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ECONOMIC EFFICIENCIES OF THE FOREST CERTIFICATION GROUP IN TRUNG SON COMMUNE, GIO LINH DISTRICT, QUANG TRI PROVINCE

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Abstract: Forest Certification is a solution that is supplement to public regulation to promote better forest management. In 2010, a forest smallholder group in Trung Son commune, one of first commune groups in Viet Nam was awarded with Forest Stewardship Council (FSC) Certificate. This research addresses the benefits of the FSC Forest Certification Group in Trung Son commune in economic, environmental and social aspects. In terms of economic effects analyzed by cost-benefit analysis (CBA), FSC forest plantations have brought great efficiency to farmers with net present value of VND 52,378 million per hectare over 7 years, approximately VND 20 million greater than the amount earned by non-FSC plantations. Moreover, through 10 principles and 56 criteria, FSC has positively contributed to society and sustainable forest management. Finally, this research figures out some problems in the FSC certification group and suggests some solutions. Some recommendations are also provided in order to enhance its efficiencies and promote the expansion of forest certification.

Keywords: Forest certification, FSC, forest management, Trung Son commune, economic efficiencies, smallholder certification group

1 Introduction

Forests play a very important role in the national economy, society, lives of people and the environment. The pressure of population growth and the impact of economic development have made a decline in forest area and forest resources. The natural forest area decreased from 14.3 million hectares in 1943 to 9.18 million hectares in 1990. The area of rich and medium forests has been declining, while the area of poor and regenerating forests has been rapidly increasing [1]. Accordingly, laws of protecting and developing forests and National Forestry Strategy have had a clear mandate on sustainable forest management, but they have not yet built up stable forest management policy for existing types of forests in our country [2].

Forest certification is an important solution for sustainable forest management, especially for production forests. In fact, it is a mechanism for forest monitoring, tracing and labeling timber, wood and pulp products and non-timber forest products [3]. The certification process involves an evaluation of management planning and forestry practices (harvest, renewal and maintenance activities) by a third party according to an agreed-upon set of standards [4]. Worldwide, there are many countries which have successfully adopted the forest certification model and practiced sustainable forest management, especially protection forests and special-use forests. Until 2013, there were above 183.1 million hectares of forest in 79 countries having the FSC certification [5]. In the year 2010, forest smallholders in Trung Son commune were one of the first smallholder groups who have sold their first FSC Chain of Custody (FSC/CoC)

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certified acacia logs and woodchips into market with price premium of 25%. However, almost all forest holders have not well known the benefit from achieving the certified forest products even though there is high demand for such a kind of certified products of both Vietnam and international markets [6].

The first objective of this paper is to investigate the economic efficiencies of the Forest certification groups in Trung Son commune, GioLinh district, Quang Tri province. The second objective of the paper is to evaluate the positive effects, limitations and difficulties in the application of forest certification. The paper also aims to propose solutions to enhance the effectiveness of the forest certification.

2 Methodology

2.1 Data collection

Secondary data were collected from Trung Son Communal People's Committee and Provincial Department of Forestry of Quang Tri. The research also involved gathering secondary information from other reports, studies and books (see [6, 7, 8]).

Primary data were collected from direct interviews. According to Trung Son Communal People's Committee, by 2013 there were 57 households in Kinh Mon and Giang Xuan Hai villages participating in the FSC forest certification program. To have a representative sample, we randomly chose 29 households from the list (accounting for 50% households with FSC forests), of which 15 were in Giang Xuan Hai and the other 14 in Kinh Mon. In addition, we also randomly selected 30 households that had non-FSC forests in Trung Son for direct interviews in order to get information. The respondents were heads of the households who directly participated in forest planting.

2.2 Data analysis

CBA analysis is used to analyze indicators, performance, economic and financial efficiencies for both FSC and non-FSC forests. It takes into account indicators such as net present value (NPV), internal rate of return rate (IRR), the benefit cost ratio (BCR). A sensitive analysis with different discount rate using Microsoft Excel software is also conducted.

