECTRA promoted a wide range of vegetables suitable for different agro-ecologies and markets such as tomatoes, onions, ladyfingers, brinjals, spinach, carrots, potatoes, chilies, green peas, beetroot, and broccoli. They helped to establish kitchen gardens, demonstrating the process and best practices before small landholders thus increasing the availability of non-hybrid vegetables which are healthy for consumption

The concept was found to be cost-effective and holistic in its approach while aiming to develop self-sufficiency in food and nutrition by promoting the cultivation of nutritious food. Sustainable livelihood, urban poverty reduction, disaster risk reduction, and peacebuilding, and climate change adaptation were also achieved through this model.

### Replicability

The concept of kitchen gardens is already being implemented in various convergence programs like Sustainable livelihood development project (SLDP), Integrated livelihood project (ILDP) supported by Letz Dream Foundation for many rural households of Alwar, Rajasthan. Several innovative technologies like hydroponic farming, organic practices, and other cropping options are ways in which the model can be further upscaled.

Kitchen gardens can play an important role in places that are water deficient. They also strengthen national food security by supplementing rations and providing essential nutrients. It has a positive impact on livelihoods as they ensure steady incomes. Kitchen gardens with an increase in food production help reduce the prevalence of stunting in children and adolescent girls.

As the initiative gains popularity, capacity building and infrastructure support must be stepped up. This should cover different components of kitchen gardening like its relevance, have a pictorial presentation of design and layouts, site selection, soil preparation/soil building, seed bank, cropping season and pattern, companion planting and its benefits, and vegetable seeds. These would be necessary for the community that is cultivating the produce.

The long-term benefits of adopting and maintaining kitchen gardens must be communicated, especially with respect to improved results in quality, transparency, convenience, and less packaging of fruits and vegetables. That they also drastically increase families' access to fresh fruits and vegetables; are environmentally friendly, and can be a weapon in the fight against climate change are clear benefits that can help families make a decision in favour of kitchen gardening. In the project implementation area, all this has already been seen. Communities are now able to manage their natural resources and are also better equipped to deal with the impact of natural disasters.



## Back to Basics- bridging gaps in Nutrition and Food Security

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*Revitalising traditional ways of farming and bringing back the basics through millet cultivation added not just diversity into the food plate of Adivasi communities in the Nilgiri area but also assured food since post COVID-19 lockdowns they were finding it harder to access the government public distribution system (PDS).*

### Target audience

The indigenous communities of Irulas and Kurumbas living in and around the Nilgiri District, which is part of the Nilgiri Biosphere Reserve is Pubhome to a rich diversity of life with an abundance of nature and people. They have been experiencing a major change in their farming practices and food consumption patterns leading to several nutritive deficiencies. As part of a pilot project undertaken by the Keystone Foundation in the four townships of the Nilgiris that included the Aracode, Coonoor, Konavakarai and Sigur, approximately 700 households were re-introduced to the super food millet.

### Problem

The mainstay of local communities is their work on the tea estates. The impact of the COVID-19 induced lockdown put many families out of work. There were also many Adivasis who were engaged as daily wage labourers in tea estates, coffee plantations and farms and

who were now finding it difficult to get paid work. They have traditionally practiced subsistence agriculture with millets following rainfed agriculture. But in recent years, due to climate changes, land has either been left fallow or influenced by the market water intensive cropping of vegetables leading to environmental issues, poor crop yield and growing agricultural distress which pushed them to shift to day wage labour that is dependent largely on the tea economy of the region.

This has triggered a variety of problems. Their food needs are being met not with what they are growing but by what is being made available through the PDS where food is predominantly rice which is carbohydrate based. The imbalance in the nutrients is causing a high incidence of low nutrition and anaemia among women. There is also an increase in food insecurity, soil erosion, market linkage issues and a reliance on water intensive cropping despite water scarcity.

### **Solution**

During the long-drawn months of the COVID-19 pandemic when the lockdowns and other restrictions on movement were imposed, farming emerged as a lifesaving option coinciding with the time of distribution of traditional seeds and support to fence the land as well as water and soil moisture retention mechanisms through bunds.

As part of an initiative undertaken by the Keystone Foundation in Kotagiri, families were provided guidance and assistance to practise farming on their traditional farmlands to cultivate millets. Most of these lands had been lying fallow, covered with bushes and invasive plants. Each of them cleared close to one acre of land and sowed millets on them. Seeds were sourced from the Keystone Foundation and some farmers got them from relatives in Sathyamangalam region. Many had to walk all the distance since transportation had been halted due to the pandemic. These were then planted on their lands where timely rains and the bund construction helped conserve the moisture, an important factor for rain-fed crops to flourish.

Building on their knowledge and experience of growing traditional, organic produce, these farmers were further initiated into the production of millets. Each family was provided with a millet seed package comprising of seven kg foxtail millet, little millet and finger millet. While millets were the primary crop that they were asked to focus on they were also guided on cultivating other super crops like amaranthus, mustard a variety of vegetables in ways that were ecologically friendly.

The Aadhimalai Pazhangudiyinar Producer Limited (APPCL) based out of Kotagiri was actively engaged in sourcing the products from these areas as COVID had hit their business very hard and this acted as a win-win for people and the company. It helped them to market and distribute the extra millet that the 700 families were providing at a handsome price. A lot of the farmers were women and now through millet cultivation, they were able to support their families through the crisis.

Once the lockdowns were lifted, basic trainings were organised on seed conservation in villages paving the way for new pathways to emerge with food security and nutrition elicited not from external market sources but from the comfort of one's own land.



## Results

Revitalising the traditional ways of farming and bringing back the basics through the millet cultivation has added diversity to the food plate alongside the food items that are made available through PDS. This also gave an impetus to local native communities to use their own land once again to ensure food security and climate resilience.

In the Aracode region, land was cultivated after more than a decade. And even though there was nothing new about farming technology or practice, the approach to linking food security, nutrition, climate resilience and market linkage to millet production was novel.

Indeed, from a situation malnutrition and other nutrition related health issues were predominant. Several locally grown crops and grains got a new lease of life and importance as their nutritive value got reinforced. Millet cropping became a popular choice more so when its climate resilient properties were enumerated. Public opinion and feedback contributed to elevating its status with policy discussions being encouraged at the district level building a case to include them in the PDS.

## Sustainability

The success of the pilot intervention has bolstered the confidence of the district and state administration to replicate it in all the hill regions, especially those that are rain deficient, making millet cultivation extremely relevant.

The challenge was to get farmers to show interest to grow millets but once they saw the output they were happy to find that their growing of millets served both the purposes of meeting their nutritious needs and also helping them sell the extra produce to APPCL. Revival of millets has been the most beneficial intervention among the many that were carried out during the lockdown last year. Indigenous farmers were able to attain food self-sufficiency during times when food prices were high at the retail level due to supply disruptions.

With millets already accorded super food status, it has all chances to now provide economic security to hundreds of small farmers and land owners.





## Harvesting all precipitation and utilising it for reducing hunger & malnourishment among low-income households

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*In Purulia and Bankura districts of West Bengal, diversity of farm systems was explored by introducing heat and drought tolerant crops by groups of 25-30 farmer households who were trained to manage seed banks, animal banks, community ponds and preparing of resource maps.*

### Target Population

The two development blocks of Purulia and Bankura districts in the semi-arid region of West Bengal are part of the red lateritic soil zone. They witness lot of erratic rainfall and top soil erosion contributing to hunger and malnutrition in 50% or more households. About 90,000 farmers were reached through campaigns, farmers' fairs and exhibitions with technological and social interventions. The beneficiaries were mostly from economically weaker sections selected on the basis of a socio-economic survey, often ratified by the local authorities.

### Problem

Small holders own land in the mid and uplands, which are far from rivers, streams and canals and where ground water pumping up is unviable. Here, topsoil gets eroded fast and for about 6-7 months a year land remains fallow and is used for grazing. People migrate in search of employment, which is not easily available now a days due to increased mechanisation of farm operations. Moreover, farm households are dependent on outside markets for inputs and small and marginal farmers rely on expensive seeds, feeds and inputs, sans quality assurance or access to dependable after sale and crop insurance services. In this scenario, prices increase rapidly and convenience of small and marginal farmers is seldom taken into account by large merchants and manufacturers/processors of agrochemicals.

## Solution

Most small and marginal farmers have sub-acre holdings. Many are eligible to get employment under MGNREGS for soil and water conservation work, widening field bunds, planting and digging small farm ponds on their own lands.

Different life cycle crops were planted to extend the growing season and integrate small animals to improve soil organic matter and seasonal distribution of income and farm work. Their home gardens and small and farm holdings were improved and growing season increased by 90% or more, sources of income increased and food intake more nutritionally balanced.

Additionally, small revolving funds were created. In a corner of the rainy season paddy-fields about 6m X 6m, 3-4 m farm ponds were dug. A bamboo platform was constructed which was about 180-200 cm above the pond where a perennial vine crop like ivy gourd was grown. In the pond some mudfishes and small snails were raised. In the case of paddy fields, the dyke around was also strengthened and small shrubs such as pigeon pea and roselle planted.

In the dry fields, 5-8 rows of tall millets, 3-4 rows of pigeon peas, 3-4 rows of niger or sesame and 4-5 rows of cowpea and black gram were grown together, in alternate strips. All the sowing was done at once but harvesting was staggered over two growing seasons. Also, as no synthetic chemicals were used, animals and birds were able to consume straws/husks and in turn produce manure, which often was converted to ordinary or worm-compost.

The project interventions that aimed to promote resilient crops, animals and multipurpose trees and shrubs were possible due to several reasons. The presence of community and group level initiatives and their close cooperation with farmers/fishermen/herders was a major contributing factor. Also, cooperation of local authority and district administration staff, through formal and informal meets, service visits and participation in fairs/exhibitions added to these efforts. There was co-learning with other civil society actors such as Jadavpur University and GEAG (NGO) Lucknow plus expertise from professionals most of whom volunteered their time and services. A large number of village youth helped disseminate local climate predictions through community blackboards and SMS messages.

## Results

Rain water storage farm ponds and micro irrigation reduced the over exploitation of ground water and reduction in use of synthetic fertilizers and pesticides helped restore biological diversity and improved ecosystem services of farming. Production of bio-inputs became a small-scale enterprise and created new jobs. Crop diversity reduced malnourishment and reintroduction of several traditional plants helped reduce dependence and improve food and seed sovereignty and security.

The broad criteria by which benefits were measured included enhancement of sources of income, and total income from farm and food processing. The number of failed crops and reduced yield due to climatic or other factors were calculated. Varieties and quantities of seed saved and multiplied for distribution among neighbours was seen as a positive indicator.

Teams of bank officials, district and block administrators and NABARD network appreciated the effort especially in interface/planning meetings with government

officials. There was eager participation across age and gender by those who participated in mapping lands and natural resources, trying out new and lost crops and small animals. Finally, interactions with many similar minded national and international civil society organisations allowed the concepts and experiences to be shared through seminars, workshops and newsletter exchanges.

While most practices were not new, their innovativeness was in putting the idea of soil and water conservation, row- intercropping, live fences, using locally adapted and drought tolerant plants and animals together. The validation of community knowledge by university scholars and professors and the idea of localised weather prediction were not tried before and despite small delays, dealing with local administrative machinery, regularly was a novel approach. For all villagers, not only farmers, the idea of localised and bi- weekly weather predictions, was well received and in demand.

### Replicability

The idea of constructing on farm pond and wells, strengthening bunds/dykes and planting coppicable trees/shrubs on them inspired many farmers to diversify crops and integrate small animals. Junior and senior staff of agricultural and animal husbandry departments held periodic meetings with beneficiaries, trained some women to inoculate domestic animals, issued farmer credit cards to fishers and small animal raisers and recognised the potential of several underutilised field and garden crops and multi utility trees and shrubs.

In the project villages many small farmers replicated multi- cropping and integrated farming. The idea of impounding rain water and micro irrigation, living fences and hedgerows, utilisation of uncultivated food and medicinal plants have gradually become popular and several government schemes, mainly MGNREGA, were used to replicate some of the interventions.

Frequent change of senior officials and suspension of work for long periods due to elections were not factored in nor was disruption caused by COVID-19. Fortunately, during this period there was more than expected rainfall which augured well for the farm output.

A popular practice was both the localised collection, and dissemination of weather data, at 3-day intervals, through blackboards and sms message over phones operated by young volunteers. The success of this initiative was evident, when despite the completion of the project period, the farmers raised and contributed money to cover the cost of continuing the service.





## Solar-based Group Irrigation Model

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*Shiv Ganga Samuhik Sinchai Samiti, a 10-membered “women institution” in Muzaffarpur district of Bihar ensured availability of irrigation water 365 days a year using a green energy source to increase area under cultivation with more cultivated crops while decreasing cost of expenditure on irrigation water.*

### Target population

AKRSP(I) is intervening in villages under Darbhanga, Vaishali, Muzaffarpur and Samastipur districts of North Bihar. In each of its multi-input areas, their development approach focuses on working with local communities to solve longstanding problems and in doing so, alleviating their poverty. The formation of the Shiv Ganga self-help group (SHG) in 2012 encouraged small savings amongst women.

By 2015, the Shiv Ganga Samuhik Sinchai Samiti in Kushwaha tola in Harpur village, of Banda Block in Muzaffarpur districts of Bihar had a team of 10 dedicated women members headed by a President. Each of the women in the group represented below poverty line (BPL) farming families, with scattered landholdings, practising subsistence farming of cereal crop production as a primary livelihood.

