Beyond the cocoa farm: a new look at farmers' choices in livelihood activities and impact on productivity in selected areas of Papua New Guinea

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Abstract. In this paper, results from a study on PNG cocoa farmers' livelihoods and socio-cultural aspects that effect cocoa production are presented. A cross-sectional descriptive study, in the context of phenomenological reflection involving semi-structured interviews, discussions, and observations, was used to study the livelihood of cocoa farmers in the province of East New Britain. Findings indicated that land tenure and shortage, culture and traditions, livelihood diversification, and poor government support were the key impediments to cocoa production. Furthermore, the research and extension system focuses on increased production for profitable capital-based farming. However, farmers are very entrenched within their socio-cultural practices and consider farming more as a way of life to survive. Farmers seem adverse to risk, comfortable in diverse livelihood activities, and seek to make a reasonable income rather than focusing solely on more profitable cocoa production.

Keywords: cocoa, smallholder-farmer, socio-culture, livelihood, livelihood strategy.

Introduction

Cocoa *(Theobroma cacao)* is the third most important agricultural export in Papua New Guinea (PNG) with more than one million farmers in the coastal areas of PNG dependent on cocoa farming as their main source of income (Omuru, Nailina & Fleming 2001). The income generated from cocoa production is important to rural families, fundamental to meeting expenses associated with everyday living, education, health, other goods and services, as well as customary cultural obligation costs such as bride price payments and church activities (Curry et al. 2007). Despite the importance of cocoa to PNG, productivity levels remain considerably lower than potential production (Curry et al. 2007; Lummani 2008). Various factors constrain production potential including high incidence of pest and diseases due to poor farm management techniques (Daniel & Guest 2011), shortage of available farm labour (Lummani & Nailina 2001; Omuru & Fleming 2001), land shortage in the context of small farm size (Lummani 2001; Lowe 2006), and low cocoa price (Omuru & Fleming 2001; Curry et al. 2007). On average, smallholder farmers in the main cocoa producing provinces of PNG achieve mean yields of between 300-400kg dry beans per hectare, per annum (Curry et al. 2007), considerably less than the potential yield of 2,500 kg dry beans per hectare (Lummani 2008) based on field trials of improved varieties and under good management practices. Despite the PNG Government and the cocoa industry's research, development and extension commitments in the past and recent years to reduce the extent of the production constraints, cocoa productivity remains considerably lower than what is potentially achievable (Daniel et al. 2011).

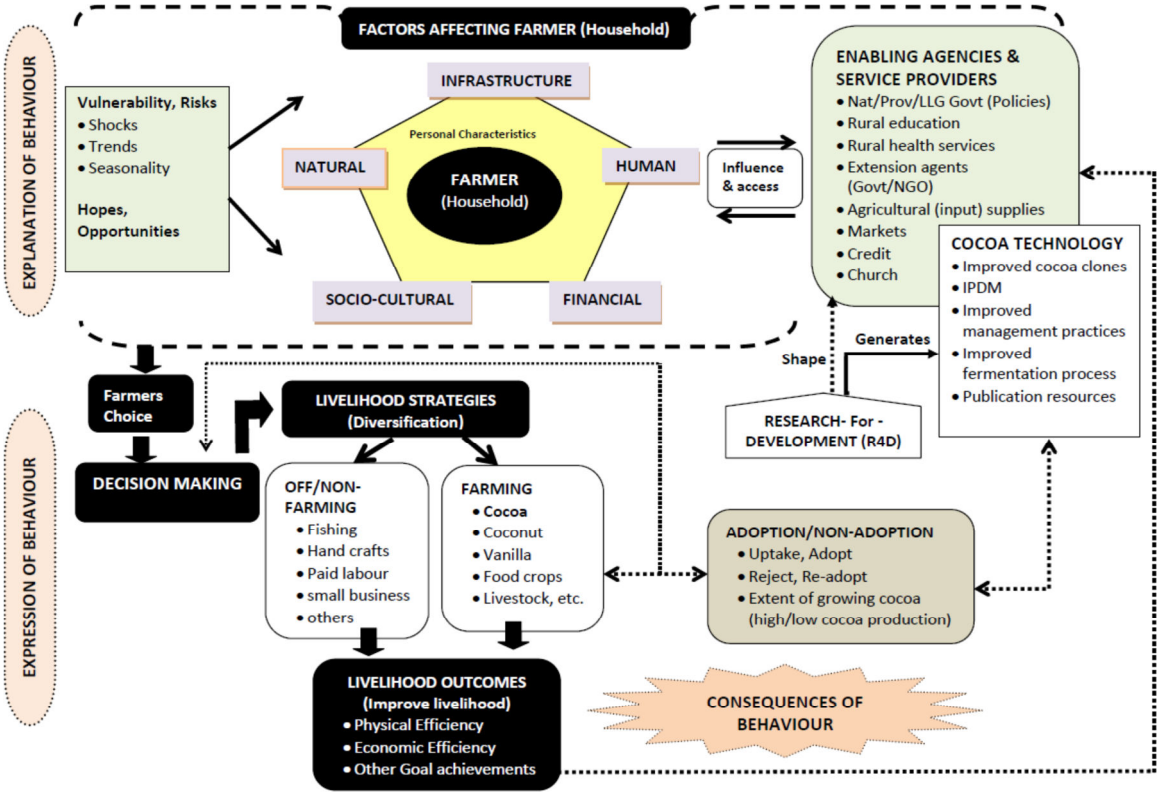
Researchers and extension agents need to understand cocoa farmers' concerns, and how they perceive the importance of cocoa production among other livelihood activities, if they hope to create industry change. It is important to recognise the attributes of farmers' socio-cultural systems in which the smallholder farmers carry out cocoa production, and to understand the nature of farmers' livelihoods, as PNG smallholder cocoa production is embedded within a broad set of cultural systems (Curry et al. 2007). Recent thinking on the nature of socio-cultural systems and smallholder farmers' livelihoods is based on the view of livelihood diversification as a survival strategy of rural households in developing countries (Ellis 1998). For this research project the livelihood concept (Ireland 2004) was employed to understand smallholder cocoa farmers' way of life and to determine the factors that influence a farmer's choice of engagement. This allowed a focus on understanding smallholder farmers' environment settings, their livelihood strategies, and other socio-cultural issues to identify the range of factors that may influence cocoa production. The paper begins by exploring the concept of an agricultural based sustainable livelihood approach (ASLA) and outlines the key attributes that might influence smallholder farmers' behaviours regarding cocoa production. It then defines a smallholder cocoa farmer before presenting the methods, findings and discussions, and conclusion of this study.

