



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

## Capital Budgeting Analysis of Organic Coffee Production in Gulmi District of Nepal.

Krishna Lal Poudel, Arati Poudel Nepal, Bhima Dhungana, Yashuhiro Sugimoto, Naoyuki Yamamoto and Aya Nishiwaki

University of Miyazaki. Faculty of Agriculture. Department of Environment and Resource Sciences, Interdisciplinary Graduate School for Agriculture and Engineering. Laboratory of Agricultural Economics. Gakuen Kibanadai-Nishi 1-1. Miyazaki, 889-2192. Japan.

Contributed Paper prepared for presentation at the **International Association of Agricultural Economists** Conference, Beijing, China, August 16-22, 2009

Copyright 2009 by [authors]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

## **Abstract**

This research paper was written to an objective of examining the present condition of organic coffee farming in the rural mid-hill region of Nepal in the background of financial viability. Nepal could avail competitive advantage from organic coffee by creating niche markets. The financial indicators showed economic profit and sustainable venture in income generation to the rural marginal people. The financial indicators administered were Benefit-Cost ratio (B/C), Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period (PP) and the value were 2.12 (at 12% opportunity cost of capital), 67763.58, 43.47 % and 6 year respectively. This was the economically very sound business scenario. Sensitivity analysis to predict the evolution of the aforementioned indicators under various circumstances subjected to variability in output and input price was done. Marketing channel was very short and having only two routes. Marketing margin was Rs. 225 and producers share was found 50%. Farmers were experiencing soil conservation, better health and better livelihood.

Key words: Organic, Capital Budgeting and Sustainable

## **1. Introduction**

Coffee is a relatively new crop in Nepal. It was introduced in the Gulmi District of Lumbini zone at around 1937 A.D. Nepal has a great potential to produce organic coffee by utilizing its long back production system called as organic by default. Agriculture gives employment to more than 80 % of the populace (MOAC, 2006). Peasants have average land holding of less than 1.0 ha. (CBS, 2007). In the mid-hill region of east-west, farmers are producing coffee. In terms of area and production, it has tiny presence in the world coffee arena. However, Nepalese highland and organic coffee has been getting niche markets since decade as high quality cupping and sound aroma. This gradually accelerated the extension of farming in the rural areas of Nepal. Small fraction of production zone is certified as organic. Following the commencement of remunerative advantage of organic coffee, farmers are organizing in some functional cooperative and getting organic certificate and introducing the product in the international market. Farmers are members of the district level cooperative and follow the guidelines prepared by it. Farmers in the region are satisfied for the transparent pricing system and marketing premium received for their organic product. Coffee is grown in Nepal almost with no inorganic fertilizers and pesticides use. It could be an

important occupation in the rural economics with massive participation of marginal, poor and down trodden class of rural communities. It could be an important means for the soil conservation, bio-diversity maintenance and watershed balance in the mid-hills of Nepal. Coffee farming in Nepal is proven as promising due to the availability of soil with fragile nature and appropriate climate in the mid hill (Nepal, 2006).

Coffee is an important plantation crop and plays a significant role in the world economy. Like all other primary agricultural commodities; coffee suffers from sharp variation in supply that, at times, can cause wide and violent fluctuation in price. It is also a very political crop. Some 70 countries produce coffee and are affiliated in to the International Coffee Organization (ICO).Nepal has imported the total amount of Rs.43 million in the year 2001. It is also exporting the produced coffee to India, Japan, Spain and Germany. Coffee is a high value low volume cash crop. This crop is economically more (nearly three times) profitable in the present context as compared to other cereal crops (Bajracharya, 2003). By utilizing the comparative resource advantage, Nepal would compete for quality coffee production. However the volume of production and associated production cost accompanied with the marketing management is the most important prerequisite to be a competitive in the international market.

Among the existing varieties, Arabica variety is grown. It is estimated that the coffee plantation covers productive area more than 1400 ha of land with the involvement of more than 5000 farm families. The production of dry cherry was 250 MT in the fiscal year 2004/05. Annually, total production and production area of coffee is increasing by 35% and 28% respectively. Within few years, rapid increase in area is expected. Nepalese coffee is sold at domestic and overseas markets. About 25-30% of the domestic demand is estimated to be fulfilled by the local production (Poudel, 2008).

