THE NAKAUVADRA COMMUNITY BASED REFORESTATION PROJECT

Project Design Document

Climate, Community & Biodiversity Standards
Second Edition

2013

Conservation International

ACKNOWLEDGMENTS

Conservation International (CI) would like to thank all of our partners and stakeholders who have supported the project from its inception and continue to work in collaboration to ensure that deliverables provide a win-win situation for all concerned. CI acknowledges the vital financial support of the FIJI Water Company and the FIJI Water Foundation, without which we would not have been able to carry out this project.

We thank the Provincial Office of Ra, with leadership and support from the Roko Tui Ra, Chief Executive of the Provincial Office whose wisdom and foresight has provided innumerable assistance to the project from the very beginning.

We acknowledge the support of the following chiefs whose "mana" and blessings have allowed the project to become active in their jurisdiction; the Taukei Vunivau, Taukei Nabukelevu, Tui Vatu and Tui Navitilevu. We thank all the community members who have been active contributors to the planning and development of project activities. We also acknowledge the support of the Church, in particular, the Tokaimalo Methodist Circuit and the Navunibitu Catholic Mission for their guidance and blessing.

The Western Commissioner and his team of government Officers in Rakiraki town have also provided policy guidance and programmatic support to ensure that the project is aligned to the overall Governmnt development strategy for the Province of Ra. In particular we extend our sincere appreciation to the Conservator of Forest and the West Divisional Forestry Officer for providing a full time forestry officer on secondment to the project. We also thank the immense input and guidance we have received from the Department of Agriculture, Extension Division, Rakiraki, and the assistance of the Landuse Section who provided valuable support in the elaboration of the Landuse Plans that were developed for the project.

We also acknowledge the assistance of the University of the South Pacific/ Institute of Applied Science who provided the lead role in coordinating the Rapid Assessment Program (RAP) survey in the Nakauvadra Range in 2008. We thank the National Trust of Fiji for assisting with the production of maps and other materials, too many of them to name.

In addition, CI would like to thank the many people who supported the development of this PDD:

CI-Fiji:	Susana Waqainabete-Tuisese, Isaac Rounds, Vilikesa Masibalavu, Nemani Wuniwaqa
CI-Headquarters:	Natasha Calderwood, Fabiano Godoy, Agustin Silvani, Curan Bonham, Mario Chacon, Adam Schoenberg
CI-Japan:	Aya Uraguchi

CONTENTS

ACRONYMS

AFOLU	Agriculture, Forestry and Other Land Use
A/R	Aforestation / Reforestation
ALTA	Agricultural Landlord and Tenant Act
CA	Community Agreement
CBD	Convention on Biological Diversity
CCBS	The Climate, Community and Biodiversity Standards
CDM	Clean Development Mechanism
CI	Conservation International
CITES	Convention on the International Trade of Endangered Species
CTTT	Carbon Trading Technical Team
DoF	Department of Forests
FPC	Fiji Pine Comission
GIZ	German Technical Cooperation
HCV	High Conservation Value
ILO	International Labor Organization
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area
NBSAP	National Biodiversity Strategy Action Plan
NLC	Native Land Commission
NLTB	Native Land Trust Board
NGO	Non Governmental Organization
NTF	National Trust of Fiji
PAC	Protected Area Committee
PDD	Project Design Document
PLA	Participatory Learning Approach
RAP	Rapid Assessment Program
RNL	Register of Native Lands
SPRIG	South Pacific Regional Initiative on Forest Genetic Resources
UNFCCC	United Framework Convention on Climate Change
USP	University of the South Pacific
VCS	Verified Carbon Standard
WAF	Water Authority of Fiji
YMST	Yaubula Management Committee

INTRODUCTION

The Nakauvadra Community Based Reforestation Project in Fiji has been developed by Conservation International (CI), and funded through the support of FIJI Water. The project is located on the northern tip of Viti Levu in the Province of Ra. It is comprised of 1,135 ha of reforestation plots along the Southern and Northern slopes of the Nakauvadra Range, a 11,387 ha forest refuge that has been designated as a Key Biodiversity Area (KBA) and is earmarked as a priority site in Fiji's proposed protected area network.

The project's main objective is to develop a multiple benefit, community based reforestation project that:

- Reforests an area of 1,135 ha which results in the sequestration of at least 280,000 tCO_2 over the 30 year project lifespan, validated and verified to the Climate, Community and Biodiversity Standards (CCBS);

- Increases forest cover around the Nakauvadra Range to expand critical habitat for endangered and endemic species living there, and enhances forest connectivity with other adjacent forest blocks;

- Enables local landowners to benefit from job creation, increased revenue, and the enhancement of livelihoods in both the short and long term.

The project incorporates a community-based reforestation model, planting hardwood timber species on 28% of the total area which can be sustainably harvested upon reaching maturity to provide for long term income generation for the landowning communities. Reforestation of the remaining 72% of the project site will be using native and endemic species, to reforest areas on the steeper slopes of the Nakauvadra Range which will expand forest habitat and create a 'green wall' around the more pristine upland and cloud forest ecosystems that are found in the rugged and higher elevation areas of the Range. The reforestation sites have been strategically identified to ensure the creation of new forest patches that are envisaged in the long term to help establish a conservation corridor between the Nakauvadra Range and nearby Wabu/Tomaniivi Range, 4kms away on the south western flanks of Nakauvadra.

As part of the livelihoods component of the project, CI has worked extensively with communities and farmers in the project zone to provide training and support in the development of new livelihood enterprises and sustainable agricultural practices, and has included the distribution of thousands of seedlings to encourage crop diversification, with fruit plants and traditional root crops to benefit families and improve food security.

GENERAL SECTION

G.1 ORIGINAL CONDITIONS IN THE PROJECT AREA

General Information

G.1.1 The location of the Project and basic physical parameters.

The Republic of Fiji consists of approximately 300 islands located roughly 3,000 km east of Australia in the Pacific Ocean. The two largest islands, Viti Levu (10,544 km²) and Vanua Levu (5,535 km²) comprise 88% of the total land area. The Nakauvadra Community Based Reforestation Project is located on the northern tip of Viti Levu in the Province of Ra. It is comprised of 1,135 ha of reforestation sites scattered along the Southern and Northern slopes of the Nakauvadra Range, a 11,387 ha forest refuge that has been designated as a Key Biodiversity Area (KBA) and is earmarked as a priority site in Fiji's proposed protected area network. The project's reforestation sites have been strategically chosen to help establish a buffer area around the Nakauvadra Range and to promote the development of a conservation corridor with adjacent forest blocks, the closest being the Tomaniivi/Wabu Forest Reserve (4 kms to the south).

The Nakauvadra Range is divided amongst approximately 75 traditional landowning units (mataqali) that are based in three districts (tikinas): Tokaimalo, Naroko and Naiyalayala. The reforestation plots are all found within these districts, with a few additional sites located in the neighboring district of Rakiraki (Fig. 3).

Figure 1: The Nakauvadra Range

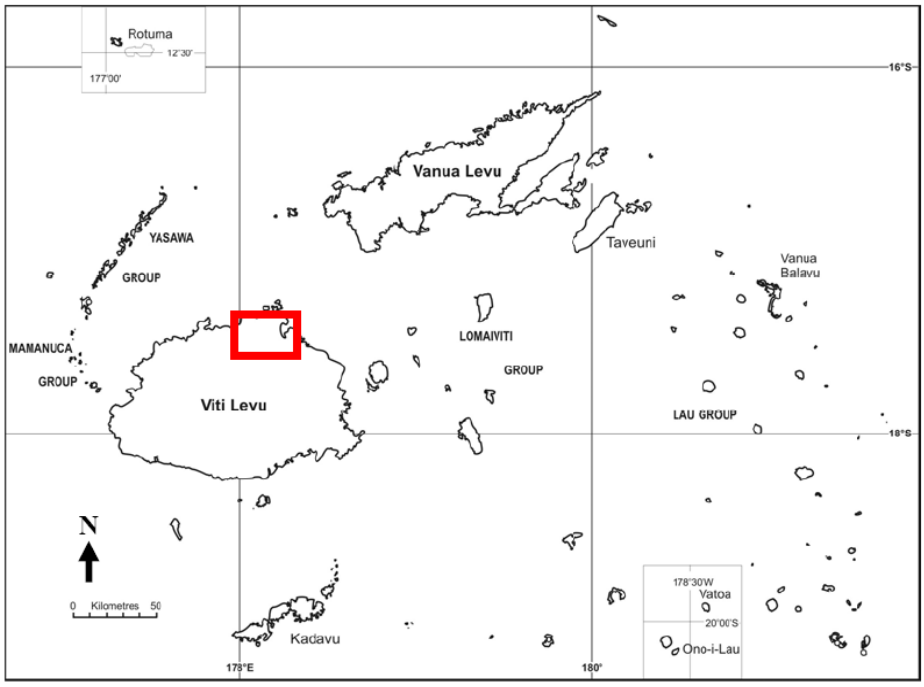


Figure 2: Project location on the northern tip of Viti Levu.

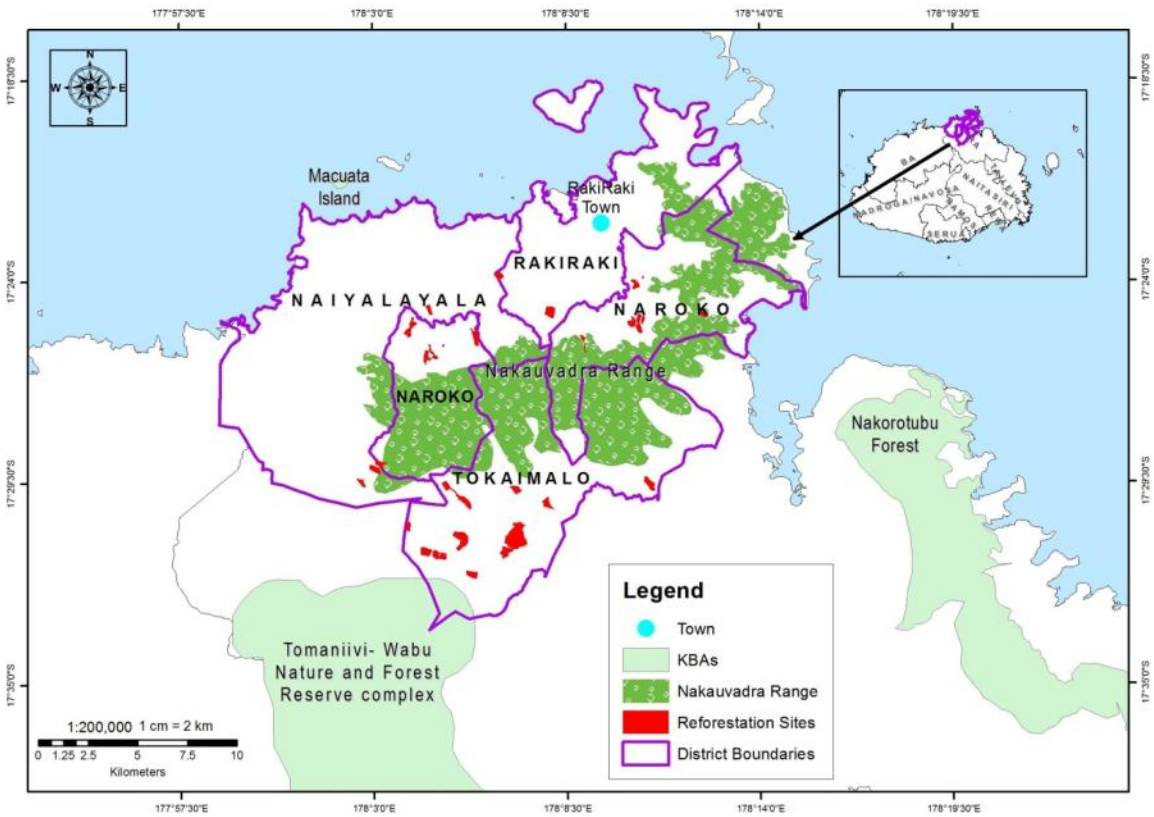


Figure 3: Map showing the geographical location of the Nakauvadra Range and district boundaries.

- **Geology, topography and soils**

The Nakauvadra Range extends for about 23 kilometers along the north coast of Viti Levu with the eastern flank terminating in cliffs at Viti Levu Bay. Its elevation ranges from 300 to 850 meters. To the west the range is about 6 kilometers wide with the highest peak Uluda rising to more than 800 meters and is bordered by steep cliffs on the northern and southern slopes (Hirst, 1965). The range is made up of andesitic rocks of the Ba volcanic group formed from two main volcanoes, the Tavua and Rakiraki volcanoes. Drainage at the Nakauvadra Range is controlled by North-westerly fractures some of which have been intruded by dykes. Several spurs extend south east while to the east of the range a large north westerly spur forms the rounded hills of the Rokavukavu peninsula. The elevation across the project reforestation sites range from 100 meters to 370 meters.

- **Climate**

The tropical maritime climate in Fiji is without great extremes of hot or cold. In all seasons, the predominant winds are the light to moderate trade winds from the east or southeast. Cyclones generally occur during the wet season months of November to April. Although rainfall is variable, the average rainfall increases steadily inland from coastal areas. In addition, the windward sides of the major islands intercept the easterly air stream and experience far greater rainfall that the leeward sides. The Nakauvadra Range lies in one of the drier areas in Fiji and being situated on the rain shadow it receives on average around 2000 mm of rain per year (Raj, 1993). Monthly rainfall data ranges from about 50 mm during the dry season to about 400 mm during the wet or cyclone season (Fiji Meteorological Office). Minimum monthly temperatures range between 20.2°C – 23.5°C while the maximum monthly temperatures range between 27.1°C - 30.1°C.

- **Hydrology**

The project zone is located at the headwaters of the Wainibuka River (Fig. 4), one of the three main tributaries of the Rewa River, which is the largest fluvial system in Fiji. All creeks south of the Nakauvadra range drain into the Wainibuka River. This river catchment (74,567 ha) has around 64% forest cover, but with relatively steep slopes and deep weathering, soil erodibility is high, with the erodibility of grassland and grazing along the upper reaches of the Wainibuka classified as severe (Atherton et al, 2005). The creeks emanating from the range provide drinking water to nine villages in the district of Tokaimalo. Most of the agricultural activities in Tokaimalo occur along these water systems especially for the subsistence production of root crops and vegetables.

Towards the coastal or northern side of the range the main water catchment includes the Penang and the Nakauvadra Rivers which serve as a main water source for Rakiraki Town. Cane farms are scattered along the Nakauvadra River with limited application of sustainable agricultural methods hence it is widely believed that deforestation and erosion on this side of the range is a major cause of flooding for Rakiraki Town during the cyclone season.

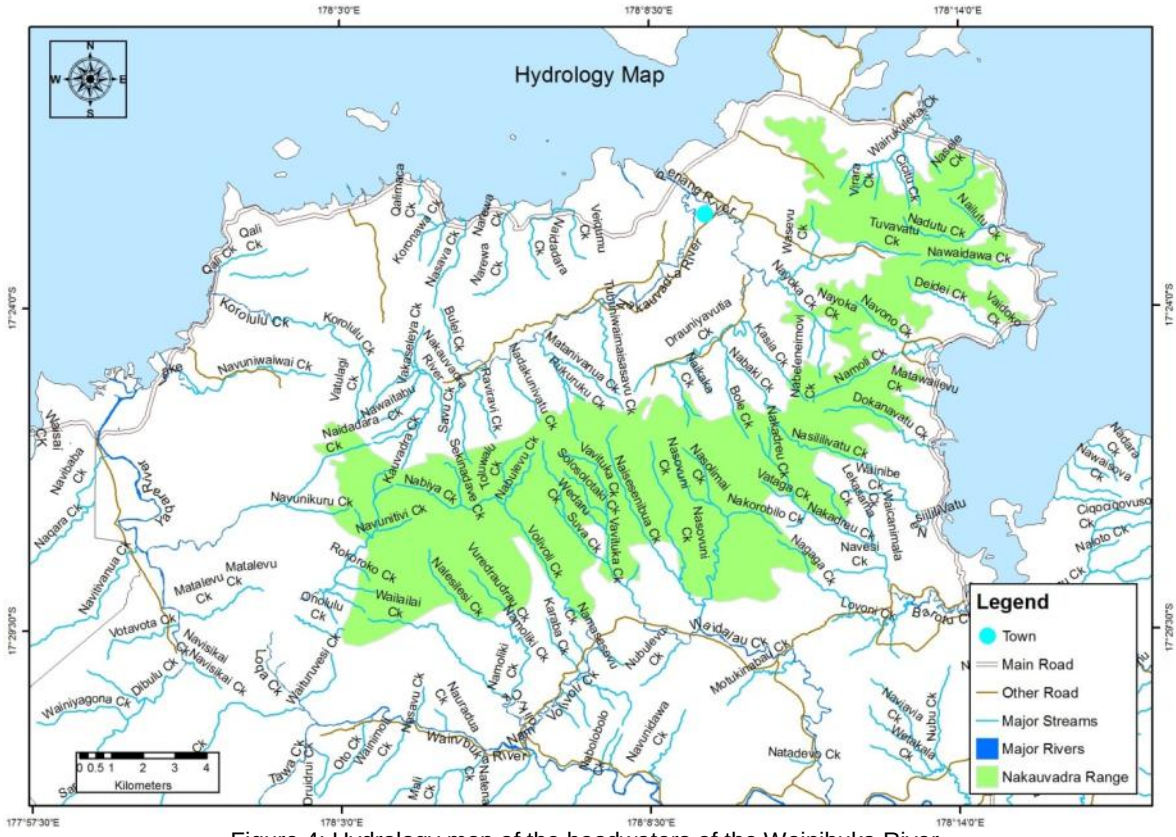


Figure 4: Hydrology map of the headwaters of the Wainibuka River.

G.1.2 Types and condition of vegetation within the project area.

The range of mountains comprising Nakauvadra are comprised of a mix of disturbed vegetation, such as grasslands, pine plantations, and agroforests on the relatively flat and accessible land near villages. Native lowland forest, upland forest and cloud forest occur in the higher elevation areas of the Range (Fig. 6).

The project reforestation areas are located on the degraded talasiga grasslands that cover the lower elevations and slopes of the Nakauvadra range as shown in Figure 5. The term talasiga ("sun burnt land" in Fijian) is the term applied to the fire-modified and fire-degraded grasslands and fern lands that cover much of the dry side of the larger Fijian islands (Parham 1972, Smith 1979). Reestablishment of native tree species in these areas has not been able to occur due to a combination of occasional fires and poor soil fertility. Talasiga covers about a third of the area of the two main Fijian islands, Viti Levu and Vanua Levu, mostly in the poorer eroded dry zones on the western sides of these islands. The lower elevation fringes of the Nakauvadra range are covered with talasiga vegetation especially along the slopes and ridges (between 50 – 300 meters m.a.s.l); lowland forest lies between 350 – 700 m.a.s.l, with the upper elevations (700 – 850 m.a.s.l) being covered with upland and cloud forest.

The flora is dominated by hardy fire-resistant ferns and alien herbaceous species, mostly grasses. Mueller-Dombois and Fosberg (1998) divided this plant community into several associations, based upon which fern or grass species dominate. The two dominant grass species are typically *Sporobolus indicus* and *Dichantium caricosum* with an occasional patch of the *Pennisetum*

polystachyon. Approximately 50 other species are also found but none of them with any abundance approaching that of the two above-mentioned grasses. Creek valleys may have vegetation including the commonly introduced *Albizia saman*, *Albizia lebbeck* and *Mangifera indica*, and the native *Elattostachys falcata*, *Alstonia vitiensis*, *Glochidion seemannii*, *Alphitonia* spp. and *Mussaenda raiateensis.*

Areas around the project sites are also heavily colonized in patches by the introduced invasive species *Piper aduncum*. In Fiji, *Piper aduncum* is an aggressive exotic species found from sea level to 400 metres, mostly along roadsides and in thickets, but also sometimes in secondary forest or on forested ridges and rarely intact rain forest (Smith, 1981).

Figure 5: Typical grassland vegetation in the project area.

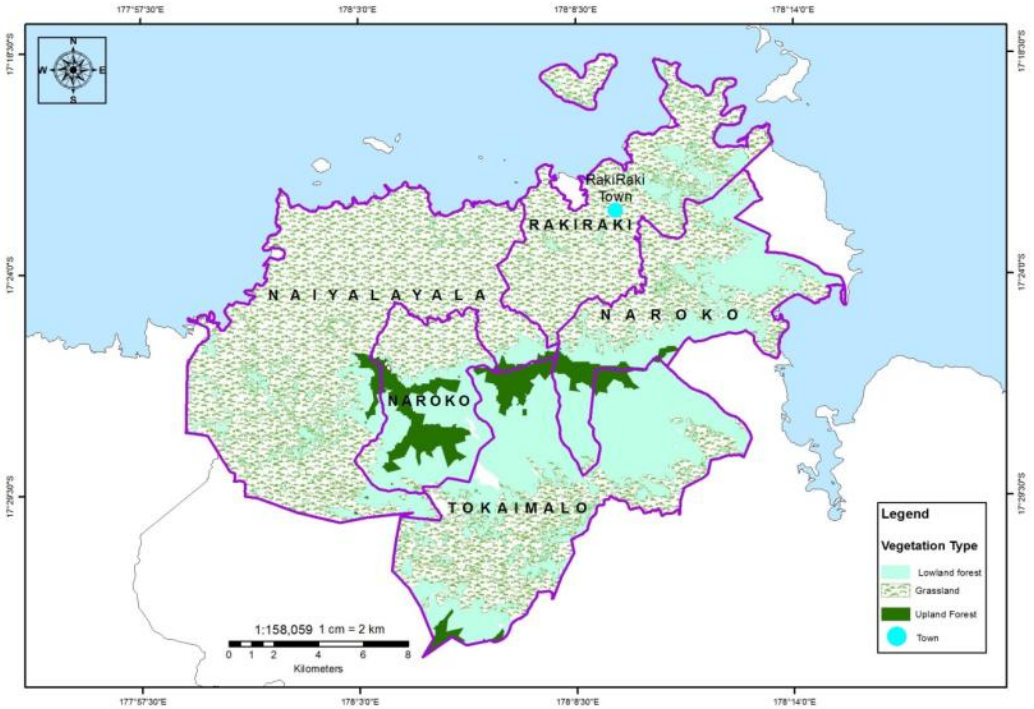


Figure 6: Vegetation map within the districts of Tokaimalo, Naiyalayala, Rakiraki and Naroko.

G.1.3 Boundaries of the project area and the project zone.

The total project area encompasses 1,135 ha. This currently includes 51 individual reforestation sites spread across the districts of Tokaimalo, Naiyalayala, Naroko and Rakiraki. We anticipate an additional 8 plots of various sizes to be established by June 2014 to complete the project area. The boundaries of each reforestation site are recorded through the use of GPS equipment. Extensive consultation with community landowners to determine the appropriate location for the reforestation areas, based on a balanced consideration of conservation and community development objectives, has been central to the project.

The project zone boundary (Fig. 7) includes the districts of Tokaimalo, Naiyalayala, and Naroko as these are the districts within which the Nakauvadra Range lies. As part of the project design process, participatory land use consultations and plans have also been carried out at a district-wide level. Three of the reforestation sites, totaling 56 ha, are located in the district of Rakiraki, immediately adjacent to Naiyalayala. Because of the small reforestation area this represents, the project zone boundary therefore incorporates the land owned by the mataqali in this area but does not include the full district within the project zone.

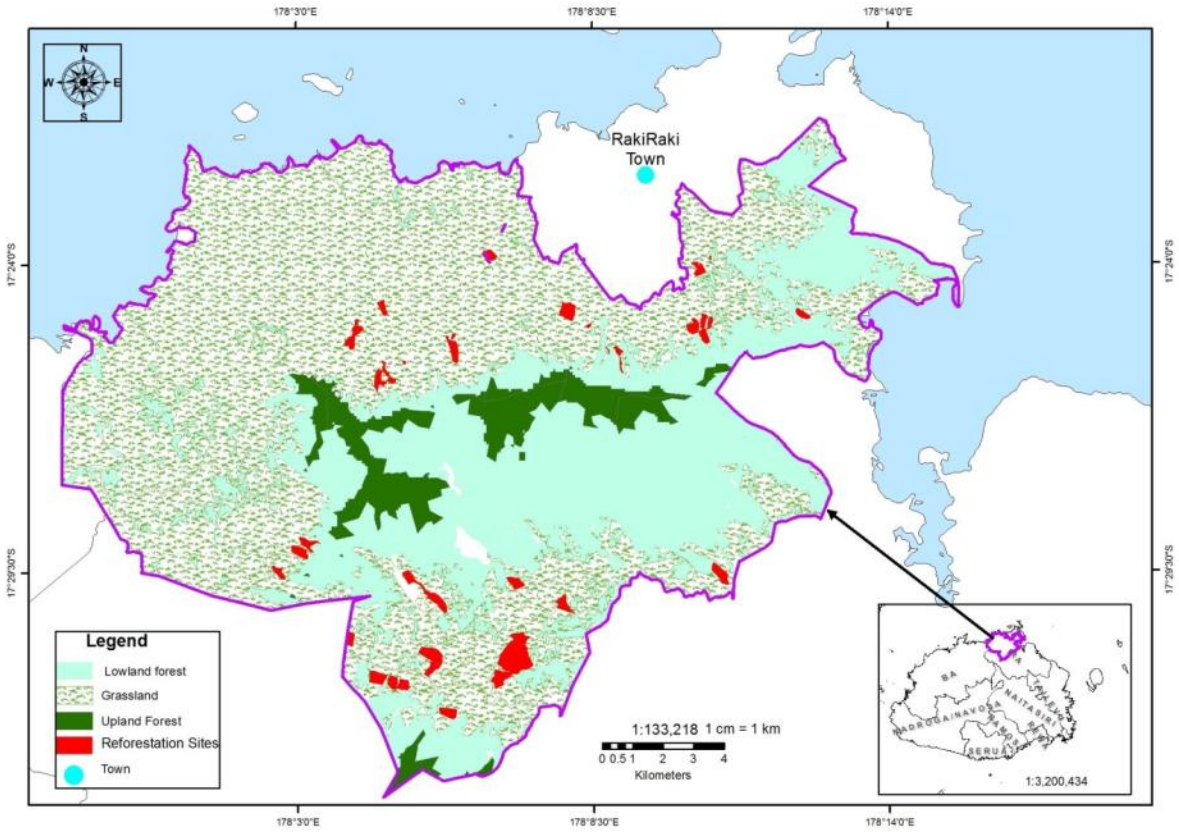


Figure 7: Map showing the boundary of the project zone.

Climate Information

G1.4 Current carbon stocks within the project area.

The carbon stock calculations were developed in accordance with the approved Clean Development Mechanism Methodology, AR-ACM0003 Version 01.0.0: A/R Large-scale Methodology: *Afforestation and reforestation of lands except wetlands.* The project meets the following applicability conditions of the methodology:

(a) The land subject to the project activity does not fall into wetland category;

The land subject to the project lies on slopes in one of the drier areas in Fiji and is not covered or saturated by water and not categorized as wetland.

(b) Soil disturbance attributable to the A/R CDM project activity does not exceed 10% of area in each of the following types of land, when these lands are included within the project boundary:

(i) Land containing organic soils as defined in "Annex A: Glossary" of the IPCC GPG LULUCF 2003;

The FAO digital soil map of the world version 3.6 classified soil of the project region as Eutic Cambisols (FAO, 2003[1]). Average organic carbon contents in topsoil (0-30 cm) and subsoil (30-100 cm) in Eutic Cambisols were calculated as 1.07% and 0.57%, respectively (FAO, 2003). Since the soil is never saturated with water for more than a few days, the minimum organic carbon content with which a soil is considered to be organic is 20% (IPCC GPG LULUCF, 2003). The land subject to the project does not contain organic soils.

(ii) Land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in annexes 1 and 2 to this methodology;

The project region is categorized as Tropical dry forest. Some areas of land have been used for sugarcane cultivation in the past and the others are abandoned / set aside after being used for grazing. Therefore, no land inside the project boundary is subjected to land-use and management practices and receives inputs listed in annexes 1 and 2 of AR-ACM0003.

(c) The pools selected for accounting of carbon stock changes in the project activity are the same as the pools for accounting of carbon stock changes in the baseline.

Above- and below ground pools have been selected for accounting carbon stock changes both in the project scenario and in the baseline.

A field survey was conducted within the project boundary to estimate the existing carbon stock of woody perennials and grassland (Annex 1). This field data was collected in accordance with peer reviewed field measurement processes and is in accordance with the general guidance for estimating baselines in grasslands published by the IPCC (IPCC, 2006). Default values suggested

[1] http://www.fao.org/geonetwork/srv/en/metadata.show?id=14116

by the IPCC were not considered appropriate due to the grassland vegetation having siginificant areas of *Piper anduncum*. This field measuring approach leads to a conservative baseline estimation which is also in accordance with IPCC good practice guidance (IPCC, 2006). This study found that the carbon stock in the living biomass of woody perennials and the belowground biomass of grasslands was **83.7 tCO_2-e / ha** at the upper limit of the 95% confidence interval.

Community Information[2]

G1.5 Description of communities located in the project zone.

Fiji has four administrative divisions divided into 14 i-Taukei Indigenous Provinces that provide administrative support to resource allocation and development among the indigenous Fijian population by the iTaukei Affairs Board. Each Province is governed by provincial council and headed by the Executive Head called the Roko Tui. Central government agencies in each Province coordinate policy programs with the Roko Tui hence the 14 i-Taukei Provinces align administrative programs and policy to the Government Administrative Division. A sub unit of the Province is the tikina or district. The most basic administrative unit in modern Fijian community is the village (koro), led by a village headman.

- **Historical, cultural and religious characteristics**

As described in G1.3, the project zone is located in the Province of Ra, which has a population of 24,512 people according to the latest 2007 census[3], and where more than 50% of the population is living below the poverty line (World Bank, 2011). The zone covers 26 villages in the tikinas (districts) of Tokaimalo, Naiyalayala, Naroko and Rakiraki. These communities are considered to be descendants of indigenous Fijians believed to have arrived in Fiji from western Melanesia approximately 3,500 years ago. The Nakauvadra Range itself which spans across the middle of these districts is very prominent in iTaukei cultural history and identity. Certain oral historical accounts relate the arrival of the first group of iTaukei (indigenous Fijian) to this area. A popular legend has it that the first iTaukei landed at Vuda point near Lautoka in a canoe called the 'Kaunitoni' led by one 'Lutunasobasoba'. From there the people moved inland and settled at Nakauvadra. Many iTaukei also believe that Nakauvadra is the home of 'Degei', a supreme and legendary being.

Historical and archival evidence also indicate the existence of an ancient and populous civilization that existed along the Nakauvadra mountain range. These communities were engaged in subsistence gardening using terracing in some areas. From here, some people began to migrate and settle in other parts of the Fijian islands. Today many iTaukei still trace their ancestral links to Nakauvadra where most traditional and social relationships relating to notions of 'mataqali', or 'tauvu' originated. These existing relationships seem to support the myths relating to Nakauvadra as being the area that indigenous Fijians first settled. Consequently, the Nakauvadra Range is still regarded by most Fijians to be a sacred (root) place.

[2] The socio-economic information provided in this section is largely based on the results of the socio-economic surveys and landuse planning workshops carried out in the project zone. The reports and data will be made available to the validation body.

[3] http://www.statsfiji.gov.fj/Key%20Stats/Population/1.8Rural%20pop%202007.pdf

Traditional Fijian society is based on communal principles derived from village life. People in villages share the obligations and rewards of community life and are still led by a hereditary chief. They work together in the preparation of feasts and in the making of gifts for presentation on various occasions, and they all help in communal activities such as the building of homes and maintenance of pathways and shared agricultural lands. This serves to act as a caretaking system that allows no-one to go hungry or uncared and provides a communal sense of identity and belonging. However, this can also be restrictive for the individual and serve to hamper entrepreneurial spirit and competition in the marketplace.

Traditional relationships and respect for leadership lines of authority is still strong in the tikinas where the project is located. Each village has a chief but there are also paramount chiefs who reside in one village and have traditional leadership authority over other villages under the same landowning area. Tikina Tokaimalo has two paramount chiefs. The two chiefly mataqali are Kaka at Nailawa village and Dreketi at Nayaulevu village. The paramount chief of Kaka is known as 'Taukei Nabukelevu' and he traditionally governs three villages, namely Nailawa, Mataveikai and Balabala. The other eight villages come under the traditional leadership of chief 'Taukei Vunivau'. Tikina Naiyalayala has only one paramount chief known as 'Tui Vatu' and he resides at Drauniivi village. Tikina Naroko does not have a distinct paramount chief but the villages have their own assigned chiefs.

Religion plays a very important part in the life of Fijians, and largely runs along ethnic lines. In the project zone, a total of seven Christian denominations exist, with the Methodist Church having the largest congregation (over 50%), followed by the Catholic Church. In villages, the church and ministers are highly respected and hold a great deal of influence within the social fabric of the community.

- **Villages**

There are 26 villages located within the project zone (Fig. 8). Not all the villages are landowners within the Nakauvadra Range so reforestation agreements and activities are only being carried out in conjunction with those villages that have property rights for the areas that have been identified as being priority sites for reforestation. Nabalabala, Vunisea, Nayaulevu, Naraviravi, Naivutu, Navuniyaumunu, Navavai, Narauyaba and Maniyava in Tokaimalo; Vatukacevaceva, Rewasa, Drana, Narara and Nanokonoko in Naroko; Naseyani and Nananu in Naiyalayala; and Vatusekiyasawa in Rakiraki. The remaining villages are included within the livelihoods component of the project, and are involved in the development of model farms and other livelihood diversification initiatives such as the planting of traditional varieties of root crops, fruit trees, sandalwood and pandanus, bee keeping and aquaculture. These communities include Nailawa and Namataveikai in Tokaimalo; Draunivau, Vaidoko and Naboutolu in Naroko and Togovere, Drauniivi, Rabulu and Narauyaba No II in Naiyalayala.

