

Report

55

2010

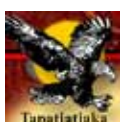
Plants for people:

Case study report

Louis Evans, Brian Cheers, Deb Fernando, Joan Gibbs,
Peter Miller, Kado Muir, Patrick Ridley, Harry Scott,
Guy Singleton, Syd Sparrow, John Briscoe

with

Andy Barr, Mary Barr, David Callow, Andrea Duncan,
John Fox, Fifi Harris, Deeva Muir, Fay Rola-Rubzen,
Christine Storer, Elena Tsvetnenko and Geoff Woodall



Curtin University

**NINTI:
ONE:**



Plants for people:

Case study report

Louis Evans, Brian Cheers, Deb Fernando,
Joan Gibbs, Peter Miller, Kado Muir,
Patrick Ridley, Harry Scott, Guy Singleton,
Syd Sparrow, John Briscoe

with

Andy Barr, Mary Barr, David Callow,
Andrea Duncan, John Fox, Fifi Harris,
Deeva Muir, Fay Rola-Rubzen,
Christine Storer, Elena Tsvetnenko and
Geoff Woodall

2010



Curtin University



Contributing author information

Authors	Other project team members
Louis Evans, Professor of Aquatic Science at Curtin University, was the overall Project Leader and directly responsible for the research projects conducted at Titjikala and Leonora. Brian Cheers, University of South Australia, provided social science expertise and was directly responsible for project activities conducted at Ceduna. Deb Fernando was a project officer in the Ceduna study and provided administrative support to the Far West Coast Aboriginal Enterprise Network. Joan Gibbs, University of South Australia, worked closely with Aboriginal communities in the Far West Coast of South Australia and coordinated the field work conducted in the Ceduna project. Peter Miller, University of South Australia, was a member of the Ceduna project team and participated in field trips and other project activities. Kado Muir, CEO of the Walkatjurra Cultural Centre in Leonora, coordinated the involvement of the Tjupan Ngalia Aboriginal community in the Leonora project and also participated in the Titjikala project, in particular in the development of the IP agreement between Titjikala and DKCRC. Patrick Ridley, Curtin University, was a Project Officer in the Titjikala project and participated in a number of field trips conducted at with Titjikala community members. Harry Scott, CEO of the Titjikala Community Government Council, was a core member of the Titjikala project team and played a pivotal role in the formulation of the IP agreement between Titjikala and DKCRC. Guy Singleton, PhD student at Curtin University, participated in project activities at both Leonora and Titjikala and was responsible for the production of a number of videos and reports on project activities. Syd Sparrow, University of South Australia, was a member of the Ceduna project team and participated in field trips and other project activities. John Briscoe, an Aboriginal elder from Titjikala, provided the initial inspiration for the Plants for People project and played a central role in all project activities at Titjikala. He led the discussions on the development of the research agreement between Titjikala and Curtin University and the IP agreement between Titjikala and DKCRC as well as providing expert advice on plant collections and documentation of medicinal uses of selected plant species.	Andy Barr, a retired pharmacist with expertise in Aboriginal medicinal plants, was a core member of the Titjikala project team, participating in meetings and workshops in Perth and Titjikala and providing advice to laboratory scientists conducting studies on plant extracts. Mary Barr, a retired community nurse, participated in meetings and workshops conducted in Perth and in field trips at Titjikala. David Callow, a professional photographer with a long history of involvement with Aboriginal communities in central Australia, took photographs during Titjikala field trips and actively participated in workshops and field trips conducted with Titjikala community members. Andrea Duncan, a Project Officer from Curtin University, coordinated the production of posters by Leonora community members and participated in other Leonora project activities. John Fox was a Professor in the then School of Environmental Biology at Curtin University at the time the project was conducted. He provided expertise in native plants and revegetation procedures. Fifi Harris, a member of the Tjupan Ngalia Aboriginal community in Leonora, participated in meetings and project activities at Leonora. Deeva Muir, a member of the Tjupan Ngalia Aboriginal community in Leonora, participated in meetings and project activities at Leonora. Fay Rola-Rubzen, Curtin University, provided business development expertise and worked with the Leonora community to develop a business plan for the Walkatjurra Cultural Centre. Christine Storer, Curtin University, provided business development expertise and worked with the Leonora community to develop a business plan for the Walkatjurra Cultural Centre. Elena Tsvetnenko, Curtin University, conducted and reported on the proximate analysis of plant materials collected during field trips at Leonora. Geoff Woodall, University of Western Australia, coordinated the studies on the cultivation potential of local yam species found near Leonora.

© Ninti One Limited 2010.

Report Number 55 ISBN: 978 1 74158 164 8 (Online copy) ISSN: 1832 6684

Information contained in this publication may be copied or reproduced for study, research, information or educational purposes, subject to inclusion of an acknowledgement of the source.

Citation

Evans L, Cheers B, Fernando D, Gibbs J, Miller P, Muir K, Ridley P, Scott H, Singleton G, Sparrow S and Briscoe J. 2010. *Plants for people: Case study report*. DKCRC Report 55. Ninti One Limited, Alice Springs.

For additional information please contact

Ninti One Limited Publications Officer: PO Box 3971, Alice Springs NT 0871, Australia
Telephone +61 8 8959 6000 Fax +61 8 8959 6048 www.nintione.com.au

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Desert Knowledge CRC. The views expressed herein do not necessarily represent the views of Desert Knowledge CRC or its Participants. The Desert Knowledge Cooperative Research Centre (2003–2010) was an unincorporated joint venture with 28 partners whose mission was to develop and disseminate an understanding of sustainable living in remote desert environments, deliver enduring regional economies and livelihoods based on Desert Knowledge, and create the networks to market this knowledge in other desert lands.

Additional support for the Ceduna case study project was provided in the form of in-kind support from the University of South Australia. Additional support was provided by the Far West Coast Aboriginal Enterprise Network (FWCAN) Steering Committee; communities, businesses, organisations, and individuals participating in the FWCAN; other organisations, groups, and individuals in the Far West Coast region; the Tjutjunaku Worka Tjuta Inc. (TWT) and its Community Development Employment Program; First Australia Business; the Eyre Regional Development Board; and the Aboriginal Lands Trust (see Table 7). Their support is gratefully acknowledged.

Contents

List of shortened forms	V
1. Overview of the project	1
1.1 Background to the project's development	1
1.2 Aims and objectives of the project.....	1
1.3 Summary of project sites and activities	2
1.4 Report structure.....	4
2. Case study report: Titjikala	5
2.1 Introduction.....	5
2.2 Specific project information.....	5
2.3 Data collection	6
2.4 Workshops.....	10
2.5 Links with Titjikala School, Titjikala Arts Centre and Gunya Tourism	10
2.6 Intellectual property and ethics guidelines	11
2.7 Future directions	12
3. Case study report: Leonora	14
3.1 Introduction.....	14
3.2 Specific project information.....	14
3.3 Stage one: Scoping phase	15
3.4 Stage two: Implementation phase	16
3.5 The poster project	23
3.6 Stage three: Future directions	26
4. Case study report: Ceduna	27
4.1 Introduction.....	27
4.2 Aims and objectives.....	27
4.3 Process issues.....	28
4.4 Outcomes	29
4.5 Summary.....	39
4.6 Case study project team	40
5. Summary of outcomes	41
5.1 Project aims.....	41
5.2 Project activities.....	41
5.3 Projected outcomes	41
5.4 Outcomes and achievements.....	42
References.....	46
Appendix 1: An account of camera training by professional photographer David Callow	47
Appendix 2: Timeline of project development – Ceduna case study.....	48
Attachment 1: <i>From Field to Website – Titjikala training manual</i>	51
Attachment 1 – Appendix 1: Collection Form 1	73
Attachment 1 – Appendix 2: Collection Form 2	74
Attachment 2: <i>Plant Collection Protocol – Leonora training manual</i>	77
Attachment 2 – Appendix 1: Flora sampling sheet.....	82

Figures and graphs

Figure 1: The home page of the Tapatjatjaka Plants Database website	6
Figure 2: A screen shot of the prototype video	7
Figure 3: Edible fruiting body (approx. 50 mm diameter) and stalk of <i>Wititata</i> (native truffle)	9
Figure 4: A Titjikala workshop session, July 2004	10
Figure 5: Inside a Gunya tent at Titjikala.....	11
Figure 6: Community members lead discussions during two scoping meetings held on traditional lands	16
Figure 7: <i>Ipomoea calobra</i> (Wather)	18
Figure 8: Distribution of <i>Ipomoea calobra</i>	18
Figure 9: Emergence of scarified and non-scarified <i>Ipomoea calobra</i> seed	19
Figure 10: Cultivated Wather (<i>Ipomoea calobra</i>) seedling.....	19
Figure 11: Percentage moisture and ash in analysed bush foods.....	22
Figure 12: The collection of display posters (600 mm x 900 mm) developed in the poster project ...	23
Figure 13: The business arts planning poster.....	25

Tables

Table 1: Summary of workshops held at Titjikala	10
Table 2: Bush foods collected from the Leonora hinterland.....	17
Table 3: Plants collected from Leonora, Western Australia	20
Table 4: Proximate analysis of plant samples – ash, protein, fat and fibre as percentage of dry matter.....	21
Table 5: Proximate analysis of plant samples – ash, protein, fat and fibre as percentage of wet weight	21
Table 6: A summary of the Far West Coast Aboriginal Enterprise Network (FWCAN) membership	30
Table 7: Financial and in-kind support for the Ceduna case study (from sources other than DKCRC and the University of South Australia).....	31
Table 8: Far West Coast Aboriginal Enterprise Network (FWCAN) members and activities.....	32
Table 9: Summary comparison of Aboriginal and Western understandings of community	36
Table 10: Summary comparison of Aboriginal and Western understandings of community development.....	37

List of shortened forms

CDEP	Community Development Employment Program
CLC	Central Land Council
CNRM	Centre for Natural Resource Management
CSML	Centre for Sustainable Mine Lakes
DKCRC	Desert Knowledge Cooperative Research Centre
FWCAN	Far West Coast Aboriginal Enterprise Network
IP	intellectual property
NAIDOC	NAIDOC originally stood for ‘National Aborigines and Islanders Day Observance Committee’
P4P	Plants for People
PAR	participatory action research
RIRDC	Rural Industries Research and Development Corporation
TPD	Tapatjatjaka Plants Database
TCGC	Tapatjatjaka Community Government Council
TWT	Tjutjunaku Worka Tjuta Inc.

1. Overview of the project

1.1 Background to the project's development

The Plants for People project originated from discussions with Aboriginal elders from the Titjikala community, 130 kilometres south of Alice Springs. The elders observed low intergenerational transference of knowledge of traditional Aboriginal bush craft, plant and animal uses, and dreaming stories. This knowledge was remaining privy to the older generation, not as a matter of cultural protocol, but because the interests of the prospective students were prioritised towards Western media and entertainment. This traditional knowledge was seen by the elders as being important to retain the community's cultural identity and to develop enterprise opportunities of benefit to the community through tourism, horticulture and education.

The project focused on identifying ways in which plant use can advance livelihoods, cultural integrity, self-esteem, health and wellbeing within such Aboriginal communities. It involved Aboriginal communities at three case study sites in arid Australia. The major thrust of the project was to develop best practice approaches for documenting and ensuring the survival of traditional knowledge about plants of cultural significance and to use that knowledge to advance the livelihoods of Aboriginal people.

Such advances occur in differing ways. For example, livelihoods can be advanced through increased interaction between community members and other project participants in workshops. Collecting plant specimens and recording traditional knowledge about these plants heightens Aboriginal project participants' self-worth. New knowledge that can improve people's health and wellbeing and give them new opportunities for generating income can be created by linking traditional knowledge about the nutritional and medicinal value of plants with laboratory studies.

To achieve the ambitious goal of using knowledge of plants to advance Aboriginal peoples' livelihoods, cultural integrity, self-esteem, and health and wellbeing, the project used a holistic approach. We brought together the expertise of Aboriginal communities with ethno-botanists, laboratory scientists, plant cultivation specialists, community developers, education and training personnel, and business development professionals.

Community members and project personnel formed partnerships at each of the three study sites and worked together to achieve the project aims. Their approach was through a collaborative, community-owned, -based, and -driven project to develop action models using participatory action research (PAR) methods. The core activities of the project included:

- conducting field studies on plant distribution
- collecting plant specimens as voucher specimens and for laboratory analysis
- developing appropriate technologies for cultivating plants at some case study sites
- carrying out laboratory evaluations on the nutritional and medicinal value of selected plants
- applying this knowledge and these technologies in training programs and in social and business enterprises.

1.2 Aims and objectives of the project

As mentioned above, the major thrust of the project was to develop best practice approaches for documenting and ensuring the survival of traditional knowledge about plants of cultural significance, and to use that knowledge to advance Aboriginal people's livelihoods. The development of these

approaches was in the context of the project (a) being part of a long-term research and capacity-building program and (b) informing other research conducted under the auspices of the Desert Knowledge Cooperative Research Centre (DKCRC).

Specifically, the project sought to develop:

- insight into best practice approaches for planning and implementing a traditional knowledge documentation, reclamation, and generational transfer program in an Aboriginal community or group
- insight into preferred business and enterprise development approaches for Australian Aboriginal people, drawing on research findings and on existing knowledge of community and social development theory and practice
- Aboriginal community participants' knowledge and skills in plant specimen collection, documentation and storage, photography and multimedia storage, and plant propagation and cultivation
- early-stage plant propagation and cultivation trials and facilities for use in Aboriginal business enterprises
- identification processes for plant species that have nutritional or medicinal value and potential for cultivar development
- approaches to inform Aboriginal knowledge on the medicinal uses of plants through laboratory validation and the application of Aboriginal intellectual property rights
- 'knowledge registers' and support the documentation of protocols to access the knowledge they contain.

The project also sought to gather information on the nutritional value, health benefits, seasonality and safety of selected bush foods for dissemination to participating groups.

1.3 Summary of project sites and activities

1.3.1 Project sites

Research investigations took place at three main study sites referred to in this report as 'Titjikala', 'Leonora' and 'Ceduna'. Research investigations also took place at other sites, principally in laboratories belonging to participating research groups.

Five research teams worked on the project – one team for each study site, a laboratory research team and a business systems research team. To maximise the flow of information between the different project components and sites, membership of the different research teams deliberately overlapped.

Titjikala, Northern Territory

The Titjikala community is located on the edge of the Simpson Desert, approximately 130 kilometres south of Alice Springs in the Northern Territory.

The project conducted at the Titjikala community sought to record traditional knowledge about the use of plants for food and medicine. We then sought to apply this knowledge to the development of business enterprises based on these plants. We also sought to develop a database of Aboriginal knowledge about plants and make this available to participants via a secure Internet site. Based on this traditional knowledge, selected plants were collected and analysed for their medicinal value. We also sought to engage members of the community in establishing a horticulture venture that would produce seedlings and other products; these products would supplement community members' diet, and be sold in regional centres.

Leonora, Western Australia

The Tjupan Ngalia community group and Aboriginal Group Holdings are two of the several different Aboriginal groups that form Leonora's Aboriginal community. Leonora – a hub for extensive grazing

and mining operations – lies 240 kilometres north of the Western Australian city of Kalgoorlie. At the Leonora site, Plants for People social enterprises took place with the Tjupan Ngalia people, whose traditional lands extend north from Leonora, and with a group of Wongatha people whose elders were brought up at the Mount Margaret Mission.

Ceduna, South Australia

A coastal town at the top of the Great Australian Bight, Ceduna is the farming hub for South Australia's Far West. We engaged a variety of communities, organisations, businesses and individuals from areas west of Ceduna – to Scotdesco and as far as Yalata – and to the east of Ceduna.

Our activities at this site included establishing a business and social enterprise, identifying plant and plant products with potential for development, engaging local community members in the documentation and intergenerational transfer of traditional knowledge, and developing a business enterprise.

1.3.2 Project activities

Best practice approaches for knowledge documentation, reclamation, and generational transfer

Community workshops were conducted at each case study site to establish procedures for ways of working and to make sure that the project was owned by the participating communities. A Plants for People Council of Elders was formed at each site to direct the project's activities in the community. Once core community participants were identified, field trips were conducted to examine plants of cultural significance, and food-gathering activities, including kangaroo hunts and witchetty grub collections, were used to generate community interest and commitment.

Alternative methods of obtaining and recording traditional knowledge about local plants and their uses were explored and recommendations were made about the type and nature of traditional knowledge to be recorded, and about access regimes to that recorded information.

Business and enterprise development approaches

Workshops were conducted in each study site to begin the development of business and enterprise development plans. Field trips were conducted that involved meetings with community leaders, elders and informants, to assist the development of structures and processes, and to identify training needs.

Knowledge and skills development

Following field trip activities, two training manuals on collecting and storing plant specimens and recording collection data were prepared and used in training at all study sites. A professional photographer, David Callow, assisted a project team to develop a training manual for photographing plants in the field and for storing and accessing digital data.

Plant propagation and cultivation trials and facilities

Early trials focused on developing skills and identifying propagation requirements for selected plant species because propagating and producing bush plants from the wild is generally quite difficult. Standard approaches to collecting and storing plant voucher specimens were used and a local herbarium was established at each study site – under direction from the relevant state herbarium – to house the plant collection.

Analytical validation

Plant specimens were collected and screened for chemical and medicinal properties in laboratories. This screening assessed plants for medicinal value and validated traditional uses.

Due to reasons of confidentiality, the description of the processes and outcomes of these analyses are not included in this report. DKCRC has a separate report dealing with these matters.

Establishment of knowledge registers

Methodologies used for establishing Indigenous knowledge registers in other countries were examined for their applicability in an Australian setting. Policies were then developed at each study site on what knowledge was to be recorded in the knowledge register and who could access that knowledge. In one community (Titjikala) an electronic database was developed containing information about 53 different plant species. Similar, though less extensive, databases were developed at Leonora and Ceduna and stored on computer.

1.4 Report structure

This comprehensive case study report includes the following components:

- this overview
- Titjikala case study report
- Leonora case study report
- Ceduna case study report
- a summary of outcomes
- Attachment 1: 'From Field to Website' Titjikala training manual, produced by Titjikala study team
- Attachment 2: 'Plant Collection Protocol' Leonora training manual, produced by Leonora study team.

This report is complemented by a series of three background papers and the laboratory analysis report as follows:

Plants for People – Background papers

- Evans L and Muir K. 2009. *Plants for People: Intellectual property rights for traditional owners about plants: Background paper with specific reference to Australian Aboriginal peoples and plants, presented to DKCRC May 2007*. DKCRC Working Paper 32. Desert Knowledge CRC, Alice Springs.
- Evans L. 2009. *Recording Indigenous knowledge on electronic databases*. DKCRC Working Paper 33. Desert Knowledge CRC, Alice Springs.
- Evans L. 2009. *Plants for People: Aboriginal wild harvest and land management: Seminar convened at the Centre for the Management of Arid Environments, Kalgoorlie, Western Australia, 21 April 2006*. DKCRC Working Paper 34. Desert Knowledge CRC, Alice Springs.

Plants for People – Laboratory study report

- Evans et al. 2010. *Laboratory analysis report: Analysis of plants from the Plants for People Titjikala, Ceduna and Leonora case study sites*. DKCRC Research Report 56, Desert Knowledge CRC, Alice Springs.

These complementary reports are available from the DKCRC website.

2. Case study report: Titjikala

2.1 Introduction

The Plants for People project at Titjikala is aimed at preserving and transferring traditional Aboriginal knowledge to younger generations, while creating a raised cultural awareness and pride. In achieving this aim, new cultural enterprises will provide the community with skills and knowledge, providing long-term financial stability for the community.

2.2 Specific project information

2.2.1 Project justification

The impetus for this project originates from the Titjikala community elders observing low intergenerational transference of traditional knowledge. Some parts of Aboriginal culture have taken a ‘back seat’ to Western forms of entertainment. The community has acknowledged a ‘two-way culture’ existing at Titjikala, where the worst parts of European culture have encroached on some parts of traditional Aboriginal culture, to the detriment of the latter. Traditional learning environments in the bush have been reduced with the impact of Western commercialism from media such as TV, DVDs and videos. Much knowledge of traditional Aboriginal bushcraft, plant and animal uses, and dreaming stories remain privy to the older generation, not as a matter of cultural protocol, but because the interests of the prospective students are prioritised towards modern media.

The knowledge owned by the Aboriginal people at Titjikala was seen as an important resource that can be used to develop enterprise opportunities to benefit the community in areas such as tourism, horticulture, and education using modern media. This project’s focus on Aboriginal culture will generate cultural pride and improve the pathways for Western and Aboriginal cultures working together.

2.2.2 Broad project aims

The Titjikala case study project sought to:

- identify and preserve traditional Aboriginal knowledge relating to the use of selected plant species
- create community awareness of the importance of retention and intergenerational transfer of traditional knowledge in both Aboriginal and Western cultures
- assist in facilitated community development through associated Plants for People projects
- develop forms of natural resource enterprise, owned and operated by Aboriginal communities/family working groups.

2.2.3 Specific project tasks

Specific to the case study at Titjikala, the project leaders:

- developed and standardised approaches to recording information
- conducted community workshops and collected plant specimens
- completed a review of current approaches to protecting Aboriginal intellectual property rights over plants
- developed training manuals for conducting capacity-building programs
- delivered training
- completed laboratory investigations on plant specimens

- recorded traditional knowledge about plant species
- reported on approaches used during the project for planning and implementing traditional knowledge documentation, reclamation, and generational transfer by community groups
- established an Internet-based knowledge register and determined a policy on accessing the data
- developed an effective approach to protecting the community's intellectual property rights to their traditional knowledge used in the project
- identified and implemented an effective approach for ensuring that the Titjikala community benefits from any commercialisation of new intellectual property arising from the project.

