

Culturally Diverse Communities and Sustainable Natural Resource Use

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Australian Government

**Department of Sustainability, Environment,
Water, Population and Communities**

Supported by the Australian Government's Transition Program for the
Marine and Tropical Sciences Research Facility (MTSRF)
Project 33: Culturally Diverse Communities and Sustainable Natural Resource Use

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This report should be cited as:

Law, Lisa, Susan McIntyre-Tamwoy and Hurriyet Babacan (2011) Culturally Diverse Communities and Sustainable Natural Resource Use, Marine and Tropical Sciences Research Facility (MTSRF) Transition Project Final Report. Reef and Rainforest Research Centre Limited, Cairns (49pp.).

Published by the Reef and Rainforest Research Centre on behalf of the Australian Government's Transition Program for the Marine and Tropical Sciences Research Facility (MTSRF).

The four-year term of the Australian Government's Marine and Tropical Sciences Research Facility (MTSRF) officially concluded at the end of June 2010. The Commonwealth Environmental Research Facilities (CERF) Transition Program for the MTSRF aimed to deliver new and additional synthesis products based on the contemporary information needs of the primary end users through the synthesis and analysis of pre-existing MTSRF outputs. In addition, the MTSRF Transition Program extended research that is highly relevant to the future CERF key investment areas of the Great Barrier Reef and Torres Strait, northern Australia and terrestrial biodiversity.

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Publication Date: March 2011

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Acronyms Used In This Report

ABGC	Australian Banana Growers Council
AMIA	Australian Mango Industry Association
BSES	.....	Bureau of Sugar Experiment Stations
CADCAI	.....	Cairns and District Chinese Association Inc
CAFNEC	.....	Cairns and Far North Environment Centre
CARMA	.....	Cairns and Region Multicultural Association
CERF	.....	Commonwealth Environment Research Facilities
CSIRO	.....	Commonwealth Scientific and Industrial Research Organisation
DEEDI	.....	Department of Employment, Economic Development and Innovation
FNQ	.....	Far North Queensland
MTSRF	.....	Marine and Tropical Sciences Research Facility
NESB	.....	Non English Speaking Background
NRM	.....	Natural Resource Management
RRRC	.....	Reef and Rainforest Research Centre Limited
SPK	.....	Sib Pab Koom (Hmong language for “to help each other”)
SRDC	.....	Sugar Research and Development Corporation
UNESCO	.....	United Nations Educational, Scientific and Cultural Organisation
WWII	.....	World War Two

Acknowledgements

Our gratitude goes to the many farmers who took valuable time out to speak with us, especially in such a challenging (wet/rainy) year. Thanks also to the many individuals in Terrain NRM, Canegrowers, Cassowary Coast Regional Council, Cairns Regional Council, Tablelands Regional Council, and other organizations listed in this report for sharing their experiences and ideas. Thanks are also extended to Rosemary Hill (CSIRO) for helping in the early phase of the project, to Lyndal Scobell for interviewing farmers and stakeholders and to Alice Buhrich for assisting with the organization of the interview data.

This study was undertaken with funding from the Australian Government's Marine and Tropical Sciences Research Facility (MTSRF) (Project 33). It was supported in kind by the Cairns Institute and the wonderfully supportive staff there who ensured the success of the project from beginning to end (Katrina Keith, Shannon Johnston and Mandy Brock).

Introduction

Agriculture and horticulture in Far North Queensland (FNQ) have been dramatically shaped by Australia's long history of migration: from the early Chinese and European migrants that cleared the land for cultivation to the Italian and Hmong communities currently managing sugarcane and banana plantations (May 1984; Reynolds 2003; Blackman 2005; Tapp and Lee 2004). Indeed, Australia is a multicultural country with nearly half of the population born overseas. This important demographic profile is often not taken into consideration when discussing land use issues, rural development and sustainability. The proportion of people born overseas in FNQ currently stands around 15.2%, but this figure is greater when the birthplaces of parents are taken into consideration.¹ The exceptional ethnic diversity of the settlement pattern of the region from 1889 onwards is illustrated by the fact that by 1996, residents of the local district around Innisfail spoke 48 different languages. This report examines how cultural and linguistic diversity shapes natural resource management practices in FNQ. In particular, this report considers the role that cultural diversity might play in sustainable farming. Given their importance to (and visibility in) the agricultural sector in the region, the main focus of the report is on the practices in those farming communities of Italian, Chinese, Sikh and Hmong descent.

The links between migration and cultural and natural resource management appear in differing ways in environmental research. For example, some researchers have developed models of population and environment interactions that include migration as a response to environmental change (Bilsborrow 1992). In other words, outward migration is modeled as a last resort after land degradation. The relationship between migration, multi-local livelihoods and natural resource management is more complex, however. Sierra (1999) cautions us against conceiving migrant resource-use in narrow/negative terms, pointing to the need for more complex models of migration/environment relations. Some of the mechanisms identified for inclusion in such models include: differential access and use of technologies, differential valuation/knowledge of ecosystems, differential economic resources, differential time horizons, differential incorporation into social institutions that affect use of ecosystems. Studies highlight the importance of systems with strong land tenure or social capital as ones where migrants are able to develop knowledge systems that are compatible to the new environment (Palsson 1998).

The literature suggests that evaluating impacts of culturally diverse communities on place, environment and their natural resource use requires:

- An understanding of their knowledge and technological skills
- Their access to natural resources
- Their values in relation to social, cultural and economic value of resources
- An assessment of how migrants are incorporated into their destination communities
- An identification of the nature of their ties to places of origin
- Assessment of social capital, trust, communication, information and networks (Curran 2002; Naylor et al. 2002; Babacan 2006).

Outside Australia there has been a growing interest in capturing 'traditional' farming knowledge (see Winarto 1996, 2004; Shiva 1995; Richards 1980; Scoones & Thompson 1994) with the recognition that "For thousands of years farmers have been the producers of

¹ <http://www.oesr.qld.gov.au/queensland-by-theme/demography/population-characteristics/tables/country-birth-sd-qld/index.shtml>

knowledge, the primary innovators and experimenters in food-crops farming” (Winarto 2004:241). This interest is connected to the growing awareness that environmental sustainability is dependent on understanding the linked systems of humans and nature and the ability of these linked systems to deal with change (Davidson Hunt & Berkes 2003a). In this current research project we explore whether farmers integrate such knowledge into their framing experience in northern Australia and if so how they might contribute to the environmental sustainability (or otherwise) of agricultural practices in far north Queensland.

There has been very little research in Australia focusing on culturally diverse communities and their relationship to sustainable natural resource use. In the last decade, however, some research has focused on Indigenous cultural practices in relation to natural resource management and this project draws on this body of knowledge for insight. Making this link between Indigenous and cultural diversity, and practices of natural resource management (NRM), is important because: (a) they are different responses to the environment from the mainstream; (b) it is knowledge that existed prior to the white settlement of Australia; and (c) while there is cultural diversity in Indigenous communities, Indigenous perspectives are distinct. Studies of Indigenous NRM have tended to focus on specific geographic areas or specific practices or species. While some generalizations can be drawn from such studies further research is required to do so with confidence. There is a great diversity of Indigenous practices across Australia and disruption to knowledge transmission systems is also an issue in some areas. As far as is practicable we review the findings of the current research in the context of Australian Indigenous traditional ecological knowledge from this region to identify any correlations, synergies or conflicts in approaches to the sustainable use of resources.

This report explores these elements around the key themes of cultural practice, social capital and perceptions of sustainable farming/natural resource management. It identifies the strengths of culturally diverse communities and considers how traditional knowledge might be utilized for sustainable resource management. By drawing on four culturally diverse communities, this research examines social, economic and cultural perceptions and practices in relation to natural resource use and conservation.

Research objectives

This research focuses on examines how cultural and linguistic diversity shapes natural resource management practices in FNQ. The specific research objectives are:

- To identify social, economic and cultural perceptions in relation to natural resource use and conservation in selected culturally diverse communities;
- To map natural resource use practices in the target communities;
- To determine the application/relevance of traditional ecological conservation practices to their current natural resource use
- To critically analyse the link between social/cultural capital and cultural continuity, adaptation, and change for sustainability practice
- To identify how social values of biodiversity can be used to prioritise management and investment decisions in a way that promotes sustainable use of natural assets

To achieve these objectives the report is organized as follows. We first provide a literature review that outlines the relevant debates in the literature on sustainable NRM in Indigenous communities and social capital for migrants. We then detail the methodology for the research, including some of the study’s limitations. Finally, we provide analysis of how these relate to sustainable farming practices and we conclude with some recommendations for further research.

Literature Review

A detailed review of the current literature was carried out to shape the direction of the interview questions and to focus the research. This review focused on:

- How people understand the environment/Indigenous Knowledge Systems
- Understanding the concepts of linked systems of humans and nature/social ecological systems
- Understanding the profile and history of multicultural rural Australia with a focus on North Queensland
- Understanding the dynamics of culture, population dynamics and environment
- Land Management Frameworks

Indigenous Knowledge Systems

Indigenous Knowledge (IK) Systems, also referred to as Traditional Ecological Knowledge (TEK) are attracting increasing attention in relation to their role or potential role in achieving sustainable conservation goals (Folke 2004; Berks 1999; Mauro 2000). This is in part because experience indicates that efforts that ignore indigenous knowledge, and local systems of knowledge more generally, tend to fail (Tripathi & Bhattarya 2004). There are a number of studies that have specifically looked at TEK in relation to agriculture (Scoones & Thompson 1994; Well 1991) and the potential to integrate such knowledge into the development of new sustainable agricultural practices (e.g. Winarto 1996, 2004; Fujisaka 1995).

In most studies IK or TEK is accepted as 'local' knowledge unique to a particular culture or society and further that this knowledge has evolved within the community and been passed down through successive generations. However, what happens when groups of farmers relocate to new environments and this Traditional Ecological Knowledge is applied to new (although perhaps environmentally similar) contexts? There has been little research in this field and it is unclear in the Australian context to what extent (if any) traditional practices from homelands of origin have been integrated into the farming practices of Australian immigrant farmers.

Australian Indigenous Relationships with Nature

Aboriginal people conceive the species and landscape as an intimately connected set of phenomena with both material resources for practical usage and an encompassing sentient spirituality (Rose 1996). This relationship is complex and multifaceted with regional differences across Australia (Petersen and Rigsby 1998). The literature varies between a general consideration of the nature of the relationship (Rose 1996) to the detailed description of certain practices or types of knowledge regarding plants (King 1997) or fire regimes (Preece 2005) or other specific practices. There is a related discussion in the literature that questions conservation frameworks based solely on western science, and which advocate a more meaningful inclusion of Indigenous frameworks of land stewardship (e.g. Adams 2004; Ross and Pickering 2002; Williams & Baines 1993; Lewis 1992).

There is very little literature that compares and contrasts the relationship of Aboriginal Australians to the land and that of other ethnic groups except for other hunter gatherer societies such as the Native Americans and Canada's first peoples (however see Byrnes et al. 2006 for some general observations).

Social Ecological systems and adaptive learning

There is a growing body of literature around understanding and defining social ecological systems (SES) and gauging their sustainability (e.g. Folke et al. 2002; Folke et al. 2003; Walker et al. 2002). Folke et al. (2003) identify four principles for building adaptive capacity:

- 1) Learning to live with change and uncertainty
- 2) Nurturing diversity for re-organization and renewal
- 3) Combining different types of knowledge for learning and
- 4) Creating opportunity for self organisation

They suggest that “human actions framed by a dynamic and diverse social memory, in tune with ecosystem dynamics have the potential to build adaptive capacity” (Folke et al., in Davidson Hunt & Berkes 2003a). Related to this literature on SES are a number of papers concerned with adaptive learning and adaptive governance in relation to social-ecological resilience that may provide useful frameworks for this research (Davidson-Hunt & Berkes 2003a; Davidson-Hunt & Berkes 2003b; Folke et al. 2003; Walker et al. 2002).

Questions which arise from this literature in the context of the current study include: Is ‘social memory’ transferrable to new socio-political and environmental contexts? Is the application of cultural practices and indigenous knowledge to new landscapes of similar climatic qualities enough for social indigenous knowledge to be considered ‘in tune’ with ecosystems dynamics? If not, what if any are the attributes for successful transfer and application of such knowledge to achieve the fourth principle as listed above?

Culture and the Environment

There is a large literature related to culture and environment, particularly in relation to Indigenous culture but also in relation to environmentalists and their relationship with the environment. A definition of culture is useful here:

The set of distinctive spiritual, material, intellectual and emotional features of society or a social group, and that it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs (UNESCO 2002:12).

In the Australian context relatively few academic papers explore the relationship of Australians generally with the environment except with regard to the ‘uptake’ of better environmental practices (e.g. Vanclay 1992). Even fewer deal with the relationship between the culture of rural communities and farmers and the environment (although this is touched on tangentially by some researchers such as Vanclay 2003).

Environmental anthropology -- sometimes referred to more broadly as ‘environmental humanities research’ (Head et al. 2005) – is a growing field of research and some of the literature has general application to the current project. Much of the research is firmly focused on Indigenous Australians and their relationship with nature but as Mulcock et al. (2005:281) point out: “Extensive research on Aboriginal relationships to land and natural resources has provided the foundation for growing anthropological interest in the interactions of other Australians with the biophysical environments they inhabit. Australian-based anthropologists also continue to contribute to research on environmental beliefs and practices in other parts of the world.”

