GREEN INNOVATION CENTRE INDIA

NEWSLETTER #3

JULY 2019

बागवानी मिशन
Horticulture Mission
Ministry of Agriculture & Farmer's Welfare
Government of India

NCCD
National Centre for Cold-chain Development

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Published by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

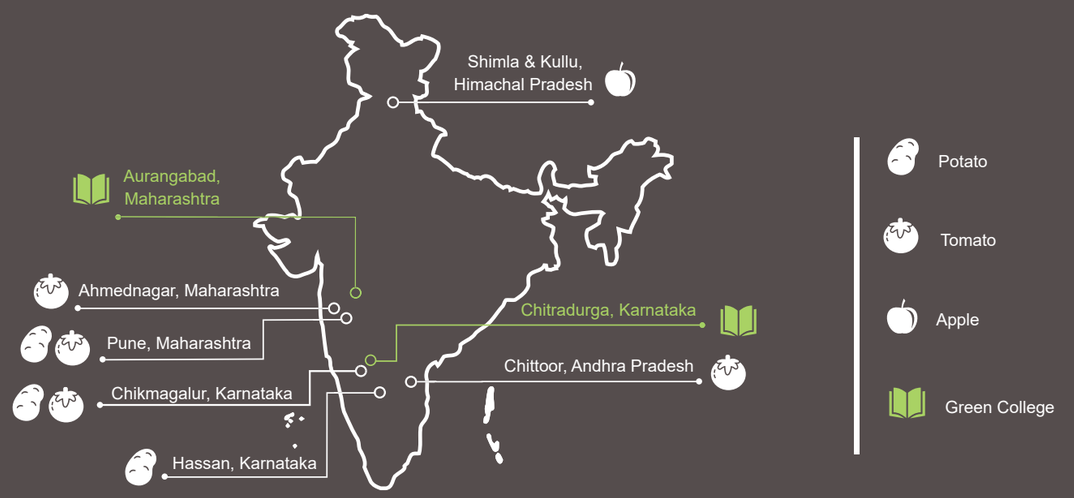
OUR GOALS

Boost the productivity & income of
111,300
small-scale farming enterprises by at least
30%
through
INNOVATIONS
in agriculture

Create
1,800
NEW JOBS
for eco-preneurs, especially for
YOUTH AND WOMEN

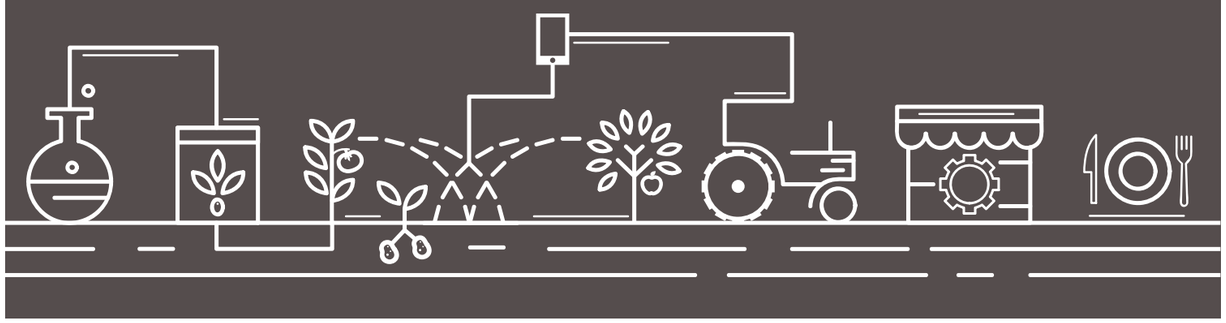
Train
139,000
farmers on
GOOD AGRICULTURAL PRACTICES
and support the setting up of farmers organisations

OUR PRESENCE



OUR APPROACH

We disseminate innovations along value chains based on three crops: potato, tomato & apple.



EDITORIAL

Dear Reader,

Welcome to the third newsletter of the Green Innovation Centre India!

Six months have passed since our last edition, and a lot has happened in fast moving India. With 900 million voters, the largest democracy in the world has voted. That is more than the European Union, the United States and Japan put together. Voters expressed their confidence in the previous government and re-elected it. This has significance for Indian agriculture, as the ground work of the preceding five years can now be pursued to fruition. After the new government formed, the Mission for Integrated Development of Horticulture (MIDH) is continuously focusing on supply chains in a regional cluster approach, Farmer Producer Organisations (FPO) and digitalisation. The Green Innovation Centre is active in these three areas and ready to further contribute to the target of doubling farmers' income by 2022.

Not only in India, but also in the Green Innovation Centre a lot has been moved. We are pleased to announce that the project has been extended until 2023. Not only the project period has changed but also our goals became even more ambitious: We now aim to boost the income of 111,300 small-scale farming enterprises with innovative practices in agriculture (previously, it was 75,000 farmers). We are also working to create 1,800 new jobs, especially for youth and women, and to provide training and education for 139,000 farmers (earlier 1,000 jobs and 90,000 farmers).

To meet these targets, we are continuing to work with farmers and eco-preneurs along the value chains based on tomato, potato and apple. You heard right! In the scope of the project's extension we will apply our approach to apple farming in Himachal Pradesh. The key article in our newsletter is dedicated to this kick-off in apple activities. We also present new innovations for Indian agriculture: solar powered light traps, 'boom sprayers', techniques for underground irrigation, tomato processing experiments and a new trainer's guide for Farmer Producer Organisations (FPOs). Some of our highlights also include a South-South exchange with African partners from Benin, Burkina Faso, Ghana, Kenya, Mali and Tunisia on mechanisation and a collaboration with our sister project ProSoil on city compost.

We are particularly pleased to announce guest articles in this edition from the CEO of the Delhi based National Centre for Cold-chain Development, Pawanexh Kohli, and the renowned Kenyan economist James Shikwati, who visited the Green Innovation Centre in April.

As you can see, dear readers, we take pleasure in further developing what we have achieved so far and constantly experimenting. So, the project remains true to its goals by thinking outside the box and preserving its innovative technology-driven and participatory spirit.

Enjoy the read!

The Green Innovation Centre India is a project in the scope of the special initiative ONE WORLD NO HUNGER, commissioned by the German Ministry for Economic Cooperation and Development (BMZ). It is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in partnership with the Ministry of Agriculture and Farmers' Welfare (MoAFW) and the State Horticulture and Agriculture Departments of Maharashtra, Karnataka, Andhra Pradesh and Himachal Pradesh.

Mr Jonathan Ziebula
(Project Director, Green Innovation Centre, GIZ)

TABLE OF CONTENTS

DID YOU KNOW?

CHINA

China is the biggest producer of our three project crops potato, tomato and apple worldwide. India follows closely as the second largest tomato and potato producing country. For apple so far it is on rank 5. Go apple farmers!

INNOVATIONS

Did you ever hear of boom sprayers, SWAR and urbanite phone farmers? No? You will on pages 4,5 & 15.

The German broadcaster

DEUTSCHE WELLE

produced a short film about our project on mechanization, modern cold storages as well as tomato model nurseries. Check it out:

27%

Equal participation of women in the workforce will increase India's GDP by 27 percent according to the International Monetary Fund.

3.51 kg!

This is how much the heaviest tomato ever grown weighted. This was measured in 1986 in Oklahoma, USA. Check out our project's tomato experiments on pages 6 & 7.

Potatoes are the first food to grow in space. They were carried aboard the shuttle 'Columbia'.

BENGALURU

The world is small. About **20 professionals** working for our project already studied together and were hostel mates at the University of Agricultural Sciences in Bengaluru.

