

THE IMPACTS OF CONTRACT FARMING ON RURAL FARM HOUSEHOLDS, LAO PDR.*

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ABSTRACT

This research is aimed to study the impacts on rural farm households of contract farming in Savannakhet, Lao PDR. The study has been conducted by the qualitative approach, by in-depth interview as well as employing observation techniques. The targets of this research were 10 key informants, such as sugarcane contract farming organizations which include buyers, officers, production groups and the 20 farm households who conduct sugarcane contract farming. Content analysis was employed for the data analysis. The results found that there were both positive and negative impacts on farm households. The positive impacts: both income and farm management skills were improved and household networks were established. Negative impacts: debts, exposure to chemical, pesticides and insecticides, low social relations were found. These are the risks facing the households participating in contract farming in Lao PDR.

Key words: Contract Farming, Impact, Farm household, Household Risk, Lao PDR.

INTRODUCTION

Contract farming is an agreement between farmers and processing and/or marketing firms for the production and supply of agricultural products under forward agreements, frequently at a predetermined price (Eaton and Shepherd, 2001). Contract farming is playing an increasingly important role in many developing countries.

Contract farming brings expansion of the markets, the promotion of agricultural commodities as a means of raising income, as well as being an alternative method for solving agriculture problems for households. Contract farming in Lao PDR, has been embraced and widely employed since 2002 (Fullbrook, 2007). It has been promoted and actively engaged particularly in provinces that share borders with neighboring countries such as Thailand and China.

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Contract farming is an alternative income scheme for rural farm households in Lao PDR. Sugarcane contract farming offers new hope instead of conventional income from rice and brings higher returns for households. In practice, the raising of income from sugarcane contract farming in rural farm households has been faced with a number of challenges. Sugarcane contract farming is new to rural farm households requiring farm management with regard to production, profit, skills and knowledge. Moreover, the households are facing a dominant buyer in the factory owners and sugarcane farms that provide an input to households as they may be competitors of the farm households in the planting of sugarcane.

Xaiburi, Savannakhet Province, is one of three districts in the province promoting sugarcane for raising the income of rural farm households. The sugarcane areas cover a total of 10,077 hectares, the majority of the areas are owned by the Mitr Lao Factory (7,517 hectare), while the rest are owned by rural farm households (2,560 hectare). There are a total of 628 households involved in sugarcane contract farming, while 564 households have debts of, on average, US\$ 5,096 per household (Savannakhet Province, 2012).

Contract farming is diversified and unpredictable as some households stopped growing the sugarcane, while some expanded their farms and others want to become sugarcane farmers. Therefore, the farm households may have some impacts from contract farming in both positive and negative aspects.

OBJECTIVE OF THE STUDY

To study the impacts on rural farm households of contract farming in Savannakhet Province of Lao PDR

SCOPE OF STUDY

Impact Evaluation (IE) a concept from the World Bank (2013) was combined with qualitative method as examined in this study. IE is an approach of BEFORE and AFTER in analysis and compares the performance of the project by comparing outcomes and beneficiaries both before and after a project has been implemented. While the qualitative method gains in-depth knowledge of impacts for understanding the issues.

Positive impacts: the aim is to examine the impacts of contract farming on rural farm households, focusing mainly on positive aspects that occurred before and after the households participated in sugar cane contract farming.

Negative impacts: the aim is to examine the impacts of contract farming on rural farm households, focusing mainly on the negative aspects that occurred before and after the household participated in sugar cane contract farming.

RESEARCH METHODOLOGY

Qualitative approach was employed in this study to explore the in-depth situation of the impacts of contract farming on rural farm households. The Nadaeng sugarcane growers group, Xaiburi District, Savannakhet Province, Lao PDR, was selected as a study site. The Nadaeng group is one of 28 groups in the district that comprise household members, who are sugarcane growers that have been planting sugarcane for the Mitr Lao sugar factory since 2007. It is larger than other groups nearby in terms of land growing area and its number of members. It is expected that the number of members will be increasing every year.

