

Increasing value of African mango and cashew production

Executive Summary

The project has established the scientific foundation for the introduction of weaver ant pest control in Sub-Saharan Africa. Results demonstrate large reductions in yield loss and increased quality of both mango fruits and cashew nuts, as well as in economic revenue by using weaver ants for insect pest control. Furthermore, the effects were at the level of or better than chemical control.

Research concerning value chains and marketing has revealed that mango value chains are rather simple, and that there is almost no local processing adding value to the fruit production. There is almost no export of mangos from Africa. Cashew nuts are generally exported to India to be processed, and Indian exporters in Benin have a firm grip of the market making it difficult to start local processing. Finally, we found that there is only little export of organic mango and cashew to Europe although there seems to be a potentially lucrative market.

Summing up, the project provides the knowledge necessary to increase African organic mango and cashew production and creates the foundation for a better economic outcome of this possible increase in production.

Introduction

The main objective was to reduce poverty, create jobs and increase African export earnings and food security by developing and implementing efficient and sustainable production of cashew and mango using weaver ants as a major component to control insect pests.

The immediate objectives were:

1. Introduce, develop and optimize weaver ant IPM in cashew and mango in Benin and Tanzania and using these countries as "stepping stones" to other African countries.
2. Develop agribusiness by increasing yield and quality (allowing organic certification) of these crops, and stabilize the production to facilitate export.
3. Establish links between farmers, processing facilities, organic certification agencies and European retailers to strengthen value chains and access to export.
4. Increase African small holders' access to protein by introducing South-East Asian techniques to harvest weaver ant queens as a food source and/or for export.
5. Implement the proposed method via training of extension workers and farmers and by producing teaching materials and manuals.
6. Build research capacity (PhD program) at the university level for further development of sustainable production methods.

Background

Cashew yields are low due to insect damage and mango production is severely reduced and export restricted because of fruit flies depositing their eggs (turning into larvae) in the fruits. Before the project, weaver ants had been shown to increase Ghanaian cashew yields fourfold (equal to the use of pesticides) by controlling various pests, and in Benin they had been shown to reduce mango fruit fly damage with up to a factor 30 in fruit samples because the flies are repelled by ant pheromones. Applying weaver ants as biocontrol agents is well implemented in Australia and Vietnam and research has shown that substituting chemical control with ant biocontrol led to increased net incomes of more than 70% in both cashew and mango - caused by higher yields, higher quality and lower costs of the weaver ants. In Africa the advantage of using weaver ant control was expected to be even larger because the comparison should be between weaver ant control and no control, as many farmers (especially the small ones) do not use chemical pesticides.

Results

Weaver ant technology has been demonstrated to be attractive in pest control in both mango and cashew and the reduction in losses to insect pests may double the yield or more, and has been found to be economically more attractive than pesticides. Furthermore, the research has found ways to produce and boost new colonies, which open up for a production of colonies for distribution to growers. Therefore, the research on weaver ant pest control as a means of increasing cashew and mango yield in Sub-Saharan Africa has been very successful.

The investigations of value chains, export barriers, and European export markets for organic products have shown that there are large potentials for increasing the economic output of the increased production. Exports of mangos from Benin or Tanzania to Europe are very limited, and there is hardly any local post-harvest processing of fruits, which is a major export barrier. Local processing faces logistical challenges due to poor infrastructure (lack of cold storage facilities, lack of refrigerated trucks and poor roads) and high transport costs due to lack of competition in container shipping from Africa to Europe. There is very little local processing of cashew, as most nuts are shipped to India for processing. This seems to be very difficult to break, as the Indian buyers have a firm grip on the entire cashew market. Overall, European importers require production to meet European food safety standards – both regulatory requirements and private standards like BRC or GlobalG.A.P. However, African countries lack institutions that can support certification and monitoring of compliance. This makes it difficult for African firms to export to Europe

Capacity building was addressed through: 1) the PhD-program under which four students from Tanzania and three students from Benin have conducted their research. All seven graduated in late 2015 and early 2016, and 2) two Danish Master students and two Danish Bachelor students made the research for their theses in Tanzania in close collaboration with the Tanzanian partner.

Concerning dissemination, the photobook *“Cashew and Mango Integrated Pest Management Using Weaver Ants as a Key Element. For organic cashew and mango growers in Africa”*, which can be regarded a manual of weaver ant control in mango and cashew, must be regarded a very large leap forward in the implementation of weaver ant control in Sub-Saharan Africa.

Conclusions

1. It has become evident that the weaver ant technique known from South-East Asia can readily be transferred to Africa and can increase mango and cashew yields by up to about 100%, and some investigations even suggest higher increases.
2. A good and functioning technique to established and grow new colonies for introduction in plantations has been established.
3. Some obstacles for value adding through better marketing and export have been identified.
4. Seven new scientists within the field of weaver ant biocontrol and marketing have been educated.

Implications

The possibilities for increased production (doubled or more) of mango and cashew throughout the Tanzanian and Beninese mango and cashew areas have been provided. In case of nationwide implementations of the weaver ant technique in both countries (and the rest of sub-Saharan Africa), this has the possibility of improving socio-economy and national economy considerably. However, the obstacles for utilizing and increasing the value of the products in terms of local processing and export must be removed in order to realize the potential.

Recommendations

1. Start nationwide implementation of weaver ant control through the national extension services – the experts on the topic has been educated (the PhDs from the project).
2. Take measures to remove or ease the obstacles for utilizing the expected increased yield and adding value to it through local processing and export.
3. Establish a good and safe certification system for organic products. Using weaver ant control (and no chemical fertilizers) the produces can be sold at a higher price as being produced organically.