The world **POTATO** sector is undergoing major changes: Until the early 1990s, most potatoes were grown and consumed in Europe, North America and countries of the former Soviet Union. Since then, potato production in Asia, Africa and Latin America has increased dramatically. Read how the Indian potato markets in North and South are interconnected on page 16.

JAROL

Sustainable development can mean many things. Already 60 years ago, the German government cooperated with apple farmers in Jarol, Himachal Pradesh. A processing machine for

APPLE CONCENTRATE

put in place back then is still working perfectly fine today.

We sent Indian apple farmers from the Himalayas to South Tyrol, Italy. Why? Both regions are mountainous and work under similar conditions. Our farmers' feedback: If

HIGH DENSITY PLANTATION

is possible in Italy, we can also do it! Another exposure visit brought them to New Zealand. Read more on pages 10 & 11.

The largest democracy in the world voted.

About

900 MILLION

people were eligible to vote. More than the entire European Union, the United States and Japan put together. The turnout was over 67 per cent – the highest ever as well as the highest participation by women voters. See how the Indian election 2019 is likely to impact agriculture on page 17.

INNOVATIONS 01

BOOM SPRAYER: UNIFORM & EFFICIENT DISEASE CONTROL

Resource-conserving plant protection made easy

Our project has developed a 'Boom Sprayer' with only locally available materials at the Kattihalli Innovation Farm, Karnataka. This enables farmers to spray safer, more efficiently and cheaper.

Farmers traditionally use knapsack sprayers, petrol sprayers or pump sprayers for pest and disease management. However, with those sprayers, most farmers are not able to apply pesticides evenly and in time. It takes more than 3 hours/acre to apply and 2-3 hours to dry. This is a problem if it rains every 3 hours and the spray gets directly washed off again. This leads to both waste of resources and susceptible plants.

Therefore, the Green Innovation Centre India has developed the 'Boom Sprayer'. There are two types: one consists of a small pipe with nine nozzles which can be carried by two persons, while a second type has six nozzles and is mounted on a bicycle handlebar, which requires only one person. With this construction, an acre can be covered within 30 minutes. This Boom Sprayer type can be used for tomatoes until the time of staking. When tomato plants reach a certain height, another Boom Sprayer type fits better: It can be handled by a single person and used vertically as well as horizontally. The farmers' feedback is positive: *'The Boom Sprayer enables the uniform spraying of the entire plant from the leaves to the stalk while requiring very little time in application compared to the conventional method.'* The biggest advantage of the Boom Sprayer is that it enables the farmer to use short spraying windows effectively. This reduces the risk of fungal infestations and protects the farmers' yield. With the Boom Sprayer the farmer saves up to 80 litres of water each acre and reduces active ingredient use about 40%. The Boom Sprayer can also be used for different crops with only slight adjustment in the width of the nozzles.

WITH SUN POWER AGAINST PESTS

Solar light insect traps as an alternative to chemicals

Moths can threaten whole tomato or potato fields.
The Green Innovation Centre India has introduced solar powered light traps as part of its Integrated Pest Managament (IPM) approach to protect crops cost-effectively and without any chemical pesticides.

Tuta absoluta, a small, brown, harmless looking moth is one of the most threatening pests for tomatoes. It can wipe out an entire harvest by feeding on the leaves, stems and fruits. An effective and innovative tool to combat Tuta absoluta and many other pests in potato and tomato fields are solar light traps. This is how it works: During day time, a solar panel feeds a battery. As soon as it gets dark, a LED of 380nm switches on for two to three hours. Under the light, there is a basin with water and kerosene. *Lepidopteran moths* are attracted by the light, and continuously circle around it. When they get exhausted, they fall in the basin and drown. One light trap can cover a field area of one acre. The costs are at 4.500 to 5.000 Indian Rupees (equivalent to 57 to 65 Euros) per piece. Since the traps last for more than one season, they are in the long run cheaper than conventional chemical fertilisers. Last year, 20 solar light traps were installed by the Green Innovation Centre India to test and refine them and estimate the economic profitability. So far, the response is encouraging.

After seeing the results, farmers purchased a trap on their own. Farmer Shriram Tajane from Nirgude village states: *'After using the light trap, I have not seen any fruit borer insect in my tomato crop, as light trap catches all the adults.'*

SWAR: SAVING WATER WITH UNDERGROUND IRRIGATION

New technique - Even more efficient than drip irrigation

Our project is currently testing a new simple but very effective irrigation tool to save water in agriculture, developed by the Centre for Environment Concerns in Hyderabad.

India is the world's largest user of groundwater, withdrawing 250 cubic kilometres per year. As a result, the groundwater level is constantly dropping. This is hazardous: water becomes scarce and irrigating fields becomes more difficult and expensive. So far, most farmers use drip irrigation to save water. While this is already a great improvement compared to conventional flood irrigation, there seems to be an even better solution in the making. Instead of a water outlet at the surface, the new SWAR technology provides underground irrigation. SWAR stand for 'System of Water for Agriculture Rejuvenation' and has been developed by the Hyderabad based Centre for Environment Concerns. Like in drip irrigation, a tube runs along the field ridges. Every few meters, this tube now has smaller tubes going about half a meter down into the soil. At the end of the small tubes, a plastic container of the size of a golf ball is fixed. It has small holes and is filled with stones. When water runs through the pipe and reaches the container, the stones disperse it and let it moisture the soil little by little. The extension centre KVK Andhra Pradesh conducted a study to compare drip irrigation with the new SWAR technology. They tested both methods on tomato, chilli and brinjal fields. Results show that SWAR increases plant height, number of branches and biomass production. The yield levels are similar. However, SWAR needs 40% less water, thus the farmer saves money. The prices are competitive with drip irrigation costs. The Green Innovation Centre is currently testing SWAR and its economic viability for tomato cultivation in the project areas.

NEW FARMER DEVELOPMENT CENTRE

Inauguration in Ramasamudram

A brand new 'Farmer Development Centre' (FDC) in Ramasamudram, Andhra Pradesh, has been inaugurated in February 2019. The shop is managed by a local Farmer Producer Organisation (FPO). The shop's benefits: Products of high quality are available and prices are reasonable to reduce production costs. Technical advice is given to farmers directly at the shop using best practice videos.

From fertilisers to micronutrients, from sticky traps over sickles to water traps, from cattle feed to nutrition supplements: Many devices and inputs can be found in one of the colourful turquoise houses in the narrow road in Ramasamudram. The new Farmer Development Centre is owned and managed by the FPO Ramasamudram with over 2.000 members, which received patronage from profits. Our partner APMAS in collaboration with eFresh and the FPO have established the FDC as a one-stop-shop for all the needs of the FPO members. Their major crops are tomato and cauliflower. The group invested 8,5 lakhs share capital to buy products in bulk. The FDC uses a database in which 300 farmers are registered so far. Farmer Reddyappa from the village Reddypalli buys his mulching sheets in the new shop. *'I use the mulching sheets for my two acres tomato field'*, he explains. *'Here, I get quality products with credible brands at low prices, compared to other shops.'* In future, the FDC wants to align its products even more closely to the Green Innovation Centre's package of practices and reach all its members to maximise the benefits for farmers and make the FDC a profitable FPO-owned enterprise.

TRIAL AND ERROR: EXPERIMENTING WITH PROCESSING TOMATOES

Through field trials and market linkages

India is, after China, the world's second biggest tomato producer. However, tomato farmers face high pressure and insecurity as market prices fluctuate permanently. As a possible long-term solution, the Green Innovation Centre India is supporting to develop 1) processing tomato varieties and 2) establish farm-to-factory linkages.