### Problem

Small holding marginalised farming families faced perennial issues of having less area under cultivation. They were largely dependent on rains and due to limited agricultural

season relied on subsistence farming and indiscriminate harnessing of aquifers. Their use of fuel-based energy sources pushed up cost of irrigation leaving farmers with much reduced income. This high cost of irrigation made farming unviable, forcing many to undertake large-scale seasonal migration to neighbouring towns and cities. The issue was aggravated due to non-availability of timely water for irrigation and functioning of the distribution pipeline, high cost of irrigation and long queue of demand.

Further, irrigation was usually dependent on a per hour charge for a unit of land or renting of a diesel/fuel-based pump-set contributing to an individualistic approach to irrigation, causing indiscriminate boring and pumping of available aquifers that put pressure on groundwater availability. A multiplicity of issues led to forgoing of the agricultural season and reduction in income, forcing farmers to work as farm labour, causing many disruptions in the socio-economic fabric of the community.

### **Solution**

AKRSP(I) with their expertise, formed a group for managing supply of irrigation water. Members conceptualised the irrigation pipe to spread over 2000 feet covering 25 farmers and 39 acres of land area. AKRSP(I) intervened with 96 models of solar-based lift irrigation benefiting over 4000 farmers. They also facilitated the initial set-up with an investment of Rs 700,000. Committee members donated land for setting up solar panels and aided the construction of a starter room for locking electronic equipment at a cost of Rs 143,130.

All the setup and operations were owned, headed, and managed by AKRSP(I) supported regular capacity building of members, training them in book keeping and coordinating with different suppliers for timely repair and maintenance. Regular meetings were held and leaders elected on annual basis. The group used renewable energy sources to ensure year-round availability of water increasing efficiency to irrigate more land area per hour with extra land brought under irrigation in addition to increasing variety of cropping. This reduced cost of irrigation and put more income in the hands of women farmers.

Community members participated in all stages of implementation, from mapping the area for laying irrigation pipelines, collecting public contributions and undertaking formation of the group to identifying group members and managing the construction work. This led to community members having higher stakes in the intervention. Regular community meetings were held to ensure an update on the functioning and collection of user charges from farmers. Committee members had an operator whose sole responsibility was to take care of the water supply and maintain a record of charges collected for irrigation of water supplied from members (Rs 60 an hour) and non-members (Rs 100 an hour). The collected amount was deposited in a bank account ensuring transparent functioning and the collected charges were used for paying maintenance.

### **Impact**

An area of 39 acres could now be irrigated by using a submersible motor pump of 5 HP capacity, solar panels of 5 KW, desired electronic equipment for operation with a boring of 400 feet, having a distribution pipeline of 2000 feet. From single cropping, cultivation expanded to three seasonal crops, and from cereal cultivation farmers began cultivating vegetables. The cost involved in irrigation decreased by 128% and time needed for



irrigation dropped by a whopping 50%. The income of the farmer associated by the set-up increased by a healthy 33%.

Through the different evidence-based studies in AKRSP(I)'s intervened areas, positive net present value points to economic and financial rate of returns for the installed system at 31% and 11% respectively, making the project viable. Shah et al. 2017 corroborated a similar fact mentioning an economic internal rate of return (IRR) of 23% from a micro solar grid.

The system changed irrigation patterns from diesel-based pump-sets to submersible pumps of 5 HP capacity. Time needed for irrigation and cost involved reduced by 40% and 50% respectively. Cultivation of vegetables throughout the year and in Kharif season had to be previously forgone leading to more profitable agriculture and high income. Underground distribution of water as compared to previously open one, reduced water wastage and brought in more land under irrigation. The solar-based setup which draws on clean energy sources reduces carbon emissions. The life of a diesel-based pump is 2-3 years and cost of its maintenance around Rs 8000-10,000 annually, to be borne by individual farmers. Meanwhile, the solar set-up remains community-owned and managed with a lifespan of approximately 20 years needing minimum maintenance.

#### Replicability

The set-up was initiated with women community members with an in-built risk of participation and reservation of male community members to lead such an initiative. Further, women managing financial aspects related to mobilisation of funds was uncommon in the village. AKRSP(I) with its community involvement and training of community members strengthened the capacity to overcome the risks.

Involvement of women community members and discussion with the community in the processes led to transparent functioning. Community contribution and donation of land for initial set-up led to community owning the intervention. Interference of AKRSP(I) post-set-up was restricted, largely to recording data to analyse effectiveness of the system. Charge collection for water supplied was the source of revenue to meet expenditures related to repair and maintenance, leading the model to become highly replicable and scalable. This participatory approach and practice of institutionalising farming practices has played a major role in increasing cropping patterns and intensity to increasing agricultural income accrued to the farmers.

## Bayan Anihan (BayANIhan): Regenerative Food Ecosystems Weaving Lab

Preventing a food collapse in the time of a pandemic or climate event

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*A multi-stakeholder platform that weaves different regenerative food ecosystem actors in a pilot project that is being implemented in 3 cities in the Philippines is enabling the transition from food security to food sovereignty.*

### Target population

The growing frequency of climate related events and the ongoing COVID-19 pandemic have altered the dynamics of food production and distribution in the Philippines. The number of ‘food poor’ and ‘food insecure’ farmers and food producers is growing and most of them are struggling to make ends meet. Their resilience and ability to bounce back is slowing down as their energies are utilised in coping and recovering from one disaster event before plunging into the next.

With the produce from the farmer community diminishing and getting expensive, community members are experiencing a major hunger gap. BayANIhan, a combination of Bayan (nation), Ani (harvest) and Bayanihan (nation building) links actors of a regenerative food ecosystem, helping communities transition from food security to food sovereignty. In the process they hone their skills at managing and mitigating impacts of the pandemic and climate related emergencies.

### Problem

Climate related emergencies from disasters and displacement are impacting an entire spectrum of food insecure stakeholders with respect to production, access and distribution of food and consumption of food. In 2021, the rise of community-led pantries in streets across the country revealed a severe hunger gap caused by the COVID-19 pandemic and the lack of access to government services. An estimated 4.2 million people were reportedly hungry. During the pandemic induced lockdowns, levels of starvation and food deprivation increased to 32%.

Farmers dealing with layers of middlemen from farm-to-market were being left with unsold produce due to unfair prices. Climate related emergencies from disasters and displacement are deepening the impact them along with food insecure stakeholders across the entire food value chain.

### Solution

To increase access to food, distribution, and production systems in a way that protects farmers from chronic food system challenges and collapse in times of emergencies, a pilot project was initiated engaging climate vulnerable farmers and food producers who had been economically affected by the pandemic in Quezon City, Mandaue City, and Maasin City. They were linked and empowered through community pantries, food banks, seed banks, urban gardens, farming cooperatives, community supported agriculture initiatives,

NGOs, local governments, and private sector allowing them to learn and collaborate with each other.

Partnering with BayANIhan, a social innovation lab that supports cross-learning and collaboration to address hunger and food production needs of partner stakeholders, a unique project is being initiated to bring about greater food justice. BayANIhan's rich work across a multitude of sectors and partners such as the government, civil society, and business sectors make them an ideal implementing partner. They bring to the table a strong support system for knowledge and resource sharing as they weave food producers and a hungry population with healthy community pantries using a collaborative ecosystem of support and sharing.

The ecosystem activation across sectors and stakeholders is the first step in the process followed by a digital mapping of initiatives and best practices. These are linked and connected through peer-to-peer learning and exchange, documentation and knowledge sharing of regenerative food production and consumption practices and prototyping scalable best practices to meet existing and emerging food needs of the community.

A Baseline data was generated for initial hunger maps. About 30 popular change makers were drawn into the programme to be part of the learning exchange and community of practice based on attendance and participation in calls, webinars, and in person/online events.

The plan was to have on the ground 10-30 initiatives across a regenerative food system such as food banks, seed libraries, urban gardens, sustainable farmer cooperatives, community supported agriculture, and map these on a GIS system. From this, three prototypes would be taken up to demonstrate cross-learning and collaboration to scale solutions up, wide, and deep. Between 6-12 best practices would be documented and shared in an online library called the 'Living Library', serving as a knowledge repository for applicable resources and frameworks from food justice, agroecology, food sovereignty, indigenous wisdom, and other connected themes. Another 6-12 initiatives would be mapped with partner platforms for social enterprises through the Good Market Global.

## Results

How this project is different from other sustainable food creation efforts lies in its ability to cut across both producers and consumers by democratising information through a mapping system to follow food supply and demand.

Reflective dialogues will foster trust building, collaboration, rediscovery of local and indigenous food systems, propagation of local agrobiodiversity, restoration of natural ecosystems; and collective awareness about the transition from sustainability to regeneration for long-term impact.

## Replicability

The pilot will run for a period of 6-9 months and come up with prototypes that can be scaled up so they can get further institutionalised through policy level changes. It is envisaged they would be scaled wide and along the way get financed and replicated with multipliers. Finally, they would be scaled deep to bridge trusting relationships across stakeholders. The aim is to go beyond replicability and create a robust food sovereignty. Using developmental partnerships across key organisations to help address finance scalable prototypes, the project will ensure sustainability of learnings implemented and address issues of hunger through food aid for food security.

This would call for dedicated participation and engagement of actors advocating for non-mainstream technologies such as use of non-GMO seeds; organic and regenerative agriculture, promotion of local economies and markets, among others. Promoting learning of technical skills for regenerative food production and consumption and the deepening of trust and leadership across stakeholders will be ways to mitigate challenges further.

Mapping the use of digital technologies will require collaboration with technically proficient groups and traditional logistics to enable use of technology to democratise information. This will help deep scale beyond scaling up and wide, fostering a resilient system of collaboration that is able to manage the complexity of leading things in a time of disruption like pandemics and climate emergencies.

Bridging stories and narratives through cross pollination and interaction go beyond digital data in maps by inspiring people to care for the cause together. A support mechanism designed to operate should the collapse of the food system take place is also one innovation that will be implemented as the project gets off the ground.

## Enhanced Food Security, Nutrition and Disaster Resilience through Women's Economic Empowerment

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*Financial inclusion and skill development of women for building community disaster resilience and ensuring improved food security & nutrition for the most vulnerable and 'excluded' communities across disaster-prone areas of India.*

### Target Population

The solution directly affected the situation of women, though the benefit of the intervention reached out to the most vulnerable, marginalised and excluded families. The good practice helped in improving their situation.

In Andhra Pradesh and in Kerala, local communities subsist on the income generated through fishing. In recent years, natural and humanitarian disasters have hampered local livelihood options, causing a sharp rise in starvation and nutritional deficiency, mostly among children, women and girls. Social dislocation and the resultant loss of traditional community support and protection mechanisms have increased incidences of violence and discrimination against women and other vulnerable groups like children, differently abled people and the elderly. Through economic empowerment, these families were brought under the mainstream economic and developmental activities. Improved income at family level directly contributed towards improved food security and nutrition for the family and improved disaster resilience.

Inclusion of women in financial and community development activities act as a catalyst to instil community disaster resilience and improved food security for marginalised communities.



### Problem

During any disaster, where community support systems as well as formal social protection measures are often severely compromised, the incidences of starvation, mal nutrition can be even more profound. Lack of access to and control over productive resources by women from the disaster affected communities make the situation further adverse. As it happened in case of women from coastal Andhra Pradesh, where the most vulnerable and marginalised families belonging to the fishermen communities have been passing through a compendium of disasters that included cyclone and floods. Women members of the families did not have any access to skills and resources to take up any income generation activities and this led to lower level of family income (that too almost nil during disaster) and the consequent issues of shortage of foods, malnutrition and violence against women.

### Solution

The proposed solution is based on the spirit of building community resilience through active participation of women. Inclusion of women and building their financial capacity to participate in income generating activities acted as the accelerating factor for strengthening the food security, nutrition, gender & protection related aspects in disaster context.

The solution was used for improved financial resilience of women from the fisherfolk communities across the coastal Andhra Pradesh. They were organised under groups and provided training and input support to identify the locally viable commercial activities for adoption. Leveraging the benefit of their connectedness with fishing (which is otherwise a locational disadvantage that causes exclusion), they decided for adopting business around drying of fish, selling fried fish at a collective/group/individual level.

The same solution was also adopted in Kerala after floods of 2018. Women from the excluded and Dalit communities were organised under groups and provided training and inputs on how to conduct business on 'Bamboo Crafts'.

Enhanced access to diversified and improved income directly contributed towards food security and nutrition aspect of the families. Women took the lead in establishing the systems and structures at community level to minimise the loss of life and livelihoods during disasters.

### Results

The women were making 50,000 (approx.) net profit every month before lockdown. More than 25 women are involved in this business of collecting and cleaning fish. The women members have increased and they are planning for two more mobile shops to sell sea food & snacks in a different location at Vyjak tourist spot.

Fibrent - the craftswomen producer company - started as a livelihood opportunity immediately after Kerala flood in 2018. Three years on, 60 women producer companies had a revenue of 26 lakh during the financial year 2020-2021. Being survivors of the flood, the training given to these women not only empowered their capacities but addressed their immediate economic needs. They survived COVID-19 pandemic because they earned an income from this.

### Replicability

The solution is based on the high-impact and high-coverage interventions that significantly

improve the life and livelihoods of the target communities. The benefits become part of the timeless fabric of families, communities, and the government system. Strategic attempts are made to ensure that the community owns the project and continues with the project interventions even after the phasing out of the project. The strategies are adaptable to different disaster contexts.

1. Innovative programme approach: It puts participation from women and girls at the centre, and advocates for the use of indigenous resources to bring about endogenous development. From the outset to the expiry of the project initiative, both outsiders (stakeholders of programme implementation) and insiders (community members) are in the process of learning from one another.
2. Developing community level systems and structures: Formation and nurturing of community level systems and structures and linking them with government institutions act as a factor for ensuring the sustainability and replicability of the solution.
3. Capacity building of the community members: Capacity building is emphasised intensely during the implementation of the project activities.

