Importance of historical review of horticulture in Fiji

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ABSTRACT

Horticultural production practices and the underlying attitudes to farming are intrinsically linked to the cultural and historic quintessence of the Fijian society. Food was produced within the context of subsistence-based villages and widely distributed throughout the country. In essence, how crops are grown, crop selection, those involved in the production and marketing, and their relationship within the value chain, are a complex and often unpredictable modification of social, cultural and economic considerations. This study presents a historical overview of horticulture in Fiji with the objective of understanding these social and cultural factors, and to assist in the appropriate design of programmes to improve sustainable production practices. Looking to the future, much of the challenges and opportunities facing the agriculture sector in Fiji remain unresolved. The emergence of global challenges such as climate change provide added complexity. Considering these factors, there is a fundamental underlying need for Fijian agriculture to be increasingly responsive to consumer and market needs in terms of produce quality, consistency and sustainable production systems.

Key words: Horticulture, sustainable production systems, productivity, postharvest, handling practices.

INTRODUCTION

The evolving structures from pure subsistence to semi commercialisation and to some extent commercialisation of horticulture are a complex and often unpredictable modification of social, cultural and economic considerations. While the horticulture subsector had historically contributed towards improving the standard of living of farmers in Fiji, the realisation of its importance has only been a recent occurrence (Young and Vinning, 2007). The increasing tourism sector provides added opportunities for these farmers to access the high value markets. While the scope for increasing food security and exports exists, the Fijian agriculture sector has challenges and opportunities which still remain unresolved. This study presents a historical overview of horticulture in Fiji with the objective of understanding these social and cultural factors in order to contribute to effective design of programmes to improve sustainable horticultural production practices.

Dimension of pre-1800 horticulture in Fiji

Early history of Fiji has been poorly documented (Williams, 1958). What is apparent is the fact that indigenous people had a sound knowledge of farming and producing a wide variety of food crops (Stockdale, 1937; Donnelly et al., 1994). Food was produced within the context of subsistence-based villages widely distributed throughout the country (Ward, 1964). Location of these villages, apart from defense purposes, was for easy access to fertile land and water. People lived communally and regarded subsistence farming as their primary occupation (Stockdale, 1937; Derrick, 1946). There was little agricultural specialization by households (Ward, 1964) because living in a communal mmsystem required production of food as in-

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system required production of food as instructed by the chief, producing for the chief as well as sharing with the kinship group (Stockdale, 1937).

Each group within a village maintained a number of scattered gardens for crops such as yams (*Dioscorea* spp.) taro *(Colocasia esculenta)* and sweet potato (*kumala)* (*Ipomoea batatas*) based on different soil conditions (Ward, 1964). In addition, people collected other products from forests and sea to meet their village food requirements. This food production and collection system ensured a consistent supply of adequate dietary food to the community.

The villagers were skillful in producing and preserving food by practicing bush fallow or shifting cultivation with terracing and irrigation (Derrick, 1946; Harwood, 1950; Ward, 1964). The villagers practiced traditional food preservation techniques, based on fermenting taro, breadfruit (*Artocarpus altilis*) and other produce (Ward, 1964). Thus, the Fijians were self-sufficient except during the tribal warfare and floods; when their food gardens were severely damaged (Derrick, 1946; Derrick, 1951). The Fijians were guided by natural phenomena and had their own agricultural calendar with 11 distinct seasons linked to the flowering of trees at various times determining an activity for food production (Table 1.1) (Harwood, 1950).

