

# BOOK OF ABSTRACTS

## FEMOZ INTERNATIONAL CONFERENCE ON RURAL FOOD ENVIRONMENTS

### *Challenges For Achieving Greater Food and Nutrition Security in the Context of Climate Change*

14 and 15 February 2024  
Complexo Pedagógico 1,  
Eduardo Mondlane University,  
Maputo, Mozambique



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# FEMOZ INTERNATIONAL CONFERENCE ON RURAL FOOD ENVIRONMENTS

## *Challenges For Achieving Greater Food And Nutrition Security In The Context Of Climate Change*

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This international conference was organised by the FEMOZ project consortium - **Strengthening the Resilience of Rural Food Environments in the Context of Disasters and Climate Change in Mozambique**, constituted by the following institutions: **Eduardo Mondlane University (UEM)**, **TH Köln - University of Applied Sciences** - and the **Frankenförder Forschungsgesellschaft (FFG)**.

FEMOZ is an applied, interdisciplinary research project assessing food environments and food and nutrition challenges in Mozambique since 2021.

The conference was organised into **five thematic sessions**. Each session focused on specific topics and presented diversity in the form of presentations, panel discussions, and posters, among others.

### **Sessions:**

1. Rural food environments: theories, concepts and methodological approaches
2. Rural livelihoods: resilience and food security in the context of disaster risk
3. Strengthening food environments: policy, governance and academy
4. Neglected or Underutilised Crop Species (NUS) for food and nutrition security
5. Poster session: food environment networks and current research projects.

For more information on FEMOZ please visit **[www.femoz.de](http://www.femoz.de)**

## Key Note Speakers

**Dr Christopher TURNER:** Food Systems and Nutrition Lead, Food Systems Research Group  
Co-manager and Academy Lead, UK Food Systems Centre for Doctoral Training  
Food and Markets Department, Natural Resources Institute, University of Greenwich

**Prof. Dr Alexander FEKETE:** Professor of Risk and Crisis Management at TH Köln- University of Applied Sciences, Germany

**Prof. Dr Amos LAAR:** Professor of Public Health Nutrition in the Department of Population, Family and Reproductive Health, University of Ghana, Accra, Ghana

**Dr Irmgard JORDAN:** Senior Researcher at the Alliance Bioversity International and CIAT (Kenya)  
Senior Researcher at the Center for International Development and Environmental Research, University of Giessen, Germany

**Prof. Dr Fátima Portilho:** Associate Professor DIII of CPDA (Postgraduate Program in Social Sciences in Development, Agriculture and Society at the Rural Federal University of Rio de Janeiro  
Coordinator of The Consumer Studies Group

## Authors and Presenters

MSc. Adérito Machava, Eduardo Mondlane University – UEM (Mozambique)

Dr Rui Pedroso, TH Köln- University of Applied Sciences (Germany)

Prof. Dr Samuel Quive, Eduardo Mondlane University – UEM (Mozambique)

MSc. Christine Bohn, Frankenförder Forschungsgesellschaft – FFG (Germany)

Prof. Dr Luís Artur, Eduardo Mondlane University – UEM (Mozambique)

Dr Fanen Terdoo, Federal University Dutsin-Ma (Nigeria)

Dr Judith Henze, Dr Silke Stöber, Mr. Raphael Ballerio, Humboldt University Berlin, Centre for Rural Development - SLE (Germany)

MSc. Wolfram Lange, TH Köln- University of Applied Sciences (Germany) / TerraGIS Estudos Socioambientais Ltda. (Brazil)

Dr Karin Fiege, TH Köln- University of Applied Sciences (Germany)

Prof. Dr Samuel Quive, Eduardo Mondlane University – UEM (Mozambique)

BSc. Cláudia Lopes, Mozambican Government Technical Secretariat for Food Security and Nutrition – SETSAN (Mozambique)

Dr Custódio Matável, Eduardo Mondlane University – UEM (Mozambique)

Dr Máriam Abbas, The Rural Environment Observatory – OMR (Mozambique)

Mr. Robert Doulkom, Humboldt University Berlin, Centre for Rural Development - SLE (Germany)

MSc. Luisa Chicamisse Mutisse, Eduardo Mondlane University – UEM (Mozambique)

MSc. Ivo Cumbana, Eduardo Mondlane University – UEM (Mozambique)

## Poster Contributions

MSc. Christine Bohn, Frankenförder Forschungsgesellschaft – FFG (Germany)

MSc. Yamile Villafani, TH Köln- University of Applied Sciences (Germany)

MSc. Jakob Herrmann, MSc. Matias Júnior, MSc. Alberto Luis, Dr Sebastiao Famba, Weltweit - Society for the Promotion of Local Initiatives (Germany), Maputo City Council/Department of Agriculture, Fisheries, Livestock and Extension (Mozambique), Association for Sustainable Development - ABIODES (Mozambique), Eduardo Mondlane University – UEM (Mozambique)

Dr Horácio Maluvane, Eduardo Mondlane University – UEM (Mozambique)

MSc. Esselina Fuel, Prof. Dr Valera Dias, Eduardo Mondlane University – UEM (Mozambique)

Dr Sandra Chemane, Eduardo Mondlane University – UEM (Mozambique)

Dr Karin Fiege, MSc. Christine Bohn, Prof. Dr Samuel Quive, TH Köln- University of Applied Sciences (Germany), Frankenfoerder Forschungsgesellschaft – FFG (Germany), Eduardo Mondlane University – UEM (Mozambique)

MSc. Natacha Morais, Nações Unidas – UNHabitat (Mozambique)

MSc. Sven Wöhrle, Prof. Dr Gernot Heisenberg TH Köln- University of Applied Sciences (Germany)

Dr Rui Pedroso, TH Köln- University of Applied Sciences (Germany)





## STRENGTHENING THE RESILIENCE OF RURAL FOOD ENVIRONMENTS IN THE CONTEXT OF DISASTER RISK AND CLIMATE CHANGE IN MOZAMBIQUE

The FEMOZ project aims at strengthening the resilience of rural food environments in the context of disaster risk and climate change in Mozambique.

The “Food Environment” mediates the interactions between consumers and markets and influences consumer’s decisions. FEMOZ food environment conceptual framework consists of an external domain (including the dimensions of food availability, prices, markets and product’s properties, marketing, and regulation) and a personal domain (including accessibility, affordability, convenience, and desirability). Both external and personal domains are considered in the context of disaster risks and climate change (CC).

**FEMOZ’s objectives address the measurement of these different dimensions of the food environment in the different target regions of the project, contributing to evaluating how potential rural development interventions for increasing agricultural production, rising incomes, or reducing food prices would ultimately and effectively reflect on the population’s diets and nutrition.**

**FEMOZ’s objectives also target the creation of change in the food environment through awareness and knowledge formation around good practices in the different dimensions of the food environment and further changes in behavior, practices, and performances for improving food security and nutrition (FSN).**

For this purpose, FEMOZ proposes the establishment of an innovative “Living Lab” long-term R&D infrastructure, including a “Science-Policy-Society Interface (SPSI)” and a “Capacity Development Hub (CDH)”. With this approach, FEMOZ ensures that co-research in the Living Lab on the different dimensions of the food environment is up-scaled, out-scaled, and deep-scaled from the outset. The project will translate research findings into action, capacitating stakeholders, and disseminating best practices for enhancing food environments in targeted rural settings.