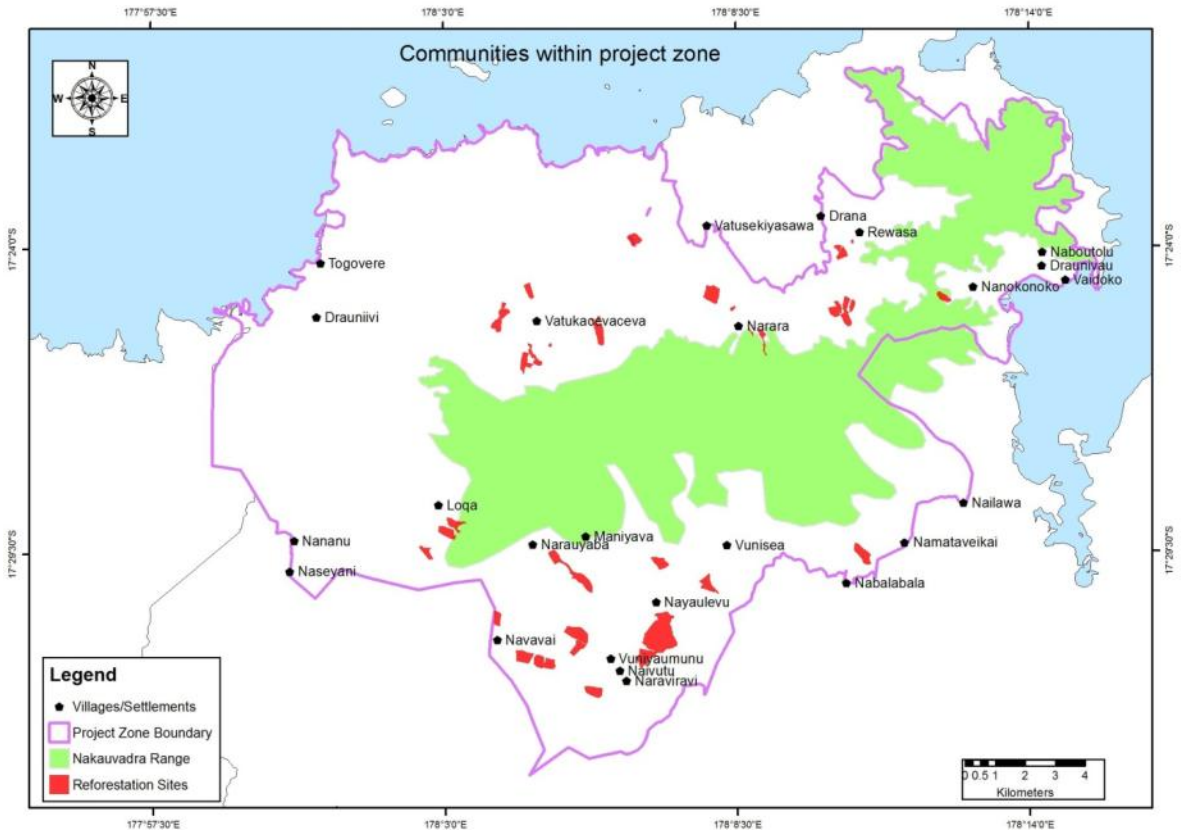


Figure 8: Location of communities in project zone.

- **Demography**

There are nearly 30,000 people living in the Province of Ra, of which an estimated 5,000 people reside in the town of Rakiraki. In order to collect the community baseline information and assess development needs at a local level which would guide project design and implementation, three socio-economic surveys and participatory landuse workshops were carried out in the districts of Tokaimalo, Naroko and Naiyalayala. A total of 396 households (representing 1,937 persons) were surveyed in villages across the project zone. According to the 2007 population census, the population in Ra between the ages of 1-24 is 49%; 25-49 years, 27% of the total. This was also evident during the socio-economic survey in which the ratio of men and women in the villages was also estimated to be roughly half.

- **Education**

Fiji has a good system of education compared with most of its neighbors and is a center for learning in the South Pacific. Enrollment is nearly 100% for primary-school children (World Bank, 2009), and tuition for grades one to eight is free. In most rural schools, classes are taught in the pupil's native tongue and in English for the first few years until students have an understanding of the English language to make it the medium of instruction. Thus nearly everyone - except some of the older generation - speaks English.

Within the project zone, most villagers have attained primary level education. In the districts of Naroko and Naiyalayala approximately 40% of the population has attended secondary school, with

many students attending schools in the Rakiraki area. The level of education within Tikina Tokaimalo is lower, with a high school dropout rate of approximately 60% after primary school. The only primary school in Tokaimalo provides boarding facilities for its young student population ranging from the age of 5 – 13 years. While no studies have been carried out to understand the reason behind the high level of high-school drop in Tokaimalo, the fact that there is no secondary school in the district, coupled with poor transportation links and rough terrain to reach the nearest school in Rakiraki district, would suggest that this acts as a major disincentive for students to stay in school.

- **Health**

Health centers are located in all the tikinas. Minor illnesses and injuries are treated in the health centers while serious cases such as births and emergencies are transferred to the Rakiraki Hospital. There are village nurses in every village who are appointed and trained by the Ministry of Health to attend to minor cases.

- **Livelihood systems**

Agriculture (especially farming) is the dominant source of livelihood, with the forest as source of supplemental income and food. There is a clear distinction between the actual landuse and the potential land uses that are determined in accordance to land classification and fertility maps produced by the Ministry of Agriculture. The discrepancy is not uncommon as there is no legislation that ensures that land is used specifically in accordance to its landuse classification and potential. Commercial agricultural production (sugarcane belt) generally sweeps the coastal foreshore to the lower slopes of the Nakauvadra Range while subsistence farming occurs predominantly from the midslopes to higher terrain.

Unlike many other countries beyond the South Pacific region, land tenure in Fiji is almost exclusively under communal ownership. Of the total land area, 7% is Crown Land, 10% is held as freehold and the iTaukei landowning units (native land) hold 83%[4]. Given the small portion of state and freehold land and the need for land to engage in agricultural production, native land, which is inalienable, was opened up for agricultural expansion through leasing arrangements. Such land were leased out to tenants under the provision of the 1880 Native Land Ordinance, then through the Native Land Trust Board and the Native Land Trust Act of 1940, and later under the Agricultural Land Ordinance of 1966 and the Agricultural Landlord and Tenant Act (ALTA) of 1976 (Naidu, 2002).

As a result, sugarcane farming is the key agricultural activity in the Province of Ra but only covers a small proportion of the land in the project zone due to the limited availability of arable land (see G2.1). Most of this sugarcane area is not cultivated by the native landowners themselves but leased to tenant farmers planting sugar either on a semi commercial or commercial scale. The majority of this population is Indo-fijian who live in homes built on their leased lands. Some of these tenants have been living in the area for more than 40 years. Very close relationships with the iTaukei landowners have developed during the years when their grandparents settled there. Sugar cane is a labor intensive crop and during peak activity seasons such as harvesting, it is the landowners themselves who provide the tenant farmers with manual labor to harvest their cane.

[4] See the Department of Town and Country Planning website: http://www.townplanning.gov.fj/index.php/planning/planning-issues/land-tenure

The majority of native landowner farmers in the project zone are subsistence farmers, planting a range of crops and vegetables and some rearing livestock. The choice of crops is limited by soil fertility, topography and climatic conditions. Vegetables are normally planted next to homes and mostly on alluvial flats for easy access to water and transportation. The most common vegetables planted include cabbage, beans, carrot, okra, eggplant, chilies, bele, rourou, and maize. Other traditional crops such as banana, cassava, sweet potato and yams are planted for subsistence use, and social or religious obligations.

Shifting cultivation is widely practiced as farmers move to new land after two to three cropping sequences. The planting cycle generally involves vegetables, dalo or cassava followed by a fallow period, or dalo, cassava then fallow. Slash and burn agriculture is still widely practiced even though the area is vulnerable to fire due to the extensive coverage of grasslands. Most farmers also own dairy cows, cattle, poultry and pigs to provide an alternative source of income and diet to their families. All three districts have rivers and creeks flowing through them which provide the community with a source of food and income (fish and prawns).

As subsistence farming is the main livelihood for the majority of the iTaukei landowners in the project zone, annual household income is low. Data from the socio-economic surveys conducted estimated that 70% of the households surveyed are living on less than FJD$ 5,000 a year (US$ 2800), (Table 1).

Table 1: Annual household incomes in project zone.

Household (HH) Income per year								
F$	Tikina Tokaimalo		Tikina Naroko		Tikina Naiyalayala		Total Project Zone	
	No HH	%	No HH	%	No HH	%	No HH	%
>25,000	2	1	1	1	6	4	9	2
>15,000	3	2	5	5	9	6	17	4
>10,000	8	6	10	9	13	9	31	8
>5,000	22	16	18	17	22	16	62	16
<5,000	109	75	73	68	96	65	278	70
total	144	100	107	100	146	100	397	100

In general, nearly all the local communities living around the Nakauvadra Range make use of the forest and the services it provides to meet some of their livelihood needs. Villagers fish for prawns and eels in almost all the rivers and creeks which flow out from the Range, mainly for subsistence consumption, with extra catch being sold at local markets at a reasonable price. Forested areas on the lower to mid slopes contain many seasonal native and introduced fruit trees, including pawpaw, banana, oranges, kavika (Malay apple), mango, ivi (Tahitian chestnut) and coconut. Villagers harvest and collect these for personal consumption and to sell at local markets. Pig hunting is practiced in nearly all the villages but is not as common a practice as it was historically due to the increased accessibility of shops for meat and other household needs. Hunting is mainly carried out by a few individuals who dare to travel long distances into the Nakauvadra Range forest. Pigs that are caught supplement the family meal, are sold for meat or used in traditional ceremonial functions.

Forests are also a source of fuelwood or construction timber. Fuelwood is sourced from the fringes of forest near villages while construction timber is harvested from pine woodlots that are scattered around the periphery of the Nakauvadra Range. It is also worth noting that the upper Nakauvadra Range is considered to be Fiji's most sacred traditional site and in mythology was Fiji's "Olympus" –

the symbolic home of Fiji's ancestral Gods. As a result, taboo over logging or clearing of the upper Nakauvadra Range is a traditional norm among the communities that live in its vicinity.

G1.6 Description of current land use and customary and legal property rights including community property in the project zone.

Following the completion of the socio-economic surveys, landuse planning workshops were held in each district. The objective of this was to identify all available resources and land use practices in each tikina, evaluate resource development pathways and integrate conservation goals and development needs. Further elaboration on this consultation process is provided in section G3.8. In addition to the participation of local communities, representatives of the Department of Agriculture (Extension and Land use Section), Department of Forest (Extension and Forestry Training School, Ministry of Cooperatives) and the Ra Provincial Council and University of the South Pacific, Institute of Applied Science (USP/IAS) also took part. The full analysis and conclusions of these workshops are presented in the Tikina Landuse Plans. A summary is provided below.

- **Historical land use**

The programme of direct government investment in agricultural development through the 1970s and 80s has impacted land use change and forest cover in the project zone. The government policy to reduce a dependence on imported food and to achieve its objective to close the economic gap between urban and rural people, led to a series of major loan and grant funded projects to increase production in rice, beef, dairy and feed grains (Foraete, 2001). While the program was well funded and supported through the provision of project managers, extension staff and in some cases import tariffs and licenses, farmers and others in the private sector were unable to meet planning targets. There were several reasons for this: targets were set too high; government service provision was generally inefficient; the incorrect assumption was made that Fijian semi-subsistence farmers would quickly acquire the attitude of commercial farmers during projects; and political upheavals occurred in 1987 (Foraete, 2001).

Tikina Tokaimalo is an example of this, as it was once the site of a commercial beef scheme. The Uluisaivou cattle scheme intended to build up a herd of 1000 cattle from New Zealand and was begun in the early 1970's, funded by the New Zealand government. The Project failed miserably after 20 years due to a number of factors including mismanagement and theft of the cattle stocks.

Sugar cane production was also very dominant within the three districts from around 1960 to 1980. This was then followed by a steady decline in production (Oxfam, 2005) mainly due to the introduction of other economically important crops such as vegetables and pulses, the high costs of transportation to the mills, soil erosion and land degradation.

- **Current land use**

In terms of land area Naiyalayala covers the largest area (20,117ha) while the other two districts each cover a little over 10,000ha. Based on the results of the Land Use Planning workshops, all three districts were found to have very limited arable land, with Naiyalayala having the highest percentage at 17%, Naroko 13% and Tokaimalo 9%. This analysis was based on soil maps / land

classification zones identified by the Ministry of Agriculture[5] (see G2.1). A summary of the land use allocation is provided below.

Tikina Tokaimalo: Out of the total land area 50% is still forested (closed and open forest). Only about 4% of the total area is used for agriculture, mainly for small scale mixed cropping. Pine and mahogany plantations still remain (pine 10% of the area, mahogany 1%) although the Fiji Pine Commission has indicated that they will not harvest the remaining trees (*pers. comm*.). A further 35% of the land is abandoned grassland, some of which will be used for the project reforestation activities.

Tikina Naroko: 58% of the land is forested. Agriculture occupies about 9.5% of which more than 7% is mainly under sugar cane. The Penang Sugar Mill is located in Naroko and is one of the reasons why sugar cane is more predominant compared to other agricultural commodities. Pine and mahogany plantations occupy less than 1% of the area. About 32% of the area is vacant land.

Tikina Naiyalayala: Out of the total land area, 72% is vacant grasslands and 21% forest. Agriculture utilizes only 4%. Pine and mahogany cover less than 1% of the area. Although Naiyalayala has the most arable land, climatic conditions limit its productivity. The seasonal long dry spells limit the choice of crops available to plant.

Maps outlining the current land uses in each district are presented below, and further information can be found in the Land Use Plans.

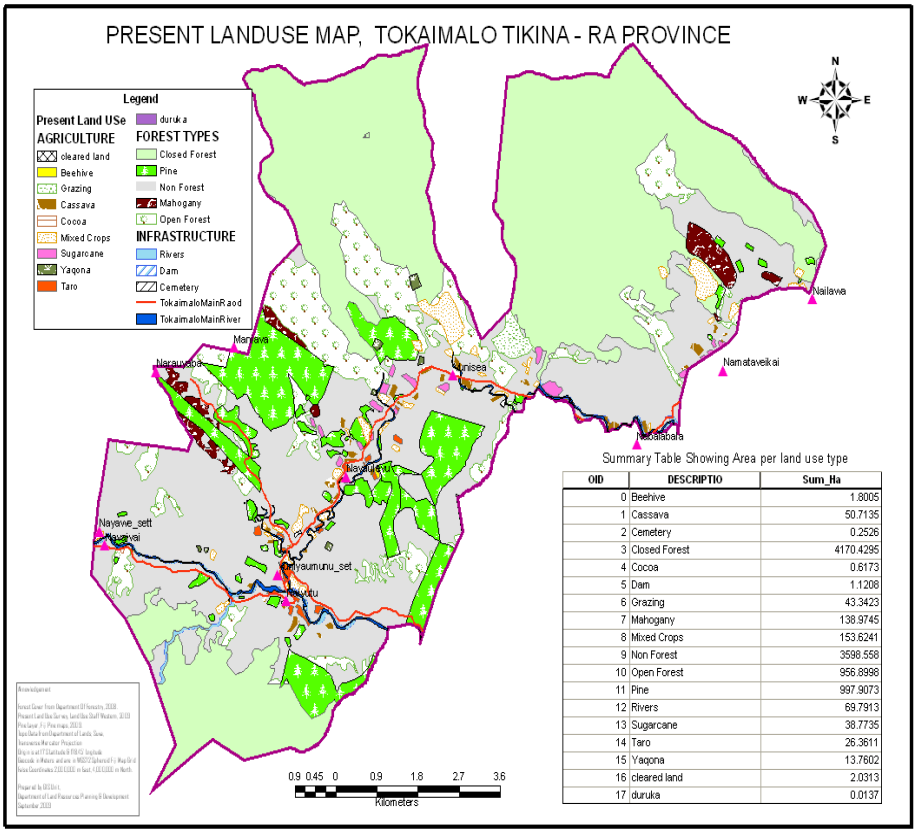


Figure 9: Current Land Use Map in Tokaimalo.

[5] http://gallery.agriculture.org.fj/pdf/Land%20Use%20Capability%20Guideline.pdf

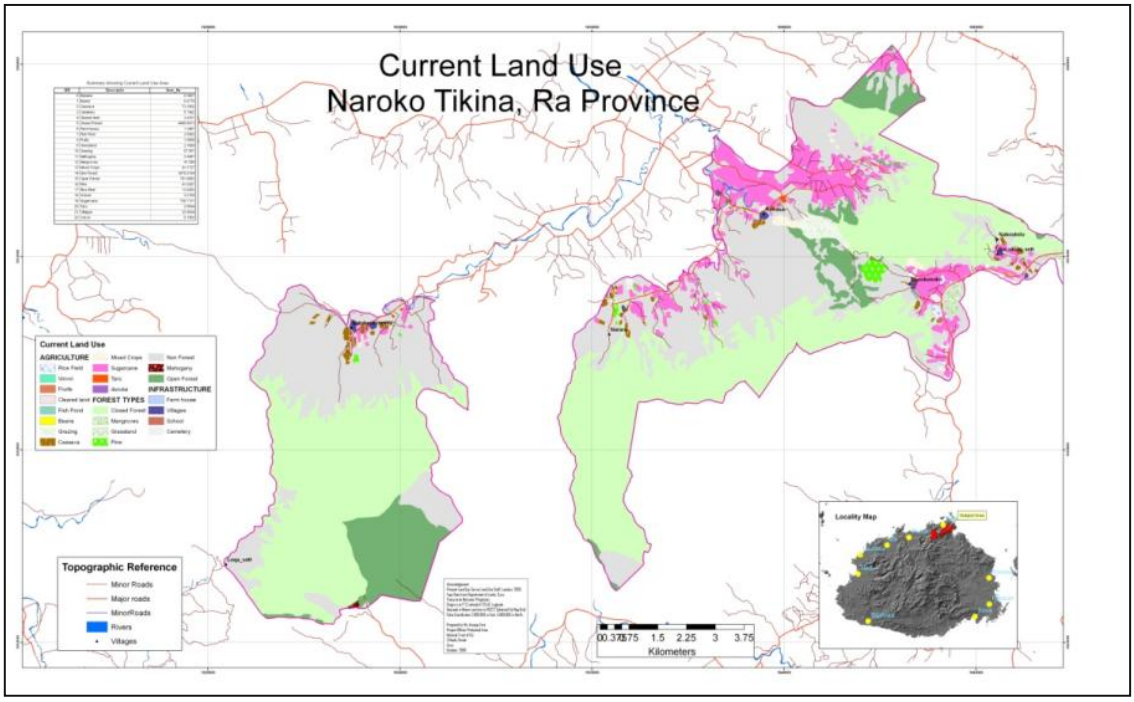
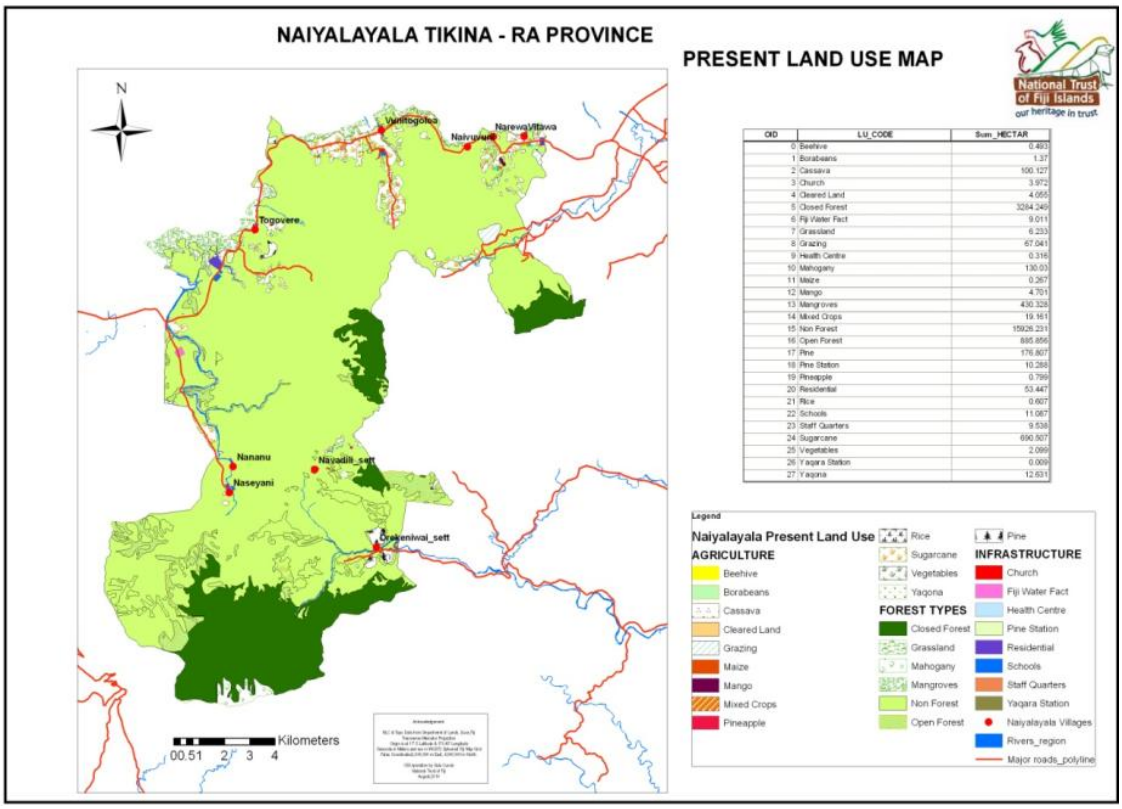


Figure 10: Current Land Use Map in Naroko.



OID	LU_CODE	Sum_HECTAR
0	Beehive	0.493
1	Borabeans	1.37
2	Cassava	100.127
3	Church	3.972
4	Cleared Land	4.055
5	Closed Forest	3284.249
6	Fiji Water Fact	9.011
7	Grassland	6.233
8	Grazing	67.041
9	Health Centre	0.316
10	Mahogany	130.03
11	Maize	0.267
12	Mango	4.701
13	Mangroves	430.328
14	Mixed Crops	19.161
15	Non Forest	15926.233
16	Open Forest	895.856
17	Pine	176.807
18	Pine Station	10.268
19	Pineapple	0.799
20	Residential	53.447
21	Rice	0.607
22	Schools	11.067
23	Staff Quarters	9.538
24	Sugarcane	690.507
25	Vegetables	2.099
26	Yaqara Station	0.009
27	Yaqona	12.631

Figure 11: Current Land Use Map in Naiyalayala.

- **Property rights**

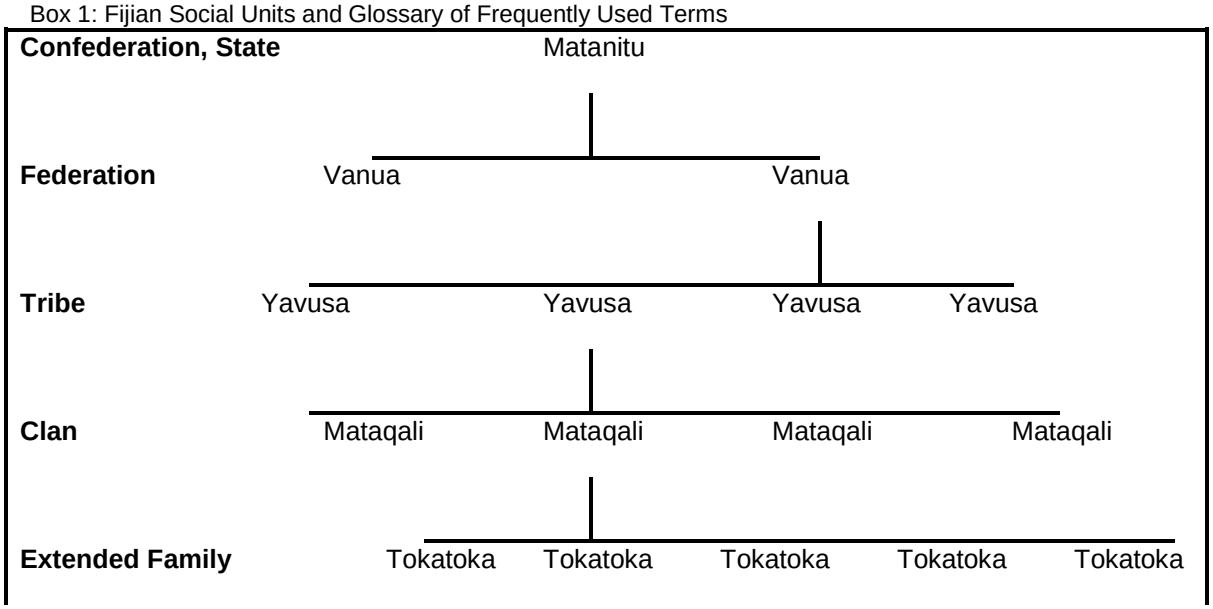
Eighty-three percent (83%) of land in Fiji is is classified as Native Lands. Lands under this customary land tenure system work on the principle of communal ownership of a land parcel that has already been topographically surveyed, charted on Native Land Commission (NLC) Maps, and registered in the Register of Native Lands (RNL) (Ministry of Lands and Mineral Resources, 2010). Under this system land and communal land owners are registered, with no individual titles being issued. Ownership of land is therefore vested in the *mataqali* or tribal group. These lands can only be leased and cannot be purchased outright. Fijian citizens of other ethnicities can only legitimately make use of these resources if the ethnic Fijian owners give permission to do so. The iTaikei Land Trust Board (iTLTB) was set up in 1940 to act on behalf of landowning mataqali to secure, protect and manage land ownership rights and facilitate commercial transaction for its use.

The advantages of the customary tenure system for the *taukei* is that it has firstly, prevented outright land sales and land speculation, and thus has ensured that they have not become a landless people in their own land. Secondly, it has helped the *taukei* to maintain their land-based customs and traditions, which are based fundamentally on the maintenance of family and kinship ties, and ultimately on the basic principles of sharingand caring.

The project reforestation sites are all on native land owned by different mataqali. Community Agreements (CA) have been signed with each landowning unit. The CA provides guidance and understanding on the roles and responsibilities of each party during the project lifetime. According to the agreement, each mataqali gives full consent to Conservation International to carry out the reforestation project on their behalf and grants access to their land for such purposes

Box 1 below outlines the traditional Fijian social and governance structure, and a glossary of the main terms used.

Box 1: Fijian Social Units and Glossary of Frequently Used Terms



Matanitu:	A traditional Fijian confederation of Vanua.
Vanua:	A traditional Fijian political unit, usually consisting of a few villages under a single chief, usually with a distinctive language and culture
Yavusa:	The largest kinship group consisting of people descended from a single vu – an ancestor god.
Mataqali:	Fijian kin group, officially a subdivision of a yavusa and designated as the landowning unit.
Tokatoka:	Subdivision of a mataqali, the basic landworking unit, often comprising a group of several brothers living the same village in separate households.
Tikina:	Subdivision of a province – a Fiji Government administrative unit.
Native Land:	Land above high-water mark, not being freehold nor owned by the State in accordance with the provisions of the Crown Lands Act. It comprises approximately 83% of the total landmass in Fiji.
Reserve Land:	Native land set aside and proclaimed as such under the provisions of the Native Land Trust Act. Reserve Land cannot be leased. De-reservation can occur provided there is 'good cause' and with the consent of the landowners.
Freehold Land:	Land owned privately and exclusively by the title holder who may dispose of it in any manner he wishes.
State Land:	State Land comprises Schedule A, Schedule B, State Freehold, State Fore-shore and State Land without Title. Schedule A and Schedule B land are held by the State in trust for indigenous landowners.

Biodiversity Information

G1.7 Description of current biodiversity within the project zone.

In November 2008, CI Fiji, together with the South Pacific Regional Herbarium, the University of the South Pacific, the National Trust of Fiji, the Fiji Department of Forests, the National Trust of Fiji, Wetlands International Oceania and the Fiji Museum carried out a Rapid Assessment Program (RAP) survey[6] in the Nakauvadra Range (Fig. 12). The survey was undertaken as part of the process to facilitate conservation initiatives within the Yaqara and Nakauvadra watersheds, and to provide an ecological baseline assessment of this important forest ecosystem. The information regarding biodiversity within the project zone is therefore largely based on the results of this work. A summary of the main results and findings are given below. The full report is attached as Appendix 2.

A RAP is a biological inventory method used to quickly assess the biodiversity of areas using criteria such as: species richness, species endemism, rare or threatened species and habitat condition. One of the key goals of this RAP was to collect baseline data on the diversity of the terrestrial flora and fauna in the Nakauvadra Range, to identify potential threats to biodiversity and suggest conservation recommendations.

In total the RAP survey documented 520 confirmed species, including a number of rare and endangered species .The discovery of the endangered Fiji Ground frog (*Platymantis vitianus*) which

[6] CI's Rapid Assessment Program (RAP) is an innovative biological inventory program designed to use scientific information to catalyze conservation action. Since 1990, RAP's teams of expert and host-country scientists have conducted 60 terrestrial, freshwater aquatic (AquaRAP), and marine biodiversity surveys and have contributed to building local scientific capacity in 26 countries. Biological information from previous RAP surveys has resulted in the protection of millions of hectares of tropical forest, including the declaration of protected areas in Bolivia, Peru, Ecuador, and Brazil.

was thought to have been extirpated 20 years ago from mainland Fiji (including Viti Levu) was a highlight of the survey. Three of Viti Levu's globally threatened (IUCN, 2012) bird species were recorded, the Fiji long-legged warbler (*Trichocichla rufa*), the Black-faced shrikebill (*Clytorhynchus nigrogularis*) and the Friendly ground dove (*Gallicolumba stairii*) along with two rare and endemic stick insects *Nisyrus spinulosus* and *Phasmotaenia inermis*. Two plant species of particular interest found were *Degeneria roseiflora* (Viti Levu endemic, rare) and *Neoalsomitra integrifoliola* (rare in Fiji). New records and range extensions were made for a number of species in all taxa. These results suggest that due to its moderate to high biodiversity and relative isolation, the Nakauvadra Range should be targeted for conservation action (Morrison and Nawadra. (ed.), 2008).

Figure 12: The Nakauvadra Range RAP team.

Table 2 provides a summary of the number of different species recorded during the survey.

Table 2: Summary of Nakauvadra RAP survey results.

Category	Number of species			
	Total	Endemic	Native	Introduced
Plants	418	138	200	80
Amphibians and reptiles	11	4	5	2
Birds	34	13	17	4
Mammals	9	0	3	6
Terrestrial gastropods	5	-	-	1
Freshwater macroinvertebrates	35	-	-	-
Freshwater fish	8	0	6	2

'-' represents unknown number of species in the category

- **Flora**

A total of 418 plant taxa (including eight undetermined angiosperm species) were recorded, of which 338 were native and 80 were alien species. The 338 native taxa recorded included 75 ferns and their allies, five gymnosperms and 258 angiosperms, and can be divided into two

groups: (i) indigenous species (200 species), and (ii) endemic species (138 species). This equates to an endemicity of 41% of the native flora and 34% for the entire flora. Two species of particular interest were *Degeneria roseiflora* (rare on Viti Levu) and *Neoalsomitra integrifoliola* (rare in Fiji). *N. integrifoliola* has only been collected once by Horne in 1878 from Bua, Vanua Levu. This species currently has an eastern distributional limit of New Guinea, the Bismarck Archipelago and Queensland (Smith 1981). This disjunct range is extraordinary. For it to be found in the Nakauvadra Range (only the second recording for Fiji in the past 100 years) not only reaffirms its existence and confirms its range extension in Fiji but augurs well for the "unusual" flora of the Nakauvadra Range.

The alien species were divided into two groups: those that were aboriginal introductions (22 species) and modern introductions (58 species). The four aboriginal introductions that have become naturalized include *Cordyline fruticosa*, *Syzygium malaccense*, *Artocarpus altilis* and *Aleurites molucana*. Similarly the exotic weeds *Sporobolus diander*, *Pennisetum polystachyon*, *Panicum maximum* and *Derris malaccensis* have become naturalized.

As already described, talasiga vegetation covers the lower slopes of the Nakauvadra Range, extending out into the dry zones of the west and northern parts of Viti Levu. However, the majority (about 65%) of the Nakauvadra Range itself is covered by lowland rainforest, which can be observed from as low as 200 m to roughly 500 m.a.s.l. The occurrence of plants such as *Aleurites molucana* (candlenut), *Artocarpus altilis* (breadfruit), *Syzygium malaccense* (Malay apple), *Vietchia joannis*, *Bischofia javanica, Cananga odorata, Citrus* spp., *Codiaeum variegatum* and *Dioscorea nummularia* and *D. alata* in the area indicate centuries of human influence and habitation. In other areas, further away from the 'traditional highways' used as access routes, stands of primary forest are still to be found, including the tree species *Agathis vitiensis*. This is the giant of the forest, and while not usual, having a number of these trees growing close to each other with an average dbh of 100 cm, is now a rarity in Fiji.

Vegetation types at an elevation above 500 metres are a mix of upland and/or cloud forest. Some common tree species associated with cloud forest inclue *Podocarpus affinis* and *Syzygium c.f. effusum* (primary indicator species for cloud forest systems especially the latter with its distinctive drip tips). Other common tree species include *Vietchia vitiensis, Fagraea beteroana, Podocarpus neriifolius, Spiraeanthemum sp., Alstonia montana, Metrosideros collina, Cyathea alata, Scaevola floribunda* and *Freycinetia urvilleana*. Tree trunks and branches are covered with epiphytic mosses, lichens, orchids, *Lycopodium* and ferns. Various *Selaginella* spp., sprawling and/or scandent ferns like *Pteris* spp., *Gleichenia* spp., and *Elastostema australe* dominate the ground cover.

- **Fauna**

Herpetofauna and Insects

A total of 11 frog and reptile species were documented representing approximately 33% of Fiji's terrestrial herpetofauna. This included three frog species, four skinks and four geckoes. In addition, skin sheds from the snake *Candoia bibroni* were also observed. Four of the species are endemic to Fiji (*Platymantis vitianus*, *P. vitiensis*, *Emoia concolor* and *E. parkeri*). With the exception of the introduced cane toad (*Bufo marinus*), and the mourning gecko (*Lepidodactylus lugubris*), the remaining species are native to Fiji and the Pacific. The survey also documented

the only known extant population of *P. vitianus* (Fijian ground frog) on Viti Levu. This frog species was thought to have been extirpated from Viti Levu in the last 20 years and as such this result highlights the conservation significance of the Nakauvadra Range for herpetofauna biodiversity.

The entomological survey was the first on record to be conducted in the Nakauvadra Range.The highlight was the discovery of two stick insects known to be endemic and very rare in the Fiji islands, with virtually nothing known about either species: *Nisyrus spinulosus* and *Phasmotaenia inermis*. The only specimen of *N.spinulosus* to have been previously collected from which original descriptions were made in 1877 is housed in the Natural History Museum in Stockholm. The shy and docile scorpion, *Liocheles australasiae* was also encountered. This is one of four scorpions recorded for Fiji and also a first for the Nakauvadra Range. These three species were found within the lowland forested area.