The sun burns down on the concrete square in front of the factory. Palms grow around the entrance street. And a sweetish smell lies in the air, in the shadow of the roof under which yellow, blue and orange plastic boxes full of fresh tomatoes are piled up. Five workers dressed in just as colourful saris tip one box after another onto the slowly moving conveyer and pick out rotten fruits. Closely behind them stands a group of men in light, short-sleeved shirts and dhotis. With their own hands they have grown these tomatoes, and now stretch their necks to get a look. In today's excursion to the processing company SunSip located at Srinivaspura close to Bengaluru, the farmers see with their own eyes, what happens to their tomatoes after the harvest…

Tomato farmers in India face severe market instabilities: Whenever prices are high and weather conditions are good, farmers across India start tomato production. Soon, there is oversupply and prices drop. Low prices let farmers lose their interest in growing tomatoes and they stop. As less and less tomatoes are produced, prices rise again. And the pig cycle starts from the beginning. These fluctuations lead to unpredictable prices and thus unstable income.

The Indian government is working on overcoming this trap and the Green Innovation Centre India has identified possible first steps to diversify tomato varieties and to not only produce for fresh market consumption, but also for processing.
The strategy is as follows: If Indian farmers can produce tomatoes suited for processing with high brix and lycopene content at a production cost which processors can afford, they can sell those tomatoes independently of the unpredictable prices for fresh market tomatoes and get more stable income. As less farmers would contribute to fresh market tomatoes, prices there might automatically fluctuate less on the long run.

The Green Innovation Centre India is testing the first steps:

- Trials to determine the best variety under the best cultivation practices were carried out.
- Farmers were linked with processors.

Field trials with processing varieties: The project initiated various research and production trials of processing varieties of tomatoes. In the last Rabi season from October to March, the World Vegetable Center carried out research trials in collaboration with the Indian seed companies I&B Seeds and SeedWorks. Additionally, the project carried out larger scale production trials involving about 25 farmers in Kadur and Madanapalli area in association with the seed company Orbi. The trials aimed at identifying which seed variety combined with which farming practices, e.g. staking or non-staking, density of plants and fertiliser package, results in the highest yields and best quality for processing at the lowest production cost.

Linkage between farmers and processors: Right from the start, the Indian agro processor SunSip was involved to assess the suitability of the produce for processing. To be suitable for processing, tomatoes need to reach a certain sugar content, measured as brix level, and should be of strong red colour. The main challenge though are the production costs, as VD Sarma, Executive Director of SunSip explains: *'We can buy tomatoes at a maximum of 4.5 Rs/kg. This means that production costs of farmers cannot exceed 3 Rs/kg.'* If Indian farmers cannot reach that level, processors will fall back on the cheaper Chinese produce. Chairman of SunSip Mr. Murali Krishna says: *'We are in the market since 1994. From 2000 onwards, Chinese competition started. Now, the Green Innovation Centre helps us and Indian farmers bridging this gap.'* Among the involved stakeholders, the following agreement was made: Farmers use a part of their land to grow processing tomato variety. The processor promises to buy it at a fixed price of 4.5 Rs/kg. This gives security to the farmers. Due to these fluctuations, farmers could gain more in certain periods, but could also face huge losses. Through the deal, this risk can be overcome.

The next steps for the Green Innovation Centre India are to conduct more trials and to understand the potentials of the seed varieties under different conditions better. The project's Horticulture Advisor Dhananjaya BN is convinced: *'Only with the best varieties and cultivation practices we can help farmers to lower their production costs and get their produce sold'.*

PARAMETERS OF TOMATOES REQUIRED FOR PROCESSING

- **Brix | >5**
- **Colour | >2**
- **PH value | >4.6**
- **Acidity | Min. 0.4%**

HOW TO EFFECTIVELY TRAIN A FARMERS' GROUP

New trainer's guide for FPOs focussing on facilitation methodologies

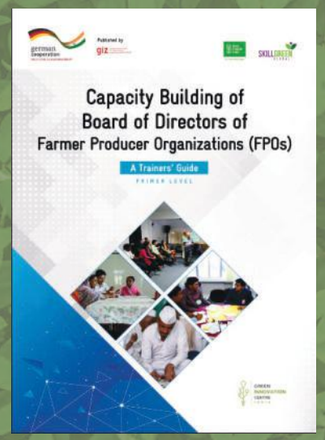
In participatory writing workshops, over 30 experts drafted content specific methodologies on FPO registration and operations including marketing, management and business planning. The handbook is meant as a hands-on guide for trainers of FPO board of directors.

Despite several handbooks on Farmer Producer Organisations (FPOs) in India capturing technical dimensions, a practical book for facilitating, instead of studying was missing. The new 'trainers' guide' can be used by trainers to build capacities of farmer representatives and staff on how to register and manage their FPO. With hands-on group exercises, games and activities in the 'Trainers' Guide', trainers can facilitate sessions in which participants actively learn about FPO formation, statutory compliance, engaging with market and networking with stakeholders, FPO management, and business planning. With its modular structure, different topics can be taught in a flexible, independent way.

Not only the format is innovative, but the development of the guide as well: With the support of Green Innovation Centre India, a participatory methodology was adopted for designing the trainers' guide. Welthungerhilfe (WHH) and SkillGreen Global organised 'writeshops': Multiple experts, farmers and volunteers from Mysore Resettlement and Development Agency (MYRADA), Andhra Pradesh Mahila Abhivruddhi Society (APMAS), Agriculture and Finance Consultants (AFC) and the German Association of Cooperatives (DGRV) amongst others have collaborated to put the content together.

The final co-created product is now available as open source for free download. It is available with license under the Creative Commons Attribution-ShareAlike 4.0 to enable interested individuals and agencies develop the guide further.

The FPO trainers' guide can be downloaded free of cost here



'A trainers' guide which is lucid, practical and yet, holistic, is the need of the hour.'

Partha Sarathy, Project Coordinator, WHH

'The guide has come out very well and very comprehensive. We at the Centre of Excellence for FPO will go for translation of the guide in Kannada and will add relevant case studies for the effective use of this guide by staff of resource institutes who promote and build capacity of the FPOs in Karnataka.'

Dr. Ashok Alur, Vice Chancellor, B.E.S.T. Innovation University, Anantpur, Andhra Pradesh

'We are keen to partner with more organisations working with FPOs and to jointly offer training of trainers, FPO trainings and to update case studies and new modules.'

Sai Krishna, CEO, National Skill Foundation India

To make sure the guide is disseminated and used effectively, trainings of trainers (ToT) are being taken up since February 2019 with the Centre of Excellence for FPOs in Bengaluru, Karnataka and the Institute of Rural Management Anand (IRMA) in Gujarat. Trainings are also offered through the project's Green Colleges initiative in Karnataka, Maharashtra, West Bengal and Jharkhand. The cost of such ToTs is shared between various project and non-project partners, combined with a participant fee. In partnership with various stakeholders of the FPO ecosystem in India, the guide is envisioned to be revised on a regular basis to keep pace with the changes.

'The key staff of FPOs needs to see themselves as members of a start-up imbibing the lessons of being lean and nimble so that they could adapt, respond and innovate in a rapidly changing external environment. The guide is focused on creating a learning programme with trainers emphasising facilitation rather than lecturing. It is hoped that it will be used widely across the country', says Dr C. Shambu Prasad, Professor for General Management, Strategy and Policy Coordinator, Incubator for Social Enterprises and Entrepreneurs for Development (ISEED), at the Institute of Rural Management Anand.

