



Technical, financial and social assessments of forestry development projects in Ra Province, Fiji

An overview of Future Forests operations in Fiji

September 2013

A review of a private sector development initiative funded by the Australian Agency for International Development (AusAID)

Background

The Enterprise Challenge Fund (ECF) for Pacific and South East Asia is a A\$20.5 million AusAID-led Australian Government initiative providing a competitive opportunity for businesses to obtain grants to assist in commercialising business projects in ECF participating countries.

To date A\$ 11.5 million has been provided in grants to 22 business projects across eight countries in the Pacific and South-East Asia (Cambodia, Laos, Philippines, East Timor, Vanuatu, Papua New Guinea, Fiji and Solomon Islands). The key rationale of the grants is to have a sustainable impact on poverty through employment, income generation and access to goods and services.

Future Forests in Fiji was awarded an ECF grant of A\$190,000 to expand and modernise seed germination and nursery facilities, and develop sustainable and equitable partnership models with landowners to expand plantation operations. The paper explores the business model and social partnership in more detail.

About Future Forests – Fiji

Future Forests Fiji (FFF) Ltd was incorporated in October 2004 with the intention of establishing sustainable teak plantations on deforested land in Fiji. The first plantations were established in 2006 on private land in Ra province. Plantings on leasehold land commenced in 2009.

By 2013 the company had established 203 hectares of plantations with teak as the main species and other species planted on sites where teak is unlikely to perform well. The company has lease agreements with local landowners in two provinces and contracts local landowners to clear, plant and maintain the plantations. The nursery supplies seedlings for these plantations and also sells seedlings to other companies, organisations and individuals.

FFF has grown since the ECF grant was provided and has expanded its shareholding through both individual investors and from a 2011 listing on the South Pacific Stock Exchange in Fiji. These funds have been used for plantation establishment, managing existing plantations and the establishment of the third stage of the operation – a sawmill for processing plantation timbers.

Box 1: ECF contribution

The ECF matching grant of A\$190,000 in 2009 allowed the nursery to expand to its present capacity of around 400,000 seedlings per year by part funding:

- two green houses,
- additional germination and outgrow tables,
- watering system,
- electricity generator,
- large concrete slab,
- nursery equipment and
- root trainer pots and trays.



Nursery Operations

The Future Forests nursery was set up in 2006 with germination tables, outgrow tables and a water tank to produce 30,000 seedlings per year, at a cost of around F\$10,000 (A\$ 5,917). In 2008 the number of outgrow tables was increased and annual capacity grew to 50,000 seedlings – see below.

Up to 600 kilograms of teak seeds are now collected annually, which yields about 360 kilograms of seed for germination. The seeds are prepared and germinated in two igloo-style greenhouses, each housing 40 germination tables. Each germination table is sown with 6,000 teak seeds and produces about 3000 seedlings on average for transplanting to root trainer pots or poly bags. Potted seedlings are hardened-off on outgrow tables before planting in the field.

Table 1: Development of the Future Forests nursery

Year	Investment (F\$)	Seedling capacity (number per year)
2006	Establish nursery with tables and water tank only F\$10,000	30,000
2007	Build office and storage area; lay concrete slab and generator shed F\$35,000	30,000
2008	Additional grow-out tables F\$10,000	50,000
2009	Two greenhouses, germination tables, watering system, gen-set, large concrete slab, machinery, trainer pots and trays F\$190,000	350,000 - 400,000

Source: Personal communication with Roderic Evers, 16 May 2013.



Box 2: Root trainer pots versus poly bags

After germination seedlings can be raised in root trainer pots or poly bags. Root trainer pots occupy less space than poly bags and so more seedlings can be accommodated on outgrow tables and more can be transported to the field per trip. A root trainer pot requires 60% less potting mix and produces a strong seedling with a well-formed, straight root system that enhances establishment and growth after planting in the field. Root trainer pots can be re-used several times.