There are a total of 30 target groups in this study. Organization and household level are the units of analysis. Organization level included 10 key informants such as middlemen, officials, sugarcane producer group and sugarcane association as their work is relevant to sugarcane promotion. Household level included 20 rural farm households who have been growing or who used to grow sugarcane under contract farming for the Mittr Lao factory, are members of the Nadaeng grower group and are based on at least one yield season in order to examine their impact on contract farming.

In-depth interview combined with Semi-structured interviews (Creswell, 2012) were applied for data collection based on 2 different semi-structure interviews. One set of guidelines is for organization level and another is for household level. At household level, the head, or a member of the household who is working or used to work closely with sugarcane contract farming would be the representative of the household and was interviewed, group interviews and observation techniques were added in this study.

Content analysis was employed, combined with triangulation to enhance the accuracy of the data (Creswell, 2008). The analysis mainly focuses on the impacts, both positive and negative on farming household levels in contract farming, mainly on economic, social, health and environmental aspects.

RESULTS AND DISCUSSION

The findings of this study leading to impacts of contract farming on rural farm household and are presented into 5 main topics: Contract Farming in Lao PDR at Household Level, Characteristics of Nadaeng Households, Practices of Contract Farming at Nadaeng Sugarcane Grower Group, Positive Impacts of Contract Farming, Negative Impacts of Contract Farming.

1. Contract Farming in Lao PDR at Household Level

Contract farming is one of “2+ 3” Policy- divided benefits between villagers and investment, 2 things contributed by villagers or farm households are land and labor, while 3 things contributed by an investor or buyer are inputs, technical advice and market (Fullbrook, 2012). This contract farming policy mainly aims at improving the livelihoods of farm households, particularly in rural areas in raising income and employment. Besides, it will help in solving the problems of market and price that households have been facing for a long time. Furthermore, it gives households the ability to access inputs and improve agricultural farming techniques.

Due to high demand for agricultural products in both domestic and international markets, together with promotion by government agencies and buyers, contract farming has become widely developed. The government, especially at district level works closely with both farmers and buyers and acts as a mediator in the case of a dispute between the two sides, as well as promoting the setting up of groups in order to maximize benefit to households. Furthermore, the government monitors and supports the contract agreements, for example allowing buyers to register at the district office and by facilitating contact between buyers, the farmers or the farmers groups. As for the private sector, such as buyers, they ensure market and price, supply inputs for households on credit as well as promoting new agricultural techniques.

With promotion from many sectors, rural farm households have opportunities in contract farming that are new and offer an alternative method for raising the income of rural households along side conventional income sources from rice. Households who provide land and labor have been trying contract farming with a wish for a high return.

Savannakhet Province, one of many provinces active in contract farming, has a shared border with Thailand to the West. Sugarcane is spread throughout Savannakhet and is second only to rice plantation areas and covers a large part of this area in Lao PDR because Savannakhet has 3 sugar factories in the province. Mitr Lao, which is owned by Mitr Phol group in Thailand, is the largest factory and plantation in Savannakhet. Mitr Lao Factory was established in 2005 to produce sugar for domestic use and for export to Thailand for further processing and re-export to Europe. The factory received a total of 10,000 hectares of concession land from the Lao government, valid for 40 years and in 3 districts: Xayburi, Champhone and Outumphone. However, not all the concession land is usable as some pieces are strewn with stones (IUCN and NERI, 2011).

Xayburi is one of 3 districts in Savannakhet planting sugarcane for the Mitr Lao Factory. It is located about 68 Km to the north of Savannakhet city. The district has a total land area of 91,254 ha with a population of 59,539 people (Xaiburi District, 2013). The district still relies on agriculture and rice is a main source of income, with a minority sourced from livestock, corn, planting tobacco, peanuts and vegetables. Xaiburi has potential for sugarcane plantations because of its road connections, convenience of transportation and fertile land. The sugarcane factory is also located in this district.

