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Perennialization of Upland Agriculture¹

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AGRICULTURE AND DEVELOPMENT NOTES

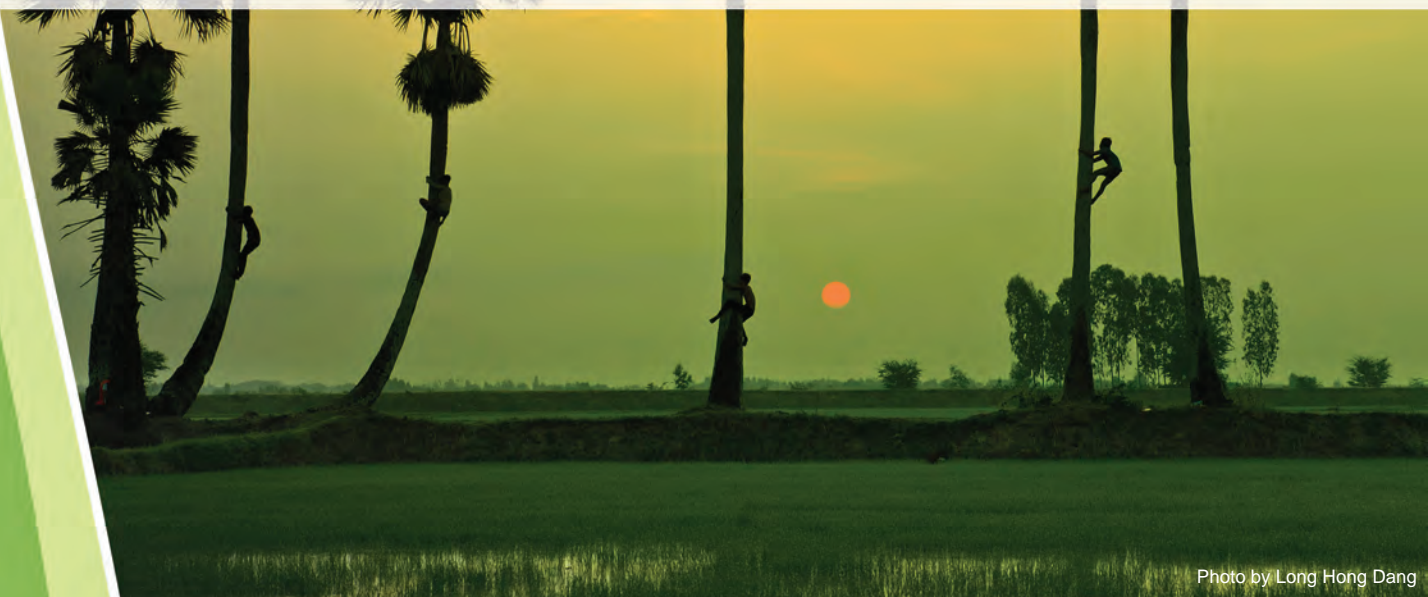


Photo by Long Hong Dang

Perennial comes from the Latin root word perennis, meaning “lasting through the whole year.” In agriculture, perennialization means converting an annual-based crop system to a perennial (enduring) one.

It is a system whereby perennial crops may substitute for the traditional food and feed crops (one or two croppings per year) that have damaged the soil, water, and other natural resource base upon which it depends.

Global Damage Due to Agriculture

His Royal Highness Prince Charles, Prince of Wales has aptly described modern agriculture as “depleting nature’s bank account³,” while Albert Bartlett (1978) said that modern agriculture was so dependent on energy inputs that it is essentially “the use of land to convert petroleum into food.”

The planting of certain crops for human food and animal feeds has caused arable lands to be less productive and unstable over the years. In fact, Wes Jackson, founder of the Land Institute, said that “the plow has destroyed more options for future generations than the sword,” in reference to the negative impact of agriculture to the world’s environment and

population (Bittman 2013). Because the world’s population continues to grow, the pressure to produce more food and seek new lands to cultivate also increases.