**For more information, please visit: [www.femoz.de](http://www.femoz.de)**

## ***SESSION 1: Rural food environments: theories, concepts and methodological approach***

Food environments play a crucial role in the food system and are a cornerstone of any policy intervention aimed at improving the food and nutrition security of the population concerned. The ways in which the food environment is related to the broader food system and its links to more sustainable diets and food security are some of the research questions that require innovative food environment concepts and effective measurement tools. Most concepts and tools for analysing food environments were initially developed for High Income Countries (HICs), with very few applications designed for Low- and Middle-Income Countries (LMICs). This is even more pertinent when considering rural food environments in LMICs. In the latter context, we typically see natural food environments (including wild and cultivated) and informal food environments, such as open-air farmers' markets and street vendors. The characteristics of these food environments are different from those of formal food environments such as supermarkets, shops, or restaurants, which are much more prevalent in HICs.

Food environments can be described according to several dimensions. Some of these are external to consumers, namely: (i) availability of food products, i.e., formal and informal markets or various natural (wild) food sources; (ii) dynamics/volatility of food prices; (iii) types of markets or sellers, and the diversity and specificities of the foods they provide; (iv) policies and regulations of markets and food safety and hygiene. These dimensions are interrelated with other dimensions of the food environment that are more in the personal domain of consumers, such as (v) physical accessibility to food, e.g., distance to food sources, travel time and transport possibilities, etc. All these dimensions collectively shape the individual ability to purchase food; (vi) Affordability, which is determined by food prices, their volatility, local food availability, impacts of natural disasters, as well as international price fluctuation and other global factors. Two other important dimensions of the personal domain for the analysis of food environments are (vii) convenience and (viii) desirability. The factors defining the latter two dimensions in the rural LMIC context are expected to be quite different from the known factors in HICs. The analysis and measurement of the latter dimensions are undoubtedly a challenge.

# Food environment research: key concepts and methodological approaches

Dr Christopher Turner

Natural Resources Institute, University of Greenwich, United Kingdom

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## Abstract

Recent years have seen a growing global interest in food environments in response to the need to improve dietary, nutrition and health outcomes. In low- and middle-income countries, food environments have become a focal point within public health nutrition research as transitioning dietary and lifestyle patterns are fuelling a double burden of malnutrition characterised by persistent undernutrition, micronutrient deficiencies, and the increasing prevalence of overweight, obesity, and diet-related non-communicable diseases. Food environments are a key interface within the food system where people acquire and consume foods. They include a range of diverse food sources, from formal and informal market-based vendors to various forms of rural, peri-urban, and urban cultivation, wild food harvesting and food transfers.

The globally applicable conceptual framework developed by Turner et al., (2018) and the Agriculture Nutrition and Health Academy – Food Environment Working Group draws from a socio-ecological approach to map a series of key food environment domains and dimensions that shape food acquisition and consumption practices. External dimensions of food environments include food availability, prices, vendor and product properties, as well as marketing and regulation policies. At the individual level, personal dimensions include dimensions of food accessibility, affordability, desirability, and convenience. Since publication, the framework has informed several systematic literature reviews, research programmes, and projects, and has also seen wider adaptation and uptake (e.g. Raza et al., 2020; Constantinides et al., 2021; O'Meara et al., 2021).

Food environment research is evolving rapidly as emerging concepts are increasingly operationalised into methods and metrics that are being applied and tested across diverse settings. 'People centric' methods, focusing on perceptions and lived experiences of food environments, have become popular in recent years (Neve et al., 2021). Methods such as participatory forms of photography (Turner et al., 2023) and mapping offer innovative approaches to capturing the ways in which people interact with their food environment as part of their daily lives and activities. Going forward, the food environment research community should collectively seek to build a robust research agenda through the harmonization of key concepts, as well as the development of integrated mixed method approaches capable of capturing the complex multi-scalar, contextual and temporal realities of food acquisition and consumption practices.

## Teoria das Práticas Sociais e segurança alimentar

Fátima Portilho

Programa de Pós-Graduação de Ciências Sociais em Desenvolvimento, Agricultura e Sociedade da Universidade Federal Rural do Rio de Janeiro.

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### Resumo

A apresentação tem como objetivo apresentar contribuições teórico-metodológicas da Teoria das Práticas Sociais para o estudo dos ambientes alimentares. As práticas envolvem dizeres e fazeres, conectados a partir de significados (crenças, normas culturais), materialidades (objetos, tecnologias, recursos financeiros) e competências (saber-fazer, habilidades). Mudanças nas práticas ocorrem por meio de políticas e intervenções que alteram estes elementos. As práticas emergem, persistem, mudam e desaparecem quando as conexões entre eles são feitas, sustentadas ou quebradas, ou quando surgem novos elementos. Trata-se de abordagem situada, que toma a prática como unidade de análise, rejeitando a primazia individual e a ação reflexiva. As práticas alimentares são compostas por outras práticas (planejar, adquirir alimentos, higienizar, comer, lavar a louça e reaproveitar ou descartar as sobras) formando um conjunto arranjado de práticas. E estão conectadas a outras práticas, gerando uma relação de coexistência e codependência com práticas que acontecem no ambiente doméstico (trabalhar, cuidar) e fora do ambiente doméstico (práticas agrícolas, industriais, comerciais, políticas públicas, transportes). Esta abordagem permite analisar a interseção entre a microescala dos fazeres mundanos e a macro escala da produção e abastecimento alimentar. A Teoria das Práticas tem sido usada para estudar as práticas alimentares em si, mas também suas transformações e os processos de normalização de novas práticas (mudanças sociais). Do ponto de vista metodológico, utiliza ferramentas convencionais de pesquisa em Ciências Sociais, porém orientadas para a prática (com foco na descrição). Esta abordagem pode contribuir para iluminar aspectos negligenciados em estudos convencionais, possibilitando estudos comparados.



# Caracterização Descritiva e Qualitativa dos Ambientes Alimentares em Moçambique

Adérito Júlio Machava

Universidade Eduardo Mondlane (UEM)

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## Resumo

Esta apresentação faz uma caracterização qualitativa dos Ambientes Alimentares rurais de Moçambique. Moçambique é um país de baixa renda e os seus ambientes alimentares possuem características particulares diferentes do norte global, daí ser importante fazer sua caracterização.

A pesquisa que informa esta apresentação assenta no modelo de Downs (2020) que identifica duas tipologias dos Ambientes Alimentares nomeadamente, os naturais e os construídos. Este modelo mostra-se adequado para compreender as dinâmicas e especificidades dos Ambientes Alimentares, pois os dois tipos coexistem nos mesmos contextos.

O estudo adoptou uma abordagem qualitativa e foi levada a cabo nos distritos de Moamba, Búzi e Ribáuè nos meses de Março e Abril de 2023. A amostra foi composta por 120 indivíduos (homens e mulheres) seleccionados aleatoriamente de acordo com critérios pré-definidos de inclusão/exclusão. Foram realizados 10 grupos focais em 10 Postos Administrativos (4 em Moamba, 3 no Búzi e 3 em Ribáuè). Por fim, fez-se o mapeamento e o georeferenciamento das tipologias dos Ambientes Alimentares construídos identificados no estudo. A pesquisa destacou, nos ambientes alimentares naturais silvestres, o mato, mar, rios e lagos. Nos ambientes alimentares naturais cultivados, o enfoque foi a machamba. Relativamente aos Ambientes Alimentares construídos informais, destacaram-se os mercadinhos e banquinhas. Nos construídos formais, o enfoque foi para os mercados e lojas/cantinas.

