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Coconut Risk Management and Mitigation Manual for the Pacific Region

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19. ORGANIC FERTILIZERS

By S. Hazelman, R. Bourdeix, and N. Tuivavalagi

Description

The risk is that coconut farmers will not have access to adequate and affordable organic fertilizers. Organic coconut farmers should be able to achieve yields attained by conventional farmers without depleting the fertility of their soil.

Organic farming includes returning microbial, plant or animal material to the soil to increase or at least maintain soil fertility and biological activity. The need to maintain optimal levels of fertility to strengthen the health of plants and enhance their resistance to pests and diseases is well recognised.

Occurrence and severity

Presently, many coconut by-products are used for organic cultivation of other crops, but not for cultivation of the coconut palms. For instance, in Rarotonga, Cook Islands, farmers traditionally use coconut leaves to manage soil in Taro plantation, but this is now sometimes replaced by a plastic cover. In most Pacific Islands, coconuts also contribute to feed for tasty organic chicken and pigs.

Most farmers do not use organic fertilization in coconut plantations. Even if part of the husk and leaves are left on the coconut plantation, they remain in a big heap and are not effectively distributed among palms.

Cultivating coconut palms without any fertilization, without cover crop and by removing all by-products will deplete the soil and reduce the yields by more than half. There are examples in other countries. In many coconut plantations located close to the sea in Côte d'Ivoire, West Africa, farmers did not provide any fertilization. Soil was over pastured by cows. All by-products were taken out: husks for burning and fish drying, leaves for braiding fences and roofs, nut for selling. Within a 20 year-period, the soil declined from good fertility with plant cover to infertile white sand with almost no plants growing under the palms. Together with ageing palms, the yield was reduced to less of than 30% of its initial value.

Mitigation and adaptation

Feed the coconut during its first five years, it will feed you during the next fifty years. The first years are crucial for establishing the palms well. Before buying any expensive fertilizers, the following practices help to enhance soil fertility in organic farms:

- Planting green manure crops such as *Mucuna* spp., *Arachis pintoi*, and *Desmodium*.
- Using animal manure; however, this should be composted rather than being applied directly to plants; raise livestock under coconut while avoiding antibiotics as treatment for animals.
- Growing tree legumes such as *Gliricidia* or *Calliandra* in fallow fields and planting climbing beans in taro fields.
- Applying locally sourced fertiliser inputs, such as wood ash and seaweed, to sustain the soil – isolated areas are especially dependent on this practice.

At the nursery and planting stages, encourage the use of organic fertilizers for coconut

cultivation. For container planting, husks, manure and biochar or charcoal could be added to the container when filling it with soil. When planting bare-rooted seedlings, both coconut husks, dried and green leaves, manure and biochar/charcoal can be placed in the planting hole. Modifications depend on the nature of the soils, and the atoll soils need special attention regarding micro-nutrients (such as iron); there may be some advantage in inverting the A and B soil horizon so that more fertile soil is immediately available to the emerging roots.

Coconut husks are rich in potassium and retain moisture and coconut leaves make good ground cover to protect soil. Do not let the coconut husks lie in a large useless heap in the farm. It is preferable, instead to use them for compost, to surround the base of the coconut palm with a first layer of coconut husk and a second layer of coconut leaves; this will both feed the palms and reduce weed growth.

The Pacific Organic Standard (POS) has provided a guideline of allowable inputs for organic cultivation in the Pacific (No. P1/2013). See the section 'References' below for details.

Organic Certified inputs like fertilizers and other products are progressively becoming available in the Pacific region. For instance, in Fiji, the company Ag Chem is selling organic inputs certified by ACO of Australia. However, it is uncertain if they are presently used in Organic Coconut production. Producing organic fertilizers can become a good business for farmers: some may benefit from coconut cultivation both by using the coconut by-products for fertilization of their own crops (including coconut) and/or by selling these by-products for preparation of organic fertilizers and substrates. There are now examples of large-scale compost production in Samoa, Fiji, New Caledonia, Cook Islands and Tuvalu.

Actions to undertake

In some cases of heavy infestation or epidemic expansion of pathogens, biological control may lose effectiveness. Thus, it may be useful to set intervention thresholds at which farmers would be better off foregoing the organic approach and biological control and using chemical methods as a temporary measure. It seems better sometimes to lose the organic certification but avoid the complete destruction of the plantation or the harvest. In case of chemical use, it must be certain that the products do not contaminate the coconut water and kernel, and that they are fully safe for human and animal consumption. This will give time to come back later to an improved biological control.

Study the possibility of taking soil samples from the best coconut plantations and burying them around coconut palms in places where production is lower. This can add useful micro-organisms where they are missing. In the past, more than 150 years ago, priests brought full boatloads of soil from Tahiti to the Tuamotu Atolls. There are also new commercial micro-organism preparations that could be useful to improve soil properties.

Study the possibility of preparing mulch from coconut stems and store it in confined spaces where the *Oryctes* beetles can enter but cannot leave, and feed chicken and young pigs with the beetle.

In theory, organic certified farmers must have organic management plans that outline how they will improve fertility and management of their coconut plantations. This rule, not really applied nowadays, should be implemented and strengthened in future.

Coconut exported from Pacific countries are often fumigated with methyl bromide, in order to destroy all insects and other arthropod pests that may be transported with the coconut fruits. For instance, all the containers of mature nuts leaving Tonga are systematically

fumigated, so they lose their organic certification. A treatment able to destroy pests while keeping organic certification should be developed.

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