Concept of Agricultural based Sustainable Livelihood Approach (ASLA)

Ireland (2004, p. 2) defines sustainable livelihood as 'the way people combine their capabilities, skills and knowledge with the assets at their disposal to create activities that will enable them to

make a living'. IMM (2008) further stated that sustainable livelihoods approaches (SLA) are based on a conceptual framework to aid analysis of the factors affecting peoples' livelihoods. The IMM (2008, p. 12) framework has been modified to an agricultural based sustainable livelihood framework (ASLF) (Figure 1) and used in this study.

Figure1. Agricultural based sustainable livelihood framework (ASLF)



Source: Author (developed from IMM 2008)

It is apparent that IMM (2008) SLA framework is people centred and illustrates the possible external, surrounding, situational and personal factors that influences the people. The IMM (2008) SLA framework, however, does not explain the expression and consequences of the people's behaviour, for example how do the influencing factors affect the peoples' decision making when choosing livelihood strategies and the consequences of the action taken based on the decisions. Such challenges trigger a new dimension to the livelihood framework resulting in an agricultural based approach (see Figure 1). This new dimension allows a better understanding of the factors that are associated with the farmers' environment and how it affects the farmers' wellbeing and their decision making in agricultural production and other livelihood activities. The agricultural based, sustainable livelihood framework (ASLF) integrates the framework components with behaviour-dependent variables that influence the farmers' (household) decision making in developing strategies to improve their livelihoods.

A farmer may make choices for farming activities like cocoa or other crops and livestock or can choose non-farm activities based on circumstances or certain factors that influence him/her. This illustrates the expression of behavioural patterns of a farmer or household. The choice of farming or non-farming activities leads to decision making, physical actions and activities. For example, growing cocoa (or not), adoption (or non-adoption) of technology, or engaging in off-farm employment ultimately resulting in livelihood outcomes. The outcomes thus improve the physical and economic efficiency, or assists in achieving other goals that may change the nature of the underlying livelihood assets (e.g. increased income will result in more financial assets). This in turn feeds back into the chain of influencing factors and ultimately resulting in changes in future livelihood outcomes. Consequently, this illustrates the expressed behaviour of the farmer or household. The ASLF (see Figure 1) provides an alternative rationale for interpreting the chosen way of life that helps understands the complexity and makes clear the many factors that affect the farmers and their environment. Therefore, ASLF was adapted as an ideal framework to apply in studying smallholder cocoa farmers' way of life with a holistic perception of a livelihood system.

