

## **“Sa vosa na Vanua” - The Land Speaks. Indigenous Agriculture Knowledge (IAK): The philosophy of life values and epistemology, and relationship to kumala production in Ra**

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### **Abstract**

Subsistence agriculture is the primary means of production for food for most I-Taukei or indigenous Fijian farmers. Indigenous Agriculture knowledge (IAK) is the local knowledge adopted by indigenous people largely dependent on traditional knowledge, common in the agricultural system to preserve the ecosystem, biodiversity, and maintain sustainable food and well-being. The purpose of this research was to build an understanding of how Indigenous Agricultural (or traditional) Knowledge (IK) can contribute to achieving Climate-Smart Agriculture (CSA) in Fijian farming systems, with a particular focus on its relevance to kumala (sweet potato - *Ipomoea batatas*) farming in Ra province in Fiji. The implementation of the Fijian Vanua Research Framework FVRF in this research has paid specific attention to indigenous Fijian society in an agricultural context aligned to future food security issues. This research sought a solidarity approach for the rural areas in Fiji, using their systems of knowledge and understandings as the basis for inquiry and investigation. This opens the possibilities of extending the knowledge base of indigenous people and transforming their understanding of the social-cultural world like solesolevaki, which is our current cultural currency. The findings of this research show the cultural role of kumala production in the traditional Fijian context, assessed under four components; values and beliefs, practices, skills, and knowledge. Indigenous Agriculture Knowledge (IAK) exists across all facets of the Fijian way of life, including health, spiritual beliefs, and environmental survival.

**Keywords:** Indigenous Agriculture Knowledge, Food Security, Climate Smart Agriculture, Kumala, and Fijian Vanua Research Framework

## Introduction

For Indigenous people, the goal for their land is very much about protection, but it is also about use. We are so integrated with our land that protection of it is tied to our practice, and our practice is tied to protection. We use the resources on our land to live (Adamson, 1997). This paper portrays the philosophy of life values and epistemology, and the relationship to kumala production in Ra from their ancestors. Climate-smart agriculture (CSA) is an approach that guides farmers' actions to transform and reorient agricultural systems to support the development and food security effectively and sustainably in the face of climate change. Climate-smart agriculture is not a novel mode of production. From an indigenous perspective, it is a method of determining which production systems and enabling institutions are best suited to respond to challenges such as location, while also maintaining and improving agriculture's capacity to support food security for every household in a sustainable manner (Leweniqila, 2022). FAO first introduced this concept in 2010 to achieve food security by achieving three main goals: building resilience and adapting to climate change, increasing agricultural production and incomes sustainably, and emerging opportunities in reducing greenhouse gas emissions compared to expected trends (Palombi & Sessa, 2013). The purpose of this research is to develop and deepen understanding about how the Indigenous Knowledge (IK) or Traditional Environmental Knowledge in a Fijian way of life influences agriculture, with a particular focus on traditional environmental knowledge (TEK)<sup>1</sup> and its relevance in kumala farming in Ra province in Fiji. For this research, we define *solesolevaki* as an indigenous Fijian cultural agency which involves the process of using the available resources for a common purpose and to benefit members. This involves natural resources (land, waterways, oceans, which are legally accessed through customary means), communal labour (*lewe ni vanua* or *veiwekani*—people who are related and belong to a particular place), systems (which work within the structure of the vanua as in land ownership, relationality, cultural practices, ceremonies) and values (the underpinning vanua ethos and way of being an indigenous Fijian as in, *I valavala vakavanua* – cultural protocols, *veirokovi/veidokai* – respect, *veilomani* – empathy, *vosota vakadede* – sacrificing or enduring hardship for collective benefits, *solu bula me baleti ira na wekamu* – sacrificing one's time, resource and even money for collective wellbeing, and *duavata* – solidarity and unity).

Indigenous knowledge (IK) influences all facets of the Fijian way of life, including in health, spiritual beliefs, and environmental survival. For ecological knowledge, indigenous Fijian people have lived and survived in their ecosystems for generations, by developing and practising these knowledge systems, which have inbuilt resilience among their *mataqali*, *yavusa*, and *Vanua*. Fijian academic *Veitayaki*

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<sup>1</sup> Where TEK is used in this paper the term environmental is used interchangeably with ecological

(2002: 396) explains how the Fijian TEK regarding seasons is captured in the traditional calendar, outlining “sources of food available at different times”.

In this paper we have adapted Berkes’ knowledge-practice-belief complex (1993) of TEK to discuss the findings of TEK’s role in kumala production in the traditional Fijian context under four components:

- 1) values and beliefs
- 2) knowledge
- 3) practice
- 4) skills

Traditional environmental knowledge (TEK) enables us to understand the dispersal of resources, the functioning of ecosystems, and how the correlation between the environment and their culture can coexist. Drawing on the concept of TEK, this combined understanding also allows groups of people to intimately appreciate the relationships to, and connections with, their environment, sanctioning them to value their local foods by “fostering adaptation and resilience strategies to environmental, biological and climate change” (Tora, 2019: 64).

Furthermore, the value of TEK holds a significant purpose in kumala production and applies to the communities of the research locations. Theorizing these values requires a critical understanding of the different aspects of TEK, and can also be observed as unique cultural wisdom of the past that holds our future.

## Methods

The Vanua research framework developed by Nabobo-Baba (2006) was used in this study to inform the case study method. It involves Talanoa or dialogue, Bula vakavanua, observation, literature reviews, informal and formal meetings to negotiate and agree on outcomes that will enable a way forward. The approach is grounded in indigenous Fijian epistemology, which Nabobo-Baba (2008) explains is based on the holistic integration of the people, the land, and their spiritual dimensions. The Vanua methodology is the main sinnet<sup>2</sup> woven through this study, ensuring that respect, humility, and traditional Fijian cultural protocols have been adhered to. The data collection process is explained in two phases: the recruitment of participants and two data collection periods which included the combined use of ‘Talanoa’ for the Vanua of Ra (Nabukadra, Burenitu, and Bucalevu villages). The three research sites are Nabukadra (<20m asl) located in the coastal land area, Bucalevu (>150m asl) in the high altitude inland, and Burenitu (80-100m asl) in the district of Nalawa which is situated at a lower altitude. Talanoa was used because it enabled access to all the participants at any one time within the confined environment of a village. Talanoa facilitated asking the questions of how? why? and when? The main event’s timeline included attending school, church, Agricultural show, Bose ni Vanua o Nakorotubu (village meeting), Ministry of Agriculture meetings, and other daily activities.