The solution in itself can accommodate the emerging challenges during the project implementation. Initially there was a challenge to get space in the tourist spot as local union did not allow them to start the business. SHG members met the District Commissioner and shared the challenges. However, the district administration took initiative and discussed with the market union members and resolved the issues. However, the lockdown impacted them adversely. They had to close the snacks shop, as they were not getting actual price to sell the fish. Other than that there were no specific challenges found during the implementation of the solution.

The solution aims at achieving the desired result of improving food security and nutrition for the most vulnerable, marginalised and excluded communities during disaster. The project intends to provide focused attention on the distinct gender-specific capacities and vulnerabilities to prevent, prepare, confront, and recover from disasters. Here, the formation and strengthening of village level systems and structures with active participation of women, adolescent girls and other community members help to ensure sustainability of the impact of the solution. This integration of the aspect of WEE in DRR is novel and innovative.



## Spatial analysis of undernutrition of children <5 years of age in selected villages of Dahod District, Gujarat, India

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*Geospatial mapping of undernutrition in 12 villages of Dahod district in Gujarat identified clusters of undernutrition with a more disaggregated picture at local and household level. This information will help policy makers deploy resources in a targeted manner to improve outcomes in the area.*

### Target Population

Nearly 74% population of Dahod district in Gujarat comprises of indigenous tribes namely, Bhil and Patelia. Prevalence of stunting (55.3%), wasting (27.8%), and underweight (53%) in under-5 children is high according to the National Family Health Survey (NFHS) 5 data, and each form of undernutrition has shown an increase of 10%, 3%, and 3%, respectively, during the last five years. A pilot study took up children under 5 years of age from Dahod. About 524 under-5 children enrolled in Anganwadi centres in the 12 villages of Saliya, Guna, Piplod, Toyani, Panchela, Pratappura, Pania, Degawada, Nana Hathidhara Parpata, Bhular and Antela of Dahod District were the study subjects.

### Problem

Gujarat is one of India's better performing states and its per capita income is 40% higher than the national average. However, a marginal reduction in various forms of undernutrition in children (<5 years) was observed during the last decade. Dahod, identified as an aspirational district, has performance indicators lower than the state of Gujarat and India. Improving this situation requires a more disaggregated picture at the local and household level.

According to NHFS-5 data, prevalence of undernutrition in children under-5 in Dahod has increased during the last five years causing great concern to policymakers. Tribal children have higher levels of undernutrition compared to rural and urban children from socio-economically advantaged sections. Prevalence of severe stunting was found to be higher (16% vs. 9%) in tribal compared to non-tribal children (CNNS 2016-18). Large regional variations exist that get masked due to the pooling of data. This situation makes a case for providing tailored solutions specific to each geographical region and community in an attempt to improve levels of nutrition among children specifically.

### Solution

Remote sensing and geographic information system (GIS) technologies have the potential to be used for mapping of malnutrition cases and study the association of contributory factors with cases distribution. The geospatial maps of undernutrition help identify clusters of undernutrition and mobilise resources to the given area for improvement in undernutrition.

A pilot study was carried out on children < 5 years of age (n=524) in Dahod district. The Epicollect software was used to record data on geographic locations, sociodemographic characteristics and anthropometric measurements using mobile phones. The spatial analysis (ESRI ArcGIS 10.5) by interpolation, Moran correlation I, and Getis-OrdGi\* statistics were used to identify hotspots of undernutrition and factors associated with it.

Colour-coded GIS maps pinpointed the situation on the ground, down to the nutritional status of individual children ensuring the possibilities of rapid responses. Geospatial maps helped the study team identify the undernutrition cluster of the area. This identification of hotspots or clusters of undernutrition will now have the potential to employ resources in a targeted manner for improved outcomes in Dahod district.

### Results

The digital elevation model is a representation of the elevation data made by using Indian Geoportal Bhuvan to represent terrain. Primary data was collected on 524 under-5 children enrolled in Anganwadi centres in the 12 above mentioned villages. The spatial analysis of stunting and underweight of 524 under-5 children with Moran I (0.492, 0.248) showed high degree of clustering in these villages. The interpolated maps showed undernutrition clusters present in the villages of Bhular, Antela and Parpata located in the hilly terrain which experience less rainfall and have less vegetation cover. The hotspot analysis of underweight identified the hotspot in villages like Bhular, Parpata, Antela, and Degawada from the hilly terrain.

Some of the data collection plans however could not be completed especially those associated with maternal and socio-economic factors and utilisation of safety net programmes due to the COVID-19 pandemic.

### Replicability

This was probably the first-of-its-kind geospatial study on mapping of undernutrition in under-5 children conducted at the village level. The technique of using geospatial devices helped capture data with accuracy of 5-10 metres. Going forward, this can be used to map the WASH facilities, food safety net programmes and their utilisation, the food supply chain, food swamp, food deserts and hotspots of hunger and malnutrition. This data can be then used for targeted interventions that will prove to be high impact and cost effective. Further, the use of smartphones which have been introduced in ICDS, the largest nutrition programme across the country, will ease the upscaling and replicability of the spatial mapping technique.

Any intervention that will be planned in the future will need to address the issue of illiteracy which is low among both men (70) and women (48) and can prove to be a barrier. Working closely with NGOs in the area will help the tribal communities to be more receptive to adoption of changes suggested by a third party. Also since women enjoy equal status among tribal communities, any effort to empower them whether through livelihood generation, skill development or orientation to environmentally sound land and water resources will contribute to the overall development of the district and to boosting the health profile of the families.

## **CATEGORY - 1**

Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters

As the technique of using geospatial mapping gets more traction, hotspots of undernutrition will get identified from time to time and disparate sets of data comprehended and analysed. The GIS will help create layered maps to understand the complexities around malnutrition, anaemia, stunting and other associated problems. The maps thus generated will serve as an effective tool for advocacy and planning. These efforts will go a long way in achieving the Sustainable Development Goal 2 which seeks sustainable solution to end hunger in all its forms by 2030 and to achieve food security and meet the targets related to ending all forms of malnutrition and achieving food security.



## Weather index-based insurance for agriculture

More security for Indonesia's farmers with financial de-risking instrument

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*Smallholder farmers should no longer stare at bankruptcy and debt in the event of a weather calamity with simpler and flexible weather index-based micro insurance that is a much more evolved version of the existing indemnity-based crop insurance offered by the government. Its success has encouraged the government to take it up at the national level.*

### Target population

Many of Indonesia's farmers are smallholders or even who work on land they have leased from bigger farmers. They have a lot at stake and look forward to a healthy crop. In recent years, extreme weather events have caused large-scale havoc to their crops and plantations, plunging countless into debt, forcing them to sell off their productive assets and reconciling to a season of limited food and poverty.

### Problem

Ministry of Agriculture in partnership with PT. JASINDO (a state-owned insurance company) have offered indemnity-based insurance for rice and cow/buffalo farming since 2013. Launched as a pilot in 2012, the insurance has been scaled up to cover 971,000 ha within

<sup>5</sup>Based on past collaboration with Ms. Woro Estingtyas (Agroclimate and Hydrology Research Institute, Ministry of Agriculture) and Prof. Rizaldi Boer (Center for Climate Risk and Opportunity Management, Bogor Agriculture University)

270 districts in 27 provinces by 2019. However, when the time came to raise claims, they found a complex and unwieldy system that made it difficult to seek compensation. The insurance covers only crop failure (75% threshold). Moreover, it also had several constraints like limiting maximum coverage to a generalised IDR 6,000,000/Ha/planting season based on average input costs at national level. This failed to take into account varying production costs in different parts of the country. Also, the labour-intensive verification surveys were painfully long drawn out adding to the anxiety and stress of the farmer.

### Solution

Farmers were already facing the dual burden of financial loss and frustration. Seeing this situation, in parallel to the scale up of indemnity-based insurance the Ministry of Agriculture collaborates with Center for Climate Risk and Opportunity Management (CCROM) Bogor Agriculture University, International Research Institute for Climate and Society, Columbia University and other relevant institutions in development of 'Weather Index Insurance' to give confidence to farmers and save them from financial ruin. A feasibility assessment and pilot were conducted in Indramayu, West Java, a prominent rice production centre provided valuable inputs based on direct feedback and interactions. Findings from older studies were collated and included in the design of the Index.

All these inputs helped make the Index all-encompassing and easy to use. It was location-specific necessitating active engagement with farmers and concerned stakeholders. The entire conceptualisation to design journey entailed seeking inputs from those who were in some way related to the farmer and his produce, like financial service providers, insurers, reinsurers, microfinancing institutions, relief agencies, and agriculture input suppliers. Another major advantage was the use of reliable climate data through satellite. This vital information was used to make changes in the existing agriculture infrastructure and strengthen its weather resilience quotient. With few farmers venturing into exports, it hedged them with respect to international risk-transfer markets.

### Results

When this farmer-friendly Index was launched, farmers were relieved to note that it was not restricted to crop failure. Payouts are triggered by a specific index acknowledged by both farmers and insurers. For example, if certain level of rainfall identified as threshold to cause drought/flood in an area is selected for index then both farmers and insurers only need to monitor regular release of weather information by BMKG (Indonesia Met Agency). Every time the index is met, claims for payouts are processed. No physical field check or inspection was required, making it time and resource efficient. Payouts were distributed evenly to all farmers in the area demonstrating a fairness and standardisation that was most welcome. The

Knowing that they were not at the mercy of ferocious weather gods and unpredictable climate events, farmers could now give wings to their dreams and embark on new agriculture projects, taking calculated risks and being innovative as they explored new markets, technologies, ideas and cropping patterns. The feeling of being covered in the event of a mishap eliminated their fear, insecurity and closed approach towards farming.

Index was designed in a way that did not make it very rigid. Rather, it allowed flexibility and room for a range of farming experiences. Like all farmers impacted by a flash flood in a certain area, each was given the same amount of compensation even though s/he may not have incurred any losses.

### Replicability

The ease with which farmers were able to claim their insurance promoted rice producing villages in East Java to also adopt this. A most encouraging development is currently Ministry of Agriculture assessing the potential use of index insurance to improve existing agriculture insurance. Efforts are now on to include a better understanding of the Index and what elements from it can add value to the existing crop insurance and how it must cover frequent climate events in the region specifically droughts, floods, pest infestations and crop disease. This entails a study of local temperature/relative humidity/rainfall patterns.

Some of the barriers that farmers experienced, related to coverage being only for a certain index and window, necessitating the need for active participation from farmers, extension workers and local agriculture office.

Farmers were explained how contracts got drawn up and what they entailed for both parties; how long the contract window could be open and what would be the best way for them to make their claim. At the end of the exercise the farmer got a lot more educated and aware, of not just claims but also the enabling legal and regulatory framework.

At the end of the day, whatever model was developed on a pan-Indonesia basis, had to be for the long-term. To make it sustainable it must tap into technology to support the building of a robust and efficient infrastructure. A process of continuous monitoring and evaluation is now further improving the index and weather data quality.



## Bridging the Gap for Improved Health and Nutrition

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*An innovative agriculture model was promoted in Kankadahad, Gondia, Hindol and Odapada Blocks of Dhenkanal district by building nutrition pathways for low-cost nutrition gardens within the household and facilitating consumption of nutrition supplement micronutrient powders.*

### Target Population

The supplementary nutrition intake alongside the mid-day meal (MDM) programme in schools covered 887 primary schools in four blocks of Kankadahad, Gondia, Hindol and Odapada of Dhenkanal district in Odisha. The Arun Institute of Rural Affairs (AIRA) mobilised communities in care and protection of local natural resources/environment, local forest patches, water channels, springs, grazing meadows, riverside sandy patches, marshy lands etc.

Community bodies and groups formed and skilled by AIRA included the Village Development Committees (VDC), Community Forest Resource Management Committees (CFMC) and WUAs. Each of these contributed to strengthening and boosting food security and nutrition and preparedness for climate change events. Most initiatives that were implemented targeted women self-help groups (SHG) and community leaders who in turn educated children on the consumption of micronutrient powders in MDM and the use of locally available green vegetables to combat nutritional deficiency to improve their food security.

### Problem

Most children below 14 years of age in rural pockets and urban poor households suffer from malnutrition. National flagship programmes and schemes like the Integrated Child Development Scheme (ICDS), Integrated Child Protection Scheme (ICPS), KSK, MDM reach students in elementary schools in an attempt to reduce malnutrition. Supplementary nutrition intake which is suggested for schools as part of free distribution is a notable attempt to improve nutrition indicators of growing children across the board. However, it was found that teachers did not show much interest in adding something like nutrition supplement in powder form since this was something new even for them. Like most people they knew of glamorised items like Horlicks, Boost, Glucose and other packaged curry masala powders and were therefore more likely to be dismissive about the efficacy of any locally put together supplementary nutrients.

During the COVID-19 pandemic, the food and nutrition security situation was impacted with grave consequences on food systems. The economic slowdown due to lockdowns further eroded people's purchasing power leading to higher food prices, affecting their ability to consume a minimally adequate diet. In such acute crisis conditions, the focus was mostly on meeting immediate needs for nutritious foods while supporting improved coping amongst impacted population groups. There was then the need to quickly support

community management of acute malnutrition and nutrition behaviour changes. This helped households preserve assets, keep children in school, and provide adequate diet for all household members, particularly adolescent girls, pregnant and lactating mothers, and children under five.

### **Solution**

AIRA's objective has been to support households to produce safe and quality agriculture to nutrition pathways for low-cost nutrition gardens, especially for pregnant women, women with small children, and children. The project implemented activities to raise awareness and promote and support households on a medium to long-term basis. AIRA adapted complementary and therapeutic foods for infants and young children through micronutrient supplements social safety nets at school meals. It provided access to food which had nutritional value, especially items sourced from locally grown farms or other edible items in raw or processed form. Discussions around these also helped address nutritional or food deficits owing to climate fragilities.