In an interesting twist Waitt et al. (2003) consider public perceptions of agricultural features as ‘nature’ although not the perceptions about farmers on nature. More relevant to the

current research, however, is Head et al.'s (2005) more inclusive understanding of the relation between culture, environment and adaptation. They pose the question thus:

What can attention to culture tell us about diverse human adaptations to the range of ecological settings across this vast continent? What are the implications of Aboriginal knowledge of place, nature and landscape, developed over millennia of intimate subsistence occupation of the continent? How have British settler cultural traditions changed through interaction with Australian environments? Are there identifiable influences brought from Asia through the historical arrival of migrants and visitors from such countries as China, Vietnam and Indonesia? These themes prompt the broader question through which we frame this discussion, namely, can we afford to ignore the issue of 'culture' in understanding past and present human-environment relations, and in canvassing possible future developments? (Head et al. 2005:253).

Migrant groups and attitudes to nature

As a subset of research within the culture and environment fold we are particularly interested in how particular groups conceptualize and relate to the Australian natural landscape. Mandy Thomas' (2002) research on Vietnamese migrant perceptions of national parks is exemplary here. Thomas (2002) shows how Vietnam's high population density and subsistence agricultural base lead to people having an understanding of landscape as "imbued with social relations, personal experiences and human engagement" (Thomas 2002: 47-48). The Vietnamese Australians interviewed by Thomas viewed the Australian landscape as a "...harsh, spacious, empty, dry continent" (Thomas 2002:128), with migrants and their immediate offspring seeing national parks as somewhat frightening and dangerous.

Although there have been significant attempts to bridge the misconception that humans and nature are separate entities (e.g. Byrne et al. 2001; McIntyre-Tamwoy 2004a & 2004b) there is still a tendency for Australians to view nature as being something outside their local domain, and situated in the outback, wilderness or national park. Head et al. (2005) consider this a major impediment to the achievement of environmental conservation goals. If this is the case for Australians who have been here for many generations then what might we expect to discover about the attitude to nature in recent immigrants for whom the Australian landscape may be very alien?

Byrne et al. (2006) put this separation of humans and nature down to a secularization of nature or more specifically that "the post-Reformation rationalist Christianity of Anglo-Celtic migrants led to a degree of institutional religious disengagement with nature, a disenchantment of places, that may tend to obscure the spiritual tone of the relationship that many Anglo-Australians clearly do have with the natural environment" (Byrne et al. 2006:103). Relevant to the current project is the assertion by the authors that "migrants from East Asia can be seen to be drawing their cultural links closer to the natural landscape ... by engaging this landscape with wider narratives of emplaced spiritual presence" (Byrne et al. 2006:103). Their study was set in urban Sydney and focussed on the national parks surrounding the city, but it is possible the same could be said of migrants in more rural contexts. The authors refer to the concept of 'transnational ethnoscaapes' (after Appudurai 1996) to explain the connection of places within the Australian landscape to those places which occupy a similar religious or spiritual significance from their homelands of origins. They conclude that "migrants are not so much reconstructing Australian nature as they are connecting it to particular, already existing, transnational religious landscapes" (op cit. 2006:113).

Social capital in multicultural rural Australia

Finally, there is an extensive literature across a number of disciplines relating to multicultural diversity in rural Australia. While the literature does not explicitly address issues of environment and/or NRM, it is a useful backcloth for discussing how environmental knowledges might be preserved, transformed and/or passed on. An excellent, and synthetic, overview of the debates surrounding multicultural rural Australia is provided in Missingham et al. (2006). Yet even this review is largely devoid of discussion of the farming practices transferred from prior homelands to an Australian context. There are some studies that discuss farming and technology transfer in an historical context, for example the history of Chinese farming in Australia (Frost 2002; May 1984), or the history of sugar plantations in Queensland (Griggs 2000), but few have investigated how ethnic farming practices might be carried over and relate to agricultural sustainability in the contemporary context (although see Hogan and Cumming 1997 and Gray et al. 1998 for related discussions). Only Price's (1963) study of southern Europeans in Australia addresses the issue head-on, where he suggests these groups quickly adopted Anglo-Australian farming practices as the shift from sustenance agriculture to larger scale cropping was new to them.

Missingham et al.'s (2006) review raises a number of important issues that have significance for this research. For example they suggest, albeit with little or no actual evidence, that:

Lacking opportunities for advancement within the rural community many immigrant background families invest in education and social mobility for their children to gain trades and obtain service and professional jobs. This gives rise to a tendency for the second generation to leave the agricultural sector, drawing upon ties of kinship and friendship in urban areas (Missingham et al. 2006:144).

The authors speculate that this may have significant consequences in relation to the uptake of and development of improved environmental practices. They suggest that the "absence of intergenerational transfer may undermine a willingness to invest in environmental remediation or improved farming practices" (op. cit. p144). Within our current study area this may be something to consider in relation to more recent groups such as the Hmong, who have difficulty finding work outside the farming section. It may also be relevant for Italian and Sikh families in the region, however, even though they have for the most part been here for multiple generations. It is only now that there is uncertainty about who will carry on the family farming tradition, as wives work off-farm and children have gained trades and further degrees.

Finally, Missingham et al. speculate that there is a link between the development of social capital and the sustainability of rural communities (see also Cocklin 2005). Drawing from Dibden and Cocklin (2003), they define social capital as networks of reciprocity and trust. In Wall et al.'s terms (1998:304, in Missingham et al. 2006:144) social capital is "the mutual relations, interactions, and networks that emerge among human groups ... found within a particular group or community." An ethnic community's social capital encompasses resources available to an individual through their membership in that community or group. It involves shared feelings of social belonging that enable groups to set up institutions and other networks that members can access. Social capital in these communities exists in the social relations among community members and with institutions of society (Giorgas 2000). Many writers suggest that culture and ethnicity can be considered a distinct form of social capital which is constructed from one's cultural endowments and includes obligations and expectations, information channels and social norms (Zhou and Bankston 1994: 824).

Babacan (1998, 1999, 2006) points to the difficulties faced by immigrants in rural Australia, particularly women, during the settlement processes. She points that settlement issues act

as a hindrance to the transference of social capital from their country of origin. These are experienced as alienation relating to relationships with the land, relationships with people and networks, understanding policies and systems in place and inability to utilize skills in their new environment. This circumstance changes over time, and immigrants contribute with their cultural knowledge to the making of 'place'. Similarly referring to social capital among refugees, Loizos (2000:132) states that "the package of customs, beliefs and practices from before their dislocation which continued to serve them in diasporic adjustment."

For this study, it is important to consider how these issues of social capital shape everyday worlds and access to institutions and information that shape farming. It is for this reason we included interviews with agricultural organizations/Stakeholders, with explicit questions about their knowledge and communication with these groups. We examine how ethnic farmers engage (or not) with agricultural organisations, but we also include cultural organizations/Stakeholders, which are particularly important for more recent migrants.

Methodology

The research for this study was undertaken in three phases. First we undertook a literature review to map the key concepts and debates relevant to the research. We then began consultations with Stakeholders, with an aim to make connections to the relevant farming communities. Finally, we interviewed farmers. In this section we recount the process and discuss the limitations of the research.

Consultation with Stakeholders

The first phase of the research involved consultations with stakeholders involved with the ethnic farming community (see Table 1).

Table 1: Key Stakeholders interviewed in the research

Local government:	Cassowary Coast Regional Council Tablelands Regional Council Cairns Regional Council
State/national bodies:	Terrain NRM Department of Employment, Economic Development and Innovation (DEEDI) Transcultural Mental Health (FNQ region)
Farming specific:	Australian Canegrowers Association (Innisfail, Tully, Tableland) Mareeba District Fruit and Vegetable Growers
Ethnic associations/ organisations:	Migrant Settlement Services Cairns and District Chinese Association Inc (CADCAI) Cairns and Region Multicultural Association (CARMA) SPK Housing (Hmong migrant organization)

Stakeholders were approached for introductions to ethnic farmers and liaised with these groups to help introduce our research and find willing participants. Stakeholders were also interviewed regarding their knowledge/perception of ethnic farming groups and their cultural practices (including environmental practices) (see Appendix 1 for interview questions). Of interest for the research was how Stakeholders communicate policies and ideas to these communities – i.e. what kinds of consultation and engagement mechanisms exist for communicating with these groups? Also Stakeholders were queried about their institutional awareness of any environmental innovations in these communities (ones that might be

marginal to mainstream practice). In addition to environmental organizations the team also interviewed cultural/migration specific organizations, as they have knowledge of settlement phases of ethnic farmers, farmer integration in the communities and more general demographic information (i.e. education, age distributions, etc). All Stakeholders assisted with introductions to farmers in their respective communities, and advised the research team on cultural protocol.

Interviews with farmers

The second phase of the research entailed data collection using a 'constructivist grounded theory' approach (Charmaz 2003). In other words, the team developed an analytical framework from findings 'on the ground'. This phase of the research began with interviews within the four communities set out in the early days of the research (Italians, Chinese, Sikh and Hmong). These four groups were identified as ethnic communities that were long- and medium-term settled in Far North Queensland. Figure 1 presents a map of the study area where we conducted interviews. There are well established Italian communities throughout the region, with a long-term established Sicilian community from Innisfail to Ingham and some northern Italians on the Tablelands. Chinese farmers were once located throughout the region but are now dispersed in small numbers (many of the Chinese who remained in Australia after Federation moved out of agriculture due to a number of restrictive agricultural policies). The Hmong have tended to settle in the Innisfail region, although there is a small Hmong farming community near Mareeba. Finally, the Sikh farming community has mostly settled along the coast south of Cairns, from Gordonvale to Cardwell. Indeed, there are two Sikh temples in Gordonvale indicating the size of the community (see Plate 1).

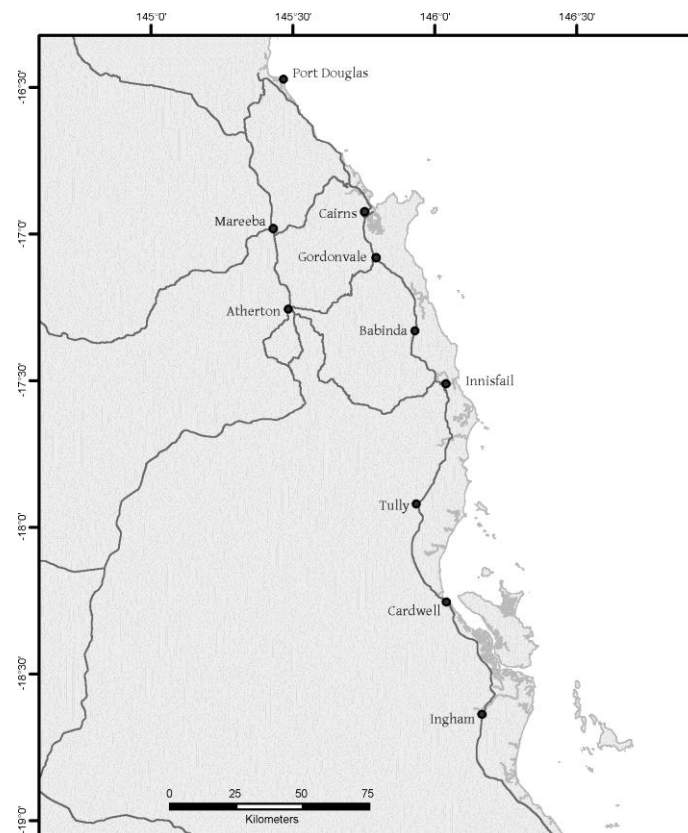


Figure 1: Map of Study Area



Plate 1: Sikh temple Gordonvale (Photo R& S Levy reproduced under Wiki Media license)

The latter phase of the research was interrupted by Cyclone Yasi, however, which necessitated a broadening of the initial research categories. The Hmong and Sikh interviews set up the week Yasi struck could not be undertaken due to damage along the coast south of Cairns. For this reason the ethnic categories of the study were broadened to include shorter-term migrant groups in less affected areas. A list of the farmers interviewed over the course of the project is presented in Table 2.

Table 2: Farmers interviewed in the research

Ethnic background	Property size	Main crops
Italian x 2	100 acres	Sugarcane, mangoes, limes
Italian x 2	100 acres	Coffee
Italian x 2	1500 acres	Cane
Italian x 2	110 acres	Mangoes, table grapes, limes
Italian	1000 acres	Tea, cattle
Italian	120 acres	Bananas
Italian	30 hectares	Mangoes
Chinese	80 acres	Microbes, bananas
Chinese x 2	Domestic vegetable plot	Bok choy, cucumbers, lettuce
Chinese	52.5 hectares	Bananas
Hmong	95 acres	Currently developing for vegetables
Hmong	28 acres	Bananas, galangal, tumeric
Sikh x2	1000 hectares	Cane
Sikh	2200 acres	Cane, bananas
Albanian	120 acres	Avacadoes, bananas
Papua New Guinean x 2	2.1 hectares	Taro, cassava, beetlenut, market garden vegetables
Samoan	120 acres	Taro
Japanese x 2	60 hectares	Eggs
Bhutanese x 5	N/A	Community gardening

Our interviews with farmers were set out in five themes and are presented in Appendix 2. The first set of themed questions solicited demographic data, a sense of cultural identification and finding out the size of the farm, crops grown, etc. The second theme charted the family's migration background, which often necessitated multiple generations being present to assist in the narration of that history. The family's migration background was the focus of the third theme, including how their family settled in FNQ and became involved in farming. The everyday practice of farming on the property now as also discussed. We examined how land tenure/farm size/technology differed across their home countries and Australia, and asked them to reflect on ethnic farming practices. The fourth theme of the research queried environmental perception, including farmer's interpretation of various terms dominant in government policy and public discourse (climate change, biodiversity, sustainability). In the fifth and final theme, farmers were asked to reflect on the future of farming in FNQ.

