Technology Fact Sheet for Mitigation

Agriculture Sector:

1.

Technology Name:	**Organic Farming**[1]
Introduction	
Organic farming is an agriculture system which excludes the use of synthetic fertilisers, pesticides and growth regulators. Instead it promotes the use of crop rotations, green manures, compost, biological pest control and mechanical cultivation for weed control.	
Technology characteristics	
As mentioned, the organic farming practice involves with restriction of artificial fertilisers and pesticides use while it promotes the use of crop rotations with crop variety and legumes, cover cropping, reduced tillage, green manures and compost, biological pest control, and mechanical cultivation for weed control for enhancement of productivity. In Laos, the organic can be broadly divided into two aspects; organic farming by default and certified system. The organic farming by default refers to the traditional organic farming practices that have Lao farmers have been applied for long but it is not officially or formally certified. The certified organic farming system is the agriculture practices that meet the organic farming standard and good agriculture practice defined by Lao Certificate Body (a third and autonomous organization).	
Country specific applicability and potential	
The specific applicability and potential of the organic farming in Laos are indicated in term of policies support, local skills/awareness and geographical strength. The national socioeconomic development plan 2011- 2015 recognises the importance of organic farming and products as a unique product and promotes organic farming and products for domestic consumption and exportation. The strategy for agriculture development 2011-2020 recognises organic agriculture or farming as a promising agriculture practice. The certified organic farming is a value-added and accessible by the poor and can contribute to meet MDG goals. National growth and poverty eradication strategy (2003) also considered organic farming as a means for income generation and poverty reduction. Strategy on climate change of the Lao PDR (2009) promotes organic farming as a means for GHG mitigation and soil conservation. Environment strategy to the year 2020 considered the organic farming as environmentally friendly practice and expected to employ organic farming as a means for soil and water conservation or sustainable practice. Tourism strategy pointed out the linkage between organic farming and ecotourism as well as seeing the organic farming as a tourism attraction. These integration and promotion of the organic farming in these strategies and plans indicated the potential of the organic farming. As mentioned, Lao famers have been practiced organic agriculture for decades although it is not formally certified. The involvement of organic farming practice could mean that Lao farmers have	

knowledge and skills or familiar with such practice and this is a strength indicating the potential of the organic farming to be grown. In addition, availability of large land area and diverse geography and climate of Laos is another indicator of the potential.

Similarly, base on the survey of the stakeholders by Helvetas 2003, they perceived that there is potential for organic farming in Laos because of growing market and demand for organic products, favourable production conditions, experience in organic farming and existing products such as fruits, vegetables, mulberry tea, rice, coffee and cotton.

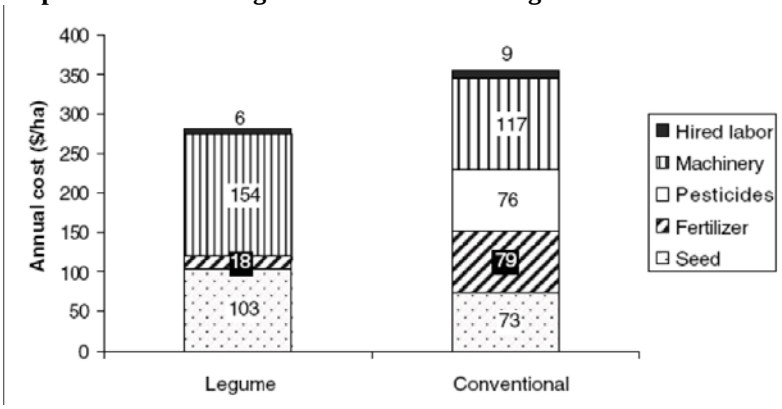
Status of technology in the country

Four different systems for organic production are common. 1) The upland fallow rotation (slash-and- burn) system the production is largely used for producing rice for home consumption, with job's tear, sesame and maize the most important crops exported. Although not formally certified, they are often referred to as "organically grown".; 2) Wild products collected in the forest and fallow lands for home consumption, local markets and for exports. Important products include bamboo shoot, banana inflorescence, and wild cardamom (Amomum sp); 3) Fruits, mostly produced without any external inputs, and 4) Market driven organic production. The systems 1-3 are largely "organic by default" but products are usually not certified as "organic".

Benefits to Economic development

The economic benefits of organic farming include low energy and cost of investment. Research finding by Kimble et al. (2007) and also cited in UNEP (2010) indicated that the organic agriculture requires less energy than conventional systems about 28% to 32%. Input costs for seed, fertiliser, pesticides, machinery, and hired labor for example in a rotation system with a leguminous crops are also approximately 20% lower than conventional rotation system does. Figure 6.2 is a comparison input cost between organic farming using rotation system with legume and conventional one. ,

Figure 6.2 Annual input costs for the legume and conventional grain rotations.



Source: Kimble et al., 2007

Furthermore, an example of UK's case, if all agriculture were organic, the elimination of nitrogen fertilisers would save substantial emissions or 1.5% of national energy consumption and 1% of national greenhouse gas emissions would be saved (Mae-Wan and Ching, 2008). Earlier studies showed that GHG emissions would be 48-66% lower per hectare in organic farming systems in Europe. The lower emissions were attributed to zero in put of chemical N fertilisers, less use of high energy consuming feed stock, low input of P (phosphorus)and K (potassium) mineral fertilisers, and elimination of pesticides. However, it requires careful design and implementation as in some areas that productivity could be lower.

Benefits to Social development

1) Provides income and employment opportunities for Lao farmers due to it is a labor intensive production system and implementable by local/farmers. In addition, organic products can be a unique, competitive and advantageous product for export for Lao farmers compare to other products.
2) Low risk on health due to restriction of chemical pesticide and herbicide while promote healthy consumption.

Benefits to Environment development

1) Improve soil organic matter, fertility and N supply due to application of manure, leguminous crops, crop residues and cover crops; leading to enhancement of soil C retention, sequestration of CO2 into soils while eliminating fossil fuel used to manufacture N fertilizer elsewhere.
2) Highly adaptive to climate change due to the application of traditional skills and high degree of crop diversity.
3) Reduces pollution due to the absence of pesticides and chemical fertilisers.

Climate change mitigation potential

As mentioned above, the annual sequestration rate increases up to 3.2tonnes of CO2/hectare per year by organic farming (Smith et al., 2007). However, if this practice applied worldwide emission reduction can be significant. Smith et al.(2008) estimated that annual global sequestration potential of organic agriculture amounts to 2.4-4Gt CO2-e yr-1, and it can be improved to 6.5-11.7Gt CO2e yr-1 by using new technologies in organic agriculture. On the other hand organic agriculture has lower methane and nitrous oxide emissions of 0.6-0.7Gt CO2-e yr-1 in comparison to conventional agriculture, which includes the burning of crop residue (Smith et al., 2007).

Financial requirements and costs

Overall, promotion of organic farming requires substantial and continuous financial support as it can take time to realize or prove its sustainability. Of cause the financial requirement can be different from one to another system. However, quantifying financial requirement is challenges because of there are various forms of organic farming, time consuming and can be costly. It is same for Laos. To date financial needs for promoting organic farming through the country is lacking. In addition, it also lacks of basic data for financial projection such target of organic farming development for example the area, system and also timeframe.

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment Reports For Climate Change Mitigation – Laos. You can access the complete report from the TNA project website http://tech-action.org/**