This case study report considers principally the collaborative method undertaken during project activities at the Titjikala site. It does not report on the methods and findings of the laboratory and other assessments of the plant materials collected, which are reported against in Evans et al. 2010. Similarly, the processes and outcomes with respect to intellectual property protocol of traditional knowledge about plants and their uses, and benefit sharing of new intellectual property, are presented in Evans et al. 2009.

2.3 Data collection

2.3.1 Floral species data

Information on culturally significant plant species was obtained during journeys into the bush with local Aboriginal people. Samples of these plants were collected for laboratory screening. An archive of 12 significant plant species was preserved at Titjikala. Plants were sought specifically for their traditional value or located opportunistically during kangaroo hunts or witchetty grub gathers. Several community members independently corroborated information that was then stored in a specially designed database that is accessible through a secure Internet site. The database is called the Tapatjatjaka Plants Database (TPD) (see Figure 1).



Figure 1: The home page of the Tapatjatjaka Plants Database website

The TPD was used to store botanical and Aboriginal peoples' intellectual property on plants considered culturally important to Titjikala in terms of food, medicine, tools or mythology. The information is in different formats: text, digital images, and audio files (in English and Pitjantjatjara). Fifty-three plant species are documented in the database. As plants may appear during certain weather or climate conditions not experienced at Titjikala in 2004, the possibility remains that further species may be added to the database.

The information stored on the database requires some revision and editing; however, it is ready for use as a platform to develop educational material and enterprises.

2.3.2 Multimedia

In its current form, information stored in the TPD is primarily text-based, written in English and appropriate for educated people in the mainstream community. Titjikala community members have low literacy and numeracy skills and find it hard to extract information from the TPD. Textual information transfer is inappropriate for a culture that has never developed a written language and relies on spoken word and actions for communication. The best way to digitally mimic spoken word and actions is through video and movies.

The prohibitive cost of licensed software for developing digital video prompted an extensive Internet search for freeware. Freeware is computer software available on the Internet at no cost. It has the added advantage of accessibility at different locations without the need for multiple software licences: project staff working at Titjikala spend a large proportion of time in other areas. Several basic freeware programs for producing video files were located and used to develop a prototype video¹ (see Figure 2). This video incorporates a still image of the plant with an inset of the flower and foliage. An Aboriginal elder can be heard describing, in English, the plant's usage; English captions appear as he speaks. The impact of the information and its ability to be absorbed were increased by using three media: images, audio and text.



Figure 2: A screen shot of the prototype video

¹ Audio modified using Audacity 1.2.2 (from <http://audacity.sourceforge.net/>), video elements combined using Movie X One 4.0 (from <http://www.aist.com>) and images modified using Photoshop 4.0.

The use of English introduces a problem because English remains a third or fourth language at Titjikala. A traditional Aboriginal language is essential for the audio component. Future enhancements of the videos should incorporate comments in Aboriginal language and English captions (to develop literacy skills important in primary education); moving images showing, for example, the preparation of a food plant, will increase the impact of the videos.

Involving people and children in recording and participating in the videos is an important part of the multimedia success. Children at Titjikala enjoy watching themselves on videos. It is important that their images appear in the multimedia to increase its usage and cultural information transference.

The aim of the prototype – to test the technology and produce a 30-second video to publish on the TPD website – was achieved. Developing the material further, as previously discussed, will make this a useful tool in the area of cultural transference of knowledge and, secondarily, in literacy.

A video involving the recording of people, places and activities at Titjikala was produced during a visit to Titjikala by the 2006 Curtin University Haydn Williams Fellow, Dr Mary Stockdale.

2.3.3 Capacity building

Training manuals

Two training manuals were prepared: 'From Field to Website' (Attachment 1 to this report) and 'Video Modification Document'. They provided a standardised approach to teaching which could be easily amended for the purposes of continuous improvement; they also provided a work methodology for new researchers at Titjikala, reducing time wastage.

The training manuals helped staff members to gather and analyse data and to manipulate data using software available at Titjikala.

From Field to Website: The 'From Field to Website' Titjikala training manual was developed to train staff in the collection, analysis and placement of data on the TPD. The manual was designed for people unfamiliar with: scientific documentation and recording procedures, the software used at Titjikala, the collection of plant specimens for chemical analysis and vouchering, and the input of data on the TPD.

Video Modification Document: The 'Video Modification Document' explains how to compress digital video using selected freeware. It shows how audio and image elements of the video are manipulated into a format acceptable for the video software, and how to compress the video to reduce memory requirements with minimal impact on media quality. The focus on reducing file memory is essential as the media files were designed for being accessed over the Internet and minimal download durations are important for the 'user friendliness' of the TPD.

Training activities

Opportunities for training at Titjikala were limited and depended on community interest. Several training sessions were attempted, with mixed results. The aims of the training were to build the skills required for Plants for People work to continue with minimal aid from people outside of the community, and to increase awareness of traditional plant usage. Unfortunately, there was not enough training time available to achieve positive training outcomes. However, some community members did become proficient in forms of data gathering such as photography and sound recording.

Professional photographer David Callow instructed people in groups of two or three to use the Nikon COOLPIX digital camera. Although David found that people quickly grasped the use of the camera and within 10 minutes were able to take photographs, he noted that people would lose the knowledge without regular camera use. A longer account of David's experience appears in Appendix 1. Unfortunately, the community members who took part in these training sessions were unavailable for subsequent field trips and therefore did not take up the opportunity to use the camera more.

Several training sessions on word processing, spreadsheets and the Internet were held at the Training Centre. A few people showed interest in attending in the first session but this rapidly decreased in later sessions. Attempts at training in the Training Centre may have failed because they were out of context for desert people.

Computer work had less appeal than other aspects of the Plants for People project, such as fieldwork. As a result, training was relocated and attempts were made to informally train people in field data collection. Children between the ages of 10 and 13 were accompanied by Johnny Briscoe, a primary information source, to record plant knowledge with the camera and cassette recorder. They appeared to enjoy using the camera but seemed to be more interested in photographing themselves than the plants. People in their late teens and onwards were also encouraged to participate in the field trips. However, most of these people did not appear interested in the project's activities or were working on Community Development Employment Projects.

Overall, there appeared to be little community interest in being trained in plant collection and documentation. The documentation, GPS and cassette recording were largely foreign to the people at Titjikala, presenting a barrier in training. However, community response was greatly increased when aspects of the Plants for People project applied to skills already present in the community, such as gathering witchetty grubs.

2.3.4 Horticultural enterprise

Several of the leading men on the horticulture team developed an interest in growing culturally significant and shade plants in a cottage-industry capacity. While they were practised in collecting and selling seeds from native plants, they had come to understand the greater value of growing and selling plants. The shade plants will be used around Titjikala and will support the Tangentyere Nursery should it run out of stock. Other communities may also benefit from shade plants supplied by Titjikala. Information stored in the TPD was used to identify culturally significant plants that will be grown for community education and cultural purposes and provide a constant supply for the local tourism industry. The focus will be on uncommon and seasonal plants, such as the native truffle.

Native truffle (Wititata)

Native truffles (Wititata) are truffle-like fungi that grow underground, have a mutualistic association with plants and are food for marsupials (Davidson 2004, pers. comm.; Lepp 2003). The specimen in Figure 3 was not vouchered; it may be *Choiromyces aboriginum*, *Elderia arenivaga*, *Mycocleandia arenaceae* or *Mycocleandia bulundari*.



Figure 3: Edible fruiting body (approx. 50 mm diameter) and stalk of Wititata (native truffle)

The Wititata is a prized food at Titjikala due to its nutritional qualities and cultural significance. It fruits only in certain conditions and several years may pass between fruiting seasons. Community members collected Wititata from June to August 2004 and had not seen any since before 2000.

The rarity and seemingly enigmatic circumstances in which Wititata develops prompted the documentation of the associated Aboriginal peoples' story. Text, photographs and some artwork were developed around the Wititata story and will be used to produce tools for the Titjikala School and the local tourism industry. The story includes the description of the Wititata bird (or Pallid Cuckoo (Goddard et al. 1996, p. 28)) whose arrival heralds the ripening of the Wititata.

2.4 Workshops

Workshops were essential for transferring information between Plants for People staff and the Titjikala community. Plants for People staff at Titjikala discussed strategies and provided updates on completed work at the five workshop meetings (see Table 1 and Figure 4).

Table 1: Summary of workshops held at Titjikala

Workshop date	Attendees
8–13 August 2003	Andy Barr (team member), Mary Barr (team member), Johnnie Briscoe (Titjikala elder), David Callow (photographer), Nora Campbell (Titjikala elder), Sarah Entata (community member), Louis Evans (Curtin University), Harry Scott (Tapatjatjaka Council Executive Officer), Hazel Ungawanka (community member)
15–19 November 2003	Andy Barr (team member), Mary Barr (team member), Johnnie Briscoe (Titjikala elder), David Callow (photographer), Nora Campbell (Titjikala elder), Sarah Entata (community member), Louis Evans (Curtin University), Patrick Ridley (Curtin University), Harry Scott (Tapatjatjaka Council Executive Officer), Hazel Ungawanka (community member)
3–8 April 2004	Andy Barr (team member), Mary Barr (team member), Johnnie Briscoe (Titjikala elder), David Callow (photographer), Nora Campbell (Titjikala elder), Sarah Entata (community member), Louis Evans (Curtin University), Patrick Ridley (Curtin University), Harry Scott (Tapatjatjaka Council Executive Officer), Hazel Ungawanka (community member)
18–19 July 2004	Andy Barr (team member), Mary Barr (team member), Johnnie Briscoe (Titjikala elder), Nora Campbell (Titjikala elder), Sarah Entata (community member), Louis Evans (Curtin University), Patrick Ridley (Curtin University), Harry Scott (Tapatjatjaka Council Executive Officer), Hazel Ungawanka (community member)
8–10 November 2004	Andy Barr (team member), Mary Barr (team member), Jimmy Campbell (community member), Nora Campbell (Titjikala elder), Samuel Campbell (community member), Sarah Entata (community member), Louis Evans (Curtin University), Patrick Ridley (Curtin University), Graeme Sawyer (Entity 1), Harry Scott (Tapatjatjaka Council Executive Officer)

Note: For the sake of brevity, only main community members who participated were recorded.

Elders and community members used these occasions to comment at the meeting or talk to project leaders afterwards about issues and opinions. Valuable information was gained from community members during the workshops and this information aided Plants for People staff members' development of strategies and cultural awareness.



Figure 4: A Titjikala workshop session, July 2004

2.5 Links with Titjikala School, Titjikala Arts Centre and Gunya Tourism

Stronger links have developed between Plants for People personnel and the Titjikala School, Titjikala Arts Centre and the tourism enterprise, Gunya Tourism.

2.5.1 Titjikala School

The school has its own video program incorporating traditional culture and modern technology. An introductory meeting was held with the school at the Plants for People workshop in November where

common goals and a commitment to jointly develop the strategy were established. The project team viewed this as important for understanding the community structure and building relationships within the community.

2.5.2 Titjikala Arts Centre

The Titjikala Arts Centre has supported Plants for People through artistic works that have a traditional foods theme. This has increased the community's awareness of traditional foods.

2.5.3 Gunya Tourism

Gunya Tourism provides luxury accommodation (see Figure 5) at Titjikala while providing training and employment in the tourism industry for Titjikala community members. To limit unnecessary exposure to tourists who are unaware of the cultural sensitivities at Titjikala, tourists are provided with a controlled interaction with traditional Aboriginal people in the central desert region. They are taken on bush trips to collect witchetty grubs, to visit dreaming sites and to sit with locals around a fire while cooking kangaroo.

Material from the TPD is now being used to develop pamphlets focused on the culture and tradition around Titjikala. A discussion and demonstration of the culturally significant material produced from the horticultural enterprise is enhancing tourists' experiences and several community members who were involved in the Plants for People project are now involved with Gunya's bush tours.



Figure 5: Inside a Gunya tent at Titjikala

2.6 Intellectual property and ethics guidelines

Intellectual property (IP) issues surrounding the TPD and affiliated research were considered in detail in this project and several areas of importance were identified. Titjikala community members have access to the information stored in the TPD and can use that information freely or as dictated by cultural

protocols. When non-community people access the information, they are not confined to the same ethical structure or priorities as community members, so challenges can arise. Further work is required so that levels of accessibility, fees for external use, controls over information disseminated from the TPD and affiliated research into the public domain are secured before information can be released.

The Central Land Council (CLC) agreed to represent Titjikala in the area of IP with the DKCRC and other research groups. The CLC continues to work with the DKCRC to develop protocols to protect and promote IP owned by Aboriginal people.

The Tapatjatjaka Community Government Council (TCGC) and Curtin University of Technology have together developed *Guidelines for Ethical Research and Education Activities Conducted in Partnership with the Plants for People Program*. The guidelines cover principles of ethical research, application of those principles, ethics and legislation, informed consent, confidentiality, traditional knowledge, community benefit and participation, appeals or complaints and intellectual property, and use of research materials. The guidelines are used to conduct transparent research in which all participants are aware of the research methodology and the intended use of data produced.

Should circumstances change or participants become concerned with aspects of the research, the guidelines provide appropriate pathways to resolve those issues. The development of the principles described in the guidelines is based on the *Ethical Research Guidelines for Researchers and Consultants* from the Tjupan Ngalia Heritage Research Council, which in turn are based on ethical statements from numerous sources. The Plants for People project leaders acknowledge that these are only guidelines and more stringent methods are required to ensure the ethical usage of information from Titjikala and to satisfy TCGC criteria for conducting research.

Further information about the actions and outcomes achieved in discussions and meetings on protecting the intellectual property rights of Titjikala community members to information used and generated through this project is provided in an associated paper (Evans et al. 2009).

2.7 Future directions

2.7.1 Multimedia and community introduction to the TPD

The multimedia prototype requires further development and needs to include the remainder of the plants in the TPD. Aboriginal languages should be incorporated along with moving images of the community members and children describing plant use. Testing of multimedia in the community should occur during further development to determine optimal formats.

On completion of the TPD, including final editing and multimedia development, interested parties in the community, including school staff, need to be trained to use the TPD. This will allow the community to access and update the database at any time.

2.7.2 Expanding the TPD

The TPD currently caters for traditional plant uses at Titjikala. However, the justification for TPD development – poor intergenerational transfer of traditional knowledge – applies not only to plants but also to other components of Aboriginal culture at Titjikala. The TPD could be expanded to encompass the network of culture and relationships between food, dreaming stories, ceremonies and other aspects of Aboriginality at Titjikala.

Like the plant data, this material could be used to increase the transference of traditional information and be used as a platform to support other localised industries and projects, including in educational books and tourist brochures.

2.7.3 Training

Community members need to be trained in data collection to increase the work rate at Titjikala. A research officer stationed at Titjikala for one or two months at a time carried out data collection for the Plants for People program. Periodic and inconsistent work schedules at Titjikala have reduced the project's effectiveness. Basic data collection, carried out by people with an intimate understanding of cultural relationships, would be pivotal in rapidly expanding the database. The logical choice is to find a Titjikala community member willing to be trained to collect data without the need for supervision.

Training could allow students with low levels of literacy and numeracy to take part in the project. The training would be based on practical aspects of data collection, including photography, sample collection, data sheets, methods of recording data and data entry. The 'From Field to Website' manual could be used and students could be trained according to their capabilities and not be expected to analyse data or complete higher-level computer functions in the early stages.

Ultimately, the long-term aim of training students from Titjikala in data collection is to create redundancy for an external research officer. However, this may take several years to complete. A short-term aim is to collect data in the absence of a research officer and aid in generating a cultural relationships model for the database expansion.

2.7.4 Security of the TPD

The TPD is a password-protected web-based database, except for the home page which is in the public domain. This means it may be vulnerable to outside attack and misuse or theft of information. A more secure system is required to prevent such an attack.

The relationship with the community is based on trust; allowing the information to be accessed by unauthorised users would be a gross breach of that trust.

3. Case study report: Leonora

3.1 Introduction

The case study team began to liaise with Aboriginal residents of Leonora in early 2003 to identify research needs related to plants and Aboriginal people's knowledge. The discussions led to Leonora being recognised as a case study site for the DKCRC Plants for People project which started in April 2004.

The project involved assisting the Leonora Aboriginal community to (a) use traditional knowledge to identify native plants used for food and medicine and (b) culture selected species with a view to developing locally owned commercial enterprise with prospective species. In the early stages of the project two Aboriginal groups – the Tjupan Ngalia group and Aboriginal Group Holdings – participated in project activities, each representing different family groups resident in Leonora. Over time, the project activities were predominantly conducted with the Tjupan Ngalia family group.

3.2 Specific project information

3.2.1 Project summary

The project sought to use a case study approach to develop best practice approaches for the documentation, reclamation and generational transfer of traditional knowledge, highlighting Aboriginal social and business enterprise development.

The interests, concerns and needs of Aboriginal groups and communities relating to the project were explored and addressed through the development of business and enterprise development plans, structures and procedures.

3.2.2 Project justification

Justification for the Leonora case study lay within the goal of empowering Aboriginal people, while preserving and transferring related traditional knowledge of plants, and using such knowledge as a capital asset for social and business enterprise development. The project sought to assist Aboriginal groups develop and promote information and awareness of plants used as sources of food and medicine in traditional Aboriginal culture, and generate enterprise around this central theme. The project provided the opportunity to reinforce the value of Aboriginal culture and social identity in both Western and Aboriginal cultures.

3.2.3 Broad project aims

The Leonora case study sought to:

- identify and preserve traditional Aboriginal knowledge relating to the use of selected plant species
- create community awareness of the importance of retention and intergenerational transfer of traditional knowledge in both Aboriginal and Western cultures
- assist in facilitated community development
- develop forms of natural resource enterprise owned and operated by Aboriginal communities/family working groups
- empower young Aboriginal people to aspire to achieve in their education
- provide business and enterprise educational opportunities for some community leaders
- support enterprise developments by the Walkatjurra Cultural Centre, a Tjupan Ngalia enterprise group.

3.2.4 Specific project tasks

The project team, comprising Plants for People staff and Aboriginal participants:

- developed and standardised approaches to recording information
- conducted community workshops at each site and collected plant specimens
- completed a review of current approaches to protecting Aboriginal intellectual property rights over plants (in association with the Titjikala community)
- developed training manuals for conducting capacity-building programs
- delivered training
- completed laboratory investigations on plant specimens
- recorded traditional knowledge about plant species
- completed nutritional studies on bush food products
- identified and reported on seasonality effects and food safety issues
- recorded approaches used during the first phase of the project for planning and implementing traditional knowledge documentation, reclamation, and generational transfer by community groups
- produced inspirational posters in association with the Leonora School for display at NAIDOC Week and at other events
- started to develop a business plan for a business enterprise (Walkatjurra Cultural Centre).

3.3 Stage one: Scoping phase

3.3.1 Overview

The scoping phase of the project ran from December 2003 to December 2004. It consisted of a number of meetings and field trips involving project staff and Leonora / Tjupan Ngalia community members held at Leonora and nearby lands that were culturally significant to people. A poster project at the school was also begun during this phase. The meetings and activities aimed to:

- attract interest and create awareness of the project among local Aboriginal community members
- conduct an informal skills audit on possible project participants
- identify any related research projects previously conducted within the community and any associated pitfalls
- identify and acknowledge the research requirements of the Tjupan Ngalia people to increase the project's significance
- inspire young Aboriginal people to aspire in their education activities.

3.3.2 Meetings held

A large number of meetings were conducted between the project team and representatives of the Leonora community.

3.3.3 Scoping phase outcomes

The completion of the scoping phase led to the development of several key project outcomes. One of these was the development of a core community-based working group that showed interest in being involved in the project. Within this working group, several elders of the Leonora Tjupan Ngalia people demonstrated that a high level of traditional knowledge still exists within the community, but is suffering from a lack of intergenerational transfer. This highlighted the need and justification for research to resolve such issues.

Outcomes sought by the community were identified as the possible development of natural resource enterprises in the form of selected flora species cultivation projects. For this to transpire, it was agreed that the Tjupan Ngalia people would need to acquire a plot of land for cultivation, providing the

required biological/geological parameters to the plants intended for culture, such as the yam species *Ipomoea calobra* (Wather). It was agreed that the land would need to be located near the Leonora town site for the project to be commercially viable.

A second working group was identified in the community to progress a related project, the Plants for People 'Poster' project, initiated by Fifi Harris, Rebecca Harkin and Maurveen Harris. The project involved promoting local Aboriginal culture and aimed to create awareness among community members of the need to retain traditional culture and start the intergenerational transfer of such knowledge. A secondary aim of this project was to generate interest in community participation in the project.



Figure 6: Community members lead discussions during two scoping meetings held on traditional lands

3.4 Stage two: Implementation phase

3.4.1 Plants for People Tjupan Ngalia project overview

The project working group undertook three field trips to Leonora to meet with community members and take flora samples for laboratory analysis. The first of these trips was in late May 2004. Geoff Woodall, Guy Singleton and Kado Muir travelled to Terracotta, a remote site of cultural significance to the Tjupan Ngalia people, to sample the yam species (Wather) native to the area which Dolly Walker had mentioned at the scoping meeting on 11 December 2003. Dolly Walker is the traditional custodian of the Wather. The group successfully harvested Wather seeds, which were taken to Albany for propagation studies.

In December 2004, research staff – including Geoff Woodall, Guy Singleton and Louis Evans – travelled to Terracotta with members of the Tjupan Ngalia community to collect more Wather seed for the trials and to sample some of the Wather tubers. A large quantity of seed was collected along with several large tubers. The quantity of seed allowed for a more comprehensive grow-out trial and assessment of the species. The tubers were analysed for their nutritional value. These studies were funded through separate grants from the Centre for Sustainable Mine Lakes and the Rural Industries Research and Development Corporation.

In February 2005, three Tjupan Ngalia community members (Cyril, Jennifer Narrier and Ethan Narrier) met with Dr Geoff Woodall in Albany to observe the grow-out trials on the Terracotta Wather seeds.

