

# Seed Funding Global South 2023 – Project report

## Agrochemical in LOCO-Evaluation - AGiLE

- **Chair at the TU Berlin:** Micro and Precision Devices (MFG)
- **Partner country/countries:** Brazil
- **Partner institution (s):** Federal University of Santa Catarina (UFSC), and Center for Studies and Promotion of Group Agriculture (CEPAGRO)
- **Sustainable Development Goals (SDGs):**



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**SDG 02:** Zero hunger

**SDG 03:** Good health and well-being

**SDG 04:** Quality education

**SDG 06:** Clean water and sanitation

**SDG 12:** Responsible consumption and production

**SDG 17:** Partnerships for the goals

South Brazilian organic producers work in a scenario favourable to agrochemical cross-contamination. For example, nowadays, the region produces 21% of organic goods and 98% of tobacco in Brazil. While organic production should not use agrochemicals, tobacco demands approximately 30 kg/100 m<sup>2</sup>, which is 2.5 times the average usage in South Brazil (12 kg/100 m<sup>2</sup>). According to the "Agribusiness Atlas" (Atlas do Agronegócio) from Heinrich Böll Stiftung Brazil and Rosa Luxemburg Foundation, agrochemicals used by tobacco producers can lead to intoxications, neurological problems, depression, and suicide. Because of the methods employed to spread these agrochemicals, cross-contamination of nearby farms through the air and water bodies is a challenge for organic producers. Fast and in loco pesticide identification on organic farms will lead to an easier identification of cross-contamination sources if done systematically and frequently.

In the search for in loco measurement systems, an interdisciplinary group was built. The group is composed of professors from physics (FSC), rural engineering (ENR), and mechanical engineering (EMC) departments from the Federal University of Santa Catarina (UFSC) in Brazil, members of the NGO Center for Studies and Promotion of Group Agriculture (CEPAGRO), and the Chair of Micro and Precision Devices (MFG/TU-Berlin).

In the context of the Global South seed funding from TU-Berlin, preliminary analyses of soil contaminated by agrochemicals and exploratory visits to vegetable producers were conducted. Soil analyses were performed at the Hybrid Nanostructures Laboratory at the Institute of Chemistry of the University of Potsdam by means of Raman and SERS spectroscopy, with the

aid of Prof. Ilko Bald. Meanwhile LIBS measurements were conducted, at the Technological Federal University of Paraná (UTFPR), Brazil, with the support of Prof. Dr. Ricardo Schneider. The analysis of the data was performed by Prof. Dr. Leonardo Furini and Prof. Dr. Gustavo Niconodeli (FSC). The results pointed out soil sample preparation as a main challenge for in loco analysis. This changed the focus of the AGiE group from the measurement devices to devices capable of preparing soil samples and analysis.

The exploratory visits were conducted in the Santa Catarina state of Brazil, where farms from three producers use a farming system named “Direct Vegetable Planting System” (SPDH). The visits were organized and led by Prof. Cledimar Lourenzi and Prof. Dr. Arcangelo Loss (ENR) and the agricultural extensionist Marcelo Zanella from the Agricultural Research and Rural Extension Company of Santa Catarina (EPAGRI). The visits were important to understand SPDH and the requirement of the vegetable producers. The SPDH involves agroecological transition and provides a gradual reduction of agrochemicals and efficient use of fertilizers. Therefore, aiming at turning farms into organic producers. The visited producers require faster and regular soil analysis. However, the closest laboratory is about 200 km distant from the farms. Also, leaf analysis requires even further distances of about 600 km. The regular waiting time for a soil analysis result is 22 days. Meanwhile, soil and vegetable conditions change significantly.

The seed funding project facilitated the formation and collaboration of an interdisciplinary group. It allowed for problem delimitation considering the expertise area of MFG group and global south partners. Subsequently, new partnerships and contacts were established, and discussions regarding project calls related to the topic were extensive. Ultimately, the seed funding played a crucial role in strengthening the relationship between TU-Berlin and the UFSC.