THE KUK EARLY AGRICULTURAL SITE
A CULTURAL LANDSCAPE

A Nomination for Consideration as
WORLD HERITAGE SITE

GOVERNMENT OF PAPUA NEW GUINEA
Ministry of Environment and Conservation

January 2007
THE KUK EARLY AGRICULTURAL SITE
A CULTURAL LANDSCAPE

MOUNT HAGEN - WESTERN HIGHLANDS PROVINCE
PAPUA NEW GUINEA

A Nomination By The
GOVERNMENT OF PAPUA NEW GUINEA

For Consideration as
WORLD HERITAGE SITE

January 2007
A Document Prepared by
The Department of Environment and Conservation

For the

Ministry of Environment and Conservation
P.O. Box 6601, Boroko, NCD, Papua New Guinea

With support from the

United Nations Educational, Scientific & Cultural Organization
Department of Environment and Conservation
Western Highlands Provincial Government
PNG National Museum & Art Gallery
PNG National Cultural Commission
University of Papua New Guinea
PNG National Commission for UNESCO
Department of Environment and Heritage, Government of Australia
Monash University, Australia
LIST OF CONTRIBUTORS

Main contributors
John Muke, Ph.D. – Social Research Institute, Port Moresby, Papua New Guinea
Tim Denham, Ph.D. – Monash University, Melbourne, Australia
Joseph Ketan, Ph.D. – University of South Pacific, Suva, Fiji
Leonardo A. Salas, Ph.D. – The Wildlife Conservation Society

Additional contributors (alphabetical order)
Vagi Genorupa – Department of Environment and Conservation, PNG
Jack Golson, Ph.D. – ANH-RSPAS, Australian National University
Lawrence Kalinoe – University of Papua New Guinea, Port Moresby
Regina Kati – PNG National Commission for UNESCO
Gaikovina R Kula – Affiliation, Executive Director, Conservation International, PNG
Navu Kwapena, Ph.D. – Department of Environment and Conservation, PNG
Herman Mandui – Archaeology Section, PNG National Museum and Art Gallery
Jo Mangi – Social Research Institute, Port Moresby
Simon Poraituk – Acting Director, PNG National Museum and Art Gallery
James Ruru – PNG National Commission for UNESCO
Jacob Simet, Ph.D. – Papua New Guinea National Cultural Commission
ACKNOWLEDGEMENTS

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General reference information was obtained from the Australian Heritage Commission, the Northern Territory of Australia, and the UNESCO.

Several committees are worth mentioning here for facilitating the nomination of the Kuk site for World Heritage listing. They are: the Kuk Heritage Management Committee, the Kuk Local Heritage Management Committee, the Cultural Sector Committee (PNG National Commission for UNESCO), and the Research and Publications Committee (School of Humanities and Social Sciences, University of Papua New Guinea).

This nomination represents the combined efforts of many dedicated individuals, far too numerous to mention here, but the following deserve a special mention: Nick Araho, Peter Baki, Mark Busse, Tim Denham, Linus Digim’Rina, Soroi Eoe, Vagi Genorupa, Steven Pekaree Goi, Yap Goimba, Jack Golson, Lawrence Kalinoe, Regina Kati, Timothy Ken, Alois Kingsley, Nicholas Namba Komorui, Nick Kuman, Ru Kundil, Robert Kombukun, Walter Komek, Robert Lak, David Tekwie Maip, Philip Maipson, Pim Mamandi, Herman Mandui, Josephine Mel, Augustine Minimbi, Vincent Pora Minimbi, Yu Minimbi, John Muke, Palim Paini Peter, Simon Poraituk, Mex Pupdi, Mick Raga, Raymond Ray, James Ruru, Leo Salas, Jacob Simet, Andrew Strathern, Marilyn Strathern, Pamela Stewart, Glenn Summerhayes, Pam Swadling, Ali Salamat Tabbasum, Edna Tait, Mathew Tepu, Sarah Titchen, Mali Voi, John Waiko, Michael Wandil, Ralph Wari, Thomas Webster, and Elspeth Wingham.
## EXECUTIVE SUMMARY

