IDEEA 2022
African Farming Mobility Project

**Topic:** Future of African Rural E-Mobility and Farming

**Scope:** Creating new solutions for African Electric Mobility, Farming or Agricultural logistics

**The IDEEA AFMP 22 project in a nutshell:**
- Different types of mobility for Africa (low cost, robust, good to repair, locally produced)
- New business models (fair and sustainable)
- Sustainable materials (local availability through growth or reuse/recycling)
- Strengthen African “Lebensraum”/environment by creating sustainable jobs in the mobility and farming sector
Background:

Various problems challenge the African continent on its way to sustainably securing agricultural productivity and employment. Under the given conditions, with a shortage of both agricultural products and the technological means to produce them, the challenges cannot be solved with conventional approaches. Mobility plays an exposed role in this context. On the one hand, it is a basic human need, and on the other hand, it is a prerequisite for offering goods on the market beyond local village borders, thus consolidating and expanding economic structures.

The socio-economic system of rural Africa and especially Kenya and Rwanda is based on village structures. Growing food for self-consumption is a general and traditional approach to most people living in these countries’ remote areas. Besides a small and divers assortment of plants, often a small number of farm animals, such as goats, exist which need to be feeded to produce milk for consumption. A lot of work is organized in a community and thus states a good basis and reception for a sharing or service structure.

The availability of material and technological resources is becoming increasingly difficult and makes a mobility turnaround seem impossible to implement without new approaches. One way to meet this challenge is to systematize circular value creation by incorporating regionally available raw and valuable materials.

This provides the framing for the 2022 IDEEA project – to **conceptualize a systematic future mobility or farming solution for rural areas in Africa**. It should be closely oriented towards the users’ needs and seamlessly integrated into potential infrastructure and sustainability.
An example of the ongoing transformation can be found in this funded project:

https://www.youtube.com/watch?v=LJ5Mgyj1SYI

Conceptual sketchings showing hub ideation of the VW Gen.Farm project are shown below:
Objectives:

- Generate a case study for a chosen mobility-, farming- or agricultural-problem in Africa: select a country (Rwanda/Kenya) and understand the social, economic, technological, and rural mobility or agricultural contexts.
- Identify local user problems with existing means of transportation and/or farming and use these insights for the creation of new solutions that increase the effectiveness and efficiency of farming or transport (people and/or goods).
- Through the integration of your solution in a hub and community context new business models to create labour and value should be developed

Target User: people that live in rural areas in Africa especially Kenya or Rwanda

Outcome: Any mobility, logistic or agricultural solution which fits into the given context and allows for an increase of local value creation, availability of work through new business models or sustainable mobility. The following questions can be worked on:

- What types of electrified mobility, logistic or agricultural solutions are needed and reasonable under the local boundary conditions? (E-Scooter, E-Moped, E-Quad, E-bike, E-motorbike, e-cargo-bike, e-harvesting machines, agricultural drones...
• How should these solutions look like and how to build them safely and with good quality by local labour?
• How could they be combined in a central mobility hub?
• What business models do arise from this system? (E.g. building mobility solutions on-site, servicing them, customizing, charging etc.)
• How could local sourcing of materials be integrated? Maybe recycling and upcycling of semi-finished product, using local plant fibres for parts or as construction material...
• How could local farmers be supported by additional machines or post-harvesting solutions? How could that create new business models and work there?
• How could logistic solutions for small local farming look like? How to get the harvested products from the farm to the harbour or market in a clean/green way?
• Which SDGs of the UN are addressed by your solution? (see last page of this brief)

Recommended Project Process:

• Undertake market research and define whom you will focus on. What group of people (i.e. age/lifestyle), where they live (environment), what trends are they a part of or are a part of their daily life (i.e. Sharing economy, connectivity), and what are the general patterns of their lifestyle of commuting and consuming.
• State of the art in “rural African areas”. Research and define its particularities (population, distances, boundary conditions, challenges ...)
• State of the art with means of transport and/or agricultural means used
• Collaboratively conduct customer research to discover user needs and patterns for insights
• Study and conduct empathetic customer research of your target market to uncover insights about how and why they do things. Understand their needs and what they used to do, what they are trying to do. Find out what works and what does not work (challenges)
• Brainstorm solutions to solve customer/user problems in ways that honor their needs, values, lifestyles, and challenges.
• Tell the story of the concept – how does it meet or not meet the customer's needs and uses. What are the tradeoffs?
• Develop and define the infrastructure (i.e. central hub infrastructure, technologies) needed to support the selected design solution. (this needs to be superficial, maybe just imagery to explain how it works)
• Define the main concept-relevant mechanical, electrical, and controls key points for the selected concept – that is, the technical specification
• Report on the design superior to the existing ones. 3D modeling, video animation.
• Develop how local materials can be integrated to create your solution.
Recommended Deliverables:

- Presentation deck including:
  - Problem statement
  - Case study of the rural area and its contexts
  - User profile and its problems with current transportation/farming solutions
  - Design goals
  - Design process:
    - An iterative process to approach the final solution and its rationale: sketches and CAD
    - Final solution: visualization and/or animations as needed
- What mobility/farming/logistic need it serves
- How it looks
- How it is used
- How it works
- How it is integrated into a rural hub structure
- What business models arise in this context ((partially) building the solution on site, servicing, repairing, customizing...)
- How local part and material sourcing can be realized

JUDGING CRITERIA

USER NEEDS RESEARCH CRITERIA

- Project Confirmation: Describe the research Goals and Methods used to confirm user needs have been met with the selected concept.
- Results Analysis & Insights: What did you learn from your research? What “customer” insights did the team develop?
- Voice of the Customer Requirements: Based on your research, analysis and insights, what customer needs did you choose to address?
- Customer-centric Idea Generation, Prioritization & Selection: How does the concept you are developing meet the needs of the target customer? How does it improve their life (i.e. usage/usability/delight)? How is it better than existing alternatives?
- Team Collaboration in User Needs Research: Who participated in the research, analysis, synthesis, ideation and application? Explain the collaboration methods used & the decisions impacted. Depth of user and context understanding
INDUSTRIAL DESIGN CRITERIA

- Identified and defined current design problem with user needs to be solved.
- Clearly portrayed how you translated your research into your final design solution and infrastructure.
- Integrated clever packaging, functionality, and connectivity -- with focus on the environmental and societal impact of the concept and its fit to the African boundary conditions (robustness, affordability, sustainability...)
- Depth of human factors understanding
- Design Concept: 2D sketching; visual story telling; 3D translation; overall aesthetics and product persona

PRODUCT ENGINEERING CRITERIA

- Project Framing (Scoping & Overall Product Development Timeline / Milestone Definition) &
  - Project Management (Meeting Timelines & Deliverables)
- Depth of concept engineering development
- Concept technological feasibility by the timeframe
- Technical Specs
- CAD Models / Manufacturing Drawings
- CAE Analysis
- Validation Plan / Criteria Definition
- Physical scale model, non-functional to be presented on site at the IDEEA Forum
- Efficient Multi-Site Product Lifecycle Management (Including PDM - Data Sharing) • Effective Team Collaboration (Engineering-Design)
- Material aspects, circular approaches and local sourcing and its impact on the design

SYSTEM JUDGING CRITERIA

- Effectiveness of team (and interdisciplinary) collaboration
- Sustainability of the business model
- Effectiveness of integration into the local hub structure
- The concept should show a level of detail to convince investors or management to invest in it - Describe your project in a way so potential investors will contribute money
UN’s SDGs