The community members spent two days in the region. They were shown how to set up a small-scale horticultural trial and given specific information relating to the culture of the Wather. The aim of the trip was to show Jennifer and Cyril the level of work that is being achieved outside the community and to inspire them to take on more responsibility and commit more to the project.

Other flora species of bush foods collected on that trip were bush tomatoes, eucalypts and acacia.

A second sampling trip took place in August 2004 when Geoff Singleton and Patrick Ridley sampled several more flora species used by the Tjupan Ngalia people as nutritional resources. One sample of particular interest to the working group was a fungus, known locally as 'Mappa', resembling a cross between a truffle and a puffball. This fungus was used extensively as a food source by the Tjupan Ngalia people. Results from the laboratory analysis of the Mappa, and all other species samples taken on this trip, are presented in an accompanying report (Evans et al. 2010). One set of flora samples was subject to laboratory testing for nutritional analysis and another set of each species were pressed for later, formal identification by the Western Australian Herbarium. The complete list of plant specimens collected at Leonora appears in Table 2.

Table 2: Bush foods collected from the Leonora hinterland

Aboriginal name	Western name	Scientific name
Mintjingka	Native fuchsia	<i>Eremophila latrobei</i>
Mappa	Puff ball	<i>Calvatia</i> sp.
Tilypirri	Pigweed	<i>Calandrinia</i> sp. TBV
Kawun	TBV	TBV
Kalkula	Silky pear	<i>Marsdenia australis</i>
Purlulu	Pencil yam	<i>Calandrinia schistorhiza</i> *
Tarrun	Bush apple	<i>Acacia aneura</i>
	Dead finish	<i>Acacia tetragonophylla</i>
	Red mallee	<i>Eucalyptus pachyphylla</i>
	TBV	<i>Eucalyptus</i> sp.
	Bush tomato (T4)	<i>Solanum centrale</i> *
	Northern corkwood	<i>Hakea chordophylla</i>
	Bush tomato (T7)	<i>Solanum asbyse</i> *
	Black plum (T3)	<i>Santalum lanceolata</i> *
	Turpentine bush (T5)	<i>Eremophila fraseri</i> *
	Hop mulga (T8)	<i>Acacia craspedocarpa</i> *
	Granite wattle (T9)	<i>Acacia quadrimarginea</i> *

* Western Australian Herbarium confirmed species

TBV – identity uncertain; additional samples requested by Western Australian Herbarium

Community members requested the development of a wild seed harvest program because a wild seed harvest would encourage Aboriginal community members to harvest wild seeds of selected flora species for selling to wholesale buyers. This would display the value of traditional Aboriginal knowledge in cultural terms and place a real dollar value on this knowledge in Western society.

3.4.2 Notes on the Wather from Terracotta

Here we describe the assessment of the Wather and its potential for culturing in a formal market-garden situation to generate enterprise for Aboriginal people.

Taxonomy

Plants collected were positively identified as *Ipomoea calobra* (see Figure 7). Its Aboriginal names are Wather (in Leonora) and Intal (in the Ashburton area) (Bindon 1996, p. 160).



Figure 7: *Ipomoea calobra* (Wather)

Family: Convolvulaceae. Members of this family are herbs or shrubs, sometimes parasitic (e.g. *Cuscuta*), usually twining or prostrate. About 55 genera exist, including *Ipomoea*, with approximately 1800 species in tropical, tropical and temperate parts of the world. There are approximately 36 *Ipomoea* species in Australia of predominantly tropical and subtropical origin. This group also includes *Ipomoea batatas* (sweet potato), which is an important horticultural crop in many parts of the world and is naturalised in some parts of Australia.

I. calobra is a deciduous perennial climber and usually climbs up through mulga (*Acacia aneura*). It occurs in red deep sands along drainage lines.

Ipomoea calobra

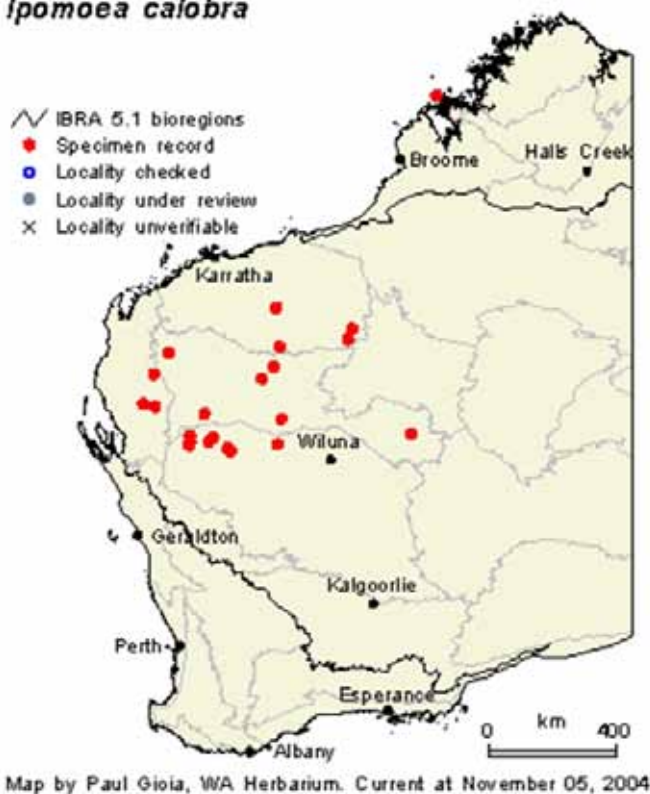


Figure 8: Distribution of *Ipomoea calobra*

Source: <http://florabase.calm.wa.gov.au>

Distribution

I. calobra is widely distributed in the Ashburton, Carnarvon and Austin botanical districts of Western Australia. The collection made at Terracotta, 12 kilometres west of Depot Springs is 150 kilometres further south than the known populations shown in Figure 8.

Tuber size, shape and mass

I. calobra tubers are of variable shape, size and mass. Individual plants produce numerous tubers, the largest of which may have a fresh weight of more than 1.5 kilograms with dimensions of 15 centimetres (width) x 30 centimetres (length) x 6 centimetres (depth). These observations are somewhat different to those of Pate and Dixon (1982) who described the tubers as only being 2–4 centimetres wide and 2–25 centimetres long. The tubers are produced along the main root, confirming the findings of Pate and Dixon, and also form at intervals along roots other than the main root.

A partial excavation of less than 10 per cent of the estimated soil volume occupied by a mature individual yielded five tubers (fresh weight of 50, 320, 620, 640 and 1400 grams, totalling 3500 grams). The excavated vine was assumed to be old and its total tuber mass was estimated at 35 kilograms (fresh weight). The mean moisture content of the harvested tubers was 88 per cent, significantly higher than

the mean obtained for five sweet potato tubers (*Ipomoea batatas*) which was 79 per cent (t-test, $P < 0.01$). Some tubers from a single parent plant exhibited browning of the freshly cut tuber while other tubers did not. Browning was localised in and around severed vascular bundles.

Propagation

Propagation from seed and tuber segments was trialled in Albany under hothouse conditions. Propagation from root and tuber segments was unsuccessful. Potted segments lasted up to four months before rotting off. Potted tubers produced new roots but no shoot initiation was observed.

Attempts by Aboriginal people to propagate this species from seed collected from Terracotta and sown in Leonora were mostly unsuccessful. Difficulties with germination were also noted in Albany where 24 seeds sown in July 2004 produced only one seedling. The remaining 23 seeds were removed from soil after three months and examined visually. A few seeds had rotted but the remaining 15 seeds did not appear to have deteriorated. A literature search revealed that nicking the seed, treating it with dry heat and soaking it in warm water were options to improve the germination of *Ipomoea* species in general (Ralph 1997, p. 104).

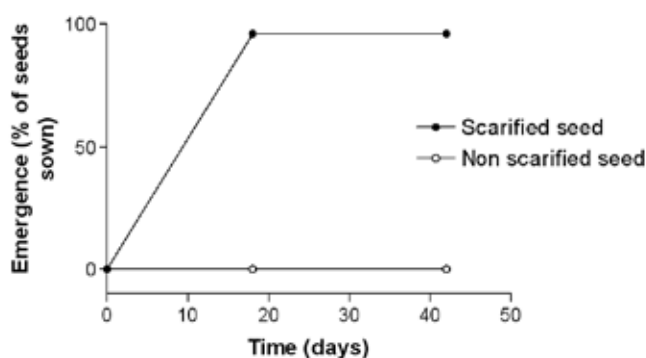


Figure 9: Emergence of scarified and non-scarified *Ipomoea calobra* seed

Note: Each point represents the mean $n=5$

A plus and minus seed scarification pot trial was established in December 2004 (Figure 9). A small section of the seed coat was removed with coarse sandpaper. Five pots were sown with 10 seeds (five scarified and five intact) and the emergence of seedlings monitored for 42 days. The results clearly show that seeds of *I. calobra* are of high viability and that scarification leads to rapid germination.



Figure 10: Cultivated Wather (*Ipomoea calobra*) seedling

Tuber production

Little has been published on tuber production except that tubers are known to be perennial. Small seedlings can produce a small tuber (see Figure 10) on the main taproot before the age of eight weeks and may produce a carrot-sized product within six months when cultivated in a hothouse.

In addition to the yam studies, some project funds were provided to help an honours student at Curtin University study sandalwood cultivation, supervised by Professor John Fox.

3.4.3 Proximate analysis of selected native plants

Bush foods background

Australian native bush foods were introduced onto restaurant menus in the mid-1980s and the commercial bush-food industry has been expanding since then (Graham & Hart 1997). Australian native bush foods are sold as raw produce to value-adding native-food processors, gourmet-food processors and manufacturers, cottage-industry processors, and to restaurants and caterers that use local native foods (Graham & Hart 1997). However, there is no reliable information on market demand and market potential for these foods. Some Aboriginal communities traditionally use many species of bush plants that are not being used by commercial producers and food processors. The nutritional value of those bush foods, not just their exotic taste and flavour, may be a decisive factor in further expanding the commercial bush-food industry.

Eight species were examined for nutritional value (Table 3).

Table 3: Plants collected from Leonora, Western Australia

Sample code	Common name	Aboriginal name	Scientific name
L1	Native fuchsia	Mintjingka	<i>Eremophila latrobei</i>
L3	Puff ball	Mappa	<i>Calvatia</i> sp.
L4	Pigweed	Tilypirri	<i>Calandrinia</i> sp.
L5	Unknown	Kawun	Voucher specimen collected
L6	Silky pear (bush passionfruit; bush banana)	Kalkula	<i>Marsdenia australis</i>
L7	Bush potato (pencil yam)	Purlulu	<i>Calandrinia schistorhiza</i>
L8	Mulga tree (bush apple)	Tarrun	<i>Acacia aneura</i>

Note: Plant samples were designated as L1–L8

Preparation of plant samples for analysis

Samples of the plants listed in Table 3 were prepared for analysis as follows:

- L1: Flowers were separated from the rest of the plant and used for analysis.
- L3: The whole fungi were used for analysis.
- L4: Leaves were separated from the stalks and used for analysis.
- L5: Dry seeds were used for analysis.
- L6: Fruits were cut and dried. Dried material was separated into external shell and internal hair-like structure, which were used as two sub-samples, L6A and L6B, for proximate analysis.
- L7: Roots were washed to remove soil, then dried on a paper towel and used for analysis.
- L8: Whole fruits were used for analysis.

Samples were dried in an oven at 105°C overnight (each sample in triplicate) to determine moisture and dry-matter content (AOAC 1990). Dried samples were ground in a blender and the resulting powders were used for proximate analysis.

Proximate analysis results

Ash was determined by igniting samples in a muffle furnace at 550°C overnight (AOAC 1990). Crude protein analysis was performed by the macro-Kjeldahl method using a Kjeltex Auto System with a Kjeltex Auto 1030 Analyzer. Crude fat was determined by Soxhlet method (AOAC 1990). Crude fibre was assessed in fat-free samples as the insoluble organic residue remaining after digestion with boiling sulphuric acid and boiling sodium hydroxide (AOAC 1990).

Data on proximate analysis of the plant samples are presented in Tables 4 and 5 and Figure 11.

Table 4: Proximate analysis of plant samples – ash, protein, fat and fibre as percentage of dry matter

Sample code	Dry matter (%)	Ash (% DM)	Crude protein (% DM)	Crude fat (% DM)	Crude fibre (% DM)	Nitrogen-free extract (% DM)
L1	26.32	3.58	42.33	1.24	3.02	49.83
L3	39.27	9.79	54.65	0.56	38.04	0
L4	7.48	10.45	49.66	1.45	2.85	35.59
L5	90.53	ND*	33.23	ND*	ND*	ND*
L6A	24.67	5.16	39.65	2.24	29.45	23.50
L6B		ND*	ND*	5.66	33.54	ND*
L7	14.26	3.48	14.00	1.21	3.37	77.94
L8	18.93	2.73	34.96	3.01	ND*	ND*

*ND – not determined due to lack of material

As was expected, dry seeds of Kawun (L5) had the highest percentage of dry matter (90%). The percentage dry matter in fungi (L3) was five times higher than that of leaves of pigweed (L4) and 2.5 times higher than that of bush potato (L7) (Table 4).

To compare the nutritional value of foods on an ‘as-eaten’ basis, it may be more informative to present their composition as percentage of wet weight (Table 5).

Table 5: Proximate analysis of plant samples – ash, protein, fat and fibre as percentage of wet weight

Sample code	Moisture (%)	Ash on wet-weight basis	Crude protein on wet-weight basis	Crude fat on wet-weight basis	Crude fibre on wet-weight basis	Nitrogen-free extract on wet-weight basis
L1	73.68	0.94	11.14	0.33	0.79	13.12
L3	60.73	3.84	21.46	0.22	14.94	0
L4	92.52	0.78	3.71	0.11	0.21	2.67
L5	9.47	ND*	30.08	ND*	ND*	ND*
L6A	75.33	1.27	9.78	0.55	7.26	5.81
L6B		ND*	ND*	1.40	8.27	ND*
L7	85.74	0.5	2.00	0.17	0.48	11.11
L8	81.07	0.52	6.62	0.57	ND*	ND*

*ND – not determined due to lack of material

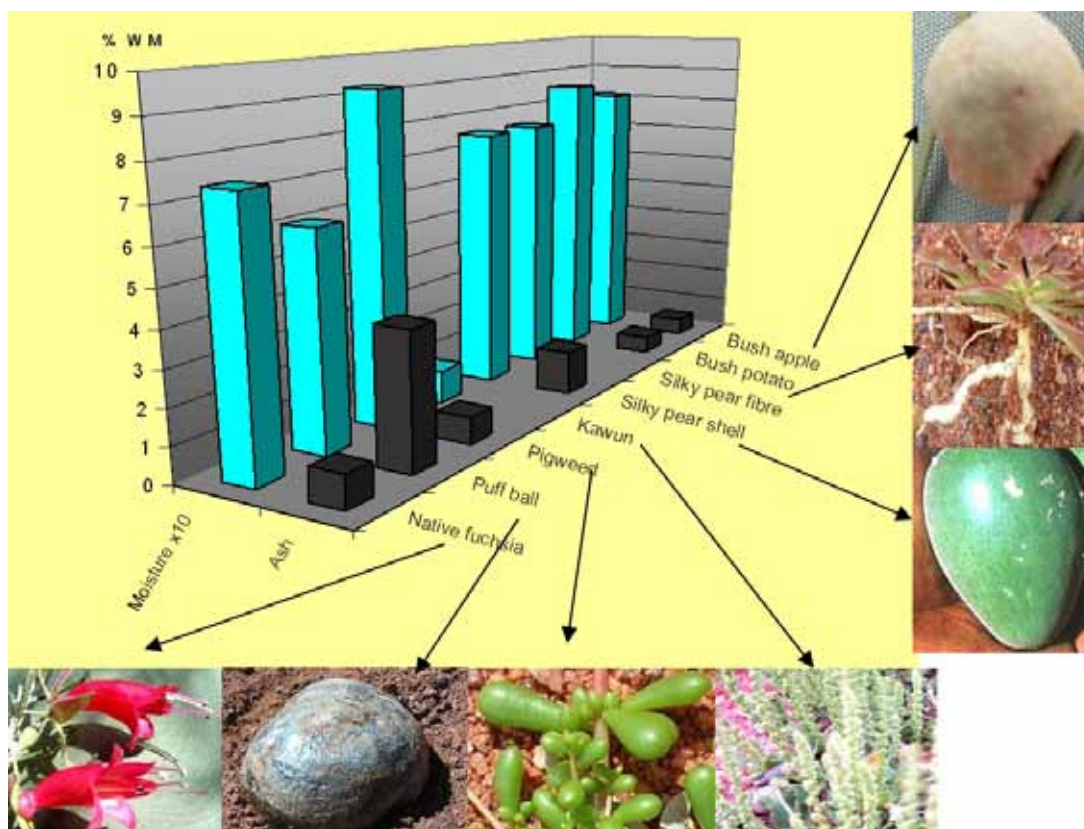


Figure 11: Percentage moisture and ash in analysed bush foods

Discussion

The highest protein level was found in the dry seeds of Kawun (L5). Other parameters could not be assessed in the seeds due to a very small sample size.

Fungi puffballs (L3) appear to be a very good source of protein (21%, which is higher than the protein level in some fish). They have a very low fat content, which makes them a desirable protein source. Fungi puffballs appear to be a good fibre source, with the highest level of fibre compared to other samples. It has been well documented that consumption of foods low in fat and high in fibre significantly reduces the risk of diabetes (Gittelsohn et al. 1998). Fungi puffballs have a high mineral content as indicated by ash value. Tjupan Ngalia community members reported that the fungi appeared after a certain combination of rainfall events and that they were highly prized as a food source.

While the highest level of fibre was observed in puffballs (14.94%), silky pear Kalkula (L6) had a reasonably high level of fibre in both the shell and the internal hair-like structure (7.26% and 8.27%, respectively). Kalkula was reported to be a favourite food of Tjupan Ngalia people.

A reasonably high protein level was observed in the flowers of fuchsia (L1). However, it is more likely that nectar from the flowers rather than whole flowers are consumed (Cherikoff 1993), and the most valuable ingredients of this plant are sugars. Nitrogen-free extract, which is calculated by difference and approximates non-structural carbohydrate content (starch and sugars), was the highest in the flowers of fuchsia.

Bush potato (L7) had the lowest protein level and the second highest carbohydrate content. The roots of bush potato resemble the roots of the conventional potato, except for their smaller size. The proximate composition of these two plants is very similar as well (bush potato cf conventional potato:

protein 2:2.1; fat 0.17:0.1; fibre 0.5:0.5; ash 0.5:0.9; carbohydrates 11:17) (Duke 1986). Both are major sources of carbohydrates; however, there are indications that bush potato could be a healthier choice of carbohydrate source.

Several different types of bush tomatoes were collected but laboratory analysis could not be performed as ripe fruit were not available. Tjupan Ngalia community members reported that the fruits from certain species were unsafe to eat unless ripe and others should not be eaten at all.

In vitro studies have shown that traditional foods are digested more slowly than Western foods (Thorburn et al. 1987). Six out of eight bush foods studied in the research cited above produced significantly smaller areas under 3-h postprandial plasma glucose curves than potatoes in seven healthy caucasian volunteers. Those findings were consistent with the hypothesis that carbohydrate in traditional diets is digested slowly and absorbed and may have been protective against diabetes (Thorburn et al. 1987).

3.5 The poster project

To complete the poster project, team members Andrea Duncan and Guy Singleton liaised with Leonora Aboriginal community members Fifi Harris, Rebecca Harkin and Maurveen Harris from late May to early October 2004.

A schedule of tasks, including specification of the working group member responsible for completing the tasks and a timeframe for completion, was developed and agreed upon by the group. This comprehensive schedule formed the basis of regular project teleconference meetings to monitor progress through the tasks, and ensured a timely completion of the project.



Figure 12: The collection of display posters (600 mm x 900 mm) developed in the poster project

Regular progress meetings were held once a week via teleconference in order to track progress, assign tasks, set deadlines and discuss matters arising. The project outcome was a series of large display posters (600 mm x 900 mm) to showcase to Leonora youth and to Aboriginal people from the Leonora District and outlying areas, principally Laverton and Kalgoorlie. The project was completed in October 2004 with the production of five posters (see Figure 12), each detailing the life and advice of a Leonora Aboriginal community member.

Overall, the poster project was deemed a success by all those involved. The research team and working group felt that the development system implemented for the project was efficient and practical. The Principal of Leonora District High School, Mr Mike Morgan, informed project members that he had noticed a positive change in attitude from members in the working group and a general lift in morale. He felt, while this was a secondary outcome of the project, it should not be overlooked.

One Aboriginal student, when viewing the posters during a NAIDOC celebration, asked his mother, 'Why can't I be like them?' His mother replied, 'Study hard at school and you will be!'

3.5.1 Business and enterprise development

Before the start of the Plants for People project, the Tjupan Ngalia Tribal Aboriginal Corporation, representing Tjupan and Ngalia people, had begun business planning aimed at establishing a cultural centre and Community Development Employment Projects (CDEP) organisation managed by the corporation. The Leonora Plants for People team conducted several meetings with the project's business development team in Perth in 2004 and early 2005 to scope a strategic plan for achieving this goal. At one of these meetings (20 December 2004), Kado Muir made a presentation on the Tjupan Ngalia people, their cultural history, goals and aspirations.

One of the outcomes of the preliminary business planning meetings was the decision to conduct a skills audit with the Tjupan Ngalia people. A guide questionnaire for skills audit was developed by Fay Rola-Rubzen, Christine Storer and Deeva Muir during a meeting in Northam. Using the guide questionnaire, a skills audit was conducted by Guy Singleton and Kado Muir. A series of questions were put to each community member regarding their educational and training achievements, previous work experience, and life goals and the results were collated. This initiative established a baseline level of information about the skills and aspirations of members of the groups and formed the basis for identifying, in the business plan, opportunities that could be pursued. As a result of the skills audit it was identified that there was scope to develop not only a cultural centre but also horticultural activities and artefact production.