Smallholder farmers

In general, smallholder farmers typically include those farms comprising less than 2 hectares of cropping land (Nagayets 2005; Wiggins, Kirsten & Llambi 2010; IFAD 2011). Smallholder farmers usually depend on household members for most of the labour or are those farms with a subsistence orientation, where the primary aim of the farm is to produce enough for the household's consumption (Hazell et al. 2007). The World Bank's Rural Development Strategy defines smallholders as those with a low asset base, operating less than 2 hectares of crop-land (World Bank 2003).

While the specific definition may vary according to location, it is known that smallholder farmers in PNG account for approximately 87% of the entire population (R.M. Bourke & T. Harwood 2009). In PNG, smallholder cocoa farmers are typically mixed farmers with a variety of cash income sources, including cocoa, copra, garden foods, betel nut, vanilla, livestock, and others (Omuru 2001). Cocoa is sold as either dry bean (fermented and dried) or wet bean (beans straight from cocoa pods), depending on various factors such as the age of their cocoa trees, yields, block condition and access to processing facilities (Curry et al. 2007).

Method

A qualitative research approach with incorporation of a phenomenological context was used as the basis of this study, predominately to capture information from farmers' experience through descriptive analysis. That is, to understand peoples' perception of how they view the world (Denzin & Lincoln 1994). The approach of this study drew from the agricultural based sustainable livelihood framework (ASLF) (see Figure 1).

The locations of the study upon which this paper is based included Vudal and Burit villages of East New Britain Province (ENBP) in Papua New Guinea (PNG), as shown in Figure 2. Additional research (under analysis) was also conducted in the Wampup and Gabsongkeg villages of Morobe Province (MP). Vudal and Burit villages are in the Gazelle District of ENBP (Figure 2). The natives of ENBP are referred to as *'Tolai(s)'* so the term *'Tolai'* is used in this paper in reference to the people of Vudal and Burit. There are a number of languages spoken in the province, of which *Kuanua* is the common language of the *'Tolai'*, while *Pidgin* is widely spoken and is the means of communication with non-natives or outsiders. The population of Vudal village is about 400 and Burit 200, with an average of six people per family(NRI, 2010).

The participants in this study were the smallholder cocoa farmers of Burit and Vudal villages and local government extension officers. Since the study was undertaken from an inductive perspective, multiple sources of evidence were drawn on. The main source of evidence was drawn from in-depth semi-structured interviews supported by the use of probing techniques, and with complementary sources such as direct observations and community-based discussions. Twenty-one smallholder farmers were interviewed of which two were females. A further five extension officers were interviewed as well. Justification of such a sampling population was only established after reaching a saturation point, meaning the number of participants was based on the point where no new information emerged, consistent with the notion of theoretical saturation as derived from Glaser and Strauss (1967).

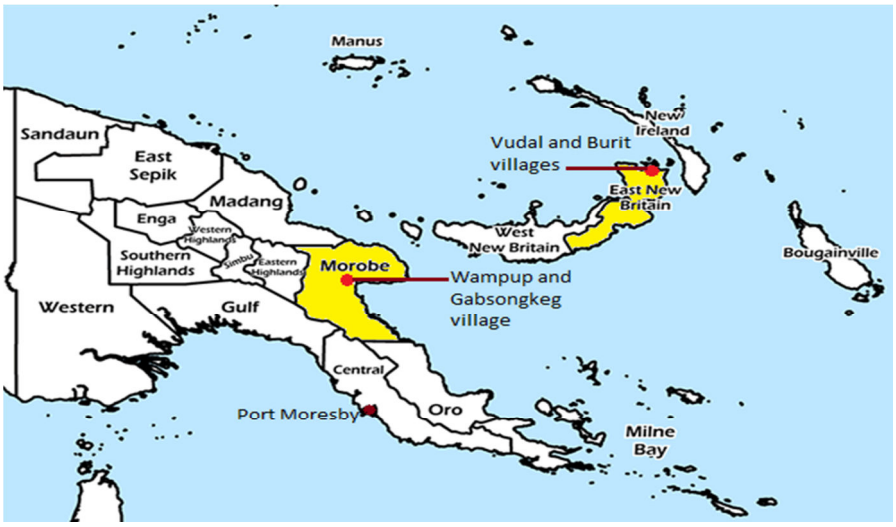
Interviews were recorded using voice recorders and notes were taken to capture gesture, voice tone, mood, and personality attributes of the respondents. After the interviews, the notes and the recordings were transcribed from Pidgin to English and were then analysed using NVivo software. The transcribed data were firstly coded from actual statements into broad themes according to the emerging ideas, and the topic concept based on research questions. These themes were further divided into nodes and sub-nodes in a hierarchical structure. The themes provided rich qualitative data and the themes were further converged into main result topics that are now described.