The Province of Ra is located at the northern tip of Viti Levu Island, Fiji (see Figure 1) and is one of eight provinces found on Viti Levu. It covers approximately 1,341 square kilometres or 12% of Viti Levu in the Fiji Islands. Fiji is located in the southwest Pacific Ocean at a latitude of fifteen to twenty-two degrees south, and a longitude of 177 degrees West to 174 degrees East. Fiji is an archipelagic

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<sup>2</sup> A sinnet in the context of wawalui and the tali dre’e which is made out of Voivoi (*Pandanus caricosus*) that is plaited for durability

nation consisting of more than 300 islands scattered over 1.3 million square kilometres of the South Pacific Ocean (See Figure 1). The two large mountainous islands of Viti Levu (10,400km<sup>2</sup>) and Vanua Levu (5,540km<sup>2</sup>), comprise 87% of the total land area (Cook, 2020). The Republic of Fiji has a population of 912,24 and an annual population growth of 0.8% (Fiji Bureau of Statistics, 2011), an increase of 90,424 from the previous census in 1996. However, the country's population is estimated to reach 924,915 in 2020 (United Nations Development Programme, 2008).



Figure 1. Map of Fiji. Source: MPI, 2019



Figure 2. Map of the research site at Ra District. Source: MPI, 2019

## Findings

TEK is examined under four main contributors in the Fijian way of life (bula vakavanua) during Agriculture farming in Ra (see Figure 3).

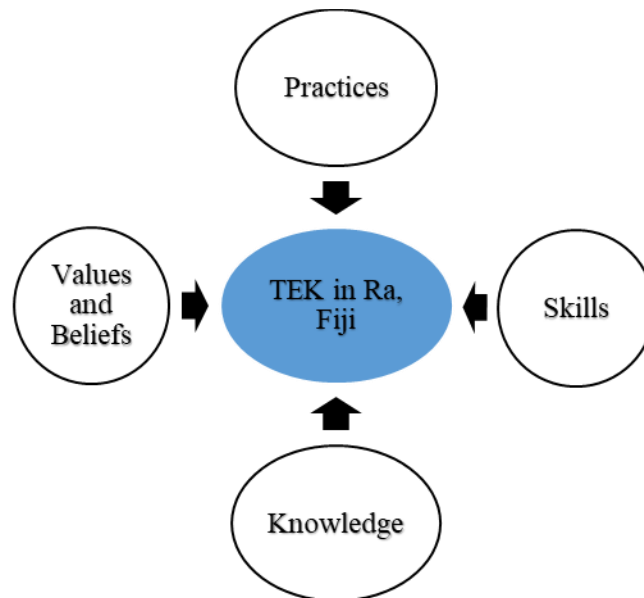


Figure 3. TEK in the traditional Fijian agricultural way of life. Laveniqila, 2020

## Values and beliefs on crop production in Ra - Understanding TEK in kumala production

The ambiguity of the concept or term TEK requires detailed insights in order to define it but to a horticulturist, the preference is to use the term traditional environmental knowledge (Roskrug, 2007). This is similar to the people of Ra where, who say

*The land is like a mother. It provides everything. It protects. It heals.* (Turaga ni Koro, 2019)

This traditional environmental knowledge has enabled the people of Ra to be self-sufficient with kumala in the past. The local agriculture knowledge has previously enabled them to achieve a wealthy and healthy life through sustainable agriculture year-round. and has protected them from famine and other climatic challenges. Kumala production requires critical understandings of environmental systems for effective horticultural management practices

## The role of TEK within ethnobotany and their impacts on Kumala production in Ra

Ethnobotany is widely described as the study of the interactions and relationships between plants and people over time and space (Prance, 2007). Paramount within this study is the use of TEK and practices. In the three case studies (Nabukadra, Burenitu, and Bucalevu), it was found that some people possess extensive knowledge of the properties of plants, an indication that traditional botanical knowledge is extensive and that earliest humans were early ethnobotanists (Schultes, 1994). The

ethnobotanical knowledge of indigenous people plays an essential role in cultivating the land, and in agricultural practices that support biodiversity. Such knowledge evolves and is continuously changing (Schultes, 1994). Indigenous people have a deep respect and admiration for their flora and fauna resources. A holistic worldview drives them to have a personified connection in which their resources are perceived as cognizant and communicative subjects rather than as an inert or insignificant objects to them (Snodgrass & Tiedje, 2008).

The indigenous worldviews and local communities are essential for agriculture globally. The Vanua of Ra view themselves as an essential component of the ecosystem through their diverse sets of cultural values and worldviews. These sets of values are derived from the traditional belief systems that are based on yavu (see Figure 4). In Fiji, the deity first and foremost among the Kalou-Vu was Degei, who was a god of Rakiraki District but was known throughout most of the Fiji islands. He was thought to be the source of all tribes within Fiji, and his authority was superior to most other gods. He was often represented as a snake, or as half snake and half stone (Derrick, 1957: 11).

Whenever Degei shakes himself, fertilizing rain will fall, delicious fruits hang on the trees, and the kumala and yam fields will yield an excellent crop. Ravuyalo, Rakola, and Ratumaibulu; Rokola was the son of Degei, and was the patron of carpenters and canoe-builders, while Ratumaibulu assured the success of garden crops. Ravuyalo would be on the lookout for departed souls on the way, hoping to catch them off guard and club them. His goal was to prevent them from reaching the afterlife (Bulu). Dakuwaqa is a shark god. Fishermen much respected him because he protected them from any danger at sea and sometimes protected them from evil denizens of the sea and provided fish.