Table 1. Area and production of coffee in Nepal

Years	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Area(Ha)	424	596	764	925	1078	1285	1396
Production(Mt.)	88.7	139.2	187.5	217.6	249.8	300.4	460.2

Source: MOAC, 2007.

Gulmi is the only district which produces certified organic coffee in 75 ha of land and 800 small farmers are involved. Organic coffee is produced above 850 msl to 1450 msl.

Producers claim that higher the altitude higher will be the ratio of dry cherry to green bean with good aroma.

## **2. Working objectives**

This research paper examined the present situation of production and marketing of organic coffee in the background of financial viability as long-term investment.

## **3. Domestic market price and export markets**

Farmers are selling coffee to local collectors in other parts of the country. These collectors then expose to the processors. Monopolistic market exists for all types of coffee where as monopsony in organic coffee in domestic and export market. Market forces especially competition among the processors is one of the major determinants of pricing coffee. Farmers who generally used to get Rs.30-35 per kg dry cherry are getting even Rs.90/kg for A-grade organic dry cherries.

Table 2. Average maximum and minimum prices for dry cherry in Nepal (Rs./kg)

Years	1993/94	2000/01	2001/02	2002/03	2005/06	2006/07
Max.	26	90	80	90(for grade-A)	90(for grade-A)	90(for grade-A)
Min.	24	80	80	80	75	68

Source: Business Plan of District Cooperative Federation.Gulmi.

Nepal exports only super quality green bean to overseas markets. It does not even export medium quality green bean. Medium and low quality green beans are roasted, grinded and sold in the domestic markets. The major brands of the domestic roasted ground coffee are NeCCO, Jalpa gold, Himalaya coffee and Nepal Organic Coffee. The major markets for the Nepalese green beans are USA, Japan, The Netherlands, South Korea, UK and Germany. However, Japan and South Korea are the largest buyer of organic coffee among these countries. These two country imports 30 Mt. organic coffee from Nepal each year (TPC, 2006).

District Cooperative Federation, Gulmi has been only the exporter of certified organic coffee (Certified from NASA). Its export is mainly to Japan and South Korea. Another

effort to promote coffee export was done by Highland Coffee Promotion Company, Everest Coffee Company and Plantec Inc. to USA, Japan and Europe.

#### 4. Research rationale

Increased interest in environmental issues has sparked a significant movement in favor of organic or ecological farming. This is because organic farming involves several environmentally friendly growing methods and also responds more effectively to consumers' growing interest in food safety. Furthermore, the European Union's new Agricultural Policy, which is being implemented under its "Agenda 2000" action program, places renewed emphasis on the need for environmentally friendly forms of agriculture as a key component of efforts to support the agricultural sector. The term *Organic Agriculture*, as defined by IFOAM (International Federation of Organic Agriculture Movements) refers to the creation of an ecological management system, which includes a transition/conversion period, and which meets the definition of a sustainable agro-ecosystem. Once it has been determined that the system's methods meet regulatory requirements, they must be certified as organic.

Coffee is a high value low volume cash crop. National long-term perspective has given priority in high value cash crop (APP 1995). This crop is economically more (nearly three times) profitable in the present context as compared to other cereal crops (Bajracharya, 2003). By utilizing the comparative resource advantage, Nepal would compete for quality coffee production. However the volume of production and associated production cost accompanied with the marketing management is the most important prerequisite to be a competitive in the international market. The climate and soil quality is adequately favorable to organic coffee production in mid hill region of Nepal (Nepal, 2006). Government couldn't have taken any initiatives towards export, marketing and processing (Poudel, 2005). Despite this fact, farmers are accelerating the production via converting land to coffee. The expected area expansion may be as;

Table 3. Expected area expansion for coffee cultivation in Nepal (Ha.)

Years	2001	2004	2006	2011	2015
Area (Ha)	424	900	2000	10,000	30,000

Source: Shrestha, 2057

## **5. Conceptual framework**

### **5.1 Survey design**

Gulmi district in the western mid-hill of Nepal is only the certified organic coffee producers and exporter. District based cooperative federation is responsible for managing every aspect of production and marketing management of organic coffee in the transparent and participatory way of farmers groups. The study area is not adequately endowed with physical infrastructure such as road, electricity and irrigation facilities. A survey was carried by deploying pre-tested semi-structured questionnaires for collecting the field level information. The sample (n=50 farms) was drawn randomly from the complete enumeration of organic coffee growers. Beside, participatory tools like FGD (Focus Group Discussion) and KIS (Key Informants Survey) were exercised to draw the general understanding and reaching to the reality.

