Solidaridad

ANNUAL REPORT

Solidaridad Regional Expertise Centre

2020-21

CONTENTS

FOREWORD

I am pleased to present Solidaridad Regional Expertise Centre's (SREC) Annual Report for 2020-21. The report highlights the progress we have made to support SREC's pursuit of attaining SDG-1, with the overall objective to eliminate poverty in all forms and improve the resilience of the vulnerable population to social, environmental and economic shocks. The report highlights how SREC worked with small farmers, government and businesses as a catalyst for change that matters.

Over the past financial year, the vulnerable smallholders and workers faced Covid-related restrictions and challenges, which created additional bottlenecks for sustainable development. Our effort was to complement the work of the Indian government and bring in disruptive interventions for sustainable transformation.

SREC focused on doubling the farmer's income, making Indian agriculture smart and climate-resilient by introducing state-of-the-art technologies, reducing harmful chemicals, reducing land degradation and improving water use efficiency. At the same time, SREC also achieved success in creating a model for reducing pollution from industrial effluents.

In the financial year, SREC partnered with different government departments, agricultural universities and the private sector of the country to reach out to 1.83 lakh smallholder farmers and around 1 lakh agricultural workers in tea, sugarcane, soybean, mustard, cotton and castor. I am proud to share that we could partner with Vodafone Idea Foundation under their Corporate Social Responsibility programme and introduce Internet of Things (IoT), Artificial Intelligence (AI), and real-time technology solutions routed through automatic weather stations, soil probes, insect traps, and crop cameras. These provide farmers with information on critical elements of farming – like soil and air quality, wind speed, the presence of insects and pests, and crop growth. We have certainly embarked on the journey to make Indian agriculture smart. The results of increased yields between 30 to 40 per cent while reducing the use of pesticides and water use through regenerative agriculture show we are on the right path. The farmers are adopting these technologies at a rapid pace.

But the above facts can be better illustrated through the story of Arvind Kumar from Hardoi district, Uttar Pradesh, India. He is getting returns to the tune of $10,200 from 1 hectare of land! Arvind got this record return while practising sustainable farming – reducing diesel use by 50 per cent and water use by over 40 per cent.

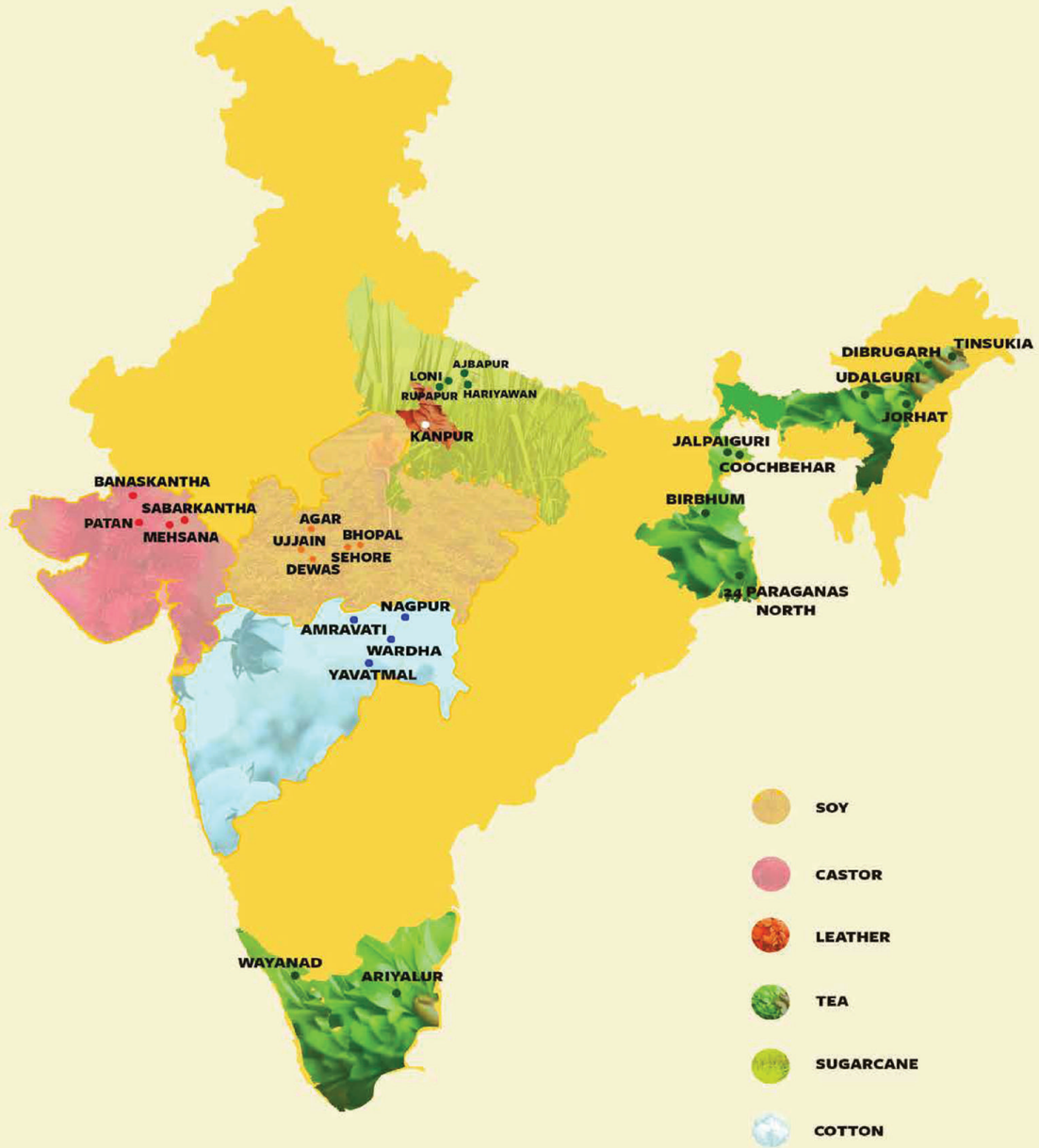
The 'Pollution Prevention and Efficient Water Use in the Kanpur-Unnao Leather Cluster' is one of the pioneer projects for Solidaridad, conducted in partnership with the National Mission for Clean Ganga, the UP Pollution Control Board, the Council for Leather Exports and the Central Leather Research Institute. The project has gone beyond targeting and addressing the environmental impact by introducing alternative green technologies to reduce effluent water discharge, to even addressing key socio-economic issues.

Solidaridad Regional Expertise Centre is grateful to our donors and partners from different departments of the Indian government, the European Union, and local and international companies. We are also thankful to local Indian corporate foundations whose support has helped us emerge as an impactful local CSO. We are delighted that they share our vision and place so much trust in us. This trust gives our staff in India the confidence to serve in the remotest corners of the country during these unpredictable times.

I wish you a delightful read.

Dr Shatadru Chattopadhyay
Managing Trustee
Solidaridad Regional Expertise Centre

OUTREACH OF SOLIDARIDAD REGIONAL EXPERTISE CENTRE



CHANGE THAT MATTERS

At Solidaridad, we aspire for inclusive supply chains built on cognitive diversity, equity and mutual respect across different rungs of the pyramid. Is it impossible to create a world in which all we produce and consume can sustain us and future generations without impacting the natural capital? We nudge ourselves constantly on the challenges that plague today's global food chain and dare to push the sustainability boundaries in food and nutritional security.

Working in a multi-stakeholder format, we bring together different supply chain actors and facilitate innovative sustainability solutions towards a resilient network that maximises benefit for all.

The year 2019-2020 was predominantly about reaping the harvest of goodwill from the ongoing projects. For example, the progressive Pragati programme for castor in Gujarat witnessed an extension. Looking at the progress of our SuCCESS code, the project partners realised the need to extend the programme for another three years with an ambitious goal—to more than double the number of participating farmers. In cotton, we saw an increasing number of farmers integrating various aspects of sustainability through existing and innovative ways while adopting organic cotton production. In leather, our interventions not only helped the tanneries achieve reduced chromium discharge and H 2 S gas emission, but also addressed the issues of downstream farming on cattle and fodder management. Our soy programme involved an additional 3,000 women farmers in trainings on food and nutrition, besides strengthening FPOs with market support and resource base for larger outreach and impact.

During 2019-2020, our sugarcane programme, 'Meetha Sona Unnati', received the formal assurance from a third-party consultancy as an effective initiative towards sustainable sugarcane production. The programme was acclaimed as a model initiative and recommended for replication in other sugar mill areas across India. In tea, TRINITEA continued to explore the digital space far and wide to make the sector truly transparent, sustainable and remunerative for the small tea growers of India.


SUPERLYTIVE
BLU PLUS

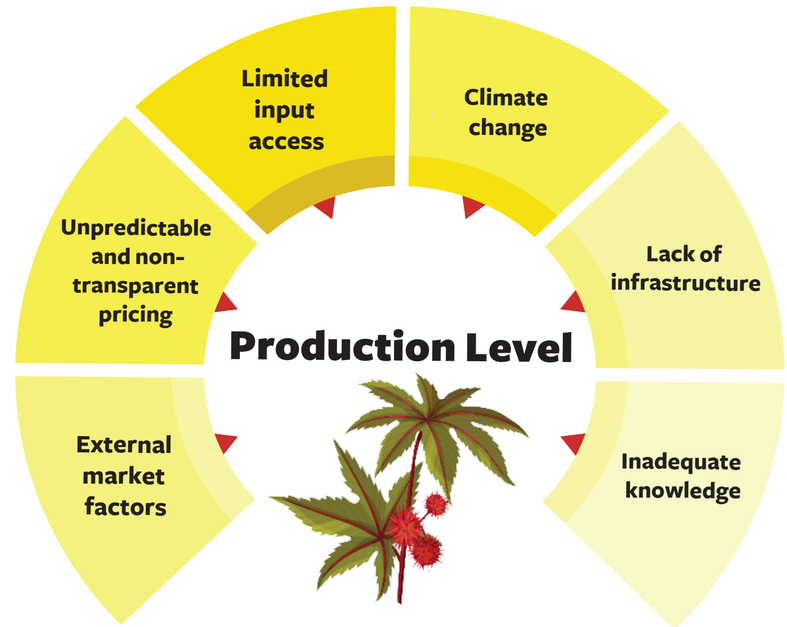
CASTOR

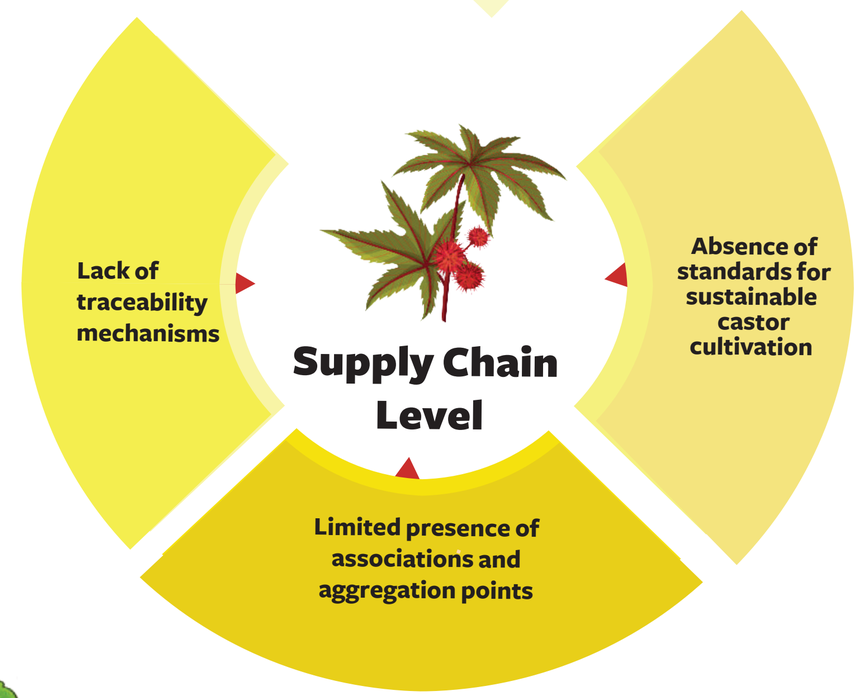
A BICAMERAL CHALLENGE

An assessment conducted by Solidaridad in Phase 1 indicated that the interest in castor cultivation was declining among the farming communities.

It was due to the challenges, mainly, at the production level and supply chain level. Production-level challenges such as inadequate rainfall and lack of efficient irrigation facilities along with poor knowledge on good agricultural practices posed major hurdles. Limited access to quality seeds and adverse pricing and market factors added to the woes at the production level.

At the supply chain level, lack of traceability, owing to the largely scattered castor market with a high number of small and marginal farmers, was a major challenge to the industry. A large smallholder base limited the presence or formation of farmers' groups and associations, thus affecting their mobilisation. Besides, there were no standards for responsible sourcing and processing of castor in India until Sustainable Castor Caring Environmental & Social Standard (SuCCESS), came around.





NEW BEGINNING

The Sustainable Castor Initiative Programme, Pragati, was launched in 2016 to facilitate and support the castor farmers in the four major castor-growing districts in Gujarat - Sabarkantha, Banaskantha, Mehsana and Patan. Solidaridad along with its partners undertook active roles in transforming the supply chain actors of castor towards social responsibility and environment sustainability. A globally aligned sustainability standard, Sustainable Castor Caring Environmental & Social Standard (SuCCESS), was implemented under the programme. During 2016-2019, the programme successfully trained and supported the certification of 3,000 farmers by the code.

The programme provided castor growers in Gujarat the means to improve their economic, social and environmental performance through the implementation of sustainable practices and compliance with the code. This resulted in intensive farmer engagement and better farm management, including safety measures, input efficiency, increased yield and income for the farmers. The programme further established an independent code secretariat during the phase, which is meant to support the certification process in full capacity even beyond the project period.