To ensure the supply to the sugar factory and promote income of local communities nearby, the Mitr Lao factory agreed to have sugarcane contract farming with rural farm households. Rural farm households will grow sugarcane for the factory, while the factory will provide mainly necessary inputs to the farm grower households such as clearing land and planting, sugarcane stalk seed, fertilizer, chemicals for weed control as well as technical support.

After few years of the establishment of the factory, sugarcane contract farming was promoted for RFHs in Xaiburi District, there are 28 sugarcane grower groups, accounted for 628 farm households (Savannakhet, 2012). The groups were formed in order to promote planting sugar cane for raising household income in the district and maximize profit for farm households who are the members.

2. Characteristics of Nadaeng Households.

The Nadaeng group was formed in 2007 and promoted as one of 28 groups in Xaiburi District. The Nadaeng sugarcane growers group includes three villages, namely Nadaeng, Dongpaivan and Namuan Village, consisting of 31 sugarcane grower households, who cultivate of 211 hectares of sugarcane, ranging from 3 to 15 hectare per household. It is larger than other neighboring groups, such as Werntai group 1 (162.7 Hectares), YangKam (149 Hectares), in terms of land area and the number of members.

As with other groups, before sugarcane came, Nadaeng households relied mainly on rice plantation with additional sources of income from livestock, corn and tobacco. Because of the plentiful supply of water almost all of the Nadaeng households were able to plant both rain season and irrigated rice. Usually rain season rice was for home consumption while irrigated rice was for sale as a source of income of the household. Rice planting households use their own labor and some households pay for labor because of a shortage of workers. We observe two labor structures in Nadaeng, the first is the main labor of a husband, wife and their children, second, is parents and daughter, daughter in law or son in law.

Livestock, especially cows, was the second main income source of Nadaeng sugarcane grower households before sugarcane contract farming started. The correspondent 17 out of 20 households earned US\$ 400- US\$ 600 per year.

With high input costs for irrigated rice, but low returns on sales, some households are considering stopping planting rice and looking for a better, new source of income. Comparing both seasons, irrigated rice growers have to pay for water and fertilizer while rain season rice does not have these costs. So they consider it is not profitable to invest and are looking for a new source of income that is sugarcane contract farming.

The Nadaeng sugarcane growers group is comprised of households who are growing sugarcane for Mitr Lao factory. The households own both rice fields and some vacant land that they did not use for growing rice because of reasons such as a lack of labor, insufficient water and the low price of rice. A few years after the sugarcane factory was established in 2007, many households started growing sugarcane because they had enough land and were able to access labor, so this was an opportunity for rural farm households to raise a new source of income from sugarcane contract farming. The households had a new hope that sugarcane contract farming would bring greater benefits than growing rice.

3. Practices of Contract Farming at Nadaeng Sugarcane Grower Group.

Almost all households in the Nadaeng group were subsistence based, owned land and provided their labor. Therefore, when they participated in contract farming, almost all other inputs were provided by the Mitr Lao factory. As with other groups, all the input costs were provided by the factory 'on credit' and the households repaid their debt, with a 6 percent interest rate, upon sale of the sugarcane back to the factory. All the sugarcane households had to pay for this credit for their inputs although some households may have received different interest rates from the factory. Unfortunately, there were only a few alternative credit sources in the area such as the Agricultural Promotion Bank and ACLIDA Bank, but the households would need property with a land title to guarantee their borrowing from these sources.

As mentioned, there are two types of sugarcane farm in this area, the majority of the area is owned by the factory and the rest is owned by rural households who take part in sugarcane contract farming. The two types of farms are treated in the same way, the factory provides all necessary inputs for the farm households to produce sugarcane and then the households sell the sugarcane back to the factory. In practice, they may not share inputs equally, as the household farmers observed that the factory provide for their own farm land first and then assist the household farmers. As an example, the factory will finish ploughing their own land and then help the household farmers to plough their land.

Working in sugarcane contract farming, the sugarcane grower households work closely with the factory and receive some assistance from the district authorities such as the agriculture extension office. The factory provides two staff members to work directly with the households in promoting sugarcane plantation in every zone. There are thirty two sugarcane zones in Xaiburi District. The zones were created by the factory to make it more convenient to assist and manage the promotion of sugarcane plantations.

