The use of education theory to guide the implementation of participatory rural appraisal in the Kingdom of Tonga

Tevita Taukei Vea’ila
University of Wollongong
NOTE

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1 INTRODUCTION

The safe use of pesticides (SUOP) and ecological sustainable agricultural practices (ESAP) signified that land did not pass on from our forefathers, but we shortly borrow it from our children and their offspring (i.e., hako in Tongan) - Taufa Uaisele H. (aged 40).

This chapter is designed to provide a general introduction to the study and the theoretical perspective adopted. The purpose and research questions follow, along with limitations and ethical considerations. There is a brief outline of the researcher’s personal background that closely links to the cultural and social context of this study. The success of the approach developed for this study depended upon a deep understanding of the socio-cultural nuances of Tongan society and the researcher’s background was a key factor in the study. In addition, the significance is outlined, and a summary of the remainder of the thesis is presented with a brief glossary of key terms.

The context of this study was in villages, and it made use of traditional Tongan social structures to provide a vehicle for delivering and supporting the approach taken. In particular, it is important to recognise the influence of community leaders, church groups and community-groups, such as women’s groups, in supporting this project. This will be discussed in more detail later in the thesis.

1.1 The Problem

Tonga is undergoing a process of rapid change with the coronation of the King Siaosi Tupou V who is the Head of State of the tiny South Pacific island nation. The king has divested himself of business interests and relinquished much of his power in favour of a more representative, elected parliament (McMahon, 2008). Despite these changes, however, Tonga is still facing many socio – economic and environmental problems.
Tonga is a small, poor country and among the most vulnerable countries in the world. The coastal zone of Tongatapu, i.e., the most populous island of Tonga, is susceptible to flooding hazards associated with climate change and rising sea level, particularly inundation, flooding, beach erosion and tsunamis (Pelesikoti, 2003; Lao, 2007). Tonga’s small open economy is vulnerable to fluctuations in world commodity prices and susceptible to frequent natural disasters including cyclones (Commonwealth of Australia, 1998:58-62). Within this framework, the Tongan economy depends upon significant inflows of remittances sent from overseas workers and relatives overseas. Such a situation can be termed a Migration, Aid, Remittances and Bureaucracy (MIRAB) economy consisting of a large public sector with a dependency on aid and remittances. Murray (2001:137) reported:

This increasing reliance on aid to fund modernisation programmes, along with the increasing importance of remittances from ex-patriot islanders who were migrating in large numbers to Pacific Rim countries, led to the development of MIRAB economies …

Inundation, flooding hazards generated by tropical cyclone storm surges, beach erosion, saltwater intrusion, agricultural runoff and social trends of population growth are the common threats for coastal villages because of their low-lying settings (Lao, 2007; Pelesikoti, 2003). Further, freshwater in Tonga, as in many Pacific Islands, is either obtained from the collection of rainwater or by the pumping of the freshwater lens overlying a saltwater body in a limestone aquifer (van de Velde et al., 2006). Thus, the economic and social well-being of the population are dependent upon the quality and the quantity of fresh water, much of which can be contaminated by chemicals, such as fertilizers and pesticides.

The reason for the over-use of fertilizers and pesticides is that traditional subsistence agriculture is being replaced by monoculture of non-traditional cash crops for export, such as squash (Murray, 2001). In order to maintain the yields of non-traditional cash crops at a competitive level, it is necessary to ply crops with copious amounts of fertilisers, herbicides, and pesticides (Murray, 2001; van de Velde et al., 2006; Toafa, 1994). An exporting economy of monoculture cash crops reduces biodiversity, and
dietary diversity and creates socio-environmental tensions such as water pollution and soil degradation while promoting health problems in the population (Overton, 1999). Crowley et al., (2003) reported that the squash market is one of high risk in that it is a single market, it is a bulky, relatively low value crop, it is a one-way trade which involves large inputs of seed, fertiliser and chemicals, and the crop is subject to the vagaries of climate, pests and diseases.