### **5.2 Economic estimation**

Like other agricultural product, development of an organic agriculture system for coffee inevitably requires consideration of its economic viability. This type of study has not been carried out yet. This requires dynamic financial evaluation methods which consider the value of money over time. The financial indicators in question are Net Present Value (NPV), Internal Rate of Return (IRR), Benefit-Cost ratio (B/C) and Payback Period (PP). Results are then subjected to sensitivity analysis to predict the evolution of the aforementioned indicators under various circumstances subjected to variability in output and input price.

This quantitative analysis has been done under some risks and assumptions. These are: farmers will continue to produce coffee, the technology will remain constant, the market interest rate remains same, the international market will work smoothly, the demand for coffee will increase gradually, quality of coffee will further improve and finally rest other things remains the same.

### **5.3. Financial indicators development**

Among them, NPV and IRR are generally considered superior methods. However, the other methods are developed as well since they are commonly used and are applicable in selected situations. Benefit-Cost (B/C) ratio is the ratio of present worth of benefit to the

present worth of cost. The payback period is also a widely used quantitative method of evaluating investment opportunities. It estimates the length of time required for an investment to pay itself out. The NPV criterion uses the discounting formulas for a non-uniform or uniform series of payments to value the projected cash flows for each investment alternative at one point in time. The sign and size of NPV determine its ranking and acceptability. IRR is that rate of interest, which equates the NPV of the projected series of cash-flow payments to zero. Practically it is considered as the rate at which the invested capital is returned back to the investors. The formula used to obtain NPV and IRR and final decision making framework were;

$$NPV = \sum_{t=1}^n \frac{C_t}{(1+r)^t} - C_0$$

Where

$t$  - the time of the cash flow

$n$  - the total time of the project

$r$  - the discount rate

$C_t$  - the net cash flow (the amount of cash) at time  $t$ .

$C_0$ -the capital outlay at beginning of the investment time ( $t = 0$ )

$$\text{Initial Investment} = \sum_{t=1}^N \frac{C_t}{(1+IRR)^t}$$

Table 4. Decision making framework

Financial Tool	Decision Criteria		
	Accept	Indifference	Reject
B/C Ratio	If, >1	Equal to 1	< 1
NPV	>0	Equal to 0	< 0
IRR	> Cost of capital i.e. i.e. Interest Rate (I)	Equal to I	< I
PP	Shortest as the best	-	-

Source: Poudel, 2008.



## **6. Results**

### **6.1 Socio-economic upgrade**

Organic coffee has been growing in the rural setting. People were marginal and facing the problem of waiting for coffee output even for 3-4 years. The cooperative has motivated them through technical know-how and explored the opportunity cost via intercrops. These days, food sufficiency for 98% respondent and only 2% have food insufficiency for 1-2 months. The school enrollment to the child was found 100% in surveyed area. Interestingly, the researcher could not find even a single school drop. Of the surveyed sample, 94 % households have modern toilet facility. And 100% farmers were found involved in saving-credit programme in group approach. They have been saving maximum Rs.500 to minimum Rs.50 per month. During survey and focus group discussion it was found that 100% farmers are eager to expand their land under organic coffee farming along with vegetable production. This seems to be economic upliftment in the community. They were found to face the major problem of white stem borer insect and regular extension services from the institutional body. The driving force for conversing more land to organic coffee was fair and better price with no middlemen in the commodity transaction. Farmers are happy for getting opportunity of exposure visit periodically.

### **6.2 Environmental benefit**

Mostly the coffee was found to grow in the sloppy, poor and marginal land. It was evidence that the frequency of land slide and surface erosion were high then. After the systematic production programme, the soil conservation was found remarkable. Farmers were worry for the degradation of lowland paddy field from the land slide and erosion from the apex of the hill. Finally, coffee productions in the hilly part enable to produce the paddy and wheat in the lower basin and river bank. That could foster the food sufficiency enough to the rural people. Farmers are feeling comfort with healthy environment and surroundings. However, the environmental benefit from coffee farming has not been accounted yet.

