



Intercropping food and cash crops with oil palm – Experiences in Uganda and why it makes sense

Expansion of oil palm production in Uganda has certainly brought economic benefits. But these have been inequitably distributed and have been accompanied by negative environmental and social impacts. This brief proposes different options that allow farmers to overcome some of these impacts by mixing oil palm with other crops that can increase smallholder incomes, resilience and biodiversity. It summarizes international experiences supported by surveys that show that Ugandan farmers are already experimenting with and adopting intercropping, and based on findings and lessons learned, offers specific recommendations for the government, private sector, extensionists, and farmer associations.

General recommendations

1. Encourage smallholders to try different intercropping systems and adopt best management practices, to improve crop diversity, and to provide a buffer to fluctuating prices of oil palm fresh fruit bunches.
2. Promoting intercropping with beans, yams, bananas, cassava, etc. in the first 4-5 years after planting, with no competition noted, and farmers benefit from food and income before the first oil palm harvest.
3. Permanent intercropping is possible if alternative oil palm spacings are adopted at establishment, such as the double row avenue (alley cropping) system, and planting of shade tolerant crops with good market prices such as black or white pepper, vanilla, cacao, coffee or turmeric.
4. Other trees can be planted in older oil palm fields around plantations or in spaces but results are not yet available from long term experiments on overall incomes from combining oil palm with timber trees.
5. Training is required to ensure that intercropping is planned and implemented as an organized system, leading to increased benefits.

Intercropping oil palm in the first four to five years after planting at the standard 9x9 metre spacing provides help to meet family food requirements and can provide alternative incomes. Crops such as beans, maize, cassava, sweet potato, sugarcane and banana do not compete when grown in the spaces between young oil palm. Where permanent intercropping is concerned, crop combinations and adapted planting densities tested in other countries minimize yield losses for oil palm and intercrops, or compensate by higher total income per hectare than from monocropping. Global experiences supported by local surveys shows that intercropping makes sense, providing farmers with additional food and cash crops while promoting multiple livelihood options that benefit outgrowers, independent smallholders and oil palm companies. But encouraging intercropping requires action by the main players – the Ministry of Agriculture, the donor IFAD, the oil palm companies BIDCO and OPUL, and the different producer associations.

Methodology

The research behind this brief and associated publications was the last in a series that started in 2018, and which explored options to improve the environmental, health and food security benefits of oil palm production that is expanding rapidly in Uganda. It sought to understand whether smallholder farmers already practice intercropping in oil palm plantations, and assess this in the context of similar experiences around the world, leading to insights on models and systems that could be further applied in Uganda and elsewhere. It involved quantitative and qualitative data collection in 2019, with in-depth surveys of farmer practices in the islands of Kalangala district and on the mainland, complemented by a global literature review. Open-ended questionnaires guided interviews with farmers practicing intercropping or monocropping, and with others including extension workers from the Kalangala Oil Palm Growers Trust (KOPGT) and Oil Palm Uganda Ltd (OPUL). Data was statistically analysed and supported by photography, observations and voice recordings. This resulted in specific recommendations to stakeholders in the National Oil Palm Programme (NOPP), presented at the end.

Main findings

Palm oil has been produced in Kalangala since 2007, and plantations are expanding on other Lake Victoria islands and the mainland. Survey results showed that more farmers grew food crops within young oil palm planta-

tions than those who did not, producing annual crops between the palm trees planted at the recommended 9x9m spacing, helping to meet family food requirements. There was no observed negative effects on the growth of oil palm or intercrops in the first 4-5 years. However, farmers were not aware of different planting systems, or crops that could then survive within plantations over the entire 25-year rotation, nor of the environmental, social and economic benefits that this could offer. Others noted the value of intercropping, but expressed concern about the lack of related training by their growers' association, the KOPGT, that did encourage intercropping for the first four years after establishment, but did not offer specific training.

With permanent intercropping, crop combinations and planting densities need to be adapted to minimize oil palm yield losses and to ensure higher total incomes per hectare compared to monoculture oil palm. Research is ongoing in many countries with various crops, spacings and combinations, though further experimentation is still needed to develop the optimum systems for different sites, situations and markets. However, Oil Palm Uganda Ltd (OPUL) has been discouraging intercropping as they consider that this negatively impacts oil palm yields and thus company profits. But they should now acknowledge the benefits and promote the practice, confirmed in reports from around the world.

Once oil palm intercropping and agroforestry options for Uganda are developed, based on models summarized in this brief, community mobilization and empowerment are required if the policy objective of developing both food and commercial crops is to be achieved. This will not decrease overall production, and will likely increase total output and smallholder resilience. Ministries, donors and companies responsible for the oil palm sector must work to educate farmers on these various options and support services to promote intercropping alongside the production of oil palm.

In conclusion, intercropped oil palm agroforestry provides alternative livelihoods, reduces dependency, spreads risks and workloads, and diversifies incomes while also helping to meet families' nutritional needs, improves biodiversity, and resilience to fluctuations in the price of fresh fruit bunches. The models introduced in this brief are explained in more detail in an accompanying research paper, and a guide for extensionists and farmers.

A word on terminology – intercropping or agroforestry?

Strictly speaking, the term 'intercropping' is used to describe the system of growing of annual or short-lived crops together on the same piece of land. But, when one of these 'crops' is a species of tree, whether they are young seedlings or mature trees, then the system is generally called 'agroforestry'. Though because this distinction is not so clear with farmers and extensionists – and also not even amongst experts – both terms are used somewhat interchangeably here, as if they are the same 'practice'.