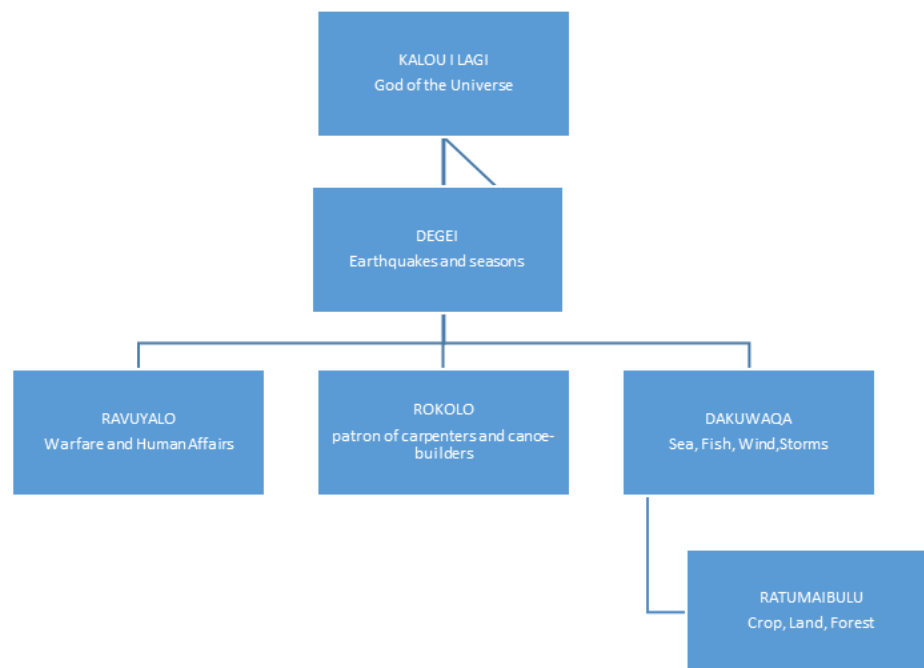


Figure 4. Figure 4: The environment as a family - Yavu ni Kalou mai Ra. Source: Viti Makawa, 2013

In indigenous Fijian society, environmental values are ethical statements and beliefs that guide resource use, and may strongly influence the behaviour of individuals and the community. Yalomatua (literally meaning 'old soul') is a highly regarded term meaning wisdom. Yalomatua can be used to describe a person, attitude, or action. In the environmental context, it is reflected in the notion of 'no wastage' which encourages the optimum and full use of a person's land in applying their indigenous

agricultural knowledge. In Ra, the value of respecting living things in the environment includes respecting animals. This applies to activities such as the processing of fish, and also influences the attitude of the hunter (Fraser, Coon, Prince, Dion, and Bernatchez, 2006). Fraser et al. add that there is respect for animals in a hunt, for instance, based on the belief that non-human animals have intelligence, are perceptive, and can act freely. In Fiji, Rasalato et al. 2010: 90 discuss how local 'ancestral legends and myths.... shed light on relationships between these animals and root crops and local people'. Seruvakula' (2000) explains how the indigenous Fijians connected to Ratumaibulu (God of the Land). For this case study in Ra, when kumala production or any crop production is carried out, it is imperative to be mindful that all the area of work is clean, and all cutting should be cleared up and covered. There is an act of respect to the God of land and Mother Nature.

In some cultures, the observance of reciprocal relationships between humans and non-human animals involve some customary rules and beliefs for showing respect. These must be followed, such as returning bones to the original environment (Sherry & Myers, 2002). In the case study sites in Fiji, Nai seu is a crucial practice at harvest, where our fathers had to present the best crop to the Bete, Chief of the Mataqali, and the Chief of the Vanua as an act of respect to the Ratumaibulu. These enabled the villagers to be blessed fruitfully on the next season of farming. Moreover, it shows the Ratumaibulu that we are not greedy, where you have the heart to give. The people of Ra have responded to this belief that bula sautu (wealth) is obtained from this practice. The respondent in Ra stated that February is the month of the year where they had to present their Nai seu.

According to Sherry and Myers (2002: 350) "lack of mutual respect will have dramatic consequences like poor yield quality and reduce in sizes of crops like kumala". These are demonstrated at the case study site where respect is required when the processing of the teitei (farming land). TEK is fundamental to the thinking and practice of revitalizing kumala production in Fiji as its four components, values and beliefs, practices, skills, and knowledge are central to the Fijian way of life. The four components are also embedded in the kinship network of an interconnected Ra society. The participants from the three villages remind us that the "The land speaks" meaning that the people who own the land had spoken out, that their knowledge, skills, and practices would enable them to fight against food insecurity, and this will provide them with an avenue to achieve climate-smart agriculture through kumala farming.

### **Practices in Kumala Agriculture Farming in Ra**

In the context of TEK, practices are carried out for survival, but at the same time, they also work to conserve the environment, maintain food security, and to provide an avenue for climate-smart agriculture. In Fiji, these practices include the use of sustainable methods for agriculture and soil conservation. The practice relating to solesolevaki as social capital in the indigenous Fijian community has a considerable effect on kumala production in Ra. These are because of four components: relations of trust; reciprocity and exchange; standard rules, norms, and sanctions; and connectedness and networks, which are tangibly present in the Fijian way of life (Vunibola, 2020). Kinship (veiwekani) is the hub through which social capital transactions take place in an interconnected Fijian society. Solesolevaki in kumala agricultural farming had been part of the pre-historic lives of the vanua of Ra, and is a asset to indigenous livelihoods in achieving holistic wellbeing.