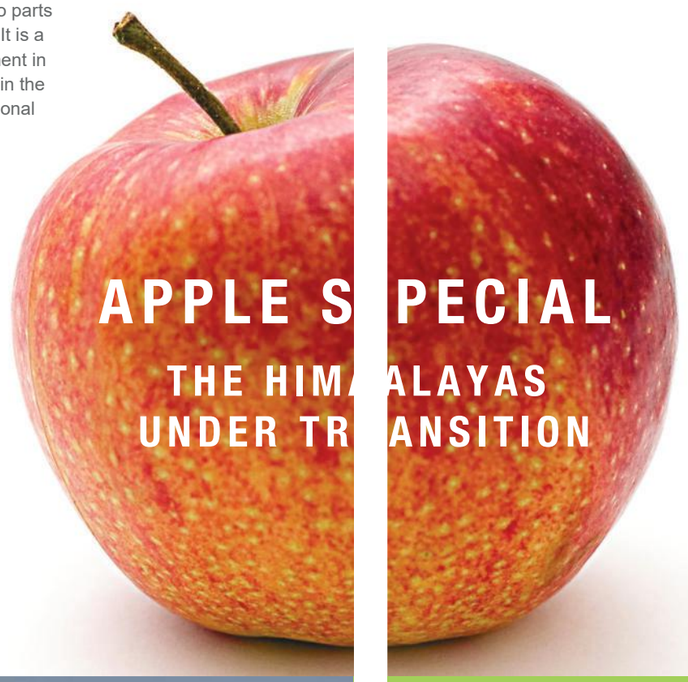
Content of the manual

- Overview of an FPO
- Statutory compliances
- Marketing & networking
- Managing the FPO
- Business plan of a FPO

HIGHLIGHTS & EVENTS 02

Kullu, Himachal Pradesh.

As small as this town is with no more than 20,000 inhabitants, it has gigantic neighbours. Surrounded by the Himalayan peaks, the town is situated on the banks of the river Beas that divides the town into two parts that are inter-connected by several bridges across the Beas. But Kullu is more than a small town. It is a district and a valley. A valley that is essential for Himachal's apple cultivation. Germany's involvement in India's apple cultivation started way back in the 1970s. In 1974, a fruit processing unit was set up in the town of Jarol, in Shimla district, Himachal, as a part of Indo-German cooperation and is fully functional until today. Here, you will find the traditional names of German machinery manufacturers such as Kirchfeld from Düsseldorf, Schmidt from Bretter, Wiegland from Karlsruhe. 45 years later, the Green Innovation Centre kicks off a new phase in working with apple farmers in Himachal Pradesh, particularly in the districts of Shimla, Kullu and Kinnaur.



APPLE SPECIAL

THE HIMALAYAS UNDER TRANSITION

WHAT HAPPENED SO FAR...

Since 2016, the Green Innovation Centre has been working in Himachal to increase the yields of apple cultivation for small-scale growers in selected districts.

A Public Private Partnership (PPP) with the German enterprise Bayer Crop Science was established in 2016. Together with farmer associations, the Department of Horticulture and Indian horticulture experts from the State Horticulture University in Solan, the partnership implemented a series of training programs on agronomic practices. In this period, a trusting foundation was built, and the project reached more than 11,000 farmers of whom about 8,000 were able to increase their income and productivity.

Key Interventions

Training modules

- Pollination, nutrition management
- Plant protection, pest & disease management
- Scouting techniques, application technology & safety
- Canopy management, training & pruning

International and local exposure visits

In 2016, Indian government officials and university representatives went on an exposure visit to Germany. This was followed by two more successful exposures: In 2018, Indian apple farmers visited plantations in New Zealand and were impressed by the high productivity levels and learned, among others, about different methods of 'training and pruning' apple trees, nutrition and integrated pest and disease management, fully mechanised apple orchards and grading and packaging units.

German equipment from 1970's

Training on pests and disease management

Farmers meeting

STORIES FROM THE FIELD

Naresh Kashyap, an apple farmer from Shimla, attended the exposure seminar to South Tyrol, Italy in 2017:

'When I was in school, all of a sudden my father died. My family was suffering from a financial crisis and my dream to join the defence forces was shattered. Being the oldest son among eight children, it was my responsibility to meet the needs of our family. At that time the only option left for me was to take over and pursue the business of my father – apple farming. During that time our income through apple farming was very low. Today, I am a successful member of the Green Innovation Centre project. An exposure seminar to apple growers in South Tyrol, Italy, was a real eye opener for me. I finally understood the "high-density plantation" (HDP) concept. Earlier, I believed that HDP can only be done on flat land. And I had doubts that such small trees could give a high production. After seeing the production stock, pattern, quality and quantity in Italy it struck my mind. If Italians can grow apples in mountainous areas, then we can do this as well! Now, I try to convey to all farmers that it is time to switch to that modern type of plantation. Especially, because in future, the challenges for traditional farming will increase. When import duties on foreign apples get removed, we will be unable to compete with the cheaper prices from abroad. The quality and quantity of our products and our income will decrease and suffer a great loss.'

THE WAY FORWARD

Based on the positive impact of Green Innovation Centre's work, the apple growers and the Government of Himachal formally requested the Federal German Ministry for Economic Cooperation and Development (BMZ) in 2018 to extend its ongoing interventions in Himachal to full-scale apple value chain interventions in the state. The interventions are aligned with the Government of India's programmes of integrated value chain development of horticulture crops in Himachal, especially apple, to address issues and problems related to agricultural productivity, efficiency and livelihood generation (Doubling Farmers' Income).

HIGH-DENSITY PLANTATION (HDP)

… is defined as planting in dense rows to make more efficient use of the soil and other resources and to achieve higher crop productivity and yield, far above that of ordinary planting. In other words, HDP is the planting of more plants by manipulating the tree size. The fruit quality improves while simultaneously costs for pruning, praying, harvesting and other work go down. The model tree of high-density planting should have a maximum number of fruiting branches and minimum number of structural branches to avoid casting shadows. HDP can play an important role in improving Himachal's apple production.

OUR MAJOR ACTIVITIES

- Developing models of modern nurseries and plantations and strategies for managing transition from old to new: shifting to high-density plantation
- Continuous implementation and updating of the four training modules (see on page 12)
- Improving post-harvest handling and farmers' marketing
- Collaboration with and support of farmer associations in Kullu and Shimla
- Establishing Indo-German technical collaboration between institutions and universities. Our multi-stakeholder approach involves coordination and cooperation with political partners, research institutions, private companies, farmer organisations and local entrepreneurs.

Green Innovation Centre's major goals are to

- Train 15,000 farmers and entrepreneurs
- Increase productivity & income for 10,000 farmers
- Create 400 jobs in up- and downstream enterprises

We are excited to see the region unlocking its great potential further and seeing this breath-taking landscape being complemented by modern apple plantations, which will provide local communities with higher production, more income and sustainable development.

Exposure visit to New Zealand

Training on crafting techniques

Farmers at an apple nursery

20 JAN

Award for best Farmer Study Group
Pune, Maharashtra

The farmer group 'Sri Rambaba Shetkari Vikas Gat, Thugaon' has been awarded as the best Farmer Study Group in Pune District by ATMA, Department of Agriculture, Maharashtra. The group is a role model in the village by realising an increase in yield while reducing costs at the same time. The group established its own innovation farm of four acres in their village. This motivated other farmers to ask for technical guidance. Four new groups were formed in the village which adopted the innovations.

21 FEB

Apple Inception Meeting
Shimla, Himachal Pradesh

Our project has renewed its commitment to train and support apple farmers in Himachal Pradesh. Perspectives and expectations from farmers, the government, research and training institutions, the private sector and development agencies were captured.

7 MAR

Launch of Trainers' Manual on Farmer Producer Organisations (FPOs)
Anand, Gujarat

The trainers' manual for the Board of Directors of FPOs was launched with the involved partners Welthungerhilfe, APMAS and IRMA (Institute of Rural Management Anand). Read more on page 8.