Results and discussion

Conceptual model of smallholder cocoa farmer livelihood

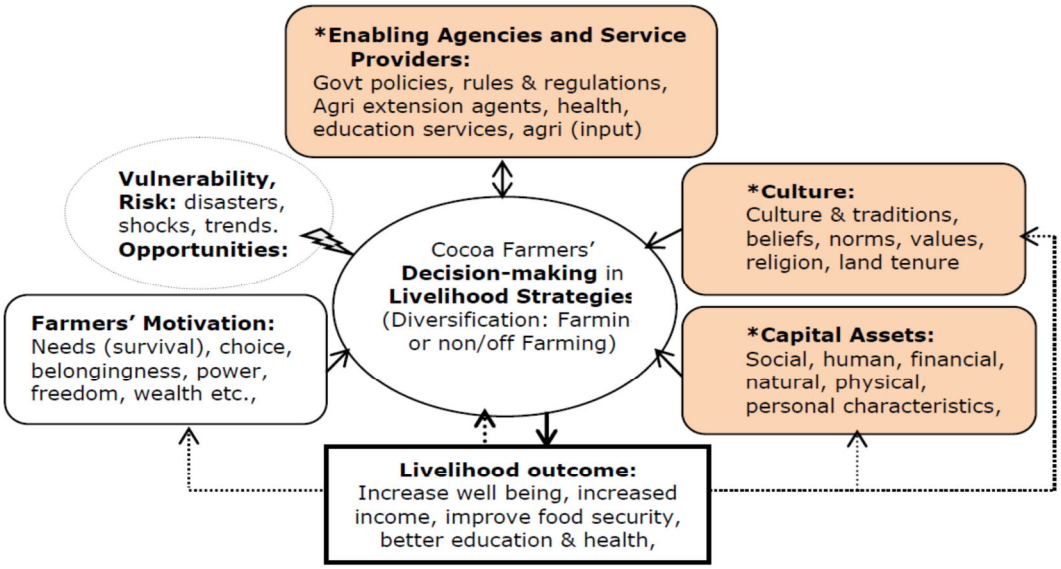
The study acknowledged the ASLF (see Figure 1) that guided this investigation; however, the findings indicate that factors affecting livelihoods depend on variables such as location, environment, culture, support, and farmers' motives as shown in Figure 3. This framework varies from the ASLF and the conventional theoretical livelihood models (e.g., Ellis 1998; IMM 2008) designed for studying poverty alleviation.

Figure 2. Map of Papua New Guinea indicating the study locations (Morobe and East New Britain Provinces)



Source: Summer Institute of Linguistics (2012)

Figure 3. Cocoa farmer's environment and factors affecting decision making in livelihood activities



The essential livelihood variables identified to have affected farmers' decision making in livelihood activities in this study were: enabling agencies and service providers (Government), availability and accessibility of capital assets, farmers' culture and traditions, farmers' motivation or needs and choices, and farmers' consciousness of vulnerability, risks and opportunities, as well as farmers' desired outcomes. However, in this paper, the findings of the farmers' culture and traditions, parts of capital assets, and the enabling agencies and service providers (Government) are discussed while the other variables are under analysis (not presented).

Farmers' culture and traditions

Culture is a complex phenomena which includes knowledge, belief, art, morals, law, custom, way of life, and other capabilities and habits acquired by the people as members of a particular society (Ray 2003). Accordingly, the *'Tolai'* people have their own unique customs, traditions, and beliefs that are different from other regions. Factors associated with culture are deeply rooted in the lore of the people, which govern their traditional knowledge system with wide applications in their livelihood pursuits. The cultural factors and practices identified in this study that may have implication on farmers' livelihoods and cocoa production are *'wantok*

system',*'puripuri'* (witchcraft), land tenure and shortages, polychronic culture, customary obligations, and traditional farming practices.

Wantok system One of the country's fundamental and significant culture is the '*wantok system*', which when translated means 'one language'. '*Wantok*' is a term used in reference to anyone who speaks the same language, comes from the same area, and has common social associations or ethnic background. Through the '*wantok system*' within the norm of extended family or the clan, each member can expect basic provisions and sustenance such as housing, food, health care, security, also a general sense of inclusion and belonging, and even money. The reward in return is reciprocated when need arises. People see this as an affirming way for the community to share its scarce resources to help each other in sustaining their livelihood, and is widely accepted. Therefore, the '*wantok system*' has important values and meanings that bind and strengthen the '*Tolai*' people and their traditions, and so cultural resources are rich in both villages. '*Tolai*' people are inherently drawn to group work or associations and are greatly influenced by the '*wantok system*' culture that people still embrace to take care of each other.Conversely, the 'wantok system' can also have detrimental effects on peoples' livelihood if they become too dependent on others with less reciprocity as one interviewee revealed:

> ... this wantok system that is making people to become lazy and depending on others. Those who work hard, have to share with lazy family members. We are too much dependent on others.