Nai Paeng, (Local name) means head of the sugarcane fields and Head of the Zone. The head of the sugarcane fields works closely with households and reports his work to the head of the zone. The head of the zone is in charge of the sugarcane fields and reports his work to the factory.

In almost all cases, households contacted the head of the sugarcane fields when they needed to clear land, needed fertilizer, or for advice with problems related to the sugarcane field. For example, if the household wants to plough their land, they call to the head of the sugarcane fields and he will order his staff to come and plough the land.

Only in a few cases would the households call directly to head of the zone. Calling to the head of the zone directly may make Nai Paeng unhappy because he might think that the households did not respect him, only in a very few, very urgent cases would the households call directly to the head of the zone.

Before planting the sugarcane, households must inform the head of the zone, the head then sends his staff to survey and measure the area to be planted. The measuring of the land area to be planted is an important step because it will affect the input cost, the factory calculate and provide the inputs based on their measurements.

With regard to planting sugarcane, some households made a contract while others did not. Some households only informed the Nai Paeng that they would grow sugarcane without making a contract. Households without a contract believed that the factory had high demand for sugarcane products, so it was not important for them to make a contract because the factory would buy all sugarcane without asking about a contract. However, for those contract households, sales would be guaranteed for 10 years. For households who did not sign a contract there may be a risk, in the event of oversupply of sugar cane.

Some of the main steps of sugarcane plantation include; clearing and planting, tending the sugar cane fields, cutting and transporting to the factory, details are as follows:

3.1 Clearing and Planting Sugarcane: Land Preparation in this step, the factory advises how to clear the land, ploughing 3-4 times, based on land conditions. If the vacant land has no large trees, it may not need to be ploughed so many times.

The depth and width of the ploughing and planting were decided by the factory, the large tractor was supplied by the factory which maintained a constant standard.

In the process of clearing land, almost all households used the big tractors provided by the factory, because their own hand tractors were not suitable to plough. From household experience, they knew that late rainy season was a suitable season for planting sugarcane because the low levels of rainfall made sure the sugarcane stalk would not decay.

High demand for land clearance during the planting season meant that the factory could not assist all sugarcane households on time, resulting in some households ploughing insufficiently before planting while some households were late ploughing and late planting. These factors brought about immature sugarcane and resulted in low yields.

Moreover, some households had ploughed only some of their land and then stopped meaning they must start to plough again next year. This raises the costs to the household. Late planting of the sugarcane meant it did not fully mature and consequently lead to low yield. There were 10 out of 20 households who were late ploughing and late planting.

Planting Steps, almost all of the households used big tractors with planting machines provided by the factory to plant the sugarcane. Only a few households, after clearing the land, planted by themselves or hired extra labor. However, the planting area was rather large for manual labor, also the quality of the sugarcane stalk seed was reduced when kept for many days, so the households preferred to use the tractor. However, because of the high demand for the tractor planting machine, at least two households in the Nadaeng group planted sugarcane by hand as they thought that if the tractor did not arrive, the sugarcane stalk seed would go to waste, so they decided to use their own strategy by hand planting instead of waiting.

In the past, households were not allowed to keep their sugarcane as seed for next year because of concerns about the quality of the yield. However, this year the

factory plans to allow the households to keep some stalks as their seed, in order to solve problems of late delivery, and lower the budget of supplying by the factory.

3.2 Process of Tending the Sugar Cane: Applying fertilizer, households were advised by the factory that they had to apply the fertilizer twice, first when planting the sugarcane and second after the sugarcane had grown to about 30 centimeters. Some households did not know the exact formula of the fertilizer, they only knew that they had to apply twice, two bags of fertilizer per Rai and follow the factory's instruction. Usually, the factory requested households to collect their fertilizer at the factory and householders used their own transport, at their own cost, to transfer from the factory to their farm.