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<thead>
<tr>
<th><strong>State Party</strong></th>
<th>The Department of Environment and Conservation</th>
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</thead>
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<tr>
<td><strong>State, Province or Region</strong></td>
<td>Papua New Guinea</td>
</tr>
<tr>
<td><strong>Name of Property</strong></td>
<td>The Kuk Early Agricultural Site</td>
</tr>
</tbody>
</table>
| **Geographical coordinates** | Center point at:  
204500 E  
9360000 N  
**Projection:** UTM zone 55 M  
**Datum:** Australian Geodetic Datum of 1966 |
| **Boundaries**        | The boundaries of the proposed Kuk site, comprising the core area and buffer zone, follow natural features and human-made structures of the former Kuk Agricultural (originally Tea) Research Station that permit clear and easily recognizable limits. These features are: the northern boundary of the Research Station along the base of Ep Ridge, Tibi Creek to the east, the southern boundary of the Research Station to the south, and the Kenta-Guga Creek to the west.  
Starting where Ep Ridge meets Kenta-Guga Creek, the northern boundary of the Research Station is followed along the base of Ep ridge to the eastern boundary of the Research Station. From that point the boundary extends south until it reaches Tibi Creek and follows the diverted creek to the southeast corner of the Research Station. From here the site boundary is aligned west along the southern boundary of the Research Station to Kenta-Guga Creek. At that point, the site boundary follows the creek northwards along the western edge of the Research Station to the base of Ep Ridge. |
EXECUTIVE SUMMARY

Map of the Kuk Early Agricultural Site, showing boundaries and buffer zone
Base map: Hagen (Sheet 7786), 1:100,000 topographic map series (Royal Australian Survey Corps, 1978), grid zone 55M, Transverse Mercator Projection, area of map depicted covers Eastings 190000 to 210000 and Northings 934000 to 9370000)
**EXECUTIVE SUMMARY**

| Justification | The early agricultural site at Kuk is of outstanding universal value because it evidences a significant stage of technological development of humanity worldwide, namely the early and independent development of agriculture, specifically Pacific agriculture (Criterion iv). Indeed, Papua New Guineans were among the world’s earliest agriculturists. The antiquity and independent genesis of agriculture in New Guinea are generally accepted by international archaeological and scientific communities (Bellwood 1990: 16; Diamond 1997: 148; Kirch 2000: 79; Neumann 2003; Renfrew and Bahn 2004: 268-9). This technological leap shaped the numbers of humans, their food supply, and their cultures throughout Oceania (Criterion iii). Kuk contains the oldest evidence in Oceania, as well as successive phases, of manipulation of the environment for plant exploitation and agriculture (Criterion v). Relic time-slices of these interactions are preserved underground at Kuk and they continue to evolve through contemporary practices at the site. |
| Statement of Outstanding Universal Value | In addition to providing evidence of a major technological leap, namely the transformation of plant exploitation (visible in 10,000 year-old remains) to agriculture (visible from 7000-6400 years BP), Kuk is of outstanding universal value because the agricultural chronology comprises intermittent and successive developments in the nature of agricultural practices and technology from at least 7000 years BP to the present. These developments witness: |
| | • Transformations in the nature of agricultural practices through time: from the construction of mounds on the wetland margin for cultivation at 7000-6400 years BP to the episodic and successive drainage of the wetland using wooden tools to dig ditches from c.4000 years BP to the present. |
| | • Evidence for the use of tubers, including taro (*Colocasia esculenta*) and a yam (*Dioscorea* sp.), from 10,000 years BP and the cultivation of *Musa* bananas from 7000-6400 years BP; these finds are central to understanding the domestication of these important economic species and for understanding the development of Pacific agriculture to which they are central. |
| | • The evolution of an agricultural landscape from 10,000 years ago to the present day, represented in well-preserved archaeological remains (features, artefacts), stratigraphy, and archaeobotanical assemblages (microfossil and macrofossil). The agricultural chronology at Kuk evidences developments, in terms of plants and technologies, that were essential for the formation of Pacific agriculture. Pacific agriculture is based on the vegetative propagation of plants (asexual reproduction), ie, the planting of a cutting, root-part, tuber, sucker, or other plant part, and is distinctive from agricultural developments in Africa, the Americas and Eurasia that were based on planting seed (sexual reproduction). |
## EXECUTIVE SUMMARY

The human-environment interactions at Kuk demonstrate a traditional land-use that has evolved from at least 10,000 years ago to the present-day. People began to disturb the rain forests in the Kuk catchment using fire during the Pleistocene, with increased levels of disturbance from c. 10,000 years ago. By 7000 years ago, the Kuk catchment was largely deforested; the landscape comprised grasslands maintained by periodic burning. An anthropic, grassland landscape persisted in the area until 1933 when the first European explorers entered the Upper Wahgi valley.