Leveraging core strengths in building resilience and systems-strengthening, AIRA partnered communities, local governments and civil society to strengthen their ability to cope with the crisis, minimise adverse effects, and foster long-term wellbeing. They also worked closely with School Management Committees demonstrating the need to consume these powders more than once in an attempt to bring about greater acceptance and results.

The project fostered education, training, equipment and information on good nutrition practices and hygiene for parents and children. In addition to scaling the use of fortified foods and high nutritional value in local production (rice, fish, cereals) it promoted an increase in consumption of micronutrients. AIRA worked with local authorities to implement risk management activities targeted at preventing food insecurity in case of emergencies. In addition to nutrition-related activities it aimed to strengthen government, civil society, VDC, SHGs capacity in disaster risk preparedness to improve food security of vulnerable populations during COVID-19.

### **Results**

The initiative benefitted an estimated 70,000 pupils, 1850 teachers, 3000 households and 950 CCHs. for pregnant women, lactating mothers with small children. There was marked impact with drop in iron deficiency and malnutrition among school going children. After consuming the micronutrient powder mixed in MDM, their health status improved and so did memory power.

An important outcome of the project has been increased local availability of and access to food and nutrition through better storage and value addition in all target households. Thanks to nutrition gardens benefits accrued, providing sufficient and diverse vegetables to meet the family's daily requirement. The vegetables were fresher, safer and more delicious than those brought from the market. This emerged as a meaningful low-cost agricultural production model with potential to thrive within the household-based food security component of the project. It met real local needs by addressing shortage of vegetables in between crop seasons and increasing diversity of vegetable choices and



nutrients. On the other hand, as an organic production-led method, nutrition gardens helped create a clean and safe source of vegetables for households.

### Replicability

AIRA's approach in the context of COVID-19 ensured crisis-affected households met their immediate food security and nutrition needs, while addressing underlying drivers that led to poverty and growing food insecurity. It focused on strengthening resilience capacities among crisis-affected households, building more inclusive food systems to ensure food production, processing and distribution, local livelihoods and nutritious food consumption in ways that could be sustained through crisis.

The project was timely given overall decline in nutrition programmes and consequent drop in nutritional status of pupils. New approaches were needed to ensure timely delivery of nutrition services and revitalisation of AIRA. By focusing on community-based nutrition programmes, the project provided an opportunity to strengthen effects of COVID-19 as well as corresponding mitigation measures and emerging global recession proving that food and nutritional security can reduce both the burden of health risk and health expenditure.

To build on gains made and to create incremental impact, efforts will be ongoing to change behaviours and attitudes of communities by concentrating on nutrition education for school children, training of teachers, revising curriculum, improving guidelines and increasing school capacities to address nutrition levels in individual schools.

## Food and Nutrition Security in Extreme Climate Fragile Conditions

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*Sustainable access was created via transboundary diversion-based irrigation through an urgent agriculture intervention involving community leaders, civil society and district administration to benefit over 5000 Indian farmers in Saralpara area of Indo-Bhutan Border with improved food security and climate resilience.*

### Target population

Indigenous communities living along the Indo-Bhutan border in Saralpara area of Kokrajhar district in Assam have faced repeated ethnic conflict and internal displacement. Post the devastating floods in 2016, Indian communities living along the Indo-Bhutan Border inside the Ultapani Reserve Forest were denied access to irrigation. Most of the families have a history of living in relief camps more than once in their life. The conflict and internal displacement pushed them to extreme levels of vulnerability. Adding to their woes have been the increased intensity of floods, erosion and siltation.

The situation had impact on neighbouring Bhutan too. The furious floods that razed the district headquarter town of Sarphang in Southern Bhutan to the ground, compelled the Royal Government of Bhutan to take a decision to divert Saralbhanga, a transboundary river to a different route, threatening to leave adjoining Indian farming communities dependent on traditional irrigation system Jamphwi, with no water.

### Problem

Every year the Saralbhanga river that runs between India and Bhutan causes annual routine floods in both countries forcing thousands of families to take shelter in relief camps set up

on embankments, roads and higher elevated locations. Due to excessive bolder extraction, it also creates huge siltation that fills up the fertile farm lands with sands and debris turning the land infertile overnight. The routine floods in the Bhutan Hills causes massive damage to crop lands. Increasing fragility of weather conditions and climate change has played a major part in turning a self-sufficient community to one that is hand-to-mouth through the year.

Adding to the complexity of the issue, the Royal Government of Bhutan set out a plan to divert Saralbhanga river to prevent future floods in their territory. This would inevitably leave the Indian border communities with no water for their farmlands, cattle and other human needs. Additionally, this would also make resident wild life, flora and fauna of Ultapani Reserve Forest bereft of lifesaving water.

### **Solution**

NERSWN while carrying out relief work for downstream communities of Saralbhanga with dry rations, WASH (Water, Sanitation and Hygiene), public health emergency (PHE) and public health preparedness (PHP) support realised the urgency of restoring the course of the river to its original route. Accordingly, an urgent intervention was made involving community leaders, civil society organisations (CSO) and the district administration. As a result, more than 5000 Indian farmers are now accessing the water from the transboundary diversion-based irrigation system in Saralpara area of Indo-Bhutan Border.

Along with their relief work, NERSWN mobilised the community, CSOs and the local government to advocate with the Royal Government of Bhutan. After a series of bilateral discussions led by community leaders, select CSO leaders and local government, the Jhonka (Deputy Commissioner) of Sarpang was convinced to halt the river diversion plan. This was a major feat that was undertaken at the right time and in the most effective manner.

The effective community-led advocacy resulted in not only increasing food production but also improving the nutrition and income of farmers. The communities set up a Border Market where the agricultural produce of Indian farmers was shared with Bhutanese citizens. While carrying out food, nutrition, WaSH and other relief work in the community, NERSWN realised the implications of what the government of Bhutan was planning at their end in an attempt to prevent future devastation to their population. Their decision to divert the river course of Saralbhanga would leave Indian communities living on the border without water.

Once the diversion plan was abandoned, NERSWN mobilised the community to intensify and widen the Diversion Irrigation System called Jamphwi, in the area to ensure access to water. Next, they supported farmers with seeds, capacity building, training on organic methods of preparing manure and pest control measures and establishing market linkages.

### **Results**

This multipronged strategy not only ensured food sufficiency in extreme climatic condition with annual routine floods but also improved the nutritional status as well as income from farm produce. More than 5000 Indian farmers are now accessing the water from the transboundary diversion-based irrigation system in Saralpara area of Indo-Bhutan Border.

The initiative was demand driven. The relief response work exposed the NERSWN team to

multiple climate and geopolitical concerns which it took up seriously and managed to create a space for all stakeholders to participate. A major factor that contributed to the success of the initiative was the participation of all stakeholders at the level of the community, CSO, local government and media as they shared the common goal of securing lives and livelihoods of a vulnerable community facing multiple disasters all their life.

The initiative helped resolve the food crisis and low nutritional status of the flood affected community. The intervention which began with provision of food, WaSH and health relief in flood situations transitioned quickly to the recovery stage where communities were supported in different ways to recover from the ill-effects of disaster before entering the rehabilitation stage. More than 3000 families and 15,000 community members benefitted from the initiative.

### Replicability

This model is easy to replicate and scale up. Though all solutions were context specific, it became increasingly important to complete the cycle of relief-recovery and rehabilitation lest a proposed solution for a disaster led to another disaster.

The project posed several challenges. The risk of causing harm to the good bilateral ties that India and Bhutan shared was considered carefully. Also, since the area had been infested by insurgency movement, the intervention had to be politically neutral so that the community could be aligned. Keeping in mind different ethnicities, extreme caution was observed since it could derail the progress of work being undertaken. NERSWN team was careful to follow a reconciliation approach in all stages of its intervention.

The intervention is of value also because of its effectiveness in resolving problems of disasters. While meeting immediate needs of disaster affected communities, it resolved long-pending problems of the transboundary river. It not only contributed towards community development but helped mitigate climate crisis thereby ensuring food and nutrition security and also helped increase incomes of the riverine community.





## Hatching Hope Initiative: Improving nutrition and economic livelihoods through production and consumption of poultry

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*A tribal community in Mayurbhanj district of Odisha saw its women adopting poultry farming to increase their income, improve nutrition and build a social security cover for themselves through the expertise acquired for setting up and managing their own poultry units.*

### Target Population

Rasgobindapur block of Mayurbhanj district of Odisha is mostly a tribal area where families have historically suffered malnutrition. The Hatching Hope Initiative was launched with the aim of supporting 7500 smallholder families. The primary beneficiaries were women and children who were empowered in ways that enhanced their nutrition and boosted their livelihood. Recognising that women were nutritional gatekeepers for the entire household, including men and children, they were the target population for the project. They found direct gains from the Backyard Poultry Production (BYP) which they undertook and through their produce and income their children and families saw an improvement in their quality of life.

### Problem

Nearly 85% of Odisha's total population resides in its rural areas of which about 57.67% comprises Scheduled Tribes (ST) who live in extreme poverty and poor nutrition. Further, an estimated 45-64% of the rural poor cannot afford a nutritious diet that is in accordance with national food-based dietary guidelines (IFPRI, 2020). More than 34.1% and 20.4% children (< 5 years) children in the state suffer from severe stunting and wasting and over 51% women in the 15-49 age group suffer from anaemia. According to NSS 2011,



composition of food expenditure shows high expenditure on eggs, meat, pulses, and fruits in rural Odisha. This means that insufficient income prevents families from accessing vital nutrients provided by these foods.

### **Solution**

Poultry farming has proven to be a successful intervention in similar communities across Asia and Africa where small birds are piggy bank for rural households building their small savings through sales. For families of Rasgobindapur, BYP was identified as a critical source of income to boost both health and economic status, namely their food security, nutrition and savings.

To make poultry a viable option and to increase the quality and quantity of egg and meat production, the project promoted a combination of good practices around poultry health and housing via biosecurity, zoonoses and vaccination; feed and nutrition using local feeds and linking smallholder farmers to the chicken value chain.

The project operated through three pathways. Pathway 1 is currently being implemented in the project area since 2019 and will be completed in November 2021. It looks at improving livelihoods of local families through poultry production. Every household was helped with building their own model poultry shed at a cost of Rs 20,000. The project provided Rs 10,250 as interest free loan while participants coughed up the remaining Rs 9750. Unfortunately, there is no subsidiary scheme of the government that can bear/reimburse this cost.

An improved BYP management uses free range coops and biosecurity measures. Producer community resilience is increased with management of SHGs that encourage savings and inter-loaning. Access to nutritious food at household and community level is increased with a sustained campaign on improved consumption. Simultaneously awareness and education levels around poultry production and consumption were increased through training, mass marketing and stakeholder engagement. Finally, the community saw substantial increase in its access to products, services, solutions and markets with rise in income levels of poultry farmers. Also, a well-defined cadre of vaccinators, hatchery owners and feed producers emerged.

### **Results**

Apart from 7500 direct beneficiaries the project reached approximately 52,000 more households with its sales and campaigns. More than 15,000 women and 1200 children were estimated to have directly benefitted via improved income and economic status and health and nutrition. A major advantage that project participants experienced was a drop in mortality of their birds. While non-participants experienced 70% death of birds on account of bird flu or other seasonal infection of illness, project participants experienced only 10%.

Overall, community was now better informed on shelter management, disease control and bird feed. There was a collective urgency to vaccinate the birds and maintain a vaccination calendar. The role of veterinary experts was emphasised and enrolment of community vaccinators who bore 50% service cost and 100% vaccine cost became a well-accepted need. As of October 2021, a total of 33 women vaccinators were hired.

As of October 2021, the earning through sale of eggs stood at Rs 42,678 and Rs 32,74,518 for meat. Household production and consumption of eggs doubled from 20 a month to 40 a

month and consumption of meat increased four-fold from once a month to once a week. Each of the 7500 families now have their own kitchen gardens with approximately 8011 birds. About seven feed mills, 594 model poultry sheds, two community hatcheries and one refrigerator have been added to the project as assets.

### Replicability

Given that nearly 85% women are maintaining BYP and leading the project implementation which entails handling mostly small animals, gives it a long-lasting flavour. The ease in initiating and operating the project and sustaining it over time is linked to the fact that it requires less space to get started. The success of SHGs has already shown the entrepreneurial spirit of women, inspiring many from neighbouring villages with similar terrain and dietary practices to join and benefit. With barely 150 sq ft area required, most households are more than willing to offer part of their backyard space which usually lies unutilised. According to the implementation team who has been extremely encouraged with the response, the project has the potential to extend to an additional 20,000 households in the same district.

A major highlight of the project model is its ability to prevent infections through day and night shelter techniques which have the potential to reduce mortality of birds to a larger extent. This implies added income over investment for producers. Having said that, the project did experience some challenges. In the event of birds falling sick a veterinarian was needed. However, identifying qualified veterinarians willing to visit remote places was not an easy task. The tendency of the community to free the birds all day and graze in open areas exposed them to infections. For them to grasp the importance of maintaining the birds in a confined environment using night and day shelters was still not well understood.

Families have been known to show impatience in nurturing birds who are basically country chickens, requiring 6-7 months to grow and be ready for sale. Availability of community crossbreeds was tempting since these need barely 3-4 months. Families were likely to keep both birds together, creating more avenues for infections to breed. Apart from the economic, gender, social and health related aspects which the project seamlessly addressed, it promoted eco-friendly practices that strengthened production techniques. Going forward, these will be further refined for use across poultry housing and health related interventions.



