

Smart Farming gGmbH

Activity report 2023



1. Introduction

- 1.1.** The non-profit organization Smart Farming gGmbH was founded on 21 June 2023 and is active in the field of “Development cooperation in research and development in the natural sciences and engineering”.

The gGmbH's approach is based on the belief that the technology of the Global North cannot simply be imposed on the Global South. The use of technology only makes sense if it is embedded in the ancient wisdom, tradition and culture of these countries. The gGmbH is committed to ensuring that green, gentle technology harmonizes with existing agricultural practices. This integrative approach not only helps improve the living conditions of smallholder farmers, but also supports soil health, promotes biodiversity and thus makes a significant contribution to global climate protection. The combination of green, gentle technology with the traditional knowledge of farmers in the Global South promotes sustainable and resilient agriculture that takes into account both the environment and local communities.

- 1.2.** In the founding year, the focus was on clarifying and planning concrete measures to support smallholder farmers in the Global South through the use of smart farming technologies. In this context, various research and visits were carried out to identify the best approaches and cooperation opportunities.



2. Objectives and activities

2.1. As part of the investigation into the possibilities for supporting smallholder farmers in the Global South, it was necessary to visit the target regions. First, possible contacts in the target regions were found through internet research. In September and October 2023, the managing director of Smart Farming gGmbH visited India to obtain a comprehensive overview of the existing conditions and possible cooperation partners on site.

a) Federal State Andhra Pradesh

During the stay in the state of Andhra Pradesh, the Vicente Ferrer Foundation in Anantapur was visited. The aim was to evaluate the potential of a possible collaboration. During the visit, comprehensive tours were given of all the foundation's facilities, including the hospital, kindergarten and school. Visits to smallholder farmers who mainly practice subsistence farming were also made possible. Due to the farmers' lack of knowledge of agricultural practices, especially with regard to irrigation and fertilization, a soil monitoring system could bring about significant improvements in harvest and soil quality.

On October 5, 2023, Mr. Moncho Ferrer - the son of the deceased founder of the foundation, Vicente Ferrer, invited to a meeting. Mr. Moncho Ferrer informed that the foundation has currently entered into a cooperation with an IT company from Hyderabad that measures soil parameters via satellites. Mr. Ferrer was nevertheless interested in the green, gentle technology of Smart Farming gGmbH. This is because satellite measurement has limitations in terms of measurement accuracy. The measurements often do not reach down to the root depth, and in plants that have already grown, the accuracy is impaired by the density of the leaves. The measurement method used by Smart Farming gGmbH, on the other hand, measures directly at the root depth of the plants and can therefore provide more accurate data. Mr. Ferrer was very interested in the method. It was agreed to stay in contact to discuss possible collaborations and the integration of green, gentle technology into their projects further.

b) Federal State Odisha

In the state of Odisha, together with the non-profit organization Jeevan Rekha Parishad (JRP), smallholder farmers who mainly practice subsistence farming were visited within a radius of about three hours' drive from Bhubaneswar. This visit highlighted the urgent need for irrigation systems due to the frequent droughts in the region, which are becoming more frequent and worse due to climate change. In discussions with local farmers, it became clear that they need a reliable irrigation solution to improve yields and secure their livelihoods.

The director of the organization, Dr. Maroranjan Mishra, informed about the organization's successes. Particularly noteworthy are the cold storage facilities financed by JRP, which are set up near the fields. They enable farmers to store their harvest temporarily and thus be able to market it more efficiently.



Dr. Mishra also pointed out that a soil monitoring system would be a great help to smallholder farmers. Many of them do not have the necessary agricultural knowledge to carry out adequate irrigation and fertilization. Such a system could provide crucial information and thus improve the farmers' agricultural practices.

During this visit, Dr. Maroranjan Mishra and the smallholder farmers were interested in a drip hose for subsurface irrigation that the gGmbH had brought with them. The drip hose could offer an effective solution for improving irrigation and was received with interest by those present.

c) Federal State Gujarat

The gGmbH has already received an invitation from Germany to visit the Captain Polyplast factory in Rajkot. The company produces micro-irrigation systems for agriculture, including drip and mini-sprinkler irrigation systems. The government subsidizes these systems for smallholder farmers by up to 80% to facilitate their access to modern irrigation solutions.

As part of this visit, smallholder farmers in the wider area around Rajkot who are already using these irrigation options were visited. As in Odisha, it was also apparent in the state of Gujarat that many of the smallholder farmers do not have sufficient agricultural knowledge. To counteract this shortage, so-called field officers are deployed across the country. These specialists have technical and agricultural training and usually look after numerous farms, which they visit directly when problems arise. During discussions with the field officers, it became clear that a soil monitoring system could make their work much easier. Such a system would enable them to view the farmers' soil conditions remotely via their smartphones and they could give them targeted recommendations on irrigation and fertilization. This could increase the effectiveness of their support and improve the agricultural practices of smallholder farmers.



Summary of the visit to India

During the visit to smallholder farmers in India, important insights into current agricultural practices and local challenges were gained.