As well as its significance as an agricultural site, Kuk Swamp is of immense global significance for understanding the evolution of human societies. Even though cultures in the New Guinea region had developed agriculture at an early time in global terms, they followed a different societal trajectory to those in other regions. In Africa, the Americas and Eurasia, interpretations of early agriculture are often associated with the development of hierarchical social formations and, ultimately, ‘civilizations’. In New Guinea people developed relatively egalitarian and local-scale societies based around the ‘big man’ political institution. Big men are community leaders whose influence is persuasive and built around consensus, rather than through coercion, command and control. Consequently, the evidence at Kuk Swamp signifies the diversity of historical trajectories after the inception of agriculture and challenges unilinear, often evolutionary, teleological and Eurocentric interpretations of human history (Denham 2004a; 2005b; Diamond 1997; Golson 1977a).

In summary, the Kuk area has immense educational, historical, scientific and social values for past, present, and future generations of Papua New Guineans and Pacific islanders. The agricultural developments at Kuk contributed to the spread, settlement and growth of present-day cultures and societies across Oceania. Papua New Guineans are proud of this significant contribution to the world’s heritage and are committed to protect it for future generations.

The core area nominated for World Heritage listing at Kuk includes the most significant and well-preserved agricultural remains dating from 7000-6400 years ago to the present, as well as evidence of plant exploitation dating to 10,000 years ago. The buffer zone includes more extensive areas of later agricultural systems and settlements dating from approximately 2000 years ago. The community-based management plan will ensure the continuing preservation of the unique character and global significance of the agricultural remains at Kuk. The enshrining of ongoing, traditional land use practices in the management plan guarantees that the agricultural landscape at Kuk continues to evolve, as it has been for millennia.
### EXECUTIVE SUMMARY

<table>
<thead>
<tr>
<th>Criteria for Nomination</th>
<th>(iii) bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared.</th>
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<tr>
<td></td>
<td>The archaeological remains at the Kuk site bear an exceptional testimony to the origins and development of New Guinean and Pacific agriculture. Kuk Swamp preserves archaeological remains – and associated archaeobotanical and palaeoecological remains – that reflect a long history of agricultural development extending to at least 7000-6400 years ago, and potentially to 10,000 years ago. In contrast to early and independent agriculture in several other parts of the world that was based on the sexual reproduction of cereals and other seed-bearing crops, e.g., Southeast Asia and Southeast China, agriculture in New Guinea was (and still is) based on the asexual reproduction of plants and was reliant on the vegetative propagation of plant parts (see Diamond 1997). These characteristics of New Guinean agricultural practice became incorporated into agriculture across the Pacific.</td>
</tr>
<tr>
<td></td>
<td>Today, most of the traditional staples of New Guinean (and Pacific) agriculture are vegetatively propagated, including bananas (<em>Musa</em> spp.), taro (<em>Colocasia esculenta</em>), yam (<em>Dioscorea</em> spp.), and sugarcane (<em>Saccharum officinarum</em>). As well as the archaeological evidence from Highland New Guinea, recent genetic and phytogeographic evidence suggests that many of these plants originated in the New Guinea region and were domesticated there first (Matthews 1995; De Langhe and de Maret 1999; Lebot 1999). Furthermore, most other types of plants were also vegetatively propagated including herbaceous vegetables and some trees, such as <em>Pandanus</em> in the highlands and sago (<em>Metroxylon sagu</em>) in the lowlands.</td>
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<td></td>
<td>(iv) be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.</td>
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<td></td>
<td>Kuk is one of the earliest and most intensively studied agricultural sites in the world. Multi-disciplinary lines of evidence from Kuk have grounded interpretations that New Guinea is one of the few places in the world where agriculture developed independently (Denham <em>et al.</em> 2003; Neumann 2003). Specifically, Kuk contains archaeological evidence representing successive technological innovations including:</td>
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EXECUTIVE SUMMARY

- the early and independent development of agriculture by at least 7000-6400 years ago and potentially by 10,000 years ago;
- the use of mounds to cultivate plants with different edaphic requirements by 7000-6400 years ago; and,
- the use of wooden spade-like tools to dig ditches to drain wetland margins by 4000 years ago.