Limitations

Caution must be exercised in the application of the findings of this research across the broad multicultural use of natural assets across Australia. We acknowledge the small sample size of the interview groups which were further reduced in the aftermath of Tropical Cyclone Yasi which hit the area. Understandably some participants were no longer available for interview and it was at this time that a number of other participants were recruited from within the region (but outside the original target groups). The authors also acknowledge that not all cultural groups were covered in the region, again making a broad application difficult. Finally we note that cultural groups are not homogenous and there may be variable practice across any particular ethnic community.

However, the interviews do provide a wealth of information from the participants which provide valuable insights into a range of issues around sustainability and environment and suggest avenues for further research.

Findings/Results

The findings presented here follow the interview themes outlined above. First we discuss the migration and farming backgrounds of our interviewees. We then elaborate their ethnic farming practices, and other cultural practices that are significant to ethnically diverse farming communities in FNQ. We go on to highlight farmer involvement with Stakeholders, which is followed by a discussion of the significance of social capital. In the final sections we discuss farmer perceptions of environment, climate and natural resources. This includes a discussion of farmer perceptions of sustainable farming. Although the initial research direction was to differentiate how culturally diverse approaches are *distinct* from mainstream practices and views, the research did not clearly lead to this conclusion and here we explore some of the reasons this is the case.

Migration and farming backgrounds

The interviewees for this research are presented in Table 2 (above). The majority of our interviewees were Italian, who have been a major migrant presence in Cairns since the 1890s, when they came to work on sugarcane farms and replace the Pacific Islanders no longer welcome under the White Australia policies (Graves 1993). Another wave of Italian migrants came after WWII (Castles et al. 1992; Cresciani 2003). The Italians we interviewed were second generation farmers, although we often had two generations present for the interview to help answer questions about migration history and to elaborate past and current farming practices in Italy (if they knew them). The majority of our interviewees had come from farming families in Italy, although the farming they engaged in was smaller-scale and in different crops (although two had grown tobacco in both Italy and Australia). The majority had also arrived in FNQ via another place, sometimes as far away as Melbourne. Several had experience in the banana and cane industries along the Queensland coast, but also came to FNQ for cane cutting or when tobacco was ready for picking. Many Italians saw the opportunities for farming during these sojourns, and eventually migrated to share farm or lease property, before eventually saving enough money to buy their own farm.

Chinese farmers were included in the research because of their importance to the agricultural history of the region since the establishment of Cairns. The Chinese descendents that we interviewed for this research has migration histories stretching back to the Palmer River Goldfields. Thousands of Chinese migrants arrived to work these fields, and when the gold began to diminish migrated to other FNQ regions to engage in a range of enterprises, including pearling, shop keeping and agriculture (see Plate 2). The Chinese played pioneering roles in clearing the land, establishing sugarcane and bananas and setting up the first market gardens (see May 1984; Reynolds 2003) (Plate 3). As May (1984:12) sets out in her study of the Chinese in Cairns:

Between 1897 and 1900, both production of Chinese cash crops in Cairns and the influx of new immigrants reached a peak. The size and prosperity of the agricultural sector was reflected in the Cairns Chinese quarter which boasted several large merchant firms, two temples and a proliferation of smaller shops and boarding houses.

In other words, the Chinese advanced and molded the early agricultural economy of FNQ, though that history often marginalised in popular perception. This is partly because the stream of migration from China ceased with restrictive immigration policies implemented in the decades following Federation. Those who stayed were fortunate to have themselves declared British subjects prior to 1901, which entitled them to own land. With time the numbers of Chinese involved in farming has tapered off, although there remain a few in the cane and banana industries.



Plate 2: Welcome at the Joss House, Innisfail, Queensland 1890-1910
(<http://nla.gov.au/nla.pic-vn3551238> Photo courtesy of the National Library of Australia)



Plate 3: Chinese labourers load bananas onto small boats on the Johnstone River, bound for the Sydney market (John Oxley Library, State Library of Queensland, Image number 128185)

The Hmong are also important to the ethnic farming community in FNQ, and are largely concentrated in the Innisfail region – although there is a small Hmong community on the Tablelands near Mareeba. Many of our interviewees – which included farmers and Stakeholder representatives in ethnic associations – came to Australia in the late 1970s from refugee camps in Thailand. Most settled in Tasmania, Sydney and Melbourne, but by the mid-1990s there was a secondary migration to north Queensland. As Wronska-Friend (2004:98) notes: “from about 1996, north Queensland became the major centre of the Hmong population in the country, with more than 800 people representing 52 households and twelve clans in 2002.”

By 2000 there were close to 1000 Hmong living in the Cairns district, with many engaging in farming and market gardening (Tapp and Lee 2004). There are cultural differences within the Hmong community, however. Those settled in Cairns are predominantly ‘Green’ Hmong, many of whom have converted to Christianity and work as non-agricultural labourers. There are also approximately 550 White Hmong that settled in the rural Innisfail area. Wronska-Friend (2004:98) claims that: “the majority of the Innisfail Hmong still follow their traditional system of belief, in which the shaman plays the important role of mediator, connecting the world of the living with the realm of spirits.” The Hmong farmers who participated in this project had some involvement in farming before coming to FNQ. Whether this was in Laos, Thailand or in Tasmania, most had some experience of growing rice, vegetables or corn. The main reason for turning to agriculture, however, was a lack of access to other jobs due to language difficulties. In this research we learned that the numbers of Hmong migrating to Cairns has increased, especially after Cyclone Larry which provided incentives and opportunities to find new livelihoods in the city.

The Sikh farmers and stakeholders interviewed for this research were from the Punjab region of India, and, much like the Italians discussed above, came over in one of two waves. The first wave was in the late 1800s, as many Sikh’s were moving throughout the British empire in Southeast Asia and in Hong Kong, and another after wave after World War II either through sponsored migration through family members or through other channels like education (and the Australian government’s Colombo Plan) (de Lepervance 1984). Sikh’s now constitute 14% of all people of Indian origin in Australia, a large percentage given that only 2.5% of people in India are of Sikh heritage, and there are 3000 Sikhs registered in the state of Queensland.² The Sikh farmers we interviewed and learned about through stakeholders were sugar cane and banana farmers with the largest concentration in the Innisfail-Tully region (prior to this more Sikh’s lived in the Gordonvale region, where there are two Sikh temples). Through Stakeholders we learned there was a new wave of migration from the Punjab to Australia through education, but due to recent visa restrictions these numbers were on the decline.

As explained above, the latter phase of the research was interrupted by Cyclone Yasi. The additional Hmong and Sikh interviews set up the week Yasi struck could not be undertaken due to damage along the coast south of Cairns. For this reason the ethnic categories of the study were broadened to include shorter-term migrant groups in less affected areas. We thus interviewed farmers with Albanian, Japanese, Papua New Guinean and Samoan ethnic heritage to supplement our findings.

² <http://www.sikhcouncil.org.au/sikhsinaustralia.html>

A note on ethnicity and identity

Although this project did not set out to investigate 'identity' issues, a note on the way our interviewees perceived our research categories and their own ethnic identity is warranted. Although these issues are addressed only briefly here, they have an impact on the way in which some farmers not only perceive their environment but also the way in which they interact with it and learn about it (we discuss this as it emerges in the report). It also has implications for how the data from the study is set out. Even if the interviewee identified as Australian, we identify them with an ethnic marker.

All the Italian interviewees asserted that they were 'Australian' and 'felt' Australian. However, a strong attachment to the ancestral place of origin is also an important part of their identity. A first generation Italian Australian farmer articulated this as a dual sense of 'belonging': "You sort of are attached to your country, to Italy ... I'm Australian, I [will] never live anywhere else, [but] in a sense, Italy is home." Others strongly identified with their 'regional' heritage (i.e. as in Australian-Sicilian) despite being 2nd or 3rd generation Australian. In some case this regional identity was structured around a social club.

Similarly many Sikh farmers were born in the FNQ region and understand themselves as Australians who are Sikh. For example, one farmer claims: "I was born here so I guess [I'm] a mixture of Sikh and Aussie culture." However, another farmer stresses the significance of his Sikh heritage (from the Jalandhar region). When asked how he would identify if someone asked him he said: "I don't think anyone really asks me. They look at me and say, oh he's an Indian. If I had to say ... well I'd say yes I'm an Indian but Sikh religion". This is despite the fact he was born Gordonvale.

Amongst the Chinese farmers interviewed in this research, the results were consistent. Interviewees identified as New Zealand-Chinese, Chinese-Australian (children born here and mother born overseas), Chinese-Australian (grandfather arrived last century), Chinese (born China), Chinese (4th Generation Australian) and Australian-Chinese (born in FNQ, 3rd generation). The strong identification as Chinese, despite many generations in Australia, may be due in part to renewed acknowledgement and interest in the important role that the Chinese played in the early history of the Cairns region (and northern Australia generally).

The remainder of our interviewees had different contexts/ideas. For instance, the Japanese farmer declared: "Our inside has become Australian actually and we love [it] here. But still as a nationality we are Japanese." This is largely due to the fact that Japan does not allow dual citizenship, unlike some countries. Other interviewees had harsh views regarding assimilation, which may owe more to racist discourse from sections of our community and the media than they do to how people think of themselves. One farmer advised that he called himself 'Aussie' and that while his ethnic group is Albanian, he has fully assimilated: "Once you come here and you don't assimilate, they should send you back, okay? We've assimilated – nobody knows what I am." The more recent migrants to Australia generally do not think of themselves as Australian. The Hmong, for example, identify as Hmong (or Hmong *Australian* or Hmong *Amu*), and the Papua New Guineans and Samoans identify with those countries (and in the case of PNG, a specific region). These later groups clearly see themselves as somewhat isolated from mainstream Australians.

Despite these differences and complexities, in this report we identify our interviewees as coming from particular ethnic groups (i.e. 'Sikh farmer'). While this is clearly not ideal and conceals some of the complexities of identity, it enables us to address the main objectives of the study which examine the relations between cultural communities and natural resource use. In particular, identity is important in building and retaining social capital that is important to ethnic farming practice. In a study of six immigrant groups (Germans, Dutch, Hungarians,

Poles, Italians and Greeks), for example, Giorgas (2000) found that levels of social capital among Italians and Greeks were relatively high. Both groups had a collective sense of identity and saw themselves not only as individuals and family members, but part of the Italian/Greek–Australian community. Giorgas argued that made them better able to organise and unite for a common purpose, gave them greater collective command over resources and helped maintain and build social capital. We explore these issues below.

Ethnic farming practices

One of the major findings of our research is that large-scale industrial food production is resistant to cultural variation. The size of Australian farms, and the regulation of crops in a general sense, appears to have homogenized farming practice. Our interviews revealed that few specifically ‘ethnic’ farming practices were practiced among Italian, Chinese, Sikh and Hmong communities. There were slightly more practices that could be interpreted as ‘ethnic’ amongst our Samoan and Papua New Guinean farmers, but these differences can largely be accounted for in the scale of the farming. In general, farmers related these similarities/differences to similarities/differences in farming systems between Australia and their home countries.

In Italy, for example, farms were smaller and in many cases not connected to each other. This was largely a result of passing down lands to the next generation.

Italian farmer: I went [to Italy] when I was a young fellow ... they were traditionally small [farm] blocks, not one consolidated holding. I remember ... that they were surprised that someone could own say 100 acres or 80 acres ... [In Italy] there were more holdings, very fragmented, not together, so you'd have a lot of travelling between blocks. You might own a series of blocks ... [What they grew] was completely different, for example they were into grapes, they made wine, and they made cheese products ... They grew wheat.

Italian farmer: [In Italy] you had little fields here and little field there ... people used to fight over the boundaries and try to sneak a little ... when I think about it now, we don't even walk the perimeter of [our farm here] ... there is heaps of land lying fallow. But over there, every little inch counted ... [and] you were taught to respect it.

Italian farmer: [The farms in Italy] were tiny ... Farming-wise they're really passionate about the ground, that's one thing ... [about] a lot of Italians that came here. Every little bit they put in, it's got to be spot on and you're trying to get your maximum out of it, simply because they come from that background ... Because in Italy – we've got 110 acres here – in Italy they might have a farm [of] about 5 acres. I guess if you had 10 acres in Italy, that's ... not a bad size. So the farms are small... [and] you're just trying to get the maximum out of it ... You had to be self-sufficient ... Each farm would grow a whole heap of different crops just to keep [them] going, because it wasn't a case of going to the supermarket.

The size and dispersed nature of land holdings was also raised as an important difference by an Albanian farmer we interviewed:

Albanian farmer: My father was involved in farming [in Australia] since 1929 and we've carried on ... Your plots of land in Albania were not one big area. You had two acres over there, another three acres over there. They were all over the place. Because in Albania they did not live on the farm ... In the old days, the towns were fortified against invaders. They farmed outside the town walls, but didn't live out there.

