

## Rapid survey technique using socio-economic indicators to assess the suitability of Pacific Island rural communities for *Kappaphycus* seaweed farming development

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### Abstract

The literature on economic feasibility of farming seaweeds like *Kappaphycus alvarezii* in tropical locations is mainly based upon Asian case studies, and often does not take into account social factors in seaweed farming success. Pacific island countries are culturally and economically distinct from Asia, and efforts are now being made to establish seaweed industries here. Past experiences have showed that social factors often outweigh technical factors in determining the success of rural development projects. In addition, Pacific island communities are very diverse in their socio-economic make-up. The particular community chosen for location of a development project is therefore critical to success. Project managers need to recognize in advance the best type of community for seaweed farming development. The objective of this study was to identify socio economic factors that can be used as predictors of project success or failure. Using results of social survey techniques carried out in eight communities within the Fiji Group, a rapid survey technique has been developed which can enable decisions about whether a community is suitable for farming seaweed or not. Though developed from Fiji case studies, the technique can be applied in other rural Asia/Pacific situations.

### Introduction

There is a small but growing literature on the economics of farming the seaweed *Kappaphycus alvarezii* (Doty) Doty ex P.C. Silva, mainly in Asia; for example, see Padilla and Lampe (1989), Alih (1990), Firdausy (1991), and Tseng and Fei (1997). Industry development in Pacific island countries including Fiji has been documented by Ask (2003), Ask et al. (2003a), Ask et al. (2003b), Luxton et al. (1987), Luxton and Luxton (1999), Luxton (2003), South and Pickering (2006), and Pickering (2006).

Selection of places to farm *K. alvarezii* in the Fiji Islands (SW Pacific Ocean) had historically been made on technical grounds related to suitability of sites for good seaweed growth. Socio-economic factors were limited to whether or not there was close proximity to infrastructure like ports or towns (Sam Mario pers.

comm.). In recent years however, experiences across the Pacific and elsewhere have pointed to a need for study to identify the critical socio-economic factors (for example, alternative livelihoods, population demographics, geography, local traditions, etc.) for which information must be gained in order to recognize in advance the best types of communities for *Kappaphycus* seaweed projects. These critical socio-economic factors could then be used as predictors of success or failure in *Kappaphycus* seaweed farming development, if incorporated into the design of a rapid survey technique for selection of communities for seaweed farming.

When seaweed farming re-commenced in Fiji in 1997 after five years of no production, seaweed buyers FMC Corporation placed importance upon identifying such predictors of success and provided support for this study to be carried out. "Success" within this

context shall mean that, once external assistance to start up a seaweed project is withdrawn, farming activity will continue and sustain itself into the future.

In this study the socio-economic characteristics of several village communities in Fiji are reported, and assessed as indicators for selection of sites to farm seaweed. A rapid survey technique is proposed that could be used to predict the areas best suited for seaweed farming projects.

## Materials and methods

Historical records from seaweed production (Sam Mario, unpubl. data) from different parts of Fiji were obtained to find out whether there has been any shift in farming from some parts of Fiji to other parts (Figure 1). Characteristics of the relevant areas were noted, to find out which are associated with the most-recently farmed areas.

Fieldwork was carried out in three broad categories of communities in Fiji (Figure 3). The categories were: Community Type I—communities in which seaweed is currently being farmed; Namuka-i-Lau (visited in May 2002) and Nakobo (visited in July 2002), Community Type II—communities in which seaweed had previously been farmed but now abandoned; Dama (visited in January 2002) and Malake (visited in September 2002), and Community Type III—communities which are soon planning to take up seaweed farming—Yaqeta (visited in August 2002) and Serua (visited in October 2002).

A total of 78 farmers were interviewed, representing about 12% of the total number of farmers currently in Fiji (658 farmers). Interviews took place with all of the farmers available in each community at the time of visit, using the Bauan dialect of the Fijian language. During the interview, each farmer in all communities completed a written questionnaire (also in Bauan) seeking basic household economic information. A second questionnaire with special questions for each of the three community types was then completed, which for Type I communities sought perceptions about *why* seaweed farming was successful, for Type II communities sought perceptions about *what* were the factors behind lack of success, and for Type III communities sought perceptions about *what* they find attractive about the notion of seaweed farming. Lastly, there was a set of questions for the village headman about village infrastructure, traditions, and population demograph-

ics. Typically each interview and questionnaire took 30–60 min to complete. Figures for currency are reported in Fiji dollars (FJD 1.00 = approx. USD 0.50 at time of writing) unless otherwise stated.

## Results

Production figures broken down by district within Fiji from 1985 to the present show that *Kappaphycus* seaweed farming has moved from the Western part of Fiji (Ra Province) to the Central part (Tailevu and Cakaudrove) during 1985–1992, and since 1997 most production has come from remote parts of South Eastern Fiji (Southern Lau Group) (Figure 1 and 2). Based upon interview results, the following socio-economic indicators emerged as likely predictors of success in establishment of seaweed farming projects in Fiji.

### Demographics

In Type I communities, active seaweed farmers were between 20 and 70 years old, with ages 30–40 most predominant but other age groups in this range well represented except for ages 60–70. The population recorded in the 1996 census provisional figure obtained from the Fiji Bureau of Statistics (2003), for Namuka-I-Lau and Nakobo was 306 individuals (51 households) and 104 individuals (28 households) respectively. According to the village headmen, the population was similar in 2002 when the study took place. Out of this population, 21 individuals were actively participating in *Kappaphycus* seaweed farming in both villages, assisted by some nuclear-family members. In Nakobo, 14 were male (household heads), and 7 were female (aged between 26–52 years). There were no female farmers at Namuka-I-Lau, though women in both places did assist household heads with land-based aspects such as tying or drying plants. Of the Type II and III communities, Dama, Malake, Yaqeta, and Serua had 35, 66, 65 and 28 households respectively.

### Alternative livelihoods

Prior to seaweed farming, Type-I Community Namuka-I-Lau depended for its livelihood on subsistence fishing and reef gleaning, with very limited subsistence agriculture owing to rocky ground, and with steady cash income only from copra and beche-de-mer. Copra fetches \$0.22 per kilogram which translates into \$20–\$100 per