Social capital became a widely known concept in the 1990s with Robert Putnam's research of communities, first in Italy (1993) and then the United States (2000). Putnam defines social capital as "those features of social organizations, such as networks, norms, and trust, which facilitate action and

co-operation for mutual benefit” (1993: 44), while Fukuyama (1995) states that the existence of social capital within a group facilitates co-operation. Halpern (2005: 39) defines social capital as referring “to the social networks, norms, and sanctions that facilitate cooperative action among individuals and communities”. With the devolution of natural resource management to natural resource owners, there is a compelling need for a better understanding of social capital in indigenous communities managing the resource. In this study, bonding social capital was significant due to the kinship relationships in the three villages through directly mobilizing intra-community interpersonal relations, and driving a strong collective action, and it was a pivotal contributor to getting tasks done. Indigenous social capital is significant in kumala production, as this bonding is based on kinship extending back for generations and in some cases as far back as a common ancestral god (Ravuvu, 1983).

### **Kumala production skills in Ra**

Skills are inherited through birth and reinforced by oral transmission and training throughout the generations, emphasizing the embeddedness of TEK in families and kinship systems. The essence of the I-Taukei vanua structure is focused on the individuals who are born into their sub-clans and said to have special *i-solisoli* (gifts or talent), which is the innate ability, skills, and talent to function in their environment. A child is immersed within the sub-clan performing *solesolevaki* with regard to specific clan responsibilities, and this is the place where informal learning occurs through watching the elders at work, and *talanoa* (engagement in conversations). Through this, here eventually comes a time of practising through the watchful eyes of the elders, until the mastering of skills. Children grow through their youth and become elders adopting the skills and the art of undertaking the tasks through the hands of many people. For instance, the traditional carpenter would build a boat for the fisherman using his TEK to select the best wood and to enhance his carving ability. The fisherman will reciprocate by taking delicacies from the sea to the carpenter as a token of thanks. These are the traditional trade system within our *yavusa*, and *mataqali*, which offer examples of the interconnectedness of social capital, and TEK lived out within the kinship system in the *bula vakavanua*.

In kumala production, there are skills associated with all production phases of its cropping in Ra, which are presented from the three research sites. These skills provide for food security where individual homes could choose which foods they prefer to eat on a particular day. Through *solesolevaki*, this opportunity is shared among all equally. In indigenous Fijian society, everyone has agriculture skills within them. One respondent in Ra has justified this in their story

*Auvu, for us here in Ra wisdom and knowledge on the farm, is not always been taught in schools but through the blood which connects us. When someone is born he or she has inherited this knowledge and through the guidance of the elders during solesolevaki allows them to practice that knowledge and to put it in reality* (psychomotor skills (Viliame M, 2018: pers. comm).



## Kumala production in Ra

### Kumala varieties

Respondents were asked about the names of kumala varieties they planted and their characteristics. The following describes their replies to this:

*The majority of participants in Nabukadra, Burenitu, and Bucalevu indicated that in the past more than 5 – 10 varieties of kumala were used in Ra district compared to the two cropped now: Karoti (Carrot) and Lokaloka (Honiara). People from Nabukadra stated that baby kumala ranges (harvested immature from 3-4 months) were fed to toddlers (gone dramidrami) since they provided rich supplements kina (Mr Vereimi K, 2018: pers. comm).*

Moreover, this baby kumala is best for any mother who is breastfeeding their children, since the plant assist mothers in providing more protein and nutrients to their milk. This name is also connected to people's knowledge of the cultivar. An example of this includes its softness once cooked, and that it is very sweet. These attributes make it ideal for babies. Baby kumala can be harvested three to four months after planting.

Kumala from the baby cultivar stores well both after harvesting and in-field. The baby cultivar can be planted in both wet and dry conditions. There is a high demand for the baby cultivar in the local markets where it is highly sought after by consumers. The baby kumala was also recommended to farmers by the Ministry of Agriculture and Rural Development. The findings from this research show that some old varieties such as Kabara, Lokaloka, and Papua have been lost due to the shift in the cultivation of crops that are demanded from the exporters; yet these traditional root crops are tolerant to drought.

### Planting of Kumala

Respondents at the three research sites expressed similar views in their use of traditional planting methods of kumala. Kumala cuttings were taken at 30cm in length from the tips of the kumala vines in new gardens (two to four months old). Many respondents preferred cuttings with three to five nodes. The cuttings are planted directly to the prepared mounds. For instance, planting the cuttings at a depth of 20-25cm allows good development of the tubers and easy harvesting. Shallow planting is not good because it exposes the tubers to the sun, which renders the tubers unpalatable. Besides, deep planting makes it difficult for harvesting, especially in clay soils. Sandy soil is the preferred soil for kumala due to its good drainage properties. Mounds are practised in planting kumala in an indigenous Fijian village.

The four traditional methods of planting kumala in Ra are straight (L shape), vertical, sideways facing where the sun rises, and in the shape of six. Farmers in Ra clarified that using the four planting methods produces benefits including high yields, upright kumala plants, rapid rooting, and ease in harvesting. Moreover, they stated that from knowledge from their forefathers, the common one was three stems coil the end to form six placed in the soil facing where the sun rises, which is an everyday use in all altitudes and soil types. There is also crop assurance when multiple vines are

planted because if one vine dies, the others will grow. Replacement is easy as cuttings are easily sourced. Planting is either done in the early morning before sunrise or at sunset.

### **Crop maintenance**

The use of traditional knowledge is essential in effective maintenance practices to achieve a quality harvest. In all research sites (Nabukadra, Burenitu, and Bucalevu) participants responded that weeding and hilling up are maintenance practices they used. They stated that weeding is crucial because it helps to protect the kumala tubers from rats, allows sufficient sunlight into the kumala crops, and makes the garden look neat as the overall presentation or appearance of one's plantation forms others' perception of a farmer. These are essential points from a cultural context. Weeding also prevents competition between the kumala plants and weeds, and most importantly, improves yields. Respondents also stated that they weed the crops before the vines cover the ground. Furthermore, they reported that hilling up is vital because it allows good development of the kumala and prevents damage by rats.

### **Preparation and management of kumala during droughts and cyclones**

Given the impacts of climate change on agriculture production and food security, proactive preparation and management of crops on the part of farmers is crucial. In Nabukadra, most of the participants stated that during drought, most of the kumala planted are the spreading type since they provide shelter and provide soil moisture. The erect type is planted near cyclone seasons. They also suggested that when planting the cuttings, only a shorter portion of the planting material is exposed, while the rest is covered in the soil.