I think that was right through Europe ... because of the Turkish occupation of Albania, it was more relevant to be in a fortified town than on a farm out in the middle of the sticks a few kilometres away ... Everything was done with a hoe or ... oxen, donkeys. So it was very small scale, very antiquated and they were barely making a living. That's why they left ... no one would leave their own country if they were well off. Because to endure another country's language problems, and all those sort of things, no one would leave because they wanted to leave.

Because the blocks were small and dispersed, this had implications for farming practice. Because the size of the properties was so much smaller, and because land was less expansive, there was an entrenched culture of taking care of/managing the soil. There were strict regimes of crop rotation, techniques of land resting and improving the soil.

Italian farmer: I would not say I'm an organic grower or what you'd call an environmentalist but I do believe if you're soil isn't productive it won't grow anything. That's something that comes from ... the Italian background more than anywhere else.

Italian farmer: You had to look after your land and ... maximize what you had, because it was very little ... You had to produce food for your family and if you were lucky, you produced a tiny bit more [to sell or barter] because ... you didn't have an income that you could just go out and buy soap and salts and all the things ...that you couldn't make.

Italian farmer: There's a lot said [by] grandparents that traditionally [gets passed] down ... the old people were very caring, or more respectful to soils. They would chip up grass, and put it in, and mix it up ... They had all this knowledge brought down over the years that they knew how to look after soils ... There was this connection, you would say, between both parties. Over the generations that [knowledge] was handed down.

Other interviewees had similar views on what their forebears had passed on, indicating a 'generational' rather than 'ethnic' difference in how farmers engage with their land/soil. In the case of the Chinese, however, there was also a sense that the early migrants to Cairns already had knowledge of how to farm in the particular tropical FNQ climate:

Chinese farmer: Well I don't know whether it's Chinese or whether it's just ancient farming ... because the Chinese used worms and... all that sort of thing but they weren't the only country that used it ... My father never believed in ploughing. The reason for that was he reckoned the sun used to dry [it] and it would kill all the biology ... I don't believe in it either. My brother used to but [ended up] chemical farming big time. So did I because that's how we were trained. But my father didn't believe in ploughing because he reckoned it killed all your goodies. He never used to talk about them as micro-organisms. He just said it killed all the goodies. So probably that's [cultural] ... My mother always used to believe in herbs and all that sort of thing. A lot of these things they're doing now, she used to tell me when I was a kid ... She used to say, eat cucumber it's really good for you because it cools the blood ... Everything had to do with the effect of food on your blood, which is basically I suppose the life source, isn't it? ... [And] bitter melon, it's really good for you ... They're starting to use it for cancer and everything now. [And] longans, they are good for you. They help you with your blood pressure and asthma too ... I mean she knew a lot of those -- I suppose it's just [Chinese] general [knowledge].

Chinese farmer: I think the early Chinese learnt to work the land ... [they] probably had more experience working the land than any of the Europeans at that stage ...

Southern China where my dad came from climate wise [was] very similar ... [and] the Chinese pioneered a lot of the industry like banana trees and so forth.

Sikh farmers also maintained there were some climatic similarities across the Punjab region and FNQ, and in some cases Sikh migrants brought with them knowledge of the crops.

Sikh farmer: When my great grand-father first came here he [went] to Melbourne [and] was involved in selling goods ... From that he earned some money and he bought some land ... Then he later moved to North Queensland and it's where the family stayed ... The climate might have been more [familiar] ... [They grew] wheat [in Punjab], they [also grew] sugar cane and potatoes. The land is quite fertile where we come from, you can virtually grow anything and there was underground water there ... When the family first arrived here there wasn't a lot of difference [between farming in the Punjab and here in Australia]. Mechanisation in Australia wasn't as advanced as it is today. So it still involved a lot of labour like manual labouring cutting cane ... they were using horses. But I guess since the 50s and 60s there's been a lot more mechanisation in Australia because of labour costs ... though in India, it is catching up. The farms are a lot smaller in size [in India] and they can't take advantage of all the mechanisation. We can here ... I guess they had the intimate knowledge about the crops and what they required [when they first migrated].

In interviews with the Hmong community, there were some traces of ethnic farming practices, but mostly in their home vegetable plots (a practice found across all groups and discussed in more detail below). When asked about the differences between farming practice in Laos and Australia, most commented on a different style of agriculture.

Hmong farmer: They layout of the crops is different ... the farmers in Laos used to work with their hands, so when they put the crops on year by year, they used their hands to clean the grass. It was a hill, not flat like this. And when we were in Laos, even though a big family, were [had] no more than 10 acres ... that was still a big farm ... but now it's changing.

Hmong farmer: Here we farm differently from in Laos ... because in Laos there are good areas, [where] you don't need much fertilizer ... [or] much water. You rely on the rain ... Here you need irrigation and you need to spray ... The soil has all been washed up, so they put a lot of fertilizer on and the ground becomes alkaline and [doesn't have] enough nutrition.

Hmong farmer: [The] big difference is here we use a tractor to [clear] the grass and then we plant it. [In Laos] it's done by hand, so very different ... [And] here our kid doesn't want to work at the farm ... whereas in Laos everybody [does] ... the whole family.

Our Papua New Guinean interviewees mostly commented on the inappropriate nature of terming what they do 'farming', highlighting the sustenance role of agriculture in PNG. They also drew attention to a different system of land inheritance, which divided up garden plots in ways similar to Europe. Furthermore, while the climate is similar, it does not mean important crops like taro grow in similar ways.

Papua New Guinean farmer: Because the whole concept ... it's a culture, it's a gardening culture. A 'farm' would have different connotations: it would be a coconut plantation, coffee plantation, tea plantation ... It's more about sustenance growing ... and trading, or selling your surplus at the markets. So in that sense [our garden] probably is very similar to a Papua New Guinea garden, but it's got more diversity. You talk about a farm in Australia, you've got 500 acres of mangoes and nothing else,

or maybe you've got 200 acres of limes as well. In a sense, farming is probably - it's a misleading term.

Papua New Guinean farmer: A typical New Guinea gardening is shifting agriculture, so that a garden will only last four or five years before they'll have to move it ... [We have been growing here eight years so] what [I do] to make my veggies grow is ... I rake all the dead leaves, branches, grass clippings. Sometimes I buy hay [to supplement].

Papua New Guinean farmer: [In Manus] land is passed down father to son, but it's not identified - it's not really that you can identify ... you've got this land, it's a physical thing, you've got to be able to identify it ... It won't be one single piece, that's your land, that's my land. But you own a bit of land here, a bit of land there. It depends on who you're related to ... your descent.

Papua New Guinean farmer: [Farming] is sort of a similar, but ... we [have] different seasons here... Back at home taro can be ready in seven to eight months, because there is only one season all year round. But here taro can be in the ground for 11 to 13 months, sometimes it can be 14 months, because of the different seasons. [In] summer they all grow quickly and then it comes to autumn it slows them down and then taro goes to sleep in spring ... Not [so] for the bananas. Bananas ... are quick, but I think for the taro it takes a long time ... We still get plenty of taro to eat ourselves all year round, but it really determines when you sell all the surplus ... You know, in winter things slow down and you've got to crack open the irrigation and it doesn't always work. Sometimes it will just start raining and it's all too cold ... Back at home we grow [taro] like the football field, because we take up the whole lot. But when I came here I put them in rows [because] I find it is easier for me to maintain my garden, to weed ... Back at home, because we come together as a group of families that we work together, so it's easy. But being one person and using my hands as a tool, it's just hard.

Cultural practices in FNQ ethnic farming communities

While large scale industrial cropping in a government-regulated environment appears fairly resilient to incorporating ethnic farming practices, we did find a number of relevant cultural practices on most farms. We distinguish here between cultural 'traits', which can sometimes be understood as regular and static, and cultural 'practices' which can be understood as proclivities of groups for certain activities that change through time (cf. Guierrez and Rogoff 2003). In other words, cultural practices can be seen as fluid over time. Most farmers maintained a domestic vegetable plot using traditional/cultural methods, for example, and some even retained tools from their home countries for planting/harvesting (see Plate 4). This was related to the fact that in the early days of migration it was not easy to get particular kinds of ethnic foods in the markets or shops.

Italian farmer: [I grow] buckwheat, potatoes or ... cabbage ... I used to do this in Italy ... my parents, they had grapes and some cows ... probably three or four in the stable ... for cheese and butter and a pig [for sausages] ... [I still grow] the same way they do over there ... and borlotti beans and chicory and ... broccoli and tomatoes.

Hmong farmer: [In home gardens Hmong] mostly grow Asian vegetables. Like the pak choi, Chinese cabbage, cucumber ... [they] pull weeds [by hand] and no fertilizers as such.

Chinese farmer: My father was a keen home gardener. He had backyard that fed the town ... what they've grown and what they've always grown are the Chinese vegetables ... most people don't know what they are but they are all in the market now. Plus your long beans and all the different types of Chinese cabbages ... and [my grandfather, born 1840] brought the longan tree ... things like the jackfruit and longans and lychees ... [came] in with the Chinese ... My brother got the DPI to name [one species of] lychee [after my grandfather] ... we're talking about heritage here.

Papua New Guinean farmer: I put the gardens [in] for my family, but [there] is plenty for us, so I decided to sell. Because there are many people who love these vegetables too, but don't have land, or [a] block ... I grow [the vegetables I do] because that's my main diet.



Plate 4: Buckwheat thresher still in use by FNQ Italian farmer

In our interviews we found that ethnic traditions related to farming have been disappearing over time or cultural celebrations from the home country take on different meaning in Australia. In some cases this is because of the different climate/growing seasons, in other cases it was because of the different way of organizing farming.

Italian farmer: I do remember when I was younger they used to have a mass [to celebrate a good crop]. I thought it was funny because the priest would always pray for a good crop and then the crop was finished ... Its changing now, because when we grew tobacco there was a definite on season and an off season ... The on season was usually about six months and the off season was during mainly the summer from about December onwards ... when it was the off season ... people would ... relax and celebrate in a way ... Now in order to be viable you need to grow a range of crops so there's no real off season [or celebrations] anymore.

Italian farmer: If this was a normal year, you would forget Christmas ... [it's the middle of mango season] and you don't feel like Christmas. Christmas is more of a case where you try to have a day's break ... and that's a big change with us going into fruit crops ... that time of the year is when you do your harvest. So that's a big change

compared to when we had tobacco. Then you had Christmas and it was Christmas ... Easter now has more meaning because it's a quiet time of year.

Chinese farmer: [We celebrate Chinese New Year and the August Moon Festival] ... that's in August [and] based in China. That was to celebrate the harvest there. [Here] we have food and that ...and a lantern parade or get the kids to make lanterns and different things ... [but] it was traditionally farmers celebrating their harvest.

Sikh farmer: There is [an ancient harvest festival in the Punjab] in April - it's also associated with Sikh religious events [and] the creation of the Khalsa ... It's Baisakhi [and marks the beginning of the new solar year]. Usually it's celebrated throughout India as a harvest festival. That's when, traditionally, the wheat crop comes off ... We still observe that day [in Australia] but it's more [of a] religious than harvest festival.

Hmong Stakeholder: The traditional Hmong New Year is the end of the 12th lunar moon, so that's approximately in mid-November ... To celebrate the Hmong New Year there's a few things to do, like call the whole family's souls on New Year's eve. Also, [we must] worship the people who have already passed away. Traditionally, you've got to stay home for three days and do nothing. But here you can't because ... all the young people still have to work.

Hmong farmer: At New Year's, you need to bring one of each crop, rice, corn, cucumber, vegetable, everything ... together [for] the celebration ... [But] in Australia it is different. Because when you are here most of them go to work so you can't celebrate at the right time. In Australia they don't celebrate ... in November ... we are celebrating differently [over the Christmas holiday].

Papua New Guinean farmer: Papua New Guinea culture particularly is so diverse that what's appropriate for a celebration for someone from Manus doesn't mean anything for somebody from the highlands or from the south coast ... [For taro] I would send the message around to the village [where one of my family married] ... I would invite them to come and to harvest ... and then after the harvest [they] put the taro together and then they ... divide it up into clans and the clans divide them [up for] smaller families ... I try to promote this [kind of culture] but ... people [here] are not really interested.

While our interviewees thus maintain the ethnic and religious celebrations of their home countries, the differences in the crops and seasons mean these celebrations take on different significance in Australia. In some cases this means being unable to perform important cultural practices that are important to spiritual renewal at the right time, which can have negative psychological implications – especially for the older generations who do not speak English or understand Australian culture. In this sense the new environment is culturally alienating and the relations between people, place and land are disrupted.

Finally, our interviewees stressed the importance of particular crops in the making of ethnic identities. Farming traditions like growing buckwheat (Plate 4), taro (Plate 5) or rice is an important part of ethnic farming culture:

Italian farmer: [An important part of culture] is not just the growing of buckwheat. It's the whole process ... from the seed [to the] cooking, [including] the harvesting and the grinding ... and in the actual cooking of the traditional dish. It's important to carry on.

Italian farmer: [I learned about grape growing] from my father ... but of lot of it was just learning because the [environmental] differences. The basics are the same but the small differences are great.