In applying fertilizer, more than ten of the twenty households said that they strictly check the fertilizing process and fertilizer can be applied by hand or by machine from the tractor. But most important is that the householders check whether or not that they are applying the fertilizer correctly, as per instruction, if not or if they are careless applying the fertilizer it will be useless, becoming a cost without any return. It was found that almost all households in this group followed the factory guidelines strictly, applying two bags of fertilizer because they thought it was an important input to ensure their sugarcane yield.

Controlling weeds, during planting or after the sugarcane reaches a certain height, it can be sprayed to control weeds. Some households did the spraying themselves to save on cost, while other households decided to pay workers to do this step for them because of concerns over health risks. Usually there would be two costs in spraying: paying for the weed killing liquid (cost 500 Baht/ per ... liter) and payment for the workers to spray (600 Baht). In the case of there being a low level of weed at their farm, households decided to control it by hand rather than use chemical.

3.3 Cutting and Transporting the Sugar Cane to the Factory: Cutting sugarcane, households had to pay for laborers in their village or at the village nearby to cut and lift the sugarcane to the truck. To find the labor, households used some strategies such as they made a prior agreement and provided a vehicle to pick them up, some households encouraged their laborers by making an advance payment, some households assisted the laborers by helping them plough their rice field. Besides the cutting, households have to pay for lifting the sugarcane to the truck at the rate of 30,000 Kip per day. At their rice field, the householders did not mainly employ the same laborers every time. When the sugarcane came, the householders had to depend on mainly hired labor that was totally different from their traditional practice. Some people work as labor brokers or middle men to organize groups of laborers to cut and lift the sugarcane on to the truck. To pay for all the cutting and lifting, the householders borrowed money from the factory.

Cutting the sugarcane and removing some of the leaves after cutting, affects the selling price of the sugarcane at the factory. There are three different prices: 1,100 Baht for fresh stalk sugar cane with leaves cleared, 1,050 Baht for fresh sugarcane without the leaves being cleared, 1,030 Baht for burned sugarcane stalk. The factory prefers the sugarcane with leaves already cleared and attracts householders with the highest price. Incentives such as providing a higher than normal price, is one strategy for buyers to attract a higher quality. Similar to other studies, the buyer wants a higher quality product by providing an attractive price or incentive to farmers or producers (Saenger, Qaim, Trero and Viceisza, 2013).

Delivery to the factory, this is an important process, the faster the delivery, the more quality and weight of the sugarcane. Households have the choice of two types of transportation to the factory: to ask for the factory truck or to provide their own truck

and deliver the sugarcane to the factory. However, in harvest season many household farms needed the truck from the factory which means some householders are late delivering the sugarcane. Late delivery affects the weight and quality of the sugarcane.

To resolve the problem of late delivery to the factory, 1 in 20 households chose to drive their small tractor, loaded with sugarcane, to the factory and could make 3-4 trips per day. However, delivery to the factory, as fast as possible, will help to save income. If the sugarcane was cut and kept for 1-3 days, it will lose weight of 0.3-0.9 Ton, while burned sugarcane, kept for 1-3 days, will lose weight of 0.6-1.5 Ton (Mitr Phol Sugarcane Research Center, 2013).

Also important was that some households were careless or did not follow the truck to the factory. They trusted the truck drivers to be honest and not cheat on the quantity by letting the truck be weighed without them checking themselves at the factory weighting point. One household checked and found that the driver had changed his sugarcane with that of another household.

Successful households explained that during every planting step they have to follow up on everything and they did not let the staff from the factory work unsupervised at their farm. For example, they had to check that the staff ploughing or applying fertilizer did so correctly as if they did not, without checking, it would affect the cost and quality of the yield.

4. Positive Impacts of Contract Farming

In this section we examine how sugarcane contract farming has impacted on rural farm households, positive impacts, before and after the contract at the Nadaeng sugarcane grower group, including impacts on income, Skills for Farm Management, Establishment of Household Networks

4.1 Impacts on Income: When comparing sugarcane and rice, income from sugarcane is higher. The households know exactly how much money they will get from sugarcane while the income from rice is vague. Money from sugarcane means households can buy things of a higher value while rice income only covers the cost of daily life such as food or clothes.