PHASE II: SCALING UP

On 15 October 2019 and 23 January 2020, the project steering committee (PSC) met with participants on behalf of all the funders--who were briefed on the current state of the project. During the meetings, the project partners decided to scale it up to Phase II, taking the elements of success in Phase I, to reach out to 7,000 farmers and strengthen the code governance

OVERCOMING THE PANDEMIC DISRUPTIONS

In spite of the pandemic bringing to a halt the initial activities planned for the year, once the lockdown was lifted in parts, the field team continued their outreach and engagement activities adhering to the safety and health guidelines.

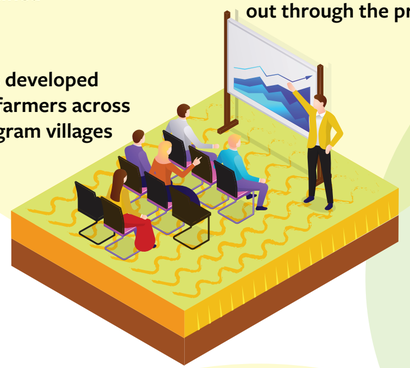
ACHIEVEMENTS IN 2020-21

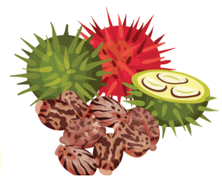
Training and Certification of Farmers

5800+
farmers trained, audited, and certified

6500+
farmers (both male and female) from over 75 villages reached out through the programme

300
farmers developed as lead farmers across the program villages





Increased Yields & Lowered Costs

36,000+ tonnes
of certified castor seeds cultivated

13,300+ hectares
brought under sustainable castor framework

9%
decrease in input cost as compared to the previous year

35% yield
improvement as compared to the yield published by the local government.

Better Conditions for Health and Environment

6,300
crop protective safety kits distributed for free

94.5 %
farmers adopted furrow irrigation instead of flood irrigation. The remaining percentage is practicing other water efficient irrigation practices such as skip furrow and sprinkler

35%
reduction in water consumption in the demo plots with accurate measurement and control

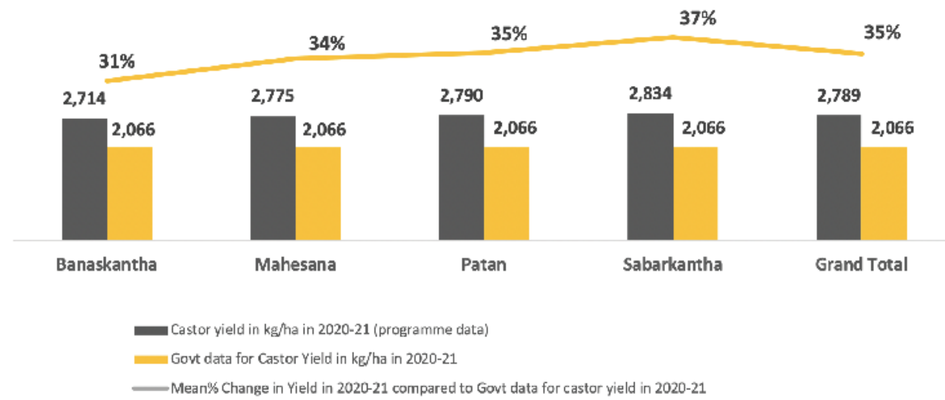


Figure 1: Increase in yield of Pragati farmers

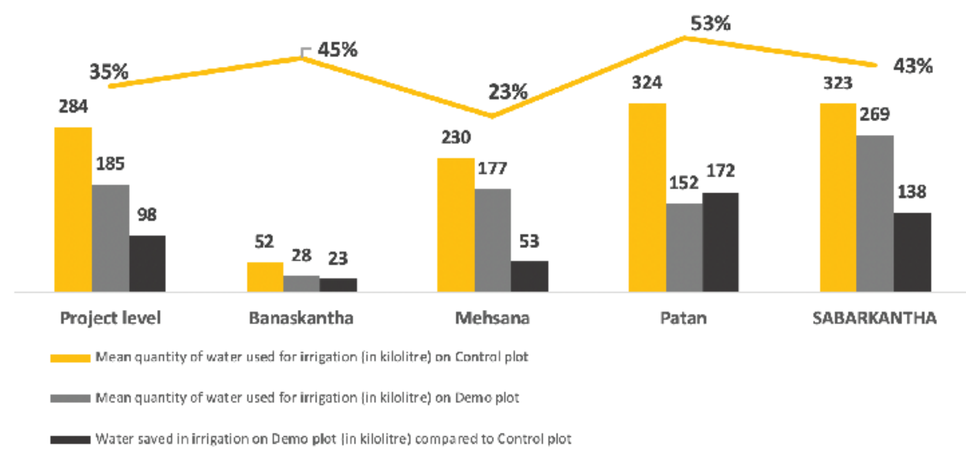


Figure 2: Water usage in demo plots

CAPACITY-BUILDING SESSIONS

Farmer training sessions focussed on good agricultural practices (GAP), such as, using certified seeds, soil management via soil test for efficient use of fertilisers and other agri-inputs, integrated nutrient and pest management, water efficient irrigation methods and preserving on-farm biodiversity. These trainings were imparted through classroom as well as practical training in demonstration plots set up across the project districts.

LEAD FARMERS' TRAINING

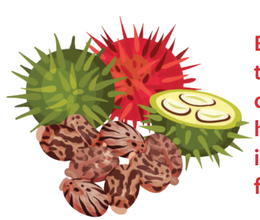
In collaboration with Agricultural Universities - Sardarkrushinagar Dantiwada Agriculture University (SDAU) and Krishi Vigyan Kendra (KVK), lead farmers' training sessions were organised. In these sessions, farmers engaged with castor and agricultural experts to find solutions to their on-field challenges to address agricultural problems brought about by climate change and other factors.

WORKERS' WELFARE

To ensure the health and safety of farmers and their workers, training sessions were organised and personal protective equipment (PPE) kits and storage boxes were distributed. Training on waste management and disposal of chemical protection products (CPP) was also organised, apart from the annual health check-ups of the farmers and their families.

EMPOWERING WOMEN FARMERS

Identifying the undeniable contribution of women farmers to castor production in the state of Gujarat, Pragati ensured to take the first step towards engaging with women farmers in Phase II. Engagement sessions with around 500 women farmers have been conducted to empower them on sustainable castor farming practices, health and financial literacy to strengthen their position and decision-making ability. Awareness training on the risks of child labour, eliminating its practice, and encouraging education for all children have also been organised.



Benchmarking and training farmers on good agricultural practices and thereby, certifying them in sustainable castor framework have helped to improve the crop productivity and quality, along with improving soil health and increasing castor yield. At the same time, it has also substantially reduced the input cost, leading to a rise in income and improvement in the social and ecological landscape of the communities, thus creating prosperity among farmer families.

SUCCESS STORIES

Water Efficient Practices in Castor Farming

43-year-old Dilsadbhai Akbarbhai Shaikh is a smallholder farmer owning two acres of land. He hails from Talepura village in Banaskantha district of Gujarat and has been growing castor traditionally for several years. Similar to other farmers in the region, he was practicing flood irrigation where water was being released for 15-18 hours in a day.

Dilsadbhai joined the Pragati initiative in the first year of its launch in 2016, and he was one of the first certified group of farmers.

As a Pragati farmer, he participated in multiple meetings and capacity-building trainings focusing on the sustainable agricultural modules in castor farming. These trainings comprised of both classroom-based sessions and practical sessions through visits to demonstration plots. It was followed up by the programme team and castor experts through field visits wherein the farmer's practices in the field were observed and good agricultural practices such as use of efficient irrigation methods were explained and promoted.

Encouraged by these processes, Dilsadbhai adopted furrow irrigation technique on his farm which helped him save five to six hours of irrigation time, thus reducing the input costs and increasing his net income. He continues to be a Pragati farmer in the current year and is in the process of shifting from furrow irrigation to skip furrow irrigation, further reducing his input costs, improving his soil quality, and increasing his overall well-being. Today, he is a happy castor producer who realises the importance of using water-efficient practices and is spreading the same awareness to other farmers as well.

Dilsadbhai Akbarbhai Shaikh

PARTNERS/DONORS

ARKEMA

BASF
We create chemistry

Solidaridad

JAYANT AGRO-ORGANICS LTD.

COTTON

CROP IN DISTRESS

Cotton, one of the major commercial crops cultivated in India, accounts for one-fourth of the total global production. This crop is associated with sustaining the livelihoods of an estimated six million cotton farmers and 40 to 50 million people engaged in related activities.

The green revolution created higher demands for farm power, water and fertilisers. Intensive cropping impacted the soil health. High levels of chemical inputs caused tremendous pollution and affected the production of crops and human health.

Conventional cotton production is directly proportionate to the highly inefficient usage of water that affects the farmers and the hydrological environment. The excess use of groundwater leading to depletion creates a real threat to large numbers of smallholder farmers.

Maharashtra is a water stressed state and is mainly rainfed. Cotton is known to be a thirsty crop and is held responsible for the depletion of groundwater levels. Cotton production has been on a decline in the recent years due to shortage of water.

Land degradation

Excess use of inorganic fertilizers, pesticides and improper irrigation practices has led to land degradation. Due to the lack of awareness and various pest attacks, farmers apply a combination of pesticides to improve the soil health without testing the soil. The excess use of inorganic fertilisers and pesticides also affects climate change.

Water pollution

The Vidarbha region of Maharashtra state is highly water-inefficient. Cotton monoculture in the region is dependent on ever-increasing risk of rainfall variability. The production of this major crop involves the use of huge inorganic pesticides and fertilisers which impacts the quality of water as well as the health of the biodiversity in and around.

Inefficient water use

Even though the Vidarbha region of Maharashtra is rainfed, farmers with irrigation facilities practice flood irrigation without any irrigation schedule. This leads to huge loss of water and energy.

The Vidarbha and Marathwada region of Maharashtra comprise of 11 and 8 districts respectively. Around 65 % of the population is dependent on agriculture and allied sectors and cotton crop is one of the important cash crops in this region. The limited availability of natural resources is affecting the social and economic conditions of the farmers.

SHAPING A SUSTAINABLE FUTURE

AN ORGANIC COTTON PROGRAMME

SUSTAINABLE PROGRAM

WATER USE EFFICIENCY PROGRAMME

WATER SAVING ASPECTS

SMART AGRI PROGRAMME

ENHANCE AGRIBUSINESS

REGENERATIVE AGRI PROGRAMME

SUSTAINABILITY & REHABILITATION

ORGANIC COTTON PROGRAMME

12494
Farmers supported in organic cotton farming

14 (7000 farmers)
FPOs engaged and strengthened

11600
Farmers trained in bio pesticides practice

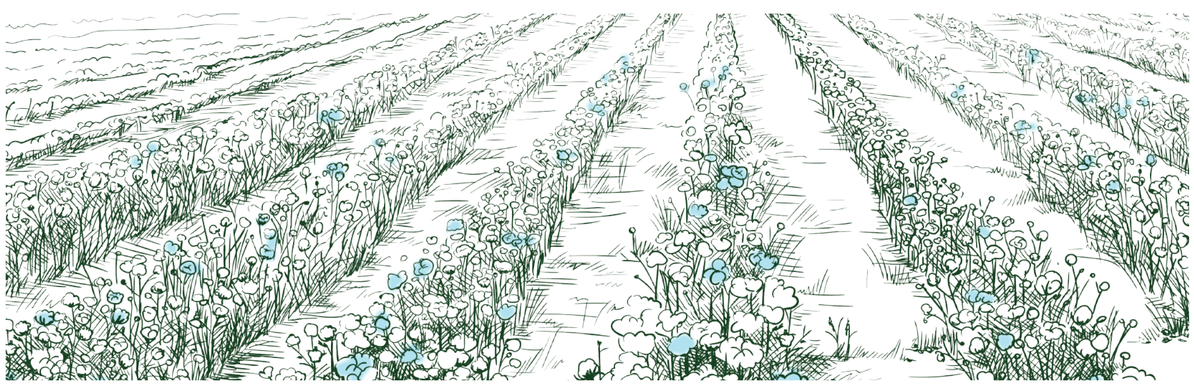
12200
Farmers trained in bio fertilisers practice

11774
Farmers trained in composting & vermicimposting

9271
Farmers trained in water management

13287
Farmers trained in soil management

11381
Farmers trained in harvesting techniques



WATER USE EFFICIENCY PROGRAMME

20,000
Farmers mobilised & trained on good practices

6
Water user groups initiated

1500
Existing water structures recorded & farmers trained on structures' management

39
New farm ponds constructed

SMART AGRI PROGRAMME

30534
farmers

307
villages

05
districts

1543
trainings conducted

REGENERATIVE AGRICULTURE PROGRAMME

Fertile soil is a prerequisite for sustainable agriculture and human wellbeing. Regenerative agriculture promises decreased GHG emission, climate change reversal, drought resistance to soil, thriving biodiversity, restored grasslands, revitalised local economy, improved nutrition and better food security. Regenerative agriculture essentially benefits soil, restoring its organic carbon through sequestration and reversing industrial agriculture's contributions to climate change, erosion, pest invasions, desertification, salinisation, decarbonisation, chemical contamination among others. The resultant is a highly productive soil that supports a more resilient food system.

Solidaridad initiated the programme on regenerative practices with 7,000 cotton farmers in Nagpur and Amravati, Maharashtra during the 2020-2021 crop cycle, adopting the regenagri certification as a framework for implementation and assessment.