Italian farmer: We were lucky to have a fellow from [Papua] New Guinea [he came from New Zealand originally] ... he was a coffee farmer there. When New Guinea became independent he came to establish [coffee] here ... then I was lucky enough to have a friend from Parma, in Italy, who had been roasting for three generations ... They are connoisseurs in Italy ... [I paid a ticket for my friend's son] to come here and teach me to roast it ... Now we process from the tree right to the cup.

Hmong farmer: [Hmong people] like growing rice plants because they prefer homemade rice ... in Innisfail my mum used to grow rice ... [but] there's plenty of birds coming to eat the seed. Every morning, my mum used to go to care them ... but it doesn't work ... Back [in Laos] there are also some ants that also eat the seeds that you plant but we have a natural poison to kill [them] ... it grows underground and you pull it out and squash it and cook with oil ... in a few days, all the ants are gone.



Plate 5: Taro crop with traditional PNG digging stick

For those from Pacific backgrounds, including Papua New Guinea and Samoa, taro is a significant crop. Learning how to grow it in the Australian context is important for both.

Papua New Guinean farmer: You try to have a lot of taro leading into Christmas and New Year, Easter, PNG Independence Day. You would try to plan it so that you would [have] a crop [then]. You can't always pick, it doesn't always work. There [are]

different varieties of taro as well, some of them take a bit longer, and some of them take a bit shorter. So you try and balance it.

Papua New Guinean farmer: As an economic proposition, it's hardly paid for itself... \$2000 a year, but the thing is it gives you a sense of identity and a sense of belonging. Financially we're just waiting for the beetle nut, which is just beginning to happen now ... There are so many people in the immigrant communities where – it's probably more likely to be the wives – but just in the house in the suburbs going crazy, because they can't relate to things.

Samoan farmer: Our most important plant that we are growing at the moment is taro. But we put down some bananas as well, not like those common bananas ... it's not a banana farm. But it's like there is one banana tree that we call it our Samoan banana. It's thicker than the normal bananas here. A lot of different bananas we put in our farm just for us ... It's potatoes in Australia and New Zealand and everywhere in the world but the taro in Samoa and also some other Pacific countries like Fiji, Tonga. I think that's the main crop for us everywhere.

But growing vegetables and herbs is not always about nostalgia and food from home. As one of the Stakeholders informed us:

Hmong Stakeholder: Another thing is the older people, they can't speak the language. The English language is very difficult for them ... that's why they grow a lot of veggies and herbs and chillis, then they don't have to go to buy at the market, because they can't drive and they don't know how to use public transport.

We will return to these issues in our discussion of social capital.

Involvement with Stakeholders

While the cultural organizations/Stakeholders interviewed for this research had intimate knowledges of migrant communities in FNQ, they tended to be less knowledgeable about the cultural practices involved with farming. The agricultural organizations/Stakeholders, on the other hand, did not necessarily conceive farming in 'ethnic' terms. Agricultural organisations tend to engage farmers on an industry basis (i.e. cane, bananas) but in some cases this means particular groups do not have their communication needs met (i.e. due to language difficulties).

Stakeholder: We don't have any presumption of ethnicity when we're giving our grants ... and we don't target any particular group. We engage people on the basis of industry ... [We are] constrained in a way, because we have funding specifically for sugar cane, bananas, pawpaw, grazing lands, dairy and tablelands mixed cropping. Anything else outside of that doesn't get funded ... So that means all the exotic fruits, any small scale agriculture, any sustainable agriculture ... doesn't get targeted.

Stakeholder: I think with the banana industry ... because we've got some issues, like we've got interstate certifications that they have to adhere to in order to get food over the border. So very much they have to grow fruit according to an industry standard and so from what I've seen [different ethnic groups have] had to adopt Australian methods.

Stakeholder: I think the only reason they stay in ethnic groups is ... because the language, or cultural issues/socialising. But if there was an Indian next door to a 4th generation Maltese, they'd be talking, too. I don't see [farming] divided along cultural lines, [its] more where they live or whether they can communicate.

Stakeholder: We don't particularly group them. We don't say, oh well, we better make sure we cover those people and cover those people ... Even now with the two major environmental programs, the federally funded Reef Rescue and last year the State run new reef regulation process. We didn't provide [specifically] for these [groups] ... but [there were] older growers – the Italian growers who might have needed explanations in Italian rather than ... English ... [They] might've had difficulty with [all the paperwork] ... It's not hand-holding [but] sometimes Government departments see it like that.

Thus, in viewing industries along an industry basis, without attention to ethnicity, some groups are not communicated with in language they understand. It may also be the case that industries that fall outside the usual Stakeholder interests are crops being grown by recent migrant groups. A valuable perspective was provided by a PNG interviewee, who thought Stakeholders undervalue migrant contributions to rural diversification.

Papua New Guinean farmer: I think the small holder is under-estimated by the government in their value to the diversification of food resources. It's not the DPI that's coming up with all these alternative crops, its people who've been elsewhere and thought, well, that might grow where I live ... Until the government twigs onto it later on and they think, oh well, perhaps we'll -- let's follow up on this fellow's idea. If you didn't have stuff coming in from everywhere, they'd probably be trying to grow wheat up here!

Moreover, some crops are of little interest to agricultural organizations as they are small scale and of little commercial value – even if they have strong cultural meaning to the groups who grow them. As one of our interviewees claimed:

Papua New Guinean farmer: Taro is just - it's hard work under any circumstance. A friend of ours ... was growing taro for a while and he just gave up ... The variety he was using was rather an inferior variety and he could only get about \$2 a kilo from it. There's no equipment been designed to harvest it ... It's a third world crop, so Massey Ferguson and John Deer aren't interested in it.

One of the main issues raised in interviews was the changing nature of farming in the region and the lack of support for new and diversified crops.

Italian farmer: The problem [with DPI] is that you have one man [in charge of] mangoes, avocados and limes. The actual area of it is huge ... so the only way he can actually communicate to farmers is by having one meeting a year where ... he will tell you what's happening in the industry. But if you rely on him to come out because you've got some disease ... he can't. He's just one person ... Realistically they need, just for the mango industry, [the DPI] would need a minimum of four to five people. So we don't rely on the DPI for backup. We actually rely more on the ones that sell chemicals or fertilizers ... they have their own agronomists. So they're the ones who will actually come around and look at your crops ... because Government-wise, it's not there.

Albanian farmer: [Its] harder today ... with multi crops it's because you've got to know about every crop. Tobacco was monoculture and all you did was learn about tobacco ... Tobacco was controlled by legislation so the minute you put a seed in the ground and you had a certain quantity that you had to grow, within a certain quality you knew what you were going to get. Now, you don't know ... A lot of unknowns. If you're a tobacco farmer the bank would lend you money just over the phone. Now with all these other crops no. Because they don't flower, they don't set, a lot of things they don't. The market can devastate you. Like avocados since I've been growing them

have gone from \$30 in one year only down to about \$14. That's a big difference. Tobacco never varied ... We had both state and federal regulation ... the Government wanted to control every kilo in case you sold it on the side and they missed out on the excise.

Italian farmer: You can't go [out] and buy a tea harvester ...you've actually got to manufacture one. I made that one in 1989 and it's ... got a lot of idiosyncrasies ... to build a new one, you know, it's about \$500,000 ... so you've got to keep [it] going for a while ... When we first started ... we virtually invented a new harvester ... we developed it ourselves ... to try to get things to harvest quicker, faster and get a good sample ... you have to sort your problems out yourself. Whereas in the sugar industry, or bananas, cattle, they've got some set of organizations you can go back to, but in tea you can't.

In other words, there are important differences in the way farmers engage with agricultural organizations in a multi-crop environment. At the same time, the Stakeholders realize the demands on farmers who are diversifying their crop base:

Fruit and Vegetable Stakeholder: I've seen the change ... [the] internet is [important]. Word of mouth is still a very strong process [too] ... People don't go to meetings anymore. Not like when I first started going to meetings, there would be 50, 60 people there ... Now if you get 50, 60 people they're either going to want to hang you for something or they want to hang somebody else ... We've gone down the deliberate road of not having meetings anymore. We have only one meeting a year which is the AGM. What we do is we promote other meetings because there are so many organizations ... You can be a member of the [avocado association], stone fruit, heavy produce, AUSVEG – there're about 20 out there. So we promote those meetings. We don't promote a Mareeba district meeting per se.

Some farmers, not just ones in 'novel' crops, have very little contact with agricultural organisations. In general there was very little communication between the Hmong farming community and the broader Stakeholder community of agricultural organizations.

Hmong farmer: The DPI did not allow you to set up a farm because you have no knowledge about how to use the chemicals [or] how to operate equipment.

Hmong farmer: The [Hmong] have some sort of link to [Banana Farmers and Growcom] but they have difficulty expressing what problems they have with the representative ... [And] every time the DPI go ... [they are] lost [in] conversation because they use formal words.

These difficulties are largely related to language barriers and miscommunication. The Hmong community, like other NESB communities, has difficulty accessing relevant agricultural information in their mother tongue (see Parker 2000 for a related discussion). In general the onerous chemical regime of banana farming requires an expert command in English – something not all families possess. But a larger problem might be posed if state and federal regulation to protect the Great Barrier Reef targets banana growers, many of whom in the Innisfail region are Hmong. As highlighted by one stakeholder (above), some of the elderly Italians in the sugarcane industry participating in such regulation had many difficulties with the paperwork. This would certainly be the case with the Hmong and would require an agricultural extension worker to address this case.

For those involved in the big commercial crops, however, especially those with good communication skills, there is a well-defined and organized network of information. Sikh farmers in particular are well-connected in these networks, often playing leadership roles.

Sikh farmer: [A] lot of the information is ... handled by ... BSES. And that's conveyed to growers through publications like, they have a magazine that comes out every month or maybe 3 month's now. And all those items -- even though cane growers might not be involved in the research, they're all covered in the Canegrower's Magazine. Which comes out every fortnight and there's been a lot of work done in recording all that on CDs like virtual farm tours and that's disseminated to growers, so the communications side of it is pretty good now. And all new ideas are being conveyed to all the growing industries through all this technology ... Canegrowers are very well organized ... I guess they've got the scale and ... the presence all along the coast [whereas] fruit and vegetables are scattered all over the place and they're small and there's a lot more variety. What applies to avocados probably doesn't apply to the lychees or the mangos. So they've got a much tougher time.

Sikh farmer: The organisations organise seminars or farm tours you know, bus tours. Around the local area to see what certain growers are doing and how those practices are working out. So it's basically getting growers information on how they can benefit from new practices ... Like any group of people, there's always the early adopters and those who wait and see other people make a few mistakes and learn from their mistakes. Probably up to 50% of growers get in fairly early but the remaining 50% may take a bit of time. A lot of time it's because it does require new capital and they mightn't have it.

This does not necessarily mean that farmers agree with the advice provided by large, industry-based Stakeholder organizations.

Italian farmer: For everybody, whether it be sugar cane – no matter what you grow – the agronomists, the Department of Primary Industry, and all agriculture services, it's all about how can you produce more. All the studies, all the work's done on how to increase production. It's about how to get a bigger bunch of bananas. It's about 'let's do some more work on how the tree works, and how can we force the whole system to make more'. Then we have all sorts of problems years later that start to come out of it, like we've got these pest problems. Nature's pretty good at pulling us back into line, I think, and saying you can't do that ... [So] I wanted to jump off that [production system] ... We produce smaller bunches of bananas. Production is not our key focus. We're looking at farming more sustainably. It's not about using more fertilisers, and we don't use any pesticides, or stuff like that in our farming system. We need to manage our eco system a lot better. There's no silver bullet in this. The answers in this lie in how you interpret and manage [the crop] ... I'm trying to get the knowledge back into our farming systems that our ancestors had, but with the introduction of synthetics, chemical fertilizers, was superseded. The answer now lies in the 20 litre drum of chemicals. The rate is there, you just put it out and that's it.

Social capital and its relevance to farming practices

As discussed in the literature review, social capital plays an important role in the sustainability of rural communities. For this research we were interested in how social capital shaped ethnic farming practices, and discerned three common themes in the research. First, we identify that the extended family and wider cultural group can play an important role in sustaining ethnic farming practice and in building up 'bonding social capital' within the ethnic community – especially in the early years of settlement (see Woolcock and Narayan 2000 on this and 'bridging social capital'). Second, we identify an important role that neighbours play in terms of building 'bridging social capital' or networks to other groups, pointing to the

possibilities these links might provide for the future. Finally, we return to the issue of the differential access of some farmers to the Stakeholders and contemplate what this might mean to farming practices.

First, the importance of kinship and other ethnic networks in relations of trust and reciprocity cannot be underestimated. Most of the farmers we spoke to were involved in chains of migration, where members of one family (and sometimes village or community) introduced Australia or the FNQ to subsequent generations of migrants. This provided important opportunities to help each other in the early days and to be part of a supportive ethnic community upon arrival ('bonding social capital'). This is particularly important in the early stages of migration when language and cultural competence is an issue. While the majority of our interviewees had been in Australia for more than one generation, and therefore were less involved in ethnic networks, more recent migrants followed similar patterns. Indeed, research with the Hmong community has traced the 'first' migrating family and the subsequent chain of migration to the Innisfail region (Tapp and Lee 2004). For these migrants, cultural associations play important roles in providing networks to other groups.