Table 1: The traditional calendar of agricultural activities

Traditional Calendar	English Calendar	Signs of activities	Distinguishing activities
Vulai werewere	June and July	Weeding month	Food gardens selected and weeded. The areas are cleared using sharpened hardwood clubs or stone axe. The area was burned and remaining logs piled to make banks or contours on sloping land.
Vulai cukicuki	August	Flowering of Drala (*Erythrina indica*) which flowers around July and August	Yam gardens are prepared and planted. The mounds are prepared and yams planted on the top of the mounds while yaqona is planted at the base. Taro and *vudi* are also inter-planted.
Vulai vavakada	September		The reeds are set out to support yam stalks. This stalking controls weeds and allows *kava* to grow easily.
Vulai Balolo lailai	October	The Balolo (*Palolo viridis*) is found in small numbers	
Vulai Balolo Levu	November	The Balolo (*Palolo viridis*) is found in large numbers	By this time it is determined which yams will grow successfully. The yam plants losing leaves will not produce yam tubers. Large numbers of Balolo signify good yields.
Vulai Nuqa lailai	December	The nuqanuqa (*Decaspermum fructicosum*) starts to flower but blossoms are in small numbers	Rain is expected for the yams. Low rainfall means poor yam yields.
Vulai Nuqa levu	January	The nuqanuqa tree is full of blossom. Also a fish commonly known as *nuqa* is found in abundance	Formation of yam tubers
Vulai Sevu	February		The first yam is dug and presented to the chief
Vulai kelikeli	March	Flowering of reeds	Yams are harvested and stored in specially constructed shed
Vulai Gasau	April	Reeds sprout. This is not regarded a good time as fruits get infected by fruit flies	
Vulai Doi	May	Doi (*Alphitonia zizyphides*)	Taro is planted on irrigated terraces.

(Source; adopted from Harwood, 1950)

These days the traditional culture of planting yams is very much prevalent with subsistence farmers. This practice is also common in urban areas. In many urban areas yam competition is a feature amongst members of same church groups. The urban dwellers prepare any available land including the front flower gardens to cultivate yams. Their traditional planting skills are showcased during the annual competition judged by the size of yams grown in their gardens.

European contact, emergence of cash cropping and pre-independence horticulture in Fiji

The sighting of some of the Fiji islands by Tasman in 1642, discovery and charting of Fiji by Captain Bligh, one and half centuries later and arrival of British and other European missionaries, traders and adventurers from 1800 onwards; signaled the loss of Fijian immunity to change (Henderson, 1931; Brown, 1973). The predominantly subsistence agricultural economy gradually transited to a cash economy upon the arrival of these settlers. This brought new attitudes to the allocation of labour and time, socio-economic organisation, value systems and appraisal of land (Ward, 1964). Initial European contact also resulted in massive social upheaval, through introduction to fatal diseases, increased regional conflict, and the introduction of private land ownership (Derrick, 1946; Brown, 1973). The first two missionaries, William Cross and David Cargill contributed to the change in pattern of food production and consumption of these people. On the other hand, settlers such as Savage helped the chiefs to win tribal wars and contributed to improved relationships between Fijians. The introduction of firearms to the natives was the principal vestige of European intrusion (Derrick, 1946). In the 1840s, villagers mostly supplied food rations to visiting ships in exchange for firearms and as warfare excited the ambitions of Fijian chiefs, especially Cakobau, the high chief of Bau went to the extent of raising money to buy more firearms through levies of coconut oil (Derrick, 1951).

During the tribal wars, villages were strategically located near caves, up on the hills in the rough terrain where the chiefs felt secure. The initial impact of cash cropping changed the structure of subsistence villages in two distinct ways. These were relocation of some villages and people moving out of villages (Ward, 1964). Many villages were relocated to fertile land areas and near to river or road for ease of transportation of cash crops, whilst some were relocated for health reason. In addition, some people moved from resource poor villages to more economically viable nearby villages. Others moved from villages to become independent farmers, with or without a legal exemption of performing communal duties (Ward, 1964). These changes contributed to a greater crop specialization, and a transition towards cash crops at the expense of traditional subsistence-based crops. On the downside, cash economy meant undermining the Fijian independence.