Successful sugarcane farm households can, with cash or credit, buy a full-size tractor, a truck for delivering to the factory, a car, more land to expand their sugarcane field or a new rice field. These are types of investments for the households instead of keeping money in the bank. The successful households have sufficient equipment; they do not have to wait for the factory to assist them.

Normally, with sugarcane planting, the average yield is 75 tons/ hectare or 12 ton per rai per year (1 hectare = 6.25 rais). This is higher than in Thailand where it is 7-9 tons per rai (Mitr Phol sugar cane research center, 2013). Sugarcane, after costs, rural farm households earned 2-5 million kip per hectare or US\$ 256- US\$ 641/ha (7,800 Kip/US\$). Compared with rice where the yield is 3 tons/1 hectare and after accounting for costs, households earned about 500,000 to 1 million kip/ hectare. Almost all households in the study site reached the same yield from sugarcane plantation, but differing production costs lead to differences in income for the sugarcane households in the study site.

Sugarcane yield in this study area is higher than in Thailand. However it does not mean that Lao farm households received more income than those in Thailand because it seems that input costs were higher than in Thailand. Data from the Xaiburi

Agriculture for Promotion and Forestry Office (2013) calculated that in the study area, cost of sugarcane growing per year is US\$ 2,134.

We can see that income from sugarcane is higher than from rice, however, sugarcane needs higher inputs and more time is needed to look after it in every process of cultivation. However, income from rice is lower compared to sugarcane, but it provides a source of secure food for households.

4.2 Skills for Farm Management: The skills of farm households were improved both directly and indirectly. Some households received training before planting the sugarcane some went to visit sugarcane fields in Thailand while others applied their own experiences with rice to their sugarcane plantation. Some households did not train directly with the factory but they learned from the other households that had been trained by the factory, followed the factory's advice and their skills improved.

Households have learned farm management techniques such as how to reduce costs, make high profits, higher returns, manage time and inputs, follow up work at their farm and build connections with other sugarcane members and the factory which enables them to develop themselves from subsistence level to be a farm business.

4.3 Establishment of Household Networks: With planting sugar cane, households had many new connections to people that were different from when they were planting rice, which does not require that they contact many people. Households called to 'Nai Paeng' and the head of the zone when they required fertilizer or help with clearing land. During harvest season, households called on laborers to cut the sugar cane. Paying the cutting fee is not the only factor to ensure enough labor for cutting sugar cane, but by giving help to the workers when they needed help to plough their own rice fields or paying some money in advance will secure the labor.

The households who were planting sugarcane are members of a group. Sugarcane contract farming creates new networks within the groups themselves and also within the district. The group head is responsible for collecting information and dealing with the members problems, at the same time; the group also helps members regarding techniques for planting sugarcane. Some households made new friends when they visited Thailand for field tours and some have new Thai friends since the factory was established.

Currently, the sugarcane association has just been established with the aim of promoting sugarcane planting, to facilitate sugarcane growers and to be a center for sugarcane contract households in developing sugarcane to improve living conditions in the Xaiburi District.

5. Negative Impacts of Contract Farming

From the study, It was found that there are some negative impacts including debts, exposure to pesticides and insecticides, poor social relations.

5.1 Households are debts: It is found that household increased debts because of high cost of inputs: high cost of fertilizer, high cost of sugarcane stalk, high cost of labor, making fence, difficulty to reduce the cost, the remainder became waste, problem of calculating process. While low production:

1) *High cost of inputs:* There is no strict regulation, households can buy inputs by themselves or credit from the company. Because of lack of capital, almost households decided to buy credit inputs from the factory and pay back when the households selling the product to the factory.

- *Higher cost of fertilizer*: Normal price fertilizer is 1,000 Baht per bag (50 Kg), but households have to pay 1,200 Baht/ bag for chemical credit. Households raised question that fertilizer should be cheaper because the factory received tax exception from the government as policy of promotion of agriculture.