In addition to the skills audit, an education program was conducted with members of the Tjupan Ngalia community. Deeva Muir successfully completed several units within a university bridging course in mathematics, English communication and introductory business management, after which she went on to manage the CDEP program awarded to the Tjupan Ngalia group in 2005. Kado Muir was sponsored to attend a five-day course in natural resource management in Darwin and he and his family were also sponsored to attend a two-day business development seminar in Perth.

Formal business planning for the Tjupan Ngalia business enterprises commenced in mid-2005, although several preliminary meetings had been held at Curtin before then. The business planning process for the Walkatjurra Cultural Centre was primarily conducted in consultation with the centre manager, Deeva Muir, in addition to other staff members and Tjupan Ngalia community members. Initial consultations were held between Deeva Muir, Christine Storer and Fay Rola-Rubzen in March 2005 during a visit by Deeva Muir to Muresk. This was followed up with discussions with Deeva and other Tjupan Ngalia community members. Based on these discussions a list of skills was developed that reflected special attributes of members of Aboriginal communities and the skills audit was conducted.

One of the activities identified in the action planning stage was for the community to hold bush camps at which family members would produce artefacts that would then be sold at the Walkatjurra Cultural Centre arts shop. Several bush camps were subsequently conducted during which members of the community went out into the bush and shared skills about making artefacts, arts and crafts to put into the Walkatjurra Cultural Centre art shop.

[illegible]

Figure 13: The business arts planning poster

A second poster, comprising various photographs and artwork, was developed by Andrea Duncan in consultation with community members. The poster was seen as a strategy to assist with visibility of goals set and management of production of the art products. The poster included photographs of bush foods and the results of laboratory studies on bush-food samples. Feedback was that the poster as a visual display was a useful tool in stimulating action.

Further discussions were held between Deeva Muir, Kado Muir, Fay Rola-Rubzen and Christine Storer. In particular, Christine Storer and Fay Rola-Rubzen had discussions with Deeva Muir in regards to the business plan for their enterprises, including discussions on the strengths, weaknesses, opportunities and threats. A copy of the outcomes of these discussions was provided to Kado Muir and Deeva Muir. Then, a business plan was developed by Kado Muir and Deeva Muir for the Cultural Centre.

The knowledge and information gained from these various education and business planning initiatives contributed to the successful development of a small business enterprise – the Walkatjurra Cultural Centre – which is now contracting its skills to local mining companies and other organisations. Further, one of the community members, Jennifer Narrier, has been employed as a part-time teacher's associate in another Plants for People project (funded by the Australian Government Department of Education, Science and Training) being conducted at Leonora School. While the advice and assistance of DKCRC project staff undoubtedly contributed to these successes, the talents of the Ngalia team members and their traditional knowledge were fundamental to the successful outcomes of this project.

3.6 Stage three: Future directions

Positive progress in the Tjupan Ngalia project provides an optimistic outlook. The project continues to focus on community-based enterprise development, with most effort being directed to the Walkatjurra Cultural Centre and its initiatives.

The issue of securing suitable land for enterprises to further develop needs to be addressed. This is a fundamental goal of the Tjupan Ngalia people in their business development aspirations.

The experience gained in this initial Plants for People project empowered the Tjupan Ngalia group to seek involvement in another DKCRC project on bush foods, the results of which are reported in a separate DKCRC report.

4. Case study report: Ceduna

4.1 Introduction

The Ceduna case study was conducted as a community development and participatory action research (PAR) project by a partnership of researchers from the University of South Australia and the Aboriginal people in the Far West Coast region of South Australia. Although there were preliminary discussions with a few Aboriginal leaders and organisations in the region about the project before it began early in 2004, those initially involved decided to develop the partnerships from scratch. This involved several trips to the region by the researchers and many meetings, conversations, and forums with local and non-local stakeholders (individuals, families, communities, organisations, businesses, and government departments) over several months. By November 2004, the partnership had matured to the point where a regional project coordinator was appointed.

The philosophy and principles of both community development and PAR were applied at all stages of the project with respect to three areas of partnership development: the establishing of aims, objectives, methods and outcomes; planning; and project management. As a community-owned, -based, and -driven project, it evolved over time as partners and stakeholders established objectives and achieved outcomes according to their perceptions of community needs, interests, and realities; potential benefits for their livelihoods and wellbeing; their relationships with each other; and local cultures.

Although the Ceduna case study remained true to the overall Plants for People aims, the objectives and outcomes were revised during the project. Some of those originally proposed were achieved, others were deleted because they were viewed by stakeholders as either unachievable by the project's end date or inappropriate to their particular contexts, and others were added and achieved.

4.2 Aims and objectives

The aims and objectives developed by project partners are described here:

Aim 1: For Aboriginal people on the far west coast of South Australia to use their traditional knowledge and Western science knowledge of local native plants to generate plant products to benefit their livelihoods and wellbeing.

The four specific objectives related to Aim 1 were:

- for Aboriginal people to use their knowledge to identify plants and products
- to generate Western science knowledge about plants
- to combine Aboriginal and Western science knowledge
- to develop plant products to benefit people's livelihoods and wellbeing.

Aim 2. For project participants to develop businesses, social enterprises, and business plans to produce and, where appropriate, market these products.

The four specific objectives related to Aim 2 were to:

- establish a business and social enterprise network of participating communities, families, businesses and organisations throughout the region
- identify interested existing businesses and social enterprises and build these further
- develop new business and social enterprises
- develop business plans.

Aim 3. For project participants to develop skills in plant identification and propagation; business development and planning; and development of other products (e.g. educational materials and documentaries).

The three specific objectives related to Aim 3 were to:

- identify required skills
- engage interested participants
- develop skills.

Aim 4: To develop, use, document, and learn from community development and PAR approaches in the project.

The four specific objectives related to Aim 4 were to:

- use community development principles and methods to achieve project aims
- use PAR principles and methods to achieve project aims
- compare Aboriginal and Western understandings of community development
- document community development and PAR aspects of the project, critically evaluate them, and make recommendations about the use of these approaches in this and other similar projects aimed at developing Aboriginal enterprises and enterprise networks.

Aim 5: To work towards developing methods that local Aboriginal people can use to document their knowledge about native plants and combine this with Western science knowledge.

The five specific objectives related to Aim 5 were to:

- identify Aboriginal people with relevant knowledge
- work towards developing a framework to document knowledge
- work towards developing a knowledge register
- work towards identifying native plants the local Aboriginal people want included in the register
- work towards identifying Western science knowledge about these plants.

Aim 6. For local Aboriginal people to transfer their knowledge about native plants of local cultural significance from older to younger generations.

The three specific objectives related to Aim 6 were to:

- identify knowledge transfer methods
- identify local Aboriginal people to be involved in transferring knowledge
- transfer knowledge.

4.3 Process issues

The initial focus was on food products, although the partnership extended this over time to other products, including:

- tourist facilities and attractions
- educational material
- ‘light medicinal’ products such as creams, ointments and soap.

When the project started, the participating organisations were at different stages of business development and planning. Some had well-established enterprises, some had none at all, and the remainder were at various stages in between. Similarly, some had no viable business plans, some

had plans they were implementing to different extents, and some had old plans that were not being implemented.

The project was intended to be a fully collaborative, community-owned, -based and -driven project through which action models are developed using PAR methods. Some of the objectives were lowered in priority because participants wanted to establish a business network that focused on enterprises, business planning and production.

The business network established is now known as the Far West Coast Aboriginal Enterprise Network (FWCAN). FWCAN is supported by local stakeholders, including Aboriginal community-based organisations; and external stakeholders, including government organisations, private enterprises, and Aboriginal and non-Aboriginal non-government organisations.

Due to this priority change, the Ceduna case study project did not generate the intended best practice models for the documentation, reclamation and generational transfer of Aboriginal knowledge of plants of local cultural significance and for the application of this knowledge in Aboriginal social and business enterprise development. Delays in reaching agreement about intellectual property and a lack of specialist expertise also contributed to this shortfall.

Research ethics approval was given by the University of South Australia Human Research Ethics Committee on 29 March 2004 (No. P05304).

4.3.1 Timeline

The project developed as shown in Appendix 2.

4.4 Outcomes

Outcomes are presented below for each objective. Community development principles were used throughout the project, the first of which is community ownership through local social structures. A key outcome under Objective 1 of Aim 2 was the establishment of FWCAN. For the purposes of this report, the outcomes under Aim 2 are described first to provide the context to understand other outcomes and because without the FWCAN the other aims cannot be achieved.

Aim 2: For project participants to develop businesses, social enterprises, and business plans to produce and, where appropriate, market these products.

Objective 1: Establish a business and social enterprise network of participating communities, families, businesses and organisations throughout the region.

This objective was achieved. There is a variety of communities, organisations, businesses, and individuals in FWCAN. The region currently encompassed by FWCAN extends from Ceduna to Scotdesco, although Aboriginal people at Yalata and east of Ceduna have also expressed interest in joining.

A summary of the FWCAN members is provided in Table 6. The network involves 87 people, including 35 elders from the various communities and families. Also involved are two schools, two women's organisations, one childcare organisation, two established family homeland businesses, four other small businesses, and six homeland communities and individuals aiming to establish businesses. The membership demonstrates the high commitment of the region's Aboriginal people and their enthusiasm and confidence in the future. At the time of preparing this report, other communities and families in the region had expressed interest in joining FWCAN and discussions are continuing with them.

Table 6: A summary of the Far West Coast Aboriginal Enterprise Network (FWCAN) membership

Network members	No. of people	Social entity
Elders from the region	35	Communities and family homelands
A women's organisation	3	Organisation
A women's organisation	2	Organisation
Community	8	Community
School in a community	2	Organisation
School and childcare organisation in a community	4	Organisations
Larger, well-established business	10	Family homeland/business
Larger, well-established business	4	Family homeland/business
Business – individual	1	Business/individual
Business – partnership	2	Business/partnership
Business – individual	2	Business/individual
Business – family homeland	1	Business/family homeland
Community homeland	3	Community homeland/potential business
Community homeland	4	Community homeland/potential business
Community homeland	3	Community homeland/potential business
Individual	1	Individual/potential business
Individual	1	Individual/potential business
Individual	1	Individual/potential business

A regional-based steering committee was established early in 2005, providing the platform for development of FWCAN. The committee has 25 members from all participating communities, families, businesses and organisations. The chair is a respected elder man and community leader in one of the communities. The committee is well established and provides strong leadership for the network.

The steering committee and the network remain under the auspices of an incorporated women's organisation in a participating community, which is culturally appropriate given the focus on traditional knowledge about native plants. The organisation administers some of the external funding and provides some administrative support. A Regional Project Coordinator coordinates and provides administrative support for the steering committee and the network.

The strength and credibility of FWCAN is indicated by the support received from members and external stakeholders as evident from Table 7. Over the first two years, FWCAN partners contributed in-kind resources equivalent to \$1.3 million. FWCAN is strongly supported in the region – Tjutjunaku Worka Tjuta Inc., through the CDEP, and other local organisations contributed an additional \$936,000 in in-kind support over the two years. There was also strong support from external stakeholders, with \$96,000 funding and \$140,000 in in-kind support over two years. FWCAN members sought additional external support from various organisations, amounting to \$248,000. Members and other stakeholders provide various kinds of support including training, workshops, business advice, funding, equipment, facilities and human resources.

Table 7: Financial and in-kind support for the Ceduna case study (from sources other than DKCRC and the University of South Australia)

Partner organisation	Cash		In-kind	
	2005/06 \$,000	2006/07 \$,000	2005/06 \$,000	2006/07 \$,000
Steering committee			150	150
Participating communities			500	500
Regional non-partner contributions			50	50
CDEP (30 workers x 2 days per week)			468	468
First Australia Business			50	50
Eyre Regional Development Board			10	10
Aboriginal Lands Trust	38	38	10	10
Totals	38	38	1238	1238

Objective 2: Identify interested existing businesses and social enterprises and develop these.

Existing businesses either came forward during early partnership development, joined FWCAN during the project or were identified by the Plants for People coordinator and other key people involved in the project in its early stages. The network encompasses many of the Aboriginal businesses and social enterprises in the region and members have a good, probably complete, knowledge of those business/enterprises that are not members.

As mentioned, member businesses are at different stages of development. Table 8 shows where each was in their business planning and development and intended directions.

Objective 3: Develop new business and social enterprises.

FWCAN members include six homeland communities or individuals aiming to establish businesses. In addition, some existing businesses have started operating again since the network formed. With the exception of those identified as individuals or partnerships in Table 6, all members can be viewed as ‘social enterprises’ as well as businesses because they are embedded in family and/or community structures and they pursue both social and financial goals.

Several social enterprises – such as women’s organisations, schools, and childcare agencies – participated in native plant activities. Individuals, families, communities, and existing small businesses were attracted to FWCAN as a network that has the stability, credibility, recognition, and stakeholder support to help them achieve their business aspirations.

Objective 4: Develop business plans.

Table 8 identifies where network members are at with their business planning. Most members have developed new plans or revised old ones since becoming involved in FWCAN. Business planning was facilitated through workshops, consultation with the project coordinator, and through advice, training and resources from various external stakeholders.

Table 8: Far West Coast Aboriginal Enterprise Network (FWCAN) members and activities

Network members	No. of individuals	Social entity	Business plan	Products	Activities	Aspirations
Elders from the region	35	Communities	Plan for inter-generational knowledge transmission in place. Currently identifying activities to reconnect youth with elders.	Advice and consultation.	Storytelling about plants. Identifying plants and their uses with local Aboriginal people, including children and youth.	Continue to seek funding to support their ideas about reconnecting youth with plants and country. Continue as the consultants and advisors to FWCAN members.
A women's organisation	3	Organisation	Business plan in place, which includes FWCAN. P4P has assisted in applying for funding over the past year.	Services for women, children and families.	Supporting FWCAN as the 'auspicing' agency, including managing some project funding. Using P4P to assist women, children, and families. Engaging individuals, families, businesses and organisations in FWCAN and supporting Aboriginal businesses.	Continue to support FWCAN and P4P (Ceduna). Funding application has been submitted for a propagation shed, which will be used for cultural intergenerational exchange of information.
A women's organisation	2	Organisation	Idea development stage.	Idea development stage – considering jams, chutneys, spices and herbs.	Researching potential products suitable for women in the community to produce.	Develop products for local people. The community is currently developing a tourism venture.
A community	8	Community	Pre-existing business plan is being revised, developed and implemented.	Native plants, market garden, community native food and medicine garden.	Planting native plants in the nursery (1000 plants have recently been planted). Growing winter vegetables in the market garden.	Become the sole supplier of native plants on the far west coast. Become a supplier for a native bush production company. Establish a community garden to provide all the community with fruit and vegetables. Establish a native bush foods and medicine garden for all the community to use.
A school in a community	2	Organisation	Planning is complete and funds have been received to implement plans.	Traditional bush trail in the school grounds identifying native bush plants and their uses.	Establishing the trail.	Establish a trail that identifies native plants in this area and their traditional uses as a tourism site for visitors to the region. Produce food products for selling at the school canteen and to the community.
A school and childcare organisation in one community	4	Organisations	Planning recently began.	Education resources:		

Network members	No. of individuals	Social entity	Business plan	Products	Activities	Aspirations
(1) A native bush foods seasonal calendar to be used in childcare centres, schools, and other education institutions, with royalties used for educational programs in the community.						
(2) A community garden to supply traditional native foods as a nutritional food source.	Planning.	Create a seasonal calendar. Involve children in planting and maintaining the community garden.				
An established business	10	Family homeland/ business	Pre-existing business plans are being revised and updated to match current realities, in consultation with Eyre Regional Development Board.	Native bush foods and plant oils that will generate a good income. Horticultural/ agricultural consultancy service.	This community is a supplier to Outback Desert Pride. Currently also supplying home-made chilli chutney to the local community. Researching other products that will generate a higher income.	Establish a produce company with other network members as the suppliers. Provide horticulture/ agriculture training consultants for remote communities. Become a tourism site.
An established business	4	Family homeland/ business	Many business plans have previously been done for this community. The business is currently reworking these into a relevant, useful document to incorporate their current activities and aspirations.	Oils, bush remedies, quandongs, coffee, tourism, market garden.	Planting lavender (Eremophila alternifolia) for essential oils, quandongs for liquors, and Acacia victoriae for coffee in a trial plot.	Produce oils, coffee and liquors. Supply another community in the region which is aiming to establish a processing and marketing company.
Business – individual	1	Business/ individual	Currently developing a business plan with the assistance of Eyre Regional Development Board.	Aboriginal art – paintings.	Producing contemporary Aboriginal artwork. Currently based in Adelaide and selling paintings.	Open an art gallery in a major city and sell paintings in Australia and overseas.
Business – partnership	2	Business/ partnership	Implementing current business plan and updating and revising it with the assistance of Eyre Regional Development Board.	Traditional spiritual massages. Traditional herbal remedies, soaps and creams.	Doing massages, selling herbal remedies, learning how to make products such as soaps, bath salts and creams using traditional medicine plants.	Develop the business and run it from home. Work with Aboriginal and non- Aboriginal communities to provide a spiritual healing service. Produce herbal remedies and other products using traditional bush medicines.
Business – partnership	2	Business/ partnership	Sole trader in idea development stage. Has attended various business workshops.	Project management. Data recording. Home-made chilli chutney.	Managing projects. Recording data. Producing chilli chutney for sale to community members (approximately 50 jars a week).	Establish her own business.

Network members	No. of individuals	Social entity	Business plan	Products	Activities	Aspirations
Business – family homeland	1	Family homeland/ business	Business plans have been developed for funding applications.	Documentary film production.	Recording videos of Aboriginal lifestyles, including use of native bush remedies and foods.	Produce a documentary about Aboriginal lifestyles and the history of people on the far west coast.
Community homeland	3	Community homeland/ potential business	New FWCAN member – idea development stage.	Idea development stage.	Idea development stage.	Develop a small business.
Community homeland	4	Community homeland/ potential business	Idea development stage.	Idea development stage.	Idea development stage.	Develop a small business.
Community homeland	3	Community homeland/ potential business	Idea development stage – working with Eyre Regional Development Board to develop ideas into business plans.	Idea development stage – water storage containers.	Idea development stage.	Develop a small business producing and selling water-storage containers.
Individual	1	Individual/ potential business	Developing a business plan and portfolio with assistance from First Australia Business and Eyre Regional Development Board.	Consultant, facilitator, project manager, motivational team-building, research, solution broker, event coordinator.	Assisting community organisations to develop events. Community development and research in P4P.	Establish her own company with franchises in other states and territories.
Individual	1	Individual/ potential business	Idea development stage.	Idea development stage.	Idea development stage.	Establish a business - cultural tours; internet café using native bush food products; storytelling by elders.
Individual	1	Individual/ potential business	Idea development stage. Developing a business plan with assistance from the Eyre Regional Development Board.	Idea development stage – cultural experience. Worm farming.	Selling worms to community members. Developing ideas for a culturally appropriate art gallery.	Art gallery that supports Aboriginal artists. Supply worms to community members on a larger scale.

Aim 1: For Aboriginal people on the far west coast of South Australia to use their traditional knowledge and Western science knowledge of local native plants to generate plant products to benefit their livelihoods and wellbeing.

Participants identified plants and plant products to develop as shown in Table 8. The project contributed by providing: a supportive interactive network to generate knowledge, information, and ideas; training, and support to access training from other sources; assistance in applying for and securing funding and in-kind support from external organisations; coordination and administrative support; some basic equipment; consultation and advice; and motivational support.

Through the network, participants were encouraged to use traditional knowledge held by themselves and others to identify and generate plant products. Furthermore, the range of products and activities presented in Table 8 demonstrates that they have a broad and culturally appropriate concept of ‘livelihoods and wellbeing’, encompassing income, employment, health, cultural and family strength, community wellbeing, the strengthening and increasing of respect for Aboriginal culture and ways of knowing, and the preservation and transfer of traditional knowledge from generation to generation.

Although this concept goes beyond the project’s aims, it is consistent with livelihood approaches developed overseas and increasingly adopted by the DKCRC and in Australia more generally. The products identified by participants express their communities and cultures.

During field trips, participants selected two plant species for scientific analysis. Four samples of each were forwarded to Curtin University for testing by the Plants for People laboratory team. The results are presented in Evans et al. 2010.

Aim 3: For project participants to develop skills in plant identification and propagation; business development and planning; and development of other products (e.g. educational materials and documentaries).

FWCAN has provided an environment for people to develop a range of skills and for identifying people required for current and planned activities. It brought a range of people and organisations – with diverse skills – into one ongoing interactional system. Knowledge and skills were developed relating to plant identification and propagation; processing plants into products; country and custodianship; cultural and spiritual knowledge; Aboriginal communities; business development and planning; health and health promotion; community development; participatory action research; teaching; arts, crafts, and bush skills; audio and video recording, editing, and production; and various aspects of Aboriginal livelihoods.

Skill and knowledge development also occurred through workshops and field trips conducted by project researchers, and through consultation and training from external organisations. Specific activities included participatory field trips with elders and other community members; training workshops on plant identification and propagation; and business planning and development workshops.

Aim 4: To develop, use, document, and learn from community development and PAR approaches in the project.

Community development

Community development principles and methods were used throughout the project. Community development is based on the belief that people have the right to determine their own collective aspirations and how they achieve them. Principles previously developed by Cheers (1998, p. 142) were refined and elaborated through this project. They are:

- *community ownership* through local social structures
- *community control* over aims, outcomes, and methods
- *community-driven development*, where local people provide leadership in project initiation and implementation

- *collective action*, involving local people working together cohesively and cooperatively
- *community participation* in the project across the diversity of the community
- *mobilisation*
- *a focus on both outcomes and process*
- *community development as an expression of community*
- *community development based on a coherent, culturally appropriate understanding of community.*

As an outcome of this project, these principles will be published in one or more books.

Participatory action research

PAR principles and methods were employed throughout the project.