Figure 13: The Fijian ground frog (*Platymantis vitianus);* and the rare stick insect *Nisyrus spinulosus.*

Birds

A total of 34 bird species were recorded during the RAP, primarily in forest habitats but including peripheral open habitats. Thirteen species of these are Fijian endemic species, four are introduced species and the remainder native. Three of Viti Levu's globally threatened species were recorded – the Long Legged Warbler (Endangered; auditory record only); the Black-faced Shrikebill and the Friendly Ground-Dove (Vulnerable).

No Masked Shining Parrots, Polynesian Starlings or Fan-tailed Cuckoos were observed during this survey, however, with the exception of the Fan-tailed Cuckoo, they had previously been observed in the Nakauvadra Range by Masibalavu (2004). It was surprising not to find the Masked Shining Parrot during the survey and it is clearly a very rare bird in the Nakauvadra Range as Masibalavu only saw two individuals in 2004.

Mammals

There are fifteen species of mammals native to Fiji, of which six are terrestrial (bats belonging to the order Chiroptera). There are fourteen non-native species of mammals present in Fiji, all of which are terrestrial and have been introduced to Fiji in the last 3000 years since the arrival of humans (Pernetta and Watling 1978). The RAP survey focussed on the native bat species

present in the Nakauvadra Range. To date there has been no record of terrestrial mammal research conducted in the Nakauvadra Range area. Only three species of bats were recorded: *Pteropus tonganus*, *P. samoensis* and *Emballonura semicaudata*. The latter two species are listed in the IUCN Red List as Near Threatened and Endangered respectively. Fiji's native bats are poorly studied, yet this group is of high conservation importance as they play an essential role as seed dispersers, pollinators of flowers and in controlling nocturnal insect populations in rainforest and other terrestrial ecosystems (Manueli 2001, Palmeirim et al. 2007).

Freshwater fish

Eight species of fish from five different families were collected or observed during the RAP, from sampling taken along the Vunilaci and Vuniqesa river systems which flow along the edges of the Nakauvadra Range into the Wainibuka River. Two species were collected from the family Gobiidae (*Awaous guamnesis* and *Sicyopterus zosterophorum*) that were found to dominate the mid and the upper catchments of the Nakauvadra Range.

Also collected were three species of freshwater eels from the family Anguillidae (*Anguilla marmorata*, *A. obscura* and *A. megastoma*). The freshwater moray, *Gymnothorax polyuranodon* (Family Muraenidae), was also observed. No introduced exotic species in the mid and upper catchments were recorded, however the lower catchments of the river system were heavily populated by the introduced Mozambique Tilapia *Oreochromis mossambicus* (Family Cichlidae) and the mosquitofish, *Gambusia affinis* (Family Poeciliidae).

- **Threats to biodiversity**

The forests in the Nakauvadra Range are one of the last remaining intact forest systems on the drier side of Viti Levu. These forests are currently not protected by any environmental legislation in Fiji. As the forests in the area are comparatively pristine and isolated due to their relative current inaccessibility, they provide potential security for a number of endemic taxa and habitats in Fiji. For example, the Nakauvadra Range contains the only known population of the endangered Fiji ground frog, *Platymantis vitianus*. In addition, given the importance of the creeks and rivers which orginiate in the Range, forests in these upper reaches of the Nakauvadra, Penang and the Wainibuka catchments, are critical to maintaining water quality and acting as a repository for potable water for local communities and the town of Rakiraki.

The main threat to the Nakauvadra Range are the negative impacts of regular (seasonal) burning of vegetation on valleys, slopes and ridges next to villages and farming communities along the base of the Range, which over the decades has seen the steady upward receding of the fire-line. This has resulted in the complete transformation of the native vegetation to talasiga grassland. This grassland is a major pathway for alien plants into the more intact forest of the mountain range. Eighty alien species have been recorded in the talasiga vegetation type including invasive plant species like *Spathodea campanulata*, *Albizia lebbeck*, *A. saman* and *Leucaena leucocephala*.

The birds of the Nakauvadra Range are similar in composition and approximate abundance, and hence conservation significance, to other large forest blocks on Viti Levu. The size of the Nakauvadra Range forest and its isolation from other forest blocks however, makes it vulnerable to extirpation of species which are poor dispersers over non-forest habitats and have

large home ranges such as the Masked Shining Parrot and the Giant Forest Honeyeater. This appears not to have happened as yet but any further erosion of forest size or quality will increase the likelihood of this happening.

G1.8 Evaluation of High Conservation Values (HCVs) in the project zone.

G1.8.1 Globally, regionally or nationally significant concentrations of biodiversity values.

a. Protected Areas

The Nakauvadra Range is located in an area classified as a Key Biodiversity Area (KBA) and is also listed in the 2007 Fiji National Biodiversity Strategy Action Plan (NBSAP) as a site of National Significance in line with Artile 6 of the Convention of Biological Diversity (CBD). This document has a prelimenary register of marine, terrestrial and wetland sites of national significance. Most of these sites have never been formalised for protection and management although the list has been used to evaluate the impact of proposed development projects.

The National Protected Area Committee (PAC) is a subcommittee of the National Environment Council under the Environment Management Act of 2005. PAC is mandated to provide policy advice to the government on issues relating to Protected Areas in Fiji. A 2009 study of priority forests for protection strongly indicated that the Nakauvadra Range as a key biodiversity area in Fiji should be protected (Olson *et.al* 2009). The PAC has accepted this paper and its recommendations for priority zones to be conserved.

b. Threatened Species

Between the 17 - 28 November, 2008 CI Fiji together with partners conducted a biodiversity RAP of the Nakauvadra Range. The RAP survey recorded a total of 15 globally threatened species as identified by the IUCN Red List 2012 (Table 3). This includes eight species of plants of which one is listed as Least Concern (LC) (*Astronidium robustum),* three are listed as Near Threatened (NT) (*Astronidium tomentosum*, *Degeneria roseiflora*, *Fagraea gracilipes*), three Vulnerable (VU) (*Cycas seemannii*, *Pandanus cf. joskei*, *Podocarpus affinis*) and one Critically Endangered (CR) species (*Geniostoma cf. clavigerum*). Two species of amphibians are listed as Near Threatened (*Platymantis vitiensis*) and Endangered (*Platymantis vitianus*). Three species of birds recorded include two Vulnerable species (*Clytorhynchus nigrogularis*, *Gallicolumba stairii*) and one Endangered species (*Trichocichla rufa*). Two species of bats are listed, one as Near Threatened (*Pteropus samoensis*), and one Endangered species (*Emballonura semicaudata).* The Fiji copper headed skink (*Emoia parkeri*), whilst not globally threatened, is listed as endangered under Fiji's list of 50 endangered species (NatureFiji-MareqetiViti, 2008).

Two species of bat are listed in Appendix I of the Convention on the International Trade on Endangered Species (CITES-2012). These are *Pteropus tonganus* and *Pteropus samoensis.*

Table 3: List of threatened species.

Species	Common name	IUCN	CITES
Plants			
Astronidium tomentosum		NT	
Astronidium robustum		LC	
Degeneria roseiflora	Masiratu	NT	
Cycas seemannii	Roro	VU	
Dendrobium biflorum			
Fagraea gracilipes	Buabua	NT	
Geniostoma cf. clavigerum	Buibuita	CR	
Oberonia heliophila			
Pandanus cf. joskei	Draudreka/Misimisi	VU	
Podocarpus affinis		VU	
Podocarpus neriifolius	Kuasi		
Amphibians			
Platymantis vitianus	Fiji Ground Frog	EN	
Platymantis vitiensis	Fiji Tree Frog	NT	
Reptiles			
Candoia bibroni	Pacific Boa		
Birds			
Accipter ruftitorques	Fiji Goshawk		
Circus approximans	Pacific Harrier		
Clytorhynchus nigrogularis	Black-faced Shrikebill	VU	
Gallicolumba stairii	Friendly Ground Dove	VU	
Phigys solitarius	Collared Lory		
Trichocichla rufa	Fiji Long-legged Warbler	EN	
Mammals			
Emballonura semicaudata	Pacific sheath-tailed bat	EN	
Pteropus samoensis	Samoan Fruit Bat	NT	Appendix I
Pteropus tonganus	Tongan Fruit Bat		Appendix I

c. Endemic Species

A total of 155 endemic species of fauna and flora were recorded from the project zone. This included 138 species of plants, four species of herpetofauna, two insects and 14 species of birds. The endemic bird and herpetofauna species are identified in Table 4 below. The list of endemic plant species can be referenced in the RAP report (Annex 2).

Of the four species of herpetofauna documented, the discovery of the endemic ground frog, *P. vitianus*, (listed as Endangered (EN) under IUCN criteria), is the first record on Viti Levu in over 20 years. Naturalists working in Fiji over the past 20 years had widely accepted that the species had beenconsumed to extinction by the introduced mongoose and humans on Vanua Levu and Viti Levu (Watling and Pernetta 1979, Ryan 2000, Morley et al. 2004, Morrison et al. 2004, Morrison 2005). Local herpetologists have in the past five years searched for surviving populations of the ground frogs in likely frog habitats on both Vanua Levu and Viti Levu. Whilst surveys on Vanua Levu had proved successful with discoveries of ground frog populations, the Viti Levu surveys into the Savura, Sovi Basin, Wabu and Tomaniivi Forest reserves suggested that these frogs had indeed perished on Viti Levu. The discovery of this species in the Nakauvadra Range, and its absence from other less disturbed sites previously surveyed within Viti Levu (e.g.,Wabu Forest Reserve, Sovi Basin), suggests that in addition to being able to co-exist with cane toads, mongoose and tree frogs, *P. vitianus* can also survive in habitats that have been historically modified or significantly impacted by humans (mainly early Fiji settlers). This presence of the Fiji Ground Frog highlights the conservation significance of the Nakauvadra Range for herpetofauna biodiversity.

Table 4: List of endemic species.

Species	Common name
Amphibians	
Platymantis vitianus	Fiji Ground Frog
Platymantis vitiensis	Fiji Tree Frog
Reptiles	
Emoia concolor	Fiji Green Tree Skink
Emoia parkeri	Fiji Copper headed Skink
Insects	
Nisyrus spinulosus	Stick insect ‘ucikau’
Phasmotaenia inermis	Stick insect
Birds	
Accipter ruftitorques	Fiji Goshawk
Artamus mentalis	Fiji Woodswallow
Chrysoenas luteovirens	Golden Dove
Clytorhynchus nigrogularis	Black-faced Shrikebill

Ducula latrans	Barking Pigeon
Erythrura pealii	Fiji Parrotfinch
Gymnomyza viridis	Giant Forest Honey-eater
Mayrornis lessoni	Slaty Monarch
Myiagra azureocapilla	Blue-crested Broadbill
Myzomela jugularis	Orange-breasted Myzomela
Phigys solitarius	Collared Lory
Vitia ruficapilla	Fiji Bushwarbler
Zosterops explorator	Fiji White-eye

Source: Morrison and Nawadra (ed), 2009

d. Areas that support significant concentrations of a species during any time in their lifecycle.

The discovery of the Fijian ground frog in the Nakauvadra Range has elevated the importance of this forest ecosystem as critical to the survival of this endemic frog species. This species was thought to have been extirpated from Viti Levu until its discovery in 2008 during the CI RAP. Eighteen individuals were recorded during the survey.

G1.8.2 Globally, regionally or nationally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance

No HCVs were identified within this category.

G1.8.3 Threatened or rare ecosystems

No HCVs were identified within this category.

G1.8.4 Areas that provide critical ecosystem services (hydrolocial services, erosion control, fire control)

To carry out the analysis to identify key areas that provide critical ecosystem services in the project zone, the methodology to identify High Conservation Value forests, in particular HCV4, was followed: http://www.hcvnetwork.org/resources/global-hcv-toolkits. Specifically, a series of questions linked to ecosystem use were asked during the land use planning workshops carried out in 2009 in the districts of Tokaimalo, Naroko and Naiyalayala. The meeting and workshops were held at two levels. The traditional system dictates that it is essential to achieve the buy-in, support and feedback from Chiefs and elders of the village at the offset. Hence, meetings were held with the chiefly hierarchy first, before workshops were then organized among the communities. This same methodology was used to identify Areas that are fundamental to meeting the basic needs of communities (HCV5).

During the community workshops four specific themes were discussed: village environment (physical & social aspects), forestry, biodiversity and agriculture. For each theme key problems and challenges were identified and a 'root cause analysis' was carried out. This was then linked back to earlier years using a historical profile to identify what went wrong, when did it happen and why? From these discussions, watershed services provided by the Nakuvadra Range was identified as a key ecosystem service.

For the districts within the project zone water is sourced through piped water, dammed from streams that drain from the Nakauvadra Range. The main water source for the eleven villages in the district of Tokaimalo, with a population of about 600 people, is through constructed water pipes from dams. Water for Rakiraki Town, the commercial center within the province with an estimated population of around 5,000 people, is sourced from the main Water Authority of Fiji (WAF) Dam located at the base of the Nakauvadra Range. The villages of Rewasa and Drana within the District of Naroko currently obtain their water from WAF supply network.

Commercial water supply for the greater Rakiraki Town area and domestic water supply for those villages that do not connect to the WAF network is a critical ecosystem service. These communities depend on these small streams and springs especially during drought periods. However, the water catchment areas are predominantly covered in talasiga grassland. Feedback from the villagers gained during the participatory landuse planning workshops indicate that the waterways dry up quickly during dry weather except for the small creeks and springs that support scattered forests along its bank. Collective resolution after the workshops indicated a need to undertake reforestation at Narara and Vatukacevaceva villages in particular in order to improve village water sources which are nearly all situated on grasslands including that of the WAF dam. The project activities have been specifically designed whereby reforestation sites are located in critical areas such as water catchments, and backed up by awareness raising activities on fire prevention.

G1.8.5 Areas that are fundamental for meeting the basic needs of local communities (e.g. for essential food, fuel, fodder, medicines or building materials without readily available alternatives)

No HCVs were identified within this category.

G1.8.6 Areas that are critical for the traditional cultural identity of communities (e.g., areas of cultural, ecological, economic or religious significance identified in collaboration with the communities)

The Nakauvadra Range is renowned locally as a significant cultural site with many links to legendary tales of Fiji's colorful past. Having being dubbed the "highway" for many of Fiji's ancestors across Viti Levu in the days when modern forms of transportation were unheard of, the Nakauvadra Range is rich in evidence of settlements and historical events that have been reinforced by oral traditions passed down by elders and scripted accounts from the Vola Vivigi or "blue book" containing descriptions of historical events that took place along the range. Nakauvadra is very prominent in Fijian cultural history. Certain oral historical accounts relate the first arrival of the Fijian indigenous people to this area. A popular legend widely known to most Fijians states that the first Fijians landed at Vuda point near Lautoka in a canoe called the 'Kaunitoni' led by 'Lutunasobasoba'. From there the people moved inland and settled at Nakauvadra. It is also believed Nakauvadra is the home of 'Degei', a supreme being of early Fijian legends (Gifford, 1951).

As part of RAP survey conducted in 2008, an annotated field map of significant cultural sites was constructed by the Fiji Museum-Archaeology Department to identify and map sites of historical and cultural importance in the Nakauvadra Range. The resulting maps generally depicted resting spots or stop-over points and shelters found high up in the forest and close to mountain peaks. The collection of oral histories and general knowledge about the Nakauvadra Range was also gathered from the people of Vunisea village.

G.2 BASELINE PROJECTIONS

G2.1 Describe the most likely land-use scenario in the absence of the project following IPCC 2006 GL for AFOLU or a more robust and detailed methodology, describing the range of potential landuse scenarios and the associated drivers of GHG emissions and justifying why the land-use scenario selected is most likely.

The project proponent has carried out the baseline scenario and additionality analysis using the step-wise approach adapted from the 'Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM activities' (Version 01). Considering currently implemented land-use practices, economic and social conditions in the project zone, and information gathered through the landuse planning workshops, in the absence of the project (baseline scenario), the most likely land use in the project area (reforestation sites) is the continuation of the land use to remain as fallow as degraded talasiga grasslands. Aerial photographs (1978, 1994 and 2007) also show that the area is historically non-forested. Agricultural development for sugarcane and beef production occurred during the late 1970s but was unsuccessful in the long term, as described in section G1.6. Succession to forests has been unable to occur naturally driven by continuous disturbances such as fire and the poor quality of the soil which affects its ability to regenerate.

The project proponent **first** identified credible alternative land use scenarios.

The project activity sites are on native lands owned by the mataqali which is a Fijian kin group and designated as the landowning unit. Under the iTaukei Affairs Act and the iTaukei Land Trust Act, all members of the mataqali hold the rights in respect to land ownership and have to be consulted before any proposed land use change activities take place on their land. Only land use changes agreed to by 60% of mataqali members are allowable (as determined by the Board of the iTaukei Lands Trust).

Participatory land use planning was carried out with the participation of all major stakeholders at the beginning of the project as described in Section G1.6 and G3.8. This process served to identify the specific sites for reforestation which historically have either been used as marginal agricultural lands or have been abandoned. Under non-agricultural activities, pine plantation forestry was introduced in the project zone in the late 1960s and 70s by Fiji Pine Limited through the leasing of lands from the mataqalis. Both current and proposed landuse maps for Tokaimalo, Naroko and Naiyalayala districts are presented in the Tikina Landuse Reports.

The following alternative scenarios were therefore identified:

- Continuation of the pre-project land use (abandoned and or cropland); and
- Pine plantation

Sugarcane farming was not identified as a likely alternative scenario, although it is an important economic activity in the Province of Ra. Tenant farmers can lease native land for agricultural purposes for a total of 30 years in accordance to the Agricultural Landlord and Tenant Act (ALTA) of 1976. The sugarcane belt runs along the edges of the project zone. 90% of the land under the

project zone lies under Land Use Capability (LUC)[7] classes V-VIII[8]. These classes state that land is not suitable for arable cropping and hence for cane cultivation (Ministry of Lands and Mineral Resources, 2010). In fact many areas that used to be under sugarcane production now lie idle and many leases have not been renewed. The livelihoods component of the project is targeting some of these areas to develop alternative land crops such as pineapple, ginger and bee-keeping.

As a **second** step, the project proponent then identified barriers that would prevent the implementation of at least one of the alternative land use scenarios described above.

Economic barriers were identified which prevent the establishment of pine plantations. In the 1960s and 70's pine plantations were established by the Government of Fiji through the Department of Forest Extension Scheme. Pine plantations were established in the project zone by the then Fiji Pine Commission (FPC) which was heavily subsidized by the New Zealand Government Development Aid, and supported by the professional and technical assistance from the School of Forestry, University of Canterbury, Christchurch, New Zealand (Whyte, 1988). In 1991, FPC was incorporated into Fiji Pine Limited (FPL) in order to privatize the forest assets and transfer ownership back to the landowners.

FPL leases mataqali land for up to 50 years. Once native lands are leased, management rights are assigned to the lease holder as defined in the *Native Land Trust Act* Cap134. FPL planted the pine trees (*Pinus caribea Mor. Var. hondurensis* and *Pinus elliotti Engel*), and the landowners benefited from the relationship through annual land lease fees, employment opportunities, and other infrastructure benefits such as expanded road networks. Much of the softwood and hardwood plantations in Fiji are grown on such native leased land. Native leased lands are, however, often problematic, with long-term forestry leases often challenged by customary landowners. Land tenure is, therefore, often considered to be an impediment to industrial plantation development and commercial development (Leslie, 2010).

The project zone has an extensive area planted under pine plantations in small groves of not more than 10ha. These trees were planted in the late 1970's and are now mature for harvesting for pulp. However, high transportation costs from the project site to the mill (a subsidy of FPL) in Lautoka is deemed uneconomical resulting in many patches of mature pine trees being abandoned on leased native lands[9]. This has left the landowners in a limbo as they have no right to access, clear or use the leased lands. In a few cases, the FPL lease has expired and the company has not renewed its land lease. However the landowners have no capital to harvest the pine trees themselves. A few clans have invited loggers to assess their pine lots but loggers have declared the exercise too expensive and pulled out of the negotiation. **Technological and knowledge barriers** also prevent pine plantation establishment in the project area. The local villagers are subsistence farmers of traditional food crops (i.e. cassava, dalo) and do not have the skills or equipment to build and propagate pine seedlings for replanting which need rhizomes in potting soils. Landowners also

[7] The LUC classification system in Fiji is a systematic arrangement of different kinds of land according to properties that determine its capacity for sustained production. This classification is to assess, classify and map land according to its capability to support a range of crops on a sustainable basis. The evaluation is based on the degree of limitation imposed on the land by a variety of physical factors which include erosion, soils, wetness and climate.

[8] Land Use Capability classification maps for each district are presented in the Land Use Plans.

[9] In communications with Fiji Pine, mill gate prices for sawlogs were given as FJD$ 69 per metric ton while logging costs are around FJD$ 35 / ton and cartage costs $28 / ton for plantations located more than 100km away from the mill.

have no experience or knowledge in establishing or replanting areas of forest by themselves. Hence there are three main barriers (economic, technological and knowledge) preventing the implementation of the most likely land use alternative.

Based upon the barrier analysis, continuation of the pre-project land use (abandoned and or cropland) was therefore identified as the alternative land use scenario.

G2.2 Document that project benefits would not have occurred in the absence of the project, explaining how existing laws or regulations would likely affect land use and justifying that the benefits being claimed by the project are truly 'additional' and would be unlikely to occur without the project.

As presented in G2.1, the project proponent has carried out an additionality analysis using the step-wise approach adapted from the 'Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM activities' (Version 01). Results of this analysis demonstrated that due to economic, institutional and knowledge barriers, it would be unlikely that landowners would be able to carry out reforestation activities by themselves.

According to the Native Lands Trust Board, 83% of the land in Fiji is held under customary title by indigenous Fijians on a communal basis by land-owning clans known as mataqali. Use of land and resources by members of the mataqali are determined, or strongly influenced, by the authority of traditional leaders. Local decision-making processes, informed by traditional ecological knowledge, have played a central role in resource management for centuries (Clarke and Gillespie, 2009). However, Fiji does not currently have any statutory mechanisms which require conservation, reforestation or land use management plans to be carried out on native land. The summary below provides an overview of key legislative provisions on property rights, land use, forestry and land conservation.

Native Lands Act, Cap 133

The Native Lands Act provides for the continued occupation and use of native lands by indigenous Fijians.

Section 3 of the Act provides that:

> *Native lands shall be held by native Fijians according to native custom as evidenced by usage and tradition. Subject to the provisions [of the Native Lands Act]such lands may be cultivated, allotted and dealt with by native Fijians as amongst themselves according to their native customs and subject to any regulations made by the Fijian Affairs Board*[10]*.*

This statutory recognition of communal ownership of lands provides a basis for community level decision making about the use and conservation of natural resources on native land.

Native Land Trust Act, Cap 134

Under the Native Land Trust Act, all native land is administered by the Native Land Trust Board (NLTB). The NLTB may grant leases or licenses over portions of native land, such as the leases that have been granted to Fiji Pine. The regulations and conditions on leasing agreements do, in a number of cases support positive conservation outcomes such as not felling trees within 24 feet

[10] Native Lands Act, Cap 134, s.3.

from the bank of a river or applying soil erosion checks as may be required, but they do not mandate any specific conservation or reforestation practices.

Forest Decree

The Forest Decree 1992 aims to regulate the extraction of timber, the taking of non-timber forest products, establishing a licensing regime and providing for the establishment of forest reserves. It does not prohibit or restrict the exercise of the following rights on native land, provided the land has not been declared to be a forest reserve:

> 'the exercise of any rights established by native custom to hunt, fish, or collect fruits and vegetables growing wild'; or
>
> 'the cutting or removal by any native in accordance with native custom of forest produce which may be necessary for the permanent abode of himself and his family, for the construction of temporary huts on any land lawfully occupied by him, for the upkeep of any his fishing stakes and landing places, for the construction and upkeep of any work for the common benefit of the native inhabitants of his village or for firewood to be consumed for domestic purposes'[11].

Land Conservation and Improvement Act

The Land Conservation and Improvement Act establishes a Land Conservation Board whose functions are to exercise general supervision over land and water resources, recommend conservation legislature, and to make conservation orders. Conservation orders may be issued where it is deemed expedient for the conservation or improvements of land or water resources. This may include prohibiting or restricting the control of grazing, clearing of land, cultivation of crops of the lighting of fires[12]. No conservation orders have been issued for areas within the project zone in Ra.

Based upon the barriers analysis and the lack of legislative regulations mandating reforestation and sustainable land use management on native lands, the project activities, and hence benefits, can be said to be additional.

G2.3 Calculate the estimated carbon stock changes associated with the 'without project' reference scenario described above. This requires estimation of carbon stocks for each of the land-use classes of concern and a definition of the carbon pools included, among the classes defined in the IPCC 2006 GL for AFOLU.19 The timeframe for this analysis can be either the project lifetime (see G3) or the project GHG accounting period, whichever is more appropriate. Estimate the net change in the emissions of non-CO2 GHG emissions such as CH4 and N2O in the 'without project' scenario. Non-CO2 gases must be included if they are likely to account for more than 5% (in terms of CO2-equivalent) of the project's overall GHG impact over each monitoring period.

The carbon stock changes associated with the baseline scenario described in section G2.1 have been calculated using the 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (version 02.1.0) in accordance with the CDM Methodology 'AR-ACM0003: Afforestation and reforestation of lands except welands' (Version 01.0.0). Above-ground and below-ground biomass carbon pools were selected for accounting of carbon stock changes for

[11] Forest Decree 1992, s.21(1).
[12] Land Conservation and Improvement Act, s5-7.

the baseline and the project scenarios, while dead wood, litter and soil organic carbon pools were not. AR-ACM0003 provides the option of not accounting for carbon stock changes in these pools.

As presented in G2.1, the land in the project areas currently in grassland will continue to remain as grassland. Carbon stock changes in pre-project tree and shrub biomass in the baseline and those in planted tree biomass as well as in pre-project shrub biomass in the project scenario were identified and selected.

The baseline net GHG removals by sinks is therefore calculated as follows:

$$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} \quad (1)$$

where:

$\Delta C_{BSL,t}$	Baseline net GHG removals by sinks in year *t*; t CO_2-e
$\Delta C_{TREE\_BSL,t}$	Change in carbon stock in baseline tree biomass within the project boundary in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e
$\Delta C_{SHRUB\_BSL,t}$	Change in carbon stock in baseline shrub biomass within the project boundary, in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e

As defined above, $\Delta C_{TREE\_BSL,t}$ and $\Delta C_{SHRUB\_BSL,t}$ were estimated by applying the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (Version 02.1.0).

Stratification

For those areas where the shrub crown cover was less than 5%, the shrub biomass was considered negligible according to the tool, para 45.

For the baseline net GHG removals by sinks, the project sites were stratified based on pre-project woody vegetation cover. For those areas where trees existed and/or the shrub crown cover was more than 5%, sub-stratification was made based on geographical units, that is, parcels (Table 5).

A total of 202 ha out of 1,135 ha areas had trees and/or shrubs, and the remaining 933 ha areas did not. These 202 ha areas were selected in the early stage of the project, and then the project proponent decided to choose areas without woody vegetation.

Table 5: List of strata of 2009 – 2014 reforestation sites.

Strata		Parcel	Area (ha)
S_{woody_veg}	With trees and/or more than 5% crown cover of shrubs	Nakorokarua	5.1
		Kadragi	100.6
		Dreketi	39.2
		Natavurani	23
		Navatuvoka	13.2

		Busali	21.2
$S_{no\ woody\_veg}$	No trees and less than 5% crown cover of shrubs	--	933
Total			1135

Crown cover of trees and shrubs

The crown covers of trees and shrubs were measured for every parcel with trees and/or shrubs using ocular method; crown width ranges were determined 1 – 5 m, 5 – 10 m and 10 – 15 m, and numbers of trees or shrubs in a parcel were counted. A crown area for each crown width range was calculated by applying maximum crown width, for example, 5 m for the 1 – 5 m crown width range. Crown cover of trees was determined for each stratum as follows:

$$CC_{TREE\_BSL,i} = \left(\sum_{w} CA_{TREE\_BSL,w} \times N_{TREE\_BSL,i,w} \right) \Big/ A_{BSL,i} \qquad (2)$$

where:

$CC_{TREE\_BSL,i}$ Crown cover of trees in the baseline, in baseline stratum *i*, expressed as a fraction

$CA_{TREE\_BSL,w}$ Crown area of a tree with crown width range *w*

$N_{TREE\_BSL,i,w}$ Number of trees in the baseline in baseline stratum *i* with crown width range *w*

$A_{BSL,i}$ Area of baseline stratum *i*

Similarly, crown cover of shrubs, $CC_{SHRUB,i}$, was determined by applying equation (2).

Table 6 shows a summary of the calculation. The results of the measurements are available in Appendix 1.

Table 6: Crown cover of trees and shrubs.

Parcel ID, *i*	$A_{BSL,i}$ (ha)	$CC_{TREE\_BSL,i}$	$CC_{SHRUB,i}$
Nakorokarua	5.1	0.08	0.09
Kadragi	100.6	0.03	0.00
Dreketi	39.2	0.07	0.02
Natavurani	23.0	0.02	0.02
Navatuvoka	13.2	0.04	0.02
Buasali	21.2	0.02	0.02

Baseline shrub biomass

Only Nakorokarua's $CC_{SHRUB,i}$ exceeded 5%, and therefore shrub biomass in Nakorokarua was estimated as follows:

$$B_{SHRUB,i,t} = BDR_{SF} * B_{FOREST} * CC_{SHRUB,i,t} \quad (3)$$

where:

$B_{SHRUB,i,t}$	Shrub biomass per hectare in shrub biomass stratum *i*, at a given point of time in year *t*; t d.m. ha^{-1}
BDR_{SF}	Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 and default above-ground biomass content per hectare in forest in the region/country where the project is located; dimensionless
B_{FOREST}	Default above-ground biomass content in forest in the region/country where the project is located; t d.m. ha^{-1}
$CC_{SHRUB,i,t}$	Crown cover of shrubs in shrub biomass stratum *i* at a given point of time in year *t* expressed as a fraction; dimensionless

Default values of BDR_{SF}, 0.1, and B_{FOREST}, 160 t d.m. ha^{-1} (IPCC, 2006, Table 4.6), and the measured value of $CC_{SHRUB,i,0}$, 0.09 were applied in equation 3. Thus shrub biomass per hectare in Nakorokarua, 5.1 ha, at the start of the project, $B_{SHRUB,i,0}$, was calculated as 1.44 t d.m. ha^{-1}. According to "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities", crown cover of shrubs, CC_{SHRUB}, is considered to be stable if land is subjected to periodic slash-and-burn practices in the baseline. Although the causes for fire in the project area are not mainly due to agriculture but because of pig hunting, or stray fires from nearby sugarcane farms, it will not reduce the conservativeness of the baseline estimation to apply the same assumption as slash-and-burn practices in the baseline. Since CC_{SHRUB} is the only variable in equation (3), no increment in shrub biomass is expected throughout the crediting period under the baseline.

Baseline tree biomass

The "default method" of "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" was applied to estimate the baseline tree biomass. Considering that the mean tree crown cover in the baseline was 0.8% and less than 20% of the 10% threshold crown cover defined by the Fijian national authorities, the baseline tree biomass $\Delta C_{TREE\_BSL,t}$ was calculated as follows:

$$\Delta C_{TREE\_BSL,t} = \frac{44}{12} * CF_{TREE\_BSL} * \Delta B_{FOREST} * \left(1 + R_{TREE\_BSL}\right) * CC_{TREE\_BSL,i} * A_{BSL,i} \quad (4)$$

Where:

$\Delta C_{TREE\_BSL,t}$	Average annual change in carbon stock in tree biomass in the baseline; t CO_2-e
CF_{TREE_BSL}	Carbon fraction of tree biomass in the baseline; t C (t.d.m.)$^{-1}$
ΔB_{FOREST}	Default average annual increment of above-ground biomass in forest in the region/country where the project is located; t.d.m. ha^{-1} yr^{-1}
R_{TREE_BSL}	Root-shoot ratio for the trees in the baseline; dimensionless

Default values were applied for CF_{TREE_BSL}, ΔB_{FOREST} and R_{TREE_BSL} (Table 7), and measured values for $CC_{TREE\_BSL,i}$ and $A_{BSL,i}$ (Table 6). Stand age was assumed as 1-year at the start of the project for conservativeness. The results were summarized in Table 8.

Table 7: Default parameters for calculation of average annual change in carbon stock in tree biomass in the baseline.

	Value	Source
CF_{TREE_BSL}	0.50	Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, version 02.1.0, para 43.
ΔB_{FOREST}	7 t.d.m ha^{-1} yr^{-1} for the year 1 – 20 2 t.d.m ha^{-1} yr^{-1} for the year 21 –	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 4.9. Tropical dry forest, Asia (insular)
R_{TREE_BSL}	0.25	Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, para 43.

Baseline net GHG removals by sinks

Baseline net GHG removals by sinks were calculated by the sum between the baseline tree biomass and shrub biomass shown in Table 8. The total carbon stock change associated with the 'without project' reference scenario over the 30 year project lifetime is therefore estimated to increase by 16,232 tCO_2-e.

Table 8: Change in carbon stock in baseline

Year	Project Year	Change in carbon stock in baseline, t CO_2-e		
		Tree biomass, $\Delta C_{TREE\_BSL,t}$	Shrub biomass, $\Delta C_{SHRUB\_BSL,t}$	Net GHG removals by sinks, $\Delta C_{BSL,t}$
2009	0	701	0	701
2010	1	701	0	701
2011	2	701	0	701
2012	3	701	0	701

2013	4	701	0	701
2014	5	701	0	701
2015	6	701	0	701
2016	7	701	0	701
2017	8	701	0	701
2018	9	701	0	701
2019	10	701	0	701
2020	11	701	0	701
2021	12	701	0	701
2022	13	701	0	701
2023	14	701	0	701
2024	15	701	0	701
2025	16	701	0	701
2026	17	701	0	701
2027	18	701	0	701
2028	19	701	0	701
2029	20	200	0	200
2030	21	200	0	200
2031	22	200	0	200
2032	23	200	0	200
2033	24	200	0	200
2034	25	200	0	200
2035	26	200	0	200
2036	27	200	0	200
2037	28	200	0	200
2038	29	200	0	200
2039	30	200	0	200

G2.4 Describe how the 'without project' reference scenario would affect communities in the project zone, including the impact of likely changes in water, soil and other locally important ecosystem services.