Suggested intercropping models

Intercropping in young oil palm plantations

This is the most common intercropping system, during early oil palm development up to four or five years, allowing the production of food and cash crops. It provides food and income before the first oil palm harvests, reducing weeding costs, with no negative effects on oil palm



growth. Between planting and the first oil palm harvest, annual crops like maize and beans and perennials like banana and pineapple can be grown to improve food security and family nutrition. Intercropping with legumes (beans, peas, soybeans, etc.) also increases soil fertility through nitrogen-fixation, and cover crops such as mucuna help to prevent soil erosion.

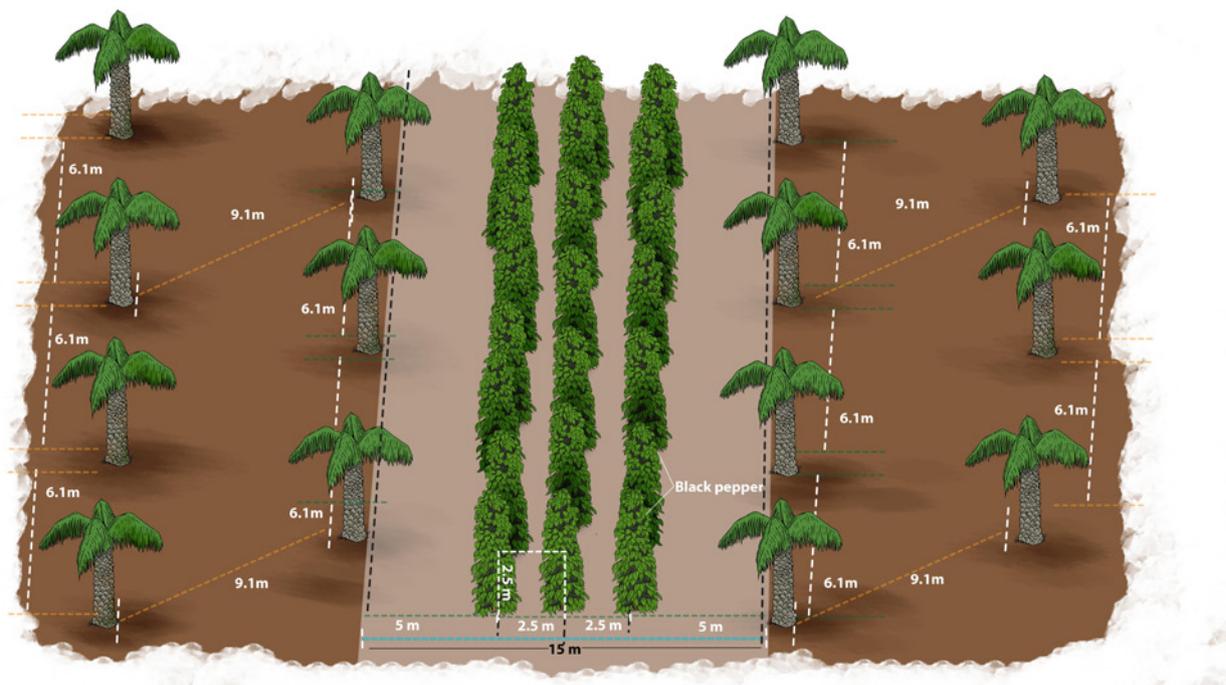


Intercropping in young oil palm plantations in Sumatra, Indonesia. A farmer shows food crops he produces, moving from one young plantation to another (left); and a plantation owned by a large farmer who allows smallholders to grow rice in the first few years after establishment (right). Photos: Thijs Pasmans

Permanent intercropping in double row avenue systems

This is a developing model that allows the production of oil palm and other crops throughout the full 25-year cycle. With a similar number of oil palm trees per hectare as in the standard 9x9 metre monoculture, palms are planted closer together in double rows at 6 metre spacing within

rows, while leaving 15 metre wide 'avenues' (see figure, below). This allows farmers to intercrop with various combinations of high value crops such as cacao, coffee, vanilla, fruit or timber trees, with minimum negative impacts on oil palm yields, and allows for a wider choice of crops that can receive adequate light, water and nutrients.



An example of permanent oil palm agroforestry, with black pepper in a double row avenue system



Double row alley intercropping in Malaysia, with cassava (left) and black pepper (right). Photos: Maja Slingerland.

Boundary tree planting

This agroforestry model includes boundary trees around oil palm plantations, and in drier areas this helps to conserve moisture and reduces wind erosion. These trees provide firewood, wood for charcoal, posts, poles, timber, fruit or rubber depending on the species. This diversifies production, improves biodiversity and nutrition cycling, and by demarcating boundaries, can also reduce land ownership conflicts. In some countries, trees are also interplanted within the plantation, though this tends to reduce oil palm yields.

Multistory homegardens

This is a common system in West and Central Africa, where oil palm is native. Here, it is often found as just one species amongst many annual and perennial crops, mixed with fruit trees and livestock. This supports multiple livelihood strategies, allowing smallholders to produce food, feed, fuel, timber and animal products on small parcels of land, increasing resilience if one or other crop fails or the price falls. All parts of the oil palm tree are used, and fresh fruit bunches are usually processed for domestic use. Maximizing oil palm yield per hectare is not an objective.

Specific recommendations

For the Ministry of Agriculture, IFAD, BIDCO, OPUL, the National Crops Resources Research Institute of the National Agricultural Research Organisation (NARO) and producer associations.

1. Promote the growing of food and cash crops in young plantations in the first 4-5 years after planting.
2. Increase the extension and training available to outgrowers and smallholders on oil palm intercropping and suitable agroforestry systems, best practices and crops, and provide planting material and support for marketing.
3. Incentivize the adoption of alternative planting systems and permanent intercropping, that provide more diverse economic and environmental benefits and better meet farmers' needs.
4. Invest in research and establish demonstration plots using double row alley systems, boundary tree planting and other mixed cropping systems.

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