By using root trainer pots FFF has reduced its seedling production costs by 60%. FFF will continue to use root trainer pots for its own seedlings and trainer pots and poly bags for seedling sales.

Figure 1: Poly bags (left) Root trainer pots (right)



There are six permanent employees attached to the nursery including the nursery manager who reports to the General Manager. A nursery supervisor reports to the nursery manager and two nursery officers report to the nursery supervisor. The maintenance technician and handyman report to the nursery manager, although a portion of their time is also spent on plantation activities. Casual labourers are hired as needed for watering, weeding and filling pots.

Other fixed costs of the nursery operations are outlined on the right -

Therefore Future Forests needs to cover F\$54,268 (A\$32,111) annually in fixed costs in order to break even and F\$0.288 (A\$0.17c) per seedling produced per year.

The sell price and the volumes needed to achieve break-even are summarised in the following table.

FFF has marketed and sold seedlings to a number of customers, including large volume sales to local non-government organisation - Conservation International to offset water - for their program to restore degraded land in Ra province as funded by Fiji Water as well as a range of other customers.

Over the last few years, the nursery has managed modest profits based on the above volumes.

Plantations – a partnership for development

“It is not possible to build a viable plantation estate on freehold land alone in Fiji where at least 85% of land is owned by mataqali. Alternatives include leasing land from mataqali or partnering with mataqali to supply FFF as contracted outgrowers or mini estates. The land leasing option is preferred by the company and the mataqali.” (Blyth & Siwatibau, 2013)

As around 85% of land in Fiji is owned by traditional landowners (called mataqali) it is not possible to build a viable plantation estate on freehold land alone. Alternatives include leasing land from landowners or partnering with landowners to supply FFF as contracted out-growers or mini estates. The land leasing option is preferred by the

Table 2: Annual Nursery Costs

Item	Variable costs (F\$/seedling)	Fixed costs (F\$/year)	Converted Fixed costs (A\$/year)
Land rent		3,500	2,071
Permanent labour		42,500	25,148
Diesel for generator		8,268	4,892
Teak seed	0.014		
Pig manure	0.044		
Sand	0.136		
Fertilizer	0.006		
Plastic bags	0.055		
Casual labour	0.033		
Total Variable Costs	0.288 per seedling produced per year		
Total Fixed Costs		F\$54,268	A\$32,111

Table 3: Comparison of selling prices and break even volumes

Number of seedlings per order	Unit price per Seedling	Number of seedlings that need to be sold per year to cover fixed costs.
Up to 5,000	F\$3.50 (A\$2.07)	15,000
5,000 - 10,000	F\$2.30 (A\$1.36)	23,600
More than 10,000	F\$1.50 (A\$0.89)	36,000

company and the landowners and this is the model used by FFF.

The landowners contribute their land and labour in return for which the company makes regular lease payments, offers short-term labour contracts for plantation operations and provides a share of the proceeds from plantation outputs – the longer-term income from timber harvests will be shared by the landowners (10%) and the company.

The FFF plantation establishment and management includes preparing the land for planting, planting tree seedlings raised in the FFF nursery, weed control during the first five years, pruning, singling and thinning, and harvesting the trees for their timber resources at the end of the rotation.

There are seven full-time employees in the FFF plantation group and two casual employees. These include a Plantation Manager/Senior Forest Ranger, a Plantation Supervisor, who is a GIS specialist, and five plantation workers supervised by the senior staff. The General

Manager, Plantation Manager and Plantation Supervisor/GIS Surveyor between them have 65 years of forest management experience in Fiji and other Pacific Island nations. The benefits of their skills and experience are evident in improvements in land assessment procedures before committing to a lease agreement, matching the right species to site conditions (teak will not grow everywhere), acquiring suitable land for lease from landowners (fertility, accessibility, slope), accurate site mapping and silvicultural¹ practices.

The following table presents labour input requirements for operations on a range of sites with trees planted at a spacing of 3 x 3 metres, which is equivalent to 1,111 trees per hectare. This is the current planting density used by FFF.