An example of the concerns about toxic chemicals is the Agency for Toxic Substances and Disease Registry (ATSDR, 2008) report on chemicals such as dichlorodiphenyltrichloroethane (derivates include DDT, DDE and DDD). Also mentioned are persistent organic pollutants (POPs) such as aldrin, chlordane, and endrane and the impact of these substances in human populations on cancer cases, damage to nervous systems, diseases of the immune system, reproductive disorders and interference with normal infant and child development.

Bagchi (2000) provided an overview of the extent of chemical use and availability in Tonga. An assessment of the various aspects of chemicals production, import, and use in Tonga identified the following areas as priority concerns:

- the lack of regulation of chemical imports;
- the improper storage, transport and distribution;
- the inappropriate use of chemicals;
- the improper disposal of chemicals.

The Pesticides Awareness for Sustainable Agriculture (TCDT, 1998b) reported that during a survey in Tonga:

- 47% of the respondents did not wear protective gear during mixing and application of pesticides;
- 65% of the respondents did not understand the English labels on pesticide containers and synthetic fertilisers;
- 30% of the respondents asked for the translation of English labels into the Tongan language;
- 71% of the respondents reported that English instructions were too difficult to understand and hard to follow.
Van de Velde (2006:461) reported that “during an initial survey of the groundwater quality, traces of pesticides dieldrin, diazinon and carbaryl have been identified in three of 12 groundwater samples taken around Tongatapu.” This report provides evidence that pesticide use in Tonga is high and poorly managed and needs to be regulated. It is an indication that an effective educational program needs be developed to educate local farmers and their families to understand how to safely use pesticides, as well the alternatives for sustainable agriculture. Van de Velde (2006) further argued that “improved agricultural practices have to be implemented through educational tools to ensure continuing economic prosperity derived from agricultural exports.”

1.2 Theoretical framework

The approach to agriculture described above reflects how international development activity has occurred over the past 50 years (Greenwood & Levin, 1998). Since the 1950s, the predominant approach has been that of “modernisation”. This approach views poverty as something that can be attributed to the unfortunate continuation of a series of traditional and ostensibly irrational practices that prevent people from doing what is in their best interests (Greenwood & Levin, 1998). Therefore, the ‘solution’ to the problem is seen as well-targeted actions that modernise the traditional practices, often through a process that emphasises education and communication strategies that make ‘traditional’ people into ‘modern’ thinkers (Greenwood & Levin, 1998; Chambers, 1997). This approach has been powerful as governments with lots of money provided the finance, and agencies such as the International Monetary Fund and the World Bank, as well as agencies for international agricultural research, controlled the agendas which often focused on more productive varieties of basic food crops and the application of ‘modern’ agricultural techniques (e.g., improved fertilisers, pesticides, mechanisation, integrated pest management).

Greenwood and Levin (1998) point out that much of the development work in areas such as Tonga is limited by a large number of constraints on what can be done and how. Further, this has led to international development becoming a policy arm that often represents the interests of industrial nations. Chambers (1997) agrees with this assessment and claims that a multi-billion dollar activity has developed across the world
that is served by an immense bureaucracy of professionals and quasi-professionals who have made nice incomes by being ‘experts’ on the world’s poor.

In the early 1970s, other agendas began to challenge the so-called ‘conventional wisdom’ of the time. For example, the rise of the feminist movement and the environmental movement moved the focus to approaches that were more participatory and holistic. Coupled with this was the emergence of a strong international movement for human rights that went beyond poverty and included self-determination, freedom from coercion, gender equality, the rights of children and the rights of ethnic groups (Greenwood & Levin, 1998).