As shown by the results of the socioeconomic surveys[13] and the landuse plans conducted in the project zone, most people are living at the subsistence level and qualify as a low income communities (earning below FJD$ 5,000/annum). Since the grasslands are not being used for any productive purposes and the financial, institutional and technological barriers identified in section G2.1 prevent the land from either being converted to other land uses, or regenerating naturally, then it is unlikely that any new creation of jobs or income generation related to these alternative land uses would be realized. It is unlikely that the communities living in the project zone would have the capacity to alter their socioeconomic position or to build capacity in alternative land uses in the absence of the project.

The Landuse Plans for Tikina Tokaimalo, Naiyalayala and Naroko identified the root causes underlying the problems and constraints linked to biodiversity conservation, village development, agriculture and forestry. Such constraints can be considered as the prevailing conditions in the "without project" scenario. These include unsustainable landuse practices, the lack of agricultural planting materials (plant seeds, cuttings and root stock for crops), the lack of agricultural knowledge about new crops or cropping systems, soil erosion, fires, logging and deforestation, solid waste and water pollution from agricultural chemicals. The livelihoods component of the project will work to

[13] A template of the questionnaire used for the household surveys is attached in Annex 3.

help address those issues linked to improving landuse practices, especially small scale community-based agriculture.

Without the project, unsustainable agricultural practices and the focus on planting limited crop varieties will continue. The cultivation of limited crop varieties poses increased risks from pests and disease which directly impacts the food security of marginalized communities. In addition, the current vegetation is already low quality grassland and as such has poor soils and provides very little benefit to water quality. Organic matter in the top soil has eroded due to repeated burning and exposure to sunlight and rain. Soil erosion is therefore prevalent in most village lands due to topographical features and erosivity of rainfall experienced in the area. This has resulted in the loss of topsoil, decrease in fertility and yield and contributed to shallowness of rivers and streams.

G2.5 Describe how the 'without project' reference scenario would affect biodiversity in the project zone (e.g., habitat availability, landscape connectivity and threatened species).

Without the project, biodiversity in the region is likely to continue to be at risk from mosaic forest fragmentation and encroachment of exotic species into the area bordering the Nakauvadra Range. Historical land use trends have led to the loss of native forest around the Range, which is now completely surrounded by talasiga grasslands, restricting the size of available habitat for many species living there. This has resulted in the gradual disappearance of species of fauna (bats and birds in particular) that would otherwise be able to assist with natural forest regeneration through seed dispersal. The loss of the natural source of seeds will impede natural reforestation and it is highly unlikely that natural succession at any scale would occur in the Nakauvadra Range. Continuous exposure to fires increases the threat of encroachment of exotic species into the higher elevation, pristine areas of the Nakauvadra Range. Fragmented landscapes may still sustain original species assemblages, but they are expected to suffer species loss with time. This can already be evidenced by the fact that no Masked Shining Parrots or Polynesian Starlings were documented during the 2008 RAP, but had previously been seen in 2004, suggesting that the forest habitat is no longer large enough to support their feeding and breeding needs. Disturbed sites are also prone to negative impact of invasion by non-native, invasive species of plants and animals, which also lead to loss of native biotic community. The RAP survey, for example, recorded 80 alien species in the talasiga grasslands including invasive plants species like *Spathodea campanulata, Albizia lebbeck, A. saman* and *Leucaena leucocephala*.

The project help provides a 'green wall' that will expand the forest habitat of the Nakauvadra Range by providing connectivity between fragmented and isolated "forest islands". The eventual reforestation of the sites will also serve to bring in new genetic sources for pollen and seed production hence enhancing the genetic diversity of existing isolated and remnant forest stands.

G.3 PROJECT DESIGN AND GOALS

G.3.1 Summary of the project's major climate, community and biodiversity objectives.

The overall goal is to establish a community based, multiple benefit forest carbon project that demonstrates the viability of forests as multi-use ecosystems – for biodiversity conservation, watershed management, carbon sequestration, soil erosion prevention, and the provision of other key goods and services for the benefit of local people.

The project's objectives are to:

- Increase biomass and carbon sequestration in project areas by reforesting 1,135 ha of degraded grasslands;
- Enhance biodiversity conservation by increasing forest cover around the Nakauvadra Range, thereby expanding habitat for important species living there and improving connectivity with other nearby forest blocks;
- Improve economic conditions of local communities by generating income and job opportunities; and
- Support the development of livelihood diversification initiatives with local communities.

G3.2 Description of project activities with expected climate, community and biodiversity impacts and their relevance to achieving the project's objectives.

The Project will achieve net GHG removals by planting trees in grassland areas surrounding the Nakauvadra Range. Major activities under the reforestation component include:

Community engagement

- Community outreach, consultations and awareness raising activities to ascertain level of interest and commitment in developing the project in the targeted districts;
- Participatory Land Use Planning and site selection - participatory land use planning was carried out by CI and the Department of Land Resources Planning and Development of the Ministry of Agriculture in the districts of Tokaimalo, Naiyalayala and Naroko. Physical and socio-economic conditions were analyzed, and development pathways were discussed amongst the stakeholders. The project sites were selected based on a discussion which aimed to balance environmental and community development needs and objectives.
- Formulation and adoption of Community Agreements (CA) with each land owner which outlines the responsibilities and commitments of all parties. Landowners on each agreement are verified against the "Vola ni Kawa Bula", the Register of Native Landowners, and confirmed by the Ra Provincial Office.

Nursery Establishment

During the pilot phase of the project, one of the problems encountered was the lack of good quality native seedlings. In addition, existing institutional nurseries often lacked the capacity to supply the

quantity of seedlings required, or specialized in propagating only one particular species (Future Forests Fiji-Teak, Department of Forests-Mahogany). Therefore, most seedlings used in the pilot phase were from bare-root or wildings sources. To address this, three community and five independent nurseries were constructed in villages throughout the project zone, and community members trained in seedling propagation and nursery management by the Department of Forests (DoF), Research Division. The DoF also provided seeds through their own established source trees and gave them to community nurseries for propagation. This has ensured that only quality seeds have been sourced, following DoF quality control systems. Since 2012, CI has purchased all seedlings from the established community nurseries, creating a new commodity line for forest products in the area. The establishment of the community nurseries has therefore directly contributed to the provision of socio-economic benefits of local people as well as meeting the biodiversity goals of the project in providing robust and quality native seedlings for reforestation.

In terms of infrastructure the project initially procured and supplied all the nursery materials and technical assistance to build the first community nurseries. In 2011, the Extension Division of the Department of Forest complemented this activity and supplied two full sets of nursery materials as well as providing on-site and hands-on community capacity building on all aspects of nursery management.

Figure 14: Community nursery at Nabalabala village (left), and native seed collection (right).

Species Selection

Species selected for planting (Table 9) consist of native (covering 72% of the project area) and hardwood timber species (28%). Hardwood timber species consist predominantly of teak (*Tectona grandis*) and to a smaller extent, mahogany (*Swietenia Macrophylla*). Teak was selected because of its ability to coppice as well as being a valuable hardwood which can fetch high market prices. Once the timber species reach maturity at 20 years, the communities will have the option to harvest both species. Training will be provided on sustainable harvesting techniques and coppice practices to allow for the repropagation of the teak species.

Based on discussions with local experts and early feasibility analysis, suitable native species were identified and assigned based on their ability to survive and grow in the conditions of the project site. The native species were also selected on their ability to encourage natural succession to help achieve the long term biodiversity and climate goals of the project.

Table 9: Species used for reforestation.

Species	Local name	Family
Native species		
Retrophyllum vitiensis	Dakua salusalu	Podocarpaceae
Intsia bijuga	Vesi	Fabaceae
Bischofia javanica	Koka	Euphorbiaceae
Gyrocarpus americanus	Wiriwiri	Gyrocarpaceae
Intsia bijuga	Vesi	Fabaceae
Elattostachys falcata	Marasa	Sapindaceae
Barringtonia edulis	Vutu Kana	Lecythidiaceae
Palaquium porphyreum	Bauvudi	Sapotaceae
Pometia pinnata	Dawa	Sapindaceae
Inocarpus fagifer	Ivi	Fabaceae
Cinnamomum spp.	Macou	Lauraceae
Gymnostoma vitiensis	Velau	Casuarinaceae
Casuarina equisetifolia	Nokonoko	Casuarinaceae
Dacrydium nidulum	Yaka	Podocarpaceae
Gonystylus punctatus	Mavota	Thymelaeceae
Santalum yasi	Yasi	Santalaceae
Parinari insularum	Sa	Chrysobalanaceae
Eleocarpus spp.	Kabi	Elaeocarpaceae
Calophyllum inophyllum	Dilo	Clusiaceae
Serianthes melanesica	Vaivai ni veikau	Mimosaceae
Agathis macrophylla	Dakua makadre	Araucariaceae
Myristica spp.	Kaudamu	Myristicaceae
Calophyllum spp.	Damanu	Clusiaceae
Endospermum macrophyllum	Kauvula	Euphorbiaceae
Cananga odorata	Makosoi	Annonaceae
Dillenia biflora	Kuluva	Dilleniaceae
Podocarpus neriifolius	Kuasi	Podocarpaceae
Pagiantha thurstonii	Tadalo	Apocynaceae
Hardwood timber species		
Tectona grandis	Teak	Verbenaceae
Switenia macrophylla	Honduran mahogany	Meliaceae

Planting Development

A total of 1,135ha are being reforested with a mix of native species and teak. The composition of planted seedlings was 25% native species and 75% non-native species in 2009; 50% native species and 50% non-native species in 2010 to 2012; and 100% native species in 2013 and 2014. Since project inception (up to the end of March 2013), a total of 851.56 ha have been planted (Table 10), representing 197,646 seedlings planted. Teak seedlings are planted along mid-slope as they are more suited to the harsh environment and on plots that are entirely comprised of mission grass (*Pennisetum polystachyum*). Native seedlings are planted at the bottom of the ridge, near waterways and remnant forest patches. From pilot plots we have found out they tend to do well in sheltered or less extreme environments.

Table 10: Reforestation schedule / year.

YEAR	DISTRICT	AREA PLANTED	TOTAL AREA/YR
	Tokaimalo	107	
2009	Naroko	1.23	108.23
	Tokaimalo	100.63	
2010	Naroko	4.00	104.63
	Tokaimalo	110.84	
	Naroko	41.37	
2011	Naiyalayala	57.05	209.25
	Naroko	103.30	
	Tokaimalo	5.15	
2012	Rakiraki	40.00	148.45
	Naiyalayala	50	
	Tokaimalo	150	
	Naroko	65	
2013	Rakiraki	16	281
	Tokaimalo	200	
	Rakiraki	43.4	
2014*	Naroko	40	283.4
	TOTAL		**1,135**

* The 2014 compositon of areas by district will be finalized closer to planting

Planting activities include site demarcation where each plot boundary is marked out by GPS. Once boundaries are established, communities are contracted and trained to undertake line polling, weeding, line cutting and planting operations. CI teams supervise all planting work, ensuring quality control from the nursery to the field. As part of CI-Fiji Program capacity building program, all the line polling in 2010 was conducted by the first year Forestry Training School students from Colo-I-Suva on a month-long field exercise.

After the polling lines have been marked out, weeding is carried out, usually two people to a line, each weeding one meter on either side of the line. To prevent soil erosion, avoid GHG emissions and protect existing carbon stocks, site burning and overall tillage is not employed during the site preparation. Only a narrow strip (2m wide) is cleared and any existing tree vegetation is not removed.

Spot planting is employed and small holes are dug (with a diameter and depth of 20 cm) along the slash belt with a spacing of 6 m × 6m for all species. The 6 x 6m planting layout was chosen as many of the native species will have large crown requirements (*Intsia bijuga*, *Calophyllum spp. Agathis macrophylla)* and will need the space to grow. With the teak species, the project will not be carrying out any thining in the years prior to harvesting and so a wider spacing was considered appropriate. Future Forests Fiji spaces seedlings at 5 x 5m when one thining is expected over a period of 25 years. To ensure high survival rates and good growth in the early stages, planting commences at the beginning of the wet season in November and continues until March/April of the

following year. Survival assessments will be carried out every two years until 2018. If the survival rate is below 80% replating of species will take place.

Maintenance of planting sites

Regular maintenance (weeding) of the reforestation sites is required for at least the first four years after seedlings are planted so that they have the opportunity to grow unhindered beyond the height of the grasses. All the planting and maintenance activities involve local communities through the issuance of paid contracts to carry out the work. This provides job creation and income generation for communities, as well as fostering a sense of ownership and pride for the project.

Figure 15: Carrying out the line polling (left), and transporting seedlings to reforestation sites (right).

Conservation awareness building

Throughout the project lifetime, CI will seek to promote the active participation of local communities for long term forest maintenance of the project site through conservation awareness building. Major activities include holding workshops and village meetings to increase community understanding on the important benefits that forests can provide – from improved watershed to enhanced agroforestry livelihood activities. Evidence of the positive impacts this can have can be demonstrated by the fact that following one of the awareness campaigns, communities in Tokaimalo decided to place a self-enforced ban on the use of duva in the main creeks, a natural poison that is used to stun and kill fish, but over the years has had a serious effect on the prawn populations.

Fire prevention awareness campaigns are also a key component. Since 2009, CI has carried out annual awareness and information meetings in conjunction with the Methodist Church, the Fire Authority and Divisional Police Force. This has already had an impact in reducing the number of wildfires and getting communities actively engaged in fire prevention measures.

Agricultural livelihoods development

The strategy for the agricultural livelihoods component is to work with local communities in improving their current land use practices and to diversify livelihood opportunities to which will provide greater food security and increased income streams. The approaches to be used are as follows:

Model Farms

The project has set up two model farms (at Vaidoko and Nabalabala) in collaboration with the Department of Agriculture to demonstrate sustainable agriculture practices, good farming techniques on hilly sites, and to provide a wider gene pool for traditional crop varieties and field trial new commodities. In addition there are 29 individual interventions with farms that are located in the project zone. The farm lots range from 1-2.5 has and have been planted with coconut, pineapple, pawpaw, taro, yam, ginger, kava and sandalwood, with contour plantings of vetiver grass to prevent soil erosion in steeper parts of the farm. Acacia woodlots were also planted to assist with firewood needs. Bee hives and pandanus have also been provided to some farms. In addition to this, a major coconut tree and pineapple planting exercise was carried out. Coconut trees are known in the Pacific as the “tree of life” and have multiple uses from the leaves as thatch and weaving, nuts for food, drink and cooking, roots to make traps and dyes, and the trunks as building materials. The coconut trees and pineapple were initially planted in the firebreaks of the reforestation sites with the intention for it to serve as an incentive for fire prevention. The coconut tree is also the totem for the Tokaimalo people and is considered sacred – another good deterrent against wildfires. The project has supplied coconut seedlings in response to popular demand.

Alternative livelihoods

- Bee-keeping
    - A total of 35 bee hives have been distributed to communities. The main reasons for developing bee-keeping in the area are that a) communities are already engaged in this activity, and b) to promote the presence of bees to help with the pollination of trees to sustain the forest health of the Nakauvadra forest. So far, production levels of 20 litres of honey per quarter among bee keepers are being recorded.
- Fish ponds
    - A total of 6 fish ponds were set up by the project following feedback from several villages that this would provide a valuable source of protein and additional income source from the sale of fish at local markets.
- Crop diversification
    - Ginger is a new crop recommended by the Ministry of Agriculture for Ra Province. Three model farms were used by the project to plant ginger in 2011, each were given about 300kg worth of seeds and training on how to plant and harvest the crop. In 2012, a total of eight farmers are now planting ginger covering a total area of 13 acres. The ginger was first harvested after nine months yielding a total of 3.4 tons of mature ginger.
- Eco-tourism
    - In the village of Narara in Naroko, the project helped build a simple community center where most of the welcome ceremonies are held, and planted flowering trees along the main path to attract birds. Currently bird watching in not an activity in the local area but

the project is hoping to be able to promote this in the future as forest cover increases. This will also motivate the community to assist with the monitoring of bird populations in the area.

Reintroduction of traditional crop varieties

Most farmers are currently planting export-oriented crop varieties which mean that the traditional landraces are being left out. The project is trying to reintroduce these varieties to the community so they and the nation of Fiji can maintain a wide genetic base. Varieties of three different crops have been reintroduced into the community through the model farms. These are sweet potato, (6 varieties), cassava (10 varieties) and yam (12 varieties). Fiji has a total of 10 varieties of sweet potato, 25 varieties of cassava and 84 varieties of yam.

Sustainable Land Management

As shown by the land classification maps much of the land in the project zone is hilly and unsuitable for agriculture. To help communities understand how to improve land management practices under these conditions and to control soil erosion, the project is carrying out a number of different activities. This includes hedgerow planting using pineapple and vetiver grass across slopes. In addition, the model farms were aligned to specific components of the land-use plans, with the first crops being harvested in 2012. CI has been assisting demonstration farmers to secure access to local markets and planning for a second rotation of crops. We have thus far recorded harvests of 1,500 tons of pineapple that have been sold at the local market.

In parallel with these field activities, the project is working in collaboration with the Research Division of the Ministry of Agriculture to re-introduce traditional varieties of some important root crops such as taro, cassava, yam and sweet potato. There is evidence of genetic erosion happening in Fiji as most farmers are planting market oriented varieties at the loss of traditional varieties (Masibalavu *et al*, 2002). It is very important that Fiji maintains a wide genetic base of various crops, both to provide a wider selection of crops, and to enhance farmers' resilience to climate change. One model farm in Tokaimalo has planted 30 varieties of taro, 7 varieties of sweet potato, 30 varieties of yams and 20 varieties of cassava.

Figure 16: Beekeeping (left), and native sweet potato varieties planted at Vaidoko model farm (right).

G3.3 Provide a map identifying the project location and boundaries of the project area(s), where the project activities will occur, of the project zone and of additional surrounding locations that are predicted to be impacted by project activities (e.g. through leakage).

The maps in section G1 provide the project geographical location and boundaries of the project zone. Figure 17 shows the location of reforestation sites stratified by planting year. Figures 18-21 show the location of each reforestation area within the four districts planted in 2009 - 2012. Planting sites for 2013 and 2014 have not yet been marked on the maps although the location and size of the areas, and the respective landowning unit for each are known and can be shown to the validator. Table 11 provides information on the size of each reforestation site, the year of planting, and the name of the mataqali who owns the land.

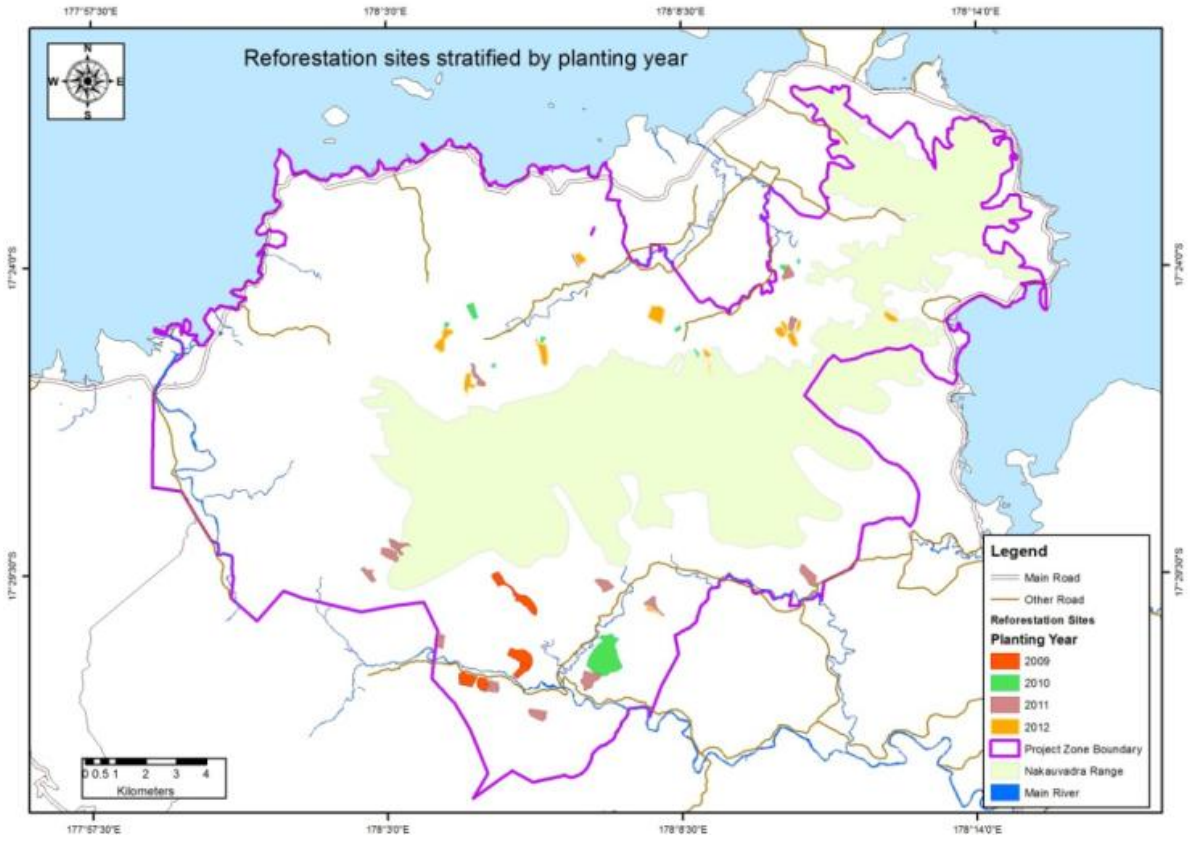


Figure 17: Reforestation sites in project zone stratified by planting year (2009-2012).

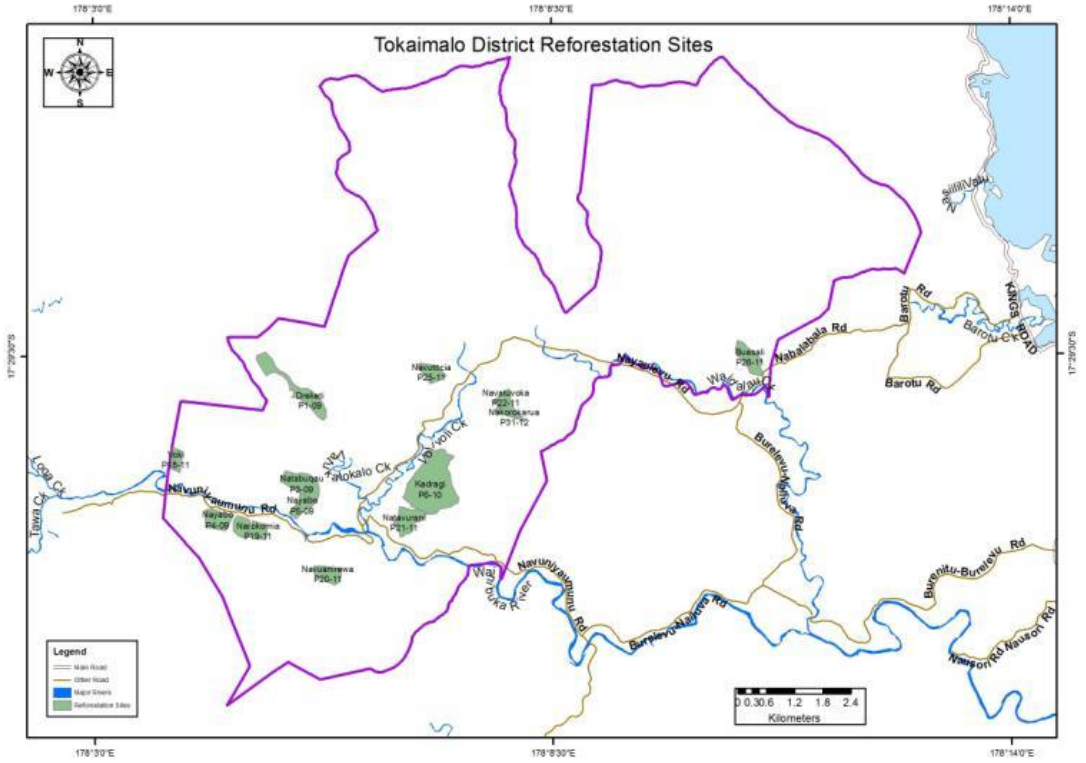


Figure 18: Reforestation sites in Tokaimalo district.

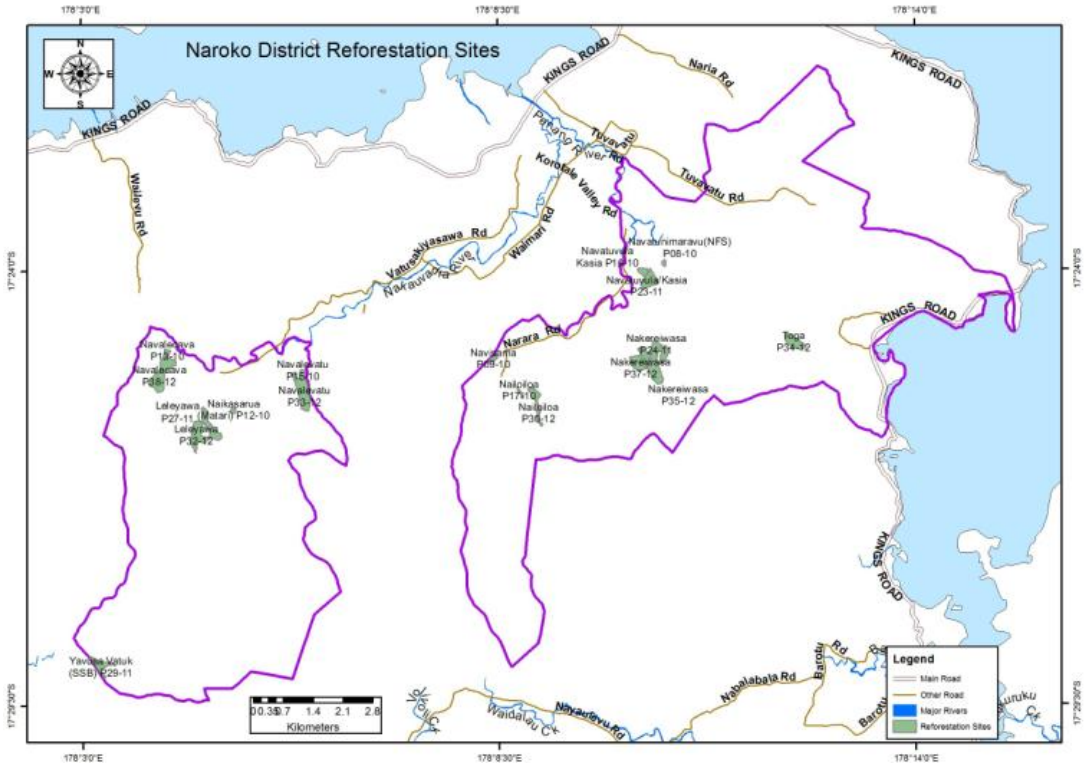


Figure 19: Reforestation sites in Naroko district.

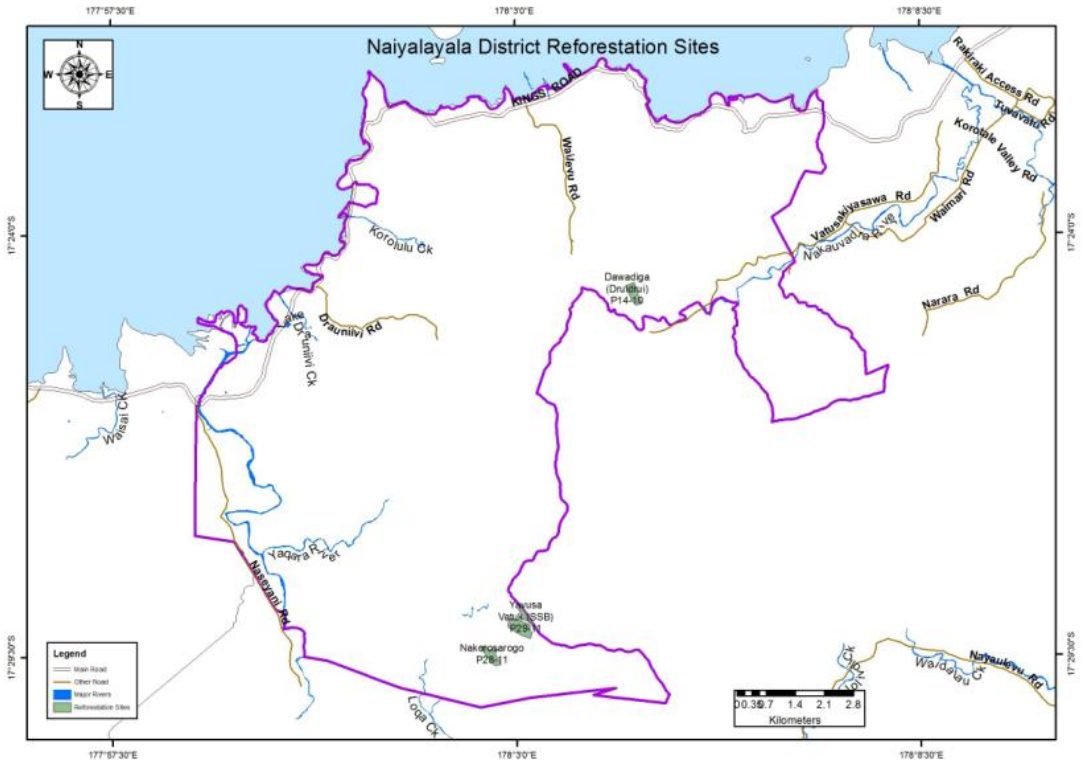


Figure 20: Reforestation sites in Naiyalayala district.

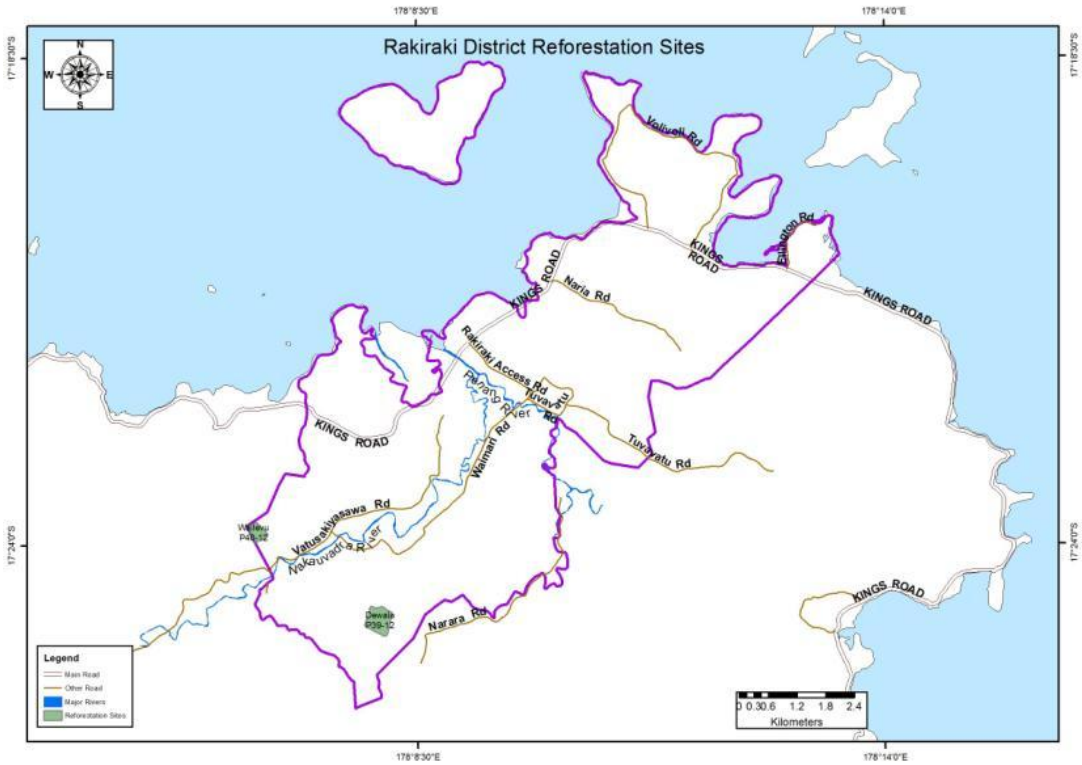


Figure 21: Reforestation sites in Rakiraki district.

Table 11: Reforestation sites 2009 – 2014.