¹ Silviculture is the practice of controlling the establishment, growth, composition, health, and quality of forests to meet diverse needs and values.

Table 4: Labour input requirements in plantations

		Land condition		
		Light Easy	Medium Moderate	Heavy Steep
Vegetation cover				
Land slope				
Operation	Per Person Day			
Line cutting	metres	400	350	300
	hectares	8.33	9.52	11.11
Planting	trees	250	200	150
	hectares	4.44	5.56	7.41
Spot weeding	hectares	2.78	3.17	3.7
Line weeding	metres	1000	700	500
	hectares	3.33	4.76	6.67
Clear weeding	metres	800	700	600
	hectares	4.17	4.76	5.56

The annual pattern of planting has been variable and below the target level of 100 hectares per year. Land availability, land assessment capacity and seedling supplies are not constraining plantation expansion by FFF. The main constraint has been a shortage of working capital for land preparation and planting.

The FFF teak plantations will be profitable but positive net cash flow typically occurs with the final harvest, after 22 years as outlined below.

Table 5: Full cost and prices for Future Forests

Item	Unit	Input level	Unit Price	Frequency	Total cost (F\$/ha)
Labour inputs			F\$/day		
Land preparation	pd/ha	9.52	22.41	1	213.34
Planting	pd/ha	5.56	22.41	1	124.60
Replanting (infilling)	pd/ha	5.56	22.41	1	124.60
Weeding year 0 – establishment year	pd/ha	15.85	22.41	5	1775.99
Weeding year 1	pd/ha	12.68	22.41	4	1136.64
Weeding year 2	pd/ha	9.51	22.41	3	639.36
Weeding year 3	pd/ha	6.34	22.41	2	284.16
Weeding year 4	pd/ha	3.17	22.41	1	71.04
Pruning and singling year 0	pd/ha	7	28.57	1	199.99
Pruning and singling yr 1-4	pd/ha	14	28.57	2	799.96
Pruning and singling yr 5-11	pd/ha	11.2	28.57	2	639.97
Thinning @20% year 6	pd/ha	15	69.60	1	1044.00
Thinning @20% year 12	pd/ha	15	69.60	1	1044.00
Lease Costs			F\$/ha		
Annual lease payment to landowners	F\$/ha/yr		11.00	annual	11.00
Lease admin charge TLTB	F\$/ha/yr		0.91	annual	0.91
Lease establishment costs	F\$/ha		215.56	Year 0	215.56
Harvesting			m³/ha		
Harvesting team	F\$/m ³		27.50 yr 18 & 25		
Log transport to mill	F\$/m ³		15.00		
Total harvesting costs	F\$/m ³		42.50		
Logging licence	F\$/m ³		5.00		
Material inputs			F\$/unit		
Teak seedlings	seedlings/ha		1.50	1111	1666.50
Replanting (5%)	seedling/ha		1.50	55.55	83.33
Chemical fertilizer Yr 0 (planting year)	kg/seedling	0.25		0.1	27.78
Plant protection chemicals	ltr/tree	0		0	0
Teak production and income			F\$/m³		
Thinnings year 6			60	9.36	561.6
Thinnings year 12			250	19	4680
Thinnings year 18			500	14.04	7020
Final harvest year 25			500	97.5	48750

Source: FFF data collected during interviews with FFF plantation staff. The labour input data for land preparation, planting and weeding are for land with medium vegetation cover and moderate slope

Social impacts of the Future Forest business model

The mataqali and the company are key stakeholders in the FFF business model. The mataqali contribute their land and labour in return for which the company makes regular lease payments, offers short-term labour contracts for plantation operations and provides a share of the proceeds from plantation outputs. However, the motivations of the company and the mataqali to commit resources to a teak plantation differ. The Company's vision is to maximise returns to shareholders, whereas a mataqali is interested in maximising short-term cash returns to meet village needs as well as providing a long-term asset which can provide benefits for future generations in the village.