A apresentação conclui com a seguinte questão: até que ponto o estágio de desenvolvimento dos diferentes Ambientes Alimentares e as suas complexas interações contribui para a promoção de dietas saudáveis e sustentáveis?

**Palavras-chave:** Ambiente Alimentar; Tipologia dos Ambientes Alimentares

# Food environments in Mozambique: a new classification metric

Dr Rui Pedroso

TH Köln- University of Applied Sciences

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## Abstract

Food environments play a crucial role for shaping healthy and sustainable diets. The evaluation of food environments has recently experienced considerable methodological advances and metric developments. These have been more focused on HMICs and many do not apply to the realities of LMICs without strong adaptations. This study develops a new metric for food environment's evaluation encompassing different accepted dimensions. Data on several dimensions of constructed and natural food environments were collected using surveys, focal group discussions, and GIS methods. Known indicators for the dimensions were derived and adapted to the realities of LMIC. We have used a joint graphical representation for the different dimensions of the food environment called the spider-plot, from which the proposed overall Food Environment Score was derived. This new metric was applied in Mozambique, in the Ribáuè district. The results show how different food environments can jointly be visually and quantitatively characterized according to the different selected dimensions. Problems in Ribáuè were easily identified, allowing a discussion on which interventions are needed to improve weaker dimensions. The developed methodology is an important improvement in the synthetization of information for policy makers for the effective design of successful policy interventions towards improving food environments.

# “Entre o comer para viver e o comer para morrer” : Os desafios da Segurança Alimentar e Nutricional em Moçambique

Samuel Quive, Ivo Cumbana, Luisa Chicamisse Mutisse e Adérito Machava

Universidade Eduardo Mondlane (UEM)

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## Resumo

O presente artigo, baseado em revisão bibliográfica, tem como objectivo analisar os desafios para a Segurança alimentar e nutricional em Moçambique no contexto de transformações nos sistemas alimentares. Os resultados indicam que Moçambique enfrenta um triplo fardo da desnutrição que resulta, por um lado, da existência de famílias que não têm o que comer, alimentando-se do que existe e quando existe sem poder de escolha e, por outro, de famílias que tendo disponibilidade e acesso aos alimentos, praticam uma alimentação não saudável (consumo excessivo/superconsumo). Esta situação é determinada pela condição económica e social em que as famílias se encontram como também por questões culturais e políticas que influenciam os hábitos alimentares das famílias. O estudo concluiu que o acto de comer além de ser um acto biológico ele assume significados sociais, culturais, espirituais e económicos e políticos que contribuem para o triplo fardo da desnutrição. O acto de comer expressa tanto riqueza quanto pobreza no sentido em que os indivíduos que têm o suficiente para comer fazem-no de forma inapropriada influenciados pelos maus hábitos alimentares comendo para morrer. Por outro, há indivíduos, que expostos à exclusão social, pobreza e dependência socioeconómica, têm limitações na disponibilidade e acesso aos alimentos, comendo essencialmente para viver.

**Palavras-chave:** Segurança alimentar e nutricional, Sistemas alimentares, Ambientes alimentares, Triplo fardo da desnutrição e Hábitos alimentares.

# The influence of food desirability and convenience on diet: Examples from the Districts of Moamba, Búzi and Ribáuè

Christine Bohn

Frankenförder Forschungsgesellschaft - FFG)

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## Background

Most of the Mozambican labour force work in agriculture and most of the rural population lives below the poverty line. The quality of their diet is often poor. Studies in sub-Saharan African countries show that in addition to self-production, a large proportion of food comes from the purchase of processed products, also in areas far from urban centres. These processed foods include ultra-processed foods, which are associated with health risks.

## Purpose and aim

In the context of the conceptual framework of food environments (Turner et al., 2018), the presentation shows the results of the analysis of two personal dimensions that influence the decisions on the food purchase: the desirability of food, including among others individual preferences, tastes, desires, attitudes, and the convenience of the food purchase, preparation and consumption.

## Methods

The study was designed as an exploratory investigation, as there is little literature on convenience and desirability of foods in Mozambique. Two types of semi-structured interviews were carried out and expert interviews were held in the three study Districts, complemented by an observational analysis of markets and food shops. Some further in-depth expert interviews and focus group discussions were held in the Moamba district.

## Results

Different quality problems of foods affect their taste and smell and eventually the food safety. The food prices, the taste and desires, and health-related topics (variety in the diet, nutritional or medicinal value of food and avoiding illness) are important food purchasing criteria. Several local strategies for saving time and effort when preparing food exist, including selecting quality and easy to prepare products at the time of purchase, preparing quick dishes, eventually including processed products, preparing larger quantities, and reserving them for the next meal, replacing some meals with convenience foods and a purchasing behaviour according to the possibilities of transporting, preserving and storing of food.

## Conclusions

The quality problems of food products sold on local markets and in food shops reduce their desirability. Due to these problems and the hygiene and food safety limitations, the local markets and food shops only partly promote healthy and nutritious food. As a result, the uniform quality and controlled safety contribute to favour the purchase of processed foods. There are changes taking place in eating habits through the tastes and desires of children and young people. Although health-related topics influence the food purchase of some consumers, more financial possibilities do not necessarily lead to better diet but might favour the consumption of highly processed unhealthy foods. In small markets, access to fresh food is limited due to the distances involved, as fresh food is usually bought nearby on a daily basis due to a lack of preservation options. The quality problems of fresh food also reduce the convenience in food preparation including the more time-consuming cleaning of vegetables or longer cooking times for poorer quality products. Furthermore, packaged convenience products are attractive due to their ease of storage and transport. There is a large local presence and frequent consumption of cheap and unhealthy convenience products with low nutritional value, but consumption of more expensive convenience products is low. Convenience products such as biscuits and juice usually replace cooked meals.

## ***SESSION 2: Rural livelihoods: resilience and food security in the context of disaster risk***

Session 2 addresses food security and disaster risks for rural smallholder households. It looks at the impact of climate change and discusses measures to strengthen the resilience of rural households. What local strategies are in place for disaster preparedness? How farmers manage disaster risks, and how they cope with the negative impacts of climate change on their livelihoods and food and nutrition security. What are the most promising measures to promote food and nutrition security seen in the context of natural disasters? The discussion should consider different types of disasters, such as floods, droughts, cyclones, and fires, review the impacts in a context of varying degrees of vulnerability in rural areas, and consider the specific situation of female- or child-headed households, refugees, displaced persons, and others.

The range of possible responses will differ according to the rural households' socio-economic situation. Intervention measures should be targeted and adapted to the specific needs of vulnerable groups.