Firstly, Aboriginal people in the region participated in all stages: establishing aims and objectives of the larger project, identifying methods to achieve these, implementing methods, collecting and analysing data, and developing and implementing product and enterprise development plans. While most participants were local Aboriginal people, other stakeholders – such as government departments, schools, and local community organisations – were involved in various workshops, conversations and consultations.

Secondly, through action research, participants developed plans, implemented some of them through the activities identified in Table 8, reviewed outcomes and devised further plans and activities. This follows the classic PAR cycle of:

action → reflection → devising research questions arising from the action → field observations to answer the questions → information analysis → action → ...

This cycle was repeated many times, both for the project as a whole and for particular activities.

Local participants did not really distinguish between research, action and community development phases due to the project's seamless process. There were four reasons for this. Firstly, how they went about the project reflected their holistic Aboriginal understandings of research/action/community development/community (see Tables 9 and 10). So research, planning, implementation, and community development were facets, rather than clearly identifiable components, of a holistic process.

Table 9: Summary comparison of Aboriginal and Western understandings of community

Aboriginal understandings	Western understandings
Holistic understanding that things are connected and intertwined e.g. people, family, community, country, spiritual realm, politics	Phenomena are separate but related e.g. people, families, community, natural environment, religion, politics
Holistic view of community-place	Separation of community from place
No hierarchy	Hierarchy
Balance	Things are dealt with more in isolation from each other
Community <i>is</i>	Community is socially constructed
Community membership is given and equal	Community membership changes; there are degrees of membership and distinctions between members e.g. 'locals', 'newcomers'
Each facet of community-place reflects the whole e.g. business, culture, spirituality, family	Social fields are clearly distinguished e.g. business, social care, health care, family
Social structures permeate each other:	Separate social structures:
• Formal (public) / informal (private)	• Formal (public) / informal (private)
• Formal	• Formal
• Informal	• Informal
• Basic informal structure – family as interlocking kin networks.	• Basic informal structure – nuclear family
Leadership spans the whole community and overlaps structures and fields	Leadership is more fragmented into structures and sectors
Issues permeate each other, with each a focal point for the whole	Issues are viewed more in isolation

Second, PAR is a practice in which the distinction between the researcher and the researched is challenged because participants are afforded the opportunity to take an active role in addressing issues that affect themselves, their families, and their communities. So there was little, if any, distinction in the project between the ‘the researchers’ and ‘the researched’ or between those who take the action and those who do the research.

Table 10: Summary comparison of Aboriginal and Western understandings of community development

Aboriginal understanding	Western understanding
<i>People engaging with each other and their community's social infrastructure for the betterment of the community</i>	
<i>Engagement with each other and their community</i>	<i>Engagement with each other and the community's social infrastructure</i>
People engaging with community/place and its facets	People engaging with the community and its components
Support community	Increase community
Restoring and maintaining balance	Strategic engagement
Focus on many aspects of the community and relationships between them	Can focus on one aspect of the community
Process	Strategic
Facilitated	Can be directed
Benefits the entire community	Benefits the entire community
Involves many community members	Can involve only some community members
Different views must be equally respected	Consensus around the most common view is okay
Encompasses the entire community: • Focus and action span all spheres • Knowing in community development spans social fields • Many community structures and organisations are involved • Involves a diverse range of interrelated people • Interrelationships between people are complex • All leaders are involved because action spheres and leadership are interrelated and overlapping • Elders must be included	Can focus on limited aspects of the community: • Focus and action can be in some social fields • Knowledge for community development can be field-specific • Only project-related structures and organisations may be involved • Involves people who might not be interrelated • Interrelationships are often single-stranded • Only some leaders need be involved because action and leadership are more confined to particular sectors • Civic leaders are not necessarily included
Supports and harnesses the community's strengths	Might only focus on particular strengths and/or weaknesses
Engagement with each other means: • engaging with the meaning of the place for each other • engaging with each other as whole people • engaging with each other as equal partners, respecting each other's ways of knowing and place in the community • respecting, maintaining, and restoring balance in people's lives • acknowledging people's complex social and structural locations in the community and their inter-linkages across it • acknowledging the multi-stranded nature of the relationships	Engagement can: • ignore the meaning of place to each other • involve relating to each other in particular roles • involve hierarchical relationships • be with limited aspects of people's lives • be with people in particular roles • be with people through particular relationship stands

Third, after a considerable period of partnership development and community engagement, participants were keen to move quickly to planning and implementation to achieve beneficial outcomes. This meant that the more clearly identifiable formal research processes (interviews and focus groups) were delayed until towards the end of 2005 while ongoing action research was embedded in other project activities throughout the project. Had this not been done, many participants would have become disenchanted and lost interest.

Finally, participants viewed laboratory testing as part of planning and action rather than as a separate ‘research’ process.

There is no doubt that had community development and PAR principles not been used, community members and external stakeholders would not have engaged with the project so enthusiastically, taken responsibility for it, and provided the drive, energy and time required to make it work. Although DKCRC and the university researchers initiated the project, the far west coast project and FWCAN have grown beyond DKCRC involvement and resource commitments and, indeed, Plants for People itself. The project now has its own identity and momentum as an integrated, self-driven, and self-reinforcing set of initiatives that are owned, controlled, and driven by participating organisations, people, communities, families and businesses. Overall, it is now FWCAN's project rather than DKCRC's.

Comparing Aboriginal and Western understandings of community development

The project sought to compare Aboriginal and Western understandings of community development, starting with a literature review. Because people's understanding of community development is derived partly from their understanding of the term 'community', our review quickly expanded to include the latter. We conducted a literature search and made some initial comparisons. These were incorporated into the working paper 'Community development in the Plants for People project' and distributed to researchers and key people at the project case study sites for comment.

A project aim was to integrate information from the literature review, results of interviews with Aboriginal participants, and researchers' documentation of, and reflections on, project processes at each site. It was decided to discontinue the literature review for two reasons.

Firstly, there is substantial literature on Western understandings of community and community development and a developing literature on Indigenous understandings. Much of the comparable Indigenous literature is from Canada and the United States. Because the voices of Australian Aboriginal people are under-represented in the formal literature, there was a view that comparison would not adequately reflect their interests. Worse, it would mean comparing Aboriginal understandings derived from this case study with Western understandings – yet again, the cultures of Aboriginal Australians would be compared with (or benchmarked against) Western understandings.

Secondly, the case study leader's time was being devoted to partnership development, community engagement, network development, and planning and development activities in South Australia, which left no time to write a serious literature review.

Throughout the project the research team has accumulated literature, documented the project process at the case study site, and listened to and reflected upon Aboriginal understandings. In addition, research conversations and focus group discussions ('research yarns') with participants have yielded valuable information regarding their understandings of community and community development as well as their perceptions, reflections on and evaluations of the project.

Project researchers considered the participants' principle understandings of community and community development. In the light of professional reading, observation and experience, these understandings were further distilled into Tables 9 and 10, which summarise researchers' perspectives of the essential differences between Aboriginal and Western understandings of community and community development.

Documenting community development and PAR aspects of the Plants for People project

The fourth objective under Aim 4 was to 'document community development and PAR aspects of the project, critically evaluate them, and make recommendations concerning the use of these approaches in this and other similar projects aimed at developing Aboriginal enterprises and enterprise networks'.

Aim 5: To work towards developing methods that local Aboriginal people can use to document their knowledge about native plants and combine this with Western science knowledge.

Many Aboriginal people in the region who have traditional knowledge about local native plants and their uses and preparation have joined the network; this includes 35 elders. Many of these people were engaged in the project, providing a rich body of Aboriginal knowledge for participants, to be shared and used in identifying plants and developing products and enterprises.

Although this knowledge was available, the development of the knowledge register was postponed for several reasons. Firstly, it had been initially intended that a common register could be developed for all Plants for People sites; however, for cultural and IP reasons, the register developed at the Titjikala site could not be made generally available.

Secondly, an IP agreement was not finalised during the life of the project. Thirdly, key participants prioritised network development, product identification and development, and business planning and development ahead of the establishment of a knowledge register.

Nevertheless, four plants were identified for inclusion in a register: this register is confidential. There is substantial generic Western science knowledge on most of the plants identified for product development, some of which has been shared with network members during workshops and field trips.

Aim 6: For local Aboriginal people to transfer their knowledge about native plants of local cultural significance from older to younger generations.

Some intergenerational knowledge transfer occurred from elders and other culturally recognised knowledge custodians to other community members. This took place through various site activities including storytelling; plant identification, propagation and processing; seed collection; and product identification during field trips involving elders, children, youth and other Aboriginal people.

As shown in Table 8, elders provided advice and consultation throughout the project to the researchers, the project coordinator, the steering committee, and businesses, families, and individuals involved in FWCAN. The elders developed a knowledge-sharing plan that is intended to identify activities to connect with youth in the communities and homelands and to attract external funding to connect youth with native plants and country.

Several products identified in Table 8 involve, at various stages of planning and development, sharing traditional knowledge about native plants with tourists and Aboriginal and non-Aboriginal people in the region; this leads to an increased respect for local cultures and the self-respect of local Aboriginal people. These products include a native foods and medicine garden; a traditional bush trail in a school; educational materials, including a documentary about Aboriginal lifestyles and history on the Far West Coast; the seasonal calendar; a horticulture plot; art galleries; cultural tours; and an internet café.

4.5 Summary

This project, initiated by DKCRC, looked at how Aboriginal people can improve their livelihoods and wellbeing by using both traditional and Western science knowledge of local native plants to create products. In the process of conducting the project, Western scientific analysis was conducted on identified plants. The outcomes of this analysis – including a knowledge register – are the subject of a separate and confidential report.

The project provided the opportunity to develop knowledge about Aboriginal understandings of community and community development and to examine how participatory action research and community development can contribute to similar projects.

Local priorities and the lack of an IP agreement delayed progress on a knowledge register and limited the number and kinds of laboratory analyses conducted. Further, once local partnerships, the FWCAN and the steering committee were established, network members decided to move quickly to update

old business plans and develop new ones, implement them through existing or new businesses, attract external support and funding, and develop the required skills, rather than giving priority to plant analysis, the knowledge register and literature reviews.

As is common for projects initiated from outside Aboriginal communities, initial partnership development took around 12 months to mature. Nevertheless, local people came to trust the researchers' intention that the project would be community-based, -owned, -driven, and -controlled and that they could use it to move towards their own aspirations, within the overall project aim. During research conversations and yarns, participants referred to this as the main reason for the project's success and for their engagement. Once trust was established, participants engaged readily and related the project aim to their various aspirations, needs and activities.

Initially, the project was located only in Ceduna. However, key local Aboriginal leaders quickly saw in the project an opportunity to bring together the communities, families, businesses and individuals from the wider region.

The role of key Aboriginal personnel in project governance and managements was vital. The FWCAN Chair and the project coordinators played key roles in bringing participants together. Other steering committee members played key engagement roles with their respective communities and families.

The establishment of FWCAN is a model that provides for Aboriginal people to achieve business success as well as social, cultural and environmental sustainability. It has empowered Aboriginal livelihoods and aspirations.

4.6 Case study project team

Ms Joan Gibbs, School of Natural and Built Environment, Mawson Lakes – Project Leader

Mr Sydney Sparrow, Aboriginal researcher, Unaipon School – Project Manager

Ms Deb Fernando – Plants for People Regional Project Coordinator

Community researchers

Dr Susan Semple, Senior Research Fellow, Sansom Institute for Pharmaceutical and Biomedical Science

Professor Brian Cheers, Centre for Rural Health and Community Development – former project leader

Mr Martin O'Leary has also contributed his knowledge about native plants in training activities in the region. Martin is Technical Officer (Curator for Acacia and Myrtaceae), The State Herbarium, Plant Biodiversity Centre, Adelaide Botanic Gardens, Science and Conservation Directorate, Department for Environment and Heritage, South Australia.

Other collaborators

Mr Ian Gentle, Indigenous Research Fellow, formerly of the Spencer Gulf Rural Health School

Associate Professor Mary Oliver, Associate Dean Teaching and Learning and Research, Centre for Regional Engagement

Mr Colin Weetra, Director of Aboriginal Health, Spencer Gulf Rural Health School

Mr Peter Miller, Chair, FWCAN Steering Committee

5. Summary of outcomes

5.1 Project aims

Plants for People was an action-learning case study aimed at contributing to DKCRC's overarching goal of generating knowledge and understanding of how to most effectively invest public and private resources in deserts to create sustainable business outcomes and regional economies. Aboriginal knowledge of plants and their uses were used as a capital asset to generate social and economic returns for participating Aboriginal communities. The project was directed specifically at Aboriginal inhabitants of inland Australia.

The major aim of the project was to develop best practice approaches for documenting and ensuring the survival of traditional knowledge about plants of cultural significance and using that knowledge in social and business enterprises aimed at improving the livelihoods of Aboriginal people.

5.2 Project activities

Project activities were conducted at three Aboriginal communities:

- Titjikala in the Northern Territory
- Leonora in Western Australia
- Ceduna in South Australia.

Located in central Australia, Titjikala is a remote Aboriginal community that operates as a self-contained entity. Project activities at Leonora, a regional centre in the North East Goldfields, involved representatives from two different community groups. The Ceduna project involved a cluster of Aboriginal community groups located in and around Ceduna.

Project activities included planning meetings and workshops, training programs, plant collection trips, plant cultivation trials, documentation of traditional knowledge about plants and their uses, creation of knowledge registers of local plants of cultural significance, laboratory studies on selected plant species, conducting social enterprises and planning for business enterprise developments.

5.3 Projected outcomes

At the commencement of the project the projected outcomes of the project were:

- improved insight into best practice approaches for planning and implementing a traditional knowledge documentation, reclamation, and generational transfer program in an Aboriginal community or group
- established knowledge registers and a documented approach to be used for accessing the knowledge in the registers
- validated Aboriginal knowledge on the medicinal uses of indigenous plants and improved insight into and experience of protecting intellectual property rights for Aboriginal knowledge about plants and their uses
- information on the nutritional value of selected bush foods
- Aboriginal community participants developing knowledge and skills in plant specimen collection, documentation and storage; photography and other multimedia skills; and plant propagation and cultivation
- identified plant species with food or medicinal value which have potential for cultivar development

- established plant propagation and cultivation trials and facilities for use in Aboriginal business enterprises.

It was also expected that the project would benefit other Aboriginal communities in arid environments through the development of a collaborative, community-based methodology to identify, test, develop and propagate native plants using traditional knowledge and through the generation of a model for community-owned product, business and enterprise development in Aboriginal communities. It was also proposed that traditional Aboriginal ecological knowledge will be more widely recognised and respected in Australian society as a result of publicity and publications arising from project activities and that community development models, theories and methods suitable for business and enterprise planning by Aboriginal communities would be developed, and their potential transferability analysed.

5.4 Outcomes and achievements

5.4.1 Best practice approaches for planning and implementing traditional knowledge projects

At the outset of the project it was determined that project activities would be planned and implemented through a partnership approach, based on mutual trust and respect. It was recognised that trust and respect take time to develop, and require the interchange of information and sharing of visions, ideas and knowledge.

Existing protocols for engaging Aboriginal people were sourced and studied. These were used to formulate a 'Plants for People Research Agreement' which outlined the basic approaches to be followed in Plants for People projects. The overall philosophy of this agreement, based in part on a similar agreement provided by one of the project team, is one in which the community has ownership over the project, is actively involved in project activities, derives real benefit from the project and seeks to combine the best of Aboriginal knowledge and Western science. This philosophy is described in two opening statements in the agreement:

All projects will seek a partnership approach, engaging community members in all levels of the project, with the aim to include the best of Aboriginal knowledge with the best of western science.

The Tapatjatjaka Community Government Council (TCGC) will not approve the research activities of any individuals or organisations that lead to, or in its opinion are likely to lead to, offending Aboriginal people living in or connected with the Titjikala Community. Therefore, the TCGC will only approve those research activities that respect, privilege, benefit and empower Aboriginal people living in or connected with the Titjikala Community.

5.4.2 Documenting traditional knowledge

A partnership approach was used for collecting and documenting plant knowledge. Field trips were conducted at each site and records were made on discussions about plants found during the field trips. Published accounts of the plants were examined and further discussions were held on the uses described by community members. Where the described uses concurred with published records, the information was then entered into the database. If the information appeared to be new, or to differ from previous reports on a particular plant, further discussions were held with community members to ensure the accuracy of the entry.

Traditional knowledge about plants of cultural significance was documented in knowledge registers established at two sites (Titjikala and Leonora) and on computer files stored at the University of South Australia. In the case of the Titjikala community, a password-protected electronic database was developed in which photographs and information was recorded for 52 different plants. Entries were made in English with some entries also made in language. A voice-over production in language was included for some plants and associated descriptions of cultural activities. At Leonora and Ceduna,

a database of photographs and information about plants of cultural significance was established. The Leonora project team used these materials to produce a report on plants of cultural significance. Laminated sheets describing selected local plants were produced and used in school and family excursions.

The intergenerational transfer of traditional knowledge about plants was seen by Aboriginal team members as a particularly important aspect of the project plan. Aboriginal leaders at both Titjikala and Leonora used both the field trips and the informal campfire meals, at which a cross-section of ages were present, to relate the events and outcomes of the project as well as the traditional knowledge associated with plants observed in the field trips.

5.4.3 Analysing plant extracts and validating traditional knowledge

Twenty-four (24) medicinal plant extracts from 14 different species were collected from Titjikala and Ceduna (specifically Scotdesco), including voucher specimens. Extracts were tested using bioassays and pharmacological, antibiotic, antiviral and anti-tumour test procedures at four different laboratories in Western Australia and South Australia. In nearly all cases, the test results obtained in the laboratory were in agreement with the medicinal uses described by community elders (Evans et al. 2010). The commercial potential of some of these results is now under examination.

5.4.4 Protecting intellectual property rights

Several meetings and workshops were held at Titjikala to discuss the approach to be used to ensure that cultural practices were acknowledged and respected and that the intellectual property (IP) rights of Aboriginal people to their traditional knowledge were protected. A protocol was developed based on published procedures for ethical research and this protocol was enshrined in a signed research agreement between the Tapatjatjaka Community Government Council (TCGC) and Curtin University of Technology (Evans et al. 2009).

This agreement was subsequently used in negotiations involving the Titjikala community, DKCRC and the Central Land Council to make sure that the Titjikala community received an equitable share of any royalties or commercial returns from project findings. These returns could be generated using both the background IP that the community brought into the project (their traditional knowledge about plants and their uses) and/or the new IP that was generated from the laboratory studies on plant extracts. These negotiations resulted in the development of a new project schedule for the project. The new schedule ensured that the Titjikala community would be legally represented at any negotiations relating to IP arising out of the project; and that the community would be entitled to an equal share of the collective commercial return to project partners arising from the new IP generated by project activities.

5.4.5 Transferring traditional knowledge to younger generations

The importance of preserving traditional knowledge about plants and their uses, and making sure that this knowledge is transferred to younger people, was emphasised by all Aboriginal participants in the project. Generational transfer of traditional knowledge about plants and their uses was achieved in this project through several strategies:

- Project activities that focused on traditional knowledge about plants were conducted at the local primary school (Titjikala and Leonora) with community members playing an active role in school excursions to examine and collect local plants of cultural significance. The Titjikala School produced a flip chart illustrating local plants and their uses and a video involving school children and community members.
- Children and young people accompanied adult members of the study teams on almost all of the field trips during which plant specimens were collected and discussions were held on their traditional uses. On one occasion, children from the Titjikala School conducted a sound-recorded interview with Mr Briscoe, the site Project Leader, and another member of the group about local plants and their uses. On another occasion, one of the young boys had his face painted with a ripe puffball. A bush

picnic involving young people was held in Leonora and specimens of a local tuber were roasted and eaten.

- Posters displaying plants of cultural significance and project activities conducted by the project team were produced and displayed at NAIDOC Week at the Leonora School and at various conferences and workshops attended by Leonora family groups.
- Access was provided where appropriate to electronic and computer-based knowledge registers containing photographs and information about local plants of cultural significance.

5.4.6 Developing social enterprises and skills

Social enterprises conducted during the course of the project included the establishment of a small garden at the Titjikala Horticulture Centre and the development of a CDEP organisation at Leonora. Both of these social enterprises have now led to the establishment of business enterprises managed by the respective community organisations, the Tapatjatjaka Community Government Council and the Walkatjurra Cultural Centre.

Knowledge and skills in plant specimen collection, documentation and storage were developed through workshops and demonstrations conducted in both Titjikala and Leonora. Plant propagation and cultivation skills were enhanced through the planting of a garden at Titjikala and through a yam cultivation trial conducted with the Leonora study team (see next section).

Training sessions were conducted in photography and other multimedia skills and two short videos were produced, one at Leonora and another at Titjikala. These videos were displayed at conferences and workshops in Alice Springs and Kalgoorlie and several comments were received praising the quality of production and the information on traditional knowledge topics. During one of these showings, a local teacher enquired about buying copies of the video, saying that it would make an ideal teaching resource. A recent outcome of this multimedia training was the success of several children from the Tjupan Ngalia community in an international video competition in which they were runners-up with a video they produced about hunting a goanna.

5.4.7 Trialing plant cultivation

A cultivation trial of a yam species was conducted through a partnership formed between the Leonora study team, the Centre for Sustainable Mine Lakes (CSML) and the Centre for Natural Resource Management (CNRM) with funding provided by DKCRC, CSML and the Rural Industries Research and Development Corporation (RIRDC).

During a field trip, seeds of the yam species *Ipomoea calobra* were collected from a site near Leonora and cultivation trials were conducted at the CNRM nursery in Albany, Western Australia. Research concentrated on propagation, tuber formation, yield and preliminary product appraisal and demonstrated that the species had horticultural potential. Representatives from the Tjupan Ngalia community, the Aboriginal group involved in this part of the Plants for People project, visited Albany to study the cultivation techniques and researcher Dr Geoff Woodall later visited the community and delivered plant specimens growing in pots. These were received by individual community members, who undertook to continue the cultivation trials at their homes.