Nevertheless, the *'wantok system'* is still part of the PNG culture and affects farmers and all other works of life regardless of education, religion, or ethnic background.

It could be argued that the effect of the *'wantok system'* means some villagers put less effort into cocoa production and other income generating activities knowing that their *'wantoks'* will provide when the need arises. Furthermore, application of the *'wantok system'* is arguably a main contributing factor to nepotism and corruption in all organisations, management, and political levels in the country.

'Puripuri' (witchcraft) with essences of 'we factor' The study revealed that the *Tolai* farmers' are also affected by an extrinsic factor, that triggers them to share and work together in groups or society other than in the '*wantok system*'. This instrinsic factori s believed to be the fear of the spells of witchcraft or evil spirits known locally as '*puripuri*'. The fear of '*puripuri*' is an external factor that forces farmers to work together in groups and progress together as a community; referred to as the 'we factor' or 'collectivism'. The 'we factor' culture emphasises relationships among people to a greater extent, emphassising interdependent activities and suppressing individual aims for the group's welfare:

> We also believe in '*puripuri*' (witchcraft or evil spirits) , therefore, if we succeed in business or increase in wealth, then we fear being attacked by other clan or even jealous relatives using '*puripuri*'. Although, the Christianity beliefs have strong influence on us, but to some scale of degree, fear of '*puripuri*' is still there.

It was clear that personal advancement in improving livelihoods by isolating the rest of the lineage may encounter some misfortune or death caused by *'puripuri'.* Therefore, most *'Tolai'* people fear the spell of *'puripuri'* by other clans if they advance in acquiring wealth, venture into businesses, and/or elevate to a higher standard or status than the rest. The fear keeps them at a standard platform so they chose to live equally along with the rest of the community and progress or advance together, rather than excel individually, to safeguard themselves from the alleged consequences of *'puripuri'.* The belief of *'puripuri'* (witchcraft) contributes to the suppression of innovation. Venturesome farmers who wish to increase cocoa production or try other enterprises to bring more wealth and development into the community to improve the quality of life are discouraged from doing so. In the *'Tolai'* society, culture *(puripuri)* and increased productivity are in conflict with on another.

Land tenure and shortages The livelihood of people in all study areas revolves around their land and so land becomes a paramount part of their life. All individuals in the village have access to land to farm their crops and animals but may not necessarily own the land. Land ownership is tied to the land tenure system in the society. The '*Tolai*' community, including Vudal and Burit villages, belong to matrilineal society, meaning the women inherit the land and make decisions over the customary land use unless the land is acquired through other means such as a purchased land. Given such circumstances, men are reluctant to invest or develop the customary land as they are aware of the implication that in an event they encounter land disputes, and/or if deceased, their sisters will have rights over the land and not their children:

> In our '*Tolai*' culture the sons do not inherit the land, the clan and the women decide whom to inherent the land. I cannot give my land to my children, as it is against the '*Tolai*' custom. I have to give it (land) to my nieces and nephews. My sister's children will inherit the land and my own children will not get any land.

Consequently, most *'Tolai'* farmers (men) tend engaged in short-term land use strategies rather than long-term investment on the land, such as expansion of cocoa trees, replanting, or application of improved cocoa management techniques that requires considerable investment of time and other resources. The matrilineal land tenure system, therefore, seems to be an obvious impediment to increasing cocoa production or other tangible development in such holdings, as men would not want to take the risk of losing their cocoa and other investments to the female lineage. The alternative is to purchase land elsewhere, however, most farmers do not have sufficient resources to secure adequate funding. Land tenure is also linked to motivational factors, as the restriction of land use discourages farmers' from farming cocoa, therefore luring them into other non or off-farm activities.

Apart from the land tenure issues, land shortage (small land size and full utilisation) was also a major constraint to farmers, as most farmers own less than two hectares of land. Population increases have increased much pressure on the land usage. Some farmers were getting rid of cocoa trees to make way for food crops. Land shortage and pressure leads to the exploitation of other natural resources like hunting, harvesting timber for building houses, and collecting sago palm leaves for making thatched roofs and mats in communal lands. It also lures farmers into other non or off-farm activities to earn a living to sustain their family and support cultural obligations, resulting in less agriculture activities occurring.Therefore, this study supports Lummani (2001) and Lowe (2006) findings on land shortage as a factor affecting the farmers. This, not only affects increased planting of cocoa but cultivation of other crops as well.