Steps in CBA include [9]:

- Identification of scenarios/options: There are two options that are non-FSC forest plantation and FSC forest plantation.
- Evaluation of costs and benefits of each scenario: Costs of FSC forest plantation scenario cover production costs (site preparation, seedlings, fertilizing, tending, protecting and harvesting cost, etc. The costs of FSC forest plantation include FSC certification as well. Benefits come from selling certified timbers and chip wood.
- Calculation of financial indicators for CBA: NPV, IRR, BCR indicators are used for analyzing and comparing financial efficiency of two scenarios with interest rate of 10%.
- Sensitive analysis: Sensitive analysis is performed to see how the indicators change when the discount rate changes in different scenarios. The worst case is when the discount rate

is equal to 15%, and the best case is 5%. The base case is when the discount rate is equal to 10%.

- Making recommendations: Based on the result, the research will make recommendations to enhance efficiency of forest certification.

3 Situation of FSC certification application in Trung Son commune

From 1999 to 2000, acacia plantations in Trung Son commune were mostly operated under the Vietnam-German project funded by German Development Bank (KfW). By 2010, 319 households in the commune had been issued red books for their forest area [7].

In 2010, with the support of World Wildlife Fund Vietnam (WWF), 5 forest smallholder certification groups in 5 villages of Trung Son and Vinh Hung communes of Quang Tri province were established. They were awarded with FSC certification, becoming the first small groups of small forest owners in Vietnam to be certified against the recognized FSC's standard for environmentally responsible, socially beneficial and economically viable forest management. The total area of the groups was 356.5 hectares, including 320 hectares of acacia plantations. All the total area of acacia plantations had the certification of FSC FM/CoC issued by GFA [6]. By the middle of 2014, the provincial group had become a legal association of smallholder forest certification groups with 922 hectares of acacia plantations belonging to 341 members. Those households belong to 20 village groups in 11 communes of 5 districts in Gio Linh, Vinh Linh, Hai Lang, Trieu Phong and Cam Lo of Quang Tri province [8]. Trung Son commune has 57 participating households with the total certified area of 125 hectares, including 50 hectares in Kinh Mon village and 75 hectares in Giang Xuan Hai village.

4 Results

4.1 Characteristics of the respondents

Table 1. General characteristics of the respondents

Characteristics	Result	
	Respondents with FSC forest	**Respondents with non-FSC forest**
Gender (percentage of male)	62.01	63.33
Age (average age of respondent)	44.28	41.67
Household size (members)	5.14	5.27
Labor (average number of labors in household)	2.76	2.63
Education (%)		
Illiterate	0	6.67
Primary school	48.28	43.33
Secondary school	31.03	30
High school	13.8	16.67
Above high school	6.9	3.33
Annual income of the households (millionVND)	67.24	58.33
Average forest area of the households (ha)	2.24	1.97

(Surveyed data, 2015)

4.2 Efficiencies of Forest Certification Group in Trung Son commune

Economic efficiencies

The market price of certified acacia logs (D > 10cm) is higher than that of non-certified similar products. Their average price is at VND 1,900,000/m^3 and VND 1,375,000/m^3, respectively. This price is "at the forest gate" price, but it includes harvesting labor costs and transportation costs that are covered by forest owners. The difference between two purchase prices is VND 525,000/m^3, accounting for approximately 27.6% [8].

Cost-benefit analysis of FSC forest plantation

For FSC forest plantations, the business rotation is 7 years. The major costs were allocated for forest establishment (site preparation, seedlings, labors) in the first year and for harvesting, debarking and transporting in the 7th year. The income sources in FSC certified plantations come from selling FSC certified logs and chip wood in year 7. Total revenue was over VND 148 million/ hectare in 7 years.

Table 2. Cost and revenue structures of FSC Forest plantation

Unit: VND 1000/ hectare

		Year							
No.	Contents	1st	2nd	3rd	4th	5th	6th	7th	Total
1	Costs	**10250**	**2600**	**600**	**900**	**400**	**220**	**21396**	**36366**
a)	**Production cost**	**10250**	**2600**	**600**	**400**	**100**	**100**	**21276**	**35326**
1.1	Forest design	150	0	0	0	0	0	0	
1.2	Site preparation	3500	0	0	0	0	0	0	
1.3	Seedlings	1600	0	0	0	0	0	0	
1.4	Fertilizers	3000	2000	0	0	0	0	0	
1.5	Planting	900	0	0	0	0	0	0	
1.6	Weed control	1000	500	500	300	0	0	0	
1.7	Protection	100	100	100	100	100	100	100	
1.8	Harvesting							8800	
1.9	Transportation of logs							3696	
1.10	Transportation of chip wood							8580	
1.11	Contribution to authority							100	
b)	**FSC certification costs**	**0**	**0**	**0**	**500**	**300**	**120**	**120**	**1040**
1.12	FM/CoC certification cost				500				
1.13	Adjustment cost					300			
1.14	Cost of monitoring						120	120	
2	**Revenues**							**48614**	**148614**
2.1	Logs (D > 10cm)							17040	
2.2	Chip wood (D < 10cm)							31574	