Farmers from Burenitu and Bucalevu stated that during periods of drought they water their kumala plants, and no weeding is carried out, and this is to maximize shade and also retain soil moisture. Matured kumala are harvested early and are used for consumption. The respondents reported in Nabukadra that kumala could sustain them and their families during extreme weather conditions because it is more tolerant to droughts and cyclones, and if stored well, kumala tubers can last for some weeks. Similarly, in Bucalevu and Burenitu, kumala has also sustained their lives during extreme weather conditions. This is because when compared with other crops that are commonly grown in Fiji, kumala is more tolerant to droughts and cyclones, and it can be harvested at any time and can last for several weeks.

### **Harvesting**

Kumala has the potential to be harvested year-round today, whereas in the i-Taukei traditional season February would be the best, since the first fruits of the season had to go through *Sevu*. The first harvest or "i *sevu*" has to be offered to the chief of *mataqali* or *yavusa* and the priest. Moreover, a thanksgiving service has to be taken honouring what has been achieved from the farmers and seeking blessing for the next season. In Ra, participants stated that farmers determine the ideal time for harvest by identifying cracks on the mounds. It was reported that harvesting is done manually. Farmers use their hands to scrape out soils from the mounds to expose the roots. Respondents also revealed that a spade or knife is sometimes used in heavy soils. When using the above-mentioned tools, care must be taken because the roots are very close to the ground surface. Respondents also stated that extreme care is taken to avoid damaging the roots when using a knife or spade because this can reduce the

storage length of the tubers. Moreover, on another role, respondents also planted kumala, especially in social contexts such as for marriages, and at Christmas and New Year festivals.

## Post-production of kumala

### Storage

After harvesting kumala crops, storage methods used are crucial either for short or long-term purposes. Most of the participants stated that the standard storage methods they use include the following: field storage, bag storage, basket storage, and food beds storage. All can be considered traditional practices. Participants provided more information on these storage methods, including their benefits.

### Field storage

Field storage is used when the kumala crops are kept in the field, and the mature tubers are harvested on demand. Participants in the three search sites stated that the benefits of using field storage include the following: a continuous supply of food for sustenance, and easy and convenient access to food when needed. However, the disadvantages are that rats may damage the tubers; and the tubers can become fibrous and lose their flavor.

Davuke, (see Figure 5) or storage pits were common in the Ra district. It has been widely used during severe drought. Nevertheless, now it has been forgotten in some of the villages, but the people in Nabukadra are still using them whereas in Burenitu and Bucalevu it was suggested that they no longer use them.

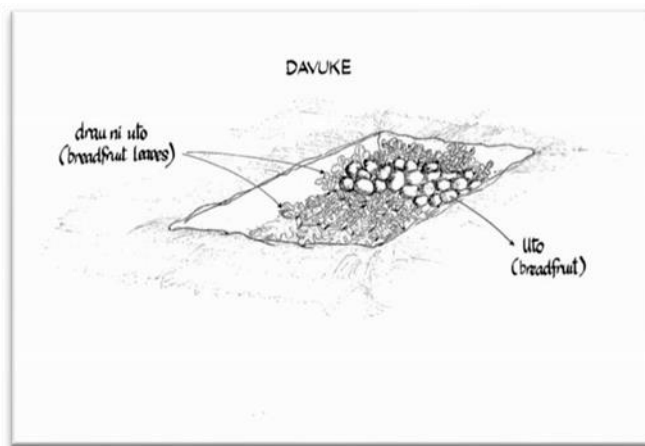


Figure 5. Davuke - Fermentation Pit. Source: Lagi, 2015

A davuke is used to preserve foods such as banana, breadfruit, and cassava through fermentation so that they can be consumed during times of lauca (famine) when there is not much food available. In contrast, Lolo has still been practised by people at all three research sites in Ra. Lolo (see Figure 6) refers to a thatched house made from local timber and coconut leaves in which Yabaki (yams) and kumala are usually stored after they have been harvested. Nowadays, other crops such as tivoli (wild yams) and taro are also stored in the lolo so they can be used in times of need.

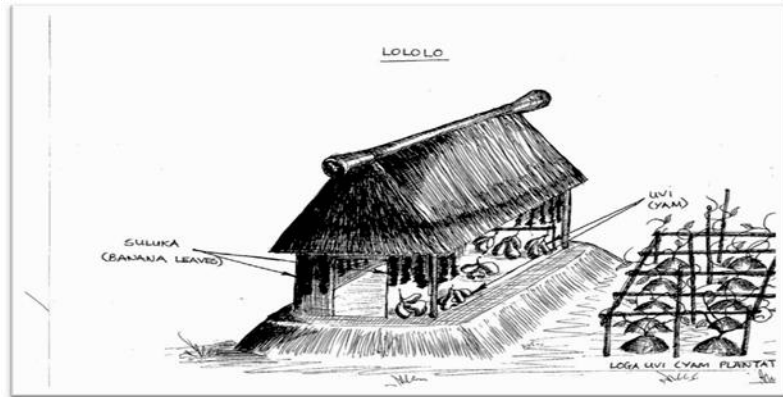


Figure 6. Lolo - Storage for root crops like Yams and Sweetpotato in Ra. Source: Lagi, 2015

Out of the above storage methods, field storage is the most common. It also helps the roots to have the most extended shelf life compared to the other storage methods. Despite that, the quality of kumala roots stored in the field also deteriorates with time. All three storage methods were easy to use and are also cheap.