Mataqali / Landowner	Village	Area planted	Year	District	Parcel Name
Dreketi	Nayaulevu	38.0	2009	Tokaimalo	P1-09
Narokomia	Navuniyaumunu	13.0	2009	Tokaimalo	P2-09
Natabuqau	Navuniyaumunu	27.0	2009	Tokaimalo	P3-09
Nayabo	Navuniyaumunu	19.0	2009	Tokaimalo	P4-09
Nayabo	Navuniyaumunu	10.0	2009	Tokaimalo	P5-09
Naikasarua (Matarisiga)	Vatukacevaceva	1.2	2010	Naroko	P12-10
Kadragi	Naqeganivatu (Yavusa)	100.6	2010	Tokaimalo	P6-10
Navatuvula Kasia	Drana	4.0	2010	Naroko	P10-10
Navatunimaravu(NFS)	Rewasa	1.0	2011	Naroko	P8-10
Naveisama	Narara	2.5	2011	Naroko	P9-10
Navalecava	Vatukacevaceva	2.2	2011	Naroko	P13-10
Dawadiga (Druidrui)	Naseyani	10.6	2011	Naiyalayala	P14-10
Navalevatu	Vatukacevaceva	1.9	2011	Naroko	P15-10
Naikasarua (Yav Vatukaloko)	Nananu	23.0	2011	Naiyalayala	P16-11
Nailoiloa	Narara	1.0	2011	Naroko	P17-10
Voki	Navavai	11.0	2011	Tokaimalo	P18-11
Narokomia	Naraviravi	11.8	2011	Tokaimalo	P19-11
Navuanirewa	Naivutu	15.8	2011	Tokaimalo	P20-11
Natavurani	Navuniyaumunu	23.9	2011	Tokaimalo	P21-11
Navatuvoka	Vunisea	13.7	2011	Tokaimalo	P22-11
Navatuvula/Kasia	Drana	10.0	2011	Naroko	P23-11
Nakereiwasa	Rewasa	10.7	2011	Naroko	P24-11
Navutocia	Nayaulevu	15.4	2011	Tokaimalo	P25-11
Buasali	Nabalabala	19.2	2011	Tokaimalo	P26-11
Leleyawa	Vatukacevaceva	12.0	2011	Naroko	P27-11
Nakorosarogo	Nananu	9.9	2011	Naiyalayala	P28-11
Yavusa Vatuk (SSB)	Nananu	13.5	2011	Naiyalayala	P29-11
Nakereiwasa	Rewasa	5.0	2012	Naroko	P7-12
Nailoiloa	Narara	6.9	2012	Naroko	P30-12
Nakorokarua	Vatukacevaceva	5.2	2012	Tokaimalo	P31-12
Leleyawa	Vatukacevaceva	15.0	2012	Naroko	P32-12
Navalevatu	Vatukacevaceva	20.0	2012	Naroko	P33-12
Toga	Nokonoko	10.1	2012	Naroko	P34-12
Nakereiwasa	Rewasa	11.5	2012	Naroko	P35-12
Nakereiwasa	Rewasa	5.5	2012	Naroko	P36-12
Nakereiwasa (Navuarewa)	Rewasa	9.3	2012	Naroko	P37-12

Navalecava	Vatukacevaceva	20.0	2012	Naroko	P38-12
Dewala	Vatusekiyasawa	26.0	2012	Rakiraki	P39-12
Wailevu	Vatusekiyasawa	14.0	2012	Rakiraki	P40-12
Leleyawa	Vatukacevaceva	5	2013	Naroko	P41-13
Navalevatu	Vatukacevaceva	5	2013	Naroko	P42-13
Naikasarua	Vatukacevaceva	35	2013	Naroko	P43-13
Navalecava	Vatukacevaceva	5	2013	Naroko	P44-13
Navatuvulakasia	Drana	5	2013	Naroko	P45-13
Naveisama	Narara	5	2013	Naroko	P46-13
Nakereiwase	Rewasa	5	2013	Naroko	P47-13
Wailevu	Vatukacevaceva	8	2013	Rakiraki	P48-13
Dewala	Vatusekiyasawa	8	2013	Rakiraki	P49-13
Voki	Navavai (Nayawe)	100	2013	Tokaimalo	P51-13
Naqeganivatu (Yavusa)	Tokaimalo	50	2013	Tokaimalo	P52-13
Navatulevu	Nananu	50	2013	Naiyalayala	P53-13
Narokomia	Naraviravi	30	2014	Tokaimalo	P54-14
Navuanirewa	Naivutu	20	2014	Tokaimalo	P55-14
Voki	Navavai (Nayawe)	50	2014	Tokaimalo	P56-14
Naqeganivatu (Yavusa	Tokaimalo	100	2014	Tokaimalo	P57-14
Navalevatu	Vatukacevaceva	20	2014	Naroko	P58-14
Navalecava	Vatukacevaceva	20	2014	Naroko	P59-14
Wailevu	Vatukacevaceva	23.4	2014	Rakiraki	P60-14
Dewala	Vatusekiyasawa	20	2014	Rakikraki	P61-14

G3.4 Define the project lifetime and GHG accounting period and explain and justify any differences between them. Define an implementation schedule, indicating key dates and milestones in the project's development.

The project start date is April 1st 2009 when the first consultations with the Tokaimalo District Council and landowning units began. The first trees were planted in November 2009. A project lifetime of 30 years was selected, with the project ending in 2039. Although the project will not be generating carbon credits, an 'accounting' period of 30 years was also selected for the monitoring of the carbon sequestration benefits that will be generated. Given that the first trees were not planted until the end of 2009, accounting for the removals by sinks of the planted trees begins in 2010.

The project will be implemented in three phases:

Phase 1: a one year pilot phase (2009) on an initial 108 ha to test the feasibility of the project and assess interest of local communities, whilst building the necessary technical and management capacity skills that will be required for long-term implementation;

Phase 2: a five year reforestation phase (2010 – 2014) during which an additional 1,027 ha for planting will be identified and reforested with a mix of native and non-native species. All reforestation activities will be conducted with full participation of local communities. During this time,

the livelihoods diversification activities and training will also be implemented with participating farmers and villages.

Phase 3: this will comprise the remainder of the project lifetime (2015 – 2039) during which ongoing monitoring activities will take place. Maintenance of the reforestation areas and fire prevention measures will be implemented. In 2029, training and support for communities on how to sustainably harvest the mahogany and teak trees, and ensure their natural propagation post-harvesting will be provided.

A project implementation schedule outlining key activities is presented in Table 12 below.

Table 12: Project implementation schedule (2009 – 2039).

	Phase 1	Phase 2					Phase 3															
Project Activities and Milestones	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019-2022	2023	2024-2027	2028	2029	2030	2031	2032	2033	2034	2035	2036-2039
1. Reforestation Establishment & Maintenance																						
Establishment of project nurseries	x	x	x																			
Weeding and planting of seedlings	x	x	x	x	x	x																
Establishment of fire breaks		x	x	x	x	x																
Maintenance of reforestation area	x	x	x	x	x	x	x	x	x													
2. Community Engagement																						
Presentation of RAP report and project concept consultation with District Councils	x																					
Project consultations with district mataqali	x	x																				
Land Use Planning workshops at district level	x		x																			
Elaboration and signing of Community Agreements	x	x	x	x	x	x																
Fire awareness campaigns		x	x	x	x	x																
3. Livelihoods Enhancement																						
Development of improved livelihood enterprise opportunities (bee keeping, pandanus)		x	x	x																		
Capacity training on sustainable agriculture practices and crop diversification		x	x	x																		
Establishment, training and provision of planting materials to model farms		x	x	x																		
Provision of sandalwood seedlings			x	x	x	x	x										x	x	x	x	x	
Sandalwood harvesting																						
Capacity training on havesting practices, regulations & repropagation of teak															x							
Sustainable harvesting of hardwood timber species															x	x	x	x				
4. PDD preparation, CCB validation and verification																						
Baseline carbon stock field assessment	x																					
Elaboration of socio-economic surveys at district level	x	x																				
CCB PDD preparation		x	x	x																		
Project climate, community & biodiversity monitoring		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CCB validation																						
CCB verification										x		x		x					x			x

G3.5 Identify likely natural and human-induced risks to the expected climate, community and biodiversity benefits during the project lifetime and outline measures adopted to mitigate these risks.

- **Loss of ongoing community support for the project**

Since most people prioritise short term benefits, the inadequate provision of benefits in the longer term could lead to the loss of support or abandonment of the project by communities.

Mitigation: The project has secured community agreements with all the landowning units involved in the project which outlines the responsibilities and benefits to be accrued by each partner. Through this, CI has ensured that landowners are consulted through each step of the project development process. Project implementation meetings with all participating communities will be held at least once a year to reaffirm the agreements and the committments of all partners. In addition, the project has been designed so that immediate financial benefits accrue to participating communities through the reforestation and maintenance activities, with the option to harvest the hardwood species upon reaching maturity in year 20. To complement this, livelihoods diversification activities are being carried out across the project area, engaging with communities at village level and focusing on income generation through the provision of materials to set up microeconomic enterprises such as honey (provision of beehives), ginger, pandanus leaves, pineapple, coconut and other fruit tres, and sandalwood. It is expected that these initiatives will become financially sustainable in the long term, and also leverage the replication of similar enterprises in other neighbouring villages.

- **Lack of knowledge**

The lack of knowledge and understanding about the long-term direct and indirect benefits could lead to non-cooperation. The communities will need to understand the benefits of increasing forest cover and the associated long term impacts on the continued provision of key ecosystem services.

Mitigation: Clear and direct communication with community members presenting the project benefits and addressing any potential challenges will be an on-going process. To promote the active participation of comunities for the long term maintenance and protection of the reforestation sties, information, capacity building and awareness raising activities will be undertaken. Key messages to be conveyed is not only that well maintained forests can provide improved watershed protection and clean water in the creeks emanating from the Range, but also contribute to enhancing livelihoods through the provision of forest products (fruits and seeds), with their own families and clan members as direct beneficiaries.

- **Limited community capacity**

The communities involved in the project do not have the capacity to undertake the reforestation and ongoing maintenance and fire preventation activities to ensure the long term success of the project.

Mitigation: CI will provide training and capacity building to each community involved in the project on all the reforestation activities including seedling collection, nursery establishment, planting and maintenance. These skills will also allow communities to set up their own independent nurseries, such as for the collection and sale of sandalwood seedlings which are highly sought after in the local area. In addition, the Department of Forests, a key partner to the

project is working with CI to offer long term support, such as the provision of training on the sustainable harvesting of the teak, and the incorporation of community nurseries into their own annual program for capacity building delivery.

- **The whole community does not take ownership of the project**

The reforestation sites are owned by different mataqali but not all members of a particular community will be involved in the reforestation agreements, which could cause resentment and a lack of ownership for the project within the community as a whole.

Mitigation: The livelihood diversification activities are strategically organized at a community level regardless of landowning status to ensure that benefits are shared among community members, thus ensuring broad support for the project. This includes the planting of pineapple, coconut and other fruit trees, the provision of sandalwood seedlings, and the establishment of beehives and fish ponds. CI is also engaging with community members at multiple levels, including the traditional chiefs, youth and women's groups, to ensure that all concerns and voices can be heard.

- **Grassland fires**

Historically, grassland fires in the project zone have occured on an annual basis, largely due to pig hunting, careless behavior, and stray fires from sugarcane burning. This could put the reforestation sites at risk, especially in the early years when the young trees are still establishing themselves.

Mitigation: The project applies several fire prevention measures. Trees are planted in mixed arrangements to help contain fires. Fire breaks have been established around the reforestation sites following guidelines developed by Fiji Pine. In the fire breaks, fire-retardant plants such as pineapples, coconuts and citrus trees have been planted. Planting fruit crops in the firebreaks means that communities will take a more active interest in monitoring for fires near the reforestation sites, whilst also providing additional food security and income generation. In addition, strategically utilizing traditional links with nature such as planting totem trees (the coconut) which are prohibited from being burnt, means the project is better able to protect reforestation sites from fire. In years that are particularly dry (eg summer of 2011), community fire wardens have also been trained and hired to patrol the project areas on a daily basis and to report any fire instances directly to the CI field office and Fire Authority. Fire wardens lodge quarterly reports to the Evironment Officer in the Provincial Council for presentation at Tikina and Provincial Council meetings.

Annual fire prevention and educational campaigns at village and tikina meetings have been held in partnership with the district committee and Methodist church, which is an important institution in the project zone. The National Fire Authority and Police Department of Rakiraki were also invited to attend to inform communities on the legal implications of starting fires in accordance with the 2009 Crimes Decree (arson clause). Key messages highlighting the threats of fire to human wellbeing, and the negative impacts on soil erosion and run off into streams have also been disseminated at District and Provincial Council Meetings. Since these campaigns, there has been a visible reduction in the occurrence of fire in Tokaimalo and Naroko, although the challenge remains to safeguard reforestation sites that are adjacent to sugar cane plantations which are burnt during harvesting. Efforts are therefore underway to carry out further fire awareness campaigns and propose other preventative methods (such as

establishing firebreaks around sugar cane plantations) with farmers, the Fiji sugar Cooperation and the iTaukei Lands Trust Board.

- **Cyclones**

Fiji is affected by seasonal cyclones during the months of November to April, and can cause landslides and the toppling over of trees, or the snapping of young seedlings. However, even when Cyclone Yasi hit Fiji in February 2011, with the highest intensity category 5, a study by Future Forest determined that although the cyclone passed almost directly through the middle of their teak plantations, the main damage was to leaves and branches and less than 15% of the total teak estate was affected (Future Forests Fiji, 2011).

Mitigation: Following cyclones, 'prop up' activities in the reforestation sites take place. If an area of young seedlings has been particulary badly damaged, then a survival count will be conducted to determine what level of replanting needs to take place.

G3.6 Demonstrate that the project design includes specific measures to ensure the maintenance or enhancement of the high conservation value attributes identified in G1 consistent with the precautionary principle.

HCVs have been identified under the following categories from the project zone:

Globally, regionally or nationally significant concentration of biodiverisity values

The project recognizes the importance of expanding the critical forest habitat around the Nakauvadra Range which is home to important endemic and endangered plant and animal species. The project design includes planting of indigenous species of trees to reforest grassland areas on the lower and mid slopes of the Range. The restored forests will improve forest habitat connectivity with other forest blocks, which will result in facilitating the movement and dispersal of species of fauna and flora. In particular, sites selected for reforestation are expected to form a corridor that joins the Nakauvadra Range to the neighbouring Wabu/Tomaniivi Range mountain range over the 30 year project period.

Areas that provide critical ecosystem services

The Nakauvadra Range is critical for the provision of clean water services to a large number of communities that rely on the many creeks and streams that originate at the top of this majestic mountain range. The role the project activities play is groundwater recharging. Landscape in which degraded, grassland areas are restored to forest should contribute to maintaining and enhancing this ecosystem service. Also, many patches of forest remain on steep slopes along creeks. They serve as riparian buffer that reduces soil flowing into the river system. By expanding forest cover in these areas, the project will help to further enhance the provision of environmental services for water.

Areas that are critical for the traditional cultural identity of communities

The Nakauvadra Range is considered a sacred place by most Fijians, the home of 'Degei', a supreme and legendary being. Evidence of ancient settlements and 'resting' spots are found in the upper reaches of the Range. The studies carried out by the Fiji Museum during the RAP served to highlight the cultural significance of these sites and to collect oral histories about the Range from local communities. Project activities do not restrict the movement or access of local people to these

areas. CI will continue to work with the Government of Fiji and local landowners to try and establish the Nakauvadra Range as a Protected Area which would provide resources and support to further safeguard the historical and cultural values of the range.

G3.7 Describe the measures that will be taken to maintain and enhance the climate, community and biodiversity benefits beyond the project lifetime.

Extensive consultation and capacity building in collaboration with communities has resulted in the project being strongly supported and driven by local people. Landowners and farmers alike are starting to increase their understanding of the benefits of expanding forest cover and the value it has for surrounding agricultural land and the provision of water and soil ecosystem services in the long term. The project focuses on reforestation efforts whilst ensuring that target beneficiaries will have sustainable alternative livelihoods and a greater sense for conservation stewardship which helps mitigate fire risks and improve land use practices which help ensure the permanence of the restored forest in the future.

The project implementation plan will be reviewed annually by the CI-Fiji team (see G4.1) for higher performance and delivery of benefits to meet community and biodiversity objectives throughout the project lifetime. All stakeholders are expected to contribute positively to project improvement through the constant and regular exchange of ideas on challenges and aspirations of different entities. Stakeholders include the participating 26 villages, the Tikina Councils of Tokaimalo, Naiyalayala, Naroko and Rakiraki, Ra Provincial Council, the Department of Forest, the Department of Agriculture; the Provincial Administrator of Ra; the Western Commissioner Office, the West Divisional Forestry Officer, and the Ra Fire Department.

The project also engages in further measures to ensure sustainability; they include conservation awareness raising campaigns with communities, educational visits and the cross fertilization of ideas with national and local government agencies. The Government of Fiji and a number of regional organizations are conducting a series of training and seminars on climate change adaptation and mitigation throughout Fiji. The objective of these trainings and seminars is to enhance the understanding of local partners working on climate change related issues. CI has provided resource personnel for these when requested and will continue to participate in conferences, trainings and workshops on climate change to share lessons learned and experiences in developing multiple benefit forest carbon projects.

The project has also facilitated cross learning visits of other local communities through educational visits to the project site to share their experiences and lessons learnt, and to promote the work of the project in different parts of Viti Levu. Government officials, including the Prime Minster, have visited the site. The project is therefore gaining a solid reputation as being a demonstrable example of community based partnership for rural development and conservation.

Benefits for biodiversity in the long term are also being supplemented by CI's work in collaboration with the Department of Forest to extend the Wabu/Tomaniivi Nature Reserve, as well as ongoing work on the formal protection of the Nakauvadra Range. The Sovi Basin Protected Area and the Wabu/Tomaniivi Nature Reserve are located along a ridge that runs through the middle of Viti Levu towards the South West of the project site, with the Nakauvadra Range in the North Eastern aspect. The project zone is located in the valley between the two ridges, introducing native tree species that are expected in time to attract biodiversity to the current talasiga grassland. It is anticipated that wildlife such as birds and small mammals will in turn help with seed dispersal to further promote

forest regeneration, thus maintaining and enhancing climate and biodiversity benefits beyond the project lifetime.

Finally, CI is working with the Research Division of the Department of Forest to collect valuable data on the health status of the reforestation plots. This is a critical component in assessing the success of these reforestation sites, and provides important data towards the establishment of baseline carbon sequestration rates. The carbon plots established in the project area are the first native species sites ever established in Fiji, and as such information on their health and growth rates is an important contribution to this dataset which will help other research and project initiatives in the future. In late 2012, an annual forest health assessment was conducted by the Research Division of the Department of Forest (DoF) together with staff from the South Pacific Regional Herbarium-University of the South Pacific (USP) and CI-Fiji. This was the second forest health assessment which complemented the first survey done by CI, USP, and DoF in February 2011. A team from CI's Rakiraki office and community representatives were also trained on how to establish sample plots and conduct forest health assessments. A total of 81 sample plots were established and results from the forest health assessments are currently being analysed. CI has now transitioned this work entirely over to the DoF, who will continue carrying out regular forest health checks in the future.

G3.8 Document and defend how communities and other stakeholders potentially affected by the project activities have been identified and have been involved in project design through effective consultation, particularly with a view to optimizing community and stakeholder benefits, respecting local customs and values and maintaining high conservation values. Project developers must document stakeholder dialogues and indicate if and how the project proposal was revised based on such input. A plan must be developed to continue communication and consultation between project managers and all community groups about the project and its impacts to facilitate adaptive management throughout the life of the project.

Definition and identification of communities and other stakeholders

The main group of stakeholders in the project are the iTaukei mataqali, the local landowning units who own the land on which the reforestation is taking place. They are the key beneficiaries of the project. In order to select those mataqali that the project will directly work with in establishing Community Agreements and carrying out reforestation activities on their land, CI first carried out a spatial analysis based on the location of land units within the boundaries of the Nakauvadra Range. The Native Land Commission maps were overlaid on the project zone map to identify mataqalis who own lands in areas identified as being suitable for tree planting and strategically positioned to meet the biodiversity objectives of the project.

Awareness-raising and outreach activities then began with the provincial administrators and key community decision makers, including members of the Provincial Office of Ra (end of 2008). These meetings were carried out in accordance with the established government and traditional protocols as outlined in G5.2. Presentations on the objectives, planned activities, community roles and expected benefits of the project were made, following which the Provincial Office gave their blessing for the project discussions to proceed at a local level. The Provincial Office then lined up meetings with the Tikina Councils and the individual villages where each mataqali resides. Project staff were invited to these meetings in which the project objectives and activities were presented. On occasion, follow up meetings with separate mataqalis were held to ensure that all mataqali members had had the opportunity to participate and engage with CI staff. Presentations were also given in the villages of Narauyaba, Vunitivi, and Nananu to present to the landowning communities

the preliminary findings of the RAP. The idea was to share with the communities the key results of the surveys and to also build their awareness of and pride in their forests. In addition, a special presentation about the findings and proposed conservation priorities was made in Rakiraki Town to the Provincial Administrator, the Roko Tui Ra, and the heads of government departments (early 2010).

Following this initial outreach process, project staff continued their engagement with mataqalis interested in participating in the project to set up Community Agreements in which the rights and responsibilities of each party is defined. Once the mataqali has signed Community Agreements, planting dates are set and the mataqali organizes their planting crew, which include community members within the villages who may not be landowners themselves. All planting and maintenance work as detailed in G3.2 are contracted to the mataqali members.

The second group of stakeholders are members of the community who are not direct beneficiaries of the reforestation component of the project because they are not part of the landowning units who have signed Community Agreements. This group of stakeholders has therefore been targeted to benefit from the alternative livelihoods component of the project. Village based meetings and workshops were held with these communities to identify the current farming practices and aspirations of the community members. Interventions can then be identified and activities planned. Model farms, for example, were set up on the basis of these discussions to demonstrate sustainable agricultural practices, provide a gene pool for traditional crop varieties, and field trial new commodities such as ginger, pineapple, bee farming and pandanus farms. In some communities, individual farmers who have been successfully producing at subsistence level have been recommended by the Extension Officers of the Department of Agriculture. These farmers are the drivers of sustainable agricultural interventions and continue to be solid examples showcasing the livelihoods benefits of the project.

Other important stakeholders include those at organizational level. These entities are primarily the mandated institutions which have jurisdiction over the project site. Since they also benefit from the project's outcomes, they help provide facilitation and support to the project. These institutions are the Provincial Office of Ra and the Department of Forest. Further information on these stakeholders and their role in the project can be found in G4.2 and G5.2.

Local stakeholder participation in project design and planning

Three socio-economic surveys in the districts of Tokaimalo, Naroko and Naiyalayala were conducted in 2009 and 2010, and helped inform the development of the community baseline. Results from the socio-economic surveys were then incorporated into the Integrated Participatory Landuse and Development Plans for Tokaimalo, Naiyalayala and Naroko which were developed later in the year. The objectives of the Land use Plans were:

- To develop a tikina-based land use plan;
- To assess development needs in communities;
- To integrate conservation goals and development needs;
- To identify all existing available natural resources;
- To evaluate sustainable resource development pathways.

The land-use planning was carried out in two phases. The first phase involved land-use mapping, in which CI created a geographic information system (GIS) that holds topographic information, mapping layers, and attribute data in digital format and allows for multi-variable analysis and interpretation. The second phase involved carrying out 3-day participatory land-use planning workshops. This was done in conjunction with government agencies, landowners, and the

communities in each district. The workshops included representatives of the village women and youth groups, and used group discussions, mind mapping exercises and root-cause analysis to identify important development and conservation issues/challenges, and strategies and actions to address them. The land-use plans classified all land according to its capabilities and indicated suitable land-use and income generating activities for each classification. Information collected from the land use planning workshops and the subsequent community consultation processes led directly to the selection and development of the agricultural livelihood interventions that are now producing ginger, honey and pineapple in the different villages across the project zone.

The following is the chronology of major events with regards to project planning and development through which stakeholders participated and provided inputs:

- September 2008. CI presented to the Chiefs of the Province of Ra at the Provincial Council Meeting outlining the project vision and objectives. The Chiefs recommended that work should proceed initially in Tikina Tokaimalo to support the development strategies of the Provincial Council which focus on developing the least advanced region in the province.

- January – April 2009. Consultations and feasibility assessments were conducted with local partners, including the University of the South Pacific, Department of Forests and the Ra Provincial Council resulting in the selection of the project reforestation sites in Tokaimalo.

- April 2009. Socio-economic survey carried out in Tokaimalo.

- May 2009. Socio-economic survey carried out in Naroko.

- May – June 2009. Consultations with the Tokaimalo District Council and landowning units to secure land use consent and conditions for involvement in project implementation. Agreed that reforestation planting and maintenance contracts would be implemented by the community.

- July – August 2009. Formulation of the PIN document and submission to the Department of Environment for approval. PDD development began including detailed planning for the project areas in Tokaimalo, finalization of project boundaries (satellite image analysis and ground validation) and the field work for carbon stock baseline assessments.

- September 2009. Approval of the PIN document by the Department of Environment after consultation with its Carbon Trading Technical Team (CTTT). The CTTT is made up of relevant Government Departments, Statutory Organizations and Universities.

- September 2009. Land Use Planning workshop carried out with all communities in Tokaimalo.

- November 2009. Land Use Planning workshop carried out with all communities in Naroko.

- December 2009. Reforestation activities begin in Tokaimalo and Naroko utilizing community teams and technical support and capacity building provided by CI and the Department of Forests.

- May – June 2010. Consultations with the Naiyalayala landowning units to secure land use consent and conditions for involvement in project implementation. Signing of Community Agreements.
- Sept 2010. Socio-economic survey carried out in Naiyalayala.
- May 2011. Land Use Planning workshop carried out with all communities in Naiyalayala.
- November 2011. Reforestation activities begin in Naiyalayala and continue in Tokaimalo and Naroko.
- November 2012. Community Agreements with Rakiraki mataqali signed and reforestation activities begin.

Figure 22: Land use planning workshops.

Ongoing communication and adaptive management plan

The project has strategically opened a field office in the town of Rakiraki to ensure the easy facilitation of communication between communities and CI staff on an ongoing basis. The project has further strengthened its ties with the Government by employing on secondment a Forestry Officer from the Department of Forest. The Forestry Officer is the project's key point of contact in the field office in Rakiraki.

Given the fact that all participating communities are traditional iTaukei villages and all the direct beneficiaries are also iTaukei landowners, CI envisages that future adaptive management will continue largely through the interaction with the Provincial Office, Tikina Council Meetings and Village meetings. CI has supported the development of the annual meetings of the Traditional Governance of the Province of Ra since project inception. This forum is a one day meeting in which all the Chiefs in the region are invited, as well as Tikina Representatives and Village Headmen. The meeting is coordinated by the Provincial Office and facilitated by CI project staff. A key focus of these meetings is to discuss the development plans for the whole Province in the coming year and address how they align with key government policies and strategies. The identification of key activities and issues also serves to guide CI's planning for the livelihoods component of the project. Other partners invited to these meetings include Government Agencies working in the Province, the University of the South Pacific and other NGOs such as Live and Learn. One of the key outcomes from these meetings has been the establishment of Environment Committees at village level. The majority of the villages in the Province of Ra have now established Environment Committees, which

are responsible for ensuring the sustainable use and management of land and water based resources in the community.

Finally, the Project will advocate the setting up of Resource Management Committees (Yaubula Management Committees (YMST). The YMST framework has been endorsed by the Provincial Council to be advocated in the Province as a means to integrate the initiatives of the project through developing a learning framework for resource conservation in the Province of Ra. Conceptually, there will be three YMST in the project zone, one in each district. The members of the YMST will consist of representatives from each village in the districts. Government agencies and other stakeholders will be invited to be observers at the YMST meetings to provide policy advice and programs. The YMST under the project is to facilitate a platform for:

- networking and exchange of information on issues pertaining to better, workable and sustainable means of managing natural capital (Yaubula) in a sustainable manner;
- managing the affirmation of traditional knowledge and incorporating new scientific knowledge and information gathered through the project and other means;
- building a network of young leaders and future advocates for conservation.

Roles and responsibilities of the YMST would involve:

- ensuring rehabilitation of natural resources;
- enhancing livelihood and sources of income for communities;
- ensuring a safe place to raise family / food security;
- identifying common resources, threat s and management issues; and
- facilitating the development and implementation of the project's Community Monitoring Plan.

The YMST will therefore serve as a key platform through which ongoing communication and consultation between the project and community groups can be undertaken.

G3.9 Describe what specific steps have been taken, and communications methods used, to publicize the CCBA public comment period to communities and other stakeholders and to facilitate their submission of comments to CCBA. Project proponents must play an active role in distributing key project documents to affected communities and stakeholders and hold widely publicized information meetings in relevant local or regional languages.

The project plan and this PDD are the results of inputs generated from series of discussion-consultation-meetings with all the local stakeholders that include local communities and institutions where the project is located. The Project is working closely with the Provincial Office and attends all meetings at all levels of the Provincial Administration. These include the Provincial Council Meeting, and Tikina and Village meetings. Project Staff attend Provincial Meetings twice a year and Tikina Meetings every quarter. Village meetings are more regular. Project Staff take these opportunities to update participants on project progress and milestones. Therefore, stakeholders are already generally familiar with the project plan.

Upon publication of the PDD on the CCBA website, CI Fiji will notify each of the communities involved in the project by organizing a series of village meetings. An information brochure summarizing the key messages of the PDD and the public comment process will be distributed, and a copy of the PDD will be made available in each village. Instructions will be given on how to submit comments online. CI's Field Officer will also leave comment boxes in the main villages in each

district so that comments can be collected from those without internet access, English capability, or any other reason that make it difficult for them to submit comments online. In addition to the village comment boxes, there will be three main points for the collection of public comments. These include the CI Head office in Suva, the CI Rakiraki field office in Ra, and the Provincial Office in Rakiraki Town.

In addition, it is possible that the annual Traditional Governance meeting will take place during the public comment period. This would serve as a platform to inform all the Chiefs of Ra about the PDD, and key project documents would be widely distributed. The Provincial Office has already agreed to facilitate the collection of comments in this forum. Any comments collected will be given to CI Fiji who will then forward them to the CCBA Secretariat.

Letters will also be written to all of CI's partners in the Civil Society sector, Government Agencies, and the REDD+ Steering Committee informing them about the publication of the PDD and to invite them to respond to the public comment period. An information brochure detailing the process to follow will be attached to the letter. Organizations with offices or representatives stationed in Suva and Rakiraki will be contacted.

G3.10 Formalize a clear process for handling unresolved conflicts and grievances that arise during project planning and implementation. The project design must include a process for hearing, responding to and resolving community and other stakeholder grievances within a reasonable time period. This grievance process must be publicized to communities and other stakeholders and must be managed by a third party or mediator to prevent any conflict of interest. Project management must attempt to resolve all reasonable grievances raised, and provide a written response to grievances within 30 days. Grievances and project responses must be documented.

The project utilizes the conflict resolution procedure outlined in Appendix 4. This process has been communicated to all participating communities as well as other key project stakeholders. In the formative period of the project when activities were only focused in Tokaimalo, conflict resolution was carried out with the assistance of the Methodist church pastor, as a third party mediator. All conflicts or perceived issues were channeled to the Pastor through verbal communications who would then inform project staff and set a meeting date to address the grievance. The meeting would be chaired by the Pastor. Both parties would be invited to present their case and the Pastor would make a decision on how best to resolve the issue.

As the project grew in scope to include additional districts, the conflict resolution process was fine tuned and re-communicated to community members. The main purpose of the conflict resolution procedure is to promote an optimal working environment that ensures equal opportunities and win-win scenarios for project stakeholders and partners, as well as to uphold the rule of law in Fiji.

As a general rule, the rights of all parties will be upheld and respected where all members of the communities and partner organizations connected in any way to the Project is given the right to raise grievance and assisted to work toward an amicable resolution. The aggrieved or communities who lodge a complaint shall not be prejudiced in any future work relating to the Project as fair hearing and trial will be upheld at all times. The Project will not seek the opinion of outside parties on internal issues nor allow influence of outside parties to the proceedings or resolutions. The Project will also ensure that private spaces are made available to facilitate fair trial and amicable solution. Issues raised through grievance or conflict will be resolved in the shorted possible time and kept confidential.

There are two types of conflict identified by the project. These include grievances against (1) Project staff, and (2) Project operations and activities. The procedure for conflict resolution for the two types of anticipated grievances are different.

In the case of grievances against Project staff, any internal grievance will be dealt with in accordance to Section 14: Conflict resolution and formal complaints policy of the CI Standard Operating Procedure. All grievances against any CI Fiji member of staff shall submit their grievance to the Country Program Director/ Manager. Upon receipt of the grievance, the Program Director/Manager shall immediately investigate the matter following the procedures outlined in the Operations Manual.

In the case of grievances relating to operational issues and project activities such as weeding, line cutting, polling, seedling supplies, planting and other related issues, the procedures differ from the above. If the grievance is a minor issue or concern then community members are encouraged to speak directly to any nearest project staff who many be able to immediately provide a satisfactory resolution to the issue. If the conflict is beyond the capacity of the field staff to resolve, the aggrieved person shall submit a written letter outlining the issue. The letter shall be submitted to the Ra Field Office or Head Office in Suva whichever is more convenient. The receiving officer shall note in the 'Conflict Register' the name of the aggrieved, the nature of the grievance, and the background of the situation. A notice will be journalized in the register and copied to the Provincial Office within 5 working days. The field officer will be given the first opportunity to resolve the issue through thorough investigation and communication with the aggrieved party. Resolution should be reached within five working days and a report tabled to the Program Director/Manager and copied to the Provincial Officer. Should an amicable solution be difficult to attain, the said report will provide a recommendation for the date of a hearing. The report should also clearly articulate all background information on the case and the result of the meeting held between the Project Officer and the aggrieved party. The Provincial Office will be the project arbitrator in these cases and its decision final. Parties that wish to contest the decision made by the project arbitrator may take the case to the court of law.

In practice however, most community conflicts and grievances will be handled in a more causual manner. Project staff members are on site, hence very accessible to community members and other partners if there are grievances that may arise.

Members of the community are also free to take grievances directly to other Government agencies such as the Provincial Administration, Department of Indigenous Affairs and the Police, if they are not satisfied with the existing conflict resolution process.

G3.11 Demonstrate that financial mechanisms adopted, including projected revenues from emissions reductions and other sources, are likely to provide an adequate flow of funds for project implementation and to achieve the anticipated climate, community and biodiversity benefits.

The grant fund from Fiji Water is adequate to support the development and implementation of activities to meet all planned targets and deliverables linked with the project objectives (through 2039). There will be no revenue generated from emissions removals as the project is not creating tradeable carbon credits. Project grant documentation to demonstrate the financial sustainability of the project will be made available to the validation body.

G4 MANAGEMENT CAPACITY AND BEST PRACTICES

G4.1 Identify a single project proponent which is responsible for the project's design and implementation. If multiple organizations or individuals are involved in the project's development and implementation the governance structure, roles and responsibilities of each of the organizations or individuals involved must also be described.

The project proponent of the Nakauvadra Forest Carbon Project is Conservation International Foundation (CI) through its Fiji office (CI-Fiji). CI-Fiji has overall responsibility for the implementation of the project. CI is a global, non-governmental organization (NGO) based in Washington D.C. (USA), with offices in more than 30 countries and more than 1000 partners around the world. CI's mission is to help societies adopt a more sustainable approach to development—one that considers and values nature at every turn.

CI has had a presence in Fiji for over 10 years, opening an office in 2003 in Suva on the main island of Viti Levu to work with the National Trust of Fiji (NTF) towards strengthening the Natural Heritage Unit and establishing the Sovi Basin (a Key Biodiversity Area and the only remaining large tract of indigenous forest in Fiji) as a Protected Area. Since 2009, CI's work in Fiji has expanded to reforestation, sustainable land use and the promotion of alternative livelihoods through the identification of a network of protected areas on Viti Levu. Other key in-country partners include the University of the South Pacific, members of the Fiji Locally Managed Marine Areas (FLMMA), the Department of Environment and the Department of Fisheries and Forests.

CI Fiji is led by a Programme Director who oversees the management of all CI Fiji operations supported by three core operational staff who provide financial, administrative, and Information Technology (IT) support to the program. There are four technical project staff, including a Forest Ecologist, a Sustainable Production/Livelihoods Manager, and a Biodiversity and Ecosystems Field Officer who is based in the field office in Rakiraki which was set up as the implementation base for the reforestation project. Details are outlined below in Figure 23.