## Traditional and Culturally Competent Emergency Food Aid

Value of providing affordable, longer lasting, culturally accepted 'Emergency Relief Foods'

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Dr. Kiran Bains

Uttarakhand,  
India

*Findings from a study conducted in seven states including a village of Uttarakhand stressed the need for inclusion of traditional and culturally-competent food aid in the food baskets of disaster-hit evacuees and how this must be based on local culture and beliefs to ensure there is no food rejection and wastage.*

### Target audience

Uttarakhand has witnessed several large-scale disasters. Floods, landslides and natural calamities recur with an alarming frequency devastating lives, properties and livelihoods. Relief and aid are quick to pour in as people scramble to regain normalcy. In all the aid that gets mobilised for these stranded evacuees in the post-disaster phase, there is a lot of food that gets delivered. It is their lifeline to survival till such time that their homes and kitchens are restored. However, when the food aid does not match cultural beliefs of the affected population, it gets rejected and wasted. A study was conducted by Pushpa Dhama (as a part of her Ph.D. research work) in 2018, in Kusauli village of Uttarakhand to assess consumer acceptability in a small disaster-prone Himalayan village of Uttarakhand. The study's findings would be relevant for any similar setting across the country.

### Problem

During natural calamities, one of the biggest casualties is a disruption in the food supplies of the families. With children, elders and those with disease, injury and psychological trauma, a matter of immense concern then is providing safe, nutritious and ambient meals which can be stored for a considerably long time. What is usually the case is that there is a huge pile up of donated food materials that are culturally insensitive. Since much of it is unusable, bulk of it tends to get wasted. Such wastage of food is seen as highly undesirable given that there will be less food available in the future with new emergency situations becoming more frequent and lasting longer. Relief agencies struggle to provide general food-aid rations that can meet basic nutritional requirements and are distributed consistently and in adequate quantities while simultaneously considering cultural food habits of affected communities.

### Solution

As part of a Ph.D. thesis, a field assessment of consumer acceptability was carried out to evaluate the usability, favourability and cost-effectiveness of the developed emergency relief product (ERF) for consumption in a small village of a disaster-prone Himalayan state in Uttarakhand.

The study's secondary data analysis revealed that although India has varied geography and diversity in cuisine, food assistance during emergencies is neither culturally competent nor geographically targeted. Further research analysis looked at cost-effective culturally

accepted nutrient-enriched ERFs with increased shelf-life for seven disaster-prone states (Jammu and Kashmir, Uttarakhand, Uttar Pradesh, Bihar, Assam, Odisha and Gujarat) of India. These were prepared and assessed for sensory, nutritional, and storage studies in the Food Laboratory of the Department of Food and Nutrition, Punjab Agricultural University, Ludhiana. The modified Emergency relief products using Locally grown pulse and millets for these states were Girda bread and Lyde for Jammu and Kashmir; Roat and Cookies for Uttarakhand; Gujiya and Kachori, for Uttar Pradesh; Thekua, Sattu and Cookies for Bihar; Sandah Guri for Assam, Arisa Pitha for Orissa and Puranpoli and Khakhra for Gujarat. The popular traditional products of these states were chosen on the basis of their higher acceptability by the target population. The selected foods were modified according to the locally grown and available cereals, pulses, and millets. A training module was developed for nutritionists and other disaster professionals to enable them prioritise food needs of disaster-prone communities.

To accommodate respondents' limited reading and writing skills, a five-point Likert scale was used. As emergencies are not a suitable time to introduce new types of food, getting their culturally known ingredients-based food products in such situations encouraged their likeness towards them and was well appreciated by the target population.

### Results

The study pointed towards the need to factor in cultural aspects of disaster affected families, based on beliefs, values, practices and problem-solving strategies. It called upon nutritionists and health care professionals to be actively involved in cross-cultural encounters so they could establish greater empathy to address culturally sensitive issues with respect to food distribution during and post emergencies. Providing traditional food prepared by the local community using locally grown crops as a preparedness measure would help in its wider acceptance because the stranded population can relate with the food as they have cultural and religious beliefs associated with it. However, the food acceptability assessment could not be done in all the seven states due to time constraints and funds allocated for the work. However, a training module was developed which can be used by nutritionists and other stakeholders to extend the idea into fruition with the help of Government and other National and International organisations that have a shared vision to address food security problems in emergencies.

### Sustainability

The inclusion of culturally competent foods in the food baskets of the stranded evacuees brings them some relief from the psychological trauma. Also, the products developed from locally available crops make them cost-effective. For instance, the use of millets and pulses enhanced the protein, carbohydrates, fibre, and minerals effectively in culturally competent foods.

The findings of the study will be used to guide not just Uttarakhand's at-risk population but also those living elsewhere in the country. This will not only address the food insecurity that arises when any calamity occurs but also generate employment opportunities for local communities who will get engaged in growing more local crops and developing these culturally competent food products. Climatologists anticipate that there will be more recurrent and intense climate-related disasters or emergencies in the future (IPCC 2007).

## **CATEGORY - 1**

Strengthening the resilience and adaptive capacity of food systems in context of climate fragilities and disasters

In response, the need for disaster mitigation, preparedness, and response measures will have to increase with keeping food aid as an indispensable factor to provide relief to the affected population. Due to their low cost and high nutritive value, these products are also suitable to be included in various welfare programmes run by State Governments and other food aid organisations. Development and storage of the food products at a large scale will open up ways for local communities to get employed in the direct (growing local crops) and indirect (cooking and other processing techniques at plant) ways while addressing food security issues, particularly availability and accessibility to safe and nutritious food by all.



# **CATEGORY - 2**

## **Improving Emergency Preparedness and Response – Food Security and Nutrition**





## Mangrove Food Bar as an Emergency Food and Nutrition Resource (EFNR) for Low-income Elderly During Natural Disasters

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**Mangrove Food Bar**



**Mangrove Flour**

*Creating mangrove bars sourced from the abundant mangrove plantations serves as temporary food supplement that addresses the compromised dietary needs of the elderly population, during a tsunami or any other natural disaster while offering locals an opportunity to earn an additional income.*

### Target population

Indonesia being a maritime country has a vast coastal area that is prone to natural disasters, especially tsunamis. Apart from the loss of life and property it is a food crisis that tends to loom large every time there is a natural disaster or public health emergency. While the young manage to navigate their altered surroundings to fend for themselves, the elderly tend to get left behind suffering high levels of malnutrition, hunger and physical debility.

### Problem

The problem is more acute in coastal areas which despite being at risk of floods and tsunamis continues to house those who cannot afford to move, given the high land prices elsewhere in the country. In the wake of a disaster, the disruption in the transportation of food further adds to the availability of food.

Any disaster be it flood or famine impacts the elderly the most. Apart from jeopardising their physical state, it is their emotional and psychological wellbeing that gets hugely impacted and within this it is their food intake that gets compromised. They experience malnutrition due to low nutrition intake, have reduced access to food, experience increased degenerative diseases and are further plummeted into poverty.

### Solution

The mangrove fruit from the *Bruguiera gymnorrhiza* plant is widely available in these

coastal areas. The idea of developing low-cost mangrove-based Emergency Food and Nutrition Resources (EFNR) has met with excellent response. It is for the first time that the mangrove-based EFNR is being consumed directly with the purpose of meeting nutritional requirements. It is tasty, easy to make, durable and has long shelf life. It is available all-year round and can be replicated effortlessly. During a disaster situation when appropriate cooking equipment is limited or unavailable, the mangrove bar with all its properties serves as an ideal interim food till such time that supplies get restored.

Once its use was established and a demand seen, not just during a disaster strike but even otherwise, it made sense to explore its commercial aspect. Since policy and regulatory framework only encourage its production and consumption, there is no restriction in growing it because it is considered a part of conservation efforts. Apart from planting it in large swathes of land, it can be easily grown in a household nursery or backyard. That way it can meet the family's own requirement and find its way into the marketplace.

### Results

The solution has had its scientific and practical evaluations related to stages including nutritional value test and measurement. A pilot was conducted with 33 people in the elderly population aged between 71-80 years and 60-70 years. They were asked to partake in the pleasure of consuming the mangrove bar and then share their feedback on a set of indicators that included carbohydrate and fat content (scientific indicators), taste and appeal. Their weight was taken at regular intervals.

The scientific results showed that each 100 g of mangrove EFNR contains 88.9 grams of carbohydrates and 0.77 grams of fat. From 64.3% to 89.3% of the elderly population was accepting the texture, taste, and colour of mangrove EFNR. Regarding the nutrition impacts of EFNR on the elderly, the study showed mangrove EFNR consumption resulted in a significantly increased weight of 0.2 kg, energy (291.9 kcal), protein (6.1 g), carbohydrate (31.1 g), and fat (15.6 g) intake. The proportion of the malnourished elderly population who gained weight was more remarkable than normal subjects in the first and second weeks of the mangrove EFNR consumption.

### Replicability

What makes this food option relevant, meaningful and scalable is that it relies on native wisdom. Making flour from fruit is part of indigenous knowledge which the community is already familiar with. Further it is contemporarised by creating food bars that are more modern and appealing. Since its appearance is similar to popular commercial food that is attractively advertised, packaged and sold, the mangrove bars retain the ability to attract customers, adding to its acceptance and commercial value.

Preparing the mangrove EFNR food bar is also more resistant to spoilage. The process of preparing and storing it is far more resistant than biscuits/cookies because these can sometimes come as semi-wet food products. The packaging and delivery is such that it gains ready acceptance even amongst those who are averse to making any change in their food patterns. Since it is saleable it becomes an attractive choice for those who want to make a living from its sale proceeds. In several villages along the country's coastline people have made handsome profit by adding them to their list of household provisions and are finding that even during a non-crisis situation there is high demand. The reason cited being convenience of having them on hand at all times. Knowing that they are nutritious adds to the pull value.



The only challenge in this seemingly idyllic option is the growing reduction of forest cover. For mangroves, the large-scale deforestation and land conversion from intact mangrove to fish ponds needs to be planned and addressed. The community uses mangrove wood as hardwood to build back their house.

Some level of non-acceptance which is there can be addressed through advocacy and behaviour change campaigns that include endorsements of fishery and marine agencies and other influencers. The opportunity of using an abundant resource for addressing the food needs of the elderly population must be leveraged to the optimum by turning it into a lifestyle choice with demand 365 days a year. Moreover, with the community expected to plant, collect, and prepare the EFNR by themselves there is a good chance of the mangrove bar being a sustainable alternate nutritious food option.





## Evidence Based Advocacy and Campaign for Inclusive Humanitarian Response by the Government ensures Food Security, Nutrition and Survival of the most Marginalised Communities in Kerala Excluded no more, Kerala's marginalised communities get their due attention

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*A unique geo-tagging exercise helped identify marginalised communities and then using the evidence to advocate with the government to include them, in not just accessing flood relief benefits but also availing other government entitlements and social protection schemes.*

### Target population

The heavy monsoon deluge of 2018 resulted in one of the worst floods ever in the history of India's southern state of Kerala. Multiple agencies stepped forward to support the government in mounting a huge humanitarian and relief response. Unfortunately, the most vulnerable and marginalised families, most of whom belonged to the Dalit, Adivasi and other excluded communities remained outside the purview of government response projects. Once this fact was noticed, deeper study revealed how they had failed to benefit from previous emergency and disaster relief operations too.

### Problem

These communities were excluded for reasons that related to their socio- economic or locational disadvantaged position within society. The inequitable distribution of food, funds, clothes and other materials at a time when the floods had caused massive disruption was worse for them as they now faced serious issues related to food security, malnutrition and survival.

It was important to draw attention of the government to this inadvertent exclusion but one which could have serious ramifications. These would be not just from the point of view of having a restricted rehabilitation plan that was not equitable, judicious and fair but also

one that could be given a caste and religious colour. Hence the need to rectify it at the earliest was expedient.

### Solution

RIGHTS in collaboration with Oxfam India undertook a geo-tagging exercise that helped locate a lot of families belonging to the marginalised sections of society and who had either not heard of the government relief efforts or had reconciled to not being a recipient. While it was not intentional, the data eligibility of recipients collected and reported by the government ended up overlooking the Dalit, Adivasi and other excluded communities.

An ‘Inclusion study’ using geo-tagging was conducted across the four districts of Kerala immediately after the floods of 2018 to identify the cases of ‘Exclusion’ in the list of eligible recipients of government support during post- floods period. The cases of exclusion were geotagged and the consolidated list shared with the government with request for reconsidering the list to ensure the ‘Inclusion’. This helped generate solid evidence in the form of authentic data from specified geographic locations.

This was then analysed and put together in the form of multiple advocacy documents and formats. A representation of senior management of OXFAM and RIGHTS made appointments and visited concerned government departments to draw attention to the issue. Through continuous follow-up with the government via several rounds of delegations and discussions, attention was drawn to the gap in the system. The government finally agreed to include the names of the excluded people and issue a notification in this regard to activate district authorities for revision of the list.

### Results

The data with the geotagging and accurate information regarding the excluded population made the government realise the gap and motivated them to reconsider the listing. Once the inertia at the level of government to acknowledge the gap in the system was confirmed and exclusion of eligible recipients noted, it was only a matter of time before the correction got reflected in official government records.

Capacity enhancement of communities was done to make them aware of the issue and the remedial steps that were now being taken to ensure they got their legitimate due. Subsequently, an estimated 78% of appeals were settled and met by the government. The worst affected and most marginalised people received financial benefit of around Rs 25 crore which was directly contributed towards improving their food security, nutrition, restoration of their livelihoods and overall building of a disaster resilient local infrastructure.

A strategic blend of evidence-based advocacy with the government for inclusive disaster response and awareness generation campaign at community level on their entitlements is the key spirit of the current solution.

Thus, the direct impact of the solution could be considered in the range of Rs 25 crore, while indirect impact is estimated at Rs 100 crores.