22-24 MAR

Visit of the German Embassy
Ahmednagar and Pune, Maharashtra

Ms Christiane Hieronymus from the German Embassy (Head of Division Economic Cooperation and Development) visited the Green Innovation Centre and ProSoil project. She appreciated the high impact of the project on the ground after visiting a tomato nursery and innovation exhibition. The new office of the Farmer Producer Company in Krushinavakalpana was jointly inaugurated. She encouraged the project to further work on innovations such as substitutes for plastic mulching.

7 FEB

Inauguration of new Farmer Development Centre
Ramasamudram, Chittoor, Andhra Pradesh

The Farmer Development Centre of Ramasamudram Agriculture Producers Cooperative was inaugurated by Mr Dasaradharami Reddy, Deputy Director of Horticulture, Mr Mendu Srinivasulu, Vice-President of e-Fresh, and Mr C S Reddy, CEO of APMAS. Read more on page 5.

27 FEB - 1 MAR

Partner Meeting Pune
Pune, Maharashtra

Twice a year, all implementing and political partners of the Green Innovation Centre India meet to reflect on past activities and future strategies. This time, special attention was given to climate activities and communication topics. As such, new branding material of the project was introduced. The get-together concluded with field trips to potato and tomato fields in Narayangaon and the Centre of Excellence for vegetables cultivation of the Krishi Vigyan Kendra (KVK) Baramati.

18 MAR

4th Meeting of the Project's Steering Committee
Madanapalle, Chittoor, Andhra Pradesh

The fourth project steering committee of the project, chaired by SK Kaul (Assistant Commissioner, MoA) discussed on the progress of the project as well as on upcoming exposure visits, conferences and the modification of the implementation agreement. Moreover, the group visited the tomato production trials under processing varieties and a model nursery.

25 MAR

Exposure Visit from Andhra Pradesh to Karnataka
Kadur, Karnataka

Farmers from Andhra Pradesh learned about non-staking of processing tomato hybrids and a package of practices adopted by Kadur farmers during the visit of Orbi Seed production trials.

29 APR

Third State Level Technical Committee Meeting for Maharashtra
Pune, Maharashtra

The Department of Agriculture (DoA), Maharashtra, announced that it will support cooperation between the Green Innovation Centre and the SMART project (State of Maharashtra's Agribusiness and Rural Transformation) to develop an integrated value chain. Further, the DoA, the Green Innovation Centre and MPKV Rahuri are working on certification for semi-automatic low-cost machines, potato planters and potato harvesters.

6-9 MAY

International Symposium on Tomato Diseases
Taichung, Taiwan

Dhananjaya BN, our technical expert on horticulture, participated with a nine members delegation from India, including scientists from agriculture universities, KVKs and government officials. The conference focused on managing tomato diseases in the face of globalisation and climate change. Dr Raghavenra Achari from the University of Horticultural Sciences Bagalkot presented a study about the tomato leaf curl virus in Maharashtra, supported by the project and two Indian universities. Participants also learned about automated grafting techniques.

15-17 and 20-22 MAY

Training of trainers in Farmer Field Schools on tomato and potato
Maharashtra

The project team of Maharashtra conducted a training of trainers on tomato and potato crops organised by the Agriculture Technology Management Agency (ATMA) Pune at Krishi Vigyan Kendra (KVK) Narayangaon and the Directorate Onion & Garlic Research Station (DOGR) Rajgurunagar.

17-21 JUN

South-South Exchange Meet on Mechanisation in Agriculture
Pune, Maharashtra

Read more on pages 20 and 21!

10 APR

Meeting of German Organisations
Bengaluru, Karnataka

We hosted the quarterly meeting of German organisations in Bengaluru. The German Consul General Margit Hellwig-Boette led the exchange on synergies and cooperation with the Government of Karnataka and industrial bodies.

3 MAY

Workshop on Tomato Processing
Bengaluru, Karnataka

Results of trials on processing tomatoes were reported and discussed between farmers' representatives, researchers and processors. Read more on pages 6 and 7.

7-9 MAY

Global Potato Value Chain Working Group Meeting
Nairobi, Kenya

Our potato expert Sangeeta Patil exchanged country experiences and best practices for the promotion of potato value chains.

26 MAY - 1 JUN

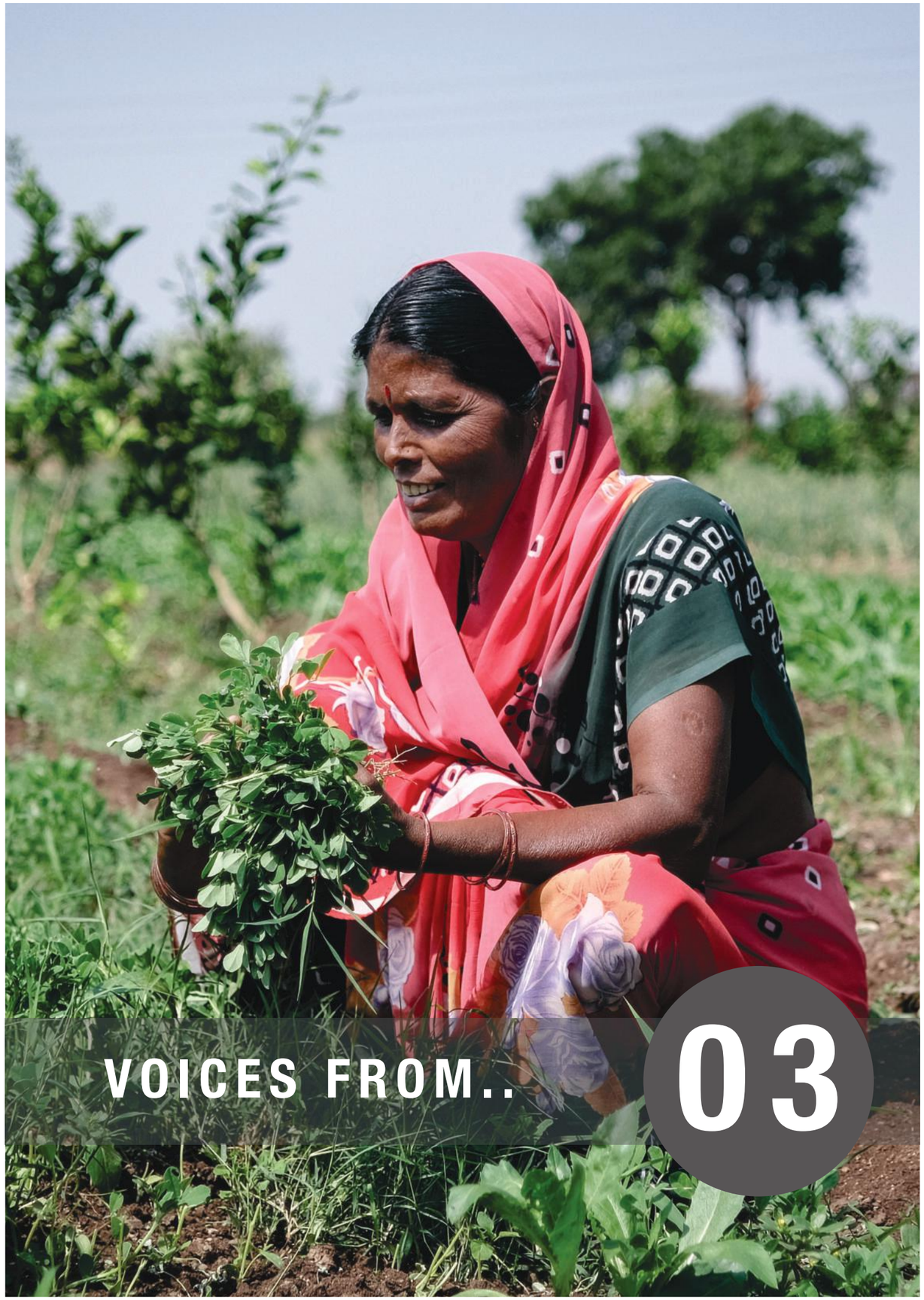
Exposure Visit to the Netherlands
Delft, Netherlands

Representatives from the tomato market in Narayangaon studied how to improve the marketing systems of tomatoes in Maharashtra. This included standardisation in grading and sorting criteria for tomatoes, the effect of improved production techniques, hygiene in the supply chain and the benefits of standard crates.