From 1901 onwards the Fijian economy rapidly progressed towards a cash economy, driven in part by colonial policies. The introduction of foreign labour, capital, new crops, cultivars and production technologies, resulted in a period of considerable change in the now emergent Fiji agricultural sector. The production of subsistence food was largely replaced by sugarcane (*Saccharum officinarum*) the major cash crop. This also led to weakening of social structures in the villages, allowing Fijians to participate in new ways of life (Stockdale, 1937; Ward, 1964). The change in social structures also impacted on the food production systems of the villagers. More labourers were sought from India and the administrator concentrated on the production of export commodities. The initial principal agricultural export commodities were copra, coconut (*Cocos nucifera*), cotton (*Gossypium hirsutum*), sugar, sugar cane (*Saccharum officinarum*), maize (*Zea mays*) and tobacco (*Nicotiana tabacum*) (Department of Agriculture, 1928; Simmonds, 1928; Taylor, 1928; Stockdale, 1937) and by 1928 cash crops such as tomatoes (*Solanum lycopersicum*) were grown for local consumption as well as for the export market (Calway, 1928).

During the 1930s, the focus of colonial administrators was primarily orientated towards export, with little thought to supplying the domestic markets (Department of Agriculture, 1930). This disparity, led to considerable conflict particularly during the indenture system, driven by what crops were grown and promoted Figure 1.1 (Department of Agriculture, 1933; Jack, 1933). With decline in banana (*Musa* spp.) exports the administration attention turned to exporting citrus, (*Citrus* spp.) canning and exporting of pineapples (*Ananas comosus*) (Department of Agriculture, 1931).

Figure 1.1 Postharvest handling and export of selected crops. (Top) bananas for export in 1990s, (bottom) sun-drying copra on primitive bamboo - pictures sourced from J.W McPaul, 1963.

The bias towards the production of export crops at the expense of labourers and other available resources, led to local food shortages. Administrators realised that output of labourers was decreasing due to lack of adequate nutritive foods available in the colony. One of the major factors contributing to inadequate nutrition was that labourers did not have any time left after a hard day's work to cultivate vegetable crops either for home consumption or to sell in the local markets (Jack, 1940). Later the farmers were given opportunities to produce horticultural crops such as lettuce (*Lactuca sativa*), water cress (*Nasturtium officinale*), peas (*Pisum sativum* L.), beans (*Phaseolus* spp., tomatoes and eggplant (*Solanum melongena*) (Surridge, 1939). While Colonial Sugar Refinery (CSR) tenant farmers were not allowed to plant vegetables on CSR land (Lal, 1997) other farmers were allowed to have small garden plots. Despite allowing having small garden plots, the farmers were persistently reminded that sugar was the main vital crop and not be interfered with by other crops (Department of Agriculture, 1943). The easement of the indenture system left government to deal with the nutrient deficient farmers. In order to address the nutritional deficiency of farmers and to meet the schedule of exports, the government had allowed farmers to plant early maturing varieties of rice (*Oryza sativa*) and vegetables (Parham, 1945), an arrangement that proved favourable to both the farmers and administrators as well. Once the farmers' nutritional status was improved they contributed to the demand for food during the war.

After Second World War, there was a view by colonial administrators that agriculture productivity was low and that Fiji was not producing enough crops (Coulter, 1967). It was the understanding of administrators that once a colony was developed, it should provide food for Australia and England. More land and cash crops were made available for cultivation. This had a negative environmental impact, in that it encouraged greater utilization of more marginal lands, particularly those associated with flood prone deltas and steep slopes. Not surprisingly, crop intensification resulted in soil erosion and loss of soil fertility (Department of Agriculture, 1950). Preventive measures to address soil erosion included issuing of two land conservation orders in 1960. The first one was to prohibit the use of sledges on dry lands and the second required all sugarcane farmers to practice contour farming on hilly lands (Whitehead, 1960). In addition, the Department of Agriculture was advised to be actively involved in conservation of natural resources (Howlett, 1995). The Department of Agriculture highlighted the necessity for four conditions for being a successful farmer *viz.,* efficient management of manpower, soil, water and capital. However, the task of farming was fraught with difficulties, whether the farmer is educated or uneducated, rich or poor (Harwood, 1950).

The indigenous farmers were also confused with the dual set and sources of government laws: the Fijian Affairs Board and the Department of Agriculture. This had greatly affected the growth of smallholder Fijian farmers (Coulter, 1967). In order to design an agricultural system for indigenous people many factors such as customs, standard of education, traditional diet, aptitude for agriculture, monetary considerations and social obligations were prerequisite for a successful agricultural program (Harwood, 1950).