5.4.8 Business development and employment outcomes

All three community groups involved in the project have now established small business enterprises involving traditional knowledge about plants.

The Titjikala community entered into a joint venture to establish a cultural tourism business, Gunya Titjikala. Tourists are paying over \$1000 a night to stay in one of three luxury tents built near the Titjikala town-site and community members are employed in various roles in the enterprise. The

increased self-esteem and self-confidence that resulted from taking part in the project activities played a significant role in giving community elders the confidence to act as tourist guides at the venture.

A successful business enterprise has also been developed at Leonora, building on an initiative that began before the project but which was also facilitated by project activities.

As part of the skills development aspect of the project, a formal education program was conducted with community members from the Tjupan Ngalia community. One person successfully completed several units of a university bridging course in mathematics, English communication and introductory business management; she went on to manage the CDEP program awarded to the Tjupan Ngalia group in 2005.

A community leader was sponsored to attend a short course in natural resource management in Darwin and he and his family were sponsored to attend a business development seminar in Perth. Strategic planning meetings were held regarding community business opportunities and one of the project members assisted the community group in planning for a business enterprise.

The knowledge and information gained from these education initiatives contributed to the successful development of a small business enterprise – the Walkatjurra Rangers – which is now contracting its skills to local mining companies and other organisations.

Further, one of the community members has been employed as a part-time teacher's associate in a Plants for People project (funded by the then Australian Government Department of Education, Science and Training) being conducted at Leonora School.

5.4.9 Improving livelihoods

Livelihoods in the communities involved in the project were improved through a number of different initiatives and strategies:

- empowering individuals and community groups through the interactions that occurred between community members and other project participants and through networking with members of other Aboriginal communities (all study sites)
- increasing self-esteem and self-worth through the respect and honour that non-Aboriginal people felt and displayed for traditional knowledge about plants and their uses (all study sites)
- empowering individuals and groups through the validation of traditional knowledge about the medicinal uses of local plants resulting from the comparison of the findings of the laboratory analyses and the reported medicinal uses of the plants (Titjikala and Ceduna study sites)
- increasing knowledge about the nutritional value of selected local plants (Leonora study site)
- creating opportunities for commercialising research findings from studies on a bush-food plant (Leonora study site) and on several medicinal plants (Titjikala and Ceduna study sites).

References

AOAC – see Association of Official Analytical Chemists

Association of Official Analytical Chemists. 1990. *Official methods of analysis*, 15th edn. Association of Official Analytical Chemists, Washington, D.C.

Barr A, Chapman J, Smith N, Wightman G, Knight T, Mills L, Andrews M and Alexander V. 1993. *Traditional Aboriginal Medicines in the Northern Territory of Australia*. Conservation Commission of the Northern Territory, Darwin.

Bindon P. 1996. *Useful Bush Plants*. Western Australian Museum, Perth, Australia.

Cheers B. 1998, *Social Care in Rural Australia*, Ashgate, Birmingham.

Cherikoff V. 1993. *The bushfood handbook : how to gather, grow, process & cook Australian wild foods*. Bush Tucker Supply Australia, Boronia Park, NSW.

Duke JA. 1986. *CRC handbook of proximate analysis tables of higher plants*. CRC Press. Baton Rouge, FL.

Evans L, Scott H, Muir K and Briscoe J. 2009. Effective intellectual property protection of traditional knowledge of plants and their uses: an example from Australia. *GeoJournal* 74(5). DOI: 10.1007/s10708-008-9229-6. Published online 24 December 2008. <http://www.springerlink.com/content/466u4025k0411240/fulltext.pdf>. pp. 391–401.

Evans L, Briscoe J, Baker E, Barr A, Locher C, Muir K, Savigni D, Semple S, Scott H, Tsvetnenko E, Tsvetnenko E and Wang SF 2010. *Laboratory analysis report: Analysis of plants from the Plants for People Titjikala, Ceduna and Leonora case study sites*. DKCRC Research Report 56, Desert Knowledge CRC, Alice Springs.

Gittelsohn J, Wolever TM, Harris SB, Harris-Giraldo R, Hanley AJ and Zinman B. 1998. Specific patterns of food consumption and preparation are associated with diabetes and obesity in a native Canadian community. *The Journal of Nutrition*, vol. 128, no. 3, pp. 541–547.

Goddard C and Kalotas A. 2002. *PUNU: Yankunytjatjara Plant Use*. Jukurrpa Books, IAD Press, Alice Springs.

Graham C and Hart D. 1997. *Prospects for the Australian native bushfood industry*, RIRDC Research Report No 97/22, Rural Industries Research and Development Corporation, Canberra.

Latz P. 1995. *Bushfires & Bushtucker: Aboriginal plant use in Central Australia*. IAD Press, Alice Springs.

Lepp H. 2003. *Truffle-like fungi in Australia*. Viewed 1 July 2004, <http://www.anbg.gov.au/fungi/truffle-like.html>.

Pate JS and Dixon KW. 1982. *Tuberous, Cormous and Bulbous Plants: Biology of an adaptive strategy in Western Australia*. University of Western Australia Press, Perth, Australia, pp. 72–74.

Ralph M. 1997. *Growing Australian Native Plants from Seed*. Murray Ralph / Bushland Horticulture, Fitzroy, Australia.

Thorburn AW, Brand JC and Truswell AS. 1987. Slowly digested and absorbed carbohydrate in traditional bushfoods: a protective factor against diabetes?, *American Journal of Clinical Nutrition*, vol. 45, pp. 98–106.

Appendix 1: An account of camera training by professional photographer David Callow

I worked with groups of two or three women. We sat around the Training Centre photographing small objects on the nearby tables. The ages varied from around 16 to 60 years.

The Nikon COOLPIX digital camera differs considerably from the normal film cameras that participants may have used in the past.

I demonstrated the series of steps required to set the camera up; the operation of the camera, including the important focusing features and exposure controls; and the reviewing of the photographic images. We handed the camera around the group giving each person the feel of the very small button controls – wide and tele zoom controls, the shutter release button and scrolling through the menu options.

I received very little feedback. The women asked no questions and I had no idea what they understood. Eventually, I finished my instructions and packed the camera away. I then asked one of the younger girls to unpack it and photograph a small stapler that sat on the table. She had remembered most of the instructions. I assisted with a few reminders as we went along and was quite impressed that she had taken so much in. I then asked one of the elder women to do the same. She struggled a little more with the small buttons but within about 10 minutes she was able to photograph and review the pictures.

I have considerable prior experience in instructing tertiary students in camera operation. There seemed little difference in the women's ability to follow the instruction compared with tertiary students. I remain unsure if the women understood why they were changing some of the set-up features of the camera or whether they were just going through the series of steps. Either way, they quickly achieved what was asked of them.

I knew though that they would need to use the camera regularly to retain this information. I encouraged the women to borrow that camera often and keep familiar with its operation.

The Plants for People project could appoint a few of the women to be the main photographers in the field. This way, each person would get regular use and perhaps be able to show others in my or Patrick's absence.

I did not have the opportunity to revisit the women to see whether they continued to use the camera.

Appendix 2: Timeline of project development – Ceduna case study

Phase/Date	Activity
Phase 1: Initial contact with Ceduna Aboriginal community about Plants for People (February 2004)	Initial contact of project leader with Tjutjunaku Worka Tjuta Inc. (TWT) Chair who advised that TWT is the appropriate organisation and potential partner in the Ceduna community.
Phase 2: Initial introduction of the community to the project (February – April 2004)	Presentation by researchers to the TWT Board and CEO. Informal discussions with various community members. TWT Board decides to be the Ceduna Plants for People (P4P) partner. Board establishes a P4P Steering Committee chaired by the TWT Chair.
Phase 3: Initial partnership development (April – October 2004)	Meetings of researchers with TWT P4P Steering Committee and CEO. Draft IP agreement drawn up by University of South Australia (UniSA) legal officer, which is discussed with TWT Steering Committee. Productive brainstorming session with TWT Steering Committee. TWT Steering Committee decides to approach other communities and family homelands in the region about joining the project – productive discussions held between researchers and these communities. TWT Steering Committee decides to invite these communities into the project and advises researchers of other organisations, businesses, individuals, and families to inform and invite to participate; researchers follow through on these decisions.
Phase 4: Informing the community (region) about the project (November 2004 – March 2005)	Ceduna case study project coordinators are appointed. Information is provided and discussed. Interested people, families, and organisations are identified. P4P is introduced to individuals, community and homeland families and groups, community organisations and government agencies. Regular meetings are held with interested people to find out how they see the project, where they would like to take it, and how they would like to use it. Formal invitations are sent to communities to participate; some are accepted. Partnership is extended beyond TWT and Ceduna on the advice of the TWT Chair. Open community forum is held; it reinforces existing interest and generates wider interest. P4P Steering Committee is formally established. Researchers, project coordinator and another community researcher participate in P4P Perth conference, which helps the coordinator and community researcher to get a clearer focus on aims, objectives, and tasks for the case study.
Phase 5: Consolidating relationships and developing ideas (April 2005 – May 2005)	Meetings of the steering committee, communities and organisations are held on a more regular basis. IP, confidentiality and ethics agreements are discussed with communities, individuals, and organisations. Agreement is reached on ethics and confidentiality but unable to proceed with IP yet. Time is spent with groups and individuals to find out common interests and visions of how they see the project helping them. Local people (including elders) and researchers frequently spend time together in the bush talking about plants and their uses and taking samples of some of them. Discussions are held about participants' ideas about plants, plant products, business ideas, and possible funding and human resources.
Phase 6: Experiencing the interest (June 2005 – July 2005)	Discussions which started in Stage 5 are continued to develop ideas and start developing plans to realise them; this involves going to existing and potential idea-implementation sites. Possible funding sources are identified. Interest and support from agencies and organisations that potentially could provide financial and other resources is generated. This involves supporting and advocating for P4P participants in their discussions with these organisations. Grants and other funding opportunities are sought out, as are people in the community to assist with writing grant applicants.

Phase/Date	Activity
Phase 7: Starting activities (June 2005 – present)	Projects and activities are identified. Funding is applied for. Some plant identification and testing occurs.
Phase 8: Establishing and supporting activities (August – present)	Materials are bought to begin some activities. Workshops are held with researchers focused on plant identification, seed collection, propagation, and possible commercial usages of plants. Small project areas to prepare for planting are identified. Time is spent solving issues about water and appropriate irrigation systems.
Phase 9: Business planning (October 2005 – present)	Some action plans / business plans are set in place so people can see a direction for their ideas and visions. Local people and organisations to assist others with developing business plans are identified. Support continues to be sought from other regional and external stakeholders – funding and expertise. Established Aboriginal businesses are visited and learned from. Outcomes and strategies for each project/activity are established. Clear guidelines for business ventures are established.
Phase 10: Having research conversations and yarns about community, community development and the journey (October 2005 – present)	Instruments and methodology are designed. Participants are identified. Data is collected. Data is transcribed and analysed. Papers are written.

Attachment 1:
From Field to Website – Titjikala training manual
produced by Titjikala study team



A basic resource

Version 2

Plants for People

A sustainable development project focused on preserving Aboriginal heritage and developing Aboriginal business enterprises in horticulture, tourism and cultural heritage activities

Contents

Introduction.....	53
Step 1: Go out bush to find the plant you want to collect.....	53
Step 2: Record plant information on a collection form.....	54
The first collection form	54
The second collection form.....	54
Hints on collecting information	57
Exercises: Record plant information on the collection forms.....	58
Step 3: Collect the plant sample.....	58
Equipment.....	58
What to sample	59
Caring for the sample.....	60
Pressing plant samples	60
Drying and mounting plants	62
Vouchering	63
Ethics of collecting plants	63
Step 4: Take photographs – training document produced by the Titjikala team to use with COOLPIX4500 camera	64
1. Knowing the camera parts	64
2. Preparing to take the photo	64
3. Taking the photo	64
4. Reviewing the photo	65
5. Very important camera stuff!	65
Hints on taking photos	65
Exercises: Take photos of the plant	66
Step 5: Put the photos onto the computer	67
Find the photos on the camera	67
Take the photos off the camera and put them onto the computer	67
Step 6: Compare your information and photos to the <i>Bushfires & Bushtucker</i> book	68
Exercises: Compare your information and photos to the book.....	68
Step 7: Change the photos so they can go on the website	69
Changing photos using Photoshop 5.5.....	69
Step 8: Update the website.....	70
Entering new plant information.....	70
Adding a resource to the website.....	71
Checking everything looks good	71
References.....	72

Figures

Figure 1: Collection form 2 – A plant with a single use	55
Figure 2: Collection form 2 – A plant with two uses for different plant parts.....	55
Figure 3: Collection form 2 – A plant with multiple plant parts for the same use.....	56
Figure 4: Collection form 2 – A plant with restricted use.....	56
Figure 5. Mounted plant label.....	63

Introduction

The Plants for People project is designed to maintain traditional knowledge of plants and associated animals in Aboriginal communities. The first part of this process is to record traditional plant uses and some animal uses associated with those plants. The second part is to record the information on the database. This manual outlines data collection in a very basic way. It was designed to be used by non-Aboriginal, mostly student, members of the project team. However, it can be also be used as a training guide that roughly outlines the process of collecting, referencing and manipulating information suitable for Aboriginal use on the Tapatjatjaka Plants website.

Collecting and recording traditional plant use information is completed in eight steps:

1. Go out bush to find the plant you want to collect.
2. Record plant information on a collection form.
3. Collect the plant sample.
4. Take photos of the plant.
5. Put the photos onto the computer.
6. Compare your information and photos to the *Bushfires & Bushtucker* book.
7. Change the photos so they can go on the website.
8. Update the website.

Please note that some of the information presented in this manual is specific to Titjikala and the instructions may not apply to other communities.

Step 1: Go out bush to find the plant you want to collect

This is the start point for collecting information on traditional plant uses. Typically, you will drive with a guide on bush tracks for half a day or a day searching for plants. You will take a variety of equipment to record information and bring back plant samples. It is vital to include as much detail as possible because you may not be able to return to the site of a plant. It is easier to talk to Aboriginal people about the plant while you are in the field without the distractions of community life.

You will need to take:

- an Aboriginal person with knowledge of traditional plant use
- lots of collection forms (see Attachment 1 – Appendix 1: Collection Form 1 and Attachment 1 – Appendix 2: Collection Form 2)
- the book *Bushfires & Bushtucker* by Peter Latz (see References)
- a digital camera
- spare batteries for the digital camera
- a miniature tape recorder
- spare batteries for the miniature tape recorder
- spare cassettes for the miniature tape recorder
- pens
- spare paper
- equipment for collecting plant parts (see ‘Collecting plant samples’ below)
- spare tyres, food, water, sun protection, GPS and appropriate safety gear.

Step 2: Record plant information on a collection form

The collection forms are used when you are out bush searching for plants with a guide. It is very important to record all the information possible on the collection form. Do not leave out information or give incorrect information. Going bush to find a plant again can be painstaking.

Record all information, even there is no provision for it on either of the two collection forms. We can still place that information on the website.

Many different people will have similar information on traditional plant uses. Even though you may have heard it before, it is important to record as much data as possible about the same plant from different sources. The data will have more credibility if a lot of people are providing the same information. And, sometimes, small details that are left out can be picked up if several people are describing the same uses.

There are two collection forms to complete. On the first form, you record the location and types of photographs. On the second form, you record all the traditional knowledge from the elders.

The first collection form

This form is generally used for new plants on the website (see Attachment 1 – Appendix 1: Collection Form 1).

Language: Circle the language of the Aboriginal plant name. Add the language in the space provided if it is not listed.

Meaning: What does the Aboriginal plant name mean in English?

GPS: Use the GPS to get the latitude and longitude.

Location where?: Describe the location. For example, ‘On top of a sand hill, 10 km SE of Titjikala on the Southern Stock Route’.

No. of samples: This is the number of plant samples you need to collect. One will go to the herbarium in Alice Springs, one to the Training Centre and one to the community. Circle the number of plant samples you have collected.

Photographs: Circle the part of the plant which you photographed.

People to listen to: Write down any other people that may have information about the plant.

Comment: Write anything else you can think of, or that the guide told you.

The second collection form

Use this form to describe the Aboriginal use for the plant (see Attachment 1 – Appendix 2: Collection Form 2).

Aboriginal plant name: It is sometimes hard to spell Aboriginal names (especially for non-Aboriginal people), so it is good to write it many times with different spellings, so long as the name reads like it sounds. When you get back to camp, it is easier to find the correct name in the *Bushfires & Bushtucker* book if you have the name written down a couple of times. You may have to ask your guide to repeat the name slowly.

Botanical name: This is the non-Aboriginal name for plants. It is always two words; for example, *Hakea divaricata*. The botanical name can be found in the *Bushfires & Bushtucker* book, but it is easiest to look for it when you have finished the collection form.

Database no.: You give the plant a database number which is used to identify the plant on the database.

Part of plant and use: Here you describe which part of the plant is used by Aboriginal people and what they use it for. If, for example, the wood of a plant is used to make a spear for hunting, then draw a circle around the word ‘wood’ and a circle around the word ‘hunting’ (Figure 1). Then, draw a line from one circle to another.

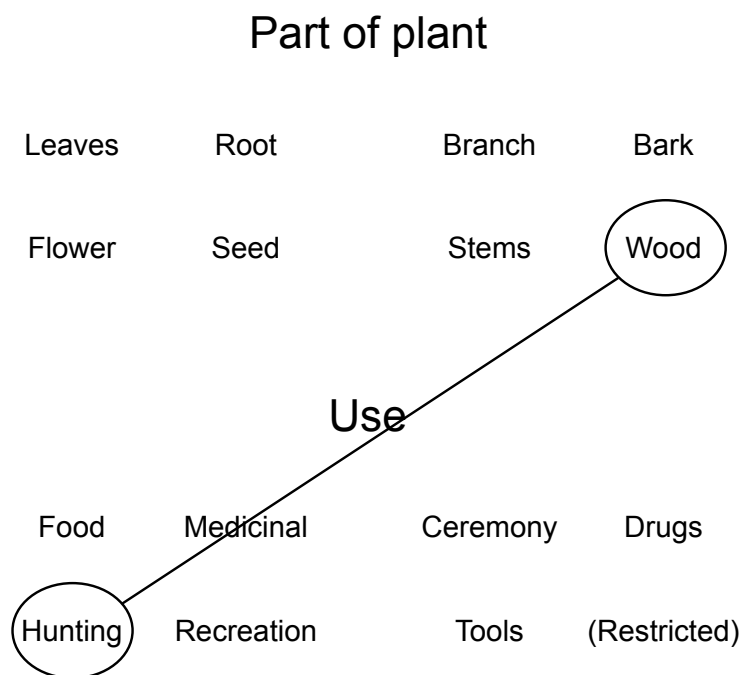


Figure 1: Collection form 2 – A plant with a single use

There may be two or more uses for some plants. Do the same as above. Circle the word for each use and the part of the plant, and then draw a line connecting each circle (Figure 2). For example, honey can be sucked from flowers of a plant and the bark might heal burns. In this case, circle ‘flower’ and ‘food’, and draw a line connecting them. Then, circle ‘bark’ and ‘medicinal’, and draw a line connecting them.

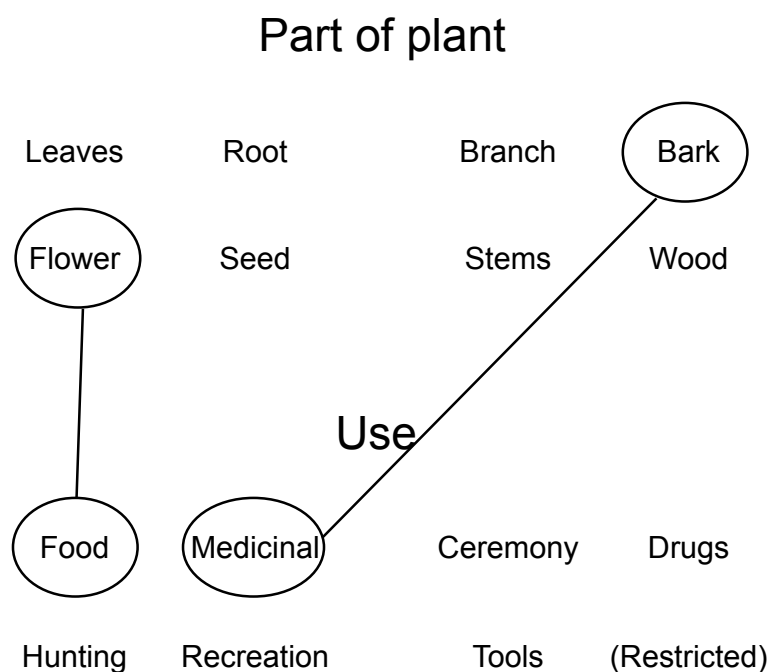


Figure 2: Collection form 2 – A plant with two uses for different plant parts

There may be two or more part of the plants used. For example, if the leaves, branches and stems are all used to heal sores and scabies, circle 'leaves', 'branch', 'stem' and 'medicinal'. Then draw three lines from 'leaves', 'branch' and 'stem' joining them to 'medicinal' (Figure 3).