Box 3: How earnings at the village level turn into village level benefits

Villagers in Narikoso, a remote area in Ra province, said that Future Forests and assistance from a non-government organisation (Global Greengrants Fund) had established a nursery and provided 200 to 300 free seedlings per landowner totalling 5,000 seedlings for the village.

Earnings for the village from Future Forests activities enabled the villagers to deposit F\$19,000 (A\$11,242) for connection to the national power grid.

The village supplies water to the company nursery as well as downstream to cane farmers. The village also participated in the sheep grazing trial which FFF stopped however they continue to graze sheep.

This village is located close to the Future Forests nursery and has a long and mixed relationship with the company – at present there was some dissatisfaction based on misunderstandings which may be associated with poor communications between FFF and the village which the company is working on to address.

This section looks in more detail at the benefits received by the landowners – both short term and long term financial benefits.

Figure 3: Village connection to the electricity grid facilitated by income received from labour contracts



Short term benefits

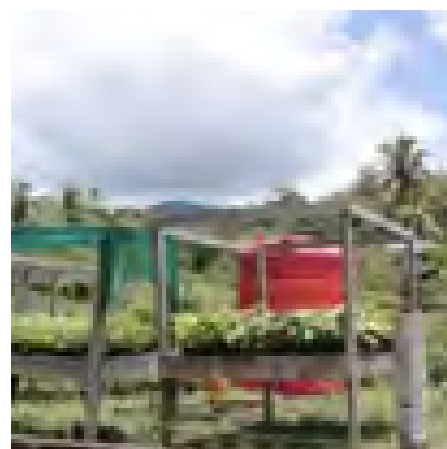
Villagers receive short-term benefits include the key payment and returns from labour contracts which include the first 5 years of the plantation. The association between village communities and FFF has introduced men and women of the area to new, widely appreciated, skills associated with raising seedlings of native and exotic tree species.

FFF contracts landowners to prepare the land, plant trees and maintain plantations for up to five years.

Income received from these contracts is used to meet community needs in the local villages. Examples include:

- connecting the village to the electricity grid (see above),
- providing clean water supply,
- building or renovating community facilities and
- paying school fees.

Figure 2: Village nursery at Narikoso



Long term benefits

Long term benefits to village communities include a share of the sales of timber from trees that are thinned from plantations after year nine and a share of the value of the final teak harvest after 20 to 25.

Based on the average lease area planted by FFF of 13.25 hectares, the estimated average income received by a village community over five years is approximately F\$20,250 (A\$11,982).

The table below provides a summary of the direct short and long term financial benefits.

Table 6: Estimated income received by a typical village community

Main income source	When received		Total F\$ for 13.25 hectares	Total Converted A\$ for 13.25 hectares
Labour contracts	Years 1 to 5	Clearing:	\$2,826	\$1,672
		Planting:	\$1,650	\$976
		Weeding:		
		Year 1:	\$4,706	\$2,785
		Year 2:	\$3,765	\$2,228
		Year 3:	\$2,823	\$1,670
		Year 4:	\$1,882	\$1,114
		Year 5:	\$941	\$557
Share of sales from thinnings	Years 12 and 18	Year 12: F\$3261.60	F\$4,321 F\$8,417	F\$2,557 F\$4,980
		Year 18: F\$6353.10		
Share of sales from final harvest	Year 25		F\$58,457	F\$34,590

Source: Based on FFF labour rates, mean annual increment (MAI) of 7.8 m³/ha/year, a final harvest in year 25 and an average planted area of 13.25 hectares. The price received for year 18 thinnings and final harvest logs is F\$500/m³ and for year 12 thinnings F\$250/m³.

All persons interviewed valued the long term benefits of timber tree planting for future generations. Most villages have been involved in pine plantations and are aware of the value of trees for timber. They appreciate the value of the plantations for their children and grandchildren.