27 JUN

Gender Workshop
Bengaluru, Karnataka

With the GIZ India Gender Expert Ms Scherazade Siganporia and our project partners we discussed the gender dimension in Indian agriculture in an interactive workshop. Gender issues, but also family-friendly work-life balance, was further deepened and sensitised in the team and will be included in our new gender strategy.

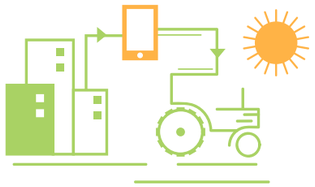


THE 'URBANITE PHONE FARMERS' OF KENYA

Digitalisation connects smallholder farmers to urban networks

Thanks to digital platforms, urban citizens in sub-Saharan Africa can support smallholder farming. Over the phone, people interested in farming but living in cities, invest money and knowledge in rural farmers to improve their practices and to participate in their success.

A guest contribution by James Shikwati.



In Kenya, smallholder farmers are estimated to account for 75 per cent of the national food production, much of which is used for household subsistence. The foundation of smallholder farming in Kenya has a negative history where at independence, academic studies were extolled, and farming was viewed as a dumping ground for failures. Smallholder farmers are known for the possession of small acreage of land, subsistence production, low returns and outdated technologies. The smallholder farmers' space has been characterised by poor access to capital, markets and services. It abhors government regulatory radars – especially taxes, and relies heavily on natural forces, such as rainfall, to power productivity.

> **It is now possible for the young, the professionals and diaspora Africans to be part of smallholder farmers' activities without necessarily opting for land entitlement.**

The *Inter Region Economic Network (IREN),* in collaboration with the *Friedrich Naumann Foundation,* has been exploring the question of how property rights and sense of ownership can turn around challenges concerning food insecurity. Three years of interaction with smallholder farmers from Kenya's Lake Region Economic Bloc show that digital platforms are widening the space of 'ownership' away from traditional focus on land. It is now possible for the young, the professionals and diaspora Africans to be part of smallholder farmers' activities without necessarily opting for land entitlement. With the farm-to-fork orientation one can be part of the farming community at whichever level of the agribusiness value chain that suits their interests.

The use of mobile phones has become a critical tool analogous to the traditional hoe in activating farmer activities. Smallholder farmers riding on extended family cultural capital continuously seek out their siblings in urban centres for financial support and advice. The extended family networks serve as a cushion when smallholder farmers fail in production and are in debt.
Efficient connectivity offered by mobile phones and apps is catalysing participation of highly educated and urban based elites to join the smallholder farmers' space. The working-class urbanite is progressively becoming the chief financier and decision maker on activities that take place in rural farms. The street name for such participation is 'the phone farmer'.
The use of digitalisation in injecting the participation of urban based population in smallholder farming systems promises to be a positive game changer.

IREN is currently piloting the IREN Growthpad App for the 'phone farmers'. The app offers the promise of 'ownership' (property rights) through creating a system of accountability and traceability. The 'phone farmers' interest and ability to take initiative and execute on how farming and agribusiness activities are carried out in their rural home is the key anchor for the app. It enables the 'phone farmer' to keep a keen eye on return of investment by insisting on delivery and reliability from service providers along agribusiness value chain.

The *IREN Growthpad App* facilitates smooth connection that enables the urbanite to join smallholder farming systems at the touch of the button. By enabling high level of precise participation and clear sense of ownership, digital platforms are reframing the profile of smallholder farmers.

James Shikwati is the founder director of the Inter Region Economic Network (IREN), a Nairobi based company advocating for free market economics for the development of Africa and currently spearheading the establishment of a tech and innovation centre in the region. Originally from Kenya, Shikwati is an economist and well-known expert on African economic development. James visited our Green Innovation Centre office in Bengaluru in early 2019 and exchanged on concepts such as the urbanite phone farmer.

STRATEGICALLY PUSHING POTATOES IN SOUTH INDIA

Analysis of the Indian potato market

South Indian potato farmers need to compete with prices of North Indian producers. How can this be done successfully? A study by Mans Lanting, Team Leader, Green Innovation Centre India, identifies the needs of the hour.

Farmers in South India face dropping prices and losses. Even when the quality of their produce is high, it is difficult to keep their cultivation profitable. This is due to the fact that potatoes from North India with advanced cold storages flood the South Indian market most of the year.

To stabilize the market, the major North Indian producers of Agra and Indore needs to be avoided. A simulation shows that an increase in the area of potato cultivation in Hassan to 21,117 ha and Chikmagalur to 5,540 ha is required. Further, rainfed yield needs to be improved to 14 MT/ha, at a reduced production cost of 5 Rs per kg. The areas in Kolar (3,506 ha) and Pune (4,000 ha) should stay as they are. Yield from irrigated land in Karnataka (20 MT/ha) and Pune (30 MT/ha) also needs to remain constant. Under these circumstances, Karnataka potatoes would cost less than the Agra and Indore potatoes and the price margin is estimated as 2.32 Rs per kg on an average.

However, 24 cold storages in Karnataka and four in Pune need to be generated, with a capacity of 6000 MT each. With the support from the Indian government in establishing cold storage facilities for harvested potatoes, production in Karnataka and supply from Pune can meet the potato needs of the South Indian States of Karnataka, Tamil Nadu and Kerala. The result would be a market situation wherein farmers, traders and consumers are made better-off.

INDIA ELECTIONS 2019: THE 'INCOME REVOLUTION' FOR FARMERS

Enabling the Indian village to connect with the global village with 'GrAMS'

India has voted. What could be the election's consequences for Indian farmers, who make up almost the half of the population? Which changes can be expected, and which are urgently needed?

An opinion piece by Prof. Pawanexh Kohli, CEO of India's National Centre for Cold-Chain Development (NCCD).

India comprises 1.3 billion citizens, with 48 per cent engaged in agriculture and about 67 per cent classified as rural. The voters have decided to bring back the incumbent Government recently. This has important significance, as the ground work of the preceding five years can now be pursued to fruition. The Government has placed agricultural income as a priority in its overall economic vision. The central theme being farmers' income with rural welfare as the tangible outcome. Income is a natural function of gainful enterprises and treating farming as an enterprise is foreseen as a core developmental strategy. These aspects have also been positioned in apropos economic context last year, by the Committee for Doubling Famers' Income. The Government's commitment towards income growth of farmers is self-evident and monetisation of farmers produce can become the new catchphrase, viz the past fussing about de-monetisation.