However, and in contrast to many other parts of the world where agriculture similarly emerged, societies in New Guinea did not subsequently develop marked socio-political hierarchies or ‘civilisations’. Instead, traditional societies in New Guinea were relatively egalitarian and characterised by the unique ‘big man’ institution, where influence is largely consensual and persuasive.

The evidence from Kuk Swamp signifies the potential diversity of societal development following the inception of agriculture and challenges unilinear interpretations of human history.

(v) be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change.

The archaeological evidence at Kuk represents an outstanding example of traditional New Guinean land-use, namely various types of plant exploitation and different types of cultivation, that represent changing human-environment relations over ten millennia. The finds at Kuk are outstanding because:

- they represent successive periods of plant exploitation and cultivation from 10,000 years ago to the present,
- they include the oldest evidence of plant food production and agriculture in New Guinea, and
- they comprise the ‘type site’ against which similar evidence from other sites in the highlands and lowlands of New Guinea is compared.

The Kuk site represents an organically evolved landscape which has relic (i.e., archaeological remains of past cultivation and plant exploitation activities) and continuing (i.e., ongoing cultivation, often referred to as ‘gardening’ in the contemporary New Guinean context) components.
<table>
<thead>
<tr>
<th>Name and contact information</th>
<th>Department of Environment and Conservation, Office of the Secretary</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>4&lt;sup&gt;th&lt;/sup&gt; Floor, Somare Foundation Bldg</td>
</tr>
<tr>
<td></td>
<td>Sir John Guise &amp; Independence Drive</td>
</tr>
<tr>
<td></td>
<td>Waigani, NCD</td>
</tr>
<tr>
<td></td>
<td>P.O. Box 6601, Boroko, NCD</td>
</tr>
<tr>
<td></td>
<td>Papua New Guinea</td>
</tr>
<tr>
<td></td>
<td>Tel: (+675) 325-0195</td>
</tr>
<tr>
<td></td>
<td>Fax: (+675) 325-0182</td>
</tr>
<tr>
<td></td>
<td>E-mail: <a href="mailto:odir@daltron.com.pg">odir@daltron.com.pg</a></td>
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# 0. Introduction

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<th>Papua New Guinea’s history as signatory of the World Heritage Convention</th>
<th>Recent history</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Papua New Guinea (PNG) became a State Party to the World Heritage Convention by ratifying its signature in 1997. Ever since, PNG has worked toward establishing the first World Heritage Site in the country, while at the same time pursuing the goals of the Convention in the South Pacific. PNG has been actively involved in the following:</td>
</tr>
<tr>
<td></td>
<td>• participated in drafting the Action Plan for the Pacific 2009 Program (17-22 October 2004 at Tongariro National Park, New Zealand) intended to increase the tentative listing of sites in this region of the world.</td>
</tr>
<tr>
<td></td>
<td>• participated in drafting the Thematic Framework for World Cultural Heritage in the Pacific (5-8 September 2005 in Port Vila, Vanuatu) intended to assist Pacific nations with identifying and nominating cultural sites for World Heritage nomination.</td>
</tr>
<tr>
<td></td>
<td>• conducted a successful National World Heritage Action Planning Workshop (20-23 March 2006 in Port Moresby, Papua New Guinea), developed a Tentative List of intended World Heritage sites for Papua New Guinea, and established an institutional framework and strategy within Papua New Guinea for the nomination and management of World Heritage sites.</td>
</tr>
</tbody>
</table>

**Institutional arrangements**

Following the March 2006 Planning Workshop, Papua New Guinea (under the auspices of the Department of Environment and Conservation) has clarified the institutional arrangements for the management of World Heritage issues and sites within the country (Figure 0.1). A National World Heritage Secretariat has been established within the Protected Areas Branch of the Department of Environment and Conservation. Following budgetary approval for 2007, the World Heritage Secretariat within DEC will have a dedicated World Heritage Officer.

The National World Heritage Secretariat will co-ordinate the nomination and management of World Heritage sites in Papua New Guinea. Furthermore, the Secretariat and DEC will devise and promote a more defined legislative framework for the promotion, management and protection of World Heritage in the country. The Secretary of the
0. Introduction

Department of Environment and Conservation will chair the National World Heritage Committee, an advisory body comprising various government agencies, non-governmental organizations, representatives from provinces and communities with nominated sites, and other interested parties.