## Multi-risks of food security and natural hazards - daily and annual relevance

Riscos múltiplos de segurança alimentar e perigos naturais - relevância diária e anual

**Alexander Fekete**

Institute for Rescue Engineering and Hazard Prevention, Faculty of Plant, Energy and Machine Systems, TH Köln–University of Applied Sciences, 50968 Cologne, Germany

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### Abstract

Mozambique faces multiple risks related to food security and natural hazards. However, their interrelations are still not analyzed in sufficient depth. The purpose of the study is to identify how these topics and interrelations have been covered by scientific studies. This can help to identify gaps and indicate further research areas. Bibliometric analysis is selected as a method since it is a standard scientific approach to analyze scientific publications in a systematic way. Databases are analyzed using standardized text search strings and the tool VOSviewer is utilized to cluster keyword co-occurrences. The results show that research foci on natural hazards for food security are not integrated. Under the focal problem of disaster certain hazards such as climate change, floods and cyclones are most prominent and are also connected to demographic and other social variables. Food Security finds more studies on droughts, sustainable development and other human and social conditions. Resilience as an upcoming research paradigm is covered less by comparison. As a conclusion the existing scientific research is not connecting daily risks such as diseases or food security with natural hazards or resilience enough. This does not represent grey literature and the wealth of studies from non-scientific publications. But it indicates further research needs for interlinkages of multiple risks of which Mozambique is a paramount example. The method provided is also applied to generate a framework for connecting multiple risk of food security and natural hazards.

# Insegurança alimentar no meio da abundância: o caso do distrito de Moamba em Moçambique

Luís Artur

Universidade Eduardo Mondlane

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## Resumo

A Insegurança alimentar é um problema que abrange milhões de pessoas em todo o mundo com particular realce para países em desenvolvimento como Moçambique. Muitos destes países tem um grande potencial agrário e implementam várias políticas visando erradicar a pobreza e insegurança alimentar. Este artigo aborda a questão de segurança alimentar no distrito de Moamba, localizado a cerca de 75 km da cidade de Maputo que apresenta um grande potencial agrário. Atravessado por dois rios permanentes e com cerca de 220,000ha de terra arável, Moamba tem sido palco de vários investimentos agrários nacionais e internacionais e um foco preferencial de políticas públicas nacionais. Baseado em pesquisa realizada em 2022, que incluiu a análise de dados secundários, inquéritos a 460 agregados familiares, entrevistas semi-estruturadas e informais à 24 informantes-chave e visitas e observações em 6 mercados e locais de transação, os resultados da pesquisa mostram que, apesar do potencial do distrito e dos investimentos feitos, a insegurança alimentar ainda é uma preocupação. No geral, os agregados familiares têm baixa diversidade de dieta, cerca de 50% tiveram dificuldades em pelo menos 1 dia da semana para conseguir se alimentar e muitas famílias recorrem a estratégias de sobrevivência para garantir a alimentação base do dia. As análises efectuadas mostram que a insegurança alimentar deriva sobretudo do facto de que os investimentos são maioritariamente virados a culturas de rendimento- para alimentar cidades em Moçambique e na Africa do Sul, do que culturas alimentares para segurança alimentar local, e são praticadas por uma minoria deixando a maior parte da população ainda com modelos de produção tradicionais de baixo rendimento. Por outro, as culturas de rendimento sofrem de sazonalidade e competição de mercados e preços e, de eventos climáticos extremos o que se traduz, em muitos casos, em poucos ganhos para suprir as necessidades alimentares e garantir contínuo investimento na produção e no bem-estar. A pesquisa recomenda que haja uma visão mais holística e balanceada entre o comercial e o alimentar e entre os investidores externos e os locais.

**Palavras-chave:** Moamba, insegurança alimentar, culturas alimentares, culturais de rendimento, investimentos

# Nature-Based Solutions (NbSs) Enhance Urban Households' Food Diversity and Nutrition in Northern Nigeria

Fanen Terdoo<sup>1</sup>, Bala Dogo<sup>2</sup> and Bolanle Joel Ajibuah<sup>3</sup>

<sup>1</sup> Department of Geography, Federal University Dutsin-Ma, Katsina State, Nigeria.

<sup>2</sup> Department of Geography, Kaduna State University, Kaduna, Nigeria

<sup>3</sup> Department of Geography, Nigerian Defence Academy, Kaduna, Nigeria

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## Abstract

Soil salinization is a threat to global agriculture and food security. Various important agricultural production systems of Eastern and Southern African (ESA), including Mozambique, are affected, not only in coastal but also in (semi-)arid inland environments. Several national policy strategies on Agriculture and Climate Change acknowledge soil salinity as a considerable constraint. However, sufficient scientific knowledge and practical experience on the problem, and hence a clear action strategy, are still lacking in Mozambique and the ESA region. Starting in 2020, Weltweit e.V. along with a consortium of Mozambican research institutions, farmer associations, agricultural extension bodies and non-governmental organisations commenced to address this gap. We established a local knowledge base on Saline Agriculture (SA), a versatile toolbox of agricultural practices, which have the potential to sustain agricultural production under saline conditions and reverses salinization through soil remediation processes. As of 2023, we started to regionally scale our efforts under the ESA Saline Agriculture Network initiative. The main objectives are: (1) promotion of applied research on SA, (2) establishing the extend of salinity impact through studies and scoping missions, (3) publication of scientific output and information material, (4) promotion of knowledge exchange between stakeholders through workshops and excursions, (5) facilitating links to international SA networks, and (6) awareness raising and advocacy for policy and donor support. The presented poster gives an overview of previous achievements and current efforts of the initiative, intending to increase awareness and attract further strategic partners for rendering Mozambican and ESA agriculture more climate resilient.

# Vulnerability and Climate Risk Assessment for Búzi and Moamba districts - Levantamento de Risco Climático e Vulnerabilidade em Moamba e Búzi

Wolfram Lange

TerraGIS Estudos Socioambientais Ltda

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## Abstract

The study is based on the conceptual framework of the Intergovernmental Panel for climate Change (IPCC 2022[1]) which defines vulnerability as the propensity or predisposition to be adversely affected. Vulnerability encompasses the two elements of sensitivity and the capacity to cope and adapt: Sensitivity is determined by those factors that directly affect the consequences of a threat. Sensitivity can include physical attributes of a system, social, economic, and cultural attributes. Capacity in the context of climate risk analyses refers to the ability of societies and communities to prepare for and respond to current and future climate impacts.

Qualitative research methods have been applied for identifying the vulnerability factors (semi structured interviews with stakeholders), the elaboration of Climate Impact Chains and the identification of potential vulnerability indicators.

The results show the factors that contribute to the vulnerability of climate change impacts and suggests a set of indicators to measure the vulnerability in the districts of Búzi and Moamba regarding floods and droughts respectively.

# Household resilience in rural food environments in the context of climate change: the case of the Districts of Moamba, Búzi and Ribaué in Mozambique

Dr Rui Pedroso

TH Köln- University of Applied Sciences

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## Abstract

Resilience is captured by a set of capacities that enable households and communities to effectively function in the face of shocks and stresses and still meet well-being outcomes. The study aims at providing partners and stakeholders in Mozambique with insights into factors that strengthen household and community resilience. In particular, the research calculates: (1) shock exposure and resilience capacity indexes (absorptive, adaptive, and transformative); (2) examines the factors/components of the resilience capacities; (3) compares the resilience index results with indicators of well-being outcomes. The study took place in the districts of Ribáuè, Búzi, and Moamba. We utilized a population-based household survey and an accompanying community survey to collect the needed data. Resilience capacity indexes are generated using Principal Component Analysis. The results show similar types of shocks for the districts of Ribáuè and Búzi, floods and strong winds and as well scarce rains and even drought. For Moamba the main shocks are scarce rains/droughts, and sharp increases in prices and unemployment of young people. It could be shown that Búzi is the district that shows highest, and Ribáuè the one that shows the lowest resilience capacities. The results can serve as the foundation for an evidence base improving resilience programming.



