

# **Agroforestry and Sawah: A Sustainable Land Use System for Socio-economic and Environmental Benefits in Ghana**

By

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## ***Abstract***

*Farmers in Ghana practice shifting cultivation and the farm is abandoned in search of more fertile land for cropping. Cocoa farms are established on uplands whilst the lowlands are used for sawah development. The synergy of silicon in cocoa and rice may suggest that integrating cocoa agroforestry into the sawah system has very high potential socio-economic and environmental benefits. This paper comes out from two publications. The farm activity schedules for cocoa and rice cultivations do not coincide but overlap within the farming season. Farmers who may be producing both farm commodities will be occupied throughout the year and will be rewarded with commensurate incomes and food all the year round. The major hindrance to this agricultural system is land ownership and use rights. There is the need for secure individualized title, correlated registration of titles and introduction of new attitudes toward land. Tenancy can provide the means by which landowners and the landless may join their respective resources in a productive and complementary manner. However, structural framework in which farmers (tenants and landowners) can work together will be the panacea for sustainable socio-economic and environmental benefits.*

## **Introduction**

In Ghana, farmers continuously cultivate the land for a maximum of five years and only abandon this piece of land due to loss of soil fertility. Subsequently, new fertile land i.e. forestland is sought for farming in the same way. Cocoa farms however, could occupy the same land management unit for more than 50 years (Owusu-Sekyere *et al* 2004). Sawah rice on the other hand is capital and labour intensive especially during the preparation of the sawah field for rice based cropping system for the first time or season. But the field could be cultivated a long as may be required. The major activities after this are repair and maintenance of the sawah field bunds in the subsequent cropping seasons and can be done for years. Cocoa farms are established on uplands whilst the lowlands are used for sawah development. Hence, the uplands and the lowlands constitute the sawah ecosystem. The major hindrance to this agricultural system is land ownership and use rights.

It is very uncommon for a farmer to crop both uplands and lowlands due to different ownership, use rights and different crop preferences. However, if a single farmer would crop both the upland and the lowland to cocoa and sawah rice, respectively, biodiversity will be restored, effective and efficient land use management system will be developed, income will be intensified and diversified and land conflicts will be avoided. But if different farmers should crop the upland and lowland to cocoa and sawah rice, respectively, the above economic and environmental benefits may be difficult to achieve. Therefore, all efforts should be made ensure socio-economic and environmental harmonies between land users.

## **Methodology**

This paper was developed from “Extending Cocoa Agroforestry into Sawah Ecosystem in Ghanaian Inland Valleys” paper published by Owusu-Sekyere et al., (2010) and “Land Tenure Negotiations for Sustainable Sawah Cropping Systems in Ahafo-Ano South District of Ashanti Region, Ghana” paper submitted for publication by Owusu-Sekyere et al., (2011). These studies were carried out in three sawah rice and cocoa growing communities (Adugyama, Amakom and Biemso No. 1) in the Ahafo-Ano South District in Ghana.

## **Results and Discussion**

Generally, in Ghana, land preparation for farming begins in the dry season (November to March) and sowing or planting begins in early March to July in the rainy season every year. Maintenance of the farms does not follow any specific time frame but weeding is done two or three times in a year. Cocoa farming is considered one of the most lucrative farming activities in Ghana. Cocoa plantations are established together with the food crops. The cocoa trees start bearing fruits after 3-5 years. Though the new cocoa hybrids fruit all the year round, the peak period of harvesting is done from November to March corresponding to the dry season of the general cropping season each year (Owusu-Sekyere et al., 2010).

From the farmers` activity calendar (Table 1), land preparation, planting and harvesting food crops and the cocoa plantation are concurrent. Lowland rice is grown between the months of July to September every year. The overlap of land preparation for rice and other cropping

systems (food crops and cocoa) extends for one month (April). Rice planting is delayed for about two months and harvesting is done three months after planting for a month. Thus, during the peak months for the other food crops and cocoa seedlings planting and harvesting, rice cultivation and harvesting is delayed for two months (Table 1). Weeding, pest and diseases control and other activities are done as and when they become necessary and do not have particular time frames.

Table 1: Farmers` monthly activity calendar for the year for the establishments of farms

Farm type	Farmers yearly activity calendar (month)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mixed food crops	Land preparation	Land preparation	Land preparation	Sowing/planting	Sowing/planting	Harvesting/processing/marketing, etc						
Cocoa plantation	Land preparation	Land preparation	Land preparation	Sowing/planting	Sowing/planting	Sowing/planting	Sowing/planting	No activity (leisure)	No activity (leisure)	No activity (leisure)	Harvesting/processing/marketing, etc	Harvesting/processing/marketing, etc
Rice (Sawah)	Land preparation	Land preparation	Land preparation	Land preparation	No activity (leisure)	No activity (leisure)	Sowing/planting	Sowing/planting	Sowing/planting	Harvesting/processing/marketing, etc	Harvesting/processing/marketing, etc	Harvesting/processing/marketing, etc

 Land preparation

 Sowing/planting

 Harvesting/processing/marketing, etc

 No activity (leisure)

Source: Owusu-Sekyere et al., 2010

Rice is cultivated in inland valleys and on uplands. The yield of upland rice is low (less than 1.6 t ha<sup>-1</sup>) as compared to about 2.5 t ha<sup>-1</sup> for lowland traditional rice and more than 4.5 t ha<sup>-1</sup> for the sawah rice technology in Ghana (Issaka et al 2007). The term sawah refers to a levelled, bunded and puddled rice field with water inlet and outlet to control irrigation and manage soil fertility. The sawah rice farming system is now catching up with farmers throughout Ghana.

