

SusTec
Sustainable
solutions to elevate
local protein-rich
crops from
subsistence to
high-tec innovative
products

Our Network: Barbara Reinhold-Hurek (Coordinator), Thomas Hurek, Abhijit Sarkar, Molecular Plant-Microbe interactions, **University of Bremen (UHB)**, Germany;
Martin Schüring, Technologie-Transfer-Zentrum, ttz Bremerhaven, Germany; **Penny Hiwilepo-van Hal**, Food Science and Technology, University of Namibia, UNAM-Food, Namibia; **Evelyn Breuer** Institute of Nutrition Food Safety Training and Research, Namibia University of Science and Technology, NUST-Nut, Namibia; **Lydia Ndinela Horn**, UNAM-ZERI, Namibia; **Percy Chimwamuombe**, Dept of Natural and Applied Sciences, NUST, Namibia

Food production

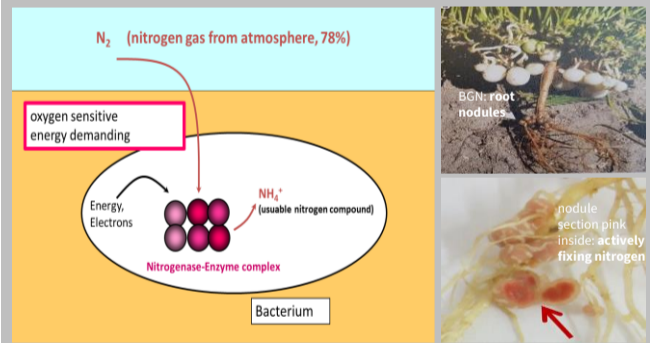
Challenges

- Malnutrition (protein deficiency): highest concentration of food insecurity in Kavango region of Northern Namibia
- Rainfed-agriculture by small holders: low crop yield, poorly developed value chains and food processing
- Chemical fertilizers or manure inputs unaffordable - prone to slash and burn agriculture
- Sandy soil: limiting N and P: declining soil fertility
- Underexplored drought tolerant local legumes (pulses): poor knowledge of rhizobial inoculants for yield enhancement

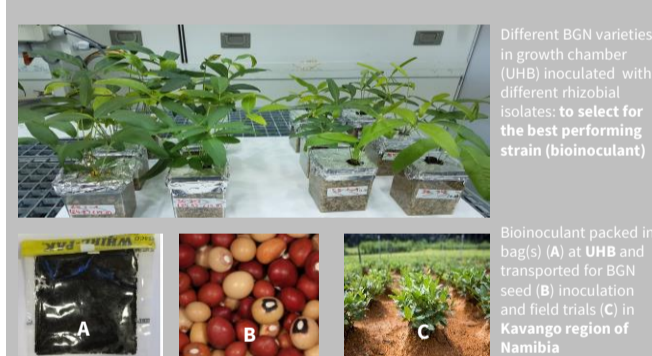
Project Objectives

- Transformation of underutilized local pulse Bambara groundnut (BGN) as model for innovative products:
- Bradyrhizobial inoculant technology for sustainable BGN cultivation in Namibia
 - Food processing 1: plant-protein enriched porridge for school feeding to combat children malnutrition in Namibia
 - Food processing 2: versatile food or food ingredient, which can be introduced into various food systems.
 - Export: novel source of protein-rich vegan food (Germany)
 - Circular economy: use BGN by-products in a value-added way

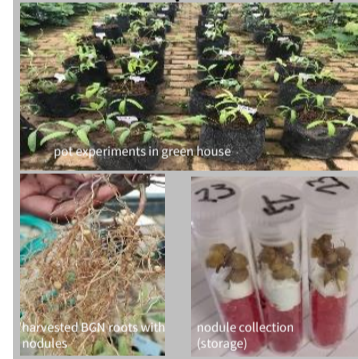
Biological nitrogen fixation (BNF) of bacteria: conversion to usable form



Development of inoculant technology for BGN cultivation



Pot experiment with BGN inoculation (UNAM-ZERI)



Practical training course at Windhoek (NUST)



Good practices

- Joint yearly report (DAAD/DLR): overview of the advancement and possibility for changes of proposed plan (when needed)
- Good documentation of methods and protocols for secured and easy accessibility of all partners (private cloud server)
- Accessibility to local weather prediction stations (important for planning field trials)
- Communication: regular virtual meetings planned by coordinator with all cooperation partners. Tandem visits (symposium organization)
- Convincing the stake holders and policy makers about the benefits of the sustainable projects
- Offering certified practical training course from Germany for graduate students in Namibian universities: motivation and hands on modern molecular techniques (knowledge transfer)

Activities

- Interdisciplinary team
 - Project leaders of German and Namibian Universities, together with Namibian ministries: integrated for dissemination and training
 - Research project and teaching: coordinated by UHB
 - BGN inoculant development (UHB); field trials with the inoculant on different BGN landraces at Kavango (UNAM-ZERI and NUST-Mic); Food processing (NUST-Nut, UNAM-Food and ttz-Bremerhaven); future logistic and commodity (BGN) export (NUST) and distribution to German importers (UHB and ttz); Circular economy (NUST)
 - Collaborative publications
- Risks:**
- Planning and funding: timely fulfilment of set milestones
 - Challenges: coordination with cooperation partners/institutes
 - Field trials often encounter unpredictable adverse weather and poor field management responsibilities: affecting yields