All of our interviewees had strong connections to cultural organizations (be they community or government organisations, or sites of worship) whether these connections were current or historical. For some of our interviewees that had been in FNQ for more than one generation, however, cultural associations played increasingly smaller roles in their day to day lives of the community. Indeed, some associations have trouble maintaining a community base.

Italian farmer: [We belong to the] Fogolar Furlan Club ... it represents Friuli [region in Italy] ... we have about 60 members, but ... the young ones don't come into the club ... it basically has two functions a year ... we don't have anything else throughout the year, quite simply because the committee is [mostly over 60 years old]. So they are at an age where they really want to retire out of the committee but there's no young ones coming through, so they're staying put so the club doesn't fall apart basically.

At the same time, the role of the family is changing – even for more recent arrivals in FNQ. Not all family members are involved in the farm and the majority of farmers are unsure if their children will carry on the farming tradition. In the absence of family members, many find it difficult to find someone to trust to employ in the business.

Italian farmer: When I grew up, every family member played a role but I know it's different nowadays ... [My wife] is not really involved at all and ... my family is not unusual ... The wives of some of my friends are the same ... I don't have expectations of [my son] getting too involved [either].

Italian farmer: We would quite happily employ somebody but it's just so hard to find someone who's responsible and who's not going to wreck your machinery ... there doesn't seem to be the commitment on the part of the ones that come out and work ...

Second, our interviews revealed the important role that neighbours play in terms of building 'bridging social capital' or networks to other groups. Many farmers stressed the important links to neighbours in their communities. Neighbours are often not from the same ethnic group, although they may also have a family history of migration.

Japanese farmer: Most of the neighbours are Italian but they are very, very helpful ... One time, a long time ago, I asked them why are you help[ing] me [so much]? They said it is very natural because of their ancestors ... Someone helped them settle down. It's very natural they said.

Albanian farmer: I do a fair bit of extension work for the farmer next door ... [If he says] I need to fertilise my avocados, give me a programme ... I'll write a programme for him, so much of this and all that sort of thing. Or [I will write] a spray programme or whatever.

Papua New Guinean farmer: I learned [a lot] from my neighbour here. At first when I came I started growing like [I did] back at home. He saw me working every day and weeding and this, so he said to me -- he's a farmer -- so he said to me, this is what you do. So I'm here to help you and reduce the amount of work you are doing ... this is what you do. Put your taros and things in rows so it will be easier for you.

Another farmer expressed an even more positive role to attribute to neighbours:

Sikh farmer: Farming is changing and we need to work more as groups rather than individual families. And that's what I work on these days ... [like] how I can work with my neighbours to cut our operating costs. I think the farming business seems to have to grow ... we have to work ... more cooperatively with others if we want to maintain our profitability. So the nature of farming will change unless you're prepared to go out and buy more land and increase the size because over history, the farm sizes just have to keep on growing, which is a shame.

This latter comment highlights not only the importance of cooperative farming in a context of globalization, but the foresight and 'bridging social capital' the Sikh community has at its disposal. Not only do Sikh farmers possess a strong sense of community that is expressed through kinship networks and at local temples, they have joined and play leadership roles in strategic agricultural organizations. In other words, the Sikh community has both strong 'bonding' and 'bridging' social capital.

In a related vein, we conclude this section on social capital with further reflections on the inadequate access some ethnic groups have to agricultural organizations. As discussed in the previous section, Access to Stakeholders, agricultural organisations tend to view farming along an industry basis. Without attention to ethnicity, some groups are not communicated with in appropriate language they understand.

The farmers we interviewed mentioned a range of cultural and farming organizations in the interviews which are presented in Table 3.

Table 3: Relevant Stakeholders mentioned in farmer interviews

Agricultural/scientific organizations	Cultural organisations
Canegrowers	Fogolar Furlan Club
Mareeba Fruit and Vegetable Growers	China North
Growcom	CADCAI
DEEDI (formerly DPI)	Pacific Community Cairns
CAFNEC	MSS
AUSVEG	CARMA
Avocado Growers Association	
BSES	
CSIRO	
AMIA	
ABGC	
AgForce	
Ecoganic	
ABGC	

More recent immigrants had stronger connections to cultural organizations and the longer-term settled farmers had more connections to agricultural organisations (apart from the Chinese, who had strong connections to both). Without high-quality access to agricultural organisations ethnic farmers miss out on industry updates, insights to new farming practices and networking with other farmers. This is certainly the case for the Hmong, who lack the language capacity to engage with the different Stakeholders. Furthermore, as discussed above, industry organisations tend to utilise new communication tools such as the internet and send out newsletters in highly technical language. But difficult to read technical information may not be digested and often innovations in these industries require outlays of capital that are not possible in a newly arrived migrant community. These difficulties should certainly be the subject of further research.

Perceptions of environment, climate, natural resources

In these final two sections of the report, we focus on farmer perceptions of the environment. We have purposely set out these sections on ethnic lines, but are fully cognizant of the limitations of our interpretations. Our sample sizes are too small for generalisation, but we draw out some relevant detail here.

Italian farmers

It seems that familiarity with the Australian environment builds attachment to it. As one older interviewee reports:

As I get older I appreciate it more, probably when I was younger [I thought] it was the 'dry dead outback'. As a kid I thought the city and all that glamour was everything but getting older I appreciate the bush and what it has to offer.

The same farmer reported that now he had an 'appreciation of nature'.

Years ago [I'd have had] no problem in [killing] a chicken hawk or falcon ... Years ago...I would have killed a carpet snake ... Now if I can catch it and put it in a bag I'll just remove it ... It's just changed. You do respect more the animals of the area.

However this feeling is contextual as the same interviewee commented on the problems of the high numbers of flying fox, kangaroos, pigs and Currawongs. Flying fox came in for particular ire "...there is no way anyone will ever make me believe that fruit bats are under threat, there's no way." Perhaps what this reveals is a more focused consideration of what constitutes a 'pest' species. To an orchardist such as a mango farmer those animals that threaten the crop are still fair game, however over time other creatures which once seemed threatening are tolerated and even appreciated.

We see the land as providing sustenance and therefore it's a two-way street, and if it gives you've got to give back ... it's a resource you have to respect and it's very important.

Spirituality and the environment: There is no doubt that some of the farmers interviewed have a very spiritual connection to the land. They describe their relationship in emotive and tactile terms: "when you plough a paddock just after rain, the smell of that is intoxicating ... that first turn of ground just after the first storms ... there's something special about it ... there's some magical connection to it."

One banana farmer recognized the wealth of Indigenous knowledge about the environment but spoke about it in the past tense: “I think there was a whole lot of (Indigenous) knowledge about the land and the layout, and the animals, and what they meant, and what we could have gained out of that. I would have loved to harness all that knowledge and use it to help us live in the land that we're in.”

Some 2nd and 3rd generation Italian farmers are very strongly linked to their farms and the surrounding environment, even using terms similar to those used by Indigenous Australians (e.g. “my country”) to describe their farms.

You can sort of understand how the Aboriginals become connected to the land and I sort of feel the same way because I know when my parents sold their place down the highway and they moved into town, I'd cleared all that land and grassed it and fenced it and run cattle there with dad for a long time. I really felt I'd lost something. I did cry the day they left, you know, I thought, Jesus, this is something we've lost now, so you become connected. I don't know if everyone does but I know I am.

Yet another farmer commented “there is a connection with Aboriginals and land, I'm sure of it and ... sort of feel that connection you know, after being here for so long.”

Intangible Values: Many of the attributes that these farmers value are intangible as shown by the following sample of comments.

What you miss it's the surroundings, the feel, the smell and the sounds.

There's that green, it's always green, it's always the rainforest. I think it's fantastic. You sort of go, you travel everywhere in Australia or you travel overseas. For me, I come back to North Queensland and I come back to East Palmerston and I think, life's not too bad. Life's pretty good. I think it's just the greenery, the rolling hills are beautiful.

Several farmers noted that they were not the camping type but appreciated the rugged beauty of the landscape, the beautiful river etc Tinaroo Dam, Lake Eacham and Chillagoe Caves all featured as places to take visitors to and to enjoy (see Table 4 for a list of places of environmental interest mentioned in the interviews).

Climate change: Many of the farmer interviewed hedged their bets with regard to climate change. Many reported ways in which they tried to do their bit for the environment but considered that the problem was too large and outside their control. For example: “I'm still one of the believers, if you can start to do things where people are cutting back, you can use solar power or whatever you can do to make a difference ... for the good of the future”; “years down the track farmers down south are going to be in strife”; and “I think the government really has to encourage it [reductions in carbon emission] because it can't be good what we're doing. It just can't be healthy, whether you believe it or not.” Another farmer claims:

I think because I have a good understanding of my farm's ecosystem I can relate to that on a global scene as well. It's very easy for me to understand. I'm not skeptical when I say do I believe in climate change. I think what we ... does impact on the earth, and we will see differences. If climate is one of the things that we're going to see, it doesn't surprise me in the least. All I can say is that I recognise it, and I'm worried about it, and I think it needs to be addressed. Not just by myself, but globally.

Generally the Italian farmers interviewed were observant about changes in climate and weather patterns but there were a range of views about whether the cause was

anthropogenic or just a cyclical or even random pattern. Most expect that the weather patterns will worsen over time.

Table 4: Natural places mentioned in terms of relaxation, recreation, appreciation.

Group	Place name	General location or environmental feature
Italian	Lake Eacham	Beautiful Scrub
	Chillagoe	Forest
	Tinaroo Dam	Wildlife
	Fishing and camping Lynd Junction	Country Roads (to Longreach / Darwin)
	Fishing and camping Mitchell river	River (to look at)
	Pompuraaw	Space
	Blencoe Falls	Greenness of wet tropics
	Burdekin Falls	Smell –soil (fresh ploughed and wet)
	Brampton Beach	Smell eucalypts after rain
	World heritage national park (name not specified)	Green paddocks
Sikh	Botanic gardens	Rainforest
Chinese	National parks (unspecified)	Greenery
		Fresh air
Hmong	National Park (unspecified)	Waterfalls
Other	Josephine Falls	Mist
	Lake Eacham	Mountains
	Lake Tinaroo	Remote camp spots
		Wildlife and creeks on farm
		Green Mountains

Hmong Farmers

Generally the Hmong farmers appeared less well informed in relation to contemporary environmental issues. English literacy may partly account for this. Most Hmong interviewed, while fluent, did not speak English as a first language and most were first generation migrants. This contrasts to the Sikh and Italian participants who for the most part had been established in Australia for more than one generation. It may therefore be the case that literature and other sources of information on environmental issues are not as accessible to this community group.

The national park as a tool of biodiversity conservation is a very recent phenomenon in Asia, often associated with the forced removal of ethnic minorities from their land (Thomas 2002). But most of the participants from this group did express a love of nature e.g. likes the feeling of the rainforest “when you get there you feel happy” and a corresponding sadness when confronted with dying sick or burnt trees. This farmer did not go so far as to say he enjoyed walking in the bush and indeed another farmer commented on the scariness of the bush:

Going for a picnic in the bush is scary, so I never go. I can see in this country they have big snakes and the people are telling me if you go to the bush you might see a snake straight away.

Partly this affinity for the local environment comes from a sense of familiarity with the climate and general landscape/vegetation, as several participants commented that the area

reminded them of their homeland. For example one first generation Australian Hmong farmer, born in Laos recalls:

The reason that we came here is my father came here first. My father said he was watching the television, they showed all the Australian country and he said, this place is the best. It looks like our country and it is very green and the soil is very good. If in the future someone might be farming, it's good, it's healthy.

In this context it is important to recall that most Hmong arrived here as refugees. In considering a permanent place to relocate once they were in Australia, searching for and finding familiarity in their environment is likely to have been a major factor in choosing a place to settle. This is likely to have been a very different decision making process to that of Sikh or Italian immigrants who were not refugees and whose decisions to move to Australia were made on a different often economic basis.

Spirituality: One Hmong farmer revealed that he kept a natural section of bush on the farm because it's "part of the belief that we live on one part of the land...everyone has to share the earth ... I believe that in a natural way and human or natural, receive energy from nature." His spirituality, he claims, comes from nature.

Intangible values: One Hmong farmer commented on the feeling of happiness that wells up when he goes to the rainforest. Nostalgia for lost homelands/home plays a part, it would seem, in the appreciation of the north Queensland landscape: "When you go to a National Park or something like that. Everything looks good, it looks good ... you feel like you are home when you were young, with your parents." Running water, the way the clouds rise up from the mountains in the morning, also reminded him of home.

Climate change: Several farmers did not understand the term climate change but expressed concern over extreme weather events. Climate change is seen as a government responsibility as in the response from this farmer:

The climate change, they want the country green. I don't worry about it, that's a government thing. It doesn't worry me.

Sikh Farmers

There is a diversity of attitudes amongst the participants in this group. Like the farmers of Italian descent, many of the Sikh farming families in the region had been here for many years and over several generations. They have a correspondingly high English literacy and there is a mix of banana growers and cane growers amongst the participants. The latter have access to a strong industry advocate and network.