The sawah field is invariably in the lowlands i.e. valley bottoms or flooded areas. But the uplands play major roles in maintaining the rice fields for sustainable production. Hence, the uplands form part of the sawah ecosystem. The wetlands or inland valleys belong exclusively to the paramount chief who has the oversight responsibility over farmlands of towns and villages under his traditional authority whilst the uplands belong to tribes, clans, families and individuals

(both indigenes and migrants). There have been great uncertainties about securing the best tenure options for suitable valley bottoms for rice cultivation that can guarantee farmers continuous and sustained rice production.

Cocoa grown in the uplands has been shown to release silicon during leaves decay and has the potential to be transported down the slope to fertilize the lowland where rice is cultivated (Owusu-Sekyere et al., 2010). Silicon is an important nutrient for the optimal growth and sustainable production of rice (Epstein 1999, Epstein & Bloom 2005, and Ma *et al* 2006) (Fig.1). This synergy of silicon in cocoa and rice may suggest that integrating cocoa agroforestry into the sawah system has very high potential benefits i.e. ensure effective and efficient resource utilization above and below ground leading to environmental stability both in the upland and the lowland, opportunity for some form of activity linked with income generation all the year round without sacrificing degradation of the two farms, no period of unemployment and few leisure times on the calendar of the farmer (Table 1 and Fig.1) (Owusu-Sekyere et al., 2010).

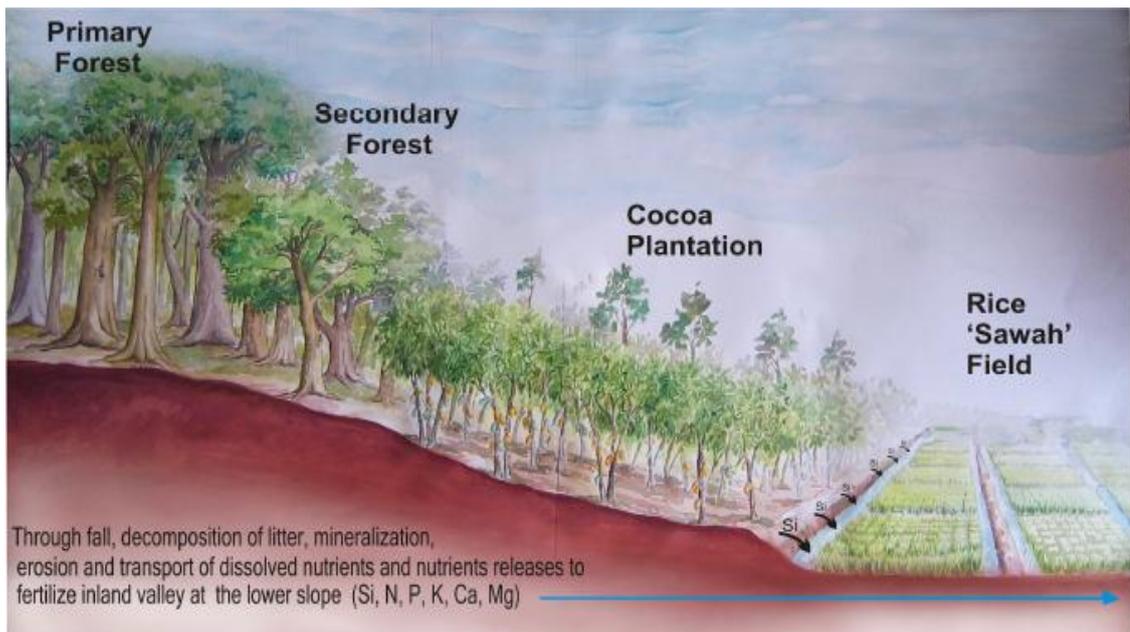


Figure 1 Extending cocoa agroforestry into sawah ecosystem in Ghana

Farmlands are obtained through inheritance given by family head and as gifts. Tenants accessed land by renting for a year, fixed tenancy for two (2) years and tenancies beyond 2 years are very few. However, few individuals own farmlands. Sawah farmers who hire or rent wetlands is high about 63%, 11% were for free, individual ownership is about 12% and about 14% cultivate on family lands. Land tenure problems can be solved by integrating formal law and social agreement to enhance economic efficiency. Tenure insecurity tends to be less

important for short-term inputs than for capital long term investment. Any attempt to promote sawah should ensure creation of secure individualized title, correlated registration of titles and introduction of new attitudes toward land. The essential function of tenancy improvement is to provide a structural framework in which tenants and landowners can work together to improve their financial and social positions to the benefit of the nation.

## **Conclusion**

It is concluded that farmlands (both uplands and lowlands) could be cultivated with cash (cocoa) and food (rice) crops. But the Tenure insecurity tends to be less important for short-term inputs than for capital long term investment. Any attempt to promote sawah should ensure creation of secure individualized title, correlated registration of titles and introduction of new attitudes toward land. Tenancy can provide the means by which landowners and the landless may join their respective resources in a productive and complementary manner. However, structural framework in which farmers (tenants and landowners) can work together to improve their financial, social positions and to maintain environmental quality should be the ultimate.

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