By the mid 1980s, many private voluntary organizations (PVOs) and non-government organisations (NGOs) have entered the development scene as major players (Greenwood & Levin, 1998). Because they are free from constraints associated with nationalistic economic policies, these organizations have been able to be open in their ideology and focus on social, economic and ethical goals that better serve the needs of local communities. As a result, international development is seen as a ‘complex patchwork of big international development projects of nation-states and the activities of PVOs and NGOs’ (Greenwood & Levin, 1998).

During the same period, a participatory approach that linked to action research emerged. This approach was known as participatory rural appraisal (PRA). PRA draws upon participatory action research as a theoretical framework (Lewin, 1946; Whyte, 1995) and it is this theoretical framework that informs this study (see Chapter 3 for a more extensive discussion).

PRA applies a set of practices based on farming systems research, and makes use of close observation of local farming practices from a systems perspective. It involves a number of interviewing and sampling methods and some group and team dynamics approaches. A variety of approaches is used to identify significant local sources of knowledge that may come from individuals or groups. Participants help to analyse a specific issue, and develop and monitor action plans. However, there are some limitations such as that fact that often a PRA team arrives in a local community, begins a rapid process of data collection and analysis, but does not take the time to become
aware, in a detailed way, of the nuances of local politics. Further, the program developed is often not self-sustaining, as it is not supported by sound community-based education. Therefore, there is a need to recognise these limitations of PRA and to conduct a study that addresses these limitations. This was the focus of this study.

1.2.1 Purpose of the study

This study aims to address the issue of safe use of pesticides (SUOP) and promotion of ecological sustainable agricultural practices (ESAP) by identifying a relevant educational theory that can be applied to extend the impact of PRA. This study recognizes the importance of encouraging local communities, both men and women of all ages, to participate in community decision-making processes, and in sustainable development, because their interests, knowledge, skills and wide experience in ecologically sustainable development are essential to the success of improvement programs (FAO, 1999; Halavatau and Hazelman, 2003; Pretty, 1995).

1.3 Research Questions

The goals and objectives of the study (See Chapter 4 for details) are:

i. To assess the strengths and limitations of Participatory Rural Appraisal (PRA) as a framework for organising community education designed to improve ecologically sustainable methods of crop pest control in Tonga.

ii. To identify an educational theory that would be suitable to support the PRA framework and that also addresses the reported limitations of PRA.

iii. To use the perspective of a participatory action research framework (PAR) to guide and evaluate the implementation of this theoretical educational model in the context of a Tongan community groups who were the focus of the data collection. These were a group of women from a town and a group of young farmers from another village.

The following questions were posed:

1. What are the strengths and limitations of PRA as a framework for community-based action that focuses on the safe use of pesticides (SUOP) and ecologically sustainable agricultural practices (ESAP) in rural communities in Tonga?
2. How can educational theory be combined with PRA to guide the planning and implementation of a community education program designed to improve the SUOP and ESAP within a group of women and young men in rural communities in Tonga?

1.4 Limitations of the study

This study was limited to the island of Tongatapu and involved young men at Nukuhetulu village and the group of women of the ‘Isileli community, Nuku’aloa. As such, the findings are specific to the context of Tonga. Some generalization may be possible for some of the findings but the major ones will be context-specific. In addition, the numbers of participants was limited to twenty young farmers and twenty women from the group of women.

The study was restricted to practical activities such as home gardens, mixed cropping, workshops, television, and radio programs. Data from these events were used to assess the suitability of a theoretical supporting framework for PRA that focused on the safe use of pesticides (SUOP) and changing ecologically sustainable agricultural practices (ESAP) in the Kingdom of Tonga. The period of the field research was over a six-month period and this study should be viewed from this perspective.

1.5 Ethical Considerations

Note: All participants in this study gave written and oral permission to use their names rather than pseudonyms.