There was a feeling expressed by one farmer that 'we' (farmers) are getting blamed too much for environmental problems. Nearly this entire group recognized the need to protect their soil. Similarly, whether growing sugar cane or banana, this group indicated an understanding of biodiversity around complex interrelationships between pests and their crop. For example: "I guess in controlling your pest diseases, you don't want to do away with the good bugs and things. You gotta be aware of what's good and just be careful." From another farmer: "Biodiversity is, well our understanding is like say in the bananas ... we have biodiversity in ours for insects and grasses. We let them do their natural thing. That's why ... we don't go and spray everything on our grass because some of those insects they need the seeds and so forth of that particular species of grass to survive and just to keep the balance." It is interesting here to note the phrase "we had biodiversity in ours for insects and grasses". It seems clear for the range of responses that various research projects and government initiatives focus on specific industries and that these industries (in this case

banana growers) absorb an understanding of key concepts such as biodiversity in the limited terms of the parameters of these initiatives. While this is probably positive feedback for those projects it also suggests that the understanding of the key concepts is limited and will not necessarily result in long term intuitive adaptive responses to new challenges.

Spirituality: Interestingly the responses from the Sikh farming community revealed little or no spiritual connection to the landscape. The responses regarding attitudes and relation to the natural environment could be characterized as 'respectful' as in they realize the importance of looking after the soil and reducing pesticides in safeguarding their resources and practical in that the environment is a means to an economic end. Of course the sample size of interviewees is too small to jump to any conclusions but this is an area of obvious divergence in responses.

Intangible values: Again there was a diversity of responses reflecting the variation amongst these farmers. One farmer clearly did not have an affinity with nature and reported that he did not ever visit National parks, hunt, fish camp or go bushwalking. When responding to the question about what places in the region he visited, he mentioned only visiting friends in Gordonvale and Townsville.

Climate change: One farmer revealed he had begun to monitor his environment, including monitoring his rainfall since 1985. In itself this is not an unusual activity but he has kept records with a view to identifying trends. Extreme weather events were identified by several farmers as a concern although there was no agreement on whether people perceived these to have been increasing in frequency and intensity over their time on the land.

Another farmer expanded:

The climate does change - it's always been changing and my concern at the moment is the effect of human endeavours and mechanisation using up all the oil reserves and coal reserves all built over thousands of years and we're using it all up. Over a short period of time, we've increased the level of carbon dioxide ... like the period till when the whole froze over; there wasn't enough carbon dioxide to warm the earth. Whereas now, we're in a period where there's too much carbon dioxide and I think most scientists are worried that it's affecting our weather, the climate, causing extreme [weather events] on top of natural changes. So, my understanding is the impact of what we've been doing over the last 100 to 200 years is affecting our climate and weather and that impacts on all parts of life including agriculture and just normal day to day activities.

Overall, and acknowledging the limited sample, the responses reflect the range of commitment and skepticism in the broader Australian community. In this respect there appear to be few differences between the Sikh farming community of north Queensland and the broader Australian society.

Chinese Farmers

Very little information from the participants from this group was provided regarding their relationships or understandings of nature and the environment generally. Only one farmer indicated that he had used natural paces for recreation:

I've been to different national parks when I was young on holidays. I always liked to look at something different - even the bush is different; everything else is different about it now.

This participant also went pig hunting and fishing.

Climate change: There is no way that conclusions about what a ‘group’ of people within our study think or understand about this complex issue can be deduced by the limited interviews undertaken. However the views probably reflect more on the general Cairns regional understandings than anything related to ‘ethnicity’ or cultural beliefs. For example: “I am not completely convinced that it’s happening. I just think the climate’s been changing all the time, [its] just that we’re sort of, looking at events and think it’s something that’s just once off. But I personally believe it’s been happening all the time.”

One 3rd generation farmer of Chinese descent who is passionately involved in biodynamic farming declared that he doesn't believe climate change is anthropogenic but rather sees it as natural cycles.

Others

The other category of farmers included an Albanian, Papua New Guinean and a Samoan. Firstly we should acknowledge that the range of responses is just that: a range of individual responses with no statistical validity. Therefore while the responses can be used as clues to cultural understandings about the environment they cannot be assumed to reveal cultural traits or understandings.

Attachment to the farm or land in general was not strongly developed in participants in this group. There appreciation of nature was variable. The PNG farmer viewed surrounding National Parks as places which excluded him. The Japanese farmers interviewed in this project had been here the longest (20 years) of this ‘other’ category, and had the most affinity with the environment. They noted their love of the mist and mountains and listed a range of places that they regularly visit such as Lake Eacham, Josephine Falls, camping in remote locations etc. The Samoan Farmer expressed a view that the local countryside was beautiful and that especially the green mountains were reminiscent of ‘home’ in Apia. This was a similar comparison to that made by the Hmong who compared the environment to that in Laos (see above).

The PNG farmer did not appear to have any sense of connection to the natural environment in which he was situated and indicated that this was different to sense of ownership felt in PNG: “PNG people realise that even if they’re not at war with their neighbours at the moment, that their parents, or their grandparents, or great-grandparents, had to murder and fight for that bit of land. So it's a much more pragmatic, perhaps a more material view of the land than the so-called idealised romanticised Aboriginal concept of the land.”

Climate change: This small diverse group of interviews included the most recent immigrants and so presumably the least acculturated in relation to Australian views and practices. They revealed little to no understanding of current climate change debates.

Samoan Farmer: The way I look at things at the moment it’s not really a big difference. Even if there’s still some cyclone disasters and everything I think the soil is still ... the same, yeah.

PNG Farmer: I’m not sure about some other crops growing but to me it’s still the same. I think there's a bit of changes in the things that growing. Last year we did have a lot of rain. It wasn't just the wet season itself, but from July onwards - June, July onwards it was quite wet all the way through spring. Yes, friends and that talk about climate change ... but as far as our land's concerned, I do have worries about it, but it's in the long term. So what can we actually do about it? My immediate concern is obviously water security.

Our Japanese interviewee had the broadest view of climate change and its potential impacts, and put these in a global context.

Perceptions of sustainable farming

All groups of farmers emphasized the importance of looking after soil. Except for the Hmong and one farming couple of Chinese descent, our interviewees did not attribute any particular methods to traditional techniques. One can assume they have learnt about the importance of reducing soil erosion and run off to catchments here in Australia. Italians focused on the health of the soil (e.g. soil health via microbes) although this was also mentioned by others. Several Italian farmers illustrated their affinity with soil when they talked about it in tactile and poetic language, for example referring to 'its intoxicating smell' or its feel and the smell after rain. This consideration of soil as something that transcends the practical or economic value belies the more pragmatic answers that some farmers gave when asked about their views on sustainable farming practices. An Italian interviewee provided this insight:

Well I think more of the fact that you need to make enough money to be profitable enough to be able to do all the things, look after the farm, send your kids to school and continue re-investing in new technology because that's, in my opinion, the answer for sustainability in farming from even an environmental point of view ... We've kept part of the scrub...we've maintained those sorts of things for those reasons there. We're using softer chemicals nowadays. We've changed a lot of ...it's helped us with erosion and things like that.

One of the Italian farmers explained why he liked growing tea:

In the tea industry ... there are no known diseases like, with cattle you've got your ticks and your flies and everything and bananas you've got all your other things and cane you've got the grubs and what-not. But with tea, there's nothing you have to spray it for - you haven't got to do anything. You've got to maintain it and fertilise it and keep it weeded and everything else, but you don't spray it for any bugs. So it's not an organic crop but it's pretty green. You know, it's a good crop.

One Australian-Chinese farmer is using banana scraps to make worm castings for a biodynamic approach to farming, using no chemicals. He has developed a way to control fungus on leaves without any chemicals. He does not relate this to traditional practices and has developed these methods through his own research and experimentation. One thing that he does attribute to his father who passed on the information relates to the problems with ploughing the soil: "My father never believed in ploughing. The reason for that was he reckons the sun used to dry and it would kill all the biology which it does."

There were a number of farming practices in the Hmong community that were considered sustainable, such as resting your soil, regenerating the land and using natural fertilizer such as chicken manure. For example one Hmong farmer explained: "I have to look after my soil [and] leave grass between the [bananas]. In a wet season like this with heavy rain, the grass is holding the soil [together] and I just [trim] it. I don't put poison it ... [This way] my soil does not wash away... [it also] keeps the soil moist." Another interviewee noted that he kept a natural, uncleared area on his farm which was about maintaining a balance with nature.

Most of the Hmong farmers interviewed commented on the different economic and environmental conditions in Australian and noted that there were different methods of farming employed here that in Laos. For example:

- Farming practices are different because of the technology available

- “The hoe is the only tool used in both places”
- Farm organisation is different – there the entire family worked the farm - here it is mainly the adults
- Fertilisers weren’t needed in Laos
- Water came from rainfall, here irrigators are used
- Hmong have ways of treating pests without using chemicals, e.g. using poison from the root of a plant to kill the ants but this technique isn’t used here
- Farms are bigger here, different to Laos. “...10 acres was a big farm in Laos, which the entire family would work, here 28 acres are worked by just 3 people”
- “Here we have machines like tractors, but in Laos we use only hands and copper shovels”
- “the farmers in Laos used to work with their hands, so when they put the crops on year by year, they used their hands to clean the grass. It was a hill, not flat like this”.

The Hmong participants commented on how it is difficult to meet the much higher cost of living in Australia. Many chose to work in farming because it required less outlay than most other businesses and most had had some experience farming in Laos. Here they “work seven days a week, not like Australians”, and also keep chickens and pigs for eating (these are looked after by the women). Many families have a veggie garden where they grow Laotian veggie’s (pak choy, white corn, Chinese cabbage, cucumber) in a traditional way, (e.g. no spray, hand pull weeds).

In a similar vein the Samoan farmer interviewed notes that:

In Samoa we didn’t have much equipment. We only use our knives and all those. But when we came here we saw a lot of equipment like implements used to plough and dig the soil ... So it’s a bit different here from what we did in Samoa and what we did here ... In our taro plantations we don’t use these ploughs, we only just cut down the grasses. We only use the ... chemicals [for weeds] ... but no plough or machines. But we came here and we looked ... because there are some people [farming] taro here. They use machines to plough and everything. So it’s less work from the person.

Clearly the scale of the farming enterprise, the availability of machinery and equipment and the corresponding availability of labour act as incentives to change from the labour intensive but perhaps more environmentally sustainable techniques traditionally used in the original homelands of many immigrant farmers.

Only one Japanese farmer was interviewed so, once again, this comment is not intended to be indicative generally of Japanese farming practices overall. This participant’s aim from the outset was to develop a sustainable farm: “the way of our life is sustainable farming. [It] is one of the manifests of our philosophy ... Here everything is harmonized, it’s the principle of the universe ... So we are always thinking more long term results and also ‘what is a human being’s nature’ and ‘what is a chicken’s nature’? We respect their nature; otherwise they’re not happy... If they’re happy they produce actually very well and they produce good eggs ... Very happy chicken - a happy egg makes happy people. That’s very important.”

The development of their business has arisen from a philosophical core: “communal living based on agriculture produces a humane society”. As set out by the Yamagishi Association: “What is more important in Yamagishi’s thought, however, is the underlying concept of an integrated system of Man and Nature: human beings are an integral and inseparable part of the total natural system; one cannot survive without the other. Yamagishi extended his philosophy of the ‘oneness’ of human and natural systems and worked for the creation of a

society that would be at perfect peace and harmony within itself, with anybody in the present and future, and with everything in nature.”³

One farmer of Chinese descent provided the following comments

China has been growing food for 5000 years, in a biological safe way. Suddenly the Western world is showing them how to grow a toxic way. I mean that's what's happening isn't it? ... I used to grow watermelons and other things ... [like] cumpers and things over the years. It's all toxic ... I can remember when I was a kid, my father used to - well there was only that fertiliser available those days. Of course the chemical companies hadn't got into the farming industry but it was all done with a bag slung over you. You throw blood and bone from the meat works. That was your fertiliser on the sugarcane or whatever you had. You see? They used to cover crop all the time. Every time you ploughed out, you'd cover crop. A lot of farmers now don't cover crop. They don't put a legume in to build the soil up for a year or whatever. That's all the old farming systems.

However, it should be noted that moving to a more sustainable farming method has been a personal journey of discovery for this farming couple who are 4th and 5th generation Australian and who confirm that they did not learn the methods they use from their Chinese forebears but have researched them.

³ <http://www.yamagishi.or.jp/en/yamagishi0601.html>

Discussion and conclusion

Drawing together the insights from these wide ranging interviews is a complex task and it is timely to review the objectives of the project at the outset. The researchers hoped to explore what, if any, sustainable practices these relatively distinct ethnic groups in our multicultural region brought to Australian agriculture from their homeland origins, whether or not this was a conscious process of adapting traditional techniques and methodologies or whether it was a more subtle attitudinal difference or belief system relating to sustainable practices or the human/nature relationship.

In preparing for this research we reviewed traditional farming practices generally in the countries of origin for the relevant migrant groups and while we did not expect to see a direct transfer of farming methods to the Australian mechanized farming environment we considered it possible that remnant 'characteristics' of traditional systems (Altieri 1987; Marten 1986) might be found. These characteristics can be summarized as follows

- Focus on risk reduction
- Year round vegetative cover of soils
- System diversity (farm systems based on several cropping systems, cropping systems based on a mixture of crops, and crops with varietal and other genetic variability)
- Trophic complexity approaching natural systems (multiple interactions between plants, weeds, pathogens and insects)
- High net energy yields because energy inputs are relatively low
- Low levels of inputs and high degree of self-sufficiency
- Integration of economic and cosmological domains.