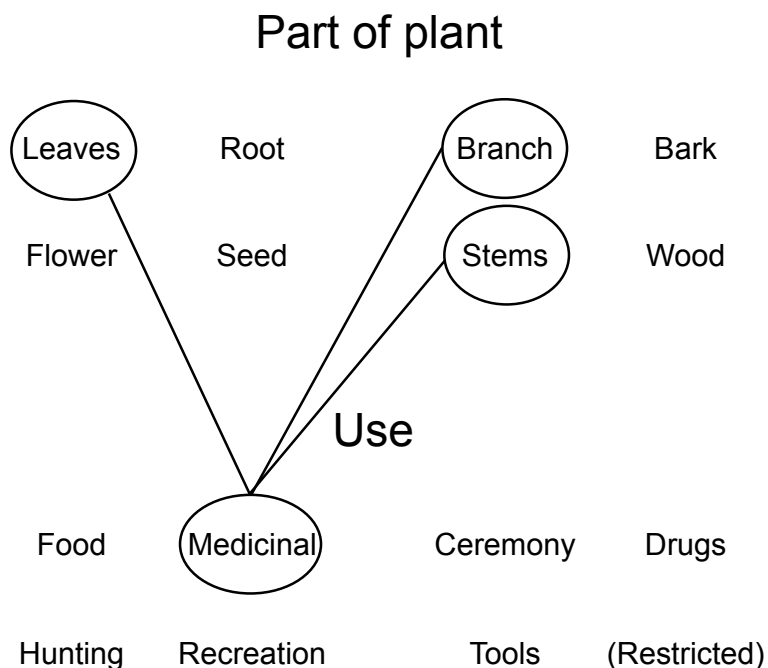


Figure 3: Collection form 2 – A plant with multiple plant parts for the same use

Use of the plant may be restricted if the information is not meant for certain people. For example, women or non-Aboriginal people may not be permitted to know about how this plant is used. In this case follow the example below (Figure 4).

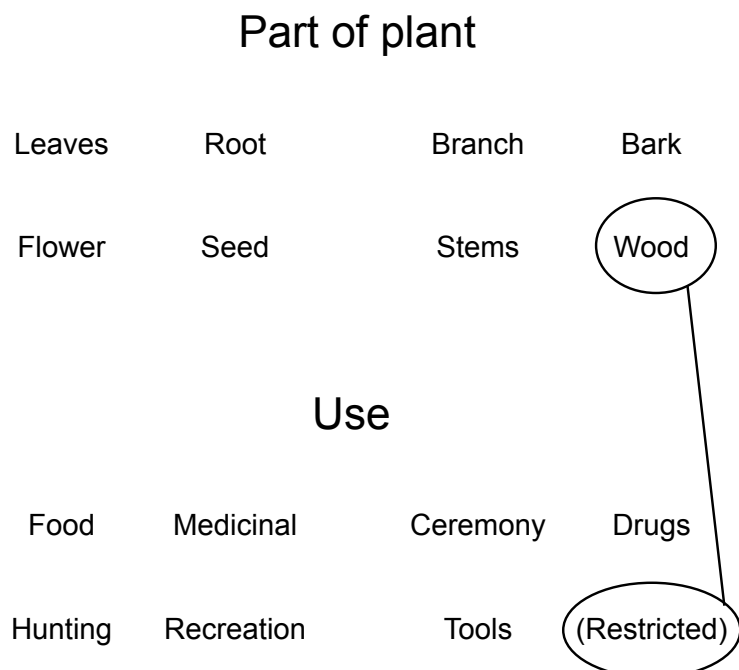


Figure 4: Collection form 2 – A plant with restricted use

Add the plant part or use if it is not listed. For example, if the root bark is used, do not circle 'bark'. Instead, write the words 'root bark' under the 'Part of Plant' section of the form.

Description of use: This is where you describe in more detail the bush tucker or medicine. You have to give more information about how the plant is used.

Make sure you have enough detail so that anyone will be able to use the plant in the same way.

- How? How is the wood used to make a spear? How long is the wood, how thick? Is there a special way of making the spear from this wood?
- Who? Can everybody use this? Or only special people (elders or young people)? List the types of people.
- What? What else do they use? Do they need to make a fire? If they need other things to help, then list them (for example sticks, water or grinding stones).
- Where? Are there special places that this can be done, or can it be done anywhere? List the places.
- When? Can it be used at a certain time of day? Can it be used at a certain time of year? How long does it go for? List the times when it can be used.

Main community group:

- Which clan will use this plant?
- Do men mainly use it?
- Do women mainly use it?
- Is it used for children or elders?
- Can anybody use it?

Person giving information: It is important to note who told you this. The more people that tell you the same information, the stronger and more credible the information.

Language group: What is the main language of the person giving you the information?

Which language group uses the plant in the way you have described?

Other links: What other areas of information are there on this plant? Are there stories about this plant? Is there a tape or video? Have you or the person seen a picture of this plant before? Is this plant a part of the dreaming? Are there any other places of information about this plant? What is the name of the photographer?

Who?: Write your name here as the person recording the information.

Hints on collecting information

- Record as much correct information as possible.
- The tape recorder is very useful. Sometimes the person will talk faster than you can write, or you might miss something. You can listen to the tape later and fill in any missing information.
- It is good to get similar information from several people.
- Don't be afraid to use all the paper. You can turn it over if you need more room.
- Ask questions.
- It is better if you have a friend helping you. Both of you will get more information than only one person on their own.

Exercises: Record plant information on the collection forms

Important: Explain to the students that they need to collect enough information so that people who have not seen the plant before will be able to use it in the same way as traditional Aboriginal people.

Exercise 1: Show the students a couple of different examples of completed forms.

Exercise 2: Creative collecting

- Objective: Students understand each area of the collection form.
- Equipment: Collection forms, pens.
- Activity: The students work in pairs, creating a plant and filling in the collection form. You will need to check the forms to see if the students are proceeding correctly.

Exercise 3: Role playing

- Objective: Students familiarise themselves with collection forms, possible contingencies needed and questioning to gain the required information.
- Equipment: Collection forms, pens, miniature tape recorder.
- Activity: The students (as a group) are encouraged to ask the trainer questions about a plant and then fill in the collection form at the same time. Initially, make it easy for the students to fill in the form, and then gradually make it harder. The elders don't know what the collection form is all about, so it might be a bit difficult extracting information from them. Use techniques that force the students to rely on both the pen and tape recorder. The students can role play among themselves.

Step 3: Collect the plant sample

There are a number of reasons for collecting plant samples. They can be used as teaching aids for the community, for vouchering in nutrient or chemical analysis and as a record of the changes in flora over time. Although not as realistic as living plants, dried and preserved plants can give a good idea of what a plant looks like and what to look for in the bush. Preserved samples can also allow people to view and learn about plants despite the varying seasonality, availability and rarity of some plants.

Collecting plant samples may facilitate identification and photography not possible in the field. Sometimes plants may need to be vouchered and stored at the Alice Springs Desert Park Herbarium, depending on the intended plant use (for example, if they are to undergo chemical analysis).

Collecting plant samples involves choosing the appropriate plant parts to collect, collecting and maintaining the samples, and then pressing the samples. Pressing the samples dries and preserves the samples, so that they last for many years.

You will need to collect three plant samples: one will go to the herbarium in Alice Springs (for vouchering), one to the training centre and one is for the community.

The samples will be kept for future reference and identification, so it is very important to make sure your collection technique is good to maintain and preserve the plant samples. The collection will have been a waste of time if the samples are damaged or infected with fungus.

Equipment

The equipment used for collecting and preserving plants are normal household items that can be obtained and assembled for minimal cost. They include:

- a digging tool (trowel)
- a pocket knife or pruning shears
- jewellers' tags (small string tags to tie onto plants for identification)

- paper bags of assorted sizes to carry specimens, or plastic bags with wet towels or wet newspaper
- newspaper
- water (to cool the specimens)
- a plant press
- a herbarium record book (available from a herbarium).

What to sample

The aim of collecting plant samples is to identify the plants and provide an example for future reference. So you need to collect the plant parts with characteristics that identify those species. Also, the sample needs to be large enough to show normal growth and development (Bowles 2001, Barber 2002). As a general rule, the following items are of interest when identifying plants:

- flowers, fruits and cones (fresh or last year's growth) (Reveal 1997, Pell 2000, Wiersma & Allrich 2004)
- mature stems and leaves (Reveal 1997, Wiersma & Allrich 2004)
- male and female plants (Wiersma & Allrich 2004)
- basal leaves (leaves growing from the base of the stem) if they are different from leaves on the branches, to show the range of leaves (Wiersma & Allrich 2004)
- buds, where possible
- bark – sometimes useful for identification.

However, different plant forms display a range of characteristics important for classification. You need to collect these characteristics as well as the general distinguishing characteristics.

- Grasses: Take the whole plant. The root form is often vital for accurate identification. Shake off excess soil (Liesner 1997).
- Small, herbaceous plants (plants with little or no wood): Remove the whole plant, making sure the roots and tubers are intact. The root form is often vital for accurate identification. Shake off excess soil.
- Shrubs and trees: Take a 30 centimetre sample of the branches. Many plants have similar stems and leaves, so you may need to take a sample to the herbarium (Reveal 1997).

Do not sample

- dead or dry plants
- parts of plants that are insect damaged
- parts of plants that are diseased
- small representatives of a plant, just because they are easier to reach or fit in the press
- damaged plants that show unnatural growth.

Generally, you don't need to take the whole plant. Only take what you need so that the remaining plant will survive. Avoid collecting all of something and the last of anything (Reveal 1997). As a general rule, if you need to take the whole plant, only do so if there are more than 20 plants (Reveal 1997).

The sample should be large enough to fill the plant press. Use more than one sample if they fit on the same page on the press. Number the sample with the jewellers' tags immediately or add 'tear outs' from the herbarium record. There is nothing worse than getting back to camp and realising you have no idea where the sample came from.

Caring for the sample

Maintaining the look and form of the plant sample relies on the proper care before it is pressed. The plant sample may rapidly deteriorate once it is cut from the main plant or removed from the soil. Once it starts to wilt, after about an hour or so, it will make a poor specimen (Barber 2002). So the best samples are pressed immediately. However, taking the press into the field may, at times, be impractical and the plant samples will need to be safely transported back to camp. Plant specimens are susceptible to physical damage and heat, so it is important to avoid crushing samples and keep them as cool as possible (Bowles 2001).

Boxes or bags give plant samples some protection during transport. Boxes are more cumbersome but they can give a bit more protection than bags. Bags are convenient to use and readily available; however, collecting in bags is not recommended because petals are easily knocked off and stems can be broken or bent (Bowles 2001). Despite this warning, bags are commonly used and, with care, will maintain good plant samples.

When using bags, follow these guidelines to prevent physical damage to plant samples:

- Plant samples need to be carefully placed in the bag – not dropped.
- Long samples need to be folded to the size of the plant press or herbarium paper (Liesner 1997).
- The larger the bag the less the sample will get damaged (Liesner 1997).
- Place large heavy samples in a different bag to small delicate ones (Liesner 1997).
- Delicate items should be stored separately.
- Blow the bag up with air and tie it off. This will provide some moisture and cushioning for the sample (Bowles 2001).
- To take the sample out of the bag, carefully turn the bag upside down. Don't pull the samples out (Liesner 1997).

It is important to minimise heat stress, wilting and desiccation to maintain good plant samples. Do this by carefully wrapping the specimen in wet towelling or newspaper, placing it in the bag and keeping it out of the sun (Liesner 1997, Liskey 1997). Either paper or plastic bags may be used. Never use plastic bags unless the sample is wrapped in wet towel or newspaper (Liesner 1997). Also, bags should be white or light coloured (but not transparent) to minimise overheating (*Making Plant Collections* 2003).

Bear in mind that field trips may take half a day and samples may not last long in desert heat, so taking the plant press is necessary.

Pressing plant samples

Pressing plant samples is a way of preserving them and presenting the plant's anatomical features for future reference. The plant press is designed so that plants can be dried quickly while being pressed flat (Bowles 2001).

It is imperative to collect good quality plants that are not damaged, wilting or dry. Cut specimens are best pressed within an hour of cutting (Barber 2002).

Before the plants are pressed:

- Number the sample with the jewellers' tags immediately or add 'tear outs' from the herbarium record.
- Make sure the plant's surfaces are dry to prevent mould or mildew from developing (Barber 2002).
- Clean any dirt or mud from the plant.

When pressing plants:

- Try to get a full sheet showing as many different plant parts as possible e.g. flowers, stems, bark and roots (Bowles 2001).
- Make sure both top and bottom surfaces of leaves are visible (Pell 2000).
- Make sure both upper and lower plant parts are shown.
- Several layers of newspaper or blotting paper between the plant specimens to prevent mould and mildew.
- Spread the leaves out on the newspaper to help prevent mould and mildew (Bowles 2001, Barber 2002).
- Trim away excess leaves and stems, while preserving enough material to show plant structure and identifiable features. Leave the section near the base of the plant parts that are trimmed away to indicate where leaves have been removed.
- Trim thick or bulky material. Cut thick roots and stems in half to aid the drying process (Reveal 1997). Put a few more newspaper sheets around the larger specimens.
- If tips of grass leaves need to be bent, bend them in such a way that you can still see the leaf base and apex (Liesner 1997).
- Wrap woody and herbaceous plants in paper towel or towel. Make sure the sample is air dry (Liskey 1997).
- Middle sections of tall herbaceous specimens (those with little or no wood) may be discarded as long as the total height and any other features are recorded in the field notes.
- If the plant is too tall to fit on the pressing paper, you may cut out sections (bottom, middle, upper), or bend the plant in a 'z' fashion.
- Cut thin strips of bark for pressing (Reveal 1997).
- Arrange the specimen so that the floral parts and leaves are presentable and can be used to identify the plant.
- Press open flowers and splay the petals so that the flower parts are displayed (Bowles 2001). Some petals will not lie in an appropriate position. A small amount of wet newspaper may hold them in position.
- If necessary, vertically dissect a flower in half to show internal structure.

Succulents may need to be treated slightly differently from woody or herbaceous plants because of their thick fleshy leaves. They can be microwaved on a very low setting for about one minute to disrupt the cells and prevent growth inside the plant press. Be careful – it is easy for the succulent to 'cook' and your sample can be destroyed. Pressing the thick leaves may not give a true representation of the leaf shape. Succulent or wet tissue sample can be left for at least a day until wilted or partially dry (Crouse 2004). Alternatively, the fleshy stems may be cut in half and hollowed out. Thin cross-sections of the plant can be used to show the overall shape (Reveal 1997).

Place the press in warm circulating air to dry the plant samples. Pressed specimens normally take a week or so to dry and it will take longer in cool and humid weather. Drying the samples as fast as possible will preserve the colour and prevent fungal infections. Drying may be accelerated by placing the press outside (on a car roof-rack or on a rock) with air circulating, instead of leaving it inside a vehicle or a room. Change the newspaper after 24 hours to aid drying and adjust the appearance if necessary (mainly, folded leaves) (Bowles 2001).

Another point to remember is that sometimes plants will shrink while drying (Liesner 1997).

Drying and mounting plants

A good way of presenting plants is to mount them on stiff cardboard. There are several different ways of doing this. First, the plants must be dried properly. You can place them in a storage oven for 24 hours at 35–40 °C or, if a drying oven is not available, dry them in a warm dry environment and change the newspaper as needed (daily). The samples can be dried for 3–5 days. Tightening the pressing straps daily while the samples are drying increases the quality of the dried specimen. Also, check the newspaper and replace if it is damp.

The standard size for mounting paper is 420 x 297 mm but use whatever you think is appropriate. It should be stiff, acid-free cardboard or paper that won't turn yellow or crack with age (Bowles 2001).

Lay the specimen on the sheets, making sure to leave room for the herbarium label. Use a strong glue that dries clear and does not contain ingredients that damage the plant, such as polypropylene glue. Do not use cellophane – it rapidly deteriorates with age. Dab glue on the sample and place it carefully on the mounting paper. You can weigh the samples down with large washers so the sample is flat.

An alternative approach

An alternative approach is described below:

- Make a solution of one-half water and one-half white glue by mixing them together in a beaker or jar.
- Place a 14" x 16" piece of glass (or a cafeteria tray) in the middle of several newspapers (to help keep glue drips to a minimum).
- Leaving a space around the edge of the glass (or tray), spread the glue/water solution evenly with a paint brush or folded paper towel. Do not cover the whole glass (or tray) with glue; leave a clean margin around the edge.
- Examine the dry plant specimen and select which side should be positioned facing up.
- Place the dry plant specimen on a sheet of herbarium paper and position it to leave room for a label in the bottom right corner. The paper may be marked lightly with a pencil to show the position of the plant.
- Carefully place the dry plant specimen on the glue solution on the glass or tray. Take care not to get too much glue on the specimen.
- Pick the specimen up out of the glue and hold it for a minute so excess glue can drip off. Carefully place the plant on the herbarium paper as marked. Don't smear the glue around; just lay the plant specimen straight down.
- Place waxed paper over the specimen and place weights (usually books) on top of the waxed paper until the glue is dry.
- Place the plant collecting data form with the plant or write all the collection data (from the plant press newspaper) lightly in pencil on the lower right corner of the mounted specimen. Later a formal label with all the information written in proper form will be placed on the lower corner.

SPECIAL NOTE: Stress the need to be NEAT. Glue smeared all over the plant or paper does not make an appealing specimen.

The label on the mounting should contain the information listed in Figure 5.

Titjikala Plant:	
Luritja Name:	
Pitjantjatjara Name	
Arrernte Name:	
Common Name:	
Scientific Name:	
Notes:	
Uses:	
Collector:	Date:

Figure 5. Mounted plant label

Vouchering

Vouchering a plant specimen is a very important part of using plants for scientific investigations such as nutrient or chemical analysis. Plant samples are vouchered or identified by botanists at state herbariums; the herbarium will keep a sample. The plant samples will have been preserved by an independent authority (the herbarium) as a reference if, at a later date, somebody disputes your investigation.

Herbariums will generally accept a fresh sample which they will press, or you can press your own. Ask the herbarium for their preference. If you press your own, describe the sample to the herbarium to make sure it is adequate for identification. Some species may need to be flowering for identification to the species level, or extra material may be required.

Ethics of collecting plants

Several issues arise when plants are taken from their natural environment. There are a few considerations you must make when sampling native flora.

- Become familiar with rare plants. Taking rare plants can affect the survival of the population. The relevant information can be found at the local herbarium.
- Do not damage the plant unnecessarily.
- Are there enough plants in an area to justify your action? A general rule is '1 in 20'. If there are about 20 plants in the area, then take one.
- Only take what you need.
- Wildflowers have a slow reproduction rate, so removing them can affect the population's survival.

Step 4: Take photographs – training document produced by the Titjikala team to use with COOLPIX4500 camera

Photographs are important for identifying plants and learning about traditional plant uses. They are an easy way to convey information to someone who has not encountered the plant before.

The digital camera makes it easy for photos to be put onto the computer and database. Taking photos can be done in five steps:

1. Know the camera parts.
2. Prepare to take the photo.
3. Take the photo.
4. Review the photo.
5. Very important camera stuff!

1. Knowing the camera parts

Make sure you can find all of the parts in the table below.

Look at the ‘Getting to know your COOLPIX 4500’ pamphlet that came with the camera.

Table 1: Camera parts of the COOLPIX 4500

Number on the picture	Camera part
2	Lens
5	Playback button
8	Shutter release button (Picture button)
9	Power switch
12	USB Connector cover, DIGITAL 1/0 Plug
13	Zoom button
26	Battery
28	DCIN 8.4V Connector cover
A	Monitor
B	View finder
E	Multi-selector

2. Preparing to take the photo

- Turn the camera on with the power switch.
- Look at the monitor. If there is a small battery sign in the top-right corner, you will need to charge the battery. If there isn't a sign, then it's OK to take photos.
- Turn the camera off before you remove the battery, otherwise you can damage the camera.
- Remove the battery and place it in the charger. The light on the charger will tell you what it's doing. A flashing orange light means the battery is charging. A constant orange light means the battery is charged. A red light means there is no battery on the charger, or the battery is not connected properly.
- Once the battery is charged, place it back into the camera and you are ready to take photos.

3. Taking the photo

- Note: Do not force the moving parts of the camera. Everything will move very easily.
- Remove the lens cap and move the lens around to the front.
- Turn the camera on using the power switch.
- Hold the camera steady while taking the picture. The steadier you hold the camera the better the photograph will be. If you are taking photos of very small things, like flowers or fruit, you need to

hold the camera extra steady or the photo will turn out blurry. Another option is to place the camera on a tripod or lean it on a solid object (like a car).

- Look at the picture through the viewfinder or monitor. Make sure the object you want to photograph is inside the white square on the monitor. The white square shows you where the camera will focus.
- You can move in or out with the zoom buttons.
- Press the picture button halfway. You will see the picture in the monitor go blurry and then clear so you get a good picture. If the photograph is still blurry or fuzzy, try again.
- A small red rectangle will appear on the screen for about one second to show you where the camera is focused. Make sure the red rectangle is on the object you want to photograph. If its not, then you won't have a good photo; zoom in or out, or change the angle of the camera to get it right.
- If you are happy with your picture, press the picture button all the way down to take a photo.

4. Reviewing the photo

- Press the playback button twice. The last photo you took will appear on the monitor.
- Move the multi-selector left and right to see all the photos.
- If some of the photos are blurry, you might need to take them again.
- Press the playback button again to take more photographs.

5. Very important camera stuff!

This camera is very expensive and easy to break. Remember these points and the camera will be safe.

- Don't touch the camera lens.
- Keep the camera dry.
- Keep the camera away from dust.
- Do not drop or bash the camera.
- Do not force the moving parts of the camera. Everything will move very easily.
- Always carry the camera in its bag.
- Turn the camera off before you unplug it from the computer.
- Keep the camera away from magnets.

Cleaning the camera

- Never use water to clean the camera.
- If there is dust on the lens, use the blower to remove it. Do not blow air with your mouth onto the lens. This will make the lens even dirtier. The blower is kept in the grey case.
- Do not touch the lens with your fingers. If there is dirt on the lens, read the instruction manual for cleaning, but never touch the lens with your fingers.
- If there is dirt on the monitor, wipe it very gently with a soft cloth. A poisonous liquid will come out if the monitor leaks.

Hints on taking photos

- Often, the only way a plant can be identified is by their flowers and fruit. So it is very important that you take close-up photos of them.
- Sometimes photos don't look like you expect, so take lots of the same plant.
- Take a photo of the whole plant. This will give other people a good idea of what to look for when they are out bush. Try taking photos at different angles. If the plant is short, take a photo from a low

level. Try getting down on the ground to take a photo.