This has been a major step forward in ensuring neglected communities are given their rightful place in society. The effort taken to get their due compensation during the 2018 floods led to a serious relook at how government projects were being accessed by them and if there truly was a uniform and partisan approach to coverage. The sustained advocacy led to their inclusion in the safety net of numerous social protection schemes.

### Replicability

The success of the initiative was in the mature handling of the situation by all those involved. The service users or marginalised communities offered all support and placed confidence in the government to do the needful. OXFAM and RIGHTS took up the issue on a war footing and used the data to highlight the gaps and bottlenecks. The service providers or government finally took cognisance of the points that were made, each of which was duly backed by evidence-based information.

This strategic engagement with the government has helped in ensuring the inclusion of the most vulnerable people under the coverage of government entitlements to ensure their food security and nutrition during any given disaster situation. The innovative solution being process and results driven makes it replicable and scalable in different settings and contexts.

## Kitchen Pods

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**Bengaluru,**  
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*The ease with which the unique and innovative ‘Kitchen PODS’ can get deployed at any point of need or disaster/emergency setting with a bounty of fresh, hygienic cooked meals serves as a source of income to those who are running the PODS and a lifesaver for those who are most impacted by the disaster and are on the brink of starvation and disease.*

### Target population

Street vendors and marginalised families who eke out a living from agriculture are the hardest hit during a disaster or any other humanitarian crisis. Since they do not own their own land and are dependent on what they can manage to procure, often through unpredictable and erratic means, are at risk of lose their meagre source of income when a disaster strikes. They also are more likely to go hungry since some of the produce they gather on any given day actually helps them put food on their table.

As part of an experimental project that has demonstrated excellent success in select cities across India, a group of six women from the tribal and marginalised communities residing around Bengaluru rural and urban, in the state of Karnataka, India was tasked with running and testing the ‘Hungry Wheels Kitchen PODS’ initiative over 36 months. As part of Oota Gaadi or the Food Vehicle project supported by Hungry Wheels, the initiative won appreciation from the Karnataka Tourism Secretary as a model means of employment and livelihood for women and youth. This is now going to be replicated by the Archaeological Survey of India elsewhere in the country.

### Problem

In the aftermath of a disaster, one of the toughest tasks is to keep the social fabric from collapsing and this entails looking into the immediate survival needs of those living on the

fringes. As people scramble to safety and deal with the impacts of the disaster, they face growing challenges with respect to disruptions in the water and food chain. Contamination and scarcity of water and food, destruction of homes and hutments and outbreak of disease compound issues causing a further erosion in their sense of security and safety.

The problem is not confined to a few individual families. The impact of the disaster can encompass entire neighbourhoods that dot the affected landscape, extending to several villages, an entire district or even state. The aim of any reconstruction and rehabilitation effort should be to mobilise rapidly, deploy quickly and dispense food swiftly where it is needed the most and to meet the demands of those who are hungry and waiting for relief.

### **Solution**

Each 'Kitchen Pod' is built on a zero-emission, driverless vehicle which is referred to as a POD. Each of these POD is connected to a vehicle in front of various PODs that can be made into a road train containing a self-sustaining kitchen, for both preparing and serving food. It usually employs up to six people directly and eight indirectly. Hungry Wheels has enough capacity to deliver thousands of units of 'Kitchen Pods' that have the ability to quickly restore livelihoods and provide safety and security for all those affected. There is a relatively low infrastructure cost too since there are no major fixed expenses. It is a minimalistic model that thrives on practical design sensibilities. Its simplicity is what lends to its innovativeness, both in terms of look and feel and user friendliness. 'Kitchen Pods' reduces resources needed to manage disasters, as these are 100% mobile. The difficult task of running a massive operation with high costs and overheads is a deterrent for most food businesses but not the Kitchen PODS.

### **Results**

The pilot was conducted at select locations over three years to check operation viability and commercial feasibility across Bengaluru and its suburbs. Visitors at every location were eager to have the Kitchen POD come again, as the hygiene and transparency in the design was new and refreshing for everyone.

With each POD having storage capacity of half a tonne of food and an average meal comprises of 300-500 grams it could feed up to 1000 people in one service. At the end of the pilot thousands of people had consumed hot, fresh and wholesome meals prepared by the cohort of six women.

### **Replicability**

The Hungry Wheels 'Kitchen Pods' are a cost effective and impactful method that thrive due to their versatility and assured results. They are mobile and can be moved to wherever there are hungry people who need food to be served. Hungry Wheels is looking to manufacture locally in various countries, for this we need impact funding to create a unique micro-factory model, which will give employment and opportunity to local communities. Hungry Wheels 'Pods' are EU Compliant zero-emission vehicles, can be customised to suit any setting and cuisine making it very acceptable across cultures. The speed with which they can get deployed anywhere in the world makes them a perfect choice in the event of a disaster when everyone is still trying to create a semblance of order, these PODS can start providing both income and food. Once things have stabilised



## **CATEGORY - 2**

Improving Emergency Preparedness and Response –  
Food Security and Nutrition

and food supplies are restored, they can be moved to another location or can find a spot where they can still be positioned and be of use to the marginalised communities. Little wonder then that those who have seen this model and benefitted from it, refer to it as the “happy pod” experience.


## Beingood App

Shahul Hameed

Kerala, India

**Features**

Let's share and care each other. Look out the features of Beingood for the better understanding of our vision.



**Easy to Use**  
Beingood is a highly user-friendly application; anyone can post help requests or check for available helps nearby easily.

**Location Wise Helping**  
This app provides you location wise details of people looking for helps or people providing helps for earliest access and easy navigation

**Honorary Bages**  
Get self-motivated and honoured forever by taking real tasks and receive points with exclusive honorary badges on your timeline accomplishments.

**Instant Messenger**  
Whenever you find help needed or help provided you can simply chat with the person in real-time for faster communication

**Community Social Networking**  
You can create communities to simply connect with them or follow people having same interests and keep a tab of all the things posted by them

**Quick Notification:**  
Instant notifications of new posts will be delivered for all the App users in 50 km radius, so that we don't miss out on new requirements.

*Beingood, a futuristic App utilises sophisticated technologies like map, navigation, real-time instant messaging and notifications to connect those needing help and those wanting to provide help. Born during COVID-19 pandemic it can be used in any humanitarian disaster in the world.*

### Target Population

Today there is proliferation of mobile smart phones and use of social media by a wide cross-section of people including the marginalised and uneducated. During the peak of the COVID-19 pandemic, the deluge of information created and disseminated was possible largely because of this reality. Against this backdrop having a dedicated app that brought together those who wanted to help and those seeking help, was timely and much needed.

The App was designed as a unique platform connecting those in search of help during disasters, calamities, pandemics and other difficult times with those in the vicinity and willing to help. They comprised of people dedicatedly serving in government institutions, task forces, organisations, volunteers and anyone else ready to help, share and care for each other. The App served as a bridge allowing both users to provide assistance and seek support across categories that included Quick Help, Food, Medical, Blood, Dress, Educational, Travel Assist and Other.

#### Problem

In 2020, during the COVID-19 induced lockdown, it was heart-breaking to see migrants and marginalised population stranded and struggling for basics like food and water. The images and videos beamed in the press and on social media showed countless people left to fend for themselves. With fear and paranoia regarding the virus, there was little movement outside. So even if there were people in one locality, they were cooped up in their homes not knowing there might be stranded individuals 100 metres away thirsty and hungry. This became the genesis for creating a technology platform that could bring together the help-seeker and helper.

#### Solution

The Beingood App was developed by Shahul Hameed, a teacher from Minicopy island of Lakshwadeep. It is free and available in App Store and Play Store globally. Hameed spent his personal money to the tune of Rs 7.5 lakh to ensure it could be of help at a most crucial time of the pandemic. Its functionalities are simple. It has icons on its home screen with ‘Get Help’ and ‘Give Help’. A person who wants to help can click on ‘Give Help’ and a person who wants to receive help can click on ‘Get Help’. The moment s/he does this, their request gets plotted in the Map in Red or Yellow colour as per the intensity of the request. There is space to add a description, photo, audio or a short video too. Once the request gets posted, it immediately provides

notifications to registered App users in a radius of 50 kms. Any of these users can contact the person seeking help using an inbuilt Real-time instant messaging system with navigation from the post itself.

The ‘Give Help’ option allows the ‘giver’ to donate food, clothes or any free service by posting and plotting details in green colour in the map so that those in the vicinity seeking help get a notification. Several volunteers were registered and they helped connect the helper and helped. Besides notifications, people could see requests as lists using filter buttons by selecting preferred categories, distance, time, category types like Urgent, Moderate and Available.

To get best results, 30 tech developers were hired from Government Cyber Park in Kerala to imbibe advanced features. They worked for a year to complete the dream project which had no previous reference point. Although people can get connected through the App without contacts, it lets them use solutions as they have the option to share the request in the App through social media. Community Groups can be created for multitasking and doing bigger things. People can follow a particular person to get request notifications even when beyond the 50 km radius. They can add requests, available help and add persons to their favourite lists. The option to select date and time according to users’ convenience while making a post too is possible.



The App provides honorary points and virtual badges to users on their timeline accomplishments appreciating real efforts to enhance the feel-good factor and motivate others to follow suit. The most relevant part of the App is it compiles all people regardless of categorisations connecting help providers and seekers for food, petrol, clothes, medicines, shelter, support for education, help with performing last rites or any other. Without having contact details of an individual, it provides them access to a wide database just by posting a request.

### **Results**

The app has been successfully launched in Kerala by the Kozhikode District Collector. It was used extensively by both categories with positive response and feedback filtering into various social media platforms and on the App too.

The feature related to location plotting was useful in rescue operations. The target of attaining zero hunger target now seemed possible. The psychological feel-good factor that app users felt helped them deal with the trauma of the pandemic. As word got around requests for being part of 'Give Help' began to rise with professional, media personnel, government functionaries, student associations, charitable trusts, industry CSR and others joining. Users from Europe, Canada and Middle-east became part of the Beingood community and helped not just by offering help but also traction in their circles, expanding the database.

### **Replicability**

The Beingood App is built on native languages in iOS and Android with high-end features and can work flawlessly while scaling-up. It uses one of the fastest servers in the world with the ability to receive droplets in any location. Its firebase real-time chat ensures unparalleled speed. Mobile number authentication is part of the registration process with an Admin panel that controls and monitors all activities and users.

For refining the working flow of the app, it must be reached and accessed by more people. Since the app is developed by an individual, its marketing and advertising is a challenge. It relies on word of mouth and visibility through people driven free platforms. Another innovative feature relates to how while installing the App, it detects Country code after its flag is selected and number entered for authentication. It is an advanced feature to enable users from others countries to receive notifications as an invalid number but when conveyed the right way, gets them authenticated.

The Beingood App is an excellent example of how technology can be used as an innovative futuristic invention to address issues and provide hope for humanity and mankind.

## Community Resilience Fund to meet the need of children's hunger in disaster

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Hunger is an inevitable outcome in the aftermath of cyclones and affects children severely. In Puri, 700 coastal community members started a 'Community Resilience Fund' through donations to feed children cooked nutritious food sustaining them for the first one-week post disaster.

### Target Population

The eastern Indian state of Odisha is often referred to as the disaster capital of the country. The fisher-folk communities residing on the beach landscape of Bay of Bengal are the worst affected population due to increasing intensity of climate change impacts in the form of sea level rise, high intensity and frequent tropical cyclones and storm surges. A self-driven initiative was launched by 700 women from Penthakotta slum habitation of Puri to address the hunger needs of children in a crisis situation. Aply termed as the "Resilience Fund" it saw many more families joining in as the food drive for children got intensified. Presently, more than 1200 families are reaping the benefit of these collective efforts.

### Problem

Families living in and around the coastal areas of Puri are impacted with repeated cyclones and other natural disasters. They have been living there for generations and not been in a position to move elsewhere. Some temporary measures are taken to safeguard themselves from the onslaughts, but by and large they are hit hard by the disaster that uproots their homes, throws their livelihoods out of gear and causes damage to their cattle and other fixed assets.

The situation in the aftermath of any disaster is even more precarious when government support fails to reach the affected people. For instance, when the last Fani Super Cyclone struck in 2019, the entire Puri district was cut off for weeks. Up to a week after the cyclone, there were no standing houses left where people could stay and no fresh food that was available, or drinking water and health services. Each year these communities face issues with respect to health, loss of property and drop in income. In many places, for days at end they remain homeless and hungry, bereft of basic essential services and little to no money to set their lives back on track. The worst affected are children who do not comprehend the magnitude of the disaster and are often found crying for food and water.

### Solution

It was in May 2019 when cyclone Fani struck the coastal town of Puri, the urban slum habitation of Penthakotta was devastated. With a population of over 45,000 the task of creating camp houses made of polythene sheets to keep families safe was onerous, time consuming and expensive. In this hard situation, many of the children started suffering



from high fever, infections, cold and cough. The unavailability of drinking water was another area that needed attention. Post the cyclone, the community had to reorganise themselves. They were engrossed with meeting their immediate needs related to survival such as rebuilding homes and keeping members safe. Dry food stuff which they had collected and saved would suffice to meet their needs for barely two to three days while support from the government and other agencies would take longer to reach.

Parents were having a hard time keeping their children from crying for food. To save them from hunger a local, community-based solution was planned by 700 women. In two months a fund of Rs 1,20,000 was raised through voluntary donations and saved in the nearest bank with the sole purpose of serving as an emergency corpus for children's food. Termed as 'Community Resilient Fund', it was associated with the food needs of children and was more like a reserve fund or a step towards 'community readiness'. It was managed by leaders (President and Secretary) of 53 women self-help groups at the consortium level covering a population of 4500.