OUTCOMES

Crop diversification

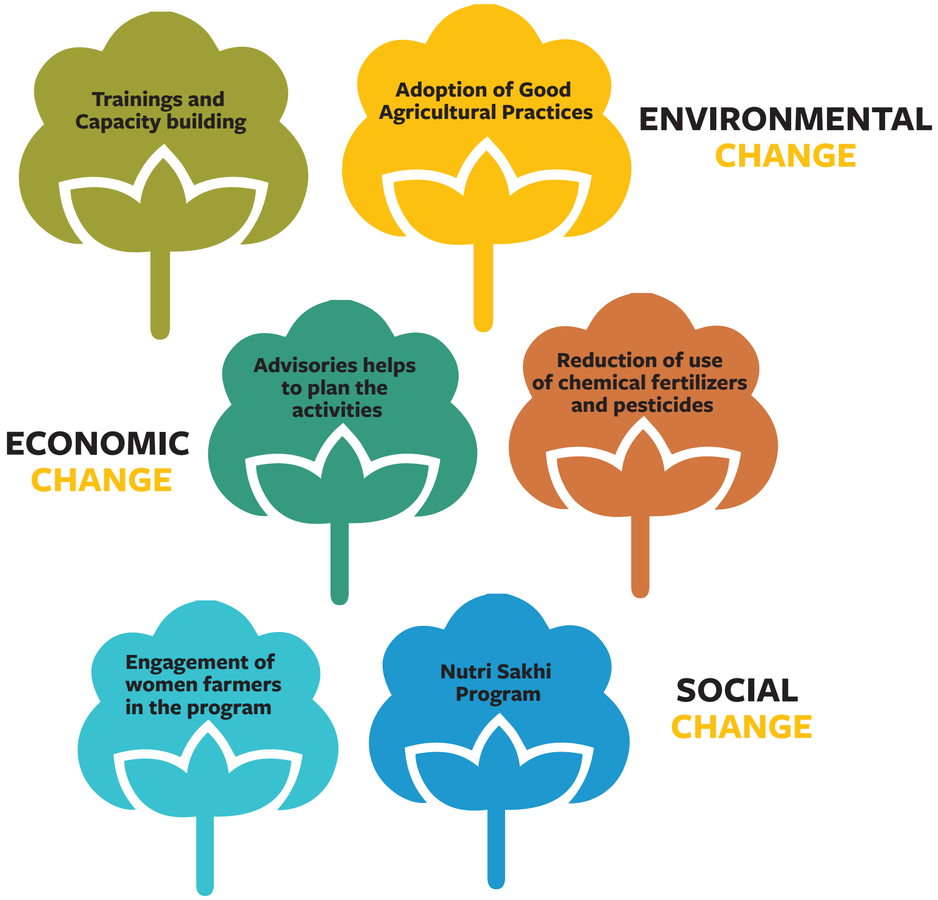
Soil health management

Conservation of biodiversity

Regeneration of soil and water bodies

Reduced GHG emissions

Carbon sequestration



KEY ACTIVITIES

In 2020-21, Solidaridad disseminated a total of 227 audio and 120 text advisories on weather and crop management. Based on real time data, weather and crop advisories were provided to the farmers, enabling them to adopt good agricultural practices, thereby reducing the use of chemical fertilisers and pesticides and its impact on the environment.

Training and awareness programmes were conducted to educate farmers on the smart agri technology and use of digital platforms to access agricultural information.

A nutri sakhi programme has been initiated to conduct training and capacity building of women , focussing on health and nutrition.

Special training programmes were organized for women farmers engaged in the agricultural business to empower and capacitate them with entrepreneurial skills.

SUCCESS STORIES

Farm ponds: A boon for farmerS

Wardha being a rainfed zone, and subject to the vagaries of the monsoon, agricultural productivity continues to lag behind. Dependence on groundwater for irrigation leads to its depletion and quality deterioration.

Nilkanth M. Kolhe is an active farmer from Manora village, Wardha district and owns a farm pond. However, the farm pond was lying idle due to silt deposits and could not contain water even during the monsoons. Ground water was insufficient to irrigate his more than two-hectare agricultural land.

With Solidaridad's intervention, Nilkanth's farm pond of 10x10x3 metres was rejuvenated. With improved and assured water availability, he was encouraged to diversify crops and venture into wheat cultivation in addition to cotton, leading to an income enhancement.

"It was good to see a huge amount of water in the farm pond after a long time. This will help me to plan the crops round the year", says Nilkanth.

PARTNERS/DONORS

Laudes Foundation

Rijksdienst voor Ondernemend Nederland

Vodafone Idea Foundation

Foundation for Health & Knowledge WELSPUN Foundation for Health & Knowledge

Biocare

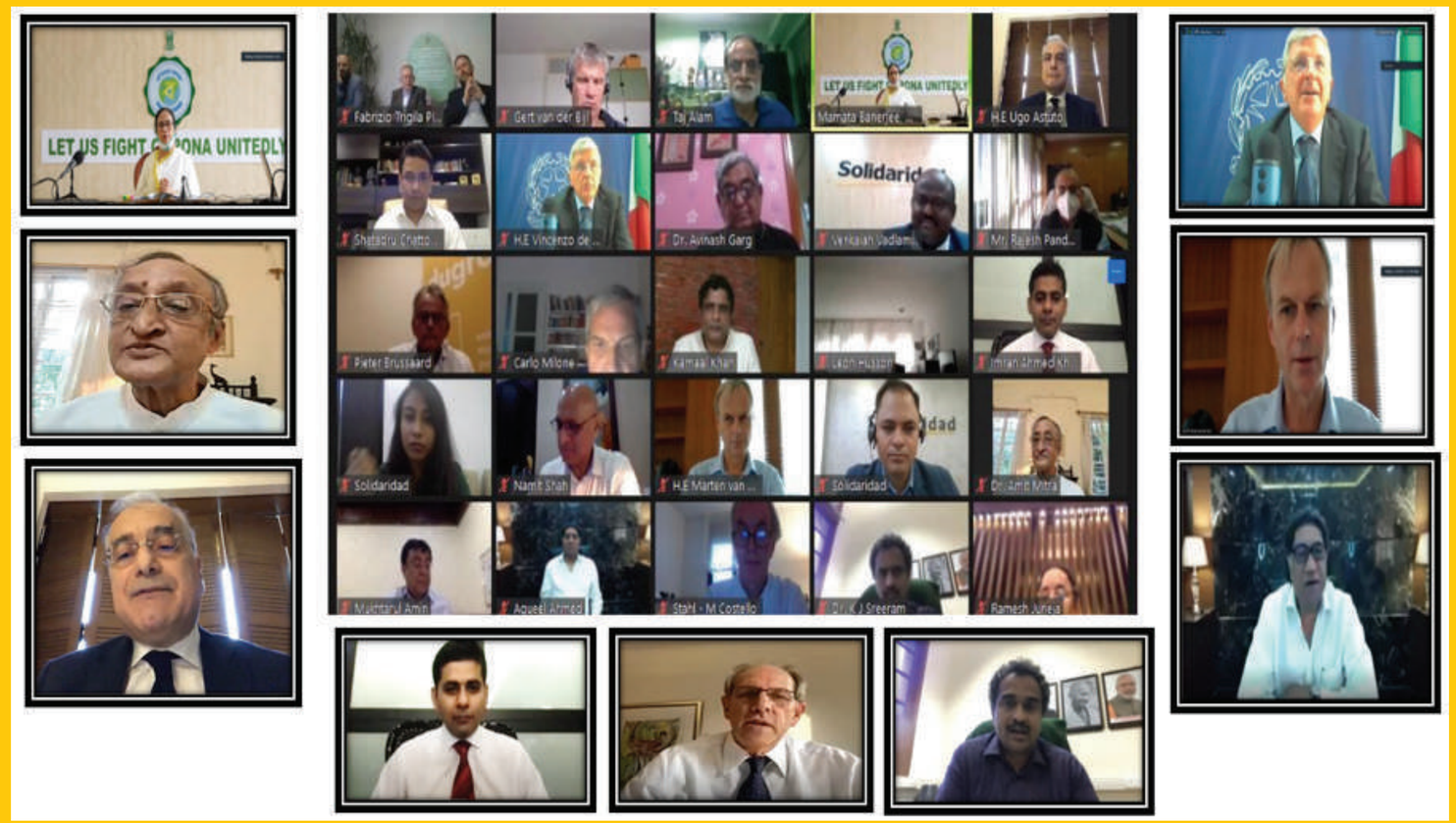
TU Delft Delft University of Technology

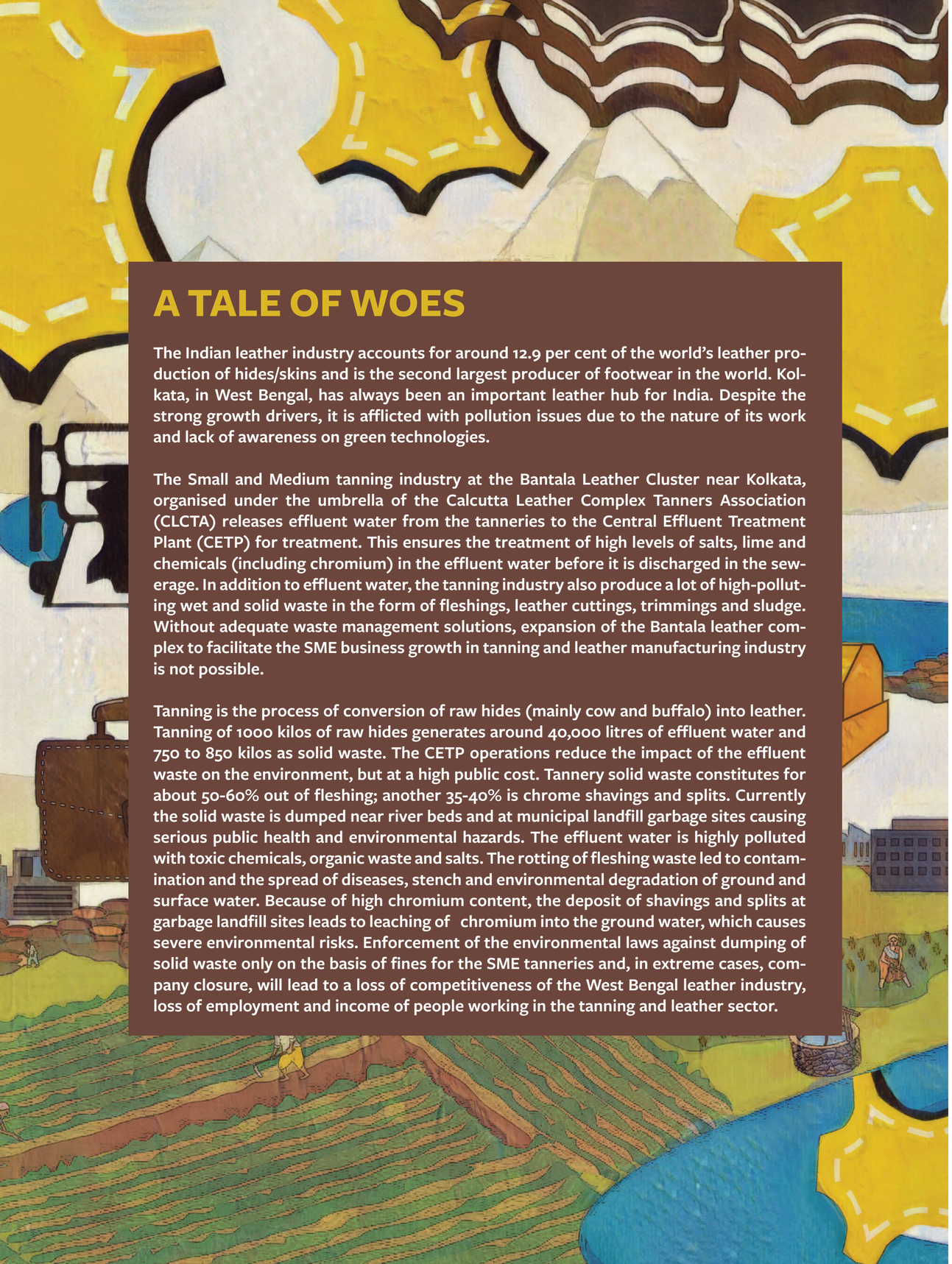
LEATHER

LAUNCH OF EU-LEATHER PROJECT, KOLKATA

23 SEPTEMBER 2020

Kolkata project was virtually inaugurated by Honorable Chief Minister; Ma'am Mamta Banerjee on 23rd September 2020 in the presence of His Excellency Ambassadors from the European Union; Netherlands; Italy and Germany. More than 250 national and international delegates participated in the formal launch of the project.





A TALE OF WOES

The Indian leather industry accounts for around 12.9 per cent of the world's leather production of hides/skins and is the second largest producer of footwear in the world. Kolkata, in West Bengal, has always been an important leather hub for India. Despite the strong growth drivers, it is afflicted with pollution issues due to the nature of its work and lack of awareness on green technologies.

The Small and Medium tanning industry at the Bantala Leather Cluster near Kolkata, organised under the umbrella of the Calcutta Leather Complex Tanners Association (CLCTA) releases effluent water from the tanneries to the Central Effluent Treatment Plant (CETP) for treatment. This ensures the treatment of high levels of salts, lime and chemicals (including chromium) in the effluent water before it is discharged in the sewerage. In addition to effluent water, the tanning industry also produce a lot of high-polluting wet and solid waste in the form of fleshings, leather cuttings, trimmings and sludge. Without adequate waste management solutions, expansion of the Bantala leather complex to facilitate the SME business growth in tanning and leather manufacturing industry is not possible.