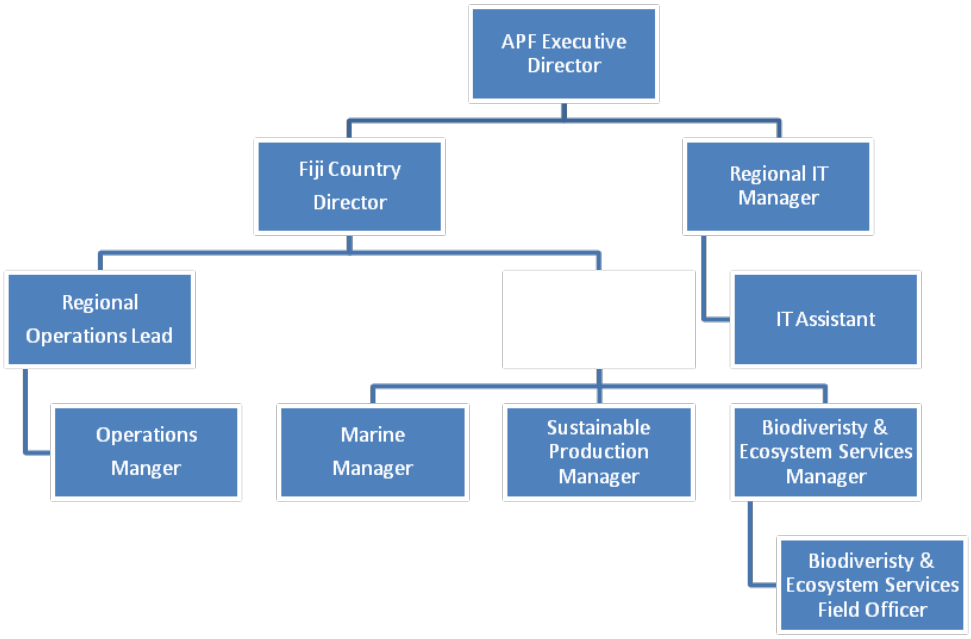


Figure 23: CI Fiji staff organogram.

G4.2 Document key technical skills that will be required to implement the project successfully, including community engagement, biodiversity assessment and carbon measurement and monitoring skills. Document the management team's expertise and prior experience implementing land management projects at the scale of this project. If relevant experience is lacking, the proponents must either demonstrate how other organizations will be partnered with to support the project or have a recruitment strategy to fill the gaps.

CI Fiji will be responsible for the overall implementation of the project, whilst receiving any needed technical assistance from CI-Headquarters and other CI offices. Together, CI staff cover all the necessary skills needed to implement the project, starting from community mobilization, site delineation/surveying, species-site suitability assessment, to seedling production until reforestation establishment, maintenance, and project monitoring and impact assessment. On occasion, where required, consultants, government agencies or other NGOs will be contracted or partnered with to assist with any of the project activities, monitoring or documentation needs (such as providing training to communities on the sustainable harvesting of the harwood species in year 20 of the project).

As described above, CI has had a presence in Fiji for over 10 years and has experience in protected area establishment and management, and community livelihoods and agro-forestry projects and activities. It also has significant expertise on sustainable land use management and the setting up of trust funds such as the Sovi Basin Trust Fund. CI Fiji is also the only NGO working with rural communities in the Province of Ra on the demonstration of integrated agriculture and forest resource management initiatives that ensure the protection and restoration of watershed areas while diversifying revenue sources and creating healthy sustainable economies at the grassroots level.

Technical support on the PDD development and carbon accounting and measurement is provided by CI-Headquarters and CI-Japan. CI has extensive experience in the development and implementation of REDD-plus (including A/R) projects and is building a diverse global portfolio of site-level initiatives, with five projects already validated under the Verified Carbon Standard (VCS) and/or the Climate, Community and Biodiversity Standards (CCBS) in Peru, China, the Philippines and Brazil, and several more ongoing in Madagascar and the DRC. At the national level, CI advises numerous countries on REDD-plus policy and UNFCCC negotiations, as well as on REDD-Readiness and Measuring, Monitoring, Reporting and Verification (MRV) issues and is testing the development of nested approaches to REDD-plus in order to link its ground activities with national REDD-plus frameworks. Finally, CI has conducted extensive capacity building efforts on REDD-plus that have involved more than 1,300 stakeholders, including government officials, representatives from NGOs, indigenous leaders, rural communities, the corporate sector, and academia.

The **Department of Forests** is a key partner to the project, and provides technical advice and assistance in forestry related activities. This includes the provision of community training courses (nursery set up, seedling propagation, planting techniques), carrying out quality control on the preparation and implementation of reforestation activities, and doing forest health checks. They will also work with CI to provide capacity building on the sustainable harvesting of the hardwood species in year 20 of the project. A Forestry Officer has been seconded by the Department of Forest to assist the project from 2008 – 2015. This indicates the strong support from the Department of Forest for the work that the project is doing in the Province of Ra.

In terms of project management, CI will adopt the project cycle commonly known as the PDCA cycle; an acronym that reflects the need to plan (P), implement planned actions (D), and regularly

monitor (C). Small corrections can then immediately be identified and implemented. Large corrections are considered and incorporated into the plans for the next step (the "A" or Action phase). The A phase becomes the P phase for the next stage, and the cycle repeats. The PDCA is the project's formal practice of adaptive management. It allows flexibility to accommodate unforeseen issues during the course of the project implementation, while maintaining coordinated, well-structured decision making and documentation.

G4.3 Include a plan to provide orientation and training for the project's employees and relevant people from the communities with an objective of building locally useful skills and knowledge to increase local participation in project implementation. These capacity building efforts should target a wide range of people in the communities, including minority and underrepresented groups. Identify how training will be passed on to new workers when there is staff turnover, so that local capacity will not be lost.

CI Fiji, in conjunction with the Department of Forests, has delivered a number of hands-on training to the mataqali as part of the project's objectives to ensure full participation and involvement of local communities in the development and implementation of the reforestation components of the project. Among the capacity building plan being pursued are trainings on seedling collection, line polling and planting, nursery establishment and management, forest health monitoring, and sustainable harvesting practices.

At the commencement of the project in 2009, seedlings for native species were difficult to secure. CI therefore initiated capacity building among local communities to propagate native species. Initially a nursery was established on site at the Tokaimalo District Methodist Church headquarters and at the CI's office Rakiraki, and further capacity building was undertaken to train community members on how to establish and maintain the nurseries. As a demonstration that the trainings were effectively transferred to the local communities, 3 additional community nurseries were subsequently set up in Tokaimalo, and 4 individual nurseries in Naroko. The project is currentl sourcing most of the native tree species from these trained community members through their own independently managed nurseries. Purchasing the seedlings rasied by the community encourages them to learn more about raising various species of tree. This is a good incentive as the knowledge gained can still be used by them even after the project lifetime as there is growing demand from other communities and organizations to carry out reforestation activities in support of the national tree planting campaigns by the Department of Forest. Members of the local communities were trained on seed collection and nursery techniques by the Department of Forest to ensure quality control and production of superior seedlings.

In addition, the project has established two agro-forestry model farms. The objective of these model farms is to show to the local communities and others outside of the project site the project activities and the benefits of improved agricultural practices and crop diversification. There are also 29 further agricultural interventions taking place in farms across the project zone as outlined in G3.2. The participants involved in these activities have been provided additional assistance and trainings to further improve their skills and fully develop their farms so they can become effective trainers themselves and promote farmer to farmer training. A list of the trainings provided is given in Table 13. A cross section of community members attended the trainings, including individuals from the women's and youth groups.

Another component of the livelihoods diversification component of the project is the provision of sandalwood sandalwood (*Santalum yasi*) seedlings to communities, and training on their propagation and nursery care (Fig 24). Sandalwood is traded for its oil and fetches a very high price in the local market. The sandalwood trade began in Fiji in the 1700s, when Europeans first began trading with Fijians. As a result of booming demand, the wild yasi populations were almost driven to extinction, which ended the trade. Since 1996, the Forestry department in Fiji, with assistance from the AUS-Aid funded SPRIG (South Pacific Regional Initiative on Forest Genetic Resources) program, have been conducting conservation programs and developed techniques on methods of growing yasi to re-establish their populations, and have been supplying seedlings to communities interested in growing and selling yasi as a source of income. Given the current demand and attractive market price (FJD$80-100 per kilogram), communities in the project zone are very keen to plant yasi as they provide additional opportunities to raise young seedlings for sale (FJD$5 per potted seedling). With additional support from the Department of Forest, the communities are committed to planting, nurturing and learning more about the conservation aspects for the Santalum yasi species.

Sandalwood seedlings that were planted in 2009 have now started to bear fruit. Capacity building in seed collection and seed propagation was coordinated with the Department of Forest. One community based yasi nursery was established and it is envisaged that the Department of Forest will support CI to establish one additional community nursery to provide the source for sandalwood seedlings that will be required under the 2013 – 2015 planting program.

Figure 24: Landowners of Tokaimalo at the Sandalwood Nursery training.

Table 13: List of trainings conducted and planned.

Name of training	Training objective	Main topics
Trainings targeted for communities		
Tree identification & Seed Collection	To ensure that communities can correctly identify native tree species and are aware of the best flowering and fruiting seasons to collect viable seeds for germination	• Tree identification using leaf, bark, flowers and seeds • Tree flowering seasons • Seed collection and predation • Basic Seed Storage

Polling and Planting	To be competent with the use of compass, line bearing	• Compass reading • Setting base line to aid planting • Setting up Line bearing • Weeding techniques • Mensuration techniques to determine the total number of seedlings needed • Planting techniques
Nursery establishment & Management	To ensure that communities are able to establish and manage a successful nursery by themselves	• Requirements to consider before constructing nurseries • Different sizes of nurseries • Techniques on constructing simple community nurseries • Weed and pest management
Forest Health Monitoring	To assist Project Officer in the collation of information to assess Forest Health	• Measuring parameters and technique of measurement • Tree Health Assent data entry • Plot selection
Timber harvesting Awareness Training	To ensure that communities understand the Laws and Regulations governing Forest and Timber Harvesting; and the practical operations involved	• Rules and regulations related to forest and harvesting o Code of Logging Practice o Health and Safety o Environment Impact Assessment o Methods of Timber Harvesting • Training on Operating o Tree Selection and mensuration o Log Production and transportation logistics o Sawmill or portable mill operation o Health and Safety • Business Management Training o Financial Literacy o Log Production costing and price determination o Business Management
Managing Teak for healthy regrowth	To assist communities to appreciate and understand the biological aspects of teak	• Biology of Teak o Growth Rate o Optimum growth requirements o Stand Management Regime

Fire awareness and monitoring	To increase community awareness on wild fire risks and to assist field staff with the monitoring of fires in project area	• Laws pertaining to Fires • Types of Fires (controlled and unplanned) • Fire Mitigation & Prevention • Fire First Aid • Fire Warden Roles & Data Collection
Sustainable Land Management	To increase community awareness on the importance of soils resource and its management	• Importance of soils • Soil Fertility and plant growth • Land use capability • Soil Erosion & Degradation • Land management technologies
Root Crop Production	To assist communities in methods to improve crop productivity.	• Ginger production • Taro production • Cassava Production • Sweet Potato Production
Training on Traditional Crop Varieties	To ensure that communities understand the various crop varieties in Fiji and the importance of conserving them.	• Different crop varieties • Indigenous knowledge of traditional varieties • Advantages of conserving genetic diversity
Bee Keeping	To encourage community interest in bee keeping and to improve knowledge on productivity. This training was mainly targeted at women	• Basic hive components • Handling bees • Bee colony • Selection and rearing of queen bees • Harvesting and Marketing
Biodiversity monitoring	To assist CI staff in conducting biodiversity monitoring	• Basic bird identification training (Bird diversity in Fiji, bird calls) • Basic plant taxonomy training (bark slash, leaves, flowers identification)
Trainings targeted for Project Field Supervisors and Assistants		
Project Management Training	To assist project Staff to effectively manage projects, both in a technical and supervisory capacity	• Project vision/goals/activities • Time Management • Team Management • Planning & Target setting • Forest Technical Skills o Polling & Planting o Base Line Setting • Communication Skills

		• Monitoring and Evaluation • Report writing
Basic Map and GPS reading	To enable project staff to be proficient and efficient in using maps and GPS	• Map Reading o Different types of maps o Scales & Legends o Field Demonstration and Application

G4.4 Show that people from the communities will be given an equal opportunity to fill all employment positions (including management) if the job requirements are met. Project proponents must explain how employees will be selected for positions and where relevant, must indicate how local community members, including women and other potentially underrepresented groups, will be given a fair chance to fill positions for which they can be trained.

Since CI is the lead implementer, the system of hiring is thus based on CI hiring policy. As an institution, CI has an established policy on hiring that subscribes to the universally accepted norms for human resources development. Worthy to emphasize is its adherence to providing equal opportunity for everyone who is qualified irrespective of gender, religion or nationality. This is also being maintained as the hiring policy in the project.

Employment through the project falls under three major categories. These include skilled and specialized technical officers, technical field assistants and contract workers. The hiring process follows two different approaches:

For the specialized and technical positions, job description forms are created and submitted for approval by Human Resources within CI. The position is advertised internally, one the CI website, and published in a local newspaper for at least 10 working days. The selection process includes a review of the submitted applications and an interview. The panel's recommendation is sent to the Executive Director for approval before the candidate is hired.

For the technical field assistant positions which are based out of the Rakiraki field office, community members from the project sites are strongly encouraged to apply. Working in these capacities requires some minimum qualifications like being able to read and write as well as the ability to work in the field for long hours. The project hires local staff with the assistance of village chiefs or good-standing people in the community such as the Mata-ni-Tikina (District Representative) who confirm and endorse that such applicants have the willingness, capacity and interest to meet the job requirements. At the same time, each candidate is assessed while on three months probation before they are confirmed into the position. Under this category of positions, all of those hired come from the communities in the project sites or have maternal links to the project zone and are provided with all the necessary training they need prior to, and during, their employment with CI. Traditionally a person with maternal links to a community has the same privileges as community members.

Contracts are assigned for all field implementation activities such as seedling provision, polling and line cutting, planting, weeding and maintenance work. These activities have been assigned specifically to the target beneficiaries of the project (the landowning mataqali) as per the terms

provided under the Community Agreements. Landowning mataqali's that sign Community Agreements under the project are guaranteed full involvement with all field aspects of the project. Because of the hard, manual nature of the reforestation and maintenance activities, men are more disposed to carry out this work. However, women have participated in managing community nurseries that supply seedlings to the project. The women's groups in villages have also been hired to provide the catering during workshops and training events.

Figure 25: Women of Vatukacevaceva Village sorting seedlings to be planted from the nursery.

In addition to the above, the project is also considering taking on international internship for students doing Forestry or Natural Resource management. The students will assist the to assess growth rates of the range of native tree species that have been planted in the reforestation zone in northeast Fiji, in relation to their substrate, location, aspect, slope, altitude, which would allow the reforestation program team to better understand how to be most successful in terms of maintaining low tree seedling mortality and high tree growth rates across a range of different sites. The findings from this study would influence the way the program would conduct the remainder of their reforestation program, and could also be used to develop a simple monitoring system that could be used to assess and indicate project success over the next decade or more.

G4.5 Submit a list of all relevant laws and regulations covering worker's rights in the host country. Describe how the project will inform workers about their rights. Provide assurance that the project meets or exceeds all applicable laws and/or regulations covering worker rights and, where relevant, demonstrate how compliance is achieved.

Fiji is a member of the International Labor Organization (ILO) and party to 33 international labor conventions of which 30 are still in force[14]. Fiji's labor laws cover employment relations; national training; health and safety at work; industrial associations; minimum wages and workers compensation as listed below.

- *Employment Relations Promulgation 2007*
- *Employment Relations (Administration) Regulation 2008*
- *Fiji National Training Act (Cap 93)*
- *Health and Safety at Work Act 1996*

[14] See http://webfusion.ilo.org/public/applis/appl-byCtry.cfm?lang=EN&CTYCHOICE=2080

- *Health and Safety at Work Amendment Act 2003*
- *Health and Safety at Work (Administration) Regulation 1997*
- *Health and Safety at Work (Training) Regulation 1997*
- *Health and Safety at Work (General Workplace Conditions) Regulation 2003*
- *Health and Safety at Work (control of Hazardous substance) Regulation 2006*
- *Wages Regulation (Sawmill and Logging Industry) Order 2012*
- *Workmen's Compensation Act (Capt 94)*

The Fiji Government has also adopted the following codes of conduct and policies specifically related to the above labor laws:

- *Code of Good Faith for Collective bargaining 2008*
- *2008 National Policy on Sexual Harassment in the Workplace*
- *Code of Ethics for Mediators 2008*
- *Employment Relations (Employment Agencies) Regulation 2008*
- *National Code of Practice for HIV/AIDS in the workplace 2008*

The project complies with all national labor laws in the country. The project supports the Employment Relations Promulgation by adopting minimum labor standards that are fair to workers and employers; eliminating discrimination based on gender, race and other factors. The project uses its own Conflict Resolution Procedure that supports the principles enshrined in the Act; advocating the establishment of mediation services and consultation between labor and management in the workplace.

The Fiji National Training Act supports the creation of the Fiji National Training Council which provides training of persons and mandates the payment of levies connected with training. The project pays levies to the Fiji Training Productivity Authority.

The project complies with the Health and Safety Act through the adoption of a simple "workplace health and safety manual". The manual outlines safety requirements for all work environments that will be encountered in the project and requires all new workers to sign off after induction to indicate their understanding of how tools, machinery and their own personal care work together to make the workplace a healthy and safe working environment.

Although the project does not fall directly under any industrial labor category identified under the wages regulation, the project complies with its closest groupings under the Wages Regulation contained in the *Wages Regulation (Sawmill and Logging Industry) Order 2012* and can be classified under other Field Work. Under this category, the project is providing compensation well above the minimum wages listed under the law.

During the induction of new employees, CI outlines their rights as employees and also highlights the role of CI as the employer. Two manuals are discussed and signed off during these inductions. All workers and community contractors are given inductions and training to discuss the following manuals: Conflict Resolution Manual (Annex 4), and Workers Health and Safety Manual (Annex 5).

G4.6 Comprehensively assess situations and occupations that pose a substantial risk to worker safety. A plan must be in place to inform workers of risks and to explain how to minimize such risks. Where worker safety cannot be guaranteed, project proponents must show how the risks will be minimized using best work practices.

Some field activities linked with the reforestation components of the project may pose potential risks for project staff as well as the contracted community laborers who are directly involved as field workers. The weeding and tree planting in particular is physically demanding and workers are at risk of getting injured through the use of cutting/pointed tools and muscle/ligament strains. Depending on the terrain and experience of the person participating in the activity, up to 100 tree seedlings may be planted by a person in a day. Muscular aches and pains can be common at the beginning of the planting season and community workers are advised to pace out their work, carrying and planting fewer trees at the start of the planting period and to progressively build up from there. The project recognizes the risks involved and inducts all new tree planters through the Workers Health and Safety Manual (see Appendix 5) to ensure that each person understands the risks involved and takes measures to avoid them. The manual outlines the early signs of injury; the do's and don'ts of such ailments, first aiding, the care and maintenance of tools and the techniques that should be adopted to avoid injuries.

G4.7 Document the financial health of the implementing organization(s) to demonstrate that financial resources budgeted will be adequate to implement the project.

Conservation International is a nonprofit organization headquartered in the Washington D.C. metropolitan area. It was founded in 1987 and stands upon a strong financial footing. CI strives to exercise the highest level of stewardship over donor contributions and has consistently earned the highest ratings from charity watchdog groups such as Charity Navigator and the American Institute of Philanthropy. CI's financial statements are audited and certified annually by a respectable firm in the auditing industry.

Funding for this project is provided as a grant from Fiji Water LLC. Fund allocation is sufficient to ensure that project activities are carried out over the intended project period. The financial monitoring and reporting system agreed to between CI and Fiji Water allows flexibility for adapted financial management.

G5. LEGAL STATUS AND PROPERTY RIGHTS

G5.1 Submit a list of all relevant national and local laws and regulations in the host country and all applicable international treaties and agreements. Provide assurance that the project will comply with these and, where relevant, demonstrate how compliance is achieved.

Many of Fiji's laws were elaborated in the early 1950's. Some of the laws have remained in use while others have been reviewed to reflect policy changes aimed at improving governance of the people, the land, and its resources. In recent years many Decrees have been declared (252 since 2006) addressing all aspects of national governance[15].

Laws directly or indirectly related to the project are as follows:

Laws that relate to Tenure and Jurisdiction

- State Lands Act (Cap 132)
- iTaukei Land Act (Cap 133)
- iTaukie Lands Trust Act (cap 134)
- iTaukei Affairs Act (Cap 120 Rev 2006)

Laws that relate to Planning

- Town Planning Act (Cap 139) Land Act (Cap 140)
- Roads Act (Cap 175)
- Water Supply Act (Cap 144)
- Sewage Act (Cap 128)
- Traffic Regulations 1974
- Public Health Act (Cap 111)

Laws relating to Resources Conservation and Development

- Environment Management Act 2005
- Agricultural Land and Tenant Act (Cap 270)
- Irrigation Act (Cap 144)
- Drainage Act (Cap 143)
- Land Conservation and Improvement Act (Cap 141)
- Plant Quarantine Act (Cap 156)
- Pesticide Act (Cap 157)
- Forest Act (Cap 150) – repealed and replaced by the Presidential Decree No 31 of 1992 Forest Decree 1992

Laws relating to Conservation and Biodiveristy

- Forest Act (Cap 150) – does not address Protected Areas although defines Forest and Nature Reserves in specific terms.

[15] A list of all the decrees approved in the Republic of Fiji Islands can be viewed at: http://www.fiji.gov.fj/index.php?option=com_docman&task=cat_view&gid=59&Itemid=158 and http://www.paclii.org/fj/indices/legis/Fiji%20-%20Decrees_2012.html

- Rivers and Streams Act (Cap 136)
- Birds and Game Protection Act (Cap 170)

Fiji is a signatory to a number of conventions as listed below which are relevant to project implementation. These include the following:

- Convention on Biological Diversity (CBD)
- UN Framework Convention on Climate Change (UNFCCC)
- Waigai Convention (bans the importation of hazardous chemicals and radioactive substances)
- International Convention on the Elimination of all Forms of Racial Discrimination (CERD)
- International Convention on the Elimination of all forms of Discriminaton against Women (CEDAW)

The project will comply will all these laws and regulations. The project is implemented in close coordination and communication with national government agencies (the Department of Forest) and local government (Provincial Office of Ra). In addition, CI liaises very closely with the Department of Agriculture, the University of the South Pacific (Institute of Applied Science) as well as the National Trust of Fiji. The compliance is assured by this project arrangement.

G5.2 Document that the project has approval from the appropriate authorities, including the established formal and/or traditional authorities customarily required by the communities.

The project gained approval from the Provincial Office of Ra to implement the project activities following a traditional presentation to the Provincial Council in 2009. The Provincial Council consists of all the iTaukei Chiefs in the Province of Ra and has an important influence over community-level decision making processes. The Council is mandated under the iTaukei Affairs Act and can make any bylaws with regards to the health, welfare and good governance of the people, subject to the approval of the iTaukei Affairs Board.

The Department of Forest has fully supported the Project from the very beginning through the provision of a Forestry Officer on secondment to assist the project with the implementation of its field activities. The Forestry Officer has been the Project's key point person in the field providing liaison with community members, landowning units, government agencies operating out of Rakiraki town and the Provincial Office. Strong support has been substantiated through two renewal extensions of the period of engagement for the Forestry Officer. Strong technical support is also provided by the Department of Forest as evident through the participation of key Divisions within the DoP. The Extension Services have provided extensive work on building community capacity to raise and propagate seedlings of native species while the Research Division has focused on the propagation and distribution of sandalwood seedlings.

In addition to the above, the REDD+ Policy framework falls under the ambit of the Department of Forest. The German Technical Cooperation (GIZ) is currently assisting the Department of Forest on the implementation of Fiji's REDD+ policy which is currently at the Readiness phase. CI gave detailed presentations about the project to the Steering Committee in 2012 and has received acknowledgement that it is being considered a pilot AFOLU project in terms of its methodological approach and objectives. The focal point of the UNFCCC in Fiji is the Ministry of Foreign Affairs. While there is no direct linkage between the project and Fiji's climate change policy, the project has been asked to report on its activities and progress on an annual basis, which CI will certainly comply with.

G.5.3 Demonstrate with documented consultations and agreements that the project will not encroach uninvited on private property, community property, or government property and has obtained the free, prior, and informed consent of those whose rights will be affected by the project.

The project reforestation sites are located on land owned by the native mataqalis who hold the customary rights to occupy and use these lands. CI and each of the participating mataqalis have signed a Community Agreement that provides guidance and understanding on the roles and responsibilities of each party during the project lifetime. According to the agreement, each mataqali gives full consent to Conservation International to carry out the reforestation project on their behalf and thereby grants access to their land for such purposes. Copies of the signed Community Agreements will be made available to the validator.

A summary of the process followed to reach the point where Community Agreements were signed is as follows:

Following approval by the Ra Provincial Council to work in the province, the project then began engagement at the district level with the Mata ni Tikina (District representative) first in Tokaimalo (2009) then Naroko (2010) and finally Naiyalayala in late 2010. Project goals and objectives including planned activities were presented at the Tikina meetings. Once the Tikina endorsed the project, engagement was extended down to the village level. It was during the Village Meetings that CI was able to identify interested landowners with vacant land to be used for the project's reforestation program. Once the planting began, news about the project quickly spread and other interested mataqali came directly to the CI Rakiraki Field Office to inform staff that they too were interested in participating in the project.

CI then approached each individual mataqali and requested a mataqali meeting. In the mataqali meeting procedures and project objectives are discussed. A field visit to each potential reforestation site is then carried out to check its suitability. Suitability factors include location, accessibility, vegetation cover, etc. Once the site has been assessed and considered suitable for reforestation, the Community Agreements are signed by all parties and dates set to begin the wedding, line polling and planting.

G5.4 Demonstrate that the project does not require the involuntary relocation of people or of the activities important for the livelihoods and culture of the communities.

The proposed project reforestation activities take place only on uninhabited grasslands owned by the native landowning units (mataqali), and therefore does not involve the relocation of any individuals or communities. Each mataqali has consented to the use of the land for the project period as detailed in the Community Agreements. The reforestation areas were also strategically chosen in discussion with the landowners to identify sites which are not used for any other purpose and therefore do not require the relocation of any activities important for their livelihoods or cultural practices.

G5.5 Identify any illegal activities that could affect the project's climate, community or biodiversity impacts (e.g., logging) taking place in the project zone and describe how the project will help to reduce these activities so that project benefits are not derived from illegal activities.

The project proponent does not expect any illegal activities to be a threat to the project's expected climate, community and biodiversity benefits. CI has spent has spent siginifcant time working with all the villages in the project zone to ensure a thorough understanding of the benefits of the project in the short and long term, and has achieved the buy-in and support from all of the communities involved. In addition, due to the customary ownership and native land titling, illegal activities by non landowning units from outside the project zone would not occur as any unsanctioned activities would be actively enforced by both the landowners and government departments such as the Native Land Trust Board responsible for the rights of its members.

G5.6 Demonstrate that the project proponents have clear, uncontested title to the carbon rights, or provide legal documentation demonstrating that the project is undertaken on behalf of the carbon owners with their full consent.

The project reforestation sites are located on land owned by the native mataqalis who hold the customary rights to occupy and use these lands. CI and each of the participating mataqalis have signed a Community Agreement that provides guidance and understanding on the roles and responsibilities of each party during the project lifetime. According to the agreement, each mataqali gives full consent to Conservation International to carry out the reforestation project on their behalf and thereby grants access to their land for such purposes. CI will also have the ability to claim that the project will generate carbon sequestration and that these climate benefits will be validated and verified to the CCB Standards. Copies of the signed Community Agreements will be made available to the validator.

CLIMATE SECTION

CL1. NET POSITIVE CLIMATE IMPACTS

CL1.1 Estimate the net change in carbon stocks due to the project activities using the methods of calculation, formulae and default values of the IPCC 2006 GL for AFOLU or using a more robust and detailed methodology. The net change is equal to carbon stock changes *with* the project minus carbon stock changes *without* the project (the latter having been estimated in G2). This estimate must be based on clearly defined and defendable assumptions about how project activities will alter GHG emissions or carbon stocks over the duration of the project or the project GHG accounting period.

The net change in carbon stocks due to the project activities were developed in accordance with the latest version of the Clean Development Mechanism Methodology, AR-ACM0003 Version 01.0.0: *Afforestation and reforestation of lands except wetlands.* All the equations in this section were compiled from the tool 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (Version 02.1.0).

The actual net GHG removals by sinks were calculated as follows:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t} \quad (5)$$

where:

$\Delta C_{ACTUAL,t}$	Actual net GHG removals by sinks, in year *t*; t CO_2-e
$\Delta C_{P,t}$	Change in the carbon stocks in project, occurring in the selected carbon pools, in year *t*; t CO_2-e
$GHG_{E,t}$	Increase in non-CO_2 GHG emissions within the project boundary as a result of the implementation of the project activity, in year *t*, as calculated in the tool "Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity"; t CO_2-e

The project did not and will not use fire for site preparation and/or for site management, and therefore, $GHG_{E,t}$ is considered to be zero throughout the crediting period.

As described in G2.3, dead wood, litter and SOC pools were not selected, and, therefore, the change in the carbon stocks in project was summarized as follows:

$$\Delta C_{P,t} = \Delta C_{TREE\_PROJ,t} + \Delta C_{SHRUB\_PROJ,t} \quad (6)$$

where:

$\Delta C_{TREE\_PROJ,t}$ Change in carbon stock in tree biomass in project in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubsin A/R CDM project activities"; t CO_2-e

$\Delta C_{SHRUB\_PROJ,t}$ Change in carbon stock in shrub biomass in project in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubsin A/R CDM project activities"; t CO_2-e

Stratification

The project boundary was stratified based on the following planting plan

Table 14: Ex-ante stratification.

Strata	Planting year	Species ratio, native trees : non native trees	Area (ha)
S_{2009}	2009	0.25 : 0.75	108.9
S_{2010}	2010	0.5 : 0.5	104.63
S_{2011}	2011	0.5 : 0.5	209.25
S_{2012}	2012	0.5 : 0.5	148.45
S_{2013}	2013	1.0 : 0.0	281
S_{2014}	2014	1.0 : 0.0	283.44

Change in carbon stock in tree biomass

Change in carbon stock in tree biomass was estimated for each stratum. . Default growth data for natural forests in tropical dry forests in Asia (insular) was used for native tree species, as no specific growth data was available (Table 4.9, IPCC, 2006). Similarly, no regional growth data was available for non native tree species, i.e., teak, and default information for continental Asia was used. As a conservative choice, above-ground biomass growth of 'Asia other' plantations in tropical dry forest was applied (Table 4.10, IPCC, 2006). For root-shoot ratio, R, the following allometric equation was applied:

$$R = \exp\left[-1.085 + 0.9256 * \ln(A)\right] \quad (7)$$

where A is above ground biomass.

Table 15: Parameters used for *ex ante* estimation of change in carbon stock in tree biomass.

Parameter	Value	Source
Above-ground biomass growth of native species	7 t.d.m ha^{-1} yr^{-1} for the year 1 – 20 2 t.d.m ha^{-1} yr^{-1} for the year 21 –	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 4.9. Tropical dry forest, Asia (insular)
Above-ground biomass growth of non native species	7 t.d.m ha^{-1} yr^{-1}	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 4.10. Tropical dry forest, Asia other
Carbon fraction of tree biomass,	0.5 t C t.d.m.$^{-1}$	A/R methodology tool "Estimation of carbon stocks and change in carbon

CF_{TREE}		stocks of trees and shrubsin A/R CDM project activities", version 02.1.0, para 25

Total tree biomass and carbon stock in tree biomass within the project boundary was estimated as follows by applying the parameters shown in Table 15:

$$B_{TREE,t} = \sum_i A_i + b_{TREE,i,t} \quad (8)$$

where:

$B_{TREE,t}$ Total tree biomass within the project boundary in year *t*; t.d.m.

A_i Area of stratum *i*; ha

$b_{TREE,i,t}$ Tree biomass per hectare in stratum *i* in year *t*; t.d.m. ha^{-1}

$$C_{TREE,t} = \frac{44}{12} * B_{TREE,t} * CF_{TREE} \quad (9)$$

where:

$C_{TREE,t}$ Carbon stock in tree biomass within the project boundary at a given point of time in year *t*; t CO_2-e

CF_{TREE} Carbon fraction of tree biomass; tC $t.d.m.^{-1}$

Change in carbon stock in shrub biomass

As described in G2.3, during the selection of the project area for S_{2011}, S_{2012} S_{2013} and S_{2014} areas without woody vegetation were chosen. For S_{2009} and S_{2010}, field surveys were conducted to estimate crown cover of trees and shrubs and revealed only one parcel, Nakorokarua, had more than 5% of crown cover, which is a threshold whether shrub biomass is considered negligible according to "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities".

In the *ex ante* estimation, we considered that all shrubs in the Nakorokarua parcel would disappear in the 15-year period due to canopy closure. Fifteen years was chosen to avoid underestimation of carbon emissions at given times, in relation to the *ex ante* estimation of planted tree growth which will slow down after 20 years.

Biomass and carbon stock in shrub biomass were calculated as follows by applying the parameters shown in Table 16:

$$B_{SHRUB,i,t} = BDR_{SF} * B_{FOREST} * CC_{SHRUB,i,t}$$

where:

$B_{SHRUB,i,t}$	Shrub biomass per hectare in shrub biomass stratum *i*, at a given point of time in year *t*; t d.m. ha^{-1}
BDR_{SF}	Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 and default above-ground biomass content per hectare in forest in the region/country where the project is located; dimensionless
B_{FOREST}	Default above-ground biomass content in forest in the region/country where the project is located; t d.m. ha^{-1}
$CC_{SHRUB,i,t}$	Crown cover of shrubs in shrub biomass stratum *i* at a given point of time in year *t* expressed as a fraction; dimensionless

$$C_{SHRUB,t} = \frac{44}{12} * CF_S * (1 + R_S) * \sum_i A_{SHRUB,i,t} * B_{SHRUB,i,t}$$

where:

$C_{SHRUB,t}$	Carbon stock in shrub biomass within the project boundary at a given point of time in year *t*; t CO_2-e
CF_S	Carbon fraction of shrub biomass; tC t.d.m.$^{-1}$
R_S	Root-shoot ratio for shrubs; dimensionless
$A_{SHRUB,i,t}$	Area of shrub biomass stratum *i* at a given point of time in year *t*; ha

Table 16: Parameters used for *ex ante* estimation of change in carbon stock in shrub biomass.