- *The high cost of sugarcane stalk seed*: The sugarcane seed is very expensive, for 1 ton of sugarcane seed, the households had to pay back to the factory, next year, 1.5 tons, the price for household sugarcane was about 1,000 Baht while households buying sugarcane stalk seed from the company were charged 1,500 Baht, because the factory was confident of the quality of the seed. For example, if a household had credit for 1 ton of stalk seed, next year they had to return 1.5 tons to the factory, at a price of 1,500 Baht per ton. However, some households thought that the stalk seed was not high quality and imported from abroad, but came from other farms near to their village.

- *The high cost of Labor*: during peak labor seasons such as harvesting, some households had to pay for labor at a higher than normal rate, 35,000 Kip per day instead of the normal rate of 30,000 Kip, so as to be able to attract enough laborers.

- *Making fence*: Planting of sugarcane in this area may differ from others as households had to erect fencing to protect the sugarcane from cows that would eat or destroy it. The cost of fencing is \$920 per hectare. The factory provided credit to households for this, provided some materials for fence making or gave cash to the households to buy the fencing.

- *Difficulty to reduce the cost*: It is not easy for households to save on the cost of production because almost all inputs depend on the factory.

- *The remainder became waste*: the remainder such as sugarcane stalk seed which can not be returned to the factory. The factory provided inputs based on their own measurements when they visited the household fields. In some cases, the measurement between the factory and real planting area of the household was different the measurement from the factory was higher which made for higher input than needed. It was a cost to the households.

- *Problem of calculating process*: all costs calculated by the households and all costs calculated by the factory are different, sometimes the cost calculated by the factory is higher, sometimes other costs appear to households' 'without reason'. It made households have artificially high costs and it is not easy to appeal as it takes time. Some households, who were careless, did not keep any receipts from the factory and had to face high costs as they did not have any evidence to appeal.

All expenditures must have evidence such as a receipt. When it is time to calculate expenditure, at the factory, if it is not the same as the households calculated, they should go back to re-calculate. They should not have to sign any documents before the calculation is cleared up because if they sign to accept that calculation it would be difficult to appeal for change.

Planting sugarcane in this area has high input costs, almost all inputs are provided by the factory, however, the households have to pay back at a 6 percent interest rate, although some households may receive a different rate. Savannakhet Province reported that planting sugarcane in Xaiburi incurred high input costs with the total input cost at \$2,143 hectare per year (Savannakhet, 2013).

2) *Low production*: In the study area, a late planting season and late supply of inputs were found to cause low production.

- *Late planting season*: High demand for clearing land during the planting season resulted in some households ploughing insufficiently prior to planting, while some households were late ploughing and late planting. These factors lead to the sugarcane not being mature enough and resulted in low production.

Ten households out of twenty found that their sugarcane had low sprouting levels, they believed that this was because they received low quality stalk seed, the stalks had been kept for many days and some had dried out. These factors lead to low sprouting of the sugarcane.

- *Late supply of inputs*: because of the high demand for inputs and consequent late supply from the factory during the planting season, some households received their fertilizer late, which affected both their fields and their yields.

3) *Lack of follow up the farm*: At every step, households have to take care and follow up, if the households are careless, it may affect the cost and yields that lead to debts. In 2012 it is found that in Xaiburi District, 604 households out of a total of 628 households have debt or we can say that 72% of sugarcane households have debt. On average, each household has debts of US\$ 5,096 (Savannakhet Province, 2012). Similarly the previous study from IUCN and NERI found that almost households in the study site had debts (IUCN and NERI, 2011).

Many households stopped raising livestock, which meant that they lost their second main source of income. Some households said that if they continued to raise cows and their cow damaged the sugarcane, they could not find money to pay for that damage, so they decided to quite livestock. Other households said that raising livestock was not easy anymore, as now they were busy with the sugarcane fields and they did not have enough time for raising cows.