Polychronic culture Monochronic cultures tend to work and respond to time, while polychronic culture take a more leisurely view of time (Hall 1983). Cohen, Karmarck and Mermelstein (1983) claimed that collectivist 'we factor' is associated with polychronic cultures while individualism is associated with monochronic culture. The polychronic theory corresponds with the findings of this study since the '*Tolai*' people practice the '*wantok system'*; the essence of collectivism defining their personality and pushing them towards a polychronic oriented use of time.

Time is valued and important in many societies in the world; however, the *'Tolai'* people and the rest of the country do not see time as important and so are polychronic. Time is not an issue to the people, they adjust their activities to available time to suit their needs. Farmers also revealed that they spend a considerable amount of their time on other activities rather than farming:

> I spend a lot of time in our Ward doing council work and I don't spend enough time in cocoa or farming work or with family.

> I am a farmer, but I think I am spending more time with church work. I am currently helping the carpenters to build our new church because all blessing comes from God and it is rightful to support church work.

Farmers are involved in multiple activities at one time and tasks are often incomplete and most activities are delayed. For example, cocoa pods ready for harvesting are not attended to when there is a death in the village as householders presence and participation in the funeral is expected and normal daily activities cease around a week at that time. Therefore, the *'Tolai'* farmers are more flexible about time; they have no problem integrating farming activities with socio-cultural and emotional tasks. It seems that maintaining relationships and socialising are more important to them than accomplishing tasks. The advantage of polychronic behaviour is that the people are flexible and adaptable to anything at any circumstance. However, given the environment with scarce resources such as labour, infrastructure, and finance, the culture of switching or spreading their focus among many things may not be favourable to complete tasks in a timely manner due to overloading, thus affects the farmers' productivity.

Customary obligations Sir Michael Somare, former Prime Minister of Papua New Guinea (PNG) once said:

> Upholding our culture and beliefs is about our roots, our identity as true Papua New Guineans, from a traditional society that was handed down by our forefathers. Our village lifestyle must never be forgotten as we move into the new millennium. Our cultures and traditions must go side by side with the education we have gained so that we can unite them (The National 2000, p. 3).

PNG is a country with diverse culture that encompasses various traditions and customs over generations, and is still tenacious. Such traditions and customs vary and are unique throughout the country. However, their effects and implications due to modernisation have created some tension on the livelihood of the people. Customs and traditions are robust and all lines of people (educated and uneducated) in the community part take in such customs including contributions to bride price payment, feasting during deaths, exchanges with other villages, ceremonial rituals, and thanksgiving church activities. It was apparent that most farmers spent ample time in church work in accordance with their religious or Christian faith, that dedication to church activities means blessing from God and is upheld in all societies.

The '*Tolai'* farmers work hard through various livelihood activities and what they earn is then committed to customary and traditional obligations rather than investment back into the farm or other enterprise that would generate more money. It appears that maintaining their status and being recognised in the community is often about their ego and is important to their lives as they do not want to bring shame to themselves and family. Although customs and traditions are important to the societies, the reality of modern changes is imminent. Therefore, the farmers' way of viewing the world needs to change. Facilitation of this through extension agencies can play a pivotal role. These agencies have the resources to develop awareness packages outlining how to accommodate modern changes without losing sight of important traditions. There could be ways of finding the balance and to be productive. Therefore, to some extent, the current customary and traditional obligations contribute to low productivity, including low cocoa productivity.

Traditional farming practices Farming is a dominant livelihood activity of the '*Tolai*' people. The society is predominantly a rural-based economy, dominated in the early stages by subsistence agriculture and informal activities, therefore the rationale for farming is merely for survival. Culturally, farming is their way of life where farmers acquired various traditional methods and techniques of farming and passed these down through the generations. Farmers are wary of variability and risks, therefore, they engage in multiple farming and non-farming activities to provide sustenance for the families survival. Their style of managing their farm is unique, as they have been surviving on their own strategies happily over decades without input of any form from the government or its agencies. However, in recent times, there has been a transition from subsistence farming to market-oriented production in agriculture, nevertheless the farming techniques are mostly traditional and rarely modern. Even cocoa was introduced, but the approach of the farmers toward cocoa management is influenced by traditional ways of farming. Agriculture has always functioned within cultural bounds and society's expectations.