Parameter	Value	Source
Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 and default above-ground biomass content per hectare in forest in the region/country where the project is located, BDR_{SF}	0.1	A/R methodology tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubsin A/R CDM project activities”, para 49
Default above-ground biomass content in forest in	160 t.d.m. ha^{-1}	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table

the region/country where the project is located, B_{FOREST}		4.7. Tropical dry forest, Asia (insular)
Crown cover of shrubs in shrub stratum Nakorokarua when trees were planted, CC_{SHRUB}	0.09 (9%)	Measured
Carbon fraction of shrub biomass, CF_S	0.5	A/R methodology tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities", para 44
Root-shoot ratio for shrubs, R_S	0.4	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 4.4 Tropical shrubland
Area of shrub biomass, A_{SHRUB}	5.1 ha	Measured

GHG removals

The tables below show the actual net GHG removals by the reforestation of native species planted under the project scenario (Table 17) and non native species (Table 18) planted under the project scenario, which includes the assumption that the teak and mahogany will be harvested starting in year 20 (2029) of the project.

To assure transparency of the results, intermediate tables and evidenc of the parameters used, as well as the methods and tools can be provided upon request.

Table 17: Summary of the actual net GHG removals by sinks for native species planted.

Year	The Project annual emissions and/or removals, t CO_2-e $year^{-1}$			
	Tree biomass, $\triangle C_{TREE\_PROJ,,t}$	Shrub biomass, $\triangle C_{SHURUB\_PROJ,,t}$	Baseline $\Delta C_{BSL,t}$	Actual net GHG removals by sinks, $\triangle C_{ACTUAL,t}$
2009	0	0	660	-660
2010	427	0	660	-233
2011	1,221	0	660	562
2012	2,794	-1	660	2,133
2013	3,887	-1	660	3,226
2014	8,059	-78	660	7,321
2015	12,217	-156	660	11,402
2016	12,163	-156	660	11,348
2017	12,127	-156	660	11,311
2018	12,100	-156	660	11,284
2019	12,078	-156	660	11,263
2020	12,061	-156	660	11,245
2021	12,045	-156	660	11,230
2022	12,032	-156	660	11,216
2023	12,020	-156	660	11,205
2024	12,010	-156	660	11,194
2025	12,000	-156	660	11,185
2026	11,992	-156	660	11,176
2027	11,984	-155	660	11,169
2028	11,976	-155	660	11,162
2029	11,969	-78	189	11,703

2030	11,682	0	189	11,493
2031	11,133	0	189	10,945
2032	10,043	0	189	9,854
2033	9,269	0	189	9,081
2034	6,352	0	189	6,164
2035	3,412	0	189	3,224
2036	3,412	0	189	3,223
2037	3,411	0	189	3,223
2038	3,411	0	189	3,222
2039	3,410	0	189	3,222

Table 18: Summary of the actual net GHG removals by sinks for non native species planted.

Year	The Project annual emissions and/or removals, t CO_2-e $year^{-1}$			
	Tree biomass, $\triangle C_{TREE\_PROJ,,t}$	Shrub biomass, $\triangle C_{SHURUB\_PROJ,,t}$	Baseline $\Delta C_{BSL,t}$	Actual net GHG removals by sinks, $\triangle C_{ACTUAL,t}$
2009	0	0	42	-42
2010	1,261	0	42	1,220
2011	2,034	0	42	1,992
2012	3,593	-1	42	3,551
2013	4,682	-1	42	4,639
2014	4,661	-1	42	4,619
2015	4,647	-1	42	4,604
2016	4,637	-1	42	4,594
2017	4,628	-1	42	4,585
2018	4,621	-1	42	4,578
2019	4,615	-1	42	4,572
2020	4,609	-1	42	4,567
2021	4,605	-1	42	4,562
2022	4,600	-1	42	4,558
2023	4,597	-1	42	4,554
2024	4,593	-1	42	4,550
2025	4,590	-1	42	4,547
2026	4,587	-1	42	4,544
2027	4,584	0	42	4,543
2028	4,581	0	42	4,540
2029	-19,250	0	12	-19,262
2030	-10,801	0	12	-10,812
2031	-26,304	0	12	-26,316
2032	-17,482	0	12	-17,494
2033	4,682	0	12	4,670
2034	4,661	0	12	4,649
2035	4,647	0	12	4,635
2036	4,637	0	12	4,625
2037	4,628	0	12	4,616
2038	4,621	0	12	4,609
2039	4,615	0	12	4,603

Summary of GHG emissions and removals

The net GHG emission removals achieved over the 30 year project lifetime are calculated by subtracting the baseline carbon removals from the ex-ante 'with-project' removals and emissions (Table 19). The project is expected to generate 283,489 tCO2e in net emissions removals over a 1,135ha project area.

Table 19: Summary of the ex ante estimate of net GHG removals by sinks generated by the project.

Year	Project Year	Baseline GHG removals by sinks (tCO2e)	Project GHG removals for non native species (tCO2e)	Project GHG removals for native species (tCO2e)	Cumulative project GHG removals for native & non native species (tCO2e)	Cumulative net GHG removals (tCO2e)
2009	0	701	0	0	0	-701
2010	1	701	1,261	427	1,688	285
2011	2	701	2,034	1,221	4,943	2,839
2012	3	701	3,592	2,792	11,328	8,522
2013	4	701	4,681	3,886	19,894	16,387
2014	5	701	4,660	7,980	32,534	28,326
2015	6	701	4,646	12,062	49,242	44,332
2016	7	701	4,635	12,007	65,885	60,274
2017	8	701	4,627	11,971	82,483	76,170
2018	9	701	4,620	11,944	99,046	92,033
2019	10	701	4,613	11,923	115,583	107,867
2020	11	701	4,608	11,905	132,096	123,679
2021	12	701	4,603	11,890	148,588	139,470
2022	13	701	4,599	11,876	165,064	155,245
2023	14	701	4,595	11,865	181,524	171,003
2024	15	701	4,592	11,854	197,970	186,747
2025	16	701	4,589	11,845	214,403	202,479
2026	17	701	4,586	11,836	230,824	218,199
2027	18	701	4,584	11,829	247,237	233,911
2028	19	701	4,581	11,822	263,641	249,613
2029	20	200	-19,250	11,892	256,282	242,054
2030	21	200	-10,801	11,682	257,163	242,735
2031	22	200	-26,304	11,133	241,993	227,364
2032	23	200	-17,482	10,043	234,553	219,724
2033	24	200	4,682	9,269	248,504	233,475
2034	25	200	4,661	6,352	259,518	244,288
2035	26	200	4,647	3,412	267,577	252,147
2036	27	200	4,637	3,412	275,625	259,994
2037	28	200	4,628	3,411	283,665	267,833
2038	29	200	4,621	3,411	291,696	275,664
2039	30	200	4,615	3,410	299,721	283,489
Total		16,232	39,360	260,361		

CL1.2. Estimate the net change in the emissions of non-CO2 GHG emissions such as CH4 and N2O in the *with* and *without* project scenarios if those gases are likely to account for more than a 5% increase or decrease (in terms of CO2-equivalent) of the project's overall GHG emissions reductions or removals over each monitoring period.

Non-CO_2 GHGs are not likely to account for more than 5% of the project's overall GHG impact as the project will not resort to burning biomass during site preparation, and will not use synthetic fertilizers. Furthermore, as per the CDM Executive Board decision in September 2008 (CDM EB 42, Paragraph 35)[16], "The Board clarified the guidance on accounting GHG emissions in A/R CDM project activities from the following sources: (i) fertilizer application, (ii) removal of herbaceous vegetation, and (iii) transportation; and agreed that emissions from these sources may be considered as insignificant and hence can be neglected in A/R baseline and monitoring methodologies and tools."

CL1.3. Estimate any other GHG emissions resulting from project activities. Emissions sources include, but are not limited to, emissions from biomass burning during site preparation, emissions from fossil fuel combustion, direct emissions from the use of synthetic fertilizers, and emissions from the decomposition of N-fixing species.

The site preparation method adopted for the project does not involve biomass burning. Herbaceous vegetation will be cleared before planting seedlings and during periodic maintenance. The cleared vegetation will be left on site. All labor for the planting and maintenance activities are from local villages, hence the transportation need is minimal. Transportation of the seedlings from the nurseries is carried out by vehicle or horseback depending on access availability. However, as per the CDM Executive Board decision cited in CL1.2, emissions from vehicle transport do not need to be considered.

CL1.4. Demonstrate that the net climate impact of the project is positive. The net climate impact of the project is the net change in carbon stocks plus net change in non-CO2 GHGs where appropriate minus any other GHG emissions resulting from project activities minus any likely project-related unmitigated negative offsite climate impacts (see CL2.3).

The net change presented in Table 19 represents the project's net total climate impact of the project, and it is positive. The total amount of the project's net carbon benefit over 30 years is 283,489 tCO2e.

CL1.5. Specify how double counting of GHG emissions reductions or removals will be avoided, particularly for offsets sold on the voluntary market and generated in a country with an emissions cap.

The project will not be generating GHG removals which can be sold or retired. The project is carrying out CCB validation and verification in order to demonstrate the net positive climate impacts achieved by the project.

[16] http://cdm.unfccc.int/EB/044/eb44rep.pdf

CL2. OFFSITE CLIMATE IMPACTS ('LEAKAGE')

CL2.1 Determine the types of leakage that are expected and estimate potential offsite increases in GHGs (increases in emissions or decreases in sequestration) due to project activities. Where relevant, define and justify where leakage is most likely to take place.

A common significant leakage source in the case of A/R projects is the displacement of agricultural activities or the displacement of grazing animals. The project mitigated such leakage risks by purposely selecting abandoned or marginal areas for the reforestation activities based on the landuse plans developed through participatory land use planning processes with communities as described in Section G1.6 and G3.8. Cropping activities, domesticated grazing and roaming animals are therefore not displaced as a result of the project activities.

CL2.2 Document how any leakage will be mitigated and estimate the extent to which such impacts will be reduced by these mitigation activities.

As detailed above, the project does not expect any leakage to occur. Sistematic monitoring of the activities of project participants will take place. Any activity leading to GHG emissions due to the project activities, and characterized as leakage will be measured and discounted from the GHG benefits generated by the project.

CL2.3 Subtract any likely project-related unmitigated negative offsite climate impacts from the climate benefits being claimed by the project and demonstrate that this has been included in the evaluation of net climate impact of the project (as calculated in CL1.4).

The activities carried out by the project to reforest the abandoned grasslands as well as activities to improve the well-being of local communities and provide alternative livelihood is expected to generate minimum negative climate impact. Therefore the likely project-related unmitigated negative offsite impacts are negligable.

CL2.4 Non-CO2 gases must be included if they are likely to account for more than a 5% increase or decrease (in terms of CO2-equivalent) of the net change calculations (above) of the project's overall off-site GHG emissions reductions or removals over each monitoring period.

Offsite non-CO2 emissions as a result of project activities will be negligable.

CL3. CLIMATE IMPACT MONITORING

CL3.1 Develop an initial plan for selecting carbon pools and non-CO2 GHGs to be monitored, and determine the frequency of monitoring. Potential pools include aboveground biomass, litter, dead wood, belowground biomass, wood products, soil carbon and peat. Pools to monitor must include any pools expected to decrease as a result of project activities, including those in the region outside the project boundaries resulting from all types of leakage identified in CL2. A plan must be in place to continue leakage monitoring for at least five years after all activity displacement or other leakage causing activity has taken place. Individual GHG sources may be considered 'insignificant' and do not have to be accounted for if *together* such omitted decreases in carbon pools and increases in GHG emissions amount to less than 5% of the total CO2-equivalent benefits generated by the project.39 Non-CO2 gases must be included if they are likely to account for more than 5% (in terms of CO2-equivalent) of the project's overall GHG impact over each monitoring period. Direct field measurements using scientifically robust sampling must be used to measure more significant elements of the project's carbon stocks. Other data must be suitable to the project site and specific forest type.

Parameters to be monitored:

Data Unit / Parameter:	A_i
Data unit:	ha
Description:	Area of stratum *i*
Source of data:	Field measurement and satellite imagery
Description of measurement methods and procedures to be applied:	The boundaries of the project sites were measured using GPS and overlaid on a map before validation. Any changes in stand area and/or planting year will be recorded.
Frequency of monitoring/recording:	Every five years
Value applied:	S_{2009}: 108.23 ha S_{2010}: 104.63 ha S_{2011}: 209.25 ha S_{2012}: 148.45 ha S_{2013}: 281 ha $S_{2014:}$ 283.4 ha
Monitoring equipment:	GPS receiver and GIS software
QA/QC procedures to be applied:	Training for measurement members before measurements.
Calculation method:	NA
Any comment:	NA

Data Unit / Parameter:	$A_{p,i}$
Data unit:	ha
Description:	Area of sample *p* in stratum *i*
Source of data:	Field measurement
Description of measurement methods and procedures to be applied:	See details in PDD text below
Frequency of monitoring/recording:	Every five years
Value applied:	NA
Monitoring equipment:	Measuring tape
QA/QC procedures to be applied:	Sound measuring tapes to be used.
Calculation method:	$A_{p,l}$ = pi * (radius of a sample plot)^2
Any comment:	If the slope is smaller than 10%, radius is 8.92 m and area is 0.025 ha.

Data Unit / Parameter:	$CC_{SHRUB,l,t}$
Data unit:	Dimensionless
Description:	Crown cover of shrubs in shrub biomass stratum *i*, i.e., the parcel in Nakorokaura at a given point of time in year *t*.
Source of data:	Field measurement
Description of measurement methods and procedures to be applied:	Ocular method, see details provided in PDD text
Frequency of monitoring/recording:	Every five years
Value applied:	0.09 was applied for year 1, and the value was considered to decrease constantly to be zero in 15 years.
Monitoring equipment:	NA
QA/QC procedures to be applied:	
Calculation method:	$CC_{SHRUB,i,t} = (\sum CA_{SHRUB,i,t} \times N_{SHRUB,i,w})/A_i$ $CA_{SHRUB,l,t}$ = pi * (CW/2)^2 where: $CA_{SHRUB,i,t}$: Crown area $N_{SHRUB,i,w}$: Number of shrubs A_i: Area (ha) CW: Crown width
Any comment:	

Data Unit / Parameter:	DBH
Data unit:	cm
Description:	Diameter at breast height (1.3 m)
Source of data:	Field measurement in sampling plots
Description of measurement methods and procedures to be applied:	See details in PDD text below
Frequency of monitoring/recording:	Every five years
Value applied:	NA
Monitoring equipment:	Measurement tapes
QA/QC procedures to be applied:	Training for measurement members before measurements.
Calculation method:	NA
Any comment:	All trees with DBH > 5 cm within the plot

Data Unit / Parameter:	H
Data unit:	M
Description:	Height of tree
Source of data:	Field measurement in sampling plots
Description of measurement methods and procedures to be applied:	See details in PDD text below
Frequency of monitoring/recording:	Every five years
Value applied:	NA
Monitoring equipment:	Measurement pole and/or a combination of a laser rangefinder and a clinometer
QA/QC procedures to be applied:	Training for measurement members before measurements.
Calculation method:	NA
Any comment:	All trees with DBH > 5 cm within the plot

The two key steps in designing a monitoring system are to:

1. Establish the required size and number of plots required

2. Document the process for collecting the required tree parameters

Size and Number of Plots

The number and size of permanent sampling plots was determined using the Winrock sample size calculator. This tools estimate the number of permanent sample plots needed for monitoring changes in carbon pools at a desired precision level.

In accordance with the methodology, a target precision level of ±10% at 90% confidence level for estimation of tree biomass was set.

As outlined in G1.4 an initial field study was undertaken in the region to gauge the expected carbon stock and provide an indication of potential variation. The outcomes of the field data collection was factored into the Winrock sample size calculator and a total number of permanent plots the 1,135 ha project area was estimated to be 28 (rounded) plots to achieve a 90% confidence interval.

The plot design was based on the Guide to Monitoring Carbon Storage (Winrock) with the optimum size of the plot determined to be 0.025 ha or a circular plot with radius of 8.92m (Fig. 26). All trees with a DBH > 5cm within this plot must be measured and recorded.

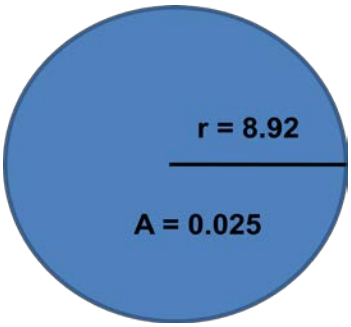


Figure 26: Monitoring Plot Design

It will be necessary to mark or map the trees to measure the growth of individuals at each time interval so that growth of survivors, mortality, and ingrowth of new trees can be tracked. Changes in carbon stocks for each planted tree are then estimated and summed per plot. Statistical analyses are performed on net carbon accumulation per plot, including ingrowth and losses due to mortality.

Procedure for marking and measuring permanent plots

1. Navigate to plot center coordinates provided from database, map or map table.
2. Establish plot center by setting a plot center post (preferably PVC pipe painted with fluorescent paint and marked with the plot number).
3. If the slope is greater than 10%, use a clinometer, Abney hand level or relaskop to determine slope. Correct for slope using the following formula:

   Ls = L / cos S

   where:

   Ls The corrected plot radius, m

L	The plot radius = 17.84 m
S	The slope angle in degrees
Cos	The cosine decimal

Note plot dimension corrections on the field sheet.

4. The crew chief begins by measuring the distance to the plot edge, flagging the beginning point and directing a technician to begin taking dbh measurements. Each tree should be marked with bright, durable paint at 1.3 m. The top edge of the painted mark should be at 1.3 m. Figure 27 shows the proper placement of the dbh tape.
5. Starting at north and moving clockwise around the plot, record on the field sheet the total height, DBH, species and status (i.e. living or dead) of all woody stems > 5.0 cm DBH that fall within the plot. Tree height is the vertical distance between a standing tree's apical bud and ground level.
6. The technician should read out the measurement, which the crew chief should record and check visually.
7. For borderline trees, if more than half the stem falls within the plot, the tree is in; if more than half the stem falls outside the plot, the tree is out. If the plot boundary coincides exactly with the center point of the tree, flip a coin. If heads, the tree is in; if tails, the tree is out.
8. When all of the trees in the plot have been measured, the crew chief must check to see that all of the trees have been measured and painted.

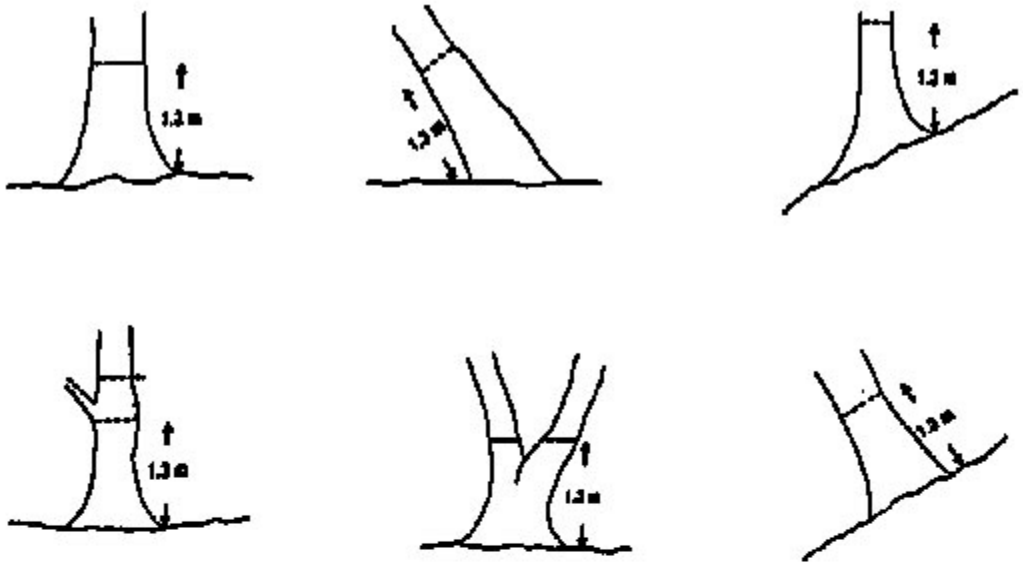


Figure 27: Proper use of a diameter tape from Winrock, 1997[17]

[17] A guide to monitoring carbon storage in forestry and agroforestry projects, Winrock, 1997
Available at: http://www.winrock.org/ecosystems/files/carbon.pdf

Shrub monitoring

In the parcel in Nakorokaura, 5.1 ha, in which the shrub biomass was judged to be significant in *ex ante* calculation, crown cover of shrubs will be measured by ocular method at every CCB verification. Numbers of shrubs in the parcel will be counted at every crown width range: 1 – 5 m, 5 – 10 m, and 10 – 15 m; a crown area for each crown width range will be calculated by applying maximum crown width, for example, 5 m in the range of 1 – 5 m; and crown cover of shrubs will be determined.

Record keeping system

All electronic and paper records are kept centrally by Conservation International Fiji at their Suva office.

Organizational structure, responsibilities and competencies

Conservation International: Train measurement team and check data quality.

Department of Forest: Support the measurement. Include the project sampling plots into their institutional sampling plots.

The University of the South Pacific (USP): Support the measurement through collaborations with the project in their regular classes of the Forestry course.

Local communities: Provide measurement crews.

CL3.2 Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available to the communities and other stakeholders.

The development of a full monitoring plan is currently underway. Once complete, the plan will be distributed to each village in the project zone, to the Provincial Office, the Department of Forests, the Department of the Environment, the National Trust of Fiji, and the University of the South Pacific. The plan will also be disseminated on the CCBA website.

COMMUNITY SECTION

CM1. NET POSITIVE COMMUNITY IMPACTS

CM1.1 Use appropriate methodologies to estimate the impacts on communities, including all constituent socio-economic or cultural groups such as indigenous peoples (defined in G1), resulting from planned project activities. A credible estimate of impacts must include changes in community well-being due to project activities and an evaluation of the impacts by the affected groups. This estimate must be based on clearly defined and defendable assumptions about how project activities will alter social and economic well-being, including potential impacts of changes in natural resources and ecosystem services identified as important by the communities (including water and soil resources), over the duration of the project. The 'with project' scenario must then be compared with the 'without project' scenario of social and economic well-being in the absence of the project (completed in G2). The difference (i.e., the community benefit) must be positive for all community groups.

The Nakauvadra project was set up to develop a multiple benefit community-based project that will ultimately enable local communities to benefit from job creation and improved livelihoods, whilst expanding forest cover on abandoned grasslands. Targeted beneficiaries were identified as the iTaukei communities living in the districts of Tokaimalo, Naiyalyala and Naroko as described in G3.8.

The main forum through which the 'with' and 'without' project scenarios and its implication were discussed was the landuse planning workshops that were held in the districts of Tokaimalo, Naroko and Naiyalayala in 2009 and 2011. In addition, socio-economic surveys were implemented to collect information of living standards. Information from both documents defined the socio-economic baseline conditions of local communities within these jurisdictions. They were also the main guide to develop alternative livelihood interventions that that will help provide additional sources of revenue and increased food security.

The major tool used during the workshops was the Participatory Learning Approach (PLA), and much of the workshop was organized into a series of lectures and break-out group exercises in order to enable all workshop participants to fully contribute to the process.

The exercises carried out during the workshops were adapted from the *Open Standards for the Practice of Conservation*[18], developed by the Conservation Measures Partnership to support the design, management and monitoring phases of conservation projects.

The main steps of the Open Standards are (Figure 28):

- **Conceptualize** what the project is trying to achieve within its geographic location.
- **Plan** both **Actions** and **Monitoring**.
- **Implement** both **Actions** and **Monitoring**.
- **Analyze** the data to evaluate the effectiveness of the activities. **Use** the results to **Adapt** the project to maximize impact.
- **Capture** and **Share** the results with key external and internal audiences to promote **Learning**.

[18] http://www.conservationmeasures.org/initiatives/standards-for-project-management

Figure 28: Diagram of the main steps of the Open Standards for the Practice of Conservation.

The workshops focused on four specific areas: village environment (physical & social aspects), forestry, biodiversity & agriculture and had several sessions.

The first session was on problem identification & prioritizing. The purpose of this session was for participants to list the types of problems that exist within their community and villages and to prioritize these accordingly in terms of issues needing immediate solutions and those that will take time to resolve. The second session carried out a root cause analysis of the issues identified in session 1. The final session was on land use mapping. Participants were given copies of the current land use maps of each district and asked to make proposals for new land use activities which would take into account the problems/identified solutions discussed in the earlier sessions.

Figure 29: Communities taking part in Participatory Learning Approach exercises.

As a result of the discussions, key issues linked to community development and existing socio-economic constraints were identified, including unsustainable land use practices, the lack of agricultural planting material, the lack of agricultural knowledge, stray animals, erosion,

deforestation, fire and solid waste. Project interventions to address some of these issues were then assessed. Not all issues (eg stray animals and solid waste) could be addressed by the project activities due to the scope of work. The following are the key expected impacts of the project on community well-being throughout the project lifetime. In addition to the income directly provided by the reforestation activities, the support provided by the project on the development of alternative livelihoods and improved farming practices will help to instigate better land use management on existing cropland areas and promote the additional planting of fruit, fuelwood and sandalwood trees near villages. This will all contribute to increasing the positive climate and community benefits generated by the project.

1. **Increased household and communal income.** The project will directly increase household and communal income for the mataqali involved in the reforestation component of the project by:

    - Providing direct payments for the planting and regular maintenance activities carried out during the first 9 years of the project (6 years planting & maintenance; 3 years maintenance). Each mataqali with a signed Conservation Agreement will be issued with contracts to undertake the work on their land. The mataqali members will decide how to structure the work force of laborers but in most instances, all households belonging to the mataqali will be given the opportunity to participate in the planting and maintenance work. Fiji's cultural heritage is a collectivist society, and wages and work load are usually shared. Laborers will receive a wage for their time, but in many cases, the contract payments will also contribute towards the communal fund which will help pay for community projects such as churches, water supply systems, village electrification schemes, school supplies, and reconstruction in case of natural disasters. These contract payments will therefore also provide the basis for capital improvements in the villages.

    - Planting hardwood species (teak and mahogany) on 28% of the total project area to give communities the option to harvest the timber starting in year 20 of the project. Mahogany is an established market in Fiji and at mill gate has a price ranging from FJD$ 70 – 305 (US $40 -170) per cubic metre depending on log grade quality[19]. Teak plantations at scale have yet to be harvested in Fiji but based on average Asian market prices, teak logs sell at around US $149 – 282 (FJD$ 263 – 498) per cubic metre depending on the quality and size of the logs (FAO, 2012). Considering the declining global supply from natural teak forests, the long-term prospects for plantation-grown teak are promising, and demand is therfore likely to increase.The project has planted over 68,000 teak and 19,000 mahogany species so this represents a very valuable source of income in the later years of the project. Capacity building and training on sustainable harvesting and coppice practices will also be provided.

2. **Provision of salaried jobs.** The project has hired 4 technical field assistants who are based out of the CI Rakiraki office. The positions have been filled by members of the community and they are responsible for assisting with all the reforestation and field-based activities, and engaging with community members. The skills, knowledge and experience that is gained as a technical assistant will better qualify those professionals on forestry

[19] http://www.fijitimes.com/story.aspx?id=171974

sector and community-based enterprise initiatives. Seasonal jobs for community fire wardens have also been created. By setting up the nurseries and through the reforestation and livelihood activities, the project also indirectly generates jobs for local people who are working as manual labor or in the development of microenterprises like bee-keeping or pandanus mat weaving.

3. **Development of alternative livelihoods and new enterprise opportunities**. As described in G3.2, the project is carrying out a number of livelihood diversification initiatives which will result in increased revenue and improved food security for local communities. The following is a summary of the livelihood activities and impacts achieved to date:

    - Sandal wood is a valuable commodity in Fiji and is currently being sold in the local market at a price ranging from FJD $85 – $100[20] (US $48 – 56) per kilo. While currently no oil is being distilled from yasi in Tonga or Fiji at a commercial level, the heartwood is exported to markets in Taiwan, Japan, China and a lesser amount to the United States. Santalum yasi attains harvestable size in about 20-25 years and under good conditions can produce yields of 15 - 30 kilos of heartwood (Thomson, 2006). The project has already planted 430 sandalwood seedlings with communities, and will expect to plant several thousand more in 2013 - 2015. The potential income from sandalwood harvesting in the later years of the project is therefore significant.

    - Beekeeping is currently practiced at a small-scale level by some communities in the project zone. CI has provided an additional 35 bee hives and conducted training with local communities in order to promote increased honey production levels. The honey is currently being sold in local markets and also at hotels serving the tourist industry along the coast in Rakiraki. Estimated production levels are 40 litres of honey produced per hive each month. It sells at FJD$8 a litre.

    - Pandanus plants (1,300 plants) have been planted with community women's groups. Weaving mats out of pandanus leaves is an art that has been passed down through many generations in Fiji and has significant cultural value. Production of the mats has traditionally been a woman's role so this activity specifically targets income-generating opportunities for the women, as well as promoting the maintenance of traditional customs.

    - New enterprise opportunities for aquaculture have been developed through the establishment of 6 fish ponds. The fish harvested from the ponds provide an additional protein source for community members and brings in income through the sale of fish at local markets.

    - In Narara, the project helped build a simple community center to welcome tourists visiting the village. Community members give tours of the nearby forest and allow tourists to swim in the natural heart-shaped pool, which is a local attraction.

    - The establishment of project nurseries and the provision of training on good nursery management has meant that since 2012, CI has purchased all native seedlings from the community nurseries. This has provided a steady income stream and has also

[20] http://www.fijitimes.com/story.aspx?id=172410

created a new commodity line for forest products in the area that are in high demand, including sandalwood and fruit trees.

4. **Increased crop diversification practices with iTaukei farmers.** Most farmers in the project zone limit their planting to export-orientated crops or lack the knowledge to diversify their agricultural production to other commodities. The project is working with a number of individuals to reintroduce traditional and resistant varieties of cassava, yam and sweet potato. Pineapple and coconuts are also being planted, both to help reduce soil erosion and diversity farmers' incomes. To date, CI has established 24,000 pineapple heads. Each head will produce one pineapple fruit a year. Each pineapple plant will mature at year 5 at which time they will be uprooted and replanted with fresh plants. After five years, suckers or young pineapple plants will come out and can be used as planting material for a new plot. The average sale price is FJD$0.50 per fruit.

   For ginger, three farms were provided with 300kg worth of seed and training on how to plant and harvest the crop. Yield level in Fiji is assumed to be 20-25tons per ha for green ginger and 25-30tons per ha for mature ginger. Green ginger is in high demand with prices for green ginger at FJD$850/ton (unwashed ginger) and FJD$900/ton for washed ginger. Green ginger is harvested 5 months from planting and mature ginger 10 months after planting.

5. **Establishment and amplification of improved agricultural practices.** The project has set up two model farms (at Vaidoko and Nabalabala) in collaboration with the Department of Agriculture to demonstrate sustainable agriculture practices, crop diversification with traditional varieties and good farming techniques on hilly sites. This includes hedgerow planting using pineapple and vetiver grasses across slopes to prevent erosion. It is hoped that through improved productivity levels and exchange visits from farmers in neighboring farms, that these techniques and practices will be replicated to other areas in the project zone.

6. **Increased participation of women in income-earning opportunities.** Although the reforestation activities are predominantly carried out by men given the hard manual nature of the work involved, the project has specifically targeted women to increase their participation in income-generating activities such as bee keeping, nursery management, fruit tree planting and pandanus farming (Fig. 30).

7. **Improved community awareness about the importance of environmental management and ecosystem sustainability.** Through the project activities, awareness raising campaigns and capacity building efforts, the project will achieve a change in perception and understanding about the importance of environmental management and ecosystem sustainability, including the role that forests play in improving watersheds, reducing soil erosion and enhancing livelihood activities. It is hoped that project will engender a sense of pride and ownership about the crucial role that the Nakauvadra forests play in maintaining key ecosystem flows in the project zone and beyond, and will also reinforce community appreciation of traditional totem trees. Evidence of the positive impacts this can have can be demonstrated by the fact that following one of the awareness campaigns, communities in Tokaimalo decided to place a self-enforced ban on the use of *duva* in the main creeks, a natural poison that is used to stun and kill fish, but over the years has had a serious impact on reducing prawn populations. Another key impact will be

reducing the incidence of grassland fires caused by carelessness, and 'spill over' from neighboring sugarcane farms. The project is carrying out fire awareness and educational campaigns with local communities and surveillance patrols with fire wardens, and will continue its efforts to propose preventative methods for fire with the sugarcane farmers.

Figure 30: The women of Vatukacevaceva village (left); pandanus fields planted by the women's group in Rewasa village (right).

The socio-economic benefits provided by the project are all highly additional as they would not have occurred under the baseline scenario in which the existing livelihood and agricultural practices would be unlikely to generate any significant increases in income or new livelihood alternatives. As described in G1.5 and G2.4, average household income for iTaukei communities in the project zone is less than FJD$ 5,000, with subsistence farming the dominant means of livelihood. However, with limited access to credit, quality planting materials and little technical knowledge on how to manage land sustainably, current socio-economic conditions will likely prevail. Without the project, the focus on planting limited crop varieties will continue, posing increased risks from pests, disease and climatic events which then increase the risk of food insecurity of marginalized communities. Project activities are therefore foreseen to have a net positive impact on the social and economic conditions of local communities in the project zone.

CM1.2 Demonstrate that no High Conservation Values identified in G1.8.4-6 will be negatively affected by the project.

Watershed services (water supply and quality) will not be negatively affected by the project. Rather, the project will help restore the forest cover and improve the water-holding capacity of the project zone which serves as a catchment area for the domestic and agricultural water supply to local communities and the town of Rakiraki. Project activities are undertaken purposively to improve the forest cover to help minimize soil erosion and threats from fire.

The significance of the upper reaches of the Nakauvadra Range as a site of cultural and historical importance for local people will not be negatively affected by the project as the project does not restrict access to these areas by local communities. In fact, the project has helped spread awareness about the significance of the Range through the archaeological surveys carried out during the RAP.

CM2. OFFSITE STAKEHOLDER IMPACTS

CM2.1 Identify any potential negative offsite stakeholder impacts that the project activities are likely to cause.

The project is not expected to generate any negative offsite community impacts. It is, however, likely that communities living in adjacent districts will wish to become involved in the project once the environmental and social benefits start being realized. Periodic progress reports of the project are currently given at meetings of the Provincial Council, Tikina and Division Government Heads. Strong support for the project outside its direct area of influence has already been noted as neighboring villages adjacent to the project zone are requesting to be involved.