Agriculture knowledge has provided a way to know and understand the history of the journey of kumala to the Indigenous Fijians. It has enabled me to voice what the people of Ra have said in their stories; *Sa vosa na vanua* indirectly means that the land has spoken. To all indigenous Fijians land is like a mother; it provides everything. It protects, and it heals. In Ra, knowledge is passed from one generation to the next in two main ways: verbally and by watching and learning. Oral transmission of TEK can be carried out in various forms in Fiji such as through stories, myths, legends, songs, and chants. These modes of transmission are also linked to places and are the basis of an indigenous Fijian's sense of place or feeling of home and identity:

1. Stories (*talanoa*) and myths/legends (*tukuni*). There are numerous stories and myths in Fijian society which serve the purpose of transferring values and beliefs to the next generation, similar to Aesop's fables.
2. Sayings/idioms (*ivosavosa* or *i'bole*), an example being *sa vosa na vanua* in this paper.
3. Songs (*sere*) and chants (*vucu*). In seafaring in Oceania, D'Arcy (2006: 71) describes how "songs were designed to keep the crew alert, confident, and aware of dangers and markers". D'Arcy mentions keywords in the phrases of the song, and that the meanings were not always transparent, such as the sailing songs of the Marshall Islands.
4. Dances (*meke*). Dances are performed by women only, men only, sitting down or standing. Women may use fans, while men may use spears or clubs. As D'Arcy states, there are a few keywords in the *meke*, and the meaning is not entirely clear. When I asked the villagers (Ra) what the *meke* was about, they answered that it tells the story of the movement of their ancestors over land and sea. They informed me that the *meke* belonged to their village, and it was unique to them. They performed it on special occasions.

## Knowledge and the importance of kumala have been forgotten - The vanua of Ra has spoken on the reasons: xxxxxxxx

### 1. Market driven ( Capitalisim)

Respondents were clear that the drive for business from exporters has influenced our system of kumala production. The young generation now tends to forget the importance of how i-Taukei does things, yet the commercial focus has influenced the move from local foods to plant more crops which exporters require.

Respondents from the three research areas stated that this was a problem, and that they believe this was the main reason many traditional crops like kumala, uvi, Tivoli and kawai have been forgotten, since people have been more focused on commodities for export demand. They believed that they had been influenced by money rather than focusing on their local foods which can sustain them during disasters and improve their health.

A quote given by one of the Turaga ni Koro in Ra states that:

*"Cassava has made the Ra people drunk." Sa vei vakamatenitaki nai tei oqo na tavioka.*

Here he has used a metaphor of drunkenness, as young people nowadays have denied to cultivate our local root crops like kumala. This local food has stories and knowledge embedded in it that consolidates its connection to the indigenous Fijians. However, young people are now driven by the demand of the exporters. So, it is a challenge to the older generation to restore the importance aligned to local crops.

### 2. Inappropriate Government or MOA plans and strategies to the indigenous farmers

Inadequate Agricultural Annual Corporate Plans on Rural Outer Islands has been a significant drawback to the indigenous Fijians. Survey respondents stated that one of the reasons they have a loss in valuing the importance of kumala crop was that the Ministry of Agriculture has been introducing other commodities to them such as rice, which is new to them and the agricultural practices. But as a spokesman from one of the villages said in regard to traditional foods, "To them, it is more than culture shock".

The MOA has encouraged farmers in the rural and outer islands to produce commodities that are new to their culture and their land. In comparison, kumala is a crop reintroduced to them after disasters. For them, kumala has been rated as an option rather than a priority for the indigenous Fijians. The Government bodies must be reminded that it is essential for them to identify suitable crops for Ra based on factors such as soil, climate, and landscape. Interestingly, respondents stated that it has been over a decade since any soil tests were carried out. They are thus not aware of their soil physiology or chemistry, which is very important.

The government and the Ministry of Agriculture want the indigenous Fijians to follow what indo-Fijians practices in agriculture. This performance has enabled some of the i-Taukei people to forget about, and to lose interest in their local foods and in the knowledge of local growing practices. The Ministry of Agriculture now has stated that commercial farmers will be their priority. For the indigenous people in Ra who all are subsistence farmers, this statement, and action from the Ministry of Agriculture have affected their activity.

Traditional knowledge is being lost due to rapid development in many areas where indigenous people live. This places political pressure on the Ministry of Agriculture, where displaced indigenous people have had to make room for development projects like tourism and retirement communities (Duncan and Sing, 2009).

### 3. The research development role and is dependent on concepts in Agriculture

Increasing production of agricultural products in rural and outer islands is of paramount importance, and research and development can support this. Agriculture provides new and improved results regarding inputs and production methods; hence R&D efficiency increases and leads to potential gains for agriculture products and reduces pressure on natural resources.

Traditional food like kumala varieties have been trialed at Dobuilevu Research Station (Ra District) in previous years (1970-1980), and planting material has been provided and distributed to farmers around the Ra district. However, now there are few or no research trials being sponsored by the ministry, and this is the main reason why there is a loss of kumala and yam varieties in Ra.

Respondents in the three research areas explained how kumala planting material was to be grown and stored in gene banks at Dobuilevu Research Station and then supplied to villages.

*Auvu i liu e dan bucini tu I Dobuilevu research station na i tei ni kumala era veivaseyaki mai ena vei korokoro, ia na gauna ogo sa sega* (Maikeli K, 2018: pers. comm)

This statement was supported by a retired Agriculture Officer, stating that:

*More than ten local varieties of kumala were previously maintained in their gene banks and supplied to all villages in Ra. One respondent mentioned that there was not a year Ra has been without Kumala planting material until the present* (Tui K, 2018: pers. comm)

The lack of planting materials of kumala has made many farmers lose interest in farming this crop; Ra has lost its reputation as the central district for planting it, and now only sugarcane is grown.

### 4. Rural to Urban drift

*Migration has influenced taste preference across Ra. Respondents explained that through immigration of these different nationalities to Fiji, there had been a risk not only to our culture but to livelihood on what we eat* (Emosi B, 2018: pers. comm)

Exposure to other cultures, food preferences, and urban activities have impacted many i-Taukei, especially the youth, who have quickly adapted to these new foods. When urban dwellers return to the village, they then influence other youth in their village, and this is now a trend for the people in Ra.