## ***SESSION 3: Strengthening food environments: policy, governance and academy***

Coherent government policies, inter-institutional coordination, adequate implementation of national strategies at the local level, and promotion of professional capacities to design policies and monitor impacts are key elements when it comes to resilient food environments. This session will address the requirements of national food policies and the challenges involved in operationalising and implementing them. Harmonising food policies across different sectors and public institutions (e.g., agriculture, health, education environment and human welfare) is one of the most demanding tasks in terms of policy actions and their successful implementation. Therefore, it is essential here to adopt approaches and instruments to benchmark the implementation of policies that affect food environments and prioritise actions.

A particular challenge for policy and action formulation involves understanding the relationship between food environments, climate change and disaster risk. Given the increasing task of adapting food environments to climate change, combining the two policy fields seems vital. Higher education can anticipate and help by training experts capable of understanding the two policy fields and serving as a facilitator between them. Furthermore, research should focus on measuring the impact of climate change and disaster risk on food environments and vice versa.

This session focuses on implementing food policies in different domains for improving food environments in Mozambique, taking into account the different regional and international experiences, which will allow observing the complementarities of these policies, including their dysfunctionality.

## Food and Nutrition Politics: Evidences and Challenges

### Results of an analysis of strategies and multi-sectoral plans based on the Food Environment Policy Index

Prof. Doutor Samuel Quive<sup>1</sup>, Doutora Karin Fiege<sup>2</sup>, Mestre Christine Bohn<sup>3</sup>

<sup>1</sup> Universidade Eduardo Mondlane

<sup>2</sup> TH Köln - Universidade de Ciências Aplicadas da Colônia

<sup>3</sup> Frankenförder Forschungsgesellschaft – FFG

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#### Background

Efforts to combat malnutrition over the last 20 years have not yet led to a significant reduction in the high level of malnutrition in Mozambique (32.7 per cent). At the same time, there has been a rapid increase in Non-Communicable Chronic Diseases (NCDs), an impact of the expansion of consumption patterns and unhealthy lifestyles. Both developments require urgent and preventive political interventions.

#### Purpose and aim

Policy plays a key role in promoting healthy food environments. It should guide the different sectors involved in food and nutrition such as agriculture, economy, health, education etc., formulate targets and regulations, strengthen data collection and studies for the creation of an evidence base, introduce monitoring and evaluation systems of FNS actions, harmonise different sectorial policies, objectives and processes between industry, government and civil society. Policy interventions in the food system are demanding and their impacts should be analysed systematically to promote evidence-based Food and Nutrition policies.

#### Methods

The Healthy Food Environment Policy Index (Food-EPI), developed in 2014 by the International Network for Food and Obesity/NCDs Research, Monitoring and Action Support (INFORMAS), represents a tool to assess the degree of implementation of public policies and support structures for the creation of healthy food environments. In the scientific discussion it is seen as one of the rare instruments which systematically analyses the progress of food policies on the level of transparent and high-quality indicators. The FEMOZ group reviewed and applied the tool to the reality in Mozambique and elaborated an evidence base study for 14 dimensions. This study was evaluated together with experts in the field and policy needs are to be prioritized.

#### Results

Mozambique has strategies and programmes in place to tackle nutritional problems with a multi-sectoral approach. However, the implementation of the programmes faces numerous problems: the high dependence on external financing partners, the lack of monitoring, differing and sometimes contradictory sector policies are just some of them. Above all, the issue of NCDs is not yet on the political agenda and the fight against malnutrition does not translate into the promotion of healthy eating.

#### Conclusions

The analysis based on the Food EPI provided a good and systematic overview of political approaches, their implementation, the actors involved and the challenges. The methodology enables political exchange between different stakeholders and thus - in a further step - also the prioritisation of policy measures.

# Inovações tecnológicas como forma de melhorar a segurança alimentar nas zonas rurais: oportunidades e desafios

Custódio Efraim Matavel

Faculdade de Ciências Agrárias, Universidade Lúrio (Unilúrio), Niassa, Mozambique

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## Resumo

Em muitas partes do mundo em desenvolvimento, incluindo a África Subsaariana, a persistência do uso de técnicas agrícolas rudimentares continua a ser um fenômeno comum. Esta realidade não apenas dificulta o desenvolvimento econômico, mas também exerce um impacto negativo significativo sobre a segurança alimentar e nutricional. Isso ocorre devido à associação entre as técnicas e tecnologias tradicionais de produção, transformação e conservação de alimentos e os níveis frequentemente baixos de produtividade. Este estudo dedica-se a abordar uma área de pesquisa que frequentemente é negligenciada e adota uma abordagem de pesquisa-ação para avaliar diversas opções tecnológicas para o processamento e preservação de alimentos no distrito de Gurue, em Moçambique. Para isso, foram analisados os impactos das intervenções específicas, tais como sistemas de secagem solar indireta e fogões melhorados produzidos localmente, em combinação com dois sistemas diferentes de retenção de calor. A análise concentrou-se nos efeitos dessas intervenções sobre a segurança alimentar e nutricional, além de abordar as oportunidades e desafios inerentes à sua implementação. Os resultados do estudo demonstram que as tecnologias testadas exercem um impacto positivo significativo sobre a segurança alimentar. Entretanto, persistem desafios quanto à adoção dessas tecnologias pelas comunidades, principalmente devido à falta de atividades de acompanhamento de longo prazo.

**Palavras-chave:** Segurança Alimentar; Energias Renováveis; Desenvolvimento Rural; Transferência de Tecnologias.

## **Caminhos para a Segurança Alimentar num Contexto de Mudanças Climáticas: Que abordagens para informar políticas?**

**Máriam Abbas**

Observatório do Meio Rural

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### **Resumo**

A insegurança alimentar constitui um dos maiores desafios dos países em desenvolvimento. Moçambique encontra-se entre os 12 países com maiores índices de fome no mundo, estando também entre os 30 países no mundo mais vulneráveis às mudanças climáticas, e menos preparados para lidar com os seus impactos. Espera-se que a população rural, em particular, os pequenos agricultores, sejam desproporcionalmente afectados pelas mudanças climáticas, com impactos severos sobre os seus meios de subsistência e sobre a segurança alimentar. A elevada vulnerabilidade do país e da sua população, está relacionada, dentre outros factores, com factores socioeconómicos, resultantes de modelos de desenvolvimento e políticas públicas desajustadas. Desta forma, este texto, tem como objectivo apresentar abordagens alternativas, que reconheçam e considerem a diversidade regional (ecológica, demográfica e de sistemas de produção) para analisar o impacto das mudanças climáticas na segurança alimentar, de modo a fornecer informações relevantes para a formulação e desenho de políticas que sejam ajustadas ao contexto local e que satisfaçam os interesses e necessidades das populações mais vulneráveis. Com base nas abordagens propostas, foi possível identificar as regiões e/ou sistemas de produção que serão mais impactados num contexto de mudanças climáticas, com impactos consideráveis sobre os meios de subsistência, biodiversidade e insegurança alimentar. Estas abordagens permitem identificar regiões com características e problemas similares, o que permite o desenho de políticas adequadas e ajustadas a cada contexto, em oposição ao cenário actual de one-size-fits-all policies.