### **6.3 Projected cash-flow statement of organic coffee farming**

The summary chart of cost and benefit was prepared through the spreadsheet. The price of green bean was found higher. The cost of initial investment in procedural mechanism

for getting certified and annual fee of renewal of organic certificate is remarkably higher for these rural farmers. Consultant fee of monitoring for Internal Control System (ICS) and expatriate expenses are due in maintaining the convincing organic farming to keep up the product image in the international markets. Costs of these are the institutional cost and initially born by farmers' cooperative federation. Finally cost is shared by the organic coffee growers by their respective area. Likewise, organic farming community had been getting intangible benefits such as, erosion control, micro climatic moderation; strong community integration, communal infrastructures, rural saving-credit schemes, formal and non-formal education and various exposure visits etc. The cost and benefit streams are now calculated for the 10 years of period. For initial three years farmers do not harvest coffee rather they harvest some intercrops from the orchard.

Table 5. Average gross cost and gross benefit in sampled (n=50) organic farms (Rs/Ropani).

Particulars	Years									
	1	2	3	4	5	6	7	8	9	10
Cost (Rs.)	15567	7252	10202	9802	9802	9287	9287	9287	9287	14287
Benefit(Rs.)	2000	2000	2000	7990	20950	52900	50400	50400	50400	50400

Source: Field Survey and author's calculation

At the present, farmers are taking advantage of B/C ratio 2.12(at 12% opportunity cost of capital); NPV is highly positive (67763.58) and three times greater IRR (43.47 %) as compared to the present cost of capital in general. Similarly, the PP is the possible shortest (6 year). Of course, this is the economically very sound business scenario.

#### 6.4. Sensitivity analysis

The coming days will not be as favorable as farmers and exporters are deserving now. The higher production followed by the lower price would not permit the present level of price. This is the situation in one hand, while in the other hand, we are producing, and as well we have to dispose our commodity in the international markets. In the international markets, the price is about half of our domestic price level. This is a critical period to examine the different situation such as; what happen in the certain percent reduction in the price level and certain percent increment in the cost structure? These sorts of adjustment were submitted in the analysis. The sensitivity analysis assuming cost increment but with possibility of price reduction in the global markets revealed that price reduction up to the 40 % will also permit to

cultivate organic coffee in the region. It was found difficult to maintain sound financial statement in reducing product price by 50 % (Table.8).

Table 6. Summary of financial indicators under sensitivity analysis of organic farming.

Conditions		Expected Results				Interpretation
		B/C Ratio	NPV	IRR	PP	
1	10% cost increment and 30% price reduction	1.35	22736.85	40.3	7	Economically Profitable
2	10% cost increment and 40% price reduction	1.15	10226	22.93	8	Economically Profitable
3	10% cost increment and 50% price reduction	0.96	Negative	< cost of cap	9	Economically Non-viable

Source: Field Survey and author's calculation

## 6.5 Cost, yield and profit situation of organic coffee

The cost, yield and net profit situation of organic coffee production system in the study area calculated from the spreadsheet is presented for the comfortable understanding (Table 7) below. For the first four years, farmers were found to be operating in the loss. Even though, they were able to harvest the intercrop from the coffee orchard which is more the value of customary cereal production. The 6<sup>th</sup> year was found the shortest payback period for coffee farming. In overall, the farming was found to be very sound and precious means for rural development and kissing to the prosperity eventually in the future.

Table 7. Cost (Rs.), Yield (Kg.) Sales (Rs.) and Net Profit (Rs.) in a Ropani of Land.

Year	1	2	3	4	5	6**	7	8	9	10
Cost	15567	7552	10202	9802	9802	9287	9287	9287	9287	14287
Yield	*	*	*	61	205	560	560	560	560	560
Sales	2000	2000	2000	7990	20950	52900	50400	50400	50400	50400
Net Profit	-13567	-5552	-8802	-1802	11148	43613	41113	41113	41113	36113

Source: Field Survey and author's calculation

\*Coffee is not produced but intercrops. \*\*6<sup>th</sup> year is the full harvest year.