### 5. Education System

*The educational system in Fiji has to teach this traditional knowledge from primary, secondary schools and finally to tertiary. Bridging these gaps has to be the government institute's priority* (Merani K, 2018: pers. comm)

Schools and Tertiary institutions are places where knowledge of traditional foods should be taught, but unfortunately it is not in the various curricula. So respondents from the three research sites believe

that, if it has been neglected to be taught by parents at home, then the government of the day has to include this in the education curriculum.

## 6. Less Family Time

Respondents stated that:

*Family is where this knowledge should be shared at first if schools and universities do not play their part. At home, after prayer in the evening, they sat and discussed what they had to do the next day or month. Fathers and elders share some knowledge that they need to apply in this type of landscape or soil type. However, some of the elders in their village are busy out drinking kava this would be a reason why knowledge and why kumala has been neglected in their village. Man, nowadays, is lazy to plant this precious crop (Talica K, 2018: pers. comm).*

Most of the knowledge in agriculture farming in an indigenous Fijian family has been transferred easily through family moments. This is a safe way, and the most comfortable way to interact with each other in the family. Moreover, within this space, dialogue between parents is essential. Parents share their knowledge and the importance of any crop to be grown. Parents should also control what to eat and what is to be planted in their homes. These were what their forefathers practised. So, from their family time, the respondents stated that this would be the safest place to share; yet people have neglected this.

## Discussion

### Solesolevaki as the social capital in i-Taukei kumala production

For the associated terrestrial grounds, in the three villages, every family has a yavu: a piece of land allocated in the village where they can build their house. The land on the outskirts of the village is owned by various mataqali who can use it for farming. In cropping systems, solesolevaki has been the main engine of life in the three villages in Ra, where the hands of many share the responsibilities. Solesolevaki revitalizes traditional agricultural practices which connect to the agronomical practices of our traditional foods like kumala. People use solesolevaki in regard to two essential concepts; na gauna ni vuavua'I, and na veivukei vaka veiwekani. Na gauna ni vuavua'i refers to the seasons following the Vula vaka Viti (Fijian lunar calendar) where it depicted the season to cultivate the land for specific crops which are flourishing, and the harvesting of specific land and sea resources, and this requires the whole village to participate; and then there is sharing of the produce later on (Vunibola, 2020). Na veivuke vaka veiwekani (helping your relation) does not depend on seasons or resources, but is how individuals respond to the need of a particular person in the village.

*When indigenous Fijian is born, solesolevaki is embedded within our belief systems that determine our actions to realize without anybody informing us that our relationship needs help, and we will also know what we can do about it. In farming, they practice solesolevaki every month. Since we have four weeks in a month every week, there is a work that will all have to attend to including individual. So, in the first week will be the chief, then the Mataqali farm, then the individual (Noke, 2018: pers. comm)*

The importance of work structure in solesolevaki is vital, as a mechanism in an indigenous Fijian community for resilience. It is an approach to achieve a holistic and inclusive wellbeing, including:

- Spiritual wellbeing
- Environmental wellbeing
- Socio-cultural and kinship wellbeing, and
- Economic wellbeing

*Respondents in Ra (Nabukadra, Burenitu, Bucalevu) further explain that solesolevaki is not only a way of helping your relatives, but it is a way where elders are helping the younger generation with agricultural farming practices on our local foods like kumala and uvi. Solesolevaki is a way of bridging the gap from family to school. Since this is not taught in school and most family's parents have no interest in teaching their children about our agriculture traditional practices (Mr Penioni L, 2018: pers. comm).*

The saying “everyone knows everyone else” is commonly used to describe networks in small and tight-knit communities, reflecting their interrelated and connected characteristics (Movono, 2017). This study has determined that internal bonds exist within the formal hierarchical structure of the community, linking each household to a sub-clan or *tokatoka*, *tokatoka* to a *mataqali*, and *mataqali* to a *yavusa* or tribe that in turn is connected to a greater *vanua* or *tikina* (Ravuvu, 1987). *Veivakani*, social relations act as bonds that connect individuals to others in the community. These bonds were observed to structurally enforce indigenous Fijian norms and philosophies such as *veivakaturagataki*, *veidokai*, and *solesolevaki*, which guide appropriate behaviour and conformity to societal norms, and maintain solidarity within the community (Coffe, 2007). *Veivakaturagataki* and *veidokai* can be translated broadly as humility and respect.

### **Solesolevaki allows indigenous Fijians to achieve a wealthy and healthy life**

Our forefathers often lived on average, to eighty years or more, and had achieved a wealthy life and food security. The indigenous Fijians in Ra were self-sufficient with their local foods, practising sustainable agricultural practices. Contemporary issues such as food security and climate change highlight the concern that traditional foods like kumala are becoming lost. There is a challenge for Fijians to combat this issue.

*Through solesolevaki young generation has learned more from our elders. Here, knowledge has been shared through practice. We are fortunate that this research has enabled us to revive this knowledge to where it should be placed. Wealth and abundance of food is achieved through wisdom. Solesolevaki produces and provides this wisdom to us through practice. This wisdom will enable us to achieve abundance and have excess to a healthy variety of food (Mrs Selai D, 2018: pers. comm).*

*Solesolevaki* is their cultural currency; it is a practice where no one is left behind; this means people have an equal share of varieties of fruit trees, vegetables, and root crops in their land. Solesolevaki allows every family an opportunity to choose which root crops and vegetables to eat; more importantly, it promotes healthy living. Through solesolevaki, the healthy living patterns in the i-Taukei world also enhance the sharing of burdens, and there is lots of laughter and songs, making the tasks more enjoyable.



*We people of Ra are all connected. Our responsibility as individuals is to ensure that we know how we are related, why we are related, and we are obliged to appreciate and respect those relations by behaving in a chiefly manner, which is what brings unity and prosperity to our village* (Koroi U, 2018: pers. comm)

This respondent explains that wisdom illustrates the significance of solesolevaki, not only as a feature of social-life networks, but also as a feature of indigenous culture that enables villagers to effectively pursue shared interests and attain unity and solidarity within their community as a collective. Everyday life and communal collaborations are highly reciprocal and support the development of social capital.

