Conservation, Consolidation and Economic Generation of Indigenous Community Agriculture Sustainable Food Yielding Reforestation

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Abstract

Purpose of this study is attempted to look into the conservation, consolidation and economic generation of integrated tropical agriculture food and fruits yielding crops reforestation among the indigenous community. The participative initiatives and design in integrated agro-aqua eco-sustainable tropical food and fruits yielding crop reforestation were used on the consolidated indigenous community customary land and the return of tropical fruits and various species of inland fishes to its natural habitat, creating orchards within the secondary jungle vicinity, tourism and indigenous entrepreneurial ventures that contribute towards economy and reduction of climatic change. There are significant differences among factors on tropical food Crops and fruits reforestation of indigenous community’s idle customary land.

Keywords: Agriculture; conservation; indigenous community; reforestation

1. Introduction

In the 9\textsuperscript{th} Malaysian Economic Plan, the projected growth of agriculture sector is expected and average rate of 6 per cent per annum for the period 2006 – 2010 and 6.5 per cent in 2011- 2020 period for the Tenth Malaysian Economic Plan. There are policy formulation as well as implementation process to move
the economy up the value chain by increasing the productivity, competitiveness and value added and value creation of the increase in earnings of major commodities of the country, this is to enable the sector to retain its sustainability. Under the new national economic programs, there has been an increase in ‘value-added’ agriculture due to changing in consumers’ taste and preference (Starks and Bukenya, 2008). The value added in agriculture is to economically add value to a product by changing its current place, time and from one set of characteristics to other that are more preferred in the marketplace” (Boland, 2007). The up-grading of up-stream agriculture production as well as the down-stream market enable the Malaysian agriculture fraternities to enjoy the economic booms especially the increase in the price of primary products and increase in the demand of world market, example rubber and palm oil.

Large scale commercial estate-plantation and medium smallholding in mono agriculture may meet the targeted growth but what about the indigenous community occupying the less than 5.5% of smallholding and indigenous customary land with their self subsistence which left unattended and total dependent to its ecological nature and the onslaught of the middleman? The total land areas belong to indigenous communities has since dwindled and change ownerships. Is it due to the ignorance and carefree nature of community? Or the authority has neglect and forgotten the group and totally discern them from the mainstream of economic growth? As King (1995) stated that Malaysia, a state with multiple ethnic, indigenous and religious subgroups and the fragmentation of legal control in relation to traditional knowledge has results in unequal distribution of rights for indigenous people and local communities. They may benefit from the program but not in their earning from their meagre plot of small subsistence farm of between 0.5 – 1.5 hectares. The indigenous community still live a nomadic life style in the jungle fringe cultivating subsistence crops like tapioca, yam and collecting jungle fruits and natural products. Worst is the problem of some of this land even though planted with rubber, oil palm, and tropical fruits such as durian, cempedak, petai etc which are left unattended. Certain indigenous community after the first season cultivation and when the fertility of soil faded and soil erosions set in, they left for a new piece of land in the jungle. In order to revive it through the new concepts of integrated tropical food yielding crops reforestation program which is profitable and add values to the indigenous community, then land consolidation and rehabilitation work has to be done first. Therefore the feasibility in the introduction of the Indigenous Community in Integrated food yielding crops Reforestation program will certainly reap in economic generation to a satisfactory level and to conserve the depletion of eco-system, retain the existing flora and fauna and improve indigenous community income and livelihood as well as getting them into the mainstream of national economic development.

2. Related literature

As Endicott (2003) point out, the true indigenous in Malaysia are the politically marginalized ethnic groups the Orang Asli, and their neighbours the Sabah and Sarawak natives, who have inhibited the area prior to the arrival of the ethnically diverse ‘Malays’. These are the group of communities that we are discussing in this paper. The livelihood of Malaysian indigenous community is very low and subsistence in nature and at time they have to depend on the jungle for their livelihood and survival by collecting the existing tropical jungle food crops products and fruits such as petai, durian, cempedak, tampoi, kedongdong and certain exotic fruits which have high commercial value but its production also dwindle through years, occasionally, they also collected wild jungle honey, bamboos and rattan if there is any demand. Their own plot of land were used to cultivate tapioca, pineapple etc and vast area were infertile and just left idle due to soil erosion.