Developments in horticulture after independence

Between the 1960s and 1970s, the problems of colonialism in the Pacific were reaching an intolerable level for the United Nations (Coulter, 1967). After Fiji gained independence in 1970, the ambitious leaders embarked on forging better economic prosperity by promoting the capitalist policies of wealth accumulation. It was realized that whilst colonial administrators had the knowledge of agricultural development, their priority was establishing physical base rather than the social, economic and technical development of the colony: the result was agricultural failures (Adams, 1970). In addition, the increasing public concern regarding self-sufficiency in food production resulted in the Colonial Sugar Refining company allowing the planting of rice under the farmers' control (Patel, 1971a) an indication that independence also allowed smallholder farmers to voice their concerns so as to be able to plant food for the family needs.

The launch of Fiji's seventh development plan for 1976 to 1980 (DP7) emphasized the past performance and future developments in the agriculture sector. The agriculture sector did not perform as expected by the national government. Some of the impediments to agricultural production were natural disasters, plant diseases, lack of inputs and farmer interest,

poor marketing, communication, lack of infrastructure, and lack of response to the incentives available such as subsidies and agricultural loans (Government of Fiji, 1976; Syna, 1983). Many objectives were outlined in DP7 to address the impediments to agriculture production (Government of Fiji, 1976).

From 1980 onwards only two government development plans were implemented. Both were developed according to the findings of resource surveys and developments projects through the DP5 (Government of Fiji, 1980). When the cocoa subsector did not perform as expected, fertile land was lost to cocoa plantations and labour was shared amongst food crops and cocoa (*Theobroma cacao*), increasing pressure on fallow land (Thomas, 1984). In addition, inconsistent extension advice on land area selection resulted in many farmers having cocoa plantations near the villages. This resulted in farmers travelling far to their food crop farms; the women had to go further in the forests to collect firewood, all interfering with production of food crops. While there was a genuine acceptance of the need for reform, resultant government agricultural support strategies were undermined through a combination of administrative shortfall in release of timely project funds, inability to secure suitable quantities of land, and delayed procurement of farm equipment. Once the funds were approved, substantial amounts had to be diverted towards natural disaster rehabilitation works, reflecting the shortfall of production targets. Exposure to natural disaster risk became a central concern. One response was to split agricultural activities geographically to mitigate natural disasters, however, natural disasters have an impact on the sector and associated recovery capacity remains a prevailing and topical problem today.

The agricultural failures were attributed to poor soil and adverse weather, and social and institutional factors, which were often overlooked in development plans (Adams, 1970). Some development plans were over ambitious, which resulted in low level achievements. As the population grew the growth in horticulture became dominant to staple food production catering different dietary preference for food consumption of the two major ethnic groups. The Fijian farmers had high cash expenditures for purchased food, highlighting the need to produce more food on their farms and alter the farming mix for higher returns (Chandra, 1980).

The smallholder vegetable growers in Sigatoka valley faced problems of over population, insecurity of land tenure, slow adaptation of new practices (irrigation and mechanization), lack of capital and knowledge, low yield and unsuitability for summer cropping of many varieties, and shortage of labour during peak farm activity with low productivity due to poor farm management, inefficient farming techniques and use of low yielding varieties, rapid rise in cost of agricultural inputs, freights and other farm costs, inflation, marketing, lack of water, poor seed quality (Chandra, 1972; Government of Fiji, 1976; Mocedru et al., 1996). There was a need to increase crop yield and efficiency to meet the increasing demand for high quality vegetables for the urban centres and tourism industry (Chandra, 1972). Forming cooperatives and buying large amounts of inputs, establishing irrigation schemes, and improving marketing systems were heavily backed at the time as a strategy to solve the problems of smallholder farmers (Mocedru et al., 1996). The farmers were introduced to advanced machinery such as combine harvester, tractor drawn *dalo* planter, and motorized ginger slicing machine (Rhodes, 1970; Sharma, 1978; Sharma et al., 1980) so that farmers would spend more time in preparing and planning the next crop for better yields as well as addressing problems of inadequate supply of labour. Despite the introduction of farming technologies, using draft animals to date is still prevalent in the Fijian smallholder farming system (Figure 1.2).