![Institutional organization of World Heritage management in Papua New Guinea (DEC 2006)](image)

**Figure 0.1** Institutional organization of World Heritage management in Papua New Guinea (DEC 2006)

Tentative List

In June 2006, Papua New Guinea formally submitted and UNESCO accepted a Tentative List comprising eight cultural, natural or combined sites, including the Kuk Early Agricultural Site (Table 0.1). A strategy has been devised for the nomination of additional sites for World Heritage Listing following completion of the Kuk nomination (DEC 2006).

The Kuk nomination

This document represents the formal nomination of the first site in PNG to the World Heritage List. Before the nomination process is completed other tasks must be undertaken, primarily the implementation of a traditional and community-based management plan; an institutional
0. Introduction

and operational framework for this management plan is included in this document (Section 5e). This nomination document will help identify the steps and challenges for the nomination of other cultural and natural sites in PNG.

Table 0.1. Tentative List of intended World Heritage sites for Papua New Guinea (received 6 June 2006)

<table>
<thead>
<tr>
<th>Site name</th>
<th>Criteria for nomination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huon Terraces: stairway to the past</td>
<td>vii, ix, x</td>
</tr>
<tr>
<td>Kikori River Basin/Great Papuan Plateau</td>
<td>vii, ix, x</td>
</tr>
<tr>
<td>Kokoda Track/Owen Stanley Ranges</td>
<td>vii, x</td>
</tr>
<tr>
<td>Milne Bay Seascape (Pacific jewels of marine biodiversity)</td>
<td>vii, ix, x</td>
</tr>
<tr>
<td>The Kuk Early Agricultural Site</td>
<td>iii, iv, v</td>
</tr>
<tr>
<td>The Sublime Karsts of Papua New Guinea</td>
<td>vii, ix, x</td>
</tr>
<tr>
<td>Trans-Fly Complex</td>
<td>x</td>
</tr>
<tr>
<td>Upper Sepik River Basin</td>
<td>vii, ix, x</td>
</tr>
</tbody>
</table>

The proposed property - the Kuk Early Agricultural Site, hereafter referred to simply as the ‘Kuk site’ or ‘Kuk’, is an archaeological site evidencing early agricultural practices in New Guinea dating to at least 7000-6400 years ago, and potentially to 10,000 years before present. Kuk is located in the Upper Wahgi Valley swamps, near the town of Mount Hagen, in Western Highlands Province. The archaeological evidence at Kuk indicates that Papua New Guineans were among the world’s earliest farmers.

In the twentieth century, PNG and Australian scientists worked at the site to develop economically profitable agricultural practices under the auspices of a now defunct state-funded agricultural Research Station (1969-1991). While the site was being developed as a Research Station, archaeological work revealed evidence of agricultural practices of great antiquity preserved underground. The development of early and independent agriculture is the thematic basis for this nomination to list Kuk as a cultural site on the World Heritage List.
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The nomination of Kuk for World Heritage Listing is an initiative of the Papua New Guinea National Government. Under existing legislation - the *Conservation Areas Act (1978)* and by mandate of the National Executive Council (Decision NG 45/94) - the Department of Environment and Conservation (DEC) is the implementing state agency responsible for the management, protection and preservation of World Heritage Sites in PNG. Other institutions assisting DEC in the nomination, management and preservation of cultural and biological properties include the PNG National Museum and Art Gallery, the National Research Institute and the National Cultural Commission. In the particular case of the Kuk nomination, the Western Highlands Provincial Government, the Kawelka landowners, the University of Papua New Guinea and Monash University (Australia) have also participated in preparing this nomination proposal. Until recently, the PNG National Commission for UNESCO was the facilitating agency responsible for coordinating the Preparatory Assistance funding. Grants have been made available through the World Heritage Funds from Japanese Funds in Trust to the UNESCO National Commission to prepare this nomination document and to implement a public awareness and education program. Therefore, this paper documents a national project of importance to several institutions and is of great significance to the people of Papua New Guinea.

The protection of the property will involve both traditional and modern methods of conservation. It will also involve both statutory and customary management practices. Such a management proposition is in accordance with the World Heritage Convention. The proposed World Heritage area at Kuk is located on state land, although currently occupied by the traditional Kawelka landowners. The Western Highlands Provincial Government and the Kawelka landowners have agreed to work together to provide long-term protection for the area. The Kawelka and their proximate neighbors, the Jika-Kilampi, principally through the efforts of their respective local government councilors, are looking forward to participating in the project. They have agreed to traditionally cultivate, without deep-drainage and other potentially destructive practices, the culturally significant areas for the Kuk World Heritage Project. The Western Highlands Provincial Government is
### 0. Introduction

reciprocating this good gesture through the allocation of social services to the people of Kuk.