Bucknell and Pearson (2006) surveyed on rural society and land use and the finding is agricultural consolidation and intensification has not translated into economic sustainability where on-farm income declined from 1991 to 2000, perhaps due to the niche markets created. Therefore if the Malaysian
indigenous communities customary land could consolidate, rehabilitate and intensify in the transformation of tropical food crops and fruits yielding reforestation. This increase agriculture and reforestation activities could be designated for innovation clusters, thus providing a foundation of resources for not only sustainability in indigenous communities’ economic generation and ecology of the Malaysian nature and jungle.

The replanting of various tropical food crops and fruit yielding trees in the process of reforestation and food crops on the indigenous communities customary land will be returning the tropical food tree to its natural habitat that not only could yield satisfactory food crops and fruits for local consumption but also for export as well as upgrading the indigenous community’s livelihood rather than the customary land just left idle and face erosion. Wiersum (1997) quoted that there are three major categories of forest management practices that could be identified, namely controlled utilization of forest product; protection and maintenance of forest stands, and purposeful regeneration. Based from the principles, model could be developed for exploitation of agriculture crops, and various stages of forest management are distinguished along a gradient of increasing input of human energy per units of exploited forest and the gradient represents a continuum of forest-people interactions, this also illustrate how a various manifestations of indigenous forest management may be arranged along a nature-culture continuum.

Reforestation of indigenous customary land into value added commercial venture and sustainability of its ecology and environment not only could transform modern farming and its sustainability for the livelihood of indignations community that depend much on the environment. Vernooy and Song (2004) stated that new approaches to agricultural development are needed to conserve agricultural diversity, improve crops, and produce food and fruits of quality for all. Such an approach should enable small farmers on marginal lands to participate as equal partners.

Thornton et al (2006) stated that it is seeking to redefine the roles of scientists and farmers through collaborative learning processes, addressing questions about the level, timing, type and form of participation, as well as the most effective approaches and methods to foster them. The research domains of the program deal with sustainable intensification of indigenous smallholders agriculture, the sustainable management of natural resources, the development of efficient markets, and the promotion of enabling policies.

Stoop and Hart (2006) suggested that sustainable agricultural development is presented as a diverse and dynamic process through which it copes with agro-ecological and socio-economic diversity at field level and with ever-changing needs and opportunities of the indigenous communities. Even Kaljonen and Rikkonen (2005) had pointed out that the latest reforms of agriculture practice in Europe that has adopted a concept of multifunctional agriculture that should encourage farming to play several roles in society and contribute to the well-being of rural areas by managing the countryside and the environment. This concept and agriculture reform best suit the managing of indigenous communities’ customary land into an integrated tropical food crops and fruit trees reforestation in Malaysia.

Mele and Chien (2004) quoted a more diverse, perennial cropping systems often have better natural mechanisms for keeping pests at bay. But while scientists emphasize the broad benefits of conservation in terms of effective ecosystem functioning, farmers are more interested in biodiversity for the provision of food or of services such as shade or windbreaks. Because of their limited knowledge of the role of biodiversity in plant protection, farmers sometimes unconsciously disturb natural regulatory mechanisms. Tropical food crops and fruits trees grow well in its natural habitat and require little care. Therefore the indigenous communities could be able to sustain their livelihood and helps the country in the conservation process of their customary land.

Friday et al (2006) has surveyed a participatory rural appraisal project as part of an agricultural development project that provided the basis for a number of community-based participatory extension initiatives. Despite the poverty of many of the communities involved, and in contrast to published
literature on the local agricultural situation, farmers clearly expressed their need for more marketable crops and alternative sources of livelihoods.

3. Research objectives

The objectives of this research are to examine and propose to the Department of Indigenous Community Welfare (JHEOS) in Malaysia ways on solving the indigenous communities’ plight of not being able to follow the mainstream of the country’s economic development, community improvement and sustainability of eco-system with the integrated tropical food crops and fruit trees reforestation on indigenous customary land which are left idle and fall prey to nature and soil erosion.