5.2 Exposure to chemicals: Herbicide: To control weeds, some households spray the liquid chemical themselves because they want to reduce their costs, while some households pay workers to spray because they are concerned about health problems. The households were trained to use the chemical correctly but, unfortunately, the factory was unable to supply protective equipment to all the sugarcane households. The households who sprayed their own crops were found not to have proper equipment to protect themselves from the chemicals; they just used equipment such as dust masks, their normal thin clothes, boots and gloves which may not offer full protection from the chemicals.

In the case of the workers spraying, problems were also found; the workers were careless when spraying, over-spraying and failing to properly clean the empty equipment causing chemical seepage in to a nearby river. Even though sugarcane grower households were able to avoid direct contact with the chemicals by paying workers to do the job, the workers who participated were affected by this process of sugarcane contract farming.

Chemical fertilizer: The rate for using chemical fertilizer in the area is 2 bags (50 kg) applied in the first year, 1 bag applied in second year and 1 bag applied in the third year. This is still low compared to the rate of chemical usage in Asia. However, it impacts upon households' sources of food such as water, food from the forest, the raising of livestock that are nearby to the area using chemicals and the draining of weed control chemical damages rice fields near to the sugar cane.

In the study area, it was found some sugarcane suffered damaged stalks due to attacks by boring insects, if this were to continue or more insects arrived on the sugarcane farm, it would be hard to avoid the use of insect pesticide.

More and more households are demanding to grow sugarcane by contract farming, planting areas are expected to expand every year, consequently, the use of chemical fertilizer, insecticide, as well as chemical weed control or herbicide are expected to increase as well, it will affect more and more people (direct and indirect impacts), animals, as well as the environment.

5.3 Poor Social Relations: Planting sugarcane affects the people raising cows, before the sugarcane, villagers could raise their cows freely. To benefit both groups there were agreements, the cow raisers have to look after their cows and not let them graze freely as before. If a cow damages the sugarcane, the sugarcane grower can kill the cow without any permission and the owner of the cow would be fined. For the sugarcane growers they had to make fences for their sugarcane. Accumulated problems between the traditional and contract farmers may develop little by little and will be difficult to solve in the long term. Contract farming may be in conflict with traditional styles of living; a study from Thailand by Jamaree Chiangthong, Wattana Sukansin, Jirawan Rakchat, Sawang Meesaeng. & Pariyawan Jaipinta (2554) found that chicken contract farming households had conflicts with their community because their chicken farms created problems, there were a lot of flies, spiders and the smell affected nearby households.

Sugarcane farming makes rural farm households very busy during the peak labor season such as when planting and cutting. The households are unable to do other activities during that time which causes them to miss out on some activities in their village such as village meetings and festivals as they have to concentrate only on farm work.

CONCLUSION AND RECOMMENDATIONS

Contract farming is a means of raising income, assisting them to access inputs as well as providing techniques for their rural farm household. Savannakhet is one of many provinces actively embracing contract farming. There are twenty eight groups of sugarcane contract growers in Xaiburi district in Savannakhet Province, including Nadaeng sugarcane grower group.

From the in-depth study of those practicing sugarcane contract farming in the area, it was found that there were positive and negative impacts. Negative impacts included high cost of inputs, low production, lack of follow up at the farm, consequently, the sugarcane grower households had debts, exposure to chemicals, pesticide and insecticide as well as lower social relationships.

From this study, the researcher would like to propose:

An organization is required to press the authorities to reduce the impacts such as debt and. If this is not done quickly it may not produce a positive impact as households increase land size or do not strictly follow up their contract farm.

In the case of Lao PDR, soil fertility may be different to other locations and research is required to examine the land condition in order to apply suitable inputs in the context of Laos.

A mechanism is required to reduce the negative impacts, in the case of chemical pollution, organic products should be found to reduce or replace the use of chemicals in the long term.

The promotion of contract farming for rural farm households should be based on conditions and contexts of the area rather than simply copying methods from other places.

The researcher would like to further study on risk reduction for rural farm households in contract farming so as to minimize the negative impacts for these households.

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