The Provincial Government is aware of the national and international significance of Kuk. The Provincial Government has allocated significant funds for the nomination process, appointed a Cultural Officer who oversees cultural heritage matters (including those of Kuk), and established a provincial Kuk Heritage Management Committee in 1999 (now inactive). Furthermore, it plans to upgrade the road to Kuk and provide piped water supply. The local landowners have reciprocated by forming the Kuk Local Heritage Committee to deal with heritage matters, including the long-term protection and management of the heritage area.

All stakeholders are committed to the Kuk World Heritage project because they understand that Kuk represents a significant development in the history of humanity and reflects the ingenuity and skills of their ancestors. They are determined to protect and preserve it. This nomination document is testimony to that conviction. It represents the combined efforts of many individuals and organizations, and carries with it the collective aspirations of the people of Papua New Guinea to have their contributions to human knowledge and history recognized internationally.
1. Identification of the Property

<table>
<thead>
<tr>
<th>1.a Country</th>
<th>Papua New Guinea</th>
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<tr>
<td>1.b State, Province or Region</td>
<td>Dei District, Western Highlands Province</td>
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<tr>
<td></td>
<td>Kuk is situated in the upper reaches of the Wahgi valley, one of the largest inter-montane valleys in the Highlands of Papua New Guinea. The Kuk site is located in Dei Council and Electoral District in Western Highlands Province. The core area and buffer zone are located on the grounds of the former Kuk Agricultural (originally Tea) Research Station. The area is located approximately 12.5 km northeast of Mount Hagen, the provincial capital of Western Highlands Province.</td>
</tr>
<tr>
<td>1.c Name of the property</td>
<td>The Kuk Early Agricultural Site</td>
</tr>
<tr>
<td></td>
<td>The name ‘Kuk’ is the traditional name given by the Kawelkas to the area where the Research Station was established. The area traditionally designated by this name extends well beyond the original boundaries of the Station. However, archaeological excavations and the evidence of early agricultural practices are currently limited to the Station.</td>
</tr>
<tr>
<td>1.d Geographical coordinates</td>
<td>Center point at: (704500 \text{ E}, 9360000 \text{ N})</td>
</tr>
<tr>
<td></td>
<td>Projection: UTM zone 55 M</td>
</tr>
<tr>
<td></td>
<td>Datum: Australian Geodetic Datum of 1966</td>
</tr>
<tr>
<td>1.e Maps and plans, with boundaries of the core area and buffer zone of the nominated property</td>
<td>The core and buffer regions of the cultural site are currently occupied and cultivated by Kawelka, a clan-cluster of Melpa-speakers, and other groups who have been offered usufruct rights. Throughout this document, ‘the Kuk site’ refers to the core and buffer areas together, unless otherwise indicated. The boundaries of the core and buffer zone proposed here are all readily identifiable from the road and drain network established during the operation of Kuk Agricultural Research Station. The plantation grid has been adopted by local landowners as a basis for allocating land units to clan-members. The location of Kuk and the exact boundaries of the core area and buffer zone are depicted in Figures 1.1-1.5. All maps are geo-referenced within a Geographical Information System (GIS) of the Kuk site that is currently under construction by the School of Geography and Environmental Science, Monash University, Australia in conjunction with the Department of Environments and Conservation (DEC), Port Moresby.</td>
</tr>
</tbody>
</table>
1. Identification of the Property

Taken together, the core area and buffer zone are defined by the boundaries of the Research Station, which also broadly correspond to topographical and hydrological features. The proposed area is bordered by Ep Ridge to the north and low hills to the south, and by Kenta-Guga Creek to the west and by the artificially diverted Tibi Creek to the east (Figure 1.4). The defined area is relatively self-contained against impacts from land-uses on adjacent areas:

- Land-uses on higher land to the north and south would result in increased deposition in the wetland, which in turn would aid preservation of buried materials.

**Figure 1.1** Location of the Kuk Early Agricultural Site on a map of the world (upper) and a map of Papua New Guinea (lower)
1. Identification of the Property

Figure 1.2 Location of the Kuk Early Agricultural Site relative to Mount Hagen. Base map: Hagen (Sheet 7786), 1:100,000 topographic map series (Royal Australian Survey Corps, 1978), grid zone 55M, Transverse Mercator Projection, area of map depicted covers Eastings 190000 to 210000 and Northings 934000 to 9370000.
1. Identification of the Property

- Kenta-Guga and Tibi Creeks serve to preserve water tables and insolate the nominated area from land-uses, including drainage, on neighbouring swampland, i.e., the creeks are the base levels to preserve water tables in Kuk and against which drainage of adjacent areas is set.