Tanning is the process of conversion of raw hides (mainly cow and buffalo) into leather. Tanning of 1000 kilos of raw hides generates around 40,000 litres of effluent water and 750 to 850 kilos as solid waste. The CETP operations reduce the impact of the effluent waste on the environment, but at a high public cost. Tannery solid waste constitutes for about 50-60% out of fleshing; another 35-40% is chrome shavings and splits. Currently the solid waste is dumped near river beds and at municipal landfill garbage sites causing serious public health and environmental hazards. The effluent water is highly polluted with toxic chemicals, organic waste and salts. The rotting of fleshing waste led to contamination and the spread of diseases, stench and environmental degradation of ground and surface water. Because of high chromium content, the deposit of shavings and splits at garbage landfill sites leads to leaching of chromium into the ground water, which causes severe environmental risks. Enforcement of the environmental laws against dumping of solid waste only on the basis of fines for the SME tanneries and, in extreme cases, company closure, will lead to a loss of competitiveness of the West Bengal leather industry, loss of employment and income of people working in the tanning and leather sector.

CHALLENGES ABOUND

Environmental Challenges

Land degradation:

Solid and wet wastes dumped into landfills are getting polluted at a faster rate than ever before due to heavy pollution effluent. This accumulation of waste is causing a decline in the utility, biodiversity, and overall health of the soil. The downstream problem arises when the water from these wastes does percolate down the soil and contaminate the ground water which is one of the major threats to the workers and local people residing and consuming the water. On the other hand, the land could have been used for some other constructive purpose, it is currently polluted and underutilized in the Kolkata Leather Cluster.

Landscape and climate change (soil degradation, GHG emission etc.)

Soil degradation causing climate change:

Land pollution is the degradation of land surfaces, both above and below ground level which causes erosion of land. Groundwater and soil are contaminated due to the accumulation of waste materials. Often, these materials, described as wet and solid waste, which include both hazardous and non-hazardous waste from the leather tanneries contributes to climate change.

GHG emission causing climate change:

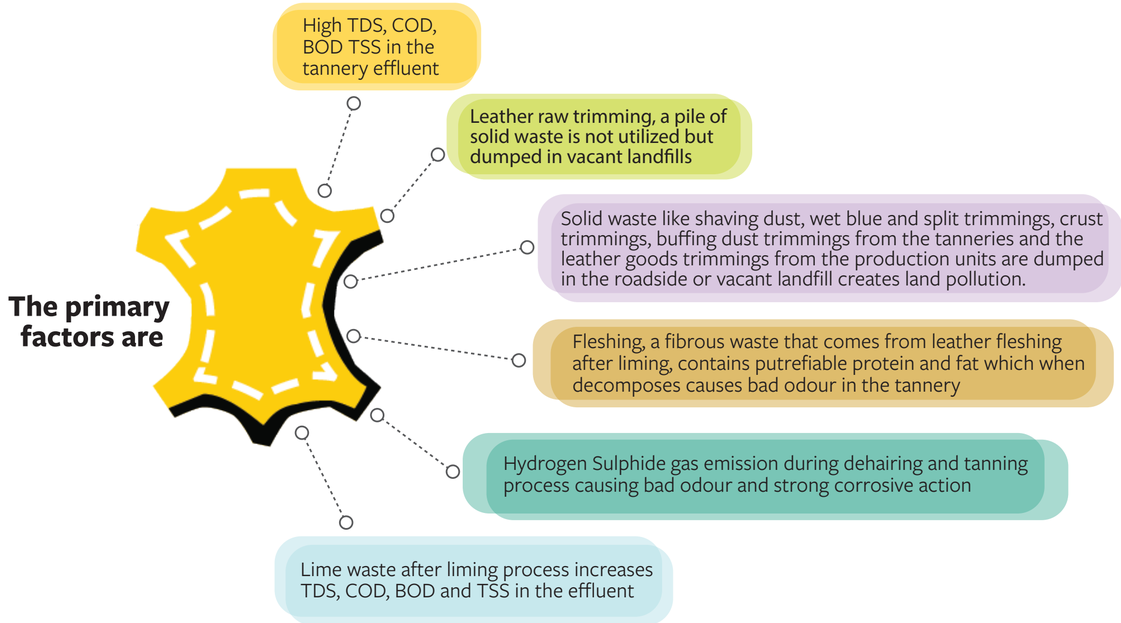
The biggest contributor of GHG emission from the leather clusters are from the usage of electric machines, and hazardous gas. Various machines operated in the tanneries like drums, water pumps, fleshing machines, press machines, roto spray machines which emits a lot of GHG. Additionally, burning of scrap leather is another contributor of GHG which increases the carbon footprint, atmospheric concentrations in the cluster and contributes to warming effect.

Tanning process causing climate change:

In one of the tanning processes called dehairing, sodium sulphide is used for the unhairing of raw hides. Sodium sulphide has become a huge challenge for tanners as well as for the pollution regulatory board. Additionally, sodium sulphide easily produces hydrogen sulphide gas which is highly toxic and is one of the contributors of climate change.

Pollution

In general, the leather industry is polluting. Leather processing is responsible for unfavourable environmental impacts. The tannery effluent contains a high concentration of heavy metal like chromium, high COD, gaseous emissions (H_2S, NH_3) and solid waste which leads to high oxygen requirements.



Water depletion and inefficient water-use

Excess water is used in leather tanning. Water is necessary for most processes such as soaking, dehairing, fleshing, drum dyeing, etc., and a large amount of unmeasured water is used. This results in loss of groundwater and depletion of the water table, which can be a major problem in the future.

Gender non-inclusivity

In Kolkata, the leather tanning sector is primarily a male-dominated industry because of the nature of the work. Women are generally employed by goods production units in the packaging division. In tanneries however, there are jobs on the dry end where women can be accommodated, but without a skill set, they lose employment opportunities.

Economic and social challenges

Resilient livelihood:

High population of workers and people are engaged in the Kolkata leather industry directly or indirectly. High concentration of hazardous chemicals used in the tanning process and the polluted environment, take a toll on the livelihoods of the workers and the population residing around the Kolkata leather cluster. The capacity of the people to sustain and improve their livelihood is disturbed by the polluting factors. Moreover, due to soil degradation and percolation of effluent from the solid waste contaminates the ground water drinking and posing a big threat for the future.

Health and well-being

Due to the nature of the job and the hazardous chemicals that are being used during the processes, health and well-being is an important aspect of the Leather cluster. Unfortunately, lack of awareness and knowledge makes it one of the least prioritized areas of the sector.

THE ROAD TO TRANSFORMATION

Environmental transformation

Pollution Abatement

Mechnical Desalting machine

To address the high TDS levels in waste water released from tanneries and CETP, Solidaridad has developed a low-cost, simple technology in the form of a desalting machine to remove the loose salt that contributes to high TDS values in effluent. Solidaridad, Kolkata installed desalting machines in the cluster, completed the comparison, and demonstrated to the industry the feasibility of dusting off the loose salt with the machine before soaking. The desalting machine reduces 33% TDS in the waste water, while reducing two to three washings into one. MSME department recognised the positive outcome of the process and CLCTA made it mandatory for all tanneries to install the machine. In parallel, all new tanneries must install the machine to obtain a NOC.

Land Rejuvenation

Liming is the process of treating wet hides with lime powder [Ca(OH)2] and sodium sulphide (Na2S) to remove keratin and open the fibres so that the chemicals can penetrate correctly. This traditional process of pit liming, paddle liming, and drum liming using sulphide, still used today, is posing a big challenge to the tanners and the pollution board. The highly alkaline sulphide is treated as the key chemical for the unhairing of raw hides. Additionally, sodium sulphide produces hydrogen sulphide gas, which is highly toxic for humans and damages electronic equipment such as computers, air conditioners etc. Solidaridad's theory and practice of enzymatic liming relates to enzymatically supported liming, bating, and degreasing processes using alkaline lipases, preferably in combination with proteolytic enzymes. Unhairing with enzymes is a controlled process that is environmentally friendly.

Reduce water depletion and promote efficient water usage

Solenoid valve

Solidaridad surveyed and discovered that excess and unmeasured water is used in the fleshing process. As a result, water is wasted and dumped into effluent. It also contributes to the rapid reduction of groundwater. Solidaridad installed a solenoid valve with a limit switch which controls the flow of liquid (water) during the operation.

Weighing machine and water flow meter

The conventional process uses chemical and water in a drum in an unmeasured way which leads to excessive and unnecessary wastage. Proper measurement of the pelts using a weighing machine can determine the correct amount of chemical and water required. The water meter can check water usage, thereby, reducing unnecessary water wastage and help conserve the groundwater.

Economic transformation

Utilization of lime sludge into making of Paver Block: CETP/PTP sludge is a solid waste generated from the tanneries. On an average, one ton of raw hide/skin generates 125 kilos of sludge. Disposing of the sludge at landfill sites is both cost-intensive for tanneries and detrimental for the environment. The accumulated waste degrades the land and leaches into the ground to contaminate groundwater. This puts the entire surrounding ecosystem at risk including the Kolkata leather cluster which houses more than 350 tanneries and more than 4000 manufacturing units. The sludge thus exists as a huge liability on the industry as long as its economic potential remains unrealised. Solidaridad approached the solid waste disposal issue as a wakeup call for a market-based solution. The 'Waste to Walk' initiative has been conceptualised by Solidaridad, along with its partners Dugros Leather and Calcutta Leather Complex Tanners Association (CLCTA). Trials were conducted with tile manufacturers for use of sludge as a constituent for making tiles. Paver blocks were thus produced by mixing the solid waste from tanneries and CETP sludge with other constituents such as cement, sand, stone chips etc. The strength of the blocks also demonstrated a high load bearing capacity of 44 N/mm2. The utilization and conversion of PTP and CETP sludge into paver blocks holds significant potential to revolutionize the industry practices towards ecological restoration and a circular economy. The approach is not only saving tanneries the cost of transportation of sludge, but also creating new business opportunities by tapping into un-utilized resources.

Intervention outcome

- Reduces the solid waste load in the landfills
- Reduces transportation cost of the tanneries to the landfill
- Beautification of the walkways with eco-friendly paver blocks/tiles
- Easy to install and low maintenance
- Can be produced in different sizes and shapes as per the requirements
- Provides new livelihood opportunities for the entrepreneurs, who can make a living out these eco-friendly paver blocks

Bonded Leather: Solid wastes such as leather cuttings, leather trimmings, chrome shavings, etc. can be reproduced into bonded leather sheets that can be used in the production of shoe components, belts linings, reinforcements for bags, wallets, shopper bags, and so on. Currently, waste is dumped alongside roads, vacant plots, and riverbeds. By converting this solid waste into a marketable by-product, tanneries will be able to reduce their disposal costs, while at the same time creating additional revenue.

Social transformation

Occupational health and safety are a multidisciplinary field concerned with the safety, health, and welfare of employees. The creation of a healthy and safe working environment requires collaboration between employers and employees. Solidaridad Leather Project "Effective Waste Management and Sustainable Development of MSME Tanning companies in Kolkata Leather Cluster" aims to foster a safe and healthy working environment. Dr. Ashish Mittal, an expert in occupational health and safety issues for MSMEs with more than 25 years' experience, conducts these health camps. Workshops are being conducted simultaneously with the participants.

The training is organized with a key focus on following:

- Simple agronomics, Personal Protective Equipment (PPE) in (High-Risk) Jobs
- A mix of academic and practical education, as well as the identification of SPOCs (specific point of contact responsible for maintaining, repairing, and testing of safety tools
- Personal protective equipment methods to increase safety awareness in the workplace and prevent workplace accidents
- First Aid training in emergency situations

FACT FILE

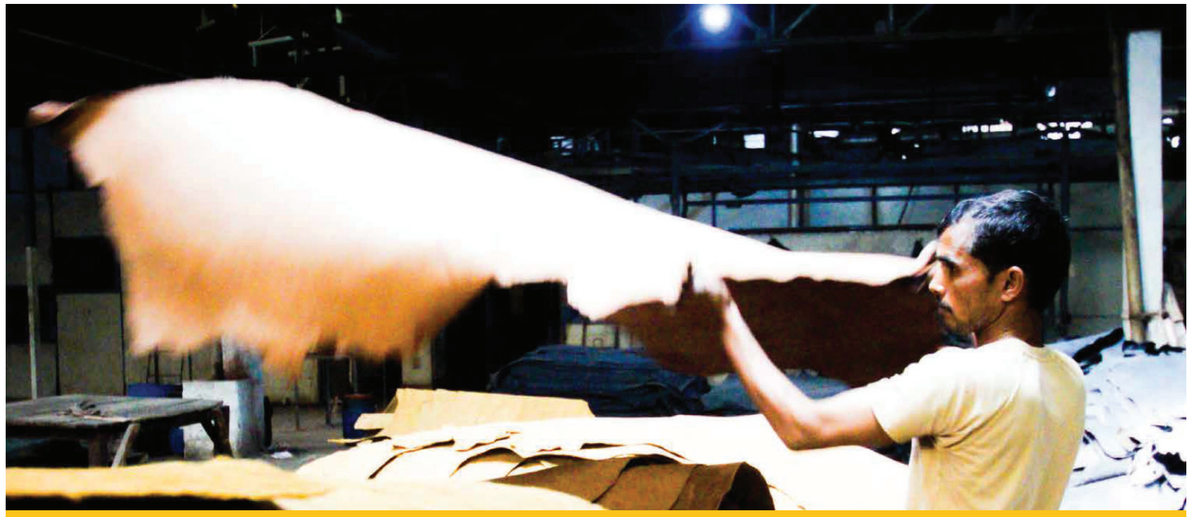
IMPACT

- Reduction in BOD, COD, TSS, TDS and other pollutional factors in the effluent
- Reduce excess use of water
- Reduces GHG emission
- Reduces Sodium Sulphide
- Reduce-Re-use-cycle of solid waste

KEY RESULTS

- **33%** reduction of salt in effluent
- **50%** reduction in ground water usage during fleshing process
- **90%** reduction in sulphide requirements
- **20-25%** reduction in COD
- Reduced BOD
- **40%** reduction of nitrogen in wastewater

ACHIEVEMENTS



Acknowledgement

Government of West Bengal acknowledged the initiatives in Kolkata Leather cluster for the TDS initiative

Government of West Bengal
Department of Micro, Small & Medium Enterprises & Textiles
Shilpa Sadan (7th & 8th Floor), 4, Camac St., Kolkata-700016

No. 2437 - MSMET-24013/5/2020-SMU (SECTION) (MSMET) Dated 01.10.2021

The General Manager (Pollution),
Solidaridad Regional Expertise Centre,
A-5, Shankar Garden, (1st Floor),
Main Najafgarh Road, Vikas Puri,
New Delhi-110018

Sub: Arrangement for sourcing desalting machine for use by the Tanneries in Calcutta Leather Complex.