- Take a photo of the leaves.
- Try taking a photo with the sun behind you, in front of you, and to the side of you.
- Pay special attention to the part of the plant that is used for the bush tucker or bush medicine.
- If the tucker or medicine is changed by cooking, or ground into a powder, take photos of this process.
- Be careful of taking photos of plants and people together. Sometimes people don't want their photo on the website. Ask for permission before you put someone's photo on the website.
- Try to make the background as invisible as possible.
- Try to contrast the object you are photographing with a different coloured background.
- Review photographs after taking them. It is no good to see that the pictures are blurry when you are back at camp.

Exercises: Take photos of the plant

Important: Emphasise the 'Very important camera stuff' from above.

Exercise 1: Identifying each part of the camera and its use

- Objective: Show the students the camera and how to use it.
- Equipment: Camera.
- Activity: Go through the basic procedure of taking a photo. Let the student do the same, showing they understand the features and parts of the camera.

Exercise 2: Taking photographs

- Objective: Students demonstrate ability to take various types of photos.
- Equipment: Camera.
- Activity: Trainer demonstrates how to take various photos. Students take photographs of five small and five large objects of their interest.
- Important: Demonstrate how blurry photos are taken and suggest methods to eliminate causes. Show that close-up photos are very easily blurred.

Exercise 3: Reviewing and deleting photographs

- Objective: Students demonstrate reviewing and deleting unwanted photos.
- Equipment: Camera.
- Activity: Review each photo and decide on its value by assessing the focus and subject matter. Delete the photo if it is too blurry.
- Important: Once the photo is deleted, it is lost forever. The camera can hold a very large number of photos (more than 150 on the fine setting), so most of the time they won't need to delete photos.

Step 5: Put the photos onto the computer

In this section we describe how to transfer the photos from the camera onto the computer. The photos can be made clearer and sharper on the computer and then put on the Internet.

This will happen in two steps:

1. Find the photos on the camera.
2. Take the photos off the camera and put them onto the computer.

Find the photos on the camera

- Turn the camera off.
- Plug the camera into the computer. Put the plugs into the DIGITAL I/O and DCIN 8.4V sockets on the camera. Don't force the plugs in. They will go in very easily when they are around the correct way.
- Turn on the camera.
- A small window will appear on the computer.
- Click the CANCEL button and the window will disappear.
- Click on the green START button in the bottom left of the screen and another small window will appear.
- Click on MY COMPUTER, then click on REMOVABLE DRIVE H:
- Another window appears. It will have a list of files, which are your photos.
- To see a small version of your photo, click on VIEW at the top of the screen and a small window appears. Click on THUMBNAILS in that window.
- If you double click on a file (click twice very fast), a bigger version of the picture will appear. If you click on the blue arrows at the bottom of the screen you will be able to see every photo.

Take the photos off the camera and put them onto the computer

- On the computer, open the folder where you want to store the photos.
- On the window that has your photos, click EDIT, and then click SELECT ALL. All the photos should be highlighted.
- Click EDIT again, and then click COPY.
- In the folder where you want to store your photos, Click EDIT and then click PASTE. All the photos should now appear in your folder.
- Now the photos are in your computer.
- The camera names each photo with a number. You need to name each photo with the plant name. Put the mouse pointer on the photo and press the right mouse button. Click on RENAME in the small menu that appears. Type the name of the plant. If you have several photos of the same plant, put a number after the name. For example, if you have taken several photos of a red gum, name the first photo 'red gum1.jpg', the next photo 'red gum2.jpg' and so on. Also, if the photo is of a flower, then name the photo 'red gum flower.jpg'. Similarly, if there are several photos of the red gum flowers, name them 'red gum flower1.jpg' and then 'red gum flower2.jpg'.

Important: Turn the camera off before you unplug it from the computer.

Step 6: Compare your information and photos to the *Bushfires & Bushtucker* book

- It is important to make sure you have the correct information before you enter it on the website. You can do this by comparing your information to the information in the book. Write all the correct information on the collection form, and then you can put it on the website.
- Check the Aboriginal spelling. It is sometimes hard to get the correct Aboriginal spelling, so your spelling may be different to the book. It is best to use the spelling in the book, unless the person giving you the information spells the word for you. There is a section in the book of botanical names that go with Aboriginal plant names in different languages (pages 353–380). When you find a similar Aboriginal plant name, find the botanical name listed next to it. Then, go to the index at the back of the book, find the botanical name and turn to that page.
- Once you have found the page, compare your photos and information to the plant in the book. Check carefully that the plant photos in the book are of the same plant that you are identifying. Some plants look very similar and may have the same uses, but have different botanical names.
- If your plant looks different to the one in the book, then the plant is not the same. You will need to try a different spelling of the Aboriginal plant name and start again.
- Check all the information in the book and compare it to your information.

Check the size of the plant.

Check where it is found. Sometimes plants in the book are not found around your area, but may look the same as the one you have collected. If the plant in the book is not found around your area, it probably isn't the same as the one you have collected.

- If you are putting the plant photos on the website, you must have the correct botanical name.
- If you are unsure about any information, do not put it on the website. We will be in trouble if we put the wrong information on the website. Ask for help.
- Once you have all the correct information, you need to get the photos looking good so they can be put on the website.

Exercises: Compare your information and photos to the book

Exercise 1: Initial reference familiarisation

- Objective: Familiarise students with the verification process and the reference book, *Bushfires & Bushtucker* by Peter Latz.
- Equipment: Exercise sheet, *Bushfires & Bushtucker* by Peter Latz.
- Activity: Break down the process and give the students a scenario in which they have to find specific information from the book. For example, give the students some language names and ask them to find the botanical name.

Exercise 2: Bulk reference familiarisation

- Objective: Familiarise students with the process of comparing collected information to the information in the book.
- Equipment: Completed collection forms minus the botanical name, plant photographs, *Bushfires & Bushtucker* by Peter Latz.
- Activity: Using past collection forms with botanical names removed, instruct students to find the botanical name in *Bushfires & Bushtucker*. Use past collection forms so you have the correct answers.

Step 7: Change the photos so they can go on the website

Now that you are sure your information is correct, your photos need to be changed so they can go on the website.

The photos take up too much room to be put on the Internet. This means it will take a long time to see the pictures on the website, so we need to make them take up less room.

Changing photos using Photoshop 5.5

- Click on START at the bottom left of the computer screen. Then click on ALL PROGRAMS, then ADOBE, then PHOTOSHOP 5.5, then ADOBE PHOTOSHOP 5.5. This will start Photoshop 5.5.
- Once Photoshop has started, click on FILE near the top left of the screen, then click on OPEN. A small window should appear. To find the folder with your photos, click on the ▼ button. Once you have found the folder with your photos (note, only the file names will appear, not the actual photos), click on the photo you want to open and then click OPEN.
- The first step is to choose the area of the photograph to remove – this is called cropping. This means you can cut out some of the stuff you don't want on the photo. On the left side toolbar there is an icon (small picture) of a square, but made from a dotted line. Press this icon (small picture). The icon should turn white. Put the mouse pointer over the photo and it will turn into a cross. Hold the mouse button down and drag the cross over the photo. A flashing box will appear. Make sure all the parts of the photo that you want are inside the box.
- Crop the picture: Hold the mouse on the crop button to extend the crop menu. Choose the icon that looks like an infinity symbol. Double click inside the cropped area.
- Change the levels: CTRL + L. You can click on AUTO. You can manipulate the length of the X-axis (to control the amount of light colour) and the middle of the X axis, by dragging the small triangles at the base of the graph. (Note: don't move the middle triangle more than 0.25 either side of 1.00). If AUTO looks poor, don't use it.
- Change the curves: CTRL + M. You only need to make a very small adjustment.
- Click on FILTER → SHARPEN → UNSHARPEN MASK. Amount = 90% and Radius = 0.8.
- Click on SAVE AS... save as a size 12 on the QUALITY bar. This produces the highest quality image and can be used in publications. If, for example, you called a plant photo 'Hakea3.jpg' originally, call the web version 'Hakea3 a.jpg'.
- Click on IMAGE → IMAGE SIZE. Width = 25 cm & DPI = 72. This will greatly decrease the memory used by the photograph. Aim for around 1.5 Megabytes (trust me). To view the actual screen size, hold CTRL, ALT and 0 together.
- FILTER → SHARPEN → SHARPEN
- SAVE AS... save as a jpg image. This will give you the jpeg image option. Take the quality down to 6. For example, if you called a plant 'Hakea3 a.jpg' originally, call the web version 'Hakea3 a i.jpg'. The resultant image should be manageable for a website.

Step 8: Update the website

This is the last thing to do and it's where you see all of your work come together. The website is where we enter all of our information and photos.

The website address is <http://web2.entity1.com/tappy_plants/>.

This will bring you to the USER LOGIN page. Click USER LOGIN on the left side of the screen. Type in your user name and then your login password, and then click LOGIN. This should bring you to the Administration page.

On the left side you will see a menu. The following list briefly describes the functions on the menu:

- **MANAGE USERS:** Used to put more people on the system. You probably will not be able to access MANAGE USERS.
- **MANAGE PLANTS:** Used to enter plant information.
- **MANAGE RESOURCES:** Used to save resources such as text, photos, videos and audio materials onto the website.
- **BROWSE PLANT:** Used by the general public to view plant information.
- **LOGOUT:** Used to log out of the website and let somebody else login.

Entering new plant information

- Click on **MANAGE PLANTS**.
- Click on **ADD PLANT**. A new page appears. Above the information you need to fill in, there are some page titles (**PLANT**, **USES**, **NOTES** and **RESOURCES**). The first page title, which should be in green, is **PLANT**.
- The following list suggests ways to fill in the **PLANT** page:
 - The top part is where you can enter the different names for the plant. The next part is a bit different.
 - **Plant habitat:** Information from the book. Describes the type of land where the plant is found. For example, salt lakes, mulga communities or spinifex.
 - **Place:** Name the place you found the plant or distance and direction from Titjikala and how to get there. If you have a GPS, put in the coordinates.
 - **Foliage:** Information from the book. Describe the type of leaves the plant has, including their colour and shape.
 - **Harvest time:** Time of the year this plant is used.
 - **Form:** Information from the book. Is the plant a tree, shrub, grass or herb?
 - **Plant size:** Information from the book.
 - **Management:** Is this plant changed or helped in any way to enable traditional usage? For example, does this plant need fire to grow bigger or are small branches cut off to produce a bigger fruit crop?
 - **Soil type:** Information from the book.
- Next, click on **USES**.
 - Click on ▼ next to **PLANT PART** and choose the part of the plant used in the bush tucker or medicine.
 - Click on ▼ next to **PLANT USE** and choose **FOOD**, **MEDICINAL**, **HUNTING**, **CEREMONY**, **TOOL**, **DRUGS**, and **RECREATION**.
 - **DESCRIPTION OF USE:** Write how the plant is used. Give as much information as possible, so that anybody reading this can use the plant in the same way.
 - **INFORMATION SOURCE:** Write the name of the person giving you the information.

- Next, click on NOTES.
 - For the notes, type in any extra information you have. For example, anything we have to be careful of when using this plant or describe how common or rare the plant is.
- Next, click on RESOURCES.
 - This shows you any extra material you can connect with the plant.
 - You can put in text, images (photos), video, audio or a link to another website.
 - But, you can only attach a resource to a plant if the resource is in the resource list.
 - If your photo isn't in the resource list, you have to put it there.

Adding a resource to the website

- Click MANAGE RESOURCES on the left side of the screen.
- Click ADD RESOURCE.
 - Type in the resource name. For example, 'Hakea subera (flower and seeds1)'.
 - Type in the description of the resource. For example, 'Photo of Hakea subera (flower and seeds)' or 'Flower and seeds of Hakea subera'
 - Click on the ▼ button next to RESOURCE TYPE and choose text, images (photos), video, audio or link.
 - RESOURCE FILE: You have to find the file on your computer so it can be copied onto the website. Click the BROWSE button and a small window will appear. When you have found your file, click on it and click OK.
 - Check to see that everything is correct. If it is, click OK.
 - The resource should now be on the website.
 - Now you can go to MANAGE PLANT and search for the plant you entered and click on RESOURCES. Follow the instructions above to add the resource.

Checking everything looks good

- Click on BROWSE PLANTS on the left side of the screen and a new window will appear.
- Clicking on SEARCH with nothing in the search row will give you the first 20 plants.
- You can search for a particular name of a plant.
 - If you click on the ▼ button next to COMMON NAME, a list will appear of COMMON NAME, ARRERENTE NAME, PITJANTJATJARA NAME and SCIENTIFIC NAME. If you click on the ARRERENTE NAME, you will search for the similar words in the Arrernte that are in the database.

References

- Barber D. 2002. *How to Make a Scientific Plant Collection*. Viewed 15 July 2004, <<http://biology.arizona.edu/sciconn/lessons2/barber/activity3.htm>>.
- Bowles JM. 2001. *Guide to Plant Collection & Identification*. Viewed 15 July 2004, <<http://biology.queensu.ca/~fowler/Bowles.htm>>.
- Cherikoff V and Isaacs J. 1989. *The bush food handbook : how to gather, grow, process & cook Australian wild foods*. Ti Tree Press, South Yarra, Vic 1989. (1993 edition).
- Crouse K. 2004. *Plant Analysis Sampling Instructions*. Viewed 15 July 2004, <<http://msucares.com/pubs/publications/p1224.htm>>.
- Goddard C, Everard P and Tjampu T. 1996. *Aboriginal Bird Names of the Yankunytjatjara People of Central Australia*. IAD Press, Alice Springs.
- Latz P. 1995. *Bushfires & Bushtucker: Aboriginal plant use in Central Australia*. IAD Press, Alice Springs.
- Liesner R. 1997. *Field Techniques Used by Missouri Botanical Garden*. Viewed 15 July 2004, <<http://www.mobot.org/MOBOT/research/books/liesner/collect.html>>.
- Liskey E. 1997. *How To: Collect plant samples*. Viewed 15 July 2004, <http://grounds-mag.com/mag/grounds_maintenance_collect_plant_samples_2/>.
- Making Plant Collections*. 2003. Viewed 15 July 2004, <http://eqb-dqe.cciw.ca/eman/ecotools/protocols/terrestrial/plantcoll/plant_collections.html>.
- Pell S. 2000. *Plant Collecting Guide*. Viewed 15 July 2004, <<http://www.biology.lsu.edu/webfac/lurbatsch/PlantCollectingGuide.html>>.
- Reveal JL. 1997. *Requirements of a Plant Collection and its Equipment*. Viewed 15 July 2004, <<http://www.inform.umd.edu/PBIO/pb250/coll.html>>.
- Wiersma J and Allrich T. 2004. *Collecting and Pressing Plants*. Viewed 15 July 2004, <<http://www.smallgrains.org/techfile/collect.htm>>.

More information – collecting and sampling

<http://www.crees.org/adap/adaplinks/adapindex/PLANTSAM.htm>

http://members.tripod.com/~litchlab/Plant_Tissue.htm

<http://www.clemson.edu/agsrvlb/Plant%20Tissue%20Sampling%20Guidelines.htm>

<http://herbarium.usu.edu/K-12/Collecting/default.htm>

<http://herbarium.usu.edu/collect.htm>

More information – making a plant press

<http://www.smallgrains.org/Techfile/collect.htm>

<http://biology.queensu.ca/~fowler/Bowles.htm>

<http://www.inform.umd.edu/PBIO/pb250/coll.html>

<http://biology.arizona.edu/sciconn/lessons2/Barber/Activity3.htm>

Attachment 1 – Appendix 1: Collection Form 1

Titjikala Knowledge Base – Collection Form 1				
Aboriginal plant name				
Botanical name				
Database number				
Language	Luritja	Pitjantjatjara	Arrernte	

Meaning	
---------	--

GPS	Latitude		Longitude	
Location where?				

No. of samples	1	2	3	
Date collected				

Photographs	Whole	Flower	Root	Leaves
	Bark	Wood	Other	

Collector's name	
People to listen to	
Comment	

Attachment 1 – Appendix 2: Collection Form 2

Aboriginal plant name		Database No.	
Botanical name			

Photograph	
Part of Plant Leaves Root Branch Bark Fruit Flower Seed Stem Wood Cone	Use Food Medicinal Ceremony Drugs Hunting Recreation Tools (Restricted – see text for explanation of restriction)

Aboriginal plant name	Part of plant		Use	
Description of use				
(Who/What/Where/ When/Why)				

Main community group	
(Women, men, everyone)	

Person giving info			
Language group			
Restriction (Y/N)		Restrict From	

Other links	Story Tape Video Picture Dreaming Other
Who?	

Attachment 2:
Plant Collection Protocol – Leonora training manual
produced by Leonora study team



Plants for People

Contents

Introduction.....	79
How to take flora samples.....	79
Taking the sample	79
Taking a photograph	80
Flora sampling sheet	81

Figures

Figure 1: Here we have found a particular tree resin we would like to sample.....	79
Figure 2: Tree that is the source of the resin.....	80
Figure 3: Two Plants for People team members fill out the Flora Sampling Sheet	81

Introduction

This guide is designed to help all Plants for People team members understand how to sample bush tucker plants for inclusion in the relevant Plants for People database. Please read through at your own leisure and don't be afraid to contact Guy if you have any queries.

How to take flora samples

Get a group of enthusiastic people together who share your passion for bush foods. Try to include senior elders or custodians of the land.

If you go out bush, never travel alone and make sure your vehicle is in perfect running order, with enough fuel for the return journey. Please don't forget to pack plenty of water, especially in summer!

Head out to a spot that has the particular plants growing, remembering unusual seasonal changes such as a lack of rain may influence what plants are around.

Taking the sample

When you have found a plant you want to sample, start by cutting or gently breaking off a small section of the plant. If the plant is small, you may be unable to sample a section and you may have to remove the entire plant. This is the case with small yams and grasses. With a larger plant, such as the mulga, you only need a few small twigs or branches.



Figure 1: Here we have found a particular tree resin we would like to sample

Try to include some of the plant's flowers or fruit (berries) if they are around; they can be quite useful in telling some plants from others – while the leaves might look the same, the flowers or fruit will be quite different.

Attach a small paper tag to the sample and label it with a name or number you will remember, usually referring to the sample site. For example, if you were at a windmill and it was the first plant you sampled, 'W1' would be a good label to use.

Store the sample in a small brown paper bag or between a few sheets of newspaper. Lay the samples down flat and place something heavy on top to press the samples.



This photo clearly shows the tree from which the resin came from and how big it is. We can also see what type of other plants grow around it and the soil type.

Figure 2: Tree that is the source of the resin

Taking a photograph

Take a photo of the whole plant using a digital camera. Try also to take a few photos of the plant to show what it looks like in the bush. If you can include a person in the photo, this helps to show what size the plant is when you look at the photo later. You can also see what other plants grow around it. Take your time with the photo because it might be the one used to show the plant in the database.

Flora sampling sheet

Fill out the Flora Sampling Sheet (Appendix 1). Don't let this sheet frighten you; it's not as complex as it looks. The main information required is as follows:

- name of the plant (traditional and Western)
- height of the plant (estimate in centimetres, metres or feet)
- type of soil (rocky, sandy, clay)
- uses of the plant (how is it traditionally used?)
- name of the location from where you took the sample
- GPS numbers if you have a GPS. Don't worry if you haven't got one or don't know how to use it; just write down where the location of the plant is and some rough details on how to get there. Then, if you ever need to send someone else out to look at the plant, they will know where go.



One person writes while the other describes the plant, in this instance a small *Pululu*.

Figure 3: Two Plants for People team members fill out the Flora Sampling Sheet

Finally, it's most important to match the label on the plant sample to that of the Flora Sampling Sheet so you know which sample belongs to which set of information.

When you get back to town, give Guy a call on 0400 024 417 or email him at <g.singleton@exchange.curtin.edu.au> and we will arrange to have the samples posted over to the team at Curtin. If you would prefer to pass the information on to Shyama at the LLCCA, drop them off at the centre on your return to town. Shyama can be contacted on 90311 395 or by email at <llcca@westnet.com.au>.

HAPPY SAMPLING!

Attachment 2 – Appendix 1: Flora sampling sheet

PLANT COLLECTION INFORMATION

Database Number _____

PLANT INFORMATION

COLLECTION INFORMATION

Scientific Name _____

Date Collected _____

Collector's Name _____

Common Name(s) _____

Collector's Headquarters _____

Name of Person Giving Aboriginal Use Info. _____

Aboriginal Name(s)
(indicate language in brackets) _____

Photo Taken of _____

☐ Whole plant ☐ Flower ☐ Root

Type: ☐ Tree ☐ Shrub ☐ Herb ☐ Other

☐ Leaves ☐ Bark ☐ Wood ☐ Stem ☐ Fruit ☐ Other

Plant Height (m) Flower/Fruit Colour

Voucher Specimens Taken: ☐ Yes ☐ No

Number of plants from which collected:

Date Sent to Lab _____

☐ Whole ☐ Flower ☐ Root ☐ Leaves ☐ Bark

Material Sent: ☐ Fresh ☐ Dry ☐ Treated

☐ Wood ☐ Stem ☐ Fruit ☐ Other

☐ Traditional Preparation

Abundance _____

Fresh Plant Material Weight (g) _____

COLLECTION SITE INFORMATION

State/Territory	GPS Latitude	Soil Type
Town	GPS Longitude	Soil Moisture
Township	Elevation (m)	Land Use
Site Location (landmarks, roads, etc.)	Slope (°)	Associated Vegetation
	Exposure (N, S, E, W)	
	Sun/Shade	

ABORIGINAL USE INFORMATION

Use As/In ☐ Food ☐ Medicine ☐ Drug ☐ Ceremony ☐ Hunting ☐ Recreation ☐ Tool ☐ Other

Description of Use (Who/What/How/Where/When)

Use the back of this sheet to sketch the collection area or record additional information

DKCRC Partners

