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“Filling gaps and removing traps
for sustainable resource management”

Combining Land-Based Organic and Landless Food Production: A Concept for a Circular and Sustainable Food Chain for Africa in the Year 2100

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Abstract

Agriculture in tropical countries has to adapt not only to climate change and resource depletion but also to population growth – especially in Africa, where around 80% of the growth until 2100 is predicted to happen. The medium estimate of the United Nations predicts an increase from currently 1.2 to 4.4 billion people by the end of the century – but no strategic plans exist beyond the year 2050. Since Africa is a continent with large deserts, arid and semi-arid areas, only about 400 m² of agricultural land will be available per person according to these predictions.

In the LandLessFood project, we are trying to design an agricultural system, based on the principles of circular economy, in which it is possible to feed everyone on this little space, focusing on Nigeria as an example.

The main idea is the combination of “landless” food systems such as microalgae production and mushroom cultivation, with organic, “land-based” food production. Microalgae are very spatially efficient, can be produced independent of fertile soils, could be used as a pathway of nutrient recycling in the sewage system and can produce large amounts of oils or starch, to fulfil the energy-need of the population. Land-based food production should be used to fulfil the need for “quality food” (vitamins, nutrients, minerals) of the population. Mushroom cultivation is a form of “selective composting” in which food is produced. While mushrooms themselves are an excellent meat-substitute, spent mushroom substrate can be used as animal feed, ideally for invertebrates, such as earthworms, which are good chicken, pig and fish feed.

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