The only potential negative stakeholder impact envisaged is the fact that the project will not directly benefit the sugar cane growing Indo-Fijian communities within the vicinity of the project zone. Indo-Fijian communities in the project zone are not landowners but tenant farmers on leased native, iTaukei lands, and therefore are not direct beneficiaries of the project. However, it is expected that the ripple effect of the broader environmental benefits of the reforestation work will positively impact all stakeholders through the provision of sustainable ecosystem services that have economical, social and environmental benefits for all communities in the Province of Ra.

CM2.2 Describe how the project plans to mitigate these negative offsite social and economic impacts.

There are no negative offsite economic or social impacts. The project does not restrict access to any areas in the project zone, and the reforestation and livelihoods activities have been strategically designed to ensure that all iTaukei communities and villages are able to participate and benefit from project interventions. In order to work towards the further inclusion of the sugarcane growers and tenant farmers into the long term strategy of the project, CI is currently working with partner organizations to expand the scope of future interventions to include tenant farmers in the sugarcane belt within the Province of Rakiraki. In this respect, CI is liaising with the Fiji Sugar Cooperation through the support of the Coral Triangle Initiative Project under the Department of Environment to work with sugar cane farmers outside the current project boundary, focusing on reforestation and sustainable landuse practices.

In order to respond to growing demands to expand the work of the project to other districts, CI was asked by the Provincial Council to assist with putting together a project proposal for submission to the UNDP/Global Environmental Fund – Small Grants Program (UNDP/SGP) to undertake similar work in Tikina Bureivanua within the Province of Ra. A project proposal was submitted in December 2012 and the Ra Provincial Council is currently working to finalize this funding opportunity with UNDP/SGP. The project will focus on sustainable land management through the production of a Landuse Plan for the Tikina Bureivanua, an inland territory to the south east of the Nakauvadra Project site.

CM2.3 Demonstrate that the project is not likely to result in net negative impacts on the well-being of other stakeholder groups.

Although the sugarcane farmers are not the direct beneficiaies of the project, they will not be negatively affected by the project activities as the reforestation will not impede access to their own leased lands nor limit their current economic activities. CI will continue its efforts to include these

stakeholders in long term holistic conservation and development planning in the region. The project will therefore not result in net negative impacts on the well-being of other stakeholder groups.

CM3. COMMUNITY IMPACT MONITORING

CM3.1 Develop an initial plan for selecting community variables to be monitored and the frequency of monitoring and reporting to ensure that monitoring variables are directly linked to the project's community development objectives and to anticipated impacts (positive and negative).

The main objective of the project is to develop an integrated multiple benefit forest carbon project that will benefit the communities in both the short and long term. Project activities are guided by community aspirations through the use of socio-economic surveys and landuse plans at Tikina level. Project activities are therefore directly linked to community development objectives. The full project monitoring plan is currently being developed. An initial list of community indicators to be monitored over time are listed in the table below:

Table 20: Community indicators and methods.

No	Indicator	Unit of Measurement	Impact	Methods	Frequency
1	Planting and maintenance contracts	Number of planting and maintenance contracts issued	Increased household and communal income	CI project records	Annually, until 2018
2	Income from planting and maintenance contracts	Total income disbursed to mataqalis for completion of contract work		CI project records	Annually, until 2018
3	Community infrastructure and services	List of improvements / investments to community infrastructure & services paid for by the planting contracts		Community interviews	Annually, until 2018
4	Household infrastructure and assets	List of improvements to HH infrastructure and investment in social or physical assets paid for by the planting contracts		Community interviews	Annually, until 2018
5	Sustainable forestry: timber production	Cubic meters of sustainably harvested wood per year		Community survey, harvest data	Annually once timber begins to be harvested in year 20
6	Income from sustainable forestry	Sale price of harvested timber per cubic meter		Community interviews, harvest data	Annually once timber begins to be harvested in year 20
7	Employees: Local	Number of full-time, part-time, temporary jobs held by members of the local community	Provision of jobs	CI project records	Annually
8	Workshops, training & capacity building events	Number of workshops and trainings held with communities on livelihood activities	Development of alternative livelihoods and new enterprise	CI project records	Annually

9	Livelihood inputs distributed	Number / quantity of livelihood inputs distributed to communities, eg number of sandalwood seedlings, quantity of ginger planting materials, number of bee hives etc	opportunities	CI project records	Annually
10a	Community nurseries	Number of community nurseries established		CI project records	Annually
10b		Number of community nurseries that continue in operation beyond the project reforestation activities		Direct observation	Annually, starting in 2014
11a	Amplification of livelihood activities	Number of respondents who have amplified or increased livelihood / enterprise activities as a result of the initial support provided by the project		Community interviews	Annually until 2018, then every 3 years
11b		Quantity change in area of crop planted or number of livelihood outputs produced as a result of amplification eg: size of pineapple plantation, number of beehives owned		Community interviews	Annually until 2018, then every 3 years
12	Farms / individuals engaged	Number of farms or individuals engaged in the project crop diversification activities eg: planting of ginger, cassava, pineapple	Increased crop diversification practices	CI project records	Annually
13	Yield: focal crop	Average volume of product produced per hectare dedicated to focal crop production. (kg/ha)		Farmer interviews	Seasonally
14	Total cultivated land area: focal crop	Change in area of cultivated land under focal crop planted as a result of initial project support		Farmer interviews	Every 3 years
15a	Traditional landraces of root crop	Area of land cultivated with traditional varieties of yam, cassava and sweet potato as a result of project assistance		Farmer interviews	Annually until 2018, then every 3 years

15b		Number of different varieties of root crop planted in farms		Farmer interviews	Annually until 2018, then every 3 years
16	New farmers applying sustainable practices	Number of new farmers who are applying sustainable management practices promoted by the project	Establishment and amplification of improved agricultural practices	Farmer interviews	Annually until 2018, then every 3 years
17	Soil fertility	% of farmers who participated in project agricultural activities who perceive that soil fertility has improved as a result of sustainable land use practices		Farmer interviews	Every 3 years
18	Land use planning at district level	Comparison of hectares of overlap in land use categories between district land use plans developed at project start vs current land use at future date		Land use mapping + district level workshops	Once at year 15 of project
19	Livelihood participants: women	Number of women participating in different livelihood activities generated by the project	Increased participation of women in income-generating opportunities	Community survey	Annually
20	Model farms	Number of visits to model farms by other stakeholders	Improved community awareness about the importance of environmental management and ecosystem sustainability	Model farm log book	Annually
21	Fire occurrence in project zone	Number of grassland fires that are reported or witnessed in the project zone		1) Project records 2) Police and Fire Dept records 3) Village reports	Annually
22	Food security and nutrition	Number of respondents who believe they have improved food security and nutrition due to alternative livelihoods, crop diversification and increased yield production as a result of project activities (compared with previous reporting period)		Household interviews	Annually until 2018, then every 3 years
23	Resource Management Committees (YMST)	Number of YMSTs established in project zone		CI project records	Annually
24a	Community perceptions about water	Number of respondents who perceive		Community interviews	Every 3 years

	quality and flow in rivers and creeks	improvements in water quality from rivers and creeks			
24b		Number of respondents who perceive improvements in water flow from rivers and creeks		Community interviews	Every 3 years

CM3.2 Develop an initial plan for how they will assess the effectiveness of measures used to maintain or enhance High Conservation Values related to community well-being (G1.8.4-6) present in the project zone.

The watershed value of the project zone (specifically, the Nakauvadra Range) is considered as the ecosystem service contributing to the well-being of communities. Although it will be difficult to ascertain direct causal impact of the reforestation activities on the enhancement of the broader watersheds in the project zone, the project has identified a number of monitoring indicators that can be used to relate the reforestation activities to changes or improvements of the watershed functions of the project site which affects especially the quality and quantity of the water for the domestic and farming use of the local communities. Monitoring will be focused in the south western part of Tokaimalo along the Volivoli creek which is where many of the reforestation sites are located. It is also expected that in due time, as forest cover increases in the area and protects the watershed, additional ecosystem services for communities, such as minimization of soil erosion will be enhanced.

Table 21: Watershed monitoring and assessment indicators.

Indicator	Monitoring Set-up	Location	Monitoring Frequency
Rainfall	Auto recording from Rakiraki weather station	Rakiraki weather station; data accessed from Nadi Weather Station website	Monthly rainfall data
Stream discharge	Marked water level indicators and measurement of stream velocity in two creeks/rivers	Indicators along Volivoli creek and Wainbuka River near Raviravi village, Tokaimalo	Every extreme storm/cyclone during wet season
Surface soil erosion	Two experimental adjacent troughs, one set up at the base of a reforestation site, the other one grassland. Sediments will be collected while run-off passes through to calculate soil loss	Nayaulevu village (reforestation site); Vunisea village (grassland site), Tokaimalo	Every quarter

In terms of assessing the effectiveness of measures to maintain the cultural and religious values associated with the Nakauvadra Range, CI has already succeeded in identifying and mapping the

key archaeological sites through the RAP survey. These were incorporated into the national register of archaeological sites maintained by the Fiji Museum. CI will continue to work with the Fiji government and landowning communities to establish the Nakauvadra Range as a protected area. The management plan for this will incorporate protocols for the conservation of these archaeological sites; it would not restrict access to the sites by local communities.

CM3.3. Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

The Project is currently developing a full monitoring plan which will be completed by the summer of 2013. The plan will be distributed to each village in the project zone, to the Provincial Office, all the Heads of Government Departments stationed in Rakiraki town, key partner organisations such as the Department of Forest, the Department of the Environment, the National Trust of Fiji and the University of the South Pacific (Institute of Applied Science). The plan will also be disseminated on the CCBA website.

BIODIVERSITY SECTION

B1. NET POSITIVE BIODIVERSITY IMPACTS

B1.1 Use appropriate methodologies to estimate changes in biodiversity as a result of the project in the project zone and in the project lifetime. This estimate must be based on clearly defined and defendable assumptions. The 'with project' scenario should then be compared with the baseline 'without project' biodiversity scenario completed in G2. The difference (i.e., the net biodiversity benefit) must be positive.

The 2008 Rapid Biodiversity Assessment found that most of the vegetation in the lowland areas of the Nakauvadra Range is disturbed, and consists mainly of *talasiga* grasslands. Along the creek valleys, several introduced invasive species such as *Albizia saman*, *A. lebbeck* and *Magnifera indica* are found. The regular incidence of wildfires in the grasslands is also resulting in the burning of forest margins which over time, further promotes the conversion of native forest into grasslands. The presence of several endemic and globally threatened plant and animal species, including the critically threatened Fijian Ground Frog, is an indication that the Nakauvadra forests support important biodiversity.

As with the community impacts assessment, the same methods were used to identify the biodiversity baseline scenario and potential project impacts. Discussions during the Land use Planning workshops focused on identifying the problems, constraints and solutions linked to biodiversity and the maintenance of ecosystem services. Participants were also shown a slideshow of the RAP survey and the endangered species found there in order to place into context the biodiversity objectives of the project and anticipated impacts.

The following outlines the main biodiversity impacts that the project aims to achieve:

1. **Expansion of forest habitat**. The project will reforest 1,135 ha of grasslands with predominantly native species, focusing on areas that are adjacent to existing forest remnants or on upland slopes that have been previously degraded by fire and are at risk of further opening up the Nakauvadra Range forest to invasive species. Over time, it is expected that the expansion of forest habitat will provide connectivity with other nearby forest blocks, like the Tomaniivi/Wabu reserve, thereby contributing to the 'ridge to reef' network of conservation corridors on Viti Levu, and facilitating the greater movement and dispersal of species.

2. **Enhancement of populations of endangered and endemic species in the Nakauvadra Range forest**. There are a number of rare, endangered and endemic species found in the Nakauvadra Range. By expanding forest cover and the area of habitat available for these species to feed and breed, the fauna and flora diversity and abundance within the project zone is expected to increase, especially for birds which have larger home ranges. The reforestation component also includes a number of endemic tree species.

3. **Reduction in incidences of wild fires and uncontrolled burning of grasslands in project zone**. Grassland fires result in the burning of native forests and contribute to soil erosion and watershed deterioration. The project is working to reduce the incidence of fires by carrying out fire awareness and educational campaigns with local communities and surveillance patrols with fire wardens. By mitigating fire risks, natural forest regeneration in the vicinity will also be encouraged as new seedlings will be able to establish themselves.

4. **Improved community awareness about the importance and value of biodiversity and ecosystem services**. Through the project activities, awareness raising campaigns and capacity building efforts, the project will achieve a change in perception and understanding about the importance and value of biodiversity, and the direct impact it has on human well being. It is hoped that project will engender a sense of pride and ownership about the crucial role that the Nakauvadra forests play in maintaining key ecosystem flows in the project zone and beyond.

Project activities to enhance and reforest the habitat surrounding the Nakauvadra Range is therefore foreseen to have a net positive impact on both the flora and fauna diversity of the area. Monitoring will have to be undertaken to document changes in the species composition within the project sites. This will also provide valuable insight on the rates of colonization of species when changes in habitat do occur. It is therefore important to identify permanent plots for plants and survey and transect sites for birds that will be regularly monitored to be able to determine the actual impacts of the project on biodiversity.

B1.2 Demonstrate that no High Conservation Values identified in G1.8.1-3 will be negatively affected by the project.

The project is designed to enhance and expand the forest habitat around the Nakauvadra Range, and help promote connectivity with other nearby forest blocks including the Tomaniivi/Wabu Forest. The native tree species that are being used for reforestation are species that are already found within the existing lowland and upland forests of the range. Several of these are endemic as highlighted in the table below. The expansion of native forest cover will also provide additional habitat area for the endemic and endangered species that live in the Range. Therefore the project will only have a positive impact on the biodiversity found in the project zone.

B1.3 Identify all species to be used by the project and show that no known invasive species will be introduced into any area affected by the project and that the population of any invasive species will not increase as a result of the project.

No invasive species will be used. The only non-native species to be planted (*Tectona grandis* and *Switenia macrophylla*) have been present in the area for more than 70 years and are considered non-invasive in Fiji (FAO, 2002). All other species are indigenous and are identified in Table 22 below.

Table 22: List of native species used by the project.

Species	Local name	Family
(E) = endemic		
Retrophyllum vitiensis	Dakua salusalu	Podocarpaceae
Intsia bijuga	Vesi	Fabaceae
Bischofia javanica	Koka	Euphorbiaceae
Gyrocarpus americanus	Wiriwiri	Gyrocarpaceae
Intsia bijuga	Vesi	Fabaceae
Elattostachys falcata	Marasa	Sapindaceae
Barringtonia edulis	Vutu Kana	Lecythidiaceae
Palaquium porphyreum (E)	Bauvudi	Sapotaceae
Pometia pinnata	Dawa	Sapindaceae
Inocarpus fagifer	Ivi	Fabaceae
Cinnamomum spp.	Macou	Lauraceae

Gymnostoma vitiensis (E)	Velau	Casuarinaceae
Casuarina equisetifolia	Nokonoko	Casuarinaceae
Dacrydium nidulum	Yaka	Podocarpaceae
Gonystylus punctatus (E)	Mavota	Thymelaeceae
Santalum yasi	Yasi	Santalaceae
Parinari insularum	Sa	Chrysobalanaceae
Eleocarpus spp.	Kabi	Elaeocarpaceae
Calophyllum inophyllum	Dilo	Clusiaceae
Serianthes melanesica	Vaivai ni veikau	Mimosaceae
Agathis macrophylla	Dakua makadre	Araucariaceae
Myristica spp.	Kaudamu	Myristicaceae
Calophyllum spp.	Damanu	Clusiaceae
Endospermum macrophyllum (E)	Kauvula	Euphorbiaceae
Cananga odorata	Makosoi	Annonaceae
Dillenia biflora	Kuluva	Dilleniaceae
Podocarpus neriifolius	Kuasi	Podocarpaceae
Pagiantha thurstonii (E)	Tadalo	Apocynaceae

As part of the livelihoods component of the project, sandalwood seedlings are being distributed to communities, and training provided on their propagation. Sandalwood (*Santalum yasi*) is naturally found in Fiji and other Pacific islands (Thomson, 2006). During the early nineteenth century, the sandalwood trade in Fiji heavily depleted their stocks and the species survives only as small relict populations (FAO, 2002). The sandalwood will be grown in small plantings around villages and in firebreaks, with the expectation that communities will be able to harvest the valued heartwood and continue to sustainably manage the propagation of the species.

In addition to the native tree species being planted in the reforestation sites, several species of fruit trees are being planted in the firebreaks. The fruit trees are all species that are commonly grown by local communities and will serve to bring in additional revenue for families. Several of the species can also be grafted with productive scions and sold to diversify household income further. Since project inception 8,250 seedlings have been planted (Table 23).

Table 23: List of fruit species planted in firebreaks to end of 2012.

Species Name		**Districts**		
		Naroko	**Naiyalayala**	**Tokaimalo**
Cocos nucifera	coconut	1600	200	900
Ananus comosus	pineapple	2000	1000	1100
Citrus spp	citrus	780	100	220
Artocarpus heterophyllus	jackfruit	5	0	0
Spondias dulcis	wi	10	0	0
Aleurites moluccna	lauci	15	0	0
Annona muricata	soursop	10	50	0
Syzygium malaccense	kavika	60	50	10
Dracontomelon vitiense	tarawau	50	50	10
Terminalia catappa	tavola	30	0	0
	TOTAL	4,560	1,450	2,240

B1.4 Describe possible adverse effects of non-native species used by the project on the region's environment, including impacts on native species and disease introduction or facilitation. Project proponents must justify any use of non-native species over native species.

During the design and consultation phase of the project, teak and mahogany were identified as being key hardwood species prized by communities for their timber value. Physical conditions of Fiji were also examined and concluded to be especially favorable for teak plantations (Ugalde, 2010). Their inclusion in the reforestation component of the project gives the landowning units the option to harvest these trees upon reaching maturity later on in the project lifecycle. However, the use of these species is not expected to have any adverse effect on the region's environment. By completion of the reforestation activities, 86,500 hardwood species will have been planted compared with the estimated 228,000 native species planted. Both teak and mahogany are planted widely in Fiji and have become integrated into the local natural landscape. In the project area, the teak and mahogany seedlings are mainly planted at some distance from the edges of the existing native forest areas, and along mid-slopes as they are more suited to exposed environments. Native species will be planted on land that is closer to remnant forest patches and near waterways (Fig 31). The seedlings used in the pilot phase of the project were also sourced from the Fiji Hardwood Cooperation Forestry Plantations in Nadarivatu, Ba Province, and from the Ministry of Forestry so the introduction of diseased or low quality stock was kept to a minimum.

B1.5 Guarantee that no GMOs will be used to generate GHG emissions reductions or removals.

No GMOs will be used by the project to generate GHG emissions reductions or removals. All seedlings used for the project reforestation activities have been from wildings or raised in local nurseries from seeds collected from parent plants or quality stock from the Department of Forest.

Figure 31: Reforestation with teak (left); and native seedlings (right).

B2. OFFISTE BIODIVERSITY IMPACTS

B2.1 Identify potential negative offsite biodiversity impacts that the project is likely to cause.

There are no anticipated negative biodiversity impacts outside of the project zone. The project will work to expand forest cover around the Nakauvadra Range which will help promote connectivity with other forest blocks located outside the project zone, including the Tomaniivi-Wabu forest reserve to the south west of the project (see Fig 2). However, one potential negative impact of the project *within* the project zone arises from the collection of wildings and seeds from forests located on the lower slopes of the Nakauvadra Range. This was especially the case in the first year of the project when it was difficult to source the number of native seedlings required for the reforestation activities. The project therefore worked with local communities and the Department of Forest to raise the planting materials needed from wildings and seeds collected from nearby forests.

If not done properly by the community collectors, the negative effect of collecting wildings would result in reducing available in situ reproductions that may hinder or delay the capacity of these forest sources to naturally regenerate themselves.

B2.2 Document how the project plans to mitigate these negative offsite biodiversity impacts.

In order to mitigate the potential negative impact of wilding collection, CI Fiji and the Department of Forest has trained and guided local communities-collectors that expressed interest in raising wildings of native species on the proper collection methods, identification of areas and species that may be collected in secondary forest within the project zone that were observed to have abundant wildings. A training guide in Fijian was also produced.

B2.3 Evaluate likely unmitigated negative offsite biodiversity impacts against the biodiversity benefits of the project within the project boundaries. Justify and demonstrate that the net effect of the project on biodiversity is positive.

With the project activity to reforest over 314,000 tree species on land that would have remained as fire-prone grasslands, and with plans to mitigate the potential negative impacts from wilding collection, the project is seen to generate net positive impacts to biodiversity.

B3. BIODIVERSITY IMPACT MONITORING

B3.1 Develop an initial plan for selecting biodiversity variables to be monitored and the frequency of monitoring and reporting to ensure that monitoring variables are directly linked to the project's biodiversity objectives and to anticipated impacts (positive and negative).

Fauna, flora and habitat indicators will be used to monitor the project's anticipated biodiversity impacts (positive or negative). The monitoring will be led by CI Fiji, the Department of Forests, University of the South Pacific and local community members. Monitoring indicators for biodiversity are shown below (Table 24).

Fauna monitoring will be focused on birds and herpetofauna as they are good indicators of forest or habitat health. Birds can be easily detected and community members can be easily trained to conduct bird monitoring. Using point-count method, transects will be placed in reforestation areas making sure to include remnant forest patches within reforestation sites and the adjacent Nakauvadra forest. Bird surveys will be conducted twice a year during wet and dry season and preferably on fine weather days from first light (about 6 am) until about 10 am, the period of peak activity and maximum detectability. For herpetofauna, monitoring will primarily focus on the Fijian Ground Frog as the project zone is the only place on Viti Levu where they are found. Fixed stream transects will be used to survey for frogs by using marked permanent transects and re-survey techniques. This will also be carried out twice a year, in the dry and wet season. This will be used to monitor for any presence or absence and abundance of Fijian Ground Frogs within project zone.

For plants, long-term monitoring plots will be set up, the total number of permanent plots is still yet to be determined and will be finalized once planting finishes. The plots will be monitored annually to detect any floristic changes within the project zone. Data collected will include tree volume, species, and stocking of trees over 5cm in DBH. Braun-Blanquet relevé method will be used to monitor for ground cover.

Habitat condition will be monitored using fixed- point photography. This will monitor major changes in the vegetation of the area by taking photos in several locations at a fixed point at the onset of the project and every six months thereafter. The monitoring frequency will be reduced to once a year after significant changes are not observed bi-annually. Forest cover change will also be monitored using remote sensing and GIS technology. Land-cover maps will be produced every five years to monitor changes in habitat boundaries.

Through the reforestation project it is expected that over time forested areas will be increased as forest patches will be connected through corridors. This will increase the number and richness ofboth plant and animal species relative to the current condition in the project area. As an indicator to assess if the increase in forest cover in the Nakauvadra Range is improving connectivity with the nearby Tomaniivi/Wabu forest reserve, monitoring for the Masked Shining Parrot (NT) will be carried out. Currently, there is a good population of these bird species living in the Tomaniivi forest block, a designated Important Bird Area (Birdlife International, 2013). During the Nakauvadra RAP survey, no individuals were recorded although they were documented in 2004. If populations of the parrot are found to return to the Nakauvadra forests, this will be a good indication of the improved biodiversity connectivity between the two forest blocks.

Table 24: Biodiversity indicators and methods.

No	Indicator	Unit of Measurement	Impact	Methods	Frequency
1	Land reforested	Hectares of land that have been reforested	Expansion of forest habitat	Project planting records	Annually
2	Trees planted	Number of trees planted, disaggregated by native and non-native		Project planting records	Annually
3	Tree survival rate	% of tree survival per planting year		Survival assessment	Every two years until 2018
4	Increase in forest cover	Rate of change in forest cover (%) and (ha)		1) Remote sensing analysis 2) Fixed point photography of reforestation sites	1) Every 5 years for remote sensing 2) Annually for photography
5	IUCN Red List Threatened Species Impacted	The number of species "potentially" inhabiting the project area that are classified as Vulnerable, Endangered, or Critically Endangered by the IUCN Red List Authorities	Enhancement of populations of endangered and endemic species in the Nakauvadra Range forest	IUCN Red List website	Annually
6	Frequency of species (birds)	The number of times that the selected indicator species were observed		1) Point count transects 2) Opportunistic sightings 3) Community interviews	Bi-annually (dry and wet season)
7	Abundance of species (birds)	The number of individuals observed for selected indicator species		Transects	Bi-annually (dry and wet season)
8	Frequency of species (frogs)	The number of times that the selected indicator species were observed		1) Point count transects 2) Opportunistic sightings	Bi-annually (dry and wet season)
9	Abundance of species (frogs)	The number of individuals observed for selected indicator species		Transects	Bi-annually (dry and wet season)
10	Endemic tree species planted	Number of endemic tree species planted in		Project planting records	Annually

		project site			
11	Fire occurence in project zone	Number of grassland fires that are reported or witnessed in the project zone	Reduction in incidences of wild fires and uncontrolled burning of grasslands in project zone	4) Project records 5) Police and Fire Dept records 6) Village reports	Annually
12	Environmental Awareness	Number of environmental education or awareness events conducted with local people	Improved community awareness about the importance and value of biodiversity and ecosystem services	Project records	Annually
13	Communities implementing local policies crafted for natural resource management / conservation	Number of voluntary community policies to enforce bans related to natural resource use eg: use of duva in creeks, no lighting of fires		Interviews with communities	Annually
14a	Community perception about the role of the Nakauvadra Range forests in maintaining key ecosystem flows and the links with human well-being	Number of respondents who perceive that the Nakauvadra Range forests have contributed to human well-being in the reporting period		Interviews with communities	Every 3 years
14b		Ranking of the 5 top benefits the Nakauvadra Range forests provide to local people		Interviews with communities	Every 3 years

B3.2 Develop an initial plan for assessing the effectiveness of measures used to maintain or enhance High Conservation Values related to globally, regionally or nationally significant biodiversity (G1.8.1-3) present in the project zone.

Monitoring and assessment of threatened flora and fauna will be conducted annually to quantify and monitor the trend or number of threatened and endemic species documented within the project zone. The same monitoring methods as described in B3.1 will be used for HCVs as well. Two species will be targeted for monitoring: the Fiji ground frog and the Fiji Long-legged Warbler. These species of frog and bird have been reported through the RAP survey, and the project has designated these species as the priority species for monitoring.

B3.3 Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

A full monitoring plan is currently being developed by CI Fiji, with assistance from the Department of Forests and the University of the South Pacific. Once complete, the plan will be distributed to each village in the project zone, to the Provincial Office, all the Heads of Government Departments stationed in Rakiraki town, the Department of Forest, the Department of the Environment, the National Trust of Fiji and the University of the South Pacific.

GOLD LEVEL SECTION

GL3. EXCEPTIONAL BIODIVERSITY BENEFITS

GL3.1 Vulnerability

GL3.1.1 Critically Endangered (CR) and Endangered (EN) species - presence of at least a single individual.

Between the 17 - 28 November, 2008 CI Fiji together with partners conducted a biodiversity RAP of the Nakauvadra Range. The Nakauvadra Range is located in an area classified as a Key Biodiversity Area (KBA) and is also listed in the 2007 Fiji National Biodiversity Strategy Action Plan (NBSAP) as a site of National Significance in line with Article 6 of the Convention of Biological Diversity (CBD).

The RAP survey recorded a total of 15 globally threatened species as identified by the IUCN Red List 2012. Of these, four are species listed as being either Critically Endangered (CR) or Endangered (E) (Table 25). The discovery of the Fiji Ground frog (*Platymantis vitianus*) which was thought to have been extirpated 20 years ago from mainland Fiji (including Viti Levu) was a particularly important discovery. Eighteen individuals were recorded during the survey. A description of the methods used and the results of each of the species surveys can be found in the RAP report (Morrison and Nawadra, 2009).

Table 25: List of Critically Endangered and Endangered species.

Species	Common name	IUCN
Plants		
Geniostoma cf. clavigerum		CR
Amphibians		
Platymantis vitianus	Fiji Ground Frog	EN
Birds		
Trichocichla rufa	Fiji Long-legged Warbler	EN
Mammals		
Emballonura semicaudata	Pacific sheath-tailed bat	EN

REFERENCES

Atherton, J., D. Olson, L. Farley L. and I. Qauqau. 2005. Fiji watersheds at risk: watershed assessment for healthy reefs and fisheries. Wildlife Conservation Society, Suva, Fiji.

BirdLife International. 2013. Important Bird Areas factsheet: Greater Tomaniivi. < http://www.birdlife.org>

CITES. 2012. Appendices I, II and III. Valid from September 2012. <http://www.cites.org/eng/app/2012/E-2012-09-25.pdf>

Clarke, P. and C.T Gillespie. 2009. Legal Mechanisms for the Establishment and Management of Terrestrial Protected Areas in Fiji. IUCN – The World Conservation Union.

Department of Agriculture, Land Use Planning Section. Land Use capability classification system. A Fiji Guideline for the classification of land for agriculture.

IUCN. 2012. *The IUCN Red List of Threatened Species. Version 2012.2*. <http://www.iucnredlist.org>

IPCC (Intergovernmental Panel on Climate Change). 2003. Good Practice Guidance on Land Use, LandUse Change and Forestry. IPCC, Geneva, Switzerland. Available at http://www.ipcc-nggip.iges.or.jp

IPCC (Intergovernmental Panel on Climate Change). 2006. Draft 2006 IPCC Guidelines for NationalGreenhouse Gas Inventories. Volume 4. Agriculture, Forestry, and Other Land Use. Available athttp://www.ipcc-nggip.iges.or.jp

FAO. 2002. Hardwood Programmes in Fiji, Solomon Islands and Papua New Guinea. Forest Plantations Working Papers. Rome.

FAO. 2012. Teak Resources and Market Assessment 2010. Planted Forests and Trees Working Paper Series.Rome.

Foraete, HM. 2001. Food Security strategies for the Republic of Fiji. CGPRT Centre, Working Paper 55, May 2001.

Future Forests Fiji. 2011. Prospectus 2011.

Gifford, E. W. 1951. Fijian Mythology, Legends, and Archaeology. In: Fischel, W. J. (ed.) Semitic and Oriental Studies. University of California Publications in Semitic Philology, Vol. XI. University of California Press, Los Angeles.

Leslie, A. and O. Tuinivanua. 2010. Asia Pacific Forestry Sector Outlook Study II. Fiji Forestry. Working Paper No. APFSOS II/ WP/ 2009/ 20. FAO.

Manueli, I. 2001 (February 10). Bats in danger of extinction. The Fiji Times, p.3.

Masibalavu.V.; Hunter. D.; Taylor. M.; Mathur. P. 2002. Survery to determine genetic erosion of taro landraces in Fiji. Submitted to Journal of South Pacific Agriculure. USP/IRETA.

Masibalavu, V. 2004. Birds of the Nakauvadra Range. Report 27, Birdlife International IBA Programme. Suva.

Ministry of Lands and Mineral Resources, Department of Lands and Surveys. 2010. Land Tenure Systems in Fiji. <http://www.lands.gov.fj/downloads/landtenuresystems.pdf>

Morrison, C. 2005. Distribution and Diversity of Fiji's Terrestrial Herpetofauna: Implications for Forest Conservation. Pac. Sci. 59(4): 481-489.

Morrison, C., A. Naikatini, N. Thomas, I. Rounds, B. Thaman, and J. Niukula. 2004. Rediscovery of an Endangered Frog Platymantis vitianus, on Mainland Fiji: Implications for Conservation and Management. Pac. Con. Biol. 10: 237 – 240.

Morrison, C. and Nawadra, S. (ed.). 2009. A rapid biodiversity assessment of the Nakauvadra Highlands, Ra Province, Fiji. RAP Bulletin of Biological Assessment 57. Conservation International, Arlington, VA, USA.

Mueller-Dombois, D. and R. Fosberg. 1998. Vegetation of the Tropical Pacific Islands. Springer-Verlag, New York.

Naidu.V.; and Reddy. M. 2002. ALTA and Expiring Land Leases. Fijian farmers' perception of their future. Ford Foundation. Center of Development Studies. School of Social and Economic Development. University of the South Pacific (USP) and Pacific Migration Research Network (PacMRN).

Olson. D.; Farley. L.; Patrick. A.; Waltling. D.; Tuiwawa. M.; Masibalavu.V.; Lenoa. L.; Bogiva. A.; Qauqau.I.; Atherton. J.; Caginitoba. A.; Tokota. M.; Prasad. S.; Naisilisili. W.; Raikabuka. A.; Mailautoka. K.; Morley. C.; Allnutt. T.. 2009. Priority Forest for Conservation in Fiji: landscapes, hotspots and ecological process. Fauna & Floral International. Oryx, 55-70.

Oxfam. 2005. The Fijian Sugar Industry, Oxfam Briefing Paper.

Palmeirim, J. M., A. Champion, A. Naikatini, J. Niukula, M. Tuiwawa, M. Fisher, M. Yabaki-Gounder, S. Thorsteinsdottir, S. Qalovaki, S., and T. Dunn. 2007. Distribution, status and conservation of the bats of the Fiji Islands. Oryx 41(4): 509- 519.

Parham, JW. 1972. Plants of the Fiji Islands. Government Printer, Suva, Fiji.

Pernetta, J. C. and D. Watling. 1978. The introduced vertebrates and native vertebrates of Fiji. Pac. Sci. 32(3): 223-244.

Raj, R. 1993. Extreme rainfall in Fiji and its socio-economic implications, paper presented at the Western Pacific Workshop on Seasonal to Inter-Annual Climate Variability. Bureau of Meteorology, Melbourne, Australia.

Ryan, P. 2000. Fiji's Natural Heritage. Exisle Publishing Limited. Auckland.

Sharma, S. 1999. The Control and Protection of Native Lands in Fiji. *Working Paper 6 of Volume 3 1999. Journal of South Pacific Law.*

Smith, A.C. 1979. Flora Vitiensis Nova - A new flora of Fiji (Spermatophytes only). Vol. 1. Pacific Tropical Botanical Garden, Lawai, Kauai, Hawaii.

Smith, Albert C. 1981. Flora Vitiensis nova: a new flora of Fiji. National Tropical Botanical Garden, Lawai, Kauai, Hawaii. Volume 2.

Thomson, L. 2006. *Santalum austrocaledonicum* and *S. yasi* (sandalwood). Species Profiles for Pacific Island Agroforestry. Permanent Agriculture Resources, Hawaii.

Ugalde, L. 2010. Review of Future Forests Fiji LTD teak timber inventory projections.

Whyte.A.G.D. 1988. Development of the Fiji Pine Commission. An account of the emergence of a major new industry in a developing country. N.Z. Journal of Forestry.

World Bank. 2011. Republic of Fiji - Poverty Trends, Profiles and Small Area Estimation (Poverty Maps) in Republic of Fiji (2003-2009).

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES