

Bush to Feed Initiatives

University of Namibia

Funded by the Embassy of Finland in Windhoek



Background

- Agriculture is the main source of livelihood of about 70% of the Namibian population
- Agriculture contributes 5% to the GDP
- Crop and livestock farming are the main activities with livestock contributing more than 60%.
- The Namibian agricultural sector faces many challenges such as **recurrent droughts, poor soil fertility, ever harsher environmental conditions...** Factors that are aggravated by bush encroachment.

Bush encroachment consists of an invasion/thickening of undesired woody-species with an associate suppression of the palatable grasses

Background

- Bush encroachment also decreases biodiversity and the **carrying capacity** of the ecosystem, with all the economic losses that this entails
- Hence it **poses a major risk to food security**
- Causes: not completely known. Switch from browsers to grazers, overgrazing, ban on fire, climate change... seem to affect it
- It affects currently Asia, Africa and North America
- Namibia is affected massively by bush encroachment (**2/3 of the country**)



Project Objectives

- Develop animal feed from encroacher bush
- Assess the potential for business opportunities
- Assess awareness and community acceptability of bush-to-feed as alternative feed for the current commercial feeds
- Register the feed (through the UNAM spin-off → Inceptus)
- Market/sell feed products to farmers

Project Components

- **Research** → improve/optimize the already existing bushfeed production
- **Capacity building** of 6 MSc students, 1 PhD student and various undergraduates → produce experts on different fields of bushfeed production
- **Commercial production:** business case, registration of the feed, selling etc.
- **Transfer of know-how** → capacity building to farmers

Research

- It used the research of the Support to the De-bushing Project MAWF/GIZ as baseline
- Conducted by 6 MSc students (completed), various undergraduate students (completed) and a PhD student (on-going)

First phase

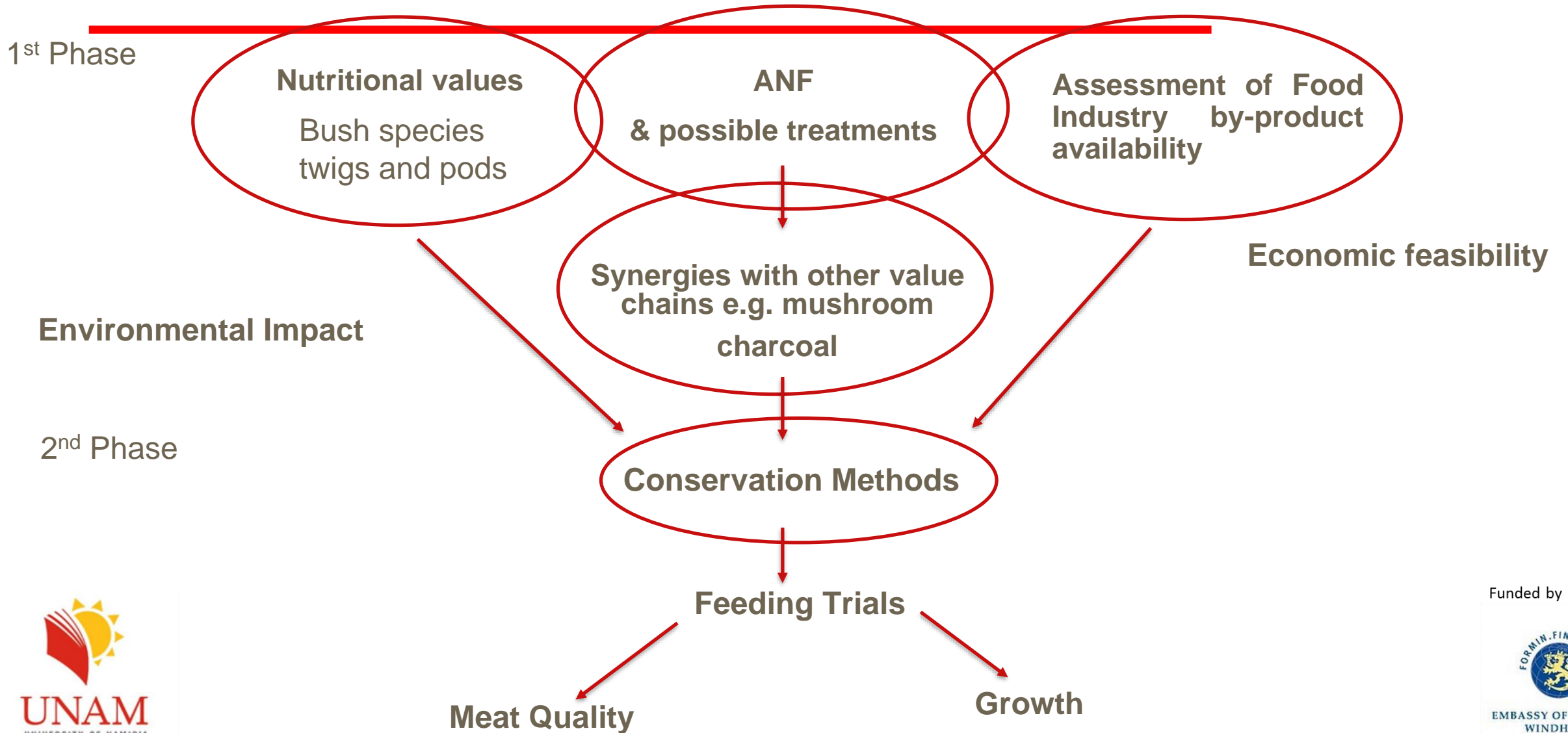
ANF (Tannins) & High fibre content
Mapping of the nutritive values and antinutritive factors (to establish when to harvest)
Local available supplements (by-products of the food industry)
Bush quantification
Biochar
Economic feasibility: Business case