Through export promotion, government realized the demand for other crop commodities abroad, consequently smallholder farmers were introduced to crop commodities such as cocoa, passion fruit and commercial taro (Vernon, 1971; Hampton & Thompson 1974; Sivam & Tavaiqia 1984a). Unfortunately, the introduction of new commodities resulted in the introduction of other weeds, which complicated the existing severe weed problems (Patel, 1971b; Berwick, 1973; Willliams, 1973). By the late 1970s smallholder farmers were able to cultivate crops for their own consumption as well as concentrate on export commodities (pulses, assorted vegetables, ginger, cassava, taro, sweet potato, yams and other root and tuber crops (Chandra, 1977; Howlett, 1995; Kumar et al., 1995; Gupta, 1999). The development of food production strategies meant enhancing productivity per unit area of land. This prompted a study in farming systems and

partial productivity analysis. The study revealed that gross output, gross margin and cash sales of ethnic Indian farmers were nearly twice that of i-taukei farmers because they grew higher value crops, more cash crops, had large farm areas, and large families, therefore they made efficient use of other farm resources (Chandra, 1977).

The globalization era of the 1980s brought about rapid changes in the production system of many smallholder horticulture growers particularly in developing countries. Since PICs had embarked on export led policies, globalization of agriculture has served as an export opportunity for many smallholder horticulture farmers. In this process many smallholder farmers have been encouraged to shift from traditional crops to mono-cultural production of high value commercial export crops in order to maximize economies of scale (Murray, 1998). The effects of mono-cropping were negative for the smallholder farmers which resulted in poor soil fertility and very low yield.

Murray (1998), related the impact of neoliberal export led agricultural policy on the fresh fruit and vegetable smallholder farmers of Chile and its relevance to smallholder horticulture farmers in the PICs. Once the fresh fruit and vegetables multinational corporations entered the Chilean economy, they provided smallholder farmers with virtually all the services such as inputs, credit, information and technology. The exporting smallholder growers entered into Credit and Consignment Contracts (CCC) thereby being heavily indebted due to the dominance of these multinational corporations and the absence of collective bargaining by farmers. In the South Pacific the economic and territorial smallness, geographic isolation and susceptibility to environmental disasters have inhibited the growth of agricultural export sectors (Murray, 2000). As a result, national sectoral reform driven by multinationals have been avoided in Fiji, with the agricultural sector still predominantly based on smallholder regional production systems and associated value chains.