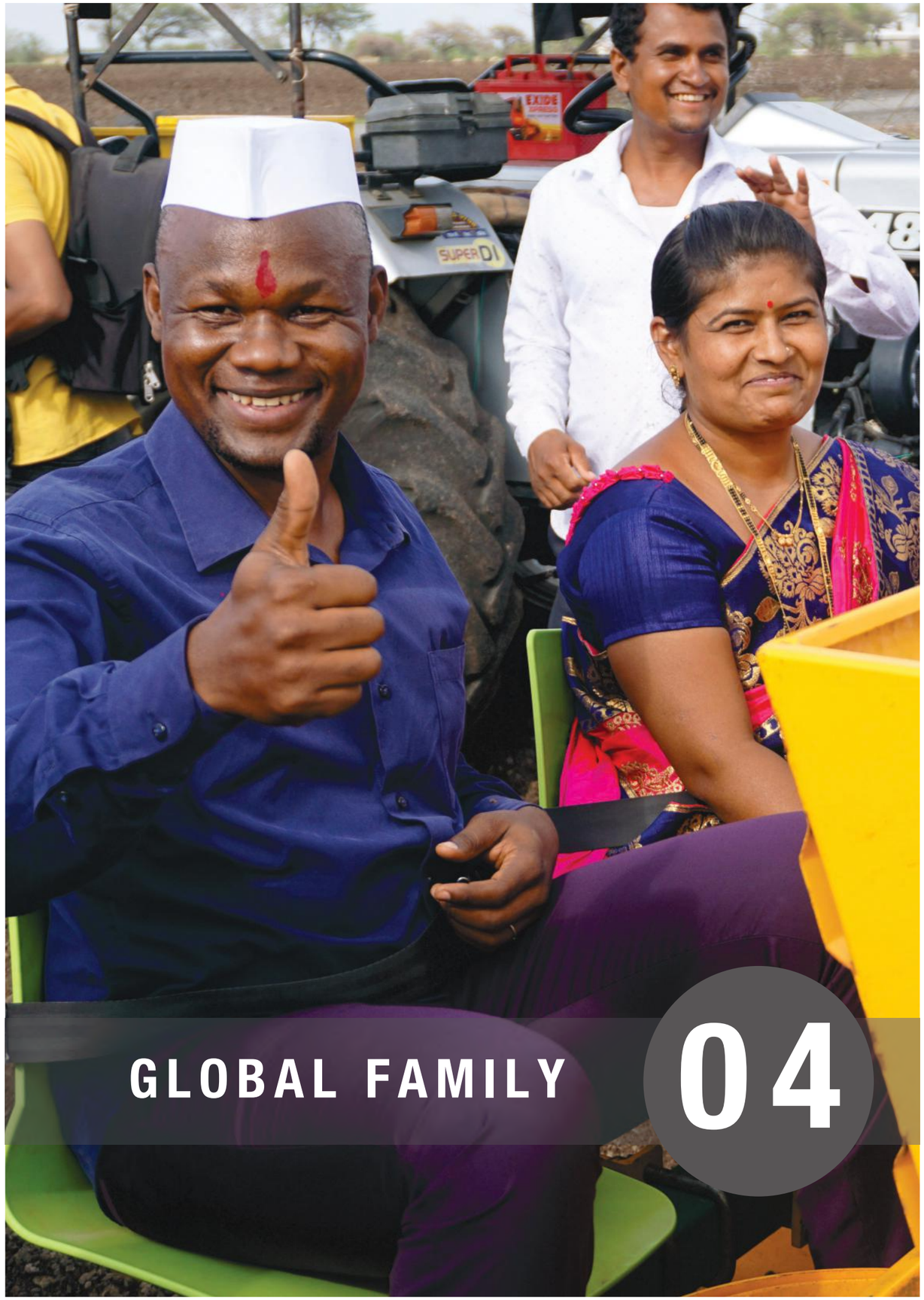
The destination market for farm produce is typically an agro-processor (food or non-food) or terminal wholesale centres. Yet, farmers were not empowered with the ability to physically transfer their produce to markets of their own volition. If farmers are to have a choice on where and whom to sell their produce, the existing post-production agri-logistics needs reorganisation. Once the source has the ability to dynamically supply multiple markets, the monetisation process will undergo a radical transformation.

The erstwhile decision to develop *GrAMs (Gramin Agricultural Markets)* is an important empowering step in this direction, which can expect to continue. GrAMs are conceived as village level aggregation hubs that will facilitate logistics connectivity from any village to multiple markets. This will empower villages by aggregating and dispatching their produce directly to any market, anywhere. The Indian village would thereby be enabled to connect with the global village.

In corollary, farmers would also need to collaborate to collectively generate viable loads for efficient handling at the GrAMs. Hence, equal priority is expected to encourage farmers to aggregate their efforts to support the logistics chain. So far, mobilising farmers into FPOs was largely to bolster their negotiation prowess as collective buyers of inputs. It is now time to foster collaboration of the type that will ensure that farmers become better sellers of their output. To transform India's agricultural economy, the key ingredients are a new market architecture matched with apropos agri-logistics. Various other ongoing initiatives, such as, reducing cost of inputs, integrated nutrient and pest management, water-soil-climate resilience, price and income support, risk management, bring incremental benefits. It can be expected that implementation is spread so as to reach every village and every farmer.

The farmers of India can expect this Government to continue the direction it set, with the agenda to empower them not merely as a workforce, but as enterprises. Farmers too, will require to work in tandem, to be rightful producer owners of profitable and growing businesses, and free themselves of gratuitous sustenance. The production-centric green revolution is of the past… the 'Income Revolution' for farmers is forthcoming.

Pawanexh Kohli is an industry professional serving as the founding CEO of India's National Centre for Cold-Chain Development (NCCD). He is a principal member of the Inter-ministerial Committee on Doubling Farmers' Income, and the University of Birmingham conferred Kohli the title of Professor of Post-harvest Logistics.



CITY COMPOST

From urban waste to healthy soil

Waste management and soil degradation are two of India's most pressing environmental concerns. The Indian state of Maharashtra, together with two projects supported by GIZ, tackles both through market mechanisms to recycle urban waste as compost for rural soils. This relieves the cities' waste management and enhances rural soils and in turn farmers' productivity.

India's urban population generates 62 million tons of municipal solid waste annually of which almost 30% is organic waste. More than 80% is disposed indiscriminately without treatment at dump yards in an unhygienic manner. In the Indian countryside, ecological sustainability of agriculture has been at risk due to an excessive use of chemical fertilisers and monoculture since the 'Green Revolution'. More than half of India's land is already reported to be degraded.

From the countryside to the city and back

A clever solution to address both problems is the urban rural nutrition and carbon cycle (URNCC). This means turning urban organic waste into city compost for rural soils. Organic waste is collected in the cities, recycled and processed to compost and finally used as organic matter by farmers. Thereby, carbon nutrient in the waste gets back to the soil to enhance agricultural production. The Green Innovation Centre India and ProSoil, both GIZ projects, are part of the implementation. GIZ supports in developing business models such that the city compost reaches the farmers and hence improving their soils, builds capacities for quality assurance of the compost and conducts pilot interventions for innovative products made of waste like PROM and Terra Preta. Private sector partners and Farmer Producer Organisation (FPOs) play a critical role in implementing the business models for URNCC.

Challenges – prices and subsidies

Farmers in Maharashtra realise the need for organic fertilisers. However, availability of local organic waste is limited. Farmers produce their own farmyard manure at a cost of 1,600 Rupees (Rs.) per ton (20 euros) or buy it at Rs. 2,350 per ton (30 euros), city compost costs about Rs. 2,300 per ton, depending on the transport distance. The Department of Fertilizers, Ministry of Chemicals and Fertilizers, provides assistance for the marketing of city compost. GIZ not only supports facilitation with government agencies for such subsidies but also links farmers groups and urban producers directly, even virtually through the HARIT app. The response is positive: *'Urban compost provides a great alternative as a soil fertility enhancer. After experimentation with a few lead farmers, we see a growing demand for this compost. This year, we are procuring 160 tons of compost from the Nashik city,'* maintains Somnath Gorakh Palve, Director of a farmers group. However, the GIZ projects are still working on the quality and timely delivery of the compost to ensure regular supply in future.