## ***SESSION 4: Neglected or Underutilized Crop Species (NUS) for food and nutrition security***

Mozambique has faced major challenges related to ensuring Food and Nutrition Security (FNS). The causes are multidimensional, highlighting the poor agricultural production and productivity, aggravated by the increasing amount and scale of extreme climate phenomena that affect a considerable part of more than 70% of the population whose main source of subsistence is agriculture. International research emphasises the role of wild crops, known as Neglected or Underutilized Crop Species (NUS). Resistant to the effects of climate change, these wild crops are seen as an alternative food source as they contain vitamins and micronutrients crucial for the development of the human body.

However, studies on NUS in Mozambique are still limited and far between. The recommendations of the existing studies have not yet been implemented at a level to measure their impact on the level of FNS in the population. The main objective of Session 4 is to stimulate debate on the feasibility of the promotion, commercialisation and consumption of NUS, considering their socio-cultural, economic, environmental, medicinal and nutritional value.

To this end, academics, researchers, processors/traders of NUS, and the general public are invited to attend the conference for a shared reflection on the potential role of NUS and the challenges to the stabilisation of FNS, particularly in a context where food sources are negatively influenced by climate change and natural disasters.



# O papel das Plantas Alimentícias Não Convencionais (PANCs) na segurança alimentar rural

Título da Apresentação: PANC no Brasil

Fátima Portilho<sup>1</sup> e Rebeca Leandro

<sup>1</sup> CPDA: Programa de Pós-Graduação de Ciências Sociais em Desenvolvimento, Agricultura e Sociedade da Universidade Federal Rural do Rio de Janeiro.

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## Resumo

A apresentação tem como objetivo apresentar contribuições teórico-metodológicas da Teoria das Práticas Sociais para o estudo dos ambientes alimentares. As práticas envolvem dizeres e fazeres, conectados a partir de significados (crenças, normas culturais), materialidades (objetos, tecnologias, recursos financeiros) e competências (saber-fazer, habilidades). Mudanças nas práticas ocorrem por meio de políticas e intervenções que alteram estes elementos. As práticas emergem, persistem, mudam e desaparecem quando as conexões entre eles são feitas, sustentadas ou quebradas, ou quando surgem novos elementos. Trata-se de abordagem situada, que toma a prática como unidade de análise, rejeitando a primazia individual e a ação reflexiva. As práticas alimentares são compostas por outras práticas (planejar, adquirir alimentos, higienizar, comer, lavar a louça e reaproveitar ou descartar as sobras) formando um conjunto arranjado de práticas. E estão conectadas a outras práticas, gerando uma relação de coexistência e codependência com práticas que acontecem no ambiente doméstico (trabalhar, cuidar) e fora do ambiente doméstico (práticas agrícolas, industriais, comerciais, políticas públicas, transportes). Esta abordagem permite analisar a interseção entre a microescala dos fazeres mundanos e a macro escala da produção e abastecimento alimentar. A Teoria das Práticas tem sido usada para estudar as práticas alimentares em si, mas também suas transformações e os processos de normalização de novas práticas (mudanças sociais). Do ponto de vista metodológico, utiliza ferramentas convencionais de pesquisa em Ciências Sociais, porém orientadas para a prática (com foco na descrição). Esta abordagem pode contribuir para iluminar aspectos negligenciados em estudos convencionais, possibilitando estudos comparados.

## ***SESSION 5: Poster session: food environment networks and current research projects***

Session 5 presents selected projects, initiatives and networks dealing with food environments in the context of disaster risk and climate change. Local, regional and international networks, as well as research, advisory, monitoring or training initiatives, have been invited to participate.

A documentary highlighting Mozambican wild plants will be shown and the Local Open Online Courses (LOOCs) focused at enabling access to content on Rural Food Environments in the context of disaster risk and climate change will be presented.

Universities and research institutions within and outside Mozambique will have the opportunity to present posters on research results and methodological approaches. The posters will be presented in an exhibition-style format, allowing conference participants to visit them at their own pace throughout the conference.

# The influence of food desirability and convenience on diet: Examples from the Districts of Moamba, Búzi and Ribáuè

Christine Bohn

Frankenförder Forschungsgesellschaft (FFG)

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## Background

Most of the Mozambican labour force work in agriculture and most of the rural population lives below the poverty line. The quality of their diet is often poor. Studies in sub-Saharan African countries show that in addition to self-production, a large proportion of food comes from the purchase of processed products, also in areas far from urban centres.

## Purpose and aim

The poster shows the results of the analysis of two personal dimensions that influence the decisions on the food purchase (Turner et al., 2018): the desirability of food, including among others individual preferences, tastes, desires, attitudes, and the convenience of the food purchase, preparation and consumption.

## Methods

The study was designed as an exploratory investigation, as there is little literature on convenience and desirability of foods in Mozambique. Two types of semi-structured interviews were carried out and expert interviews were held in the three study Districts, complemented by an observational analysis of markets and food shops. Some further in-depth expert interviews and focus group discussions were held in the Moamba district.

## Results

The desirability of food is determined by several factors, including the food quality and safety. Quality problems of the food sold on local markets or in food shops affect the taste and smell and eventually the food safety. The spoiled food eventually is sold, and bacterial contamination can occur due to poor hygiene conditions or water quality problems. The desires of local people include a greater variation in food and the purchase of products such as milk, coffee, meat, rice, sugar and oil. Snacks, biscuits, sweets or sugary drinks are frequently consumed and are often bought for children. The convenience is determined by (a) the time needed to get to the points of food sale (more than 90% of the food purchases are on foot or by bicycle). Due to the lack of storage facilities, fresh food is usually bought daily from nearby stalls or markets; (b) the time needed for shopping, which is usually quick, but social interaction can take a time, and (c) the time needed for meal preparation and cooking, which is generally time-consuming, as meals are made on the basis of non- or minimally processed products, eventually integrating convenience products, and (d) the facility of transport and storage.

## Conclusions

A varied and healthy diet is jeopardised by limited access to fresh food in areas further away from markets (limited supply) and limited financial access. Quality problems reduce the desirability of fresh food and the convenience of preparing it (more work to clean or cook). The deficiencies in quality, the storage and sales conditions and the lack of packaging are reasons that markets, and grocery stores only partially promote healthy and nutritious food. Convenience products adapted to the local market are popular and easily available, packaged in small quantities, cheap and long-lasting. They are frequently consumed, even in rural areas (also see FAO et al., 2023). Changes are taking place in eating habits, especially through the tastes and desires of children and young people.