## 6.6 Marketing Channel, Marketing Margin and Producers` Share

The principle route through which the product passes ultimately to the consumers from the farm. Sometimes it is termed as farm to fork. In the study area, it is glory to example that farmers have been experiencing the direct selling of their products to the district level cooperative and it exports directly. The importer from Japan and South Korea receives product at Kathmandu, capital city at the fixed contract price US dollar 6 per kg green bean; free on board (f.o.b.). The marketing channel for coffee marketing in this aspect was found to be interesting and very short. There are only two routes.

1. *Producers*  $\Longrightarrow$  *Collector in Functional Group*  $\Longrightarrow$  *District Level Cooperative/Exporter*
2. *Producers*  $\Longrightarrow$  *District Level Cooperative/Exporter*

Marketing margin is the difference between the net price received by the farmers and the price paid by the consumers. However, the importers were not direct consumers in this regards. But, for the farmers within the country boundary, it works as marketing margin. This was calculated by subtracting the farm-gate price from the final export price in the country. The marketing margin was Rs. 225. It is good price as compared to other crops. This could be proved from the calculated producers share on export value which was 50 %.

## 7. Conclusions

Organic coffee production system was found financially viable even in different condition. Nepal has opportunity to availing the geo-graphical suitability to capitalize the nature endowed competitive advantage for organic coffee production. Organic agriculture is rapidly gaining importance within the global markets, even though it still accounts for a small proportion of farm production. Coffee, in particular, is following this pattern. There is a growing interest in this type of product on the part of consumers, with prices higher than those for the same products produced by conventional farming (Michelson, et al, 1999). At present, both types of coffee farming are seemed economically viable (Poudel, 2005). It would be worthy to pay attention towards organic. Farmers can fetch the good revenue and its long-term financial suitability permits to go coffee orchard. The integrated way of community development and environmental value are the additional benefits to the community.

Rural poverty is gradually addressed by the sustainable income from the coffee production and selling to cooperative. Farmers are now improving their capability of

investment on education, better health care and are saving in the group basis. The saving in the group could be used as sources of credit that feels urgent financial need and finds the other income generation venture. This movement is called as organic movement in this region by the stakeholders. The researcher himself found the glamorous vision of the farmers for organic coffee production. They claim that coffee is giving profit but could not quantify the actual cost and benefit. In this backdrop, the financial analysis of organic coffee was sought to be significant for the cooperative and its members and to the policy makers in the future.

## References

- APP.1995. Agriculture Perspective Plan APROSC and JMA Inc. National Planning Secretariat, Singh Durbar, Kathmandu. Nepal.
- Bajracharya, P. 2003, Business Plan for HCPC Limited, AEC/FNCCI. Katmandu.Nepal.
- CBS. 2007.Statistical year book of Nepal.Central Bureau of Statistics.Kathmandu.Nepal.
- MOAC. 2007. Ministry of Agriculture and Cooperatives. Agricultural Marketing Information Bulletin. Hariharbhawan, Lalitpur. Nepal.
- MOAC. 2007. Ministry of Agriculture and Cooperatives. Statistical Information on Nepalese Agriculture, Singhdurbar, Kathmandu
- Michelsen, J. et al., 1999. The European Market for Organic Products: Growth and Development. Ed. Hohenheim University. Institute for Agricultural Business Management. 410A. p. 199.
- Nepal, A. 2006. Soil nutrient analysis of organic coffee farm in Gulmi district. Journal of Himalayan College of Agricultural Sciences and Technology, Green Field. Jan –Jun 2006, Vol 4, Issue 1 pp 104-105
- Poudel, K. L. 2005. Marketing Perspective and competitiveness study of Nepalese coffee” Journal of Himalayan College of Agricultural Sciences and Technology. Purbanchal University. HICAST. Green Field.Vol. 3, Issue 2, pp 158-160
- Poudel, K. L. 2008. Agribusiness Management. Himalayan College of Agricultural Sciences and Technology.HICAST. Purbanchal University. Nepal.
- Shrestha, M.B.2057.Project Profile on: Coffee plantation at mid-hill districts, AEC, Katmandu. Tea and Coffee Asia, September October November 2001
- TPC. 2006. Nepal Overseas Trade Statistics. Trade Promotion Center, Pulchowk, Kathmandu, Nepal.