The main observations are:

- **Low agricultural knowledge:**
Many smallholder farmers have very limited agricultural knowledge and skills. This particularly applies to knowledge of effective irrigation and fertilization methods.
- **Uncertainty regarding irrigation and fertilization:**
There is widespread uncertainty about how crops should be correctly watered and fertilized. This uncertainty leads to inconsistent and often ineffective practices in agriculture.
- **Water waste and over-fertilization:**
The uncertainty and lack of knowledge often lead to water waste and over-fertilization. These practices damage both soil and groundwater, putting plants under additional stress.
- **Negative effects on crop yields:**
The negative effects of improper irrigation and fertilization result in lower crop yields. Poor soil quality and the stress of excessive fertilization contribute to the deterioration of crop results.

The findings highlight the need to provide targeted support and training to smallholder farmers to improve their agricultural practices. A soil monitoring system could play a central role in this by providing precise data that enables targeted and sustainable irrigation and fertilization. These improvements would not only increase soil quality and crop yields, but also promote biodiversity. Studies show that healthy soil quality and increased biodiversity can make a significant contribution to combating climate change and making a positive contribution to global climate protection.



Attachments and additions

Federal State Andra Pradesh

Visit to the Vicente Ferrer Foundation in Anantapur. Tour of the facilities on campus and visits to smallholder farmers in the region.



Shanta led through the foundation's facilities. Hospital, kindergarten, school, canteen, the care of the poorest is comprehensive here.



The foundation's own hospital provides care for people who otherwise find it difficult to find help, for financial reasons, or simply out of shame or fear.



Children with disabilities or girls are sometimes abandoned in India due to pressure from their fathers. The foundation takes them in and looks after them.



India is making great efforts to build water retention basins to bridge drought periods.



Due to climate change, droughts are becoming more frequent and increasingly extreme.



Then there is no rain all year and the water collection basins dry out completely.



These smallholder farmers were lucky, they were supported by the government with drip irrigation.



With a soil monitoring system, irrigation can be adapted precisely to the needs of the plants.



Onion harvest at 35°C. Drip irrigation hoses are visible on the ground.



With green, gentle technology, a harvest is possible even during drought periods and supports the livelihood of small farmers.



Peppers grow on desert-like soil thanks to drip irrigation. It saves up to 60% water.



Normally, the water collection basin is filled by rain from June to September. In 2023, there was no rain.



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Federal State Odisha

In the wider area around the capital Bhubaneswar, small farmers were accompanied by the director of the Jeevan Rekha Parishad (JRP), Dr. Maroranjan Mishra, to clarify the possibilities of support from Smart Farming gGmbH.



JRP supports smallholder farmers with tent-like greenhouses that protect the plants from drying out.



Vegetable cultivation requires little land, has short growth cycles, is in high demand on local markets and also serves as self-sufficiency.



A drip hose for subsurface irrigation attracted a lot of interest. Together with a soil monitoring system, it optimizes plant growth and improves soil quality.



In the cold storage facility with self-sufficient energy supply via solar cells, smallholder farmers can temporarily store their harvest.



At +4°C, farmers can store their harvest until they are sold. Without refrigeration, around 30-40% of agricultural products would spoil.



To generate additional income, the farmers are trained in honey production.



The proportion of women in agriculture in India is 70-80%. They are particularly supported, also in order to overcome gender inequality.



Soil cultivation is carried out using the simplest means. The dependence on rain for irrigation is becoming increasingly difficult due to climate change.



The farmer on this field uses flood irrigation, which uses a lot of water and removes the top nutrient-rich soil. Micro-irrigation with control of water and nutrient requirements using a soil monitoring system can improve soil quality, save water and fertilizer and promote biodiversity



SMART FARMING
FUTURE OF AGRICULTURE

Federal State Gujarat

In Rajkot, there was the opportunity to visit a manufacturer of drip and mini-sprinkler irrigation systems. These irrigation systems are subsidised by the Indian government for smallholder farmers with up to 80%.



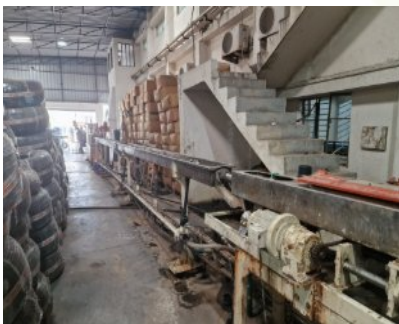
Captain Polyplast in Rajkot manufactures drip irrigation systems and installs them on the fields of smallholder farmers.



A decommissioned production plant of the Israeli company NetaFim. Granules are filled in.



The molten granulate is pressed into a tube shape using high pressure.



The squeezed hose is cooled in a water bath, holes are punched and automatically wound up.



Pipes that lead from the main connection to the individual segments on the fields.



Field officers have technical and agricultural training. They advise smallholder farmers.



Pumps transport groundwater to the distributors of the drip irrigation hoses. Liquid fertilizer can be added.



Farmers receive support for switching to organic fertilizer. Field officers advise on the amount of fertilizer to be used..



Large areas of Gujarat are desert-like landscapes. However, agriculture is still possible with drip irrigation.



The dragon fruit thrives in this poor soil with drip irrigation.



The Oilseed Research Center in Ahmedabad researches and develops seeds for oilseed crops.



Farmers receive seeds from public research institutions and are allowed to multiply and exchange them.



Rethinking the economy, in harmony with nature.
Living and working with dignity.
These are the goals of the non-profit Smart Farming gGmbH.
This is what we work for.

Thanks to all supporters who helped us in 2023.

Senden, December 20, 2023



Achim Giebler, Managing Director