It is noted that in the Philippines, for example, 30 percent of arable land is planted with maize to be harvested as animal feed. Maize is one of the most common animal feeds in the world, but it can cause serious erosion in the uplands and increase the risk of landslides. If a perennial alternative could be found, the roots would stabilize the soil and yields may even be higher too.

Another evident damage is the conversion of forests to agricultural land. In the last 100 years in the Philippines, the trend was a continuous loss of forests starting in the 1900s when there was still 70 percent standing forest. In 1999, only 18.3 percent were left. If this trend continues, the Philippines will have no forest left in the very near future.

Perennialization as a Strategy for Sustainable Agriculture

One of the answers to this dwindling forest cover worldwide is to change the system of agriculture from short-term crops to planting of perennials. As advocated by the World Agroforestry Center, perennialization involves the substitution of annual crops with perennial plants and trees as they provide continuous ground cover and deep root systems for soil protection and stabilization, while increasing carbon stocks and reducing soil nutrients lost by leaching. The integration of trees into farming practices has the potential to sustain land productivity in addition to providing useful tree products such as firewood and fodder. This practice is referred to as agroforestry—growing trees on farms. Based on existing studies, it can provide the following benefits to the environment:

- Extend the productive life of soils;
- Develop resilience to extreme rainfall events, droughts, and insect pressures;
- Reduce land run-off that creates coastal dead zones with disastrous effects on fisheries;
- Maintain the quality of surface and groundwater; and
- Build food security.

Perennials vs. Annuals

Compared to annual crops, perennials have many ecological advantages. First, they live longer and develop deeper root systems over time; hence perennials have greater access to groundwater. Also, their deep root systems make them less prone to wind and rain damage, helping farmers adapt to climate extremes and protecting the soil from erosion.

The yearly work of ploughing in the stubble of previous annual crops and planting new seeds are not required with perennial crops, which saves energy and labor costs for farmers.

It also saves farmers the cost of pesticides and herbicides. Healthy stands of perennials can block weeds by denying sunlight and ground space, hindering their germination and growth. Aside from the obvious savings on expenses, the planting of perennials likewise reduces the impact of chemicals on local watersheds.

Perennials can be in the form of grasses, herbs, vegetables, and fruit trees (i.e., apples, avocado, bananas, blueberries, grapes, basil, chives, fennel, garlic, ginger, radish, etc.), but there are also exciting opportunities for them to directly substitute for grain crops.

Perennials that Can Replace Traditional Crops

Some perennials can be used as substitutes to existing annual crops that dominate world food production today. Nuts (i.e., chestnuts, hickories, hazels, and neohybrid hazelnuts) are potential crop substitutes identified as alternatives to cultivating cereals.

There are also other perennials such as peach palm (*Bactris gasipaes*) that has edible and very nutritious fruits; air potato (*Dioscorea bulbifera*), which can be prepared in the same way as other yams, potatoes, and sweetpotatoes; sugar palm or kaong (*Arenga pinnata*) and mangrove palm (*Nypa fruticans*) which have saps harvested for different commercial products in Southeast Asia; and breadfruit (*Artocarpus altilis*), a staple food in many tropical regions.

It is a fact that the eating habits of people are difficult to change. However, livestock are more adaptive and can change their diets in a much shorter time. Given this situation, it is easier to apply perennialization to substitute for livestock feeds and roughage than food.

Conclusion

There are still many challenges to be faced and research needed to support the movement for perennialization. Such research should be focused on technologies that can help develop the cultivation of sugar palm, nipa, and other crops, most especially in an agroforestry system; and the identification of a substitute protein source for livestock co-feeding.

Finding alternatives to annual cropping systems becomes more urgent as the world faces the need to mitigate and adapt to climate change. Perennialization could play a significant part in providing more robust, productive, and environmentally benign agricultural systems in the future.

¹ This learning note is based on Mr. Craig B. Jamieson's presentation at the 2nd International Conference on Agriculture and Rural Development in Southeast Asia held on 12-13 November 2014 in Makati Shangri-La, Manila, Philippines.

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³ Plenary speech at the Global Forum for Innovations in Agriculture, Abu Dhabi, 9-11 March 2015.

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Photo of sugar palm fruits by Suharijanto Pribadi

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