Second phase

Mapping of the nutritive values and antinutritive factors (to establish when to harvest) (PhD)
Conservation methods (undergraduates)
Effects of supplements on animal growth
Meat quality



Research Overview



Commercial Production

- It will be based on the economic feasibility study
- Harvesting, chipping and mixture with supplements
- Based on the first research (R&D component)
- First target → own consumption (sheep, goat, beef cattle and dairy cattle)
- Different feeds (product prototypes) registration and selling

Transfer of the know-how

- Diffusion of research results (posters, booklets etc.)
- Workshops with commercial and resettlement farmers
- **Manual**
- Farmers consultation and monitoring
- Animal feed laboratory analyses (funded by N-BiG/BCBU)
- Students capacity building → Practical lessons, feedlot Challenge

Project Outputs

- Research papers
- Manuals, posters etc.
- local experts in different aspects of bushfeed production
- Capacity built on laboratory analyses
- Business case of the production at Neudamm
- Trained commercial, resettled and communal farmers
- Product prototypes: (registered) different rations of bushfeed pellets for different animals, **biochar (possibility), wood ash, charcoal**





Dry matter intake (kg)	ME	MP	Ca	P	Mg	Na
11	10,30000	3,75	0,31	0,28	1,01	0,30
13	8,55	4,70	0,31	0,28	1,01	0,30



Results

- Production volumes and high nutritive qualities of the agro-industrial by-products indicate their potential for utilization as energy and protein supplements for fibrous feeds low in crude protein and energy such as bush based feed in Namibia.
- Given the high CP content of the *S. mellifera*, this fodder resource can be considered a suitable supplement for poor quality (low N content) natural pastures and crop residues such as grass hay, straw and stover.
- The results suggested that the associated costs and benefits of producing bush-based feed pellets using encroacher bush (*Senegalia mellifera*) is viable and investing in the project should be considered.
- It was recommended in this study that small scale and upcoming farmers consider venturing in the manual method of production as it was less costly compared to the mechanized method,



Enhancing Community Adaptation through

Climate Resilient Agriculture: Encroacher

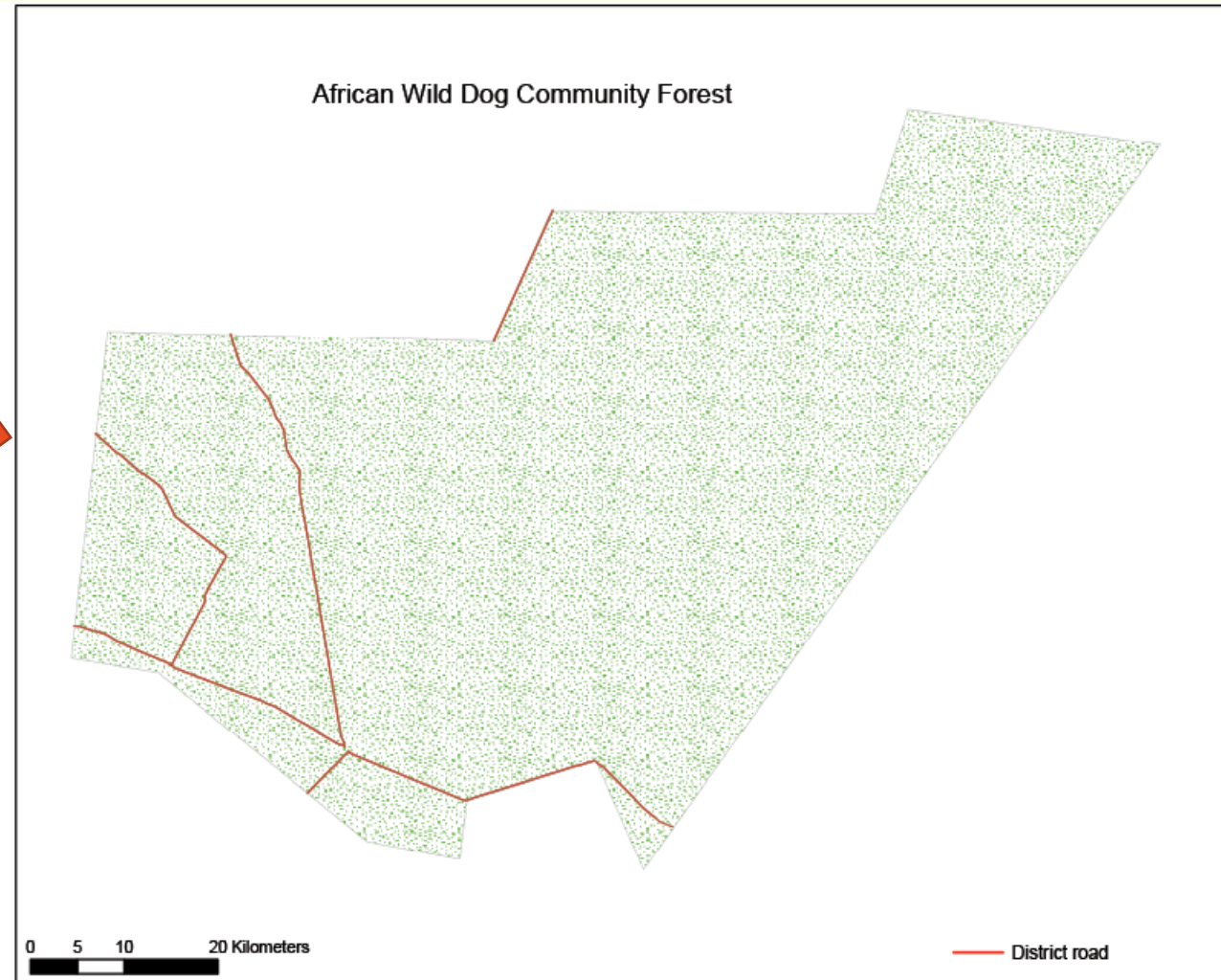
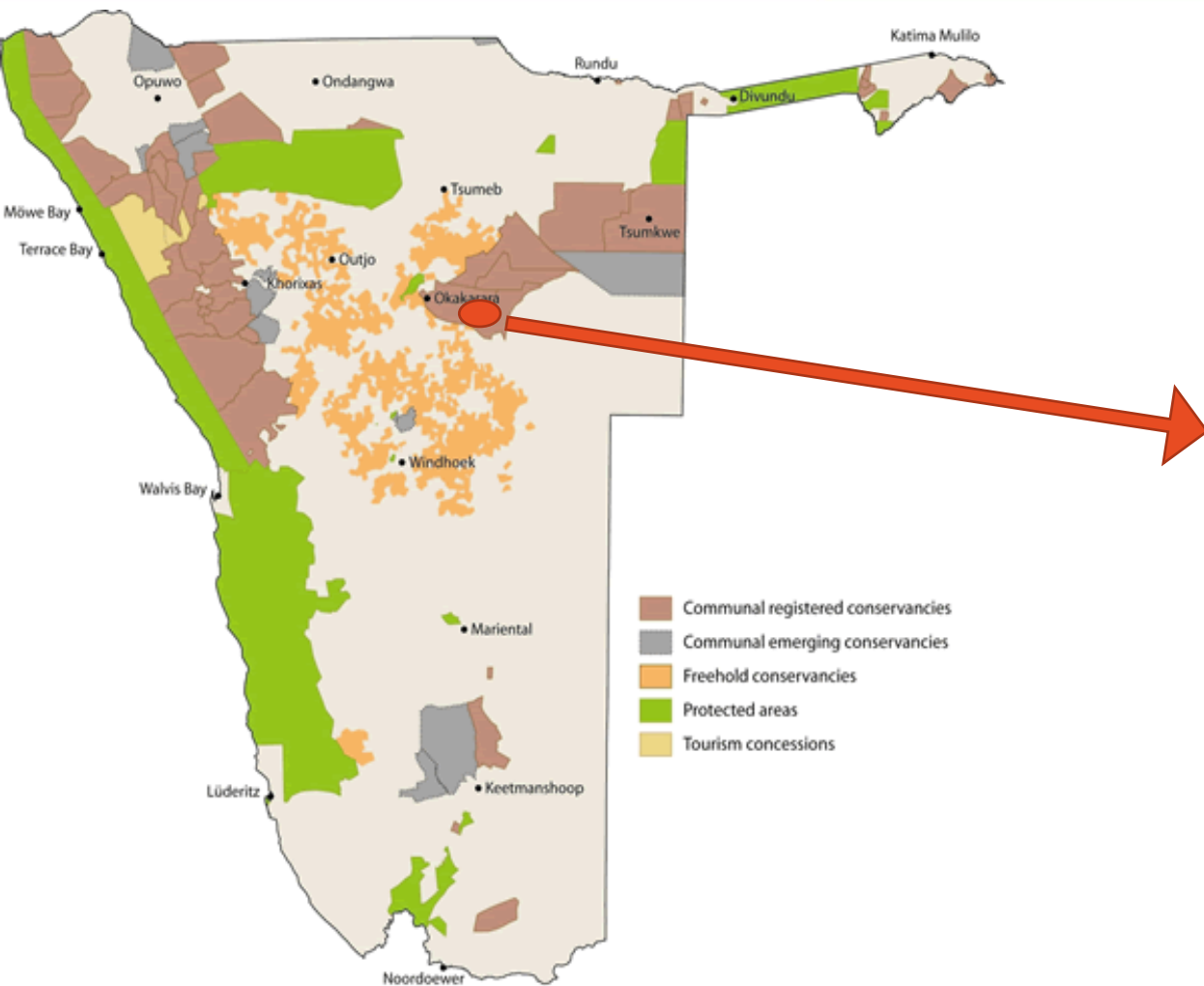
UNAM
UNIVERSITY OF NAMIBIA