The introduction of an integrated tropical food crops and fruit trees reforestation strategy on the consolidated and rehabilitated indigenous customary land not only could generate income and livelihood of indigenous community to a satisfactory level for their effort in cultivating tropical food crops and fruit trees in its natural habitat among the path cleared in between the secondary forest on their 0.5 – 2 hectare plot of land. The enhancing of integrated tropical food crops and fruit trees in the secondary jungle could nurture the soil nutrients and contribute to environmental friendly tropical fruit products for local consumption and export.

4. Theoretical framework

| Dependent Variable                                                                 | Independent variables                                      |
|----------------------------------------------------------------------------------|------------------------------------------------------------|
| Conservation and Economic Generation of Indigenous Community                      | Agro expert and managers                                    |
| Customary land in Integrated Tropical Food Crops And Fruits Yielding Reforestation | Ministry of Agriculture                                      |
|                                                                                  | MARDI                                                       |
|                                                                                  | JHEOA (Indigenous Community)                                |
|                                                                                  | State and District Agro Department                          |
|                                                                                  | Drainage and Irrigation Department                          |
|                                                                                  | Federal Authority in Marketing Agriculture                  |

Fig. 1. Theoretical framework

5. Research Methodology

Investigative and interview technique through the chieftain as medium were applied. Respondents were randomly choose from the indigenous community with the help of Tok Batin and group together in the indigenous community hall (Balai Batin). Survey questionnaire were distributed to them and each question read twice in Malay Language in order that the respondents understand and cycle the right
choice of them. Since the total selected respondents are illiterate, the investigative and interview session has been conducted to gather the answers of the opinion on the self subsistence and indigenous customary land of the indigenous community.

Interview session also convenes on the management of their plot of land for the feasibility of conducting of the concept of integrated tropical fruit reforestation program proposed. Since the total selected respondents are illiterate, the investigative and interview session has been conducted to gather the answers of the opinion on the self subsistence and indigenous customary land of the indigenous community. Interview session also convenes on the management of their plot of land for the feasibility of conducting of the concept of integrated tropical fruit reforestation program proposed.

Likert 5 point scale (5- Strongly Agree, 4- Agree, 3- Neither, 2- Disagree and 1- Strongly Disagree) were use in the process of gathering data pertaining the indigenous communities’ opinion on their farm dimension, livelihood dimension and the propose integrated tropical fruits reforestation conception. The details of plot of land, and management of their land uses from the respondents were also studied from field trips and secondary data. This is to determine the feasibility of the propose integrated tropical fruits reforestation in improving the indigenous community’s income and livelihood, economic generation, sustainability of eco-system, reduce the climatic change, environmental conservation as well as create jobs for the local indigenous people by enhancing the proposed integrated tropical fruits reforestation concept.

6. Results

Reliability of instruments - Cronbach Alpha statistic is found to be 0.732; therefore the reliability of the questionnaire is acceptable.

6.1. Descriptive statistics

Table 1.1 summarizes the respondents’ characteristics. They are 125 male (75.8%) and 40 female (42.2%), indigenous people from two separate indigenous communities who still practice the traditional way of life and nomadic farming on their small plot of customary land in this district. Table 1.2 shows the respondents’ age composition, 113 of them were aged 41 (67.5%) and above. Table 1.3 shows that 22 respondent have between 0-5 years experience in agriculture (13.3%), 48 respondents have between 6-10 years experience (29.1%) and 95 respondents have more than 11 years experience (57.6%) in subsistence agriculture. Table 1.4 shows that 75 respondents have poses land not more than 0.5 hectares (45.5%), 65 respondents (39.4%) poses between 1 - 2 hectare of agriculture land and only 25 respondents poses more than 3 hectare of agriculture land (15.1%). Table 1.5 shows that 80 respondents (48.5%) earned a monthly income of between RM150 – RM300 or USD100/month and below.
Table 1. Summary of respondents’ characteristics

|                        | Frequency | Percentile (%) |
|------------------------|-----------|----------------|
| Gender                 |           |                |
| Male                   | 125       | 75.8           |
| Female                 | 40        | 24.2           |
| Age                    |           |                |
| 21 -30                 | 22        | 13.3           |
| 31 -40                 | 30        | 18.2           |
| 41 -50                 | 70        | 42.4           |
| > 50                   | 43        | 26.1           |
| Experience in Agriculture |         |                |
| 0 – 5 years            | 22        | 13.3           |
| 6-10 years             | 48        | 29.1           |
| >11 years              | 95        | 57.6           |
| Land own               |           |                |
| 0-0.5 hectare          | 75        | 45.5           |
| 1-2 hectare            | 65        | 39.4           |
| >3 hectare             | 25        | 15.1           |
| Monthly income         |           |                |
| 150 -300               | 80        | 48.5           |
| 301 -600               | 38        | 23             |
| 601 -900               | 37        | 22.4           |
| 901 -1200              | 10        | 6.1            |