The chairwoman and participants of the group of women “Fe’ofa’aki ‘a Kakau” of ‘Isileli, Nuku’aloa, and the town officer and young farmers of Nukuhetulu village in Tongatapu were advised of the nature of the research before they decided whether to participate or not. The data collected through observations and interviews were used only for the purpose of the research. An approval to conduct this research was obtained from the University of Wollongong Human Ethics Committee (Appendix Six). Informed consent was sought from the participants who were then advised of their right
to withdraw or send any complaints and comments to the University of Wollongong Human Ethics Committee at any time during the inquiry.

1.6 Sources of Information

A number of individuals and organizations provided valuable support to this research study through the provision of documents, reports and personal experience information. Some of the major contributors are outlined below.

The former Director of Tonga Community Development Trust (TCDT) (1984-2003), Mr Denis Wolff, gave permission in writing to the researcher to use the information collected during the Pesticides Awareness Project (PAP) and Pesticides Awareness for Sustainable Agriculture (PASA) program, provided that PAP and PASA were acknowledged. In 2004, the new director of Tonga Community Development Trust (TCDT), Mr Lopeti Senituli, approved study leave for the researcher to conduct the research and provided personal experience information. A PASA task force of TCDT, Mr ‘Ofa Fakalata (scientific) and Mr ‘Inoke Fakatene (technical) provided information upon request throughout the period of the research.

The coordinator of Development of Sustainable Agriculture Program (DSAP) Extension, Dr Sosiua Halavatau, of the Secretariat of the South Pacific Commission (Suva) provided project reports to support this research. The in-country DSAP/Tonga coordinator, Mr Kamilo ‘Ali, also provided reports to support this research. The coordinator of International Waters Project (IWP/Tonga), Mr Sione Faka’osi, working in conjunction with Global Environment Fund (GEF), United Nations Development Program (UNDP), South Pacific Regional Environment Program (SPREP) and Department of Environment in Tonga with the Pesticides Awareness Sustainable Agriculture (PASA) of Tonga Community Development Trust also provided reports about the usefulness of PRA for safe use of pesticides (SUOP) and ecological sustainable agricultural practices (ESAP). The information collected during the field activities was used only for the purpose of this research, and was securely and confidentially protected.
1.7 Significance of the Research

The economy of Tonga is based heavily on agriculture. Agriculture provides approximately eighty percent of employment opportunities to the workforce (Commonwealth of Australia, 1992 & 1998; MAFF/Statistics Department & FAO, 2002; Pelesikoti, 2003; van de Velde et al., 2003). Local growers are using more pesticides in order to get better yields from their farming activities because the majority of farming projects are being run with little consultation with local communities (Ecowoman, 2000; PASA TCDT/FSP Annual Reports, 1998, 2001, 2002, 2003 & 2004). The outcomes of this study will better inform and educate local communities on how to contribute to safe farming practices.

Participatory Rural Appraisal (PRA) is a participatory education process which is designed to encourage local people to participate in Ecologically Sustainable Development (ESD). It is an alternative to more conventional, top-down education approaches to rural development and is based on village experiences. This study was designed to identify and apply a theoretical education framework that would inform and support the PRA process, making it more effective. The study also contributes to the evolution of theory as an anticipated outcome is that the theoretical framework may be applied across a variety of similar contexts.

If local communities have been well informed during the planning, implementation, monitoring, and evaluation stages of a project, their inputs and participation are likely to contribute to its success. By way of contrast, Pelesikoti (2003) argued that top-down approaches, often imposed by the government do not have the capacity to implement sustainable objectives. Such approaches do not have adequate guidelines for effective consultation and communication and lack strategies to effectively involve communities and other essential stakeholders.

Theoretically-and educationally-supported PRA strategies may encourage women and young male farmers to more actively and effectively participate in the education process and empower them to develop their own solutions (alternatives) for crop pest control in Tonga. The goal is for local women and young male farmers to collaborate and work as problem-solving or learning teams. Local families can then develop home-grown
gardens and create locally-owned solutions to ecologically sustainable development requirements such as making compost for their gardens, growing companion crops, and using local insect repellents to chase away pests.