Sir,

At the very outset, the Department places on record your co-operation and support for enthusing the Tanneries in Calcutta Leather Complex on adoption of "Good Tanning Practices" through the use of "Desalting Machines" in the pre-tanning stage of raw hide. It is also a matter of comfort for the Leather Industry in the State and the CLC as well that Solidaridad-Asia would lend a few Machines for free for the common use of the small tanneries who are rendered unable to purchase such machines for their tanneries just at this moment.

This Department has decided to set up such Machines in more than one large Tanneries in CLC (names to be identified by CLCTA) who would provide desalting services to the small tanneries against nominal cost.

It has also been decided that all the Tanneries have to have their own desalting machines installed in their Tanneries so as to get the "Consent to Operate" from the West Bengal Pollution Control Board. Hence, considering that there are more than 700 Tanneries in CLC large number of Desalting Machines will be necessary. It may be difficult for any single indigenous manufacturer to supply such huge number of machines within short time of say, one year or so. Hence, more than one manufacturers have to be engaged/searched out who would be able to manufacture such machines as per standard design and specification and get the machines certified for efficacy from any authentic source, say, CLRI, CMERI, or alike.

This Department may explore the feasibility of identifying manufacturers in Howrah for scaling up production, since import of such machines may not be immediately possible.

Considering the above position, I am directed to request you to kindly share with us the design/specification/model etc. of the Machine, if there is no bar on manufacturing such machines here in this State or in our Country. It will also be welcome if you would inform the name of any Dealer/Importer in India for the Machines manufactured abroad, for supply to the CLC Tanneries at a negotiated price considering the bulk requirement.

An early reply on the above may kindly be sent for further consideration and action on the matter.

Once again this Department places on record its appreciation for the gracious venture undertaken by the Solidaridad-Asia for abatement of pollution world-wide, particularly by the Leather Sector.

Yours faithfully,

Joint Secretary to the
Government of West Bengal

TESTIMONIALS FROM THE FIELD

"Solidaridad's claim of reducing TDS, TSS, BOD and COD in the effluent water discharged stands true."

Mr. Haider Ali
Crescent Tannery

"Solidaridad has introduced and initiated the adoption of eco-friendly green technology in the leather industry. The industry has been now capacitated with multiple livelihood opportunities with the adoption of innovative techniques and utilization of the waste generated in the tanneries. This will create a sustainable circular economy which is the need of the moment. Appreciate the efforts of the project."

Mr. Imran Ahmed Khan
General Secretary (H), CLCTA and COA
Member, CLE

"The Solidaridad project on effective waste management has been a big eye opener to our tanning and production processes, leading us to become more environmentally aware and resulting in our company's green growth."

Mr. Ahmad Kamal Khan
Managing Director, Dugros India

PARTNERS/DONORS

Funded by the European Union

CLC TANNERS ASSOCIATION
(We Care for the Environment)

stahl

dugros

SOY

ALARMING SIGNS

The two states of Madhya Pradesh and Rajasthan, in India, play a key role in the agricultural growth of the country. Madhya Pradesh contributes around 8% of the total food grain and around 25% of total pulses and oil seeds production in India. In Rajasthan, a large population is engaged in agriculture and allied sectors. Largely dependent on the timely arrival of monsoon, the state produces 5.49% of the nation's total food grains and 21.31% of its oilseeds. Rajasthan is the largest producer of mustard and Bajra and second largest producer of groundnut in the country.

However, farmers are grappling with various challenges of farming: lack of access to improved quality seeds as well as resource and infrastructure and dearth of adequate and timely extension services. In absence of any guidance, they end up paying more for unwarranted inputs, especially excess chemicals.

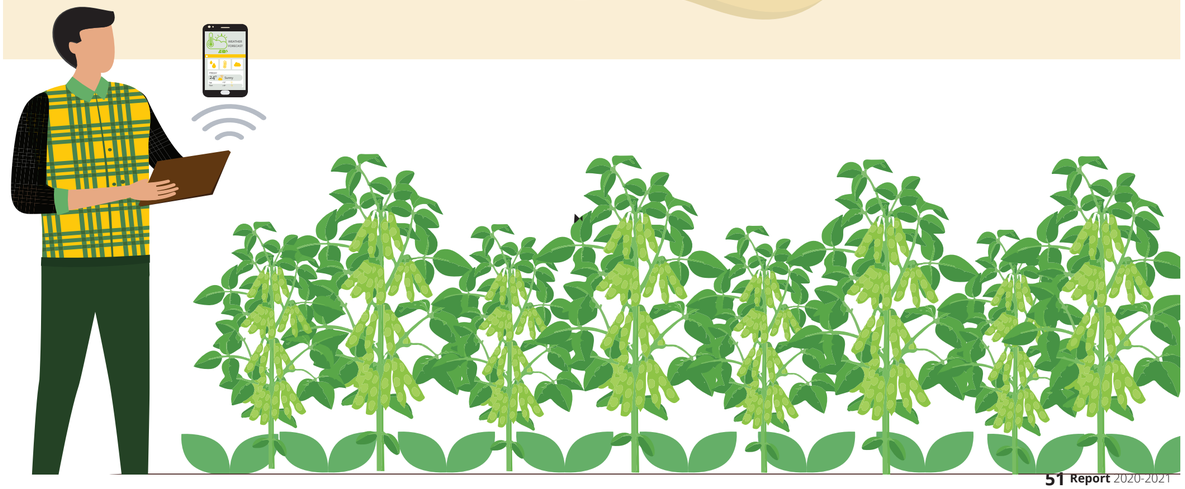
Climate shock is the other risk that farm households and livelihoods face in the region, which affects agricultural productivity and increases food insecurity. Lack of coping mechanisms often means that farmers can do very little to overcome such shocks.

In addition, overexploitation and mismanagement of soil and water resources have been aggravating land degradation. Accumulation of toxic elements in soil and change in vegetation types also deteriorate land quality. This results in poor agricultural output and risks the income and livelihood of the farming community.

Lack of women's access to knowledge and nutritional risks is a major social challenge prevalent in the state. Women perform more than 70 per cent work in agriculture, but their access to knowledge and improved technologies is very limited. This affects their decision-making. Madhya Pradesh is infamously tagged as the state with highest infant mortality rate and maternal mortality rate. 39.5 % of children under the age of five are stunted in the state while 38.7 % of children under five are underweight. Moreover, the rate of malnutrition and anaemia among women and children is significantly high in the region. Ironically, the state produces largest quantity of soy (most affordable source of protein) and the community that grows soy are the most impoverished.

ENVIRONMENTAL CHALLENGES

ECONOMIC AND SOCIAL CHALLENGES



A HOLISTIC INTEGRATED FARMING APPROACH

Solidaridad, along with partners and stakeholders, continues to promote Integrated Farming System (IFS) as well as implement interventions that address the issues of knowledge gap and productivity as well as access to quality seeds, inputs and market linkages. The programme also promotes the food value of soy and kitchen gardens to address malnutrition.

In 2020-2021, Solidaridad made a concerted focus on rising social, environmental and economic challenges by pursuing a holistic integrated farming system approach. Solidaridad strategised to reach out to the farmers with a cadre of trained frontline workers comprising rural entrepreneurs, lead farmers, nutri sakhis and service providers. The programme also facilitated the farmer producer organisations (FPOs) in backward and forward linkages. The interventions promoted through the programme contributed towards socio economic development of farmers in the region, including women farmers.

GOOD AGRICULTURAL PRACTICES

Training of extension team and lead farmers

The pandemic induced lockdown in the year 2020 brought to halt the training and extension activities in groups. However, to support the farmers and the ongoing project activities, a digital extension system was introduced which includes whatsapp, sms, videos and voice calls. Local extension institutions such as Krishi Vigyan Kendra (KVKs), experts and scientists were engaged to conduct virtual sessions.

The project extension team and lead farmers were targeted for dissemination of knowledge and scientific information through the digital means, and they further transferred the information among connected farmers in their respective clusters.

Training of trainers

Online training of trainers was organised by the subject matter experts and scientists, followed by assignment of responsibilities to extension team members and lead farmers. Customised trainings involved detailed lecture sessions on the package of practices such as seed varieties, land preparation, INM, IPM, weed management, irrigation and moisture management, drought mitigation, sowing methods, harvesting and storage practices etc.

Farmers field schools (FFS) for efficient extension support to farmers

The Farmers Field Schools (FFS) and lead farmers led extension approach is followed for farmer engagement and extension. A total of 50 FFS were set up and 510 lead farmers were trained to facilitate farmer to farmer learning process. The FSS is being equipped with necessary tools and equipment to make the learning and sharing easier for farmers. A training calendar has been developed.

Online Advisory Support to Farmers

With the objective to disseminate advisory through mobile phones, a list of 4972 farmers was prepared and groups were formed. Messages, videos and audios are shared in these groups and the lead farmers were made responsible for passing on the information to other targeted farmers in the cluster.

Location specific Crop Advisory for farmers

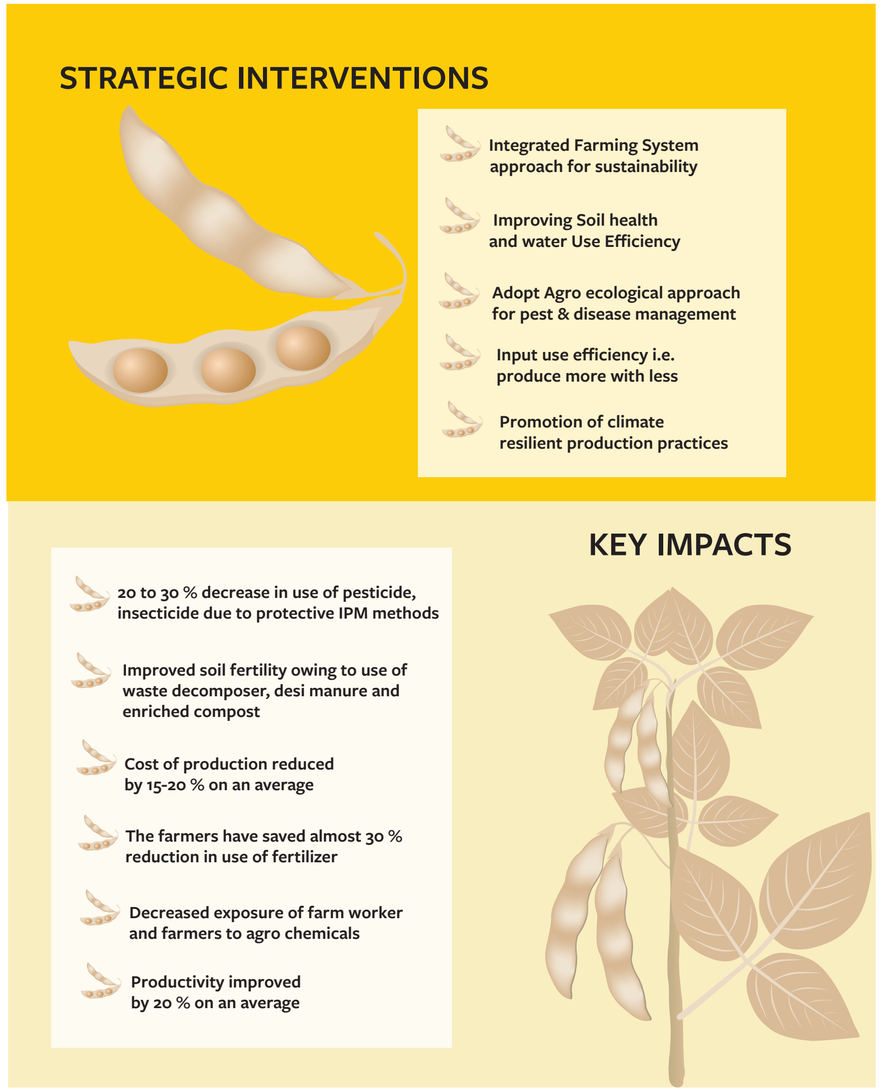
Location specific advisory is generated after the collection of crop condition data on weekly basis. After analysis of the compiled data by the experts, localised advisories are generated for each farmers' field school (FFS). With strategic intervention of Solidaridad-Vippy and its experienced technical team, the adverse impact of climate change on crops could be significantly minimised.

Front Line Demonstrations (FLDs)

FLDs are used as field schools for dissemination of good practices and technologies among farmers under the guidance of crop specialists. During 2020-2021, 210 FLDs were conducted to share knowledge as well as demonstration of improved sowing methods, integrated pest management, biopesticides, micronutrients and high yielding variety seeds, etc. Decomposer culture was also demonstrated. Knowledge was imparted on application of enriched compost, sowing in altered land configuration like broad-bed furrows (BBF) and raised-bed furrow (RBF).

20:20 MODEL FOR ECO AGRICULTURE

A new concept around the 20:20 Model of Eco Agriculture, was introduced this year to demonstrate the new and innovative solutions for addressing the challenges of the conventional agriculture i. e. heavy use of chemicals, land degradation etc. Developed by Padma Shri Awardee Dr M H Mehta, the former vice-chancellor of Gujarat Agriculture University (renowned agronomist and Chairman of Gujarat Life Science, Vadodara) developed 20:20 model of Eco Agriculture, this model is a combination of eco-friendly technologies, resource efficient and circular agriculture practices and gives practical insight to have 20 % more crop production with more than 20 % reduction in input cost in a sustainable and evolutionary manner. The model leverage and apply the technological advancement in areas of Bio-fertilizer, bio-pesticide, bio-compost and agro waste management in crop production. It is a proven concept which have already been implemented in different countries including India, Africa and far Eastern countries.