6.2. Statistics

Frequency table of indigenous people interview pertaining to the improving of income and livelihood by enhancing the propose integrated tropical food crops and fruits trees reforestation concept of eco-system sustainability shows that almost all the respondents strongly agreed to the propose setting up of a work teams in between government agencies and the indigenous communities in improving the indigenous communities’ income and livelihood by enhancing integrated tropical food crops and fruits reforestation program.

The statistical Table 2 above on the indigenous people’s customary land dimension can be sums up as even though the total area is quite large but due to the lack of fund, technological know-how, and the indigenous people’s attitude and culture, many are left idle which were cover by secondary jungle with thick undergrowth and a few fruit trees. Occasionally, we can see the clearing of certain patches of land for the cultivation of temporary crops like tapioca and yam. If the indigenous land can be consolidate and rehabilitate through propose integrated tropical food crops and fruits reforestation program. It will reap in high quality agriculture produces, exotic jungle product and generate economy for the indigenous communities and country as well as conservation of eco-system and reduction of climatic change and global warming.
Table 2. Indigenous community’s opinion on customary land dimension

| Customary Land Dimension                          | N  | Frequency | Mean |
|--------------------------------------------------|----|-----------|------|
| 1. Age slow down the tending of land             | 165| 120 45    | 3.6  |
| 2. Able to tend to the land themselves           | 165| 9 20 35 101 | 0.3  |
| 3. Land located far from community               | 165| 110 45 10 | 3.3  |
| 4. Income derive from land not enough to cater the livelihood | 165| 145 20    | 4.4  |
| 5. Not be able to replant again                  | 165| 100 65    | 3.0  |
| 6. Soil erosion not taken care properly          | 165| 146 19    | 4.4  |
| 7. Not be able to sustain                        | 165| 156 9     | 4.7  |
| 8. Undergrowth not clear                        | 165| 120 45    | 3.6  |
| 9. Not applying of agro fertilizer              | 165| 112 53    | 3.4  |
| 10. Low yielding farm produce                   | 165| 98 50 17  | 3.0  |
| 11. Younger generations are not interested to toil the land | 165| 135 10 12 8 | 4.1  |
| 12. Constant attack by farm pests               | 165| 145 20    | 4.4  |
| 13. Able to develop the land                    | 165| 15 18 19 113 | 0.5  |

The consolidation and rehabilitation of indigenous customary land in forest management will comply with the rules and regulation stipulated in the national land code with strict regulation on the plot of customary land grant to the indigenous community members that stipulated in the land title on land uses, prohibition for sale and mortgage as well as the prevention of soil erosion. Occasional supervisions by personnel from state and district agriculture departments is a must and routine round to the consolidated indigenous customary land.

Most of the indigenous community land were left idle even there are still planted with orchards like durian, langsat, bidara, cempedak, jering, tampoi, petai and various exotic jungle fruits or uneven rubber trees and oil palm intertwined with secondary jungle and thick undergrowth. The propose integrated tropical food crops and fruits reforestation are feasible to revitalize and regenerate the indigenous customary land into economically sound eco-system friendly conservation project and generate economy to upgrade the livelihood of indigenous communities and the country. The profit derive from the ventures would be able not only upgrading their livelihood but also re-greening the country and protect the eco-system that will reduce the climatic change, environmental conservation as well as create jobs for the local indigenous people who are suffering from unable to join the mainstream of economic growth.

The statistical Table 3 above shows that the indigenous communities really need help from all quarters, private or public to revitalize their idle customary land to generate economy. Would it be on sharing basis or governmental subsidized project, otherwise it will leave to the mercy and onslaught of the unscrupulous middleman. The blunders will further worsen the situation and livelihood of the indigenous community.