## Flood risk perception assessment in Búzi, Mozambique

Yamile Villafani

TH Köln – University of Applied Sciences, Institute for Technology and Resources Management in the Tropics and Subtropics - ITT, Germany

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### Abstract

The district of Búzi in Mozambique is highly prone to natural hazards. The increasing frequency to coastal and fluvial flood in addition to local vulnerabilities have hindered the development in the area, with efforts and studies mainly focused on disaster response. The purpose of this study is to evaluate how the presence of flooding events can shape the perception of the risk. The perception is deconstructed into influencing factors that are individually evaluated: awareness, preparedness, dread, experience and trust in the government. In addition, further situational elements are considered, including socio-economic and demographic factors of the population, proximity to the hazard, control and voluntariness and flood history. On-site semi-structured interviews were administered to focal groups of villagers in Búzi to evaluate the perception to flooding risk. The set of answers were coded and analysed (ANOVA and correlation tests). The results indicate that despite direct experience with flooding, the local knowledge of the elements of the risk is intermediate and preparedness is high. Moreover, with greater distances to risk areas, the awareness decreases. The latter is negatively related to higher trust in the government, and the higher the awareness, the higher the distrust. Preparedness positively influences on the control of the risk, voluntarily removing themselves of the risk whenever possible, thus fearing flooding slightly less. These and further influencing factors can be utilised in future studies to broaden the evaluation of the flood risk perception in the study area and provide stakeholders with valuable input towards informed risk management decisions.

**Keywords:** Risk perception, flood risk, risk management

## Promoting Saline Agriculture as an approach to sustainably manage the risk of soil salinity in a changing climate

Experiences from recent initiatives in Mozambique and Eastern Africa.

Jakob Herrmann<sup>1</sup>, Matias Siueia Júnior<sup>2</sup>, Alberto Luis<sup>3</sup>, Sebastião Famba<sup>4</sup>

<sup>1</sup> Weltweit-Association for the Promotion of Local Initiatives e.V., Bad Soden, Germany

<sup>2</sup> Municipal Council Maputo, Department for Agriculture and Extension, Maputo, Mozambique

<sup>3</sup> ABIODES-Association for Sustainable Development, Maputo, Mozambique

<sup>4</sup> University Eduardo Mondlane, Faculty of Agronomy and Forestry Engineering, Maputo, Mozambique.

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### Abstract

Soil salinization is a threat to global agriculture and food security. Various important agricultural production systems of Eastern and Southern African (ESA), including Mozambique, are affected, not only in coastal but also in (semi-)arid inland environments. Several national policy strategies on Agriculture and Climate Change acknowledge soil salinity as a considerable constraint. However, sufficient scientific knowledge and practical experience on the problem, and hence a clear action strategy, are still lacking in Mozambique and the ESA region. Starting in 2020, Weltweit e.V. along with a consortium of Mozambican research institutions, farmer associations, agricultural extension bodies and non-governmental organisations commenced to address this gap. We established a local knowledge base on Saline Agriculture (SA), a versatile toolbox of agricultural practices, which have the potential to sustain agricultural production under saline conditions and reverses salinization through soil remediation processes. As of 2023, we started to regionally scale our efforts under the ESA Saline Agriculture Network initiative. The main objectives are: (1) promotion of applied research on SA, (2) establishing the extend of salinity impact through studies and scoping missions, (3) publication of scientific output and information material, (4) promotion of knowledge exchange between stakeholders through workshops and excursions, (5) facilitating links to international SA networks, and (6) awareness raising and advocacy for policy and donor support. The presented poster gives an overview of previous achievements and current efforts of the initiative, intending to increase awareness and attract further strategic partners for rendering Mozambican and ESA agriculture more climate resilient.



# Planeamento das Infraestruturas de Agro- Processamento como vector de Desenvolvimento no Distrito de Moamba: Uma Contribuição Metodológicas para o Desenvolvimento do Distrito

Horácio Facitela Maluvane<sup>1</sup> e Cláudio Artur Mungoi<sup>2</sup>

<sup>1</sup> Doutorando em Urbanismo- Planeamento Territorial de Regiões, pela UEM.

<sup>2</sup> Professor Doutor, Professor Associado, (Doutorado em Desenvolvimento Rural) - Universidade Eduardo Mondlane

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## Resumo

Em Moçambique, a agricultura é a base da economia nacional, mas na província de Maputo, no Distrito de Moamba em particular, o défice de Planeamento das Infraestruturas de Agro- Processamento, influencia negativamente ao sector familiar e aos mercados consumidores, na produção e conservação dos produtos agrícolas. Enquanto este planeamento, constitui um vector importante para a promoção de desenvolvimento no distrito. O objectivo do artigo é de analisar a influência do planeamento das infraestruturas económicas de Agro-Processamento, no aumento da produção e produtividade, processamento e conservação dos produtos locais, melhoria da qualidade de vida e na promoção de desenvolvimento do distrito. Para o efeito, foi utilizado o método qualitativo com enfoque para o estudo de caso, associado ao levantamento das potencialidades do distrito, através das imagens fotográficas das áreas produtiva e sustentado pela bibliografia sobre a temática. Do trabalho realizado no campo, verificou-se que, a maior parte dos produtos comercializados são importados, prejudicando a competitividade dos produtos locais. Enquanto nos locais de importação, apesar de serem armazenados em grandes quantidades, os produtos encontram-se em bom estado de conservação e, por outro lado, nos mercados do distrito, onde os produtos importados são comercializados, a maior parte destes encontram-se deteriorados. Esta situação também se verifica com os produtos agrícolas localmente produzidos no território em análise, obrigando as comunidades a optarem na produção de subsistência familiar. Portanto conclui-se que com o planeamento das infraestruturas de Agro-Processamento será possível reduzir as perdas de produção local e desta forma, incrementar a produção para o consumo interno.

**Palavras-chave:** Planeamento, Agro-Processamento, Infraestrutura

# Potencial aplicação alimentar de macroalgas marinhas cultivadas no sul de Moçambique

Esselina Fuel <sup>1</sup>, Valera Dias <sup>1</sup>

<sup>1</sup> Universidade Eduardo Mondlane, Faculdade de Ciências, departamento de Ciências Biológicas

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## Resumo

As alterações climáticas têm afectado negativamente a produtividade agrícola, colocando em risco a segurança alimentar e nutricional em todo o mundo. O cultivo de macroalgas marinhas e sua aplicação alimentar, tem se demonstrado como alternativa sustentável para assegurar a demanda nutricional e reduzir a pressão sobre os recursos existentes especialmente nos países de baixa e média renda. Este estudo tem como objectivo avaliar a aplicação do extracto seco em pó de macroalgas vermelhas *Kappaphycus alvarezii* e *Eucheuma denticulatum* no enriquecimento nutricional de alimentos produzidos à base de cereais locais (milho, trigo e mapira).

Macroalgas de ambas espécies serão colhidas nas áreas de cultivo na costa da Ilha de Inhaca e na baía de Vilankulo. No laboratório serão processadas para a obtenção do extracto seco em pó e determinadas as quantidades de proteínas, lípidos totais, carboidratos, teor de minerais, vitaminas e metabólitos secundários, por meio de técnicas cromatográficas e métodos espectrofotométricos. Serão também analisadas a textura, a coloração e as propriedades sensoriais dos alimentos enriquecidos nutricionalmente para obtenção de fórmulas de alimentação. As análises estatísticas serão realizadas usando o software SPSS 20 (SPSS Inc.) e Excel 2013. Para a estatística descritiva, serão apresentadas as médias e o desvio padrão das médias ( $\pm$  DPM). Os resultados serão submetidos à análise de variância unifatorial (One way ANOVA) a Testes post hoc de comparação múltipla de Tukey quando a diferença entre as médias for estatisticamente significativa. Este é um estudo pioneiro em Moçambique cujos resultados servirão como ponto de partida para desenvolver e formular produtos naturais nutricionalmente enriquecidos para a prevenção da desnutrição.