(Surveyed data, 2015)

The net present value of FSC forest plantation was VND 52.378 million/hectare in 7 years, BCR was quite high at 3.19 (table 3). This means that, on average, farmers gained 3.19 unit of revenue from one unit of cost incurred. This is a much higher income than that coming from agricultural production, particularly in the mountainous area as Trung Son. The IRR reached 33.47% at the discount level of 10%. At the discount rate equal to 33.47%, NPV will be equal to zero. The current discount rate is much lower than IRR, thus the FSC forest definitely guaranteed for farmers with positive NPV.

Table 3. Cost-benefit analysis of FSC forest plantation with timber purpose in 7 years

Year	Total cost/ha (VND1000)	Total benefit/ha (VND1000)	Discount rate (10%)	Present value of benefit/ha (VND1000)	Present value of cost/ha (VND1000)	Net present value/ha (VND1000)
1	10250	0	0.91	0.00	9318.18	-9318.18
2	2600	0	0.83	0.00	2148.76	-2148.76
3	600	0	0.75	0.00	450.789	-450.789
4	900	0	0.68	0.00	614.71	-614.71
5	400	0	0.62	0.00	248.37	-248.37
6	220	0	0.56	0.00	124.18	-124.18
7	21396	148614.4	0.51	76262.69	10979.53	65283.15
Total				76262.69	23884.53	52378.16
	NPV/ha = 52378.16		**BCR = 3.19**		**IRR = 33.47%**	

Cost-benefit analysis of non-FSC forest plantation

Table 4 shows the cost and revenue structures of non-FSC forest plantation with timber purpose in 7 years. The production cost from year 1 to year 6 was quite the same with FSC forest plantation. However, the cost for year 7 was higher due to higher transportation cost for chip wood.

Table 4. Cost and revenue structures of non-FSC forest plantation with timber purpose

Unit: VND 1000/ha

		Year							
No.	Contents	1st	2nd	3rd	4th	5th	6th	7th	Total
1	Costs	**10250**	**2600**	**600**	**400**	**100**	**100**	**25940**	**39990**
	Production cost	**10250**	**2600**	**600**	**400**	**100**	**100**	**25940**	**39990**
1.1	Design the forest	150	0	0	0	0	0	0	
1.2	Site preparation	3500	0	0	0	0	0	0	
1.3	Seedlings	1600	0	0	0	0	0	0	
1.4	Fertilizer	3000	2000	0	0	0	0	0	
1.5	Planting	900	0	0	0	0	0	0	
1.6	Weed control	1000	500	500	300	0	0	0	
1.7	Protection	100	100	100	100	100	100	100	
1.8	Harvesting							8800	
1.9	Transportation of logs							2640	
1.10	Transportation of chip wood							14300	
1.11	Contribution to authority							100	
2 2.1 2.2	**Revenues** Logs (D > 15cm) Chip wood (D < 15cm)							**113124** 60500 52624	**13124**

(Surveyed data, 2015)

The revenue of non-FSC forest plantation was VND 112.124 million/hectare, which came from logs (53.48%) and chip wood (46.52%). As we can see, the revenue from logs is much lower than that of FSC forests, because the way that the free market measures log wood, which has diameter greater than 15cm, while the diameter of logs of FSC forest is only greater than 10cm. Therefore, the amount of logs decreased and led to a decline in revenue.

Table 5. Cost-benefit analysis of non-FSC forest plantation with timber purpose in 7 years

Year	Total cost/ha (VND1000)	Total benefit/ha (VND1000)	Discount rate (10%)	Present value of benefit/ha (VND1000)	Present value of cost/ha (VND1000)	Net present value/ha (VND1000)
1	10250		0.91	0	9318.18	-9318.18
2	2600		0.83	0	2148.76	-2148.76
3	600		0.75	0	450.79	-450.79
4	400		0.68	0	273.21	-273.21
5	100		0.62	0	62.09	-62.09
6	100		0.56	0	56.45	-56.45
7	25940	113124	0.51	58050.5	13311.32	44739.18
				58050.5	25620.8	32429.70
	NPV = 32429.70		**BCA = 2.27**		**IRR = 25.41%**	

For non-FSC forest, the NPV, BCR, IRR are VND 32.429 million, 2.27 and 25.41%, respectively. The forest with timber purpose (both FSC and non-FSC) has high value of NPV, BCR, and IRR, represents for their economic value, and demonstrates for the important roles of forest plantation in poverty reduction as well as enrichment for farmers in Trung Son commune.