Statistical Table 4 above shows that the indigenous communities need certain forms of assistance from the authorities. The introduction and implementation of the Integrated Tropical Food Crops and Fruits Reforestation program not only could sustain the existing eco-system with its flora and faunas, further
with the addition of various tropical food crops and fruits trees back to its natural habitat will boost its reforestation scheme, produce high quality and high demanded tropical fruits for local consumption and foreign market as well as increase the consciousness in environmental conservation. There is a jump in demand for tropical exotic fruits and jungle product among the south east Asian countries and the far east. Therefore if the Federal Marketing Authority could coordinate and collaborate with the Indigenous community chieftain, this not only will benefit the indigenous people’s livelihood but also will reap in profit and foreign exchange for country’s economic growth.

Table 3. Indigenous community’s opinion on the marketing of products dimension

| Land Tending Dimension                                      | N  | Frequency | Mean |
|-------------------------------------------------------------|----|-----------|------|
|                                                             |    | SA        | A    | U   | D   | SD  |
| 1. Difficult to sell the farm produces                      | 165| 125       | 32   | 8   |     |     |
| 2. All extra produces sold to middleman                     | 165| 132       | 12   | 10  | 11  |     |
| 3. Agriculture produces fetch low price                     | 165| 120       | 20   | 18  | 7   |     |
| 4. No help come from government agencies                    | 165| 80        | 45   | 10  | 15  | 15  |
| 5. Most of the edible farm produce were consume in personally| 165| 98        | 28   | 15  | 17  | 7   |
| 6. Most of the produces destroyed by pests                  | 165| 135       | 20   | 6   | 3   | 1   |
| 7. Need to gather jungle products to supplement family needs| 165| 95        | 46   | 10  | 10  | 4   |

Table 4. Indigenous community’s opinion on the food crops and fruits reforestation concept

| Integrated Tropical Food Crops and Fruits Reforestation | N  | Frequency | Mean |
|---------------------------------------------------------|----|-----------|------|
|                                                         |    | SA        | A    | U   | D   | SD  |
| 1. Able to generate double the income from customary land.| 165| 130       | 23   | 10  | 2   |     |
| 2. Need proper management of customary land              | 165| 121       | 19   | 10  | 9   | 6   |
| 3. Owners are able to involve in the management of their plot of land | 165| 130       | 25   | 4   | 4   | 2   |
| 4. Able to share profit and income distribution with government agencies | 165| 95        | 38   | 21  | 8   | 3   |
| 5. Joining as member of cooperative.                     | 165| 143       | 10   | 6   | 4   | 2   |
| 6. Owners maintain their plot of and.                    | 165| 165       |      |     |     |      |
7. Discussion

The indigenous communities’ plight that lack of knowledge, education, and government agencies’ help and their own attitude has hinder their progress and livelihood. They have to depend on the traditional subsistence planting attitude even the government has provide land for cultivation. The stagnated growth of indigenous community agriculture initiative could be rectify easily by gather cooperation from government agencies like FAMA, MARDI, state and district agriculture department, drainage and irrigation department, and the village chieftains or local representative in the state government. Doessel and Vakadkhani (1998) quoted that income inequality can be reduced by stimulating the good producing sectors of the economy such as agriculture and the indigenous communities’ customary plots of land could be consolidated and rehabilitated and put into proper and prosperous use for the integrated tropical food crops and fruits reforestation in the forest management program. Bringing forward the whole indigenous communities throughout the country by upgrading their livelihood through the integrated tropical food and fruits tree reforestation program could also directed them to the mainstream of economic growth. the bridging of the economical gaps between the ordinary Malaysian citizen and indigenous communities will definitely heed the calling of the government of putting agriculture as the country’s third engine of economy growth will prosper the country. All participative fraternities inclusive of government and private sectors should formed a smart partnership to cater in the good course of helping the indigenous community into the mainstream of the national economic growth and prosperity.

Fig. 2: The Integrated Tropical Food Crop and Fruits Reforestation Concept.