Favourable policies and cooperation schemes for upscaling

Since April 2018, GIZ has been carrying out the implementation of the city compost project and is now entering in the phase of implementation of business plans and standardisation for further upscaling. GIZ is also collaborating with state agriculture universities to conduct research trials and hence recommendations for city compost application. The initiative is in line with India's political priorities, such as the nation-wide campaign 'Clean India' for sanitation or the goal of the Government to double farmer's income by 2022. At state level, the Department of Agriculture is keen to take up the idea, and also the Indian National Bank for Agriculture and Rural Development (NABARD) is up to promote the viable business models through its network. In collaboration with the Urban Development Department, the initiative of URNCC is being promoted and supported in the state of Maharashtra.

Innovative together! The city compost initiative is supported by two GIZ projects. Hand in hand, ProSoil in Delhi and the Green Innovation Centre in Bangalore provide support to make India's streets cleaner and soils healthier.

With city compost, Maharashtra can make use of the 22,300 tons of municipal solid waste emerging daily, up to 45 per cent of which is organic. A single average city in Maharashtra can therefore provide nutrient and carbon for about 14,000 hectares of land annually.

> *'The new compost allows our potatoes to withstand more moisture stress during the dry spell, as it increases the water holding capacity of the soil. Compared to our conventional farm yard manure it is also better decomposed and does not lead to any fungal diseases, as the compost is treated with fungicide,'* says farmer Vilas Darekar Papalwadi.

Authors:

Navin Horo, Soil Protection and Rehabilitation for Food Security
Monika Austaller, Green Innovation Centre India

FROM SOUTH TO SOUTH, MECHANISATION COUNTS!

Exchange between African countries and India on mechanisation in Pune

Getting hands dirty and heads rotating around power harrowers, ploughs and laser levelling: The Green Innovation Centre project is present in over 15 countries. This means we can learn from each other. The innovative South-South exchange format brought together eight countries for one week in Pune on the topic ‘mechanisation in agricultural value chains’.

Eight countries, six days, five languages and a lot of machinery. That was the South-South exchange meet on mechanisation in agriculture in Pune.

From the 17th to 22nd of June the Green Innovation Centre India, a part of the global project in 15 countries under BMZs special initiative One World – No Hunger, welcomed participants from its sister projects in Benin, Burkina Faso, Ethiopia, Ghana, Kenya, Mali and Tunisia and their partners.

In Pune, the project working group on ‘mechanisation in agricultural value chains’ exchanged perspectives in English, French, Hindi, Kannada, Marathi and German on technologies, business and financing models and opportunities for collaboration, to mechanise Africa’s and India’s agriculture.

It was an intercultural, intercontinental and multilingual mechanisation festival.

To get a closer impression and one’s hands dirty, farmers and experts from the project in India demonstrated equipment and technologies directly on the field.

Ploughs, planters, laser levellers, nurseries, seed production and plant protection – the participants shared insights into various solutions. The focus was primarily on contextual relevance, application, function, standards and especially on the relationship between costs, efficiencies and impact on production.

The exchange revealed many different approaches and solutions to similar challenges in the mechanisation of the agricultural sector in Africa and India.

- **What kind of machinery increases productivity and reduces expenses most efficiently?**
- **How can agricultural machinery be adapted to the needs of smallholder farmers?**
- **Which custom hiring models and financing approaches have proven successful and why?**

> ***‘Whether in Asia or in Africa: We face similar problems in agriculture. But we have different approaches to solve them.’***
>
> **Andrian Kithinji Mungania, Green Innovation Centre Kenya.**

One highlight was the potato planter, which was developed by the Indian manufacturer Rohit Industries together with farmers and the Green Innovation Centre India. This semi-automatic planter is adapted to the Indian context with its small scale fields. It generates higher ridges (in combination with deep ploughing and power harrowing) to improve the water drainage in the field, that leads to less weeding and less susceptibility of seeds to diseases and damages. The harvest is overall higher and of better quality thanks to the uniform depths and spacing of the seed potato. The participants simply took a seat and planted a few potatoes.

In the end, meetings and exchanges with mechanical engineers, service providers and farmers, led to the exploration of new business relationships between the African and Indian agricultural sectors. With new ideas, approaches and partners, the African guests returned home after a fruitful week that proved the importance and benefits of the South-South exchange formats for the development cooperation in the global South.

FACES OF GREEN INNOVATION CENTRE INDIA

Dr Kavita Bhardwaj

Green Innovation Centre India, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Technical Expert for Apple Value Chain Development, Shimla, Himachal Pradesh

'Being a part of the Green Innovation Centre has given me the freedom to follow through on ideas and concepts I have. From what we can tell, our technologies and business models are unique globally, so it is exciting to be on the cutting edge. Small holder farmers' unwavering hope and faith in the future only encourage me to engage them further to take farming to the next level.To bring tailored solutions to smallholder farmers, I feel I am making a difference and remain connected to my roots, joining hands to ensure the business of small farmers – my family – continues to prosper.'

Tupalle Chandra Sekhar Reddy (CS Reddy)

APMAS (Mahila Abhivruddhi Society, Andhra Pradesh)
Founder & CEO, Hyderabad, Telangana

'I am passionate about facilitating innovations to have women in leadership roles in Farmer Producer Organisations (FPOs) for them to emerge as self-reliant business organisations engaged in tomato value chains based on cooperative values, ethics and principles.'

Kshama Patil

Department of Horticulture, Government of Karnataka
Deputy Director, Bengaluru Karnataka

'I am working in the limits of Deputy Director of Horticulture and heading the Project Monitoring Unit for farmer producer organizations (FPOs) and Public Private Partnership for Integrated Horticulture Development (PPP-IHD). I have coordinated in registering about 100 farmer producer companies (FPCs) across Karnataka. I am passionate about developing the farmers clusters (Farmer Producer Organisations) with an objective to address the complete value chain, i.e. collective sourcing of inputs to reduce cost of cultivation, access to direct marketing linkage to gain bargaining power for farmers and provide technical support for quality production.'

Arvind G. Risbud

MYRADA, Green College Initiative
Executive Director, Bengaluru, Karnataka

'In the scope of my work I want to help bring about sustainable improvement on the village level. I like to be a part of the change happening around me especially if the change is for the better. My most interesting experience in this project so far was when a first generation woman entrepreneur proudly explained her achievements to the Myrada Board. I believe the Green Innovation Centre project combines commitment and competence and benefits all the stakeholders in different ways.'

Marina Kuch

Green Innovation Centre India, Agriculture and Finance Consultants (AFC)
M&E Advisor, Bengaluru, Karnataka

'Monitoring & Evaluation (M&E) is an important part of every project. Me and my team keep track of the project's progress towards its goals. This allows me to see all the positive impact the project has on farmers as well as on other stakeholders in the potato and tomato value chain. Experiencing the positive impact motivates me every day.'

Published by

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices:
Bonn and Eschborn

Green Innovation Centres for the Agriculture and Food Sector – India
One World No Hunger Initiative (SEWoH)
No. 38/43, First Floor, 10 A Main Road, Fifth Cross
Block 1, Jayanagar, Bengaluru – 560 011, India
L +91 80 46664000
E greeninnovationcentreindia@giz.de
I www.bit.ly/GIC-India

Responsible
Jonathan Julius Ziebula, Project Director

Authors:
Julia Jung, Monika Austaller, Lukas Hanke

Design and Layout
Srinivas Prasad S P

Photo credits/GIZ
Klaus Wohlmann, Jonathan Ziebula, Monika Austaller, Lukas Hanke, Ronny Sen, GIZ
pexels.com, noun project

GIZ is responsible for the content of this publication.

On behalf of the
German Federal Ministry for Economic Cooperation and Development (BMZ)

Bengaluru, India
July 2019