It is hoped that such PRA strategies will also encourage the group of women and young male farmers to change their behaviour by adopting ecological sustainable management of crop pest control in Tonga. The group of women can share with their husbands an awareness of the proper use of pesticides and the impacts of improper use of pesticides on the environment including human health. In addition, they can discuss the possible alternatives for sustainable agricultural practices such as using composting, companion crops and moon planting guides which are ecologically and environmentally friendly. Young male farmers can share, with their parents and their friends, different skills and experiences they have learned and practised in the safe use of pesticides (SUOP) and ecologically sustainable agricultural practices (ESAP).

1.8 Structure of the remainder of the thesis

The remaining chapters are structured as follows:

- Chapter 2 provides an introduction to Tonga and discusses the challenges of sustainable development in Tonga and the research problems.
- Chapter 3 reviews relevant educational theories and justifies the selection of Cambourne’s Conditions of Learning as an appropriate model. The chapter then concludes by linking Cambourne’s conditions of learning to PRA.
- Chapter 4 discusses the theoretical framework of the study: participatory action research (PAR).
- Chapter 5 describes the methodology. It provides a justification for a case study approach and defines the cases used in this study. It describes the phases of data collection and how these were linked to the model of implementation described at the end of Chapter 4.
- Chapter 6 describes the findings and results by linking them to the phases of data collection. The two cases (i.e., the women’s group and young farmers) are compared.
Chapter 7 concludes the thesis with the presentation of a modified model that could be applied in other contexts. The strengths and weaknesses of this model are discussed as well as directions for future research.

1.9 Key terms

For the purpose of this study, the following definitions are used:

*Ecologically Sustainable Methods* (ESM) of crop pest control are practices that do minimal long-term damage to the environment in Tonga (WCED, 1987).

*Crop pests* are living organisms that occur where they are not wanted, and can cause damage to crops, humans or other animals. Pests can include insects, mice and other animals, invasive plants (weeds), fungi, and microorganisms such as bacteria and viruses (SPREP, 2003).

*Invasive species* are introduced species or pest species sometimes called invasive alien species living where they have not previously been found. They are generally “invasive” as result of deliberate or accidental human activity. They are highly adaptable and are usually widespread and can live in a wide range of environments. They breed rapidly and spread easily. When they arrive in a new location, they have usually escaped from the diseases and predators that would have kept their numbers under control in their home location (SPREP, 2003i).

*Behaviourism Theory* – Behaviourism theories (Lefrancois, 1972: Skinner, 1958) emphasise the relationship between stimulus materials, responses and reinforcement. This theory claims that the relatively immediacy of, and the type of reinforcement (i.e. intrinsic or extrinsic) impacts on the learning of behaviours.

*Cognitivism Theory* – consists of theories such as meaningful reception learning (Ausubel, 1960 & 1968) and discovery learning (Bruner, 1966). Meaningful reception learning occurs when information is presented to the learner in a more or less complete form which can be subsumed into the learner’s existing cognitive structures, i.e., made meaningful (Lefrancois, 1988). Discovery learning occurs where learners are provided
with experiences through which they organise their own cognitive structures – “categories”, or coding systems for themselves (Lefrancois, 1988).

Constructivism Theory - based on the belief that knowledge is not passively received but actively constructed by the learner to generate understanding when prior knowledge is related to the present experience (von Glassersfelds, 1984).

Cambourne’s (1988) Model of Learning consists of the following:

i. Immersion: The context in which the learning takes place.

ii. Demonstration: The learners could see, hear the actions of the artefacts to be learned.

iii. Engagement: The learners are convinced to learn because the activities are do-able and own-able by them.

iv. Expectation: The learners could expect that the demonstrated activities are do-able and own-able.

v. Responsibility: The learners are responsible for their own learning.

vi. Approximation: The learners are trying out what they have learned and being able to experiment and make mistakes.

vii. Use: This is related when learners put into practice what they have learned.