**Figure 1.3** Location of the Kuk Early Agricultural Site at higher resolution. Base map: Hagen (Sheet 7786), 1:100,000 topographic map series (Royal Australian Survey Corps, 1978), grid zone 55M, Transverse Mercator Projection.

**Core area**

The core area (116 hectares) has yielded the archaeological, geomorphological and palaeoecological evidence of early plant exploitation and agricultural practices. It is of greatest heritage significance and requires the most active management to ensure continuing preservation of the buried archaeological artifacts, features and associated deposits.

The core area encompasses the southeastern area of the Kuk Agricultural Research Station (plantation blocks A7-A12, B7-B12, C7-C12 and D7-D12; see Figure 1.5). The core site
1. Identification of the Property

contains the archaeological evidence of greatest antiquity and of greatest significance. This area will be conserved and protected as an archaeological site within a cultural landscape under a management plan (see Section 5e and Annex E). Prominent Kawelka leaders, Mr. Ru Kundil and Mr. William Pik, and other clansmen are currently cultivating this area. They have pledged their support for the project and have demonstrated this support by facilitating archaeological excavations and setting aside land from cultivation, or ‘gardening’, for heritage management.

Figure 1.4 Location of the nominated site in the landscape

**Buffer zone**
The buffer zone (195 hectares) includes the remainder of Kuk Agricultural Research Station and contains evidence of later agricultural practices. It is of considerable heritage significance and requires only limited active management to ensure continuing conservation. Additionally, activities in the buffer area, particularly related to drainage and hydrology, have a direct bearing on the preservation of buried archaeological remains in the core area. Prominent Kawelka leaders, who are recognized as the traditional owners of the land, have pledged to
1. Identification of the Property

maintain the integrity of the buffer zone through traditional cultivation (see Annex E).

Figure 1.5 Upper diagram depicts the drain (black lines) and road (grey lines) network for the core area of the Research Station, with the lower diagram depicting the alpha-numerical grid reference system used to label blocks of land across the entire Research Station.
### 1. Identification of the Property

Expanses of the broader valley, which constitute the evolving agricultural landscape of which the Kuk site is part, do not require designation or active management because they represent the cumulative development of agriculture and society in Papua New Guinean over millennia. As the nature of New Papua New Guinean societies and their agricultural practices change, they will become inscribed on the ever-changing agricultural landscape of the Upper Wahgi valley.

**Geographical coordinates**

Overall coordinates (rectangle containing the property):

Eastings $^{0}03000$ to $^{0}05000$, Northing $^{93}59000$ to $^{93}60000$

UTM projection zone 55M

Australian Geodetic Datum of 1966

**List of maps included in the nomination**

- **Figure 1.1** Location of the Kuk Early Agricultural Site on maps of the world and of Papua New Guinea
- **Figure 1.2** Location of the Kuk Early Agricultural Site relative to Mount Hagen. Base map: Hagen (Sheet 7786), 1:100,000 topographic map series (Royal Australian Survey Corps, 1978), grid zone 55M, Transverse Mercator Projection, area of map depicted covers Eastings $^{1}90000$ to $^{2}10000$ and Northings $^{93}40000$ to $^{93}70000$.
- **Figure 1.3** Location of the Kuk Early Agricultural Site at higher resolution. Base map: Hagen (Sheet 7786), 1:100,000 topographic map series (Royal Australian Survey Corps, 1978), grid zone 55M, Transverse Mercator Projection.
- **Figure 1.4** Location of the nominated site in the landscape
- **Figure 1.5** Upper diagram depicts the drain (black lines) and road (grey lines) network for the core area of the Research Station, with the lower diagram depicting the alpha-numerical grid reference system used to label blocks of land across the entire Research Station
- **Figure 2.2** Core area and buffer zone on a topographical map of the Station (major modern drains in blue); note the hummocky region in the western part of the Station and more gentle wetland slopes in the core area
- **Figure 2.8** Map showing the location of trenches excavated at Kuk during 1972-1977 and 1998-1999 (Denham 2004b: Fig. 1)
### 1. Identification of the Property