In one of the front line demonstrations, lead farmer Mr Ram Chander from Aakhakedi village, Agar Malwa District, applied the practices in soybean crop. The results obtained were analysed viz a viz control plot. As a result of application of 20:20 model practices, Mr Ram Chander has realised around 20 % increase in the yield and saved around 20% in the cost of production. It gave a practical proof of advantages of this model.

SMART AGRI: LEVERAGING TECH ENABLED SOLUTIONS

Solidaridad with the support from Vodafone-Idea Foundation has introduced the Smart Agri project. The project intends to implement an integrated programme to bring change in subsistence agriculture by leveraging technology to transform it into an enterprise in the five districts of Madhya Pradesh. A total of 25000 farmers were targeted to be supported in two years. The project promotes improved agricultural practices by adopting IoT based solutions, and building their capacities to integrate such solutions with good agricultural practices and efficient farming technologies. Under the project lead farmers are trained to support a cluster of farmers through tech-enabled demonstrations. We are also promoting digital literacy and digital content-driven training for better uptake of agricultural advisories. In addition to this, the project also aims to address the cross-cutting issues related to gender and nutritional security of women and children in the targeted areas of Madhya Pradesh. The training cum resource center has been established in the project locations, the major objective of these training cum resource center is to provide the one stop solutions to all the aspects of Smart agriculture and AI solutions. In addition to this a call center is also set-up to provide real time advisory support to farmers using IOT based solutions.

Under the Smart Agri project, automatic weather stations, soil probes, insect traps and crop cameras have been installed to help drive productivity of crops. This has helped farmers to have better access to weather information and preparedness to the changing climatic conditions. The soil moisture reading helped in scheduling of irrigation and need based irrigation to crops, thus, ensuring efficient use of water in agriculture.

ECONOMIC SUSTAINABILITY

Shifting to high value crops

Crop diversification is a viable solution to stabilise and raise farmer's income in sustainable manner. Promoted through a shift of resources from cereals and low value crops to high value medicinal and aromatic plants, crops and vegetables. Crop diversification gives a wider choice in the production of a variety of crops in a given area, thus, reducing the risks related to crop failure. It is generally viewed as a shift from traditionally grown less remunerative crops to more remunerative crops.

Climate Resilient Livelihood

A package of interventions such as demonstration of climate smart practices, improved and pest/diseases resistant seed varieties, use of bio-pesticides/bio-fertilizers is being promoted among smallholder farmers towards building climate resilience. The precise advisories are prepared using the data received from the automatic weather stations and sensors, to help farmers prepare for changing weather conditions as well as prevent possible pest/disease attacks. The farmers are sensitised about the causes and impact of climate change and to make optimum and sustainable use of local resources.

Strengthening farmer producer organisations (FPOs) and rural entrepreneurs

Solidaridad works with FPOs by giving market support, capacity building and developing a resource base for larger reach out and impact. FPOs are being promoted for better integration of farmers into the value chain so as to improve their incomes, access to quality inputs, infrastructure facilities, value addition, processing and market linkages etc. In 2020, Solidaridad continued to extend its support through training and capacity building of six FPOs, 15 rural entrepreneurs and 20 extension service providers (associated with FPOs).

Mustard model farms: A bold step towards atma-nirbhar bharat

Through a joint mission the Solvent Extractors' Association of India (SEA) and Solidaridad are promoting sustainability in the edible oil sector, towards India's self-sufficiency in edible oils and to enhance the productivity of oilseeds in order to improve income and livelihood of farmers.

SEA and Solidaridad are implementing the mission mustard model farms project. With an ambitious target to increase the production of rapeseed-mustard by 200 lakh tons by 2025, the mission was launched in 2019, in Rajasthan which is one of the largest mustard producers in India.

PRODUCTIVITY OF MODEL FARMS VS CONTROL FARMS -2020-21

Model Vs. Control

District	Avg. Model Productivity (KG/Ha)	Avg. Control Productivity (KG/Ha)	% Increase / Decrease of Model over Control
Bundi	2759.90	1750	+57.71%
Tonk	2517.17	1466.25	+71.67%
Kota & Baran	2968.75	2531.25	+17.28%
	2728.59	**1915.83**	**+48.89%**

SOCIAL TRANSFORMATION

Empowering women

Emphasis on empowering the women farmers continued during 2020-2021. Women farmers were mobilised and capacitated on decision making, entrepreneurship, health and nutrition.

Women Farmer Field Schools (FFS)
Training on improved technologies, women friendly tools, sustainable and regenerative climate smart agricultural practices. Aim to mainstream the involvement of women in decision making process

Nutrition management
Awareness creation on importance of nutritive diets, preparation methods of nutritious food using locally available ingredients including soy and nutritious vegetables. Integrated in government run nutrition programmes such as mid day meal and aaganwadi scheme through trained 'nutri-sakhis'

Women entrepreneurship
Skill development of women as entrepreneurs on food processing, preparation of bio-pesticides/bio-fertilizers, cultivation and primary processing of high value crops like medicinal plants and vegetables etc.

Women leadership
Empowering women by nurturing their leadership skills. Rakshika Mahila Kisan Producer Company, an all women owned FPO, aims to facilitate collective actions on aggregation of quality inputs, seeds, nutritious food products and market linkages, thereby generating income for rural women and supporting development of collective livelihood activities.

ACHIEVEMENTS

45112
farmers capacitated on Good Agriculture Practices

53146 ha
area brought under sustainable agriculture

48.89%
yield increase in model farms compared to control groups

510
lead farmers are disseminating the knowledge and skill on GAP among others

14.45 %
lead farmers are disseminating the knowledge and skill on GAP among others

30%
increase in income with crop diversification

20 to 30 %
decrease in use of pesticide and insecticide after adoption of 20:20 model

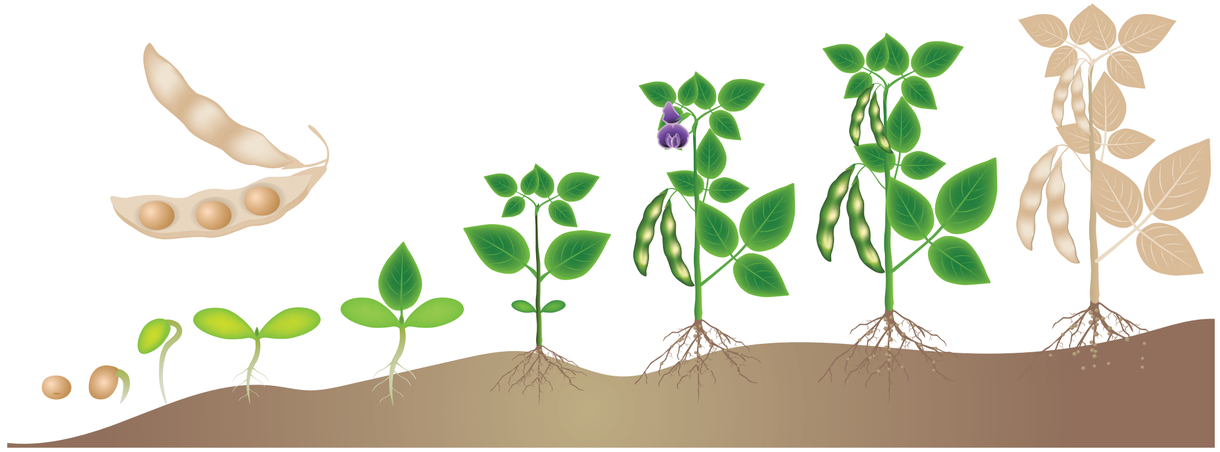
6 FPOs
and 100 rural youths trained on Agri supply chain, Agri input and output linkages, FPO services-Agri extension

210
Front Line Demonstrations (FLDs) set-up up on Soybean

15,000
quintals of wheat and chick-pea procurement was facilitated by Samarth Kisan Producer Company during the lockdown

25
"Nutri-Sakhi" trained on different aspects of nutrition

4,542
women trained towards empowerment, nutrition and food security



RESPONDING RESPONSIBLY TO THE COVID-19 CRISIS

In 2020, COVID-19 wreaked havoc globally. In rural parts of India, with little access to basic livelihood requisites during the lockdown, smallholders and daily-wage workers grappled with a double crisis of income and health uncertainty. Recognising the pressing crisis at hand, Solidaridad engaged in various relief and awareness mechanisms to abate the spread of COVID-19 in rural communities. Working closely with its partners and local authorities, Solidaridad extended support to landless farmers, workers and vulnerable communities with basic livelihood requisites through supply of dry ration kits and personal protective equipment and preventive care provisions such as masks, gloves, soaps and sanitisers to several community workers and healthcare volunteers.

SUCCESS STORIES

Building Resilience with Climate Smart Agriculture

Kanwar Lal

65-year-old Kanwar Lal of Narwal village, Agar Malwa, Madhya Pradesh, had been practicing chemical intensive farming for many years. The use of high dosage of fertilisers and pesticides led to an exponential rise in input cost, over 60% per acre, while the yield remained stagnant; and degradation of soil quality due to destruction of physio-chemical and biological properties such as microbial population, beneficial organisms, soil composition, soil pH, organic carbon content, and water holding capacity. Climate change adversely affected his crop and productivity whilst pest and disease attack increased.
To mitigate the challenges, Kanwar Lal shared the issues with the front-line team of Solidaridad, two years ago. He joined the training sessions and observed the practical benefits of ecological agriculture practices.

Eco friendly practices

He was provided with a compost unit. Following the technical advice of experts and utilising the dung from his small herd of cattle, he generated 10 quintals of good quality compost within 40 days of installation. The application of his home generated compost in wheat cultivation gave him better result as compared to the control plot, same in terms of plant height, plant density, leaf size, panicle length and grains per panicle.

He further applied the same in his orange crop and the result was visible in terms of better flower initiation, reduction in flower drop and less incidences of pest attack.

Having realised the benefits, Kanwar replicated the model with his own investment and set up four additional units of Tetra pack of 10 quintals each. His two sons are helping him in looking after the work. The vermiwash excreted from each unit is a highly beneficial organic bio pesticide with multiple benefits crops. It not only works as a bio pesticide, but also as a growth promoter and enzyme. With the help of his two sons, he is able to generate three to five litres of vermiwash from each unit on weekly basis. Through fertigation and foliar spray, he is applying it on the standing crop of wheat and gram.

With the immense benefits gained from the adoption of composting, today he is supplying it to other farmers generating an additional income for his family as a new source of livelihood. Currently, he is supplying 16 to 20 quintals of vermicompost to other farmers. Kanwal Lal envisions to try other innovative methods such as use of cattle horn, dry fish, poultry manure etc. which are a rich source of nutrients.

He is thankful to Solidaridad for bringing the knowledge and skills to his doorstep and helping him transform the farming practices. He is happy to be revered in his community as a source of knowledge and information.

PARTNERS/DONORS

Department of Horticulture, Govt of Madhya Pradesh

Department of Agriculture, Govt of Madhya Pradesh

Indian Institute of Soybean Research, Indore

Directorate of Rapeseed and Mustard Research (DRMR), Bharatpur

Dewas

Agriculture College, Sehore

Krishi Vigyan Kendra (Agriculture Science Centre), Agar, Bhopal, Ujjain and

Dewas Kisan Producer Company Ltd, Dewas

Tejas Kisan Producer Company Ltd, Phanda, Bhopal

Ekta Kisan Producer Company, Agar Malwa

Siddhpur Kisan Producer Company Ltd, Sehore

SUGARCANE

SOIL AND WATER: AN AGENDA FOR SUGAR-CANE CULTIVATION

Declining soil health and depleting water are the major challenges faced by sugarcane growers in India. Climate change has further exposed the severity of these challenges. Due to degraded land, farmers using conventional practices, receive low yield despite putting their best efforts.

Soil and water pollution has increased due to usage of chemical fertilisers on a large scale, thereby reducing soil fertility. Excess usage of water and fertilisers are also contributing to carbon emission impacting the environment and human health.

Soil analysis conducted during 2020-21, reflected low soil organic carbon as one of the critical reasons for farmers' low yield and income. To improve the carbon content of the soil, Solidaridad provided vermicompost beds to nearly 2000 farmers in Karnataka. Vermicomposting was an addition to the other interventions Solidaridad is promoting since the inception of the project, such as use of farmyard manure, trash mulching, waste decomposer and use of different agro-industrial by-products. The outcome of the programme intervention is visible at scale, with farmers not only experiencing improved environmental impacts like soil health, improved water usage or reduced farm pollution, but a simultaneous increase in yield and income.

"Catch & Match" campaign

Monsoon is unflinchingly the best time for rainwater harvesting—a prominent method for water-use efficiency. Solidaridad Asia's sugarcane team launched a water harvesting campaign 'Catch & Match' in Karnataka, India. Following the mantra of 'retain, recharge & reuse', the campaign was designed to motivate and create awareness about water harvesting among smallholders and women farmers in the sugarcane- growing state.

Owing to the pandemic lockdown and lack of mobility, the farmers were reached out and trained through video conferences, radio programmes and other digital platforms. The campaign was run by Solidaridad and Shree Renuka Sugars Ltd, with the support of Coca Cola Foundation. Gulbarga district's coordinator IEC- MGNREGS, Mr. Siddaram, conducted a webinar on different schemes related to farm pond construction in Karnataka as a support to this campaign.