bushes value chains initiative in Otjozondjupa

Region, Namibia



African Wilddog Community Forest



African Wilddog Community Forest

- Highly encroacher area: *A. mellifera*, *C. alexandri* and *D. cinerea* as major encroachers.
- Area - 382 400 ha
- 112 villages, with 5000 inhabitants
- Dominant ethnic group Herero and San
- Registered by government (> provides opportunity for community to manage their resources and generate income)



TVET Institution

- OKAKARARA VOCATIONAL TRAINING CENTER (OVTC)
 - **Office Administration**, Plumbers and Pipe fitters
 - Bricklaying and Plastering, **Carpentry and Joinery**
 - **Welding and Metal Fabrication**, Hair Dressing
 - Hospitality, **Auto Mechanic**, Electrical General, Clothing Production



Objectives

The overall objective of this study is to sustainably utilise and **add value** to encroacher bushes through **selective thinning**. This method will contribute towards rangeland restoration, create economic opportunities and increase food and feed security as well as enhance drought resilience.

This project uses a **complex value chain approach** in which **different parts of the bush** are used for **different purposes** to maximise the benefit from the biomass.

Objectives:

- To evaluate the medicinal and cost effectiveness of using biochar on preventing plant poisoning in ruminants;
- To evaluate the effect of treatment with wood ash, biochar and PEG on the nutritive value of bush feed with special focus on tannin contents, feed intake and digestibility;
- To determine the ensilability of bush feed using different silage enhancers (lactic acid bacteria (LAB) inoculants, molasses, grain malt);

Objectives

- To determine the effects of three different preservation methods (pelletizing, drying and ensiling) on the nutritive value and production cost of bush-based feeds made from encroacher bushes;
- Feeding encroacher bush silage on milk yield, composition and products quality (goats and cows);
- Bush feed on growth performance, blood metabolites, and meat quality (goats);
- The use of waste wood fractions as growth substrate on oyster mushroom production;
- To execute an overarching cost benefit analysis inclusive of all the various uses of the encroacher bush to determine its economic value.