This idea took on the form of a movement which addressed risk and the building of resilience through preparedness. Later its membership reached 1200 women and the fund grew with a monthly savings of Rs 10 by each member. Once food resilience was achieved, the community began to prepare itself to meet other challenges in a similar self-help mode.

### Results

In the aftermath of Fani Cyclone in 2019, the slum community of Penthakotta in Puri faced the worst vulnerabilities due to 'scarcity of food' that extended to nearly a month. This solution was novel since it talked about reducing 'hunger' of children for seven days post the cyclone. The idea to keep it untouched and reserved was a good decision. This provided a means to the mothers to stay united and to first gauge and then distribute household and child care tasks amongst themselves. This led to greater empathy and support within their group.

A recent example would be that of the COVID-19 outbreak. In August 2020 an amount of Rs. 75,000 was used to undertake "community sanitisation". This helped in preventing community spread of the virus. The same process was repeated few months later during the second wave of COVID-19.

### Replicability

The ease of implementing this initiative and getting the community to own it makes it easily replicable. It works particularly well in places where there are recurring disasters. It is likely that every year more families would want to benefit from a similar Resilience Fund seeing how quickly its benefits percolate down to those who need it most. The group of 1200 women have been standing unitedly for a common cause of 'providing food to their children'.

## CATEGORY - 2

Improving Emergency Preparedness and Response –  
Food Security and Nutrition

There is an overall realisation that “self-help is the best help” and that the idea of a “Community Resilience Fund” is one of those ideas which no one in the family can deny. In a vulnerable community where the disaster has become a frequent feature, often a family corpus or saving at the individual level does not prove to be as useful and handy as a group fund.

Savings by the community for the specific purpose of ‘providing food to their children’ in an extreme hunger situation can tug at your heart strings. It also brings the entire community together as they share responsibilities of cooking, feeding and fending for their and one another’s children. This goes a long way in reducing their vulnerabilities. The decision to keep the fund in the name of the women consortium in the nearest bank was a wise one since women could be the best custodians and managers of the same.

## Community action to avert food and nutritional insecurities during emergencies via community grain banks

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*Grain banks in Odisha served as an interim lifesaving intervention allowing families and community members to rely on the very grains, vegetables and dry rations that they had saved through the year and which could now meet their nutritional needs till aid and relief poured in.*

### Target Population

The recurring flood situation caused by the Bramhani River system and cyclones emerging from Bay of Bengal in Bari Block of Jajpur District of Odisha places children, women, lactating mothers, widows of single-headed families and adult members at grave risk. During the floods of 2020 the concept of setting up grain banks was tested with the target community reaping its benefit. The practice was piloted in four small villages/hamlets of Meduakula Dalei Sahi, Bari Bila Sahi, Haladi Basanta Malik Sahi and Gamu Kula Sahi.

### Problem

Emergencies affect the poor and those living on the periphery of society the most. Every time a disaster strikes, their homes get washed away and food stocks perish, leaving them struggling for basics. The usual response is to provide relief after the emergency situation has peaked. Even in places where natural calamities have a recurring presence, the ability

to be prepared before-hand is lacking. The same was tested during the COVID-19 pandemic when entire communities and large vulnerable populations struggled to battle hunger and poor nutrition.

### **Solution**

Pallishree NGO witnessed these problems closely and set about strengthening preparedness at the community level so that not one individual remained hungry and all his/her food and nutritional requirements were adequately met with. In the year 2016, the idea was implemented in the four pilot villages of Bari Block in Jajpur District in Odisha. Women from the village were collected and the problem discussed before mooted the idea of setting up a grain bank that stockpiled necessary food items through their own efforts and which they could dig into during their lean and emergency periods. The grain banks are now an integral part of the community's disaster preparedness efforts.

The objective of grain banks is to manage food and nutrition insecurities through a culture of “self-help” wherein people can themselves rise to the occasion to become their own saviours. This is critical in the immediate phase post a disaster when everyone is trying to deal with the aftermath and struggling to put the pieces of their lives together - searching for loved ones, seeking emergency medical aid, finding a roof over their head and keeping starvation at bay. All while hoping and waiting for help to arrive. This grain bank was then a perfect solution which brought with it the guarantee of healthy, nutritious and abundant food.

The approach that was followed to get the grain bank operationalised, functioning and sustainable over a long period was to facilitate women centric organisations to handle it. By empowering them with the know-how and requisite steps of how to set it up, replenish it and disburse its stocks was therefore a wise decision. The grain bank relied on vegetable stocks grown and nurtured on high homestead land or on rooftop of homes. Based on climatic conditions a variety of dry vegetable substitutes were grown for emergency use in common kitchens. This provided relief to the women of the house. Each family contributed a handful of rice to a common grain bank every day round the year. This collection was then utilised for emergencies on a collective basis.

With the grain bank, community members were encouraged to also grow vegetables keeping the climate-disaster land condition in mind. In all villages, climber type of vegetables were promoted as they provided protection to thatched houses and could be grown in the local context.

### **Results**

More than 500 people benefitted through this process with each habitation collecting 3-5 quintals of rice for emergency use on an annual basis. Ever since the grain banks were set up the communities experienced several small to medium disasters. They met these with greater resilience, safe in the knowledge that come what may they and their families would not have to sleep hungry. In no time their grain bank would come to their rescue and help them address their food insecurities.

By contributing a handful of rice on a daily basis, target families could easily organise and avail of common kitchens during emergencies. Their vulnerability was reduced as they

found a legitimate and manageable way to cope with the situation without causing any stress or burden on any single individual. The larger objective was to ensure food availability to cover two meals a day and for this to be the staple food which people of the area were accustomed to. In few places the common kitchen continued up to four days.

### Replicability

The practice has potential for upscaling and replicability in small villages, hamlets and household micro groups where people are vulnerable to disasters and have reduced access to the outside world immediately post disaster. The grain bank fills a major gap between distress and relief; and scarcity and availability. In that it provides lifesaving support when large-scale devastation has taken place and relief is yet to pour in.

Going forward, the model can be further refined with a wider variety of grains, dry rations and food items with longer shelf life. It can be structured in a way that allows women take the lead in organising items for the grain bank, maintaining records of its usage and refurbishing it once it is depleted. Also utilise cash and in-kind contributions in a meaningful way. What is heartening about this initiative is that it is completely voluntary. There is no burden or pressure on anyone to give or any fixed quantity that must be parted with. Even the responsibility of collection is shared and done on a weekly or fortnightly basis.

Confidence and ownership of the community will be important to build if collective action has to sustain itself. It must anticipate and prepare for any eventuality where there is an interruption or ceasing of donation owing to a slackening of participation and ownership or household/family conflict. There could be extraneous factors wanting to disrupt the process and those in charge of managing the grain bank must be prepared to overcome these hurdles. Engaging with youth, panchayati raj members and community leaders and influencers will be a step in the right direction. Eventually, the role of women who are at the centre of this novel intervention must be strengthened.





## Disaster resilient and ecologically sustainable sanitation system for flood prone areas of Bihar

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*‘A unique flood resilient and ecologically sustainable sanitation toilet technology was implemented in five flood-prone districts of North Bihar by Megh Pyne Abhiyan through Phaydemand Shauchalay (Beneficial Toilet -EcoSan) that managed humanure and urine reuse with encouraging results.*

### Target Population

Phaydemand Shauchalay of EcoSan (ecologically friendly sanitation) is a technology that provides much scope to be adapted for different terrains. In flood-prone and high groundwater regimes, it is found to be suitable as the faecal tanks are above ground where waste is decomposed by aerobic bacteria and in the warmth of sunlight. This does not permit contamination of surrounding soil and groundwater.

The flood vulnerable communities are a specific target group in the entire North Bihar and also in other similar flood prone areas in adjoining states. Phaydemand Shauchalay is a good example of addressing the issue of sanitation and water quality, both during and post flood conditions, in totality. With the possibility of customising the design to suit local settings and available resources, it offers a valuable technology for scaling up and out.

### Problem

North Bihar has an approximate population density of 1,294 persons per sq. km with an estimated 65.54 million population (as against 103.80 million of the entire state). According to the Water Resources Department (WRD) of the Government of Bihar (GoB), there are 15 extreme flood prone districts that include Darbhanga, Purbi Champaran, Katihar, Khagaria, Madepura, Madhubani, Bhagalpur, Muzaffarpur, Saharsa, Samastipur, Shohar, Sitamarhi, Supaul, Vaishali and Begusarai in the state.

Alongside, there are 28 flood prone districts of Araria, Begusarai, Bhagalpur, Bhojpur, Buxar, Darbhanga, Purbi Champaran, Gopalganj, Katihar, Khagaria, Kishanganj, Lakhisarai, Madhepura, Madhubani, Muzaffarpur, Nalanda, Patna, Purnia, Saharsa, Samastipur, Saran, Sheikhpura, Shohar, Sitamarhi, Siwan, Supaul, Vaishali and Paschim Champaran.

It will not be erroneous to say that almost the entire of North Bihar is prone to floods in varying proportions across flood typologies. Recurring floods pose a threat to toilet structures as well as prevent access to them in difficult times, causing a temporary reversal to open defecation, which is undesirable because of compromised health and nutrition standards.

<sup>6</sup> The MEGP initiative received application from other sectors with indirect impact on food security and nutrition as well. In humanitarian context none of the sectors can be seen in an isolation. Food, shelter, wash, livelihoods have obvious interconnections. This case story, although not directly contributing to food security has its relevance through indirect impacts and therefore included in the report to emphasise on the need for inter-sectoral coordination.

## Solution

Phaydemand Shauchalay is an adaptive and innovative sanitation technology, which follows above ground excreta management and therefore has a sustained use before, during, after floods and in waterlogged areas as well. In addition, the disposal of excreta in soils and water is completely stopped, thereby helping in source (groundwater and surface water) protection. Faecal management happens in the sanitation unit itself eliminating the need for other structures for sewage treatment. Different design models of Phaydemand Shauchalay are possible, based on location, flood typology, land availability and financial resources. The compost or ‘humanure’ is handled by family members themselves and used directly in the agricultural fields and kitchen gardens.

Phaydemand Shauchalay is based on the principle of a nutrient loop as opposed to a linear system, i.e., human faeces which decompose are used in agricultural fields and kitchen gardens as humanure. So also, urine, though directly, but after dilution becomes a substitute for urea. This is because urine contains major plant nutrients of nitrogen, potassium and phosphorous (NPK) which are essential for plant growth. This is an adaptive, and innovative sanitation technology, which follows above ground excreta management and therefore has a sustained, safe and hygienic use before, during, after floods across flood typologies

Local communities of North Bihar are plagued by several concerns which come to the fore when any alternative technology is proposed. In case of Phaydemand Shauchalay too they had concerns around how they could prevent groundwater contamination; prove its efficacy as a flood resilient and ecologically sustainable technology; increase adoption by locals given that it took longer to construct and was more expensive than the twin-leach pit toilet they were used to; anticipated problems given its specified usage sequence; essentially being an external concept and therefore questionable in the flood prone areas of North Bihar where any technology had to be scalable. Each of these concerns were addressed through inter-community interactions and sharing to alleviate fears and establish Phaydemand Shauchalay technology as an effective measure and one that could become universally accessible, even for the physically challenged and elderly. Also, peer-to-peer interactions helped build a local cadre of masons skilled in construction of Phaydemand Shauchalay for flood-prone regions.

## Results

Naya Tola Bishambharpur village in Bhagwanpur panchayat of Nautan block is located on the riverside of River Gandak close to the eastern embankment in Pashchim (West) Champaran. This hamlet is prone to riverine floods which makes access to sanitation a major issue. With flood waters rising to 10 feet and marooning the village for days and weeks in cycles within a year, they require sanitation technologies that can be accessed during floods. To overcome this perpetual challenge, eight households were motivated for the pilot in the village, after being exposed to Kairi village of Domat panchayat in Gawnaha block, Pashchim Champaran, where the Phaydemand Shauchalay was piloted in a flash flood typology.

In both the pilots the CapEx on Phaydemand Shauchalay was undertaken by the household and through the government scheme and the technical inputs were provided by Megh Pyne Abhiyan (MPA), a Public Charitable Trust that works on issues of water distress in East India.

### Replicability

The underlying objective of the action pledge taken by MPA was to contribute towards building resilience among vulnerable communities by promoting Phaydemand Shauchalay in flood-prone North Bihar. This was seen as a suitable and sustainable alternative sanitation technology which could be accessed in the most challenging times, particularly recurrent floods of varying nature and intensity, made more erratic due to climate change.

Phaydemand Shauchalay is appropriate for natural flood hazard prone regions (flash and riverine flood, waterlogged areas and other flood typologies) as a sustainable and disaster-resilient alternative. Construction of toilets of different designs within the same flood prone region highlighted the need for appropriate design depending on inundation, duration and intensity of flooding. The technology emphasised the relevance and potential of a disaster resilient and ecologically sustainable sanitation technology that could be practiced in flood prone districts and where there were alluvial flood plains.

Currently, Phaydemand Shauchalay is the only workable sanitation solution currently, as it has been proven that twin leach pits and septic tanks simply do not work in flood conditions and can be detrimental in areas marred with waterlogging and shallow water tables. For ensuring the future of Phaydemand Shauchalay in flood prone areas, other designs can be drawn up with inputs from solution providers and state governments to promote these in relevant settings.

The good practices from Asia, mapped in this compendium brings range of opportunities of learning from the grass root that can catalyse policy and practice reforms in food and nutrition security. The stories documented are great testimonies of the existing capacities at various levels that can revitalise the sectoral reforms to cope with changing disaster risk landscape. The case stories not only present innovative and proven solutions but the interconnectedness between different stories is also evident through the commonalities in the problem context, vulnerabilities, approaches or strategies which these stories may share. Thus, the learning exchange can be useful to a wide range of users as there is definite merit which these solutions can offer through replication in a wider geography with contextual adaptation.