### **Solesolevaki: a tool to revitalize kumala varieties to the Fijians**

Respondents in Nabukadra, Burenitu, and Bucalevu all expressed their views regarding the importance that solesolevaki has in reviving the traditional agricultural knowledge that has been forgotten, and regaining the lost glory we had for kumala varieties. In Ra, there were only two varieties of kumala still widely grown. This also signifies that there has been no kumala research done in recent decades.

*Solesolevaki needs to be revived since it allows the preservation of every kumala variety in Fiji. It also disclosures our traditional safety net of Veivukei (helping each other) on their plantation* (Mr Lenati K, 2018: pers. comm).

From an agriculture perspective Vunibola (2019) restates the concept that when a child is born to a family in I-Taukei settings, it is called 'luve ni vanua' meaning that all the people, the land, culture, and traditions are responsible for nurturing the child. From these case studies, it can be seen that solesolevaki contributes to this social safety net when individuals feel out of place from the systems that influence their lives. To the vanua of Ra, solesolevaki is also; 'karua ni vuvala' (second family), 'neitou koronivuli' (our tertiary school), or 'i yavu ni neimami veimositi va'a veiwe' ani' (strength of our kinship) to the villagers. Solesolevaki was a second home to the indigenous Fijians. It is a library where all local agricultural knowledge is kept in this ambry where an individual can share it with everyone.

This library has also proven to society in Ra (Nabukadra, Burenitu, and Bucalevu) that those who drop out from the educational system have been successful and can survive to provide for their family, vanua, and lotu. The solesolevaki at this level is like a school, and it offers bridging courses for youth on agronomical practices for traditional foods like kumala cultivation. It is a place where proper behaviours are encouraged for the youth to achieve 'the same collective system supports and maturity' (Vunibola, 2020).

### **Solesolevaki allows food sovereignty to exist**

Indigenous communities, local farmers, small business cooperatives, and those concerned with growing and sharing nutritious food are applying a food sovereignty lens to neutralize government-controlled food security activities (Vunibola & Leweniqila, 2021). Food sovereignty issues and indigenous Fijian values are synonymous in that indigenous Fijians too are emphasizing their rights to define food and agriculture systems through ecologically sound and sustainable methods. The

government ministries have not yet identified the potential crop that suits them relevant to the soil type and their landscape in Ra. Exporters have been dominant in manipulating the Indigenous Fijians on their agricultural demands rather than the Vanua's choice.

*Farming for us now is like labor for someone's demand. We have been forced to cultivate commodities that they export most or commodities that have markets. For most of these new commodities that have been introduced to our communities, we need training and trials to be done since we do not know it. This has resulted in the forgotten of our traditional crop knowledge and practices in Ra.*

It is equally important to enhance the viability of traditional food production systems. The island of Pohnpei (Federated States of Micronesia) has a similar story with people drifting away from traditional food to relying on imported processed food, resulting in Noncommunicable diseases and micronutrient deficiencies. In 2013 a local non-government organization, the Island Food Community of Pohnpei, initiated the "Go local" food campaign. Gene bank collections of traditional carotenoid-rich varieties of sweet potato, bananas, pandanus, breadfruit, and taro were established along with community awareness programs. The campaign resulted in a positive change in attitude, with an increase in the consumption of local food (Englberger et al., 2013). The success of this campaign may serve as a guiding light, to develop similar programs in which can preserve the genetic diversity of traditional food resources and ensure food security in island countries like Fiji.

## Conclusion

This paper has outlined some of the roles that the Fijian way of life (*bula vakavanua*) plays in influencing the implementation of *kumala* agriculture farming in Ra with a focus on Traditional Environmental Knowledge (TEK). TEK is examined under four components: values and beliefs; practices; skills; and knowledge, based on field experience and Berke's knowledge-practice-belief complex (2008).

*Solesolevaki* is a dying tradition in society due to many factors, but from this study, this tradition is to be revived to benefit *i-Taukei* societies as spearheaded by the *vanua* of Ra. *Solesolevaki* is a means for personal and family development, and communal development, satisfying sociocultural obligations, providing the avenue for economic development, reducing rural-urban migration, and making the hands of many help in rebuilding a vibrant place to live. Through *solesolevaki* the indigenous Fijian could be self-sufficient with food; hence it will provide a future avenue for climate-smart agriculture.

Livelihood perceptions have been central to rural development thinking and practice in the past decade. However, where do such perspectives come from, what are their conceptual roots, and what influences have shaped the way they have emerged? The traditional way of farming and production systems aligned to *kumala* unites people and connects them to the environment. Local communities work together, helping one another. Local farmers learn their knowledge and skills through listening, participating with, and observing their elders. This interaction is significant in the transfer of knowledge from elders to the young generation. Participant responses confirm that traditional knowledge plays an essential role in contributing to the sustainable livelihoods of farmers. Participants in Nabukadra village stated that *kumala* could sustain the livelihoods of people in their community because it provides a sustainable food supply for them during extreme weather conditions. It also provides a constant source of income, is the primary source of food during community feasts, can be

sustainably produced, and ensures a continuous supply of food throughout the year. Kumala is also widely used in cultural ceremonies.

Likewise, in Burenitu and Bucalevu, the use of traditional knowledge in kumala production has, and will continue to, enhance the livelihood of the people in the community. The Vanua of Ra values and beliefs should be explicitly acknowledged, respected, and recognized by the government bodies and outsiders. Community aspirations and their values and beliefs should also be reflected in the Ministries annual corporate plans. Strategies should include protection and enhancement of agricultural knowledge, and the Ministry of Agriculture should promote local foods like kumala, with places such as Uvi, Tivoli, Uto, and Kawai to be their top priorities for the rural and outer islands in Fiji. The findings from the research discussed in this paper explain the current context of kumala production and the loss of kumala varieties. Moreover, they give credence to the potential of kumala to contribute to Climate-Smart Agriculture in Ra and across Fiji generally.

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