Outputs

- Feed production
- Mushroom production
- Fencing poles production
- Charcoal and biochar production
- Economic analysis of the bush value chains
- Trained community members
- Adapted TVET programs to the market demand
- Graduate students
- Restored rangelands



Associated projects and partners

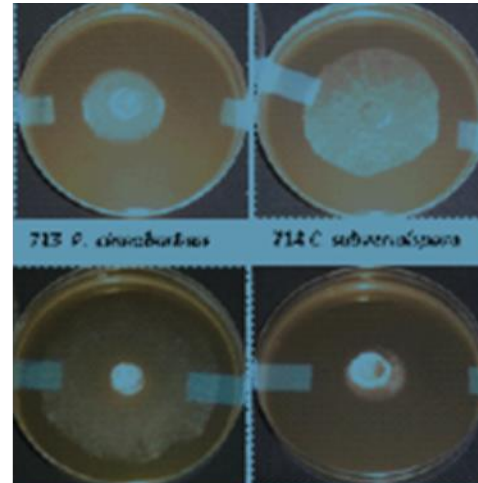
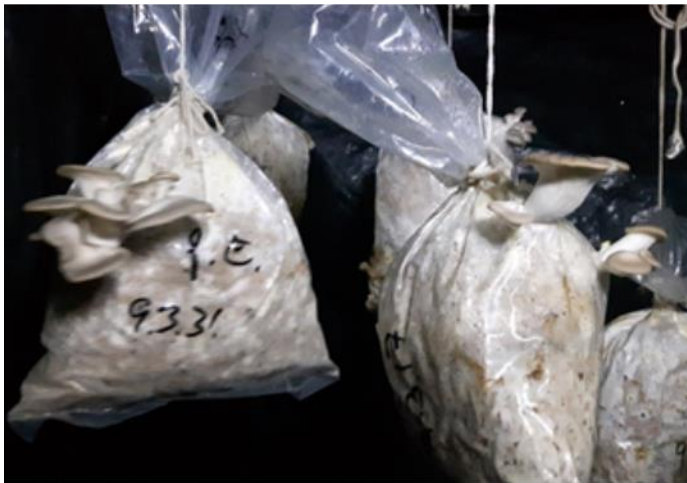
- Sustainable management of Namibia forested land (NAFOLA) PROJECT.
- MAWF-GIZ Bush Control and Biomass Utilisation (BCBU) Project (former Support to the De-Bushing Project)
- Debushing Advisory Service (DAS)
- Namibia Biomass Industry Group (N-BiG)
- Namibia Biomass Green Gold Processing
- FARM4TRADE



giz



“Sustainable use of invasive bush biomass for animal feed in synergy with mushroom production: A strategic approach in Namibia”



Background

- In the initial phase milled bush and pruned bush were analysed for nutritional content
- Pruned bush contained much more CP than milled bush
- It was understood then that it was due to the branch size
- Advise: Separation and selection of small branches $d < 5\text{cm}$
- The nutritional quality of the feed increased but woodchips started to pile up at many farms
- Lack of reliable conservation method was identified as a major challenge by many surveyed farmers



Background: Facts



- Use of SSF to improve the nutrient content of feeds (reduce lignin, ANFs etc.)
- Use of mushroom production to improve the nutritional content of low quality roughages (straws, stovers, bamboo tops..)
- Use of mushrooms to produce low quality feed from wood (Japan)
- Growth of mushrooms on acacia wood
- Use of silage as conservation methods for acacia shrubs in other African countries
- Ensilaging of bushfeed by a commercial farmer using a packaging machine



Outputs

- To promote the dual approach bush-to-feed mushroom production at communal and commercial farms
- To promote the use of wood for already existing commercial mushroom producers
- To promote the use of silage as an alternative to pelletizing and drying
- To promote the role of mushrooms in food security

Achievable by sharing results, workshops, manuals and trainings

Conclusions

As a research, educational institution and innovation hub the main roles of UNAM in the bush value chain addition industry could be:

- Provide expertise
- Generate and provide valuable data (baseline, feasibility study)
- Optimisation → understand the problems and use simple applied research to solve the problems
- Capacity building (students, farmers, entrepreneurs, institutions, etc.)

Thanks for your attention!