The challenge is that improved (modern) technologies and methods of farming were introduced over decades and yet adoption is poor despite the importance of the technology and expected productivity. Farmers see farming as survival, while surplus can be sold; however the money earned is invested back into cultural obligations to maintain their status and recognition in the community and not back to the source of revenue. In a society where the default position is survival, the agricultural research and extension workers are going to find it difficult to facilitate changes, especially for the concept of adopting new technology and improved efficiency or productivity to take root in farmers' minds. Extension and research workers really have to understand the farmers' way of life. Therefore, culture and science are in conflict.

Capital assets (financial and human)

Livelihood assets are fundamental as they form the resources of the community and the individual farmers' who own or have access to assets to enhance their livelihoods. The Tolai farmers have combined their assets in many different ways to generate positive livelihood outcomes. The study indicated that resources differed within the study sites based on availability, accessibility, desire of usage, and variability. There was a wide variation in assets (community and personal) that made up livelihood capital, from tangible stores such as food stock, personnel effects, *tambu* ('*Tolai'* traditional money), cash or any savings in the bank, and resources such as water, land, forest, crops, sea (for Vudal village), livestock, farm tools, and machines. The intangible assets included the demand and appeals during times of stress, shock or when emergencies occurred, for example during the cocoa pod borer (CPB) infestation in 2006 in Burit and Vudal villages. Claims for relief and help from government, extension agencies and NGOs were made during this devastating infestation period. Farmers' accessibility or opportunity to obtain information and technology, use of government services such as road, electricity, education, health, market and credit facility are also intangible assets. The tangible and intangible assets that were identified in this study were categorised into natural, social, financial, physical and human assets. However, financial and human assets stood out and are

believed to be the pivotal assets that seem to have a great effect on the farmers' livelihoods. They are discussed below.

Household income The 'Tolai' people still use their traditional currency called '*tambu*' (made of shell) in addition to modern money (PNG Kina). There are various income sources for the household, however the majority of the income is earned through farming activities such as cocoa production, marketing of garden produce (greens, vegetables, taro, sweet potato, peanut, fruits and nuts), coconut, betel nut, betel pepper and chickens. Farmers who live in the North of Vudal village also rely on fishing, being located close to the sea. They catch fish for food and for marketing purposes. According to the study, market attendance was one of the women's most important and regular activities for daily income. Apart from farming, household income is also generated through non/off-farming activities by gathering bush materials (for building houses) and selling, and making and selling of mats and baskets from coconut leaves. Some villagers earn their living from casual employment, receiving bride price payments, sawmilling, trucking, and trade stores. Occasionally family members and relatives are engaged in formal employment in Kokopo, Port Moresby and other parts of PNG and send a portion of their earnings to the village. The actual figure of income per household could not be established, since most farmers would not divulge such personal information, but it was obvious that they earn sufficient income through farm produce and other means to meet their daily needs.

Expenditure and savings The income earned by households in Burit and Vudal is spent on various items. The form expentidure takes is dictated largely by needs but social obligations are also a major contributor to total household expenditure. Although expenditure patterns vary between households, money obtained from cocoa is rarely saved for future use. Money earned from cocoa is invested in cultural obligations and other needs and not back into cocoa production. Saving becomes challenging due to the increasing costs of goods and services and short-term needs and wants.

> What I earn from cocoa or other crops goes into buying 'tambu', school fees, clothes, and household needs, we spend all our income. We hardly invest back in cocoa because we are faced with many needs.

Money earned was often spent on '*wantoks'* (relatives) and socio-cultural obligations such as church contributions, funeral feasts, taboos, marriage, and so on. A farmer said:

> Culture and customs are part of our life in our society. It was passed on from generations and it is important to us. Although customs are important, but in my opinion, it is a burden on us as it costs us a lot of time and money to do cultural activities, we make a loss. I am against much of the customs, but I cannot let go because, our ancestors have put this in place and it becomes a ritual in our society. If we do not follow it, (customs) then we will be rejected from the 'Tolai' society, it is not normal for a 'Tolai' to ignore customs. Culture and customs sometimes become a burden to me and my family. When I do not have anything to contribute to cultural obligations, then it puts the burden and shame on my family so I have to go and seek help from my brothers or sisters to help me with money so that I can participate.

However, farmers have expressed their desire to improve the standard of living by building permanent houses and educating their children:

> I want to own a permanent home to improve our lives... meet my children's school fees and to sustain my family.

Livelihood strategies and labour use in the household The '*Tolai*' households or families construct a diverse portfolio of activities and social support network to assist them in their struggle for survival and to improve their standard of living. The livelihood strategies meet food consumption needs, source of income, and social obligations of the '*Tolai*' families. It is imperative to address the question of how labour in the Vudal and Burit households is organised and how tasks and activities are undertaken. It is also important to establish the decision making behind the assignment to each task, and whether they are gender-based. Most smallholder households rely on unpaid family labour for farming and/or non or off-farm activities.