FACT FILE

2000
farmers supported with vermicompost beds in Karnataka

30%
reduction in cost of fertilizer application

79
billion litres water saved

29217
(24017 from Uttar Pradesh and 5200 from Karnataka) farmers trained on good practices

GHG emission

1
- 85% farmer reduced pesticide dosage
- Average reduction of 1.88 dose/hectare/year
- Average reduction of 0.08tco2eq/hectare/year

2
- An average decline of 163 hours of electrical pump usage for irrigation
- Average reduction of 1.17tco2eq/hectare/year of GHG emission

5500+
Farmers trained through E-Suvidha

2000
farmers supported with safety kits

In Karnataka, with the adoption of good agriculture practices, the cost of cultivation has reduced from 52,000 to 41,600 INR per acre. Yield increase to 135 tons per hectare and a net profit of 1,82,000 INR per hectare.

SUCCESS STORIES

A win-win situation


Arjun Mahadevappa Kumbar

42-year-old sugarcane farmer from Kollur, Karnataka, Arjun Mahadevappa Kumbar and his wife owns six acres of land. His farm land was infested with rats which attracted a lot of snakes, risking the safety of his children and family. Like many other farmers in the region, he would engage in trash burning regularly. As a school dropout, he was not educated enough to try and find new methods to deal with his problems.

Arjun followed traditional farming practices including irrigation, until his interaction with Solidaridad in 2019. During field day visits by Solidaridad experts, he was given hands-on experience on some of the best and most sustainable practices. Solidaridad also facilitated institutional training at the Dharwad Agricultural university where Arjun along with other farmers were introduced to new technologies in sugarcane farming.

"For fifteen years we were practicing trash burning. Still many farmers continue to do that around us. But Solidaridad taught me to look at the long-term benefits of soil health. I learnt about wide row spacing, alternate furrow irrigation, row mulching and vermicomposting. This reduced the consumption of a variety of inputs like fertilisers by 50% but increased the output of sugarcane. It is a win-win situation for us", says Arjun.

By implementing the best practices, Arjun is able to reduce water usage by almost 30%, with a significant increase in his yield of 70 tonnes of sugarcane per acre which is the highest yield in his village. He aims to get to a yield of 100 tonnes per acre in the coming years with the changes he has brought about in his farming practices. "With additional income from this crop we have increased our land holding in the family. We save on labour costs by doing a bulk of the work ourselves and that adds to our income", says Arjun. He hopes that these best farming practices will be profitable enough to ensure his three children, including a girl child, to take up farming as well.

> Earlier the farmers used to burn the sookhi patti (dry leaves), but today we can proudly say that 99.99% farmers add the dry leave to the soil which has helped improve soil fertility.
> **- Raja Srivastava, DCM Shriram**

PARTNERS/DONORS

DCM SHRIRAM SUGAR

IFC

SHREE RENUKA SUGARS
Shree Renuka Sugars Limited

TEA

FACT FILE

72018
small growers trained to adopt good practices

105338
tea workers trained to adopt good practices

41397.89 ha
brought under sustainable management

5490
women small growers assessed and oriented

45
factories & estates supported to adopt improved social & environmental policies and regulations in their supply chains

07
smallholder associations established & supported

5 SHGs
established & supported

06
tools and models developed to facilitate the implementation of Good Practices & tested in consortia

STRENGTHENING SUSTAINABILITY AND RESILIENCE

The small tea growers (STGs) in India contribute more than 50 per cent of the total tea production in the country. However, they lack access to high-quality services and sustainability support to meet multiple challenges. Climate change-induced excesses cause negative effect on tea production. Producers have to buy more fertilisers to maintain soil fertility and spray more pesticides to tackle new emerging pests leading to increase in the cost of tea production, and affects food safety, which are among the top buying concerns of most tea packers. Non-remunerative returns due to inability of the smallholders to add value and participate in high-value supply chains is also a persistent challenge. The supply chains are opaque and lacks traceability on quality, price and other aspects.

Since its launch in 2019, the Trinitea programme has included 34% of the total STGs in India with the aim to reach 50% by 2022.

Support to small tea growers

However, the relevance of Trinitea goes beyond the inclusion of STGs, to a broader economic need and is simultaneously addressing other factors such as:

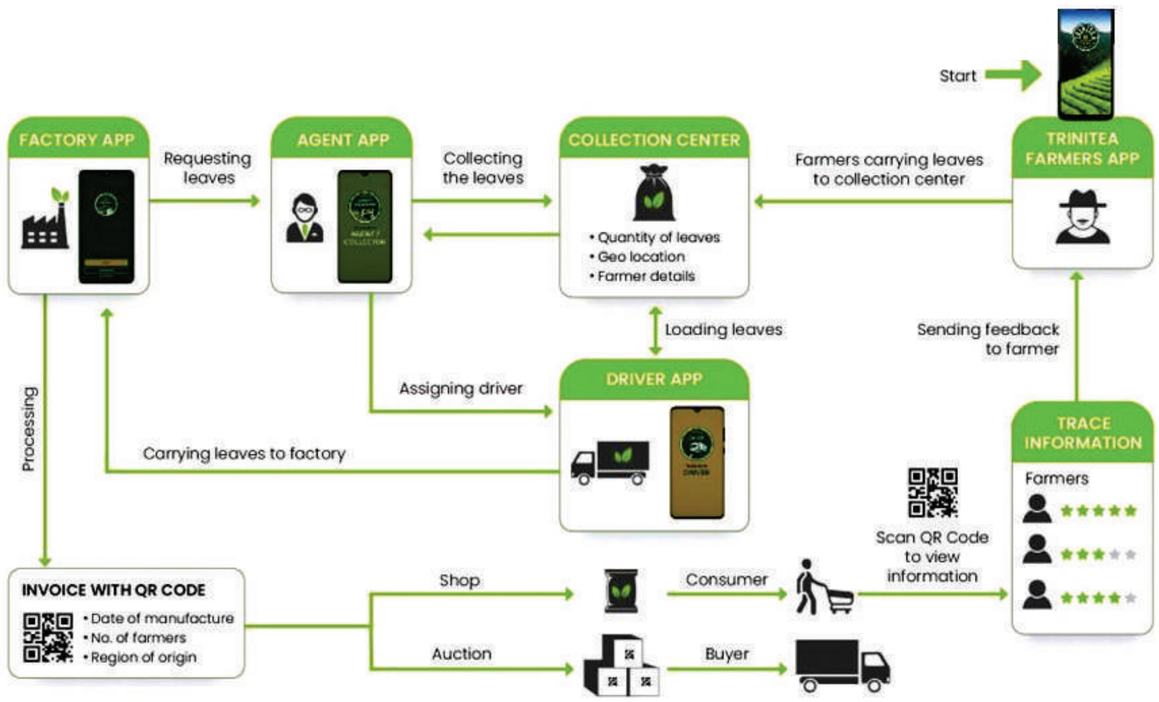
Expensive certifications: Certification schemes recognised by the industry are third-party and expensive, making them inaccessible to STGs. Trinitea's digitally-enabled self-assessment model allows every farmer to ensure that their tea is of good quality. Unlike the square-root model of third-party verification, where only a handful of farmers are sample-audited for their produce, Trinitea vouches for assurance and traceability by/for every farmer.

Demand for better tea: Small tea growers are not able to meet the demand for a higher level of sustainable practices and food safety compliance due to lack of technical knowledge and inputs to produce higher-grade tea. This leads to inefficient fertiliser and pesticide use, lower quality leaf and poor remuneration, creating a cycle of poverty. The Indian Tea Association (ITA) and Solidaridad have created a panel of tea industry experts who prepare the curriculum and provide on-site guidance to small tea growers, throughout the year, to equip them with the best practices.

Demand for a traceable supply chain: With the rise in consumers' demand for a traceable supply chain to trace the origin of the product, Trinitea integrated the digital traceability component that intrinsically captures the entire journey of the production of the tea right from the farm to the cup. It uses the QR code technology allowing consumers to view the producers and hear from them directly, and learn about the safety and quality standards.

TRACEABLE-TEA APP

With traceability features built into all stages of the tea supply chain, Trinitea captures the farm-to-cup journey of every tea leaf. Its traceability technology captures information at every point of transaction, from tea grower at farm gate to all intermediaries involved, including agents, factories and transporters in the supply chain. As the processing of the green leaves completes in the factory, a QR code is generated with the invoice for labelling on the product. By scanning the QR code, consumers can trace the origin of the product and know about the life and livelihood of its producers.



SUPPORT AND ENCOURAGEMENT DURING THE PANDEMIC

Recognising the pressing crisis of COVID 19 in 2020-2021, Solidaridad has engaged in various relief and awareness mechanisms to abate the spread of the pandemic in rural communities. Working closely with its partners and local authorities, more than 10,000 farmers and daily wage workers received relief materials, including sanisters and masks, in Assam under the Trinitea programme (with active assistance from Trinitea partners, ABSTGA and ITA.) Farmers and workers also expressed their gratitude to Solidaridad for supporting them during the crisis.

> "Distribution of masks and sanitisers by Trinitea has been very useful since we cannot go to the markets to purchase them
> **Tea grower from Tinsukia District, Assam, India"**

> "We appreciate the step taken by Trinitea to organise this workshop as many of the smallholders are living in poverty today. We, on behalf of our community in Doomdooma would like to thank Solidaridad, and hope that we are relieved of this pandemic soon,
> **said one of the small tea growers from Doomdooma, Tinsukia district in Assam, India.**"

Within the purview of the Trinitea programme, detailed videos and printed circulars on awareness about COVID-19 and the importance of social distancing to prevent its spread are being created and shared with small tea growers and workers in Assam and West Bengal. During the stringent lockdowns and travel curbs, Trinitea actively drove digitalisation of the extension activities to transfer knowledge. Whereas 16,000 farmers were directly trained by the community mobilisers, Solidaridad experts and implementing partners, close to 55,000 were reached through remote digital interaction. This was undertaken through virtual training, monthly bulletins, training videos, WhatsApp messages, individual calls with experts and through broadcasting via news channels. Solidaridad ensured that the training topics were location and season specific and based on the cropping calendar. Further, the team derived performance gaps from the Trinitea assessments, and integrated the results in the trainings.

SOLIDARIDAD GHG TOOL

Solidaridad Asia has developed a greenhouse gas (GHG) measuring tool to calculate the total on farm emission based on three major sources (1. GHG emission from on-farm energy use 2. GHG from chemical fertilizers and pesticides 3. GHG from transport).

The tool was piloted in four districts of tea growing region of Assam i.e., Dibrugarh, Jorhat, Tinsukia and North bank (Udalguri). The data points of farm activities were collected through a questionnaire developed on an open data kit (ODK) platform. The questionnaire consisted of the farmer's basic profile and the variation in different farm inputs recorded during the project duration. A total of 200 farmers were surveyed, 50 from each district. The study calculated the variation in their fertilizer and pesticide inputs during the Trinitea program and computed the GHG reduction.

GHG emission from on-farm energy use

GHG from chemical fertilizers and pesticides

GHG from trash burning

GHG from transport

The GHG measuring tool calculates the total on farm emission based on four major sources: Based on the total on farm GHG emission the tool identifies major areas of intervention and recommends a set of climate smart practices to reduce the on farm GHG emission.

SUCCESS STORIES

Of Grit & Guts: A Woman Tea Farmer's Success Story

Karuna Daimari shows us how to turn adversities into opportunities through sheer determination and hard work.

The role of most women in the tea industry often ends with plucking leaves. But not for Karuna Daimari — who is trying to change the stereotyped narrative by embracing entrepreneurship.

Karuna Daimari, a small tea farmer from the Udalgiri district in Assam, was suddenly put to the throes of a harsh reality when her husband got killed by a wild mithun (a large domestic cattle) at work in the farm.

"I was pregnant when he died. In the initial days, I used to think of getting rid of the tea garden but could not gather myself to abandon something that he had worked upon so hard," she says, reminiscing the hard times.

For the first two years since the tragedy, Karuna had left the business at the hands of the sardar (the farm caretaker) as she was unfamiliar with the workings of the industry. It was in 2005 when she decided to take the reins of the farm in her hand and shoulder the responsibilities of her family. Since then, she has extended the farm area from 42 to 50 bighas.

Turning Luck Around

"It has been a life of intense hardship, and often people ask me how I have done it," says Karuna, who is an inspiration for many in her village.

Karuna bikes her way to the garden every day, which is about 6 km away. She even has to cross one river on the way — which is the only way to reach her garden!

"I learnt to ride the two-wheeler so that I can visit my garden every day," Karuna smiles away as she mentions this.
At 38, Karuna has turned herself into a model woman farmer. She not only supports 30 women and about 12 men work-

ers by providing them employment in her farm, but is also a devout adherent of sustainable farming practices.

"All thanks to TRINITEA for introducing me to the sustainable ways of growing my tea. I have gained immensely from the trainings and field demonstrations," Karuna mentions. In 2020, Karuna recorded a total crop production of 92,410 kg, higher up from 39,150 kg in 2007.

One of the major hurdles Karuna faced at the very start of her enterprising (farming) journey was her lack of knowledge about tea cultivation. It was her determination to overcome the challenges and the subsequent association with the ABSTGA that helped her sail through. With the help of the association, Karuna got herself enrolled into the TRINITEA programme that guided her into the intricacies of good tea farming practices. The scientists and trainers handheld her through the entire process, from helping her produce tea in balance with nature to creating awareness about the social, economic and environmental aspects of sustainable farming. The programme is also facilitating in market and supply chain access for her.

Karuna never fails to attend the TRINITEA meetings with experts. The regular trainings on different scientific methods of cultivating tea have after all helped her cut down the input costs. In fact, despite the perpetual low green leaf price, Karuna has managed to make profit just by reducing the input cost for her garden.

"I'm still learning a lot from TRINITEA. The programme is helping me become a smart farmer through the digital adoption of farming techniques," she admits, beaming with confidence.

