



Exploring the potential of cowpea inoculation in Namibia for improved resource use and human nutrition

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▪ Motivation, problem statement and aim

Cowpea is an important source of protein in the semiarid parts of sub-Saharan Africa. Even under water or temperature stress, cowpea can produce grain and fix nitrogen. The robustness of cowpea makes them a good choice especially for smallholder farmers with limited resource. Inoculated cowpea is not only more resilient against many plant diseases, but also can fix nitrogen more effectively.

Located in sub-Saharan region, water supply is a constant struggle of Namibia. In addition, due to dry climate and soil characters, only 1% of the country is arable. In contrast to harsh natural condition, over 70% of population depends their livelihoods on agriculture. For insufficient production, food supply in Namibia is highly dependent on imports. This combination of natural and societal condition puts Namibian population into nutrition hazard.

Thereby, the study aims to investigate the potential of cowpea inoculation in Namibia by answering the following questions:

- 1) How much can inoculation increase cowpea production in Namibia?
- 2) How much land and water resource can be saved by introducing inoculation in cowpea cultivation?

▪ Methodology

Environment Policy and Integrated Climate (EPIC) model is adopted for crop simulation. It is calibrated specifically to the Namibian agricultural environment. Different climate scenarios and agricultural management systems are simulated in EPIC. The simulation result is used in optimisation modelling using General Algebraic Modelling System (GAMS). The model is simulated under objective of maximum food production given the current population.

▪ **Result**

Primarily, potential cowpea production is depicted in both inoculated and non-inoculated scenarios. The simulation considers the total arable land of the country and subsistence farming as the only farming management. Cowpea production increases by 26% with inoculation.

The land and water use of inoculated cowpea cultivation is shown in relative to non-inoculated cowpea cultivation. In the perspective of current resource availability, the relative resource use is elaborated. Inoculation saves up to 23% of land and 79% of water use.

▪ **Conclusion**

By introducing inoculation in cowpea cultivation, Namibia is expected to have meaningful increase in production and decrease in both land and water use. Since cowpea is already well integrated in smallholder farmers' practice, the adoption of inoculation can penetrate the positive effects into remote and vulnerable areas.