The pattern of choice of occupation varies with the task. In general, there was a clear-cut division of labour along gender lines. Broadly speaking, the heavy work such as clearing sites for gardening, building houses, pruning cocoa trees, planting certain crops, hunting and fishing fell to the men. Women (including daughters) did certain planting, weeding, harvesting of specific crops, sold farm produce in the markets, collected firewood, looked after the childern and any small animals, and performed daily household chores. However, it was observed in both villages, and other places, that crossover in the performance of tasks was becoming common. Men now assist women to care for children and women assist men to clear garden sites, depending on the needs and opportunities that present themselves. Both parents have the

responsibility to raise and discipline their children. In the past, these activities were strictly along gender lines (Beer 2006b). The exact time spent on each of the activities could not be established, as most respondents were unable to provide accurate accounts. Most said it depends on circumstances, for example, if making a new garden they would concentrate on clearing and planting for a week or two and then attend to other activities. Activities are attended to based on the circumstances and when need arises, there is no planning of activities by the'*Tolai'* as they are polychronic.

There is an obvious trend towards diversification of livelihood strategies where farmers have diversified into different income generation activities, customary obligations, leisure, church activities, daily chores and do not focus solely on cocoa despite the importance of the crop in terms of cash income (according to research and extension)(Daniel et al. 2011). Consequently, full effort is not put into cocoa production by smallholder farmers.

Enabling Agencies and Service Providers

The study revealed that basic government services like, improved roads, electricity, water supply and sanitation, health, agricultural extension, market and credit facilities are lacking (also implicated by Omuru 2001b; M. Bourke & T. Harwood 2009; Sitapai 2012). Farmers from the study sites responded when asked about government services to their community:

> One thing is we have the resources, but the Government is not helping or enhancing us to develop these resources to improve our way of life. In the last five years, we did not receive any services from the Government.
>
> I see the extension and research officers that they do not understand our problems, that's why they do not deliver what we need. They are up there and do not know what little farmers here going through. So a lot of families are struggling on their own without the support of the Government.

Apart from basic Government services, research and extension programs in agriculture are mainly tailored towards increased production by improving innovations (Omuru 2001b), assuming that all farmers would eventually see the benefit of the new innovations and thus adopt them to improve their livelihood. This approach is consistent with Rogers' (2003) innovation adoption-diffusion theory that is grounded on profitable capital-based farming. However, the *'Tolai'* farmers are subsistence based and not profit oriented. They engage in various livelihood activities, sharing their scarce resources and are predominately adverse to risk. The capitalised based approach of research and extension in PNG is appreciated, but may not be appropriate for many farmers given such a socio-cultural background. Consequently, farmers' socio-cultural factors need to be integrated in the development of future programmes, projects, and approaches.

Conclusion

This study has provided an understanding of the livelihood and underlying socio-cultural aspects of the smallholder cocoa farmers. It established several possible associated elements affecting cocoa production and other desired livelihood outcomes, thereby giving rise to a livelihood model (Figure 3). Accordingly, the key variables such as cultural factors, availability of assets, and accessibility to enabling agents and service providers were identified as fundamental contributing factors affecting farmer's decision making in undertaking certain livelihood activities. The diversification of livelihood activities triggers the farmer to distribute the scarce resources (assets) thinly to these activities including cocoa production. Growing cocoa is one of those strategies and not the only activity of the farmer.

Furthermore, in the context of the phenomena of livelihood, farmers are rooted in their traditional culture, norms and beliefs, therefore, all livelihood activities including farming revolve around culture. Farmers take farming as a way of life, for sustenance and not profit. On the other hand, research, development and extension (RD&E) agencies and agents, assume farmers are profit driven and primarily interested in increase productivity and efficiency. This indicates conflicting perceptions or rationales for farming between RD&E and local farmers. Culture and science are in conflict. Such antithetical perceptions towards farming and livelihoods between RD&E and the local farmers is seen as one of the main challenges for changes in farming, including cocoa production. Therefore, it is important to recognise smallholder cocoa production as part of a socio-cultural system and to understand the nature of livelihood in which the cocoa farmers are embedded. It is also important to recognise the degree of interconnectedness within communities, and intervene by empowering the cocoa farmers with appropriate support, approach farmers with a holistic view (other than merely on cocoa), and to provide essential government services to see changes in productivity and improve farmers' livelihood outcomes.

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