Sensitive analysis

In this research, we conducted an ex post CBA, that means we could take the available information about prices, costs, etc. to analyze because it occurred in the past, so that our analysis of economic efficiency could be more accurate. However, the discount rate of 10% used here based on the opportunity cost of farmers when they decided to invest in forest plantation. However, it was just an average number and the discount rate changing each year, and there had been many debates on determining the right discount rate. Therefore, we did a sensitive analysis to see how the indicators had changed when the discount rate changed, to check if the FSC certification program was worthwhile or not. The worst case was when the discount rate equal to 15% in the context of financial crisis starting from 2008, the best case was 5% when the FSC program was considered as a social project, and thus it had a lower discount rate. The base case discussed here was when the discount rate was equal to 10 %, that is the opportunity cost for farmers. As shown in table 6, in the worst case all the indicators still have a large value that represents for the high economic efficiency of the forest certification.

With high discount rate derived from the economic crisis, the NPV, BCR and IRR of FSC forest still had a desirable value that could encourage farmers to participate in this program. This program was even more viable when we considered it as a social project. Developing the

FSC forest in Trung Son commune played an important role in farmers' livelihood, at first in terms of economic effects.

Table 6. Sensitive analysis of two scenarios of forest plantations with timber purpose

Indicators	Unit	Discount rate (%)		
		5	10	15
Scenario 1: FSC forest plantation				
NPV/ha	VND1000	76555.25	52378.16	35744.02
BCR	Time	3.63	3.19	2.78
IRR	%	39.83	33.47	27.67
Scenario 2: Non-FSC forest plantation				
NPV/ha	VND1000	48839.50	32429.70	21180.52
BCR	Time	2.55	2.27	1.99
IRR	%	31.38	25.41	19.96
Difference between scenario 1 (FSC forest) and scenario 2 (non-FSC forest)				
NPV/ha	VND1000	27715.75	19948.46	14563.51
BCR	Time	1.09	0.93	0.78
IRR	%	8.45	8.06	7.71

As we can see, both scenarios give desirable financial ratios for farmers. However, NPV, IRR and BCR ratio of non-FSC forest plantation at three discount rates at 5%, 10% and 15% are all lower than those of FSC forest plantation. The differences are quite considerable. At a discount rate of 15%, the FSC forest still creates more VND 14.563 million in NPV than non-FSC forest plantation. Therefore, the FSC forest plantation is definitely more efficient than non-FSC forest due to the higher revenue from certified wood.

Environmental efficiencies

In some principles and criteria of the FSC there is a concern for the environmental protection, biodiversity preservation, landscape maintenance, and water protection.

The planned harvesting ensures avoiding massive exploitation. In the regulation, clear cuts exceeding 10 hectares are forbidden. It also encourages the growing of plants with capability of synthesizing nitrogen to improve soil fertility; tree bark must be left on the ground in order to keep organic materials for land. This will greatly contribute to water protection, erosion prevention and soil fertility enhancement in the region.

Regarding the harvesting method to minimize environmental risks, it is important not to plough burnt vegetation after harvesting. One important principle in harvesting and replanting is to comply with the principle 10. It will help the plantation area no longer erosive and exhausted.

For reducing pollution from the use of chemicals, it is necessary not to use prohibited pesticides and herbicides, minimize the use of chemicals, prohibit the use of agricultural chemicals within 10 m from rivers and 30 m around round lakes, water storage areas. Remaining pesticides and old storage tanks must be disposed, fuel storage depots should be maintained and prevented from falling, and means to dispose waste oils provided [10].

Social efficiencies

In social aspect, when participating in forest certification, households must comply with the principles set out by FSC, many of which are relevant to society. Principle 1 regulates the compliance with all applicable laws and international treaties; principle 2 is about the rights and responsibilities in land using; principle 3 mentions legal rights of local people in the management of land use; principle 4 is on community relations and civil rights [11]. In this research, we concentrated on analyzing the land use rights and management plan of the group and members of the group.