In fact the interviews with farmers and stakeholders in ethnic farming communities indicate that there are relatively few cultural farming practices remaining in large-scale industrial agriculture or that at least these have not survived the adaptation to Australian agricultural systems. However, it was noted that the protection of soil and the principle of year round vegetative cover was seen as a fundamental principle by several farmers who accredited this to their farming traditions.

The focus on risk reduction in a traditional farming system is about ensuring the subsistence role of the farm and assumes that, to ensure stability, productivity in any one year might be sacrificed. The idea is that pest and pathogen attacks are not catastrophic because other species/crops will survive and compensate. This is clearly not applicable to modern large scale mechanized monocrop farming where any large scale attack on a crop has the potential to wipe out the harvest and in most case wipe out the farm as a viable commercial entity. However most farmers indicated they maintained family gardens that to some extent operated in this manner. There is little system diversity whether in relation to variety of crops, genetic diversity and or the mixture of crops and animals on farms within the participant group.

This is not to say that we found the practices of interviewees to be 'unsustainable' (even if we were qualified to do so). Obviously the adoption of conservation methods on large commercial farms can promote biological diversity. Crop rotation, intercropping, cover crops, integrated pest management, and green manures are all techniques that can be used in larger commercial systems. These practices can reduce dependence on fertilizers and pesticides and promote sustainable intensification. It is accepted that the integration of farming systems, traditional and modern high productivity systems could help to preserve biological diversity.

Generally the results of our research indicate that there has been little translocation and adaptation of traditional sustainable farming practices. For groups such as the Sikhs and the Italians and the Chinese Australians the commercial domain of their farm operations owes less to their ethnic backgrounds than to modern Australian farming practices. They may still maintain strong cultural practices and traits in their personal domestic domains but in relation to farming practices they are as likely as any other Australian farmers to adopt and implement sustainable farming practices. These groups have for the most part been in Australia for several generations and not withstanding issues of rural isolation or other socio-economic barriers they have in comparison to recent refugee groups greater access to relevant literature, education and training. A more detailed study of the household gardens (vegetables and fruit trees) may possibly reveal that these gardens have a role in maintaining some genetic diversity in food plants.

Most of these long-term farming families who have extended over several generations consider that the industry has become greener and more sustainable in recent decades. This is seen as a reaction to a (perceived) sudden transition after WW2 to heavy machinery, and high chemical methods of farming.

Some farmers thought WWII was a major turning point in obliterating the cultural practices different ethnic groups might have brought to the soil. It is interesting to speculate that soldier resettlement programs that operated after the war may have had something to do with the problems that developed. Certainly in other areas they led to overstocking of marginal sheep and cattle country.

Italian farmer: The Chinese would be a bit different. They'd have their veggie patches, and they would grow differently. They'd chip differently. The Italians would do it a little bit differently [too]. They'd use a shovel or something like that. They'd be a bit different ... in the way they would cultivate their soil, but a lot of that got taken from where they were, and that knowledge was applied here ... Things changed here after the war ... Before World War II farmers had more say. They were putting in their own practices, and looking after the soil was a lot easier. They had small tractors, there was no compaction of the soil, cane was cut by hand, and the soil was a completely different structure. Everything was looked after a lot better ... It was mainly using those practices, or cutting cane and putting all the trash under the one row, and things like that. They had different practices. They had to look after their soil. They had to know how to get nutrients back into the soil, because you couldn't just go to one of the fertiliser places and say I'll have 20 tonne of urea thank you very much. The fertiliser changed everything. After the war, fuel, synthetic fertiliser, high analysis fertiliser like urea made change. Our landscape changed.

Chinese farmer: They ... needed explosives [like] ammonium nitrate [which] is an oil based product. So they made the explosives ... We used to blow all the stumps out of here before the big bulldozers came. That's how we got our trees out ... So what I'm getting at is they discovered that plant[s] loved nitrogen ... so what better way than to get rid of the byproduct of the explosives by making/selling a fertiliser called nitrogen, ammonium nitrate or urea. So that's how the chemical thing started. I mean Hitler was playing around with organophosphates, poison gas. Now what'd we do with that stuff? We kill the fruit fly and we kill all the bugs with it. So it all started way back then. So you're talking about the 1930s - I would say '40s really, that's the start of it... the chemical farming ... But I think farming ... really got into the fair dinkum ... in the '60s. Then in the '60s ... the bugs came, because you're killing the biodiversity. So they came up with a chemical. So, you put the chemical [on]. Another bug came because of that chemical. So they gave you another chemical ... So you've got to get back to before then [if you want to find ethnic farming practices]. So you've got to look at what they were doing 5000 years ago. It's not only China but all countries.

In recent decades programs like Reef Rescue have aimed to promote more sustainable farming practices, but may also homogenize farming practice even as they achieve industry wide goals. Industry associations increase access to information and facilitate the uptake of practices and techniques, but access to these organisations is not equal. If state legislation regulated the banana industry to the same degree that it regulates sugarcane, this would pose a major threat to the Hmong farming community. The onerous reporting regimes to comply with state legislation require expert English language capacity. Extension work and/or other sorts of assistance would have to be made available. Agricultural Stakeholders do not tend to view the farming community in ethnic terms, however, so sourcing this support might prove difficult.

More recent immigrant groups to FNQ face additional problems of racism, literacy and lack of capital. Several Hmong interviewees recalled difficulties and mistakes with mixing chemical for instance because of confusion over the instructions. Several of the newer migrant farmers had identified niche markets for traditional crops but while these might eventually be profitable they did not have the capital nor access to the networks to help them establish efficient marketing and transport solutions to promote and distribute their product. Quite a few of the farmers interviewed spoke of the role of DPI in assisting, advising or directing their focus but this attention was not consistent across all crops or in all areas.

Indigenous Australian sustainable resource use

Prior to the commencement of this project there was some consideration given to the potential to compare and contrast traditional sustainable practices and or cultural beliefs about nature between these diverse ethnic groups and those of Australian Aborigines. In terms of practices it is clear from our research that there are no comparable sustainable practices amongst the diverse ethnic farming groups interviewed. There are however some indications of compatible belief systems. For example some of the Hmong farmers interviewed indicated a deep respect for the balance of nature. They saw a similarity between the Wet Tropics landscape and the landscape of their homelands. There is insufficient information from the interviews to understand if this connection with the natural landscape has deeper similarities. However it is interesting to speculate on the benefits of a collaborative project between the Hmong and the Traditional Owners of the Wet Tropics World Heritage Area which involved the traditional owners introducing the Hmong to the country. To some extent it is clear that the Hmong feel that they are on the periphery of Australian society and they are buffeted by incomplete and sometimes indecipherable information. The feelings of familiarity or recognition of the landscape as something similar to home (and therefore safe), was to some extent with the knowledge that this environment is not known and the perhaps overstated advice from others that the bush is dangerous.

Several of the Italian farmers also expressed an affinity with Indigenous Australian beliefs in relation to the land. Increasingly the traditional owners are looking for ways to work with community to help manage their lands. Now that Giringan Rangers have been established with ongoing funding it is timely to explore new partnerships beyond those with government agencies.

Social Ecological Systems and Adaptive Capacity

What do the results of the research tell us about the adaptive capacity of the regions farmers to meet the environmental challenges of the future? Firstly it is clear that it is not an even playing field and that the different groups of farmers having differing levels of knowledge

about the environment, farming and sustainability. What's more they have variable access to such information. We cannot assume those communities that resettle after experiencing the trauma and social disruption associated with being a refugee will be able or willing to transplant farming practices from one cultural and physical environment to the other.

The four principles proposed to define the adaptive capacity of SES are:

- 1) Learning to live with change and uncertainty
- 2) Nurturing diversity for re-organization and renewal
- 3) Combining different types of knowledge for learning and
- 4) Creating opportunity for self organisation

These require specific investment and action when we are talking about dislocated/relocated community groups. The role of government agencies should focus on steps 2 and 4 to provide the means and impetus for communities to develop adaptive capacity and build resilience.

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Appendix 1: Interview questions for Stakeholders

For environmental/NRM/government groups

- 1) Are you familiar with Italian/Hmong/Chinese/Sikh migrant groups in your region?
- 2) Do you know much about the cultural practices of these groups?
- 3) Does your organization have specific connections/networks to any of these farmers?
- 4) What kinds of consultation and engagement mechanisms exist for communicating with these groups?
- 5) How do you communicate policies or other environmental information to these groups?
- 6) Are you aware of any environmental innovations that exist in these communities?
- 7) Anything else we should be considering?

For cultural organisations

- 1) Can you tell us a little about the settlement phases of these groups?
- 2) Are they integrated in the broader community?
- 3) What are the general demographics of the community (ie along gender, age, education, etc, lines)?
- 4) What are the main sources of information for these groups?
- 5) Are you aware of any environmental innovations that exist in these communities? Or farming traditions that might be integrated into mainstream farming in Australia?
- 6) Are there ways of farming being undertaken that are unique to (a particular group) that you are aware of?
- 7) Are there cultural practices, festivals or rituals relating to farming, or the harvest, being undertaken that are unique to (a particular group) that you are aware of?
- 8) Anything else we should be considering?

Appendix 2: Interview questions for Farmers

DEMOGRAPHIC AND FARM INFO

- Name _____
- Address of property _____
- Size of property _____
- Main crop _____
- Gender _____
- Ethnic group _____
- Cultural identification _____
- Which age group do you fall into?
- 18-25 years _____ 46-55 years _____
- 26-35 years _____ 56-65 years _____
- 36-45 years _____ 66+ years _____
- How many people, including yourself, live in your household? _____
- What are the ages and genders of other people in the household? If under 18 please list age.

	Relation to interviewee	Age (use age groups above)	Gender
Person 2			
Person 3			
Person 4			
Person 5			
Person 6			
Person 7			
Person 8			

GENERAL MIGRATION BACKGROUND

- Where were you born?
- How long have you lived in North Queensland?
- When/why did you or your family move to FNQ?
- Where did they come from?
- Do you belong to a cultural association? (If so which ones? And could you describe how often you meet or participate in the activities of that association?)
- What were some of the difficulties in settling into rural life in Australia?
- What sorts of things do you do on your farm that you think come from your cultural background and are therefore different to farmers of other backgrounds?

GENERAL FARMING BACKGROUND

Cultural history

- How long has your family been involved in farming?
- How did you (or your family) decide to engage in farming here in QLD (cultural continuity, livelihood, cultural reasons)?
- How do you think this farm is similar to, or different from, the farms back in Italy/Laos/China/India?

- Are there any tools that you use that are similar to tools that your family used in Italy/Laos/China/India?
- In what way is farm work organized in similar or different ways to Italy/Laos/China/India? (Describe/ not at all/ don't know)
- Did your family bring any distinctive skills to farming in Australia? If so can you describe them?
- How do you and your family celebrate a good crop/harvest?
- Can you describe what festivals/feast days or holidays you and your family observe? Are any of these related to farming in anyway?

Everyday practice

- What crops are grown on this farm now? Have they changed over time?
- Do you have a separate home garden on the farm? Do you use different techniques at each?
- What are the most important things to do to ensure a good crop? (Can you rank them 1, 2, 3 etc)
- What role do family members have in the running of the farm? (identify involvement of grandparents, children, women, men)
- How did you acquire your farming skills (ie from family, network, government, etc)?
- Are you involved in any farming or environmental associations? Which ones and why them/why not?
- What involvement do you have with farming bodies/organizations/departments?

PERCEPTIONS OF ENVIRONMENT, CLIMATE, NATURAL RESOURCES

Environmental perception

- How do you feel about the Australian bush? Do you ever visit natural places for enjoyment and relaxation and if so what sort of places do you visit?
- Do you or your family ever go hunting, fishing or collecting wild foods? If so can you describe the sorts of animal or food you get? (e.g. freshwater fish, yabbies, ducks, bush fruit).
- What do you like least about the Australian natural landscape?
- What do you like best about the Australian landscape?
- Aboriginal people often talk about the spirits that inhabit certain places. What do you think about this? Do you have any similar thoughts?
- In your culture, how do you understand your connection to the land? Does this change when you migrate to a new country?
- Imagine that you are a long way from home. Close your eyes and picture your home/farm in its landscape setting. Describe what you see/feel/smell. Is there some natural feature above all others that you think of when you think of home? (such as the mountains, the rainforest, the clouds, the smell of rain on ploughed dirt etc).

Climate change

- What is your understanding of climate change and does this worry you as a farmer?
- What changes have you personally noticed in the weather (or nature generally) over the time that you have been farming here? Do you think these relate to climate change or something else?
- Are there environmental indicators that you notice which happen before significant weather events (e.g. heavy rain, cyclones)? How do you know to look for those changes?

Sustainable natural resources

- What is your understanding of sustainable farming?
- How do you ensure that your farm is sustainable? What specific things do you do that promote sustainability? Have you changed any practices deliberately to become more sustainable?
- What is your understanding of biodiversity?

THE FUTURE

- How do you think farming in north Queensland will change in the future? Do you see your children and descendants continuing to farm? (why/why not?)
- In what way do you think the important parts of your cultural heritage will be passed on to future generations?
- Is there anything that you do that is aimed at ensuring that your family's cultural traditions are passed down to future generations and strengthened?

Is there anything that we missed or is important for us to know about?