Towards a Better Tomorrow

Karuna now aspires of sharing her knowledge about environmental sustainability and good agricultural practices with the rest of the people in her village. She has created separate chemical storehouses in her farm. She has also displayed posters on environmental awareness in the garden for the farm workers to learn about the positive impact of sustainable farming on the environment.

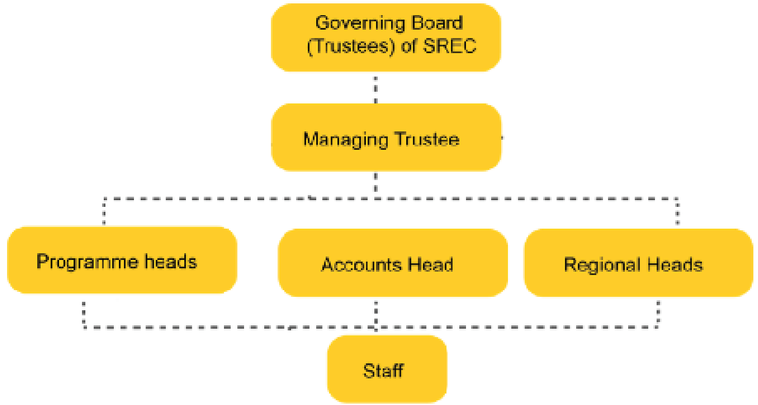
She has bigger plans as well: "I want to set up my own factory so that I don't have to depend on others for a decent price." Karuna's is a story of hard work and determination that every woman in India can draw inspiration from. From a novice to a rural entrepreneur in agriculture, she has been breaking the stereotypes every day since last 16 years, raising her two sons and her farmland singlehandedly with equanimity — and with her unflinching quest for a better life.

HUMAN RESOURCE

ORGANISATIONAL STRUCTURE & GOVERNANCE

Solidaridad Regional Expertise Centre (SREC) is an NGO registered under the Indian Registration Act, 1908. The certificate has been issued by the Sub Registrar of Janakpuri, New Delhi, under Section 60 of the act with the registration number 17474 in additional Book No.4 Volume No. 12384 on page 113 to 126 on 18 December 2008.

SREC satisfies the conditions of u/s 80G of the Income Tax Act of 1961 and is also registered under Section 12 A of the Income Tax Act of 1961.



INCLUSIVE POLICY, DECISION AND HR SYSTEMS DEVELOPMENT

SREC is firmly committed to a policy of equal opportunity in all HR practices based on performance and competences. We provide an environment that is free of harassment of any kind, including harassments related to sex, race, ethnic origin, religious beliefs, caste, age, nationality, disability or sexual orientation among others. We are inclined to engage with well-trained and motivated people, who ensure high standards of competence, through a transparent recruitment and selection process while providing equal opportunities to all applicants.

FUTURE-READY WORKFORCE

The organisation's human resource philosophy is to provide and nurture a congenial work culture to help employees strive for growth and excellence in their work. The development of people is the primary responsibility of the organisation and we strongly believe that if an environment is created where individuals can develop their competencies, people can and will do their best. During 2019-2020, several initiatives were taken to build capacity of the young talent within the organisation. SREC recognises the importance of the staff's ongoing performance, while also realising the relevance of staff training and development, which refers to activities that improve an organisation's ability to achieve its mission or a person's ability to define and realise his/her goals and to do his/her job more effectively. The premise of the HR cycle and the performance and talent management system is a continual (formal and informal) dialogue between employees and their line managers.

SAFE AND HAPPY ENVIRONMENT

The organisation values the individual needs of staff, intern and other associates, and commits to providing an environmentthat facilitates work and life balance. Our constant endeavour has been:

- To provide appropriate working conditions and resources to enable the staff to work efficiently and support them to realise their potential
- To respect and be sensitive to the needs of the staff throughout the employment relationship, building a high-performance culture
- To demonstrate a passion for quality
- It is our constant endeavour to explore alternatives in the ways of working that embrace and harmonise all important areas of our lives.

EXCITING PLACE FOR INNOVATIONS

The organisation seeks to achieve sustainable employability for its employees and encourages and facilitates their personal and professional development. The employer and the employee are jointly responsible for ensuring that the employee remains competent, engaged, motivated and fit. The process of staff development complements the organisation's strategy, especially the ethos of being a learning organisation. The capacity building trainings are broadly on:

- Knowledge and technical skills
- Attitude and competencies of individuals
- Leadership

GENDER-INCLUSIVE ENVIRONMENT

SREC is an equal opportunity employer and does not discriminate on the basis of gender, caste, religion, race, disability etc. Women are highly encouraged to apply for suitable positions in the organisation. SREC has been constantly working towards improving the gender balance within its teams.
SREC's anti-Harassment policy applies to all employees and protects them from harassment by co-workers, seniors, and any other individual at the workplace. The Code of Conduct and Good Practices (CCGP) of the organisation is applicable to all staff members.SREC conducts awareness of such policies through workshops and during the onboarding process of new employees.

GOVERNANCE AND INTEGRITY

SREC is committed to operate with integrity and respect towards people, both internally and externally,while performing its activities.

SUBSIDIARITY AND LOCAL CULTURE INTEGRATION

we acknowledge and value the diversity our its employees as much as we respect with the diversity of the communities we work with.

HUMAN RESOURCES, STAFF AND MANAGEMENT

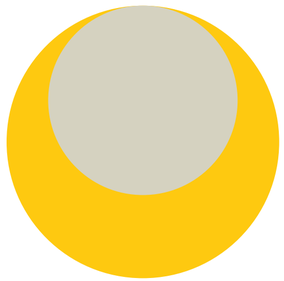
SREC has a well defined human resource (HR) policy, which is an attempt to document prevalent organisational practices and norms in a standardised format for user-friendly reference. This HR Policy contains the key policies, goals, benefits and expectations of SREC and other information an employee will need in the course of seeking employment in the organisation.

ISO 9001-2008 CERTIFIED

Solidaridad Regional Expertise Centre is certified under ISO 9001-2008 since 9 September 2009. The purpose of the certification is to follow a globally accepted quality management of the work in order to:

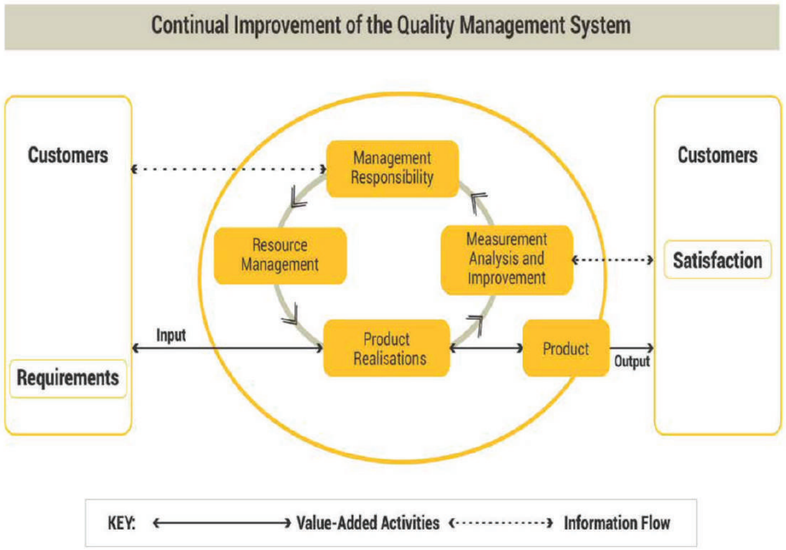
- Demonstrate our ability to consistently provide services that meet applicable statutory and regulatory requirements of donors and beneficiaries.
- Enhance donors' and beneficiaries' interest and satisfaction through effective application of the system, including processes for continual improvement of the system and the assurance of conformity to donor and applicable statutory and regulatory requirements.

EMPLOYEE STR ENGTH 2020-2021



Staff	Consultant
73	26

DECISION-MAKING PROCESS IN SREC



THE PROGRAMMES IN SREC ARE DEVELOPED AS PER FOLLOWING:

1. The programme team under the supervision of the Managing Trustee Managing director) develops multi-annual strategy plan (MASP) within India.

These MASPs are in line with local priorities and in alignment with government plans.

2. The MASP is then placed for consultation before the Board of Trustees and inputs are collected.

3. The MASP serves as the basis for the preparation of annual plans by the Managing Director, which are again deliberated and approved by the Board of Trustees.

4. The overall responsibility of managing and implementing the programmes and projects in line with MASP lies with the Managing Director. The Managing Director further delegates this function to programme coordinators.

5. Each commodity has a coordinator or manager assigned in SREC who are overall responsible for the project implementation.

6. Each project is registered by the Programme Support Officer (PSO) in SREC under the overall supervision of the Manager-Accounts and Administration of SREC.

The Admin & Accounts Manager, along with the PSO, registers the project in a database where a unique number is generated. With the number on the project, the PSO makes a digital file. In this file, all the important documents of the project are saved. Each digital project folder should have at least the following elements:

Reporting: Every month, staff meetings are organised in SREC to evaluate and discuss the progress of different programmes, and if necessary, corrective actions are taken. The key outcomes of the monthly meetings are documented and preserved in hard and soft copies. An annual overall report, along with audited financial statement, is prepared as well.

FINANCIAL STATEMENT

2020-2021

DHINGRA & JUNEJA

Chartered Accountants

13/82, LGF, Vikram Vihar
Lajpat Nagar-IV, New Delhi-110024
Tel. : 011-41729407, 46103248, 9811991182
E-mail : vdhingra1231@gmail.com
Vikas.dhingra@dhingrajuneja.com

Extract of Independent auditor's report of the trustees of the Solidaridad Regional Expertise Centre

In our opinion and to the best of our information and according to the explanations given to us, the financial statements give the information so required and give a true and fair view in conformity with the accounting principles generally accepted in India:

a) In the case of Balance Sheet of the state of affairs of the Trust as at 31st March 2021, and

b) In the case of Statement of Income and Expenditure, of the excess of expenditure over income for the period from 1 April, 2020 to 31st March 2021.

For Dhingra & Juneja

Chartered Accountants

Firm Registration Number: 018799N

VIKAS DHINGRA Digitally signed by VIKAS DHINGRA Date: 2022.08.31 16:32:42 +05'30'

Vikas Dhingra
(Partner)
Membership No: 099604
UDIN :- 22099604AQLKUI7390

Date: August 31, 2022
Place: New Delhi

Funding Agencies	Source of Fund	Purpose
Vippy Industries Limited	Local	To implement the Project on "India Sutainable Soy Program"
Mahindra & Mahindra Limited	Local	Farmer Support Programme for Sustainable Agriculture and Livelihood Enhancement
Indian Institute of Soybean Research	Local	Front line demonstrations of Soybean
Jayant Agro Organics Limited	Local	Sutainable Castor Initiative "Pragati"
Vodafone Foundation	Local	Smart Agri : Leveraging technology for self subsistence to enterprise farming
The Solvent Extractors Association of India	Local	SEA - Solidaridad Sustainable Rapeseed-Mustard Mission
Huawei Telecommunication Co,Pvt.Limited	Local	Smart Agri : Leveraging technology for self subsistence to enterprise farming
Laudes Foundation	Foreign	Establishing an Organic Cotton Hotspot in Maharashtra, India
European Union	Foreign	Effective waste management and sustainable development of the MSME tanning companies in the Kolkata Leather Cluster
Solidaridad Network Asia Limited	Foreign	To support farmer in Sustainable production in agriculture & industry, combined with sustainable trade and significant contribution to combat poverty and preserving people's environment, in the context of a global economy

Statements of Financial Position

	As at 31st March 2019	As at 31st March 2020	As at 31st March 2021
Funds & Liabilities			
- Trust Fund	10,000	10,000	10,000
- Capital Fund	3,162,200	3,574,660	12,766,782
(Represented by Fixed Assets)			
- Restricted Fund	19,930,150	51,998,030	159,420,504
- General Fund			
Towards general objectives of the Trust	7,960,664	5,925,081	10,943,463
Towards specific objectives of the Trust	9,626,000	9,626,000	9,626,000
- Current Liabilities & Provisions	2,870,350	5,518,407	7,954,851
	43,559,364	**76,652,178**	**200,721,600**
Property & Assets			
- Fixed Assets			
Gross Block	10,729,758	12,661,218	24,537,248
Less: Accumulated Depreciation	6,165,359	7,592,469	10,485,419
Net Block	4,564,399	5,068,749	14,051,829
- Current Assets and Loans & Advances			
Cash & Bank Balances	34,968,404	65,426,399	173,294,173
Other Current Assets	2,295,034	2,705,550	8,073,407
Loans & Advances	1,731,527	3,451,480	5,302,191
	43,559,364	**76,652,178**	**200,721,600**

Statements of Activities

Particulars	Financial Year 2018-19	Financial Year 2019-20	Financial Year 2020-21
Revenues			
Restricted Income (Grants & Donations)	34,507,148	48,620,671	123,096,679
Unrestricted Income			
Overhead Support	4,727,411	4,513,249	6,488,118
Interest from Bank	1,024,355	718,110	1,713,901
Voluntary Contribution (Donation)	10,166,104	291,005	492,000
Other Income	-	-	760,877
	50,425,018	**54,143,035**	**132,551,575**
Expenses			
Programme Related Expenses	34,774,030	48,620,671	123,096,679
Management & General Expenses	3,737,918	7,557,946	4,810,489
Total Expenses	**38,511,948**	**56,178,617**	**127,907,168**
Surplus/(Deficit) for the year	11,913,070	(2,035,582)	4,644,407
Changes in Net Assets	**11,913,070**	**(2,035,582)**	**4,644,407**

Solidaridad

A-5, Shankar Garden, Main Najafgarh Road, Vikas Puri, New Delhi 110018 Tel: +91 (11) 4513 4500