Land use rights certificates are required when you want to join the forest certification group. In Trung Son group, most households have land use rights for a term of 50 years. The map of the forest area has also been made and clearly demarcated; this can avoid the risk of land disputes.

Decisions on forest land allocation, forest land leases with legality and forest land allocation contracts are also mentioned in FSC principles and criteria. This identifies whether households have the rights of land use and it will determine the area where the households are using is legitimate or not. The maintenance group after obtaining certification is also a problem because when farmers participate in groups, they have to have a harvesting plan. This plan ensures that harvest cycles are alternative, avoiding deforestation and massive exploitation. It has affected many households; upon facing difficult time some households who have enthusiastically participated in certified groups before can withdraw from their groups and sell out their forest for woodchips in order to solve urgent needs of their family. The number of withdrawing households is not significant, but it affects much the management group.

Managing group activities with mutual benefit can ensure the sharing of benefits to each member of the group and maintaining continued activities during the period. There were many difficulties in two groups in Trung Son commune, and they were usually the problem of sharing benefits in a fair way. This is the first successful model in Vietnam; thus the contributing to and sharing of benefits still depend much on the support of Forest Department and WWF organization.

4.3 Advantages and disadvantages for FSC small groups in Trung Son commune

Advantages

- This program has received the attention of all levels. International organizations have provided technical assistance and funds for the commune to build the FSC model.
- Development of plantation forest for timber products is associated with sustainable forest management and the process of forestry economic development today.
- There is a high demand for certified wood materials from domestic manufacturing and export processing enterprises with high price.
- Afforestation has helped many people escape from poverty and get rich [2].
- Staffs that support the forest certification are well trained and experienced, so the activities in the commune are going smoothly and efficiently.

Disadvantages

- Majority of the forest owners in this commune are relatively poor while there is no concrete policy by the government to support and facilitate them to maintain their forests.
- Smallholder forest owners cannot afford to have access to the commercial bank loans because banks do not accept forest land use rights certification and acacia forests as a mortgage.
- Costs for annual evaluation and for every 5 years are high, so it is difficult for the households and self-organizations to hire specialists who can evaluate and issue certifications.

5 Conclusion and recommedations

5.1 Conclusion

With the forest certification, the certified wood would have premium prices about 25% compared with the price of non-certificated one and meet the requirements of many demanding markets in the world, including some stable markets such as US, Europe, Japan, etc.

The forest certification is a process that helps forest management become better and more sustainable, shown by the compliance with FSC principles and criteria of forest management. Sustainable forest management is expressed through longer harvest cycles, intercropping native trees, planning harvest with no clear cuts.

There are many advantages which encourage locals to protect and develop their forests to meet the requirements of forest certification in terms of time and quality wood products. Maintaining and developing groups are most important elements to ensure the sufficiency of certified wood for production in our country. However, it requires much attention from authorities as well as legal assistance from forestry companies. For the study site with difficult terrain, extreme weather and low educational level, it requires more attention of all levels to improve all aspects in integration process. In assessment of forest certification group, it shows that the current economic benefit has imposed and dominated all other benefits in terms of environment and society.

5.2 Recommendations

Through the analysis and evaluation above, we have suggested some recommendations, ensuring sustainability, maintaining and expanding new groups with the purpose of environmental protection, economic development and social equity, as follows:

- The government should adjust policies related to land allocation, land lease or land use rights to ensure that all people could understand and participate in forest certification program.
- The planning of land use and land allocation need a long term strategy that is suitable with local conditions and meets the requirements of the forest certification group. Along with that, local authorities should make suggestions on planning and orientation for forest products.
- Setting up the group forest certification requires long-term vision, a balance between the objective timber and environmental and social protection. Here, the sustainability of the

group depends on the participation of the parties involved although the commitment is voluntary.

- Administrative procedures to suit farmers' requirements to encourage them should be reduced, especially in areas with ethnic minorities.
- Training in technical knowledge and replication on the mass media should be promoted so that people can access and understand more about forest certification and its benefits.
- The state should have preferential policies on finance, credit loans for the households participating in afforestation, ensure them to meet the requirements for the timing of long planting period and funding on planting, tending, and harvesting.
- The government should implement policies to support families, group issues related to tax, license in order to minimize the costs in selling, transporting, harvesting and certifying.
- For the sustainable forest certification, there must be policies and commitment to support community from the forestry companies and local authorities.

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