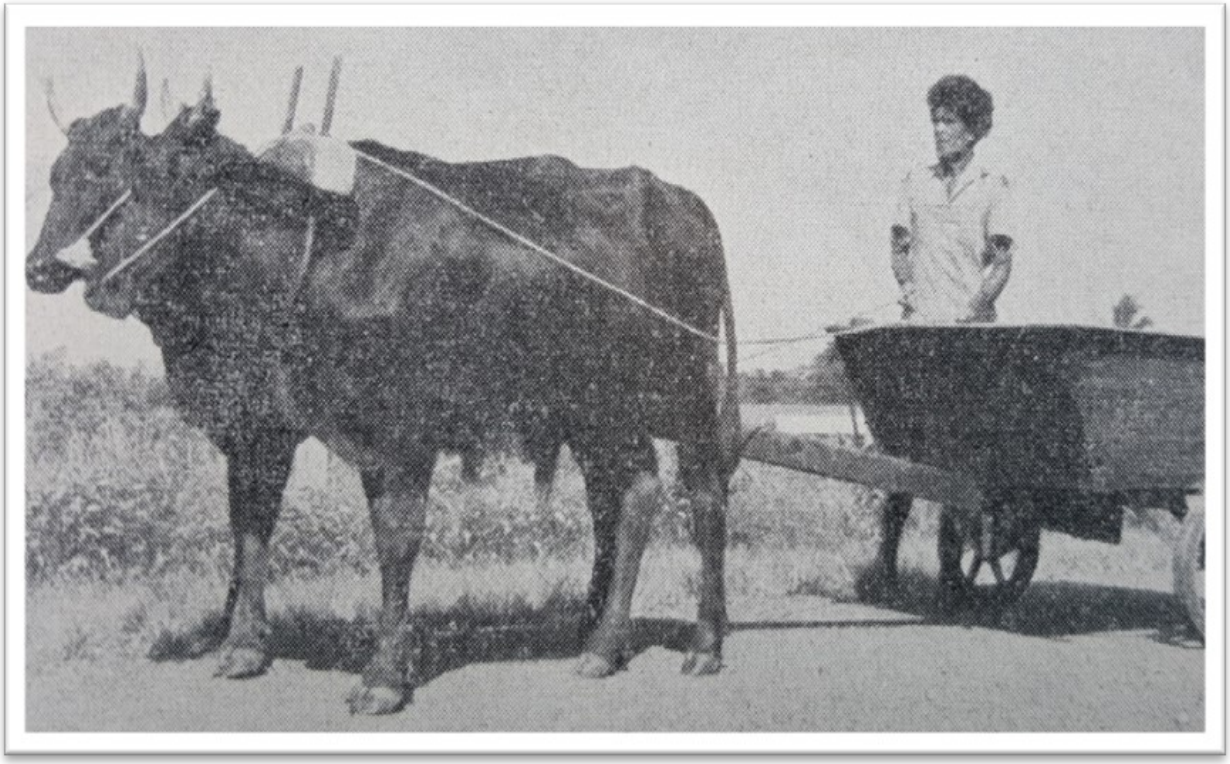

Figure 1.2a The use of draft animals is a common feature in Fijian horticulture system. Using draft animals for family during 1956 (sourced from McPaul 1956).

Figure 1.2b The use of working bullocks is prevalent with smallholder farming system in Fiji.

The late 1980s was marked by wide fluctuations in agricultural output due to adverse weather, political upheavals and resultant emigration of skilled labour (Kasper et al., 1988; Jayaraman, 1996). The foreign aid was immediately removed in response to the political upheaval, which impeded implementation of remaining capital projects as per DP9. In addition, during the late 1980s the government moved towards an export oriented strategy for development and withdrew its support for agriculture (Prasad & Narayan 2005). By the 1990s most import licences were removed. In view of deregulation and removal of licensing and quotas, the current trade policy regime is fairly liberal with generally low tariffs on food and agriculture products. However, a satisfactory resolution to security of tenure in agricultural land leasehold was still seen as paramount to economic reforms (Jayaraman, 1996).

In order to access high-value domestic and export market which require quality produce consistently, horticultural growers face the challenges of agricultural land leasehold, access to credit, lack of good seed and planting materials, labour shortages, calamities of weather, poor market linkages with postharvest transportation and storage systems. Some of the horticultural productivity recommendations would be found expensive if implemented in Fiji and in other PICs, as the majority of the horticulture growers are experiencing high input costs. Most of the inputs, including fertilizers, chemicals, seeds and farm equipment, are imported, subsequently contributing to increased cost of production.

CONCLUSION

Looking to the future, much of the challenges and opportunities facing the agriculture sector in Fiji remain unresolved. The emergence of new global challenges such as climate change provide added complexity. Considering these factors, there is a fundamental underlying need for Fijian agriculture to be increasingly

responsive to consumer and market needs in terms of produce quality, consistency and sustainable production systems. The predominance of the smallholder farmers' subsector certainly, in the context of poverty alleviation and rural livelihoods, is one of the hidden strengths of the current Fiji agricultural sector. While increasing productivity essentially remain a key goal for the industry, mmmmmmm it must remain cognizant of limited land resources and a need to improve sustainable production practices, Fiji cannot afford to allow produce to be rendered useless through high-levels of postharvest losses. It is noted that with over the last 100 years of reforms to improve and optimize the agricultural sector in Fiji, one notable weakness has been postharvest losses.

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