The formula of profit sharing is shown below

\[ \text{Integrated Tropical Fruit Reforestation} = \sum_{i=1}^{n} (I+F+A+C+T+B) - \text{Cost} \]
Where Integrated Tropical Food Crops and Fruit Reforestation concept and implementation on the indigenous communities are the combine effort of government agencies which include indigenous people (I), FAMA (F), Agro department (A), Indigenous Community cooperative (C), local private tourist agencies (T), FRIM (B). The cost of implementing the integrated tropical Food Crops and fruits reforestation concept is minimal, it consist of the indigenous community customary land, tropical fruits tree sapping clearing of the undergrowth, tree sapping from FRIM and subsidies provided by the various government agencies. The total earning from the initiatives could be handling through the JHEOA and the indigenous community cooperative. The other cost will be absorbed by the government agencies respectively. Therefore the exact earning of the above concept will be five fold, it not only could upgrade the indigenous communities’ livelihood but also able to profit various sectors and indirectly conserve eco-system, reduce global warming and generate economy for the indigenous communities and country.

The indigenous community will enjoy larger amount of profit and earning if they are willing to put forth other initiative and effort in venturing into other miscellaneous business such as bee breeding, fungus planting as well as sandal wood planting. Besides, the creativities and innovativeness of the indigenous community could spur further their earning by introducing local specialties like dishes, handy crafts etc. All this ventures are very lucrative and enable them to earn many folds of profits. The indigenous people still getting on with their daily routine of harvesting their effort and maintain their holding of the customary land. The differences are the results from the new economic concept; they may reap in the extra income to further upgrade their livelihood.

8. Conclusion and recommendations

The anticipation of integrated tropical food crops and fruits reforestation concept on the indigenous community customary land through consolidation and rehabilitation is in fact very feasible to their expectation in term of profit earning which could increase their income and livelihood rather than just let the valuable land idle and face soil erosion. This initiative once started could last for years to come, even to many generation of indigenous community and also could retain them from moving out to the urban vicinity. It has been tested and the result is beyond the mere expectation of everyone involved. Even if the concept applied not round the year basis but seasonal in nature tropical food crops and fruits season of durian, langsat, rambutan, bidara dan cempedak, rambai, petai, jering and other exotic fruits lasted only a month in a year. The secondary jungle could also reap in the valuable tropical hard word for wood based industries. Some of the exotic tropical jungle fruits and fungi contain high medicinal value and much sort after in the develop countries.

With the introduction and implementation of the formidable integrated tropical food crops and fruits reforestation concept on the indigenous communities’ customary land, each village’s chieftains will have to play their role in helping their society prosper the community and village. Through this means, the government not only do not have to subsidize heavily on them but the indigenous people could upgrade their livelihood and generate the country’s economy. The government through the Ministry of Agriculture and its affiliating agencies should draft out a monthly schedule of planning to initiate the smooth process of integrated tropical food crops and fruits reforestation in each indigenous village throughout the country. The young generation of the indigenous society must be educate, trained to upkeep, clear the undergrowth and fertilize their customary land to facilitate the success of the integrated tropical food crops and fruits reforestation. Everything must be at bay for the successful of the said program implementations. Indigenous community chieftains should review the projects occasionally with the district office, office of indigenous community affair and governmental authorities to foresee prospect of the integrated tropical food crops and fruits reforestation for the country’s future.
In the nutshell, as Ferrari observe and noted that since the 1980s, and the past decade, indigenous peoples and local communities have been taking active initiatives in conserving and sustainable managing biodiversity, sometimes on their own but often with the support of NGOs or as join management with government departments, despite the lack of supporting legal instruments. There is a recent increasing trend in community conservation initiatives and in community involvement in conservation initiatives initiated by NGOs or government agencies which is in-line with the Ninth and Tenth Malaysian Economic Plan for agriculture sector which emphasized on New Agriculture, participation in high quality and value-adding activities. Such as undertaken to expand the use of better clones, seedlings or breed, adopt new technology and knowledge-based agriculture, gazette the necessary and for agricultural zoning, land consolidation as well as promote better coordination in project planning and implementation, extension services, quality control, financing and marketing. With the inclination of according to Phillips (2003), the shift from a ‘fortress conservation’ framework to a community-oriented protected areas approach has emerged alongside international trends seeking to combine conservation and community development – the notion of community-based conservation.

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