## Do Fruto da macuácula aos seus Produtos (farinha e óleo): Estratégias Para Preservar o Potencial Nutricional

Sandra S. I. Chemane<sup>1 2 3</sup>, Mafalda Ribeiro<sup>2</sup>, Susana Casal<sup>2</sup>, Maida Khan<sup>4</sup>, Olívia Pinho<sup>1 2</sup>, and Olga Viegas<sup>1 2</sup>

<sup>1</sup> Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, Portugal

<sup>2</sup> LAQV/REQUIMTE, Laboratório de Bromatologia e Hidrologia, Departamento de Ciências Químicas, Faculdade de Farmácia da Universidade do Porto, Portugal

<sup>3</sup> Departamento de Engenharia Rural, Faculdade de Agronomia e Engenharia Florestal,

<sup>4</sup> Universidade Eduardo Mondlane, Maputo, Moçambique, Departamento de Engenharia Química, Faculdade de Engenharia, Universidade Eduardo Mondlane, Maputo, Moçambique

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### Resumo

The fruit of *Strychnos madagascariensis*, macuácula, is rich in carotenes, which give it its characteristic orange color, and of which  $\beta$ -carotene predominates, and has a considerable lipid content, of which the high oleic acid content stands out. As it is a perishable fruit, the communities turn it into flour (nfuma) so that they can eat it all year round and oil is extracted from the flour. The objectives of this work were (1) to demonstrate the nutritional potential of macuacua, (2) to indicate possible points for improvement in the processing of its products in order to enhance their value. Para concretização destes objetivos, os frutos foram colhidos em 4 distritos do sul de Moçambique (Chicualacuala, Chókwè, Manhiça, Marracuene); as farinhas foram produzidas localmente e no laboratório; os óleos extraídos em laboratório e as análises realizadas através de métodos AOAC.

## **Entre as políticas e a prática das cantinas escolares: (Aprendizado do Estudo de viabilidade para a implementação e gestão do sistema de alimentação escolar nos municípios de Maputo e Pemba.**

**Natacha Morais**

Nações Unidas ( UNHabitat – projecto SEACAP)

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### **Resumo**

Análise da legislação nacional sobre segurança alimentar e educação. Bem como análise dos programas de cantinas escolares no país.

Alguns programas sociais implementados por entidades estatais como o caso das cantinas escolares tem o potencial de alavancar directa e indirectamente outros sectores como da produção agroalimentar rural. São cadeias de insumos que ganham significado para abastecer um mercado idóneo preparando para mercados os estágios mais exigentes de serviços e produtos.

As cantinas escolares são um importante meio de segurança alimentar, de promoção da educação alimentar, de aumento de mercados, aumento da retenção escolar e de melhoria da saúde.

Estão divulgados alguns programas de cantinas escolares, mas carecem de mais e melhor divulgação e documentação.

**Palavras-chave:** Lanches escolares, legislação, plano de negócios de cantinas escolares, educação alimentar

## **Segurança Alimentar e Nutricional versus Mudanças Climáticas – o caso do Mestrado MSAMC na Universidade Rovuma**

**Pompílio Armando Vintuar<sup>1</sup>, António de Abreu Pereira<sup>1</sup>, Karin Fiege<sup>2</sup>, Samuel Quive<sup>3</sup>, Elias Maxombe<sup>1</sup>, Artur Afonso<sup>1</sup> e Silvana Fernando Lia**

<sup>1</sup> Universidade Rovuma – Faculdade de Ciências Alimentares e Agrárias

<sup>2</sup> Universidade de Ciências Aplicadas da Colônia – TH Köln

<sup>3</sup> Universidade Eduardo Mondlane – UEM (Moçambique)

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### **Abstract**

O presente mestrado é uma iniciativa conjunta da Universidade Rovuma e parceiros, nomeadamente, UEM, TH Köln (THK)- University of Applied Sciences de Alemanha, no âmbito do projecto FEMOZ, que visa transferir os resultados da pesquisa em actividades de fortalecimento de capacidades em resiliências em sistemas alimentares. O mestrado combina temáticas sobre Segurança Alimentar e Nutricional com as temáticas sobre Mudanças Climáticas e Risco de Desastres.

## Políticas de Segurança Alimentar e Nutricional: Evidências e desafios para promover Ambientes Alimentares Saudáveis em Moçambique

Christine Bohn<sup>1</sup>, Ivo Cumbana<sup>2</sup>, José Daniel<sup>3</sup> Karin Fiege<sup>4</sup>, Adérito Machava<sup>2</sup>, Matthias Schmidt<sup>1</sup>, Samuel Quive<sup>2</sup>, Luísa Mutisse Chicamisse<sup>2</sup>, Pompílio Vintuar

<sup>1</sup> Frankenförder Forschungsgesellschaft GmbH

<sup>2</sup> Universidade Eduardo Mondlane

<sup>3</sup> Universidade Rovuma

<sup>4</sup> Technische Hochschule Köln (University of Applied Sciences) – Institute for Technology and Resources Management in the Tropics and Subtropics (ITT)

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### Background

Mozambique has to parallel challenges to overcome: chronic and acute malnutrition and the spread of Non-Communicable Diseases (NCDs) as consequence of changing food habits. Both problems pose serious challenges for the country's fragile health system.

### Purpose and aim

Politics in the context of Food and Nutrition Security play a key role to promote healthy food environment. Nearly every policy sector could contribute to a healthy food environment and can be supported by impact analysis of nutrition related interventions and a benchmarking with international good practices.

### Methods

The INFORMAS “Food Environment Policy Index” is a tool enabling systematic and comprehensive analysis of politics in the FNS field. The first step is a elaboration of a evidence report, evaluating a series of policy domains on the basis of pre formulated indicators. A participatory process of discussing the results and prioritising recommendations promote policy to identify applied measures for creating healthy food environments.

### Results

A series of policy decisions supported the institutionalization of the FNS thematic in Mozambique. But there are still a lot of challenges with regard to the implementation and monitoring of policy measures, the harmonization and coordination of sector policies, the adaptation of the legal framework as well as the adjustment of the budgeting to international recommendations.

### Conclusions

The evaluations of the impacts of FNS policies on the basis of the Food EPI methodology provides important information on how healthy food environments can be supported by a comprehensive FNS policy. The discussion and prioritization of recommendations helps the concerned policy sectors to formulate and implement evidence-based interventions. The Food EPI serves also as an instrument for monitoring Food and Nutrition Policies.

# Predicting indicators of the water-energy-food nexus in Mozambique using machine learning and data analytics methods

M. Sc. Sven Wöhrle, Prof. Dr. Gernot Heisenberg

TH Köln Institute of Information Science

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## Abstract

Food security stands as a critical Sustainable Development Goal (1), with precise forecasts being pivotal for NGOs and governments to address crises effectively. Various organizations are engaged in monitoring and predicting food security levels. Figure 1 illustrates the multifaceted influencers of food security, highlighting several subjective factors lacking straightforward datasets. Notably, survey data, such as the Demographic and Health Surveys (DHS), offer expansive insights that could serve as proxies for elements like social safety nets and coping strategies. This research aims to: Demonstrate the efficacy of machine learning in forecasting food security (short & long term) and to Validate the use of DHS data as a foundational resource for subsequent modeling efforts.