The solution on the 'mangrove food bar' from Indonesia which serves as a source of temporary food supplement through mangrove plantation is a novel idea that promises to address not only the humanitarian needs but also incentivises environmental conservation through ecosystem services. Through the multipronged results, such solution can potentially revamp the mangrove conservation efforts across the Asia. Interestingly, exploration of such solutions are not limited to Indonesia only, as the compendium also documents the efforts of Panjab Agricultural University in developing the nutrition - enriched emergency relief food from locally grown pulses, cereals and millets. Such initiatives are promising pathways for the researchers and policy makers to explore.

The Sack gardening initiative from Bangladesh, which documents an excellent execution of a very simple but effective agricultural innovation in flood prone areas that improves diet diversity at household levels. The solution is suitable in areas with lack of arable land and prone to frequent floods and inundation. The programme implementation in Bangladesh's char region in Kurigram which shares similar risks and exposure as the char region of South Salmara and Dhubri in Assam reflects on the importance of cross learning. Sri Lanka's efforts of reviving tank cascade system to improve crop production can inspire revival of tank cascade systems across South Indian states and states in central India including Chhatisgarh and Madhya Pradesh. These potential areas can be better capitalised through effective bilateral and regional cooperation. The compendium brings a successful case story from India - Bhutan transboundary cooperation which led to the protection of traditional diversion-based irrigation system called Jamphwi. The region has significant opportunities of cross-learning which can be easily tapped to collectively address the complex challenges posed by disasters and climate change.

The compendium interestingly brings range of solutions on alternate cropping options those are climate resilient. The number of solutions we received on revival of minor millets from different states of India and also from Indonesia, indicates how it has gained traction among practitioners across countries to find solutions for future risks through revival of traditional and resilient cropping. The different approaches used implementation of such solutions from Maharashtra, Odisha and Indonesia will offer learnings to practitioners and policy makers from across the region. The innovative agriculture models aimed at improving productivity, income and household consumption have also received adequate representation in the compendium. Agriculture production model cluster model, nutritional rehabilitation centres in Chhattisgarh to different models on kitchen gardening, multi-layer farming, integrated rice fish farming or faith agriculture of

Dayalbagh, provides kaleidoscope of solutions relevant across the spectrum of climate change and disasters.

Hatching hope initiative of Mayurbhanj presents a strong case of how simple solutions such as the poultry farming can ensure improvement in nutrition for disaster affected communities through improved access and availability of food and income enhancement. Disaster disproportionately impacts women and girls. The Mayurbhanj story also builds a strong case of women empowerment through gender sensitive programming. The importance of women participation is acknowledged in most of the case stories as the most important element of success. Cases of women economic empowerment leading to food and nutrition security in Kerala and Andhra Pradesh, the solar-based group irrigation model and women champions as organic change makers in PDS very specifically credits the success of their project to the transformative capacities of women leaders. Local capacities are important element in determining the risks or resilience of any community. Compendium illustrates with case stories, the novel initiatives led by communities aimed at reducing their dependency on external aid to the extent possible. The community grain banks, or community resilience fund are examples from Odisha which has proven effective to ensure food security in the immediate aftermath of a disaster without any dependency on the external aid.

It also highlights cases on inclusive and adaptive social safety nets. Use of simple technology such as geotagging the exclusion in humanitarian relief has effectively aided the Government and humanitarian service providers to ensure that no one is left behind. The compendium also documents technological innovation such as the beingood app which connects the service providers with the disaster affected communities in real time. Learnings from the plethora of work that is already happening across all dimensions of food security and nutrition can drive any systemic reforms. There is a need on strengthening knowledge sharing platforms through collective action. A learning platform which is driven by diverse stakeholders including government, civil society, private sector researchers, scientists and practitioners can catalyse collective action. With the changing risk landscape, collective action is not a choice but a necessity to cope better with disasters. Such co-learning platform should consistently strive for a larger engagement leading to the collaboration and cooperation from local to regional level. Stakeholders including the Government line departments, private sector agencies, donor agencies, UN and multi-lateral agencies should strive to extend hands to the innovators to help them replicate their proven solutions at a wider scale for the larger interest of the humanity.





### Jury Members



**Major General M. K. Bindal** is presently the Executive Director, National Institute of Disaster Management. He was commissioned into the Corps of Army Air Defence in December 1985. An alumnus of the National Defence Academy, Major General M. K. Bindal is a graduate of the Defence Services Staff College and has attended the prestigious Higher Command Course at the Army War College besides excelling in all other career courses in the army. Major General M. K. Bindal served as the Provost Marshall in the United Nations Mission in Mozambique where he was deeply involved in the liquidation of the mission. He has been the Director, Centre for United Nations Peacekeeping (CUNPK) New Delhi. For three years he was also the Secretary of the International Association of Peacekeeping Training Centres.



**Prof. Janki Andharia** is currently the Dean of the School of Disaster Studies, Tata Institute of Social Sciences (TISS), Mumbai and has over 32 years of experience in the field of community organization and social development. She has been involved in national and state level policy making work and has had a long association with grassroots organisations. She was awarded the Association of Commonwealth Universities Scholarship to pursue her Ph.D from School of Environment Sciences, University of East Anglia U.K. in the area of Gender, Development and Environment.



**Mr. Hari Krishna Nibanupudi** is an International development professional with over two decades of Policy and Practice Experience in the fields of International Humanitarian Assistance, Disaster Risk Reduction, Sustainable Development, Climate Change Adaptation and Regional Cooperation. He has served reputed International organizations such as Oxfam, World Bank Institute (WBI), International Center for Integrated Mountain Development (ICIMOD), United Nations Development Program (UNDP), etc., in South Asia, South East Asia, The Middle East and Africa. Hari Krishna has also published and produced a number of award-winning blog articles, opinion pieces, research papers and videos.



**Mr. Shailendra Yashwant** is an independent documentary photographer and environmental journalist based in India. He has been documenting, reporting and campaigning on wildlife conservation, social justice and climate change issues in South Asia for over three decades. He has partnered with many organisations including Save The Children, Oxfam, UNICEF, Sanctuary Nature Foundation, Changing Markets Foundation, DIB, Swedwatch, on projects ranging from environmental investigations into industrial pollution, climate change adaptation and disaster risk reduction

projects to documenting the impacts of climate change on remote communities. He also regularly contributes opinion pieces, photo-features and reports to Money Control, Earth Journalism Network, The Third Pole, Sanctuary Asia and Scroll.in.



**Mr. Nicolas Bidault** is the Senior Regional Officer in Research, Assessment and Monitoring for WFP Regional office in Asia and the Pacific. His team is responsible, among other topics, for vulnerability risk analysis, climate impact analysis, remote monitoring and the use of Earth Observation and applications to development and humanitarian sectors. Prior to that, he was working for the UN Network for SUN for Nutrition working closely with governments, UN agencies, civil society organisations and research institutions on nutrition-related data issues and studies.

Before that, Mr. Bidault was the Director of the Strategic Information and Health Financing department at the Global Fund to Fight Aids, Tuberculosis and Malaria based in Geneva, where he was responsible for evidence generation, analytics and research. He has a long career in monitoring and data analytics in various UN agencies in Africa, Latin America and Asia. He graduated with a PhD in engineering from the University of Minnesota, USA and started his professional career in the private sector.



**Ms. Anusara Singh Kumar Wong** is a public health nutrition and food technology specialist with over 11 years of experience working in nutrition policy and programming in both development and humanitarian contexts, including in regional offices, Head Quarter, and countries such as Sri Lanka, Timor-Leste, Jordan, DPR Korea, Liberia and others. She has worked with the United Nations World Food Programme (WFP) and international NGOs to support nutrition interventions, including both nutrition-specific and nutrition-sensitive programming.



**Prof. Rajib Shaw** is a professor in Graduate School of Media and Governance of Keio University, Japan. He did his studies in Yokohama National University and Osaka city University in Japan and University of Allahabad and Burdwan University of India. He is co-founder of a Delhi based social entrepreneur startup, Resilience Innovation Knowledge Academy (RIKA), and chair of the board of two Japanese non-government agencies: SEEDS Asia and CWS Japan. He is the Co-chair of the United Nations Asia Pacific Science Technology Advisory Group (AP-STAG), and CLA for IPCC's 6th Assessment Report. Professor Shaw has 53 books and more than 400 research papers in the field of environment, disaster management and climate change. Professor Shaw is the recipient of prestigious "Pravasi Bharatiya Samman Award (PBSA)" in 2021 for his contribution in education sector. PBSA is the highest honor conferred on overseas Indian and person of Indian origin

## PANEL OF JURIES

from the President of India. More about his work can be found in: [www.rajibshaw.org](http://www.rajibshaw.org)



Being a Disaster Risk Reduction, Policy Planning and Capacity Development expert, **Dr. Santosh Kumar** has more than 30 years of experience in different positions in the Development Planning and DRR Sector. A PhD. in Economics, he studied Gender & Development in IDS, Sussex, UK and received professional training in Disaster risk Management from Israel, backed with international work exposure at The World Bank and Inter- governmental body of SAARC.



**Arvind Betigeri** is a Public Health Professional with over 18 years of experience in designing and successfully implementing Large Scale Food Fortification Programs

In his current role as a Regional Rice Fortification Advisor for Asia and The Pacific at WFP, he is responsible for providing technical and capacity building support to WFP operations on Large Scale Food Fortification in 14 countries of Asia and The Pacific region, build strategic partnerships with key government, private sector and NGO partners, strengthen food ecosystems and expand WFP's fortification portfolio for the region.

Prior to joining WFP, he spent 14 years working as a Project Leader leading the Large-Scale Food Fortification efforts of PATH. Arvind also worked as Senior Consultant with NITI Aayog, Government of India where he was advising the National Nutrition Mission (Poshan Abhiyan) on integrating fortification into the safety net programs. His efforts culminated in the launch of a Central Sector Scheme for fortified rice in 15 districts of India through the Public Distribution System this scheme will now be scaled up to cover the entire PDS in India.

## Project team



**Dr. Sushma Guleria** is a development professional with over 15 years of experience in the Disaster Management realm and currently looks after the Centre for Climate Resilience and Environment and Centre for Water and Land Disaster Risk Reduction (DRR) with focus on eco-DRR, climate and environment related disasters, policies and tools, Community Resilience, livelihood security and natural resource management etc. She has more than 45 publications to her credit including Chapters in books, Papers and Articles in International and National Journals, policy briefs, documentation of disasters etc.



Working in one of the world's largest humanitarian organization in the world, WFP, and earlier with CARE, **Ms. Pradnya Paithankar** has experience of handling large scale projects in the space of nutrition and health and HIV/AIDS. A student of public health nutrition, Pradnya's expertise lies in development of strategic roadmaps, project management, monitoring and evaluation, research and vulnerability assessments and mapping. Experience of working with the government and initiating work with grassroot level communities to scale to policy advocacy and contribution to policy formulation, her experience covers a large landscape. Pradnya is currently providing leadership to of WFP India's efforts to bring the food and nutrition security to the forefront of development agenda by undertaking periodic food security analysis at various levels. As Head of Programmes/SDG Manager, she is contributing to leverage WFP's expertise globally in the field of DRM to strategically support government systems to design, monitor and implement approaches towards achievement of 2030 agenda.



**Mr. Animesh Prakash** is a Humanitarian sector professional with specialization in Climate Change Adaptation, Disaster Risk Reduction and Humanitarian Response. He comes with 12 years of work experience in the areas of partnership management, high impact programme delivery, innovation and influencing. He is currently working with UNWFP as Programme Policy Officer (DRM & CCA) and has held positions in DRR at Oxfam and UNDP in past. Animesh has worked extensively on sectors including, Transboundary Water Governance, Emergency Food Security and Vulnerable Livelihoods (EFSVL), Water Sanitation and Hygiene (WASH) and Early Warning. He has led many multi-partner development projects in India and regional projects in South Asia. Some of his technical innovations in development and humanitarian programming has received recognitions at platforms including, UNOCHA, MIT Climate Colab, Partos and Dutch Coalition of Humanitarian Innovation. Animesh holds degree in Disaster management and Human rights law.



**Ms. Kavya Mohan** is currently working as a Junior Consultant at the National Institute of Disaster Management, Delhi. Prior to this, she was working with NGOs in Uttarakhand and Gujarat on projects related to Agriculture, Livelihoods and Women Empowerment. She has a Master's Degree in Environment and Development from Ambedkar University Delhi. Kavya is passionate about working towards contributing to ongoing social-ecological issues.



The National Institute of Disaster Management (NIDM) was constituted under an Act of Parliament with a vision to play the role of a premier institute for capacity development in India and the region. The efforts in this direction that began with the formation of the National Centre for Disaster Management (NCDM) in 1995 gained impetus with its redesignation as the National Institute of Disaster Management (NIDM) for training and capacity development. Under the Disaster Management Act 2005, NIDM has been assigned nodal responsibilities for human resource development, capacity building, training, research, documentation and policy advocacy in the field of disaster management. NIDM provides Capacity Building support to various National and State level agencies in the field of Disaster Management & Disaster Risk Reduction. The Institute's vision is to create a Disaster Resilient India by building the capacity at all levels for disaster prevention and preparedness.

The United Nations World Food Programme is the world's largest humanitarian agency fighting hunger worldwide. The mission of WFP is to help the world achieve Zero Hunger in our lifetimes. Every day, WFP works worldwide to ensure that no child goes to bed hungry and that the poorest and most vulnerable, particularly women and children, can access the nutritious food they need.





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Map and Exchange Good Practices (MEGP) Initiative



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(Ministry of Home Affairs, Government of India)

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