In addition to these significant income opportunities, village communities identified the following benefits of their association with FFF:

- Permanent employment opportunities with FFF for skilled and unskilled workers
- Skill development for men and women
- Enhanced social relationships within the village
- Positive changes to the natural environment.

The mutual benefits accruing to both landowners and the company are a good model for others to replicate. The project outcomes demonstrate the value of a timely public contribution to effectively kick start a business operation that is driven by individuals with a clear understanding of the importance of, and a commitment to, a harmonious relationship with traditional landowners.

The future of Future Forests -teak processing

- In 2011, Future Forests floated on the Fiji stock exchange, gaining \$F1.8 million in additional funds. With these additional funds, Future Forests will continue to expand its plantations and plans to develop sawmill and timber processing operations. The operation will provide both formal employment opportunities in a depressed province and incomes for landowners on whose properties plantations were established in the past.
- A future saw mill and wood processing capacity are integral elements of the sustainable business model. The desired operating capacity of the saw mill is 5,000 cubic metres of logs per year and the configuration is based around two portable sawmills designed to process 20m3 of logs per day
- Initially the mill will produce rough sawn timber for the domestic and export markets. Over the longer term the plan is to produce joinery products including turned objects and other small items primarily for the domestic market.
- The establishment of the sawmill will add value to the company's teak resources and to provide a source of revenue to support the FFF's plantation development. If throughput is 5000m3 per year, a recovery is 45% is

Figure 3: Village meeting house rebuilt after floods with funds from labour contracts with Future Forests.



achieved and the sell price of sawn timber is F\$1200 per m3 the operation will generate net profits of over \$F 800,000 per year.

- This mill will be the only processing facility in the Ra province and it will provide a market for landowners with old plantation timbers on their land and also encourage additional landowners to plant teak and other valuable timbers.

Key lessons from Future Forests

Overall, an integrated and properly structured timber plantation project can be a profitable business in a Pacific environment but longer term income streams require ongoing funding support.

The review by Blyth & Siwatibau identified a number of lessons for forestry projects in Fiji that may be helpful to the developers of new forestry project and to the owners of these projects in the context of scaling up or rolling out their business models to new sites. These lessons are likely to be most critical to successful implementation of forestry projects in Fiji and in other Pacific Island countries where similar conditions exist. These are summarised below -

- Build enduring partnerships with village communities
 - Relationships with landowners will be stronger if they receive short and medium term contract incomes, rather than promised long term payments when trees are harvested.
 - All related promises and agreements should be documented, agreed and honoured by all parties and communications should be regular and open.
 - Avoid creating unrealistic expectations in the local communities.
 - Training local people has flow on benefits in other areas and strengthens the partnership approach.

- Access land with secure tenure for the term of the partnership agreement and land that is best suited for the intended forestry purpose
- Confirm availability of financial resources before setting plantation and reforestation targets
- Source suitable germplasm and apply appropriate nursery management practices to meet desired seedling survival rates and tree growth rates after planting
- Engage specialist skills to guide establishment, maintenance and management of reforested land
- Labour intensive work contracted to local villages delivers short-term community livelihood benefits, meets essential project and company tasks and enhances community relations
- Provide mataqali (landowners) with a share of the long-term benefits from investments in plantations and reforestation
- A guaranteed market for forest resources is an essential pre-requisite for attracting investors and mataqali commitment to plantations and reforestation
- Satisfy market requirements for timber resources – consider environmental certification such as forest stewardship council certification.

References

For further reading, please review the full report - M Blyth & S Siwatibau, Technical, financial and social assessments of forestry development projects in Ra Province, Fiji, 2013 found at www.enterprisecallengefund.org

Further details on Future Forests can be obtained from the company's website www.fff.com.fj

Symbol	Currency	Present rate*: 1 Australian dollar =
A\$	Australian dollar	1
F\$	Fiji dollar	1.69 Fiji dollars

* rate current as of 31 July 2013