<table>
<thead>
<tr>
<th>1.f Area of nominated property and proposed buffer zone</th>
<th>Area of nominated property: 116 hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Buffer zone: 195 hectares</td>
</tr>
<tr>
<td></td>
<td>Total: 311 ha</td>
</tr>
</tbody>
</table>
2. Description

2.a Description of the property

The property is a cultural landscape representing successive periods of drainage or manipulation of a wetland for plant food production from c.10,000 years ago to the present. Archaeological and palaeoecological research at Kuk Swamp since the 1970s has determined that agriculture was practised on the site by at least 7000-6400 years ago (Denham et al. 2003, 2004a), or possibly by 10,000 years ago (Golson 1977b, 1991; Golson and Hughes 1980; Hope and Golson 1995). The multi-disciplinary investigations at Kuk have confirmed that New Guinea was one of the few places in the world where early and independent agriculture developed (Neumann 2003).

Geography

Kuk Swamp is located in a large inter-montane valley in the interior of New Guinea at 1560 m above mean sea level. The Wahgi valley is one of the largest of the inter-montane valleys that run along the highland spine of New Guinea. Kuk Swamp is part of the extensive wetlands carpeting the floor of the upper reaches of the Wahgi valley, hereafter called the ‘Upper Wahgi valley’. The Upper Wahgi Valley has a lower montane humid climate with an average annual temperature of 19 °C and annual rainfall of c.2700 mm. Climate in the Upper Wahgi Valley is moderately aseasonal and dominated by local orographic effects. The retention of waters in the swamp and accumulation of organic matter washed off the slopes of the mountain ranges to the south and west has generated some of the most fertile soils in New Guinea.

Kuk Swamp is effectively a side-swamp of the much more extensive North Wahgi wetlands (Figure 2.1). Wetlands formed in the valley bottoms of the highland valleys during the Pleistocene and Holocene. Today these wetlands are intensively cultivated in several densely populated valleys, eg, Wahgi Valley and Tari Basin in Papua New Guinea and the Baliem Valley in West Papua (Indonesia).

The archaeological site is located on a former Tea, and then Agricultural Research Station that was drained in the late 1960s and early 1970s. The boundaries of the proposed site accord with that of the former Station comprising Ep Ridge to the north, boundary drains to the east and south, and Kenta-Guga Creek to the west. At the time of drainage some parts of the Station were underwater and wetland surface slope gradients were generally less than 1 in 200 (0.5%), although slopes were steeper along the wetland margin (Figure 2.2). Scattered across the wetland surface are low mounds and hummocky ground comprised of
2. Description

older deposits, over and around which the wetland has accumulated.

Figure 2.1 Photograph of the extensive North Wahgi Swamplands from the top of Ep Ridge (looking northwest; Photo: Tim Denham 1999)

Figure 2.2 Core area and buffer zone on a topographical map of the Station (major modern drains in blue); note the hummocky region in the western part of the Station and more gentle wetland slopes in the core area
2. Description

**Ecology and Palaeoecology**
The vegetation cover at Kuk and in its immediate vicinity has been extensively altered over millennia of human occupation. The natural, or pre-human, vegetation at Kuk formerly consisted of lower montane rain forest (see Figures 2.3-2.4). The earliest signs of human disturbance to the rain forests of the Upper Wahgi valley date to around 20,000 years ago in the Pleistocene (Denham *et al.* 2004a; see Figure 2.5), although other valleys of the highlands show evidence of human burning and disturbance of the forest dating to over 30,000 years ago (Fairbairn *et al.* 2006).

![Figure 2.3. Lower montane rain forest in the Lower Jimi valley, with former gardens visible as lighter coloured grasslands (Photo: Tim Denham, 1990). This type of rain forest would have carpeted the floor of the Upper Wahgi valley, but has gradually been disturbed since the late Pleistocene and eventually replaced by grasslands and a cultivated landscape from the mid-Holocene.](image)

The greatest changes to the ecology of the Kuk area occurred in the early Holocene (see Figure 2.5). From the beginning of the Holocene, the forests show a cumulative and gradual signal of disturbance accompanied by burning and increases in ferns and grasslands. At about 7000 years ago, the palaeoecology of Kuk changes dramatically: the rain forests in the Kuk vicinity were almost gone and replaced with grasslands. Although there are some minor variations through time, this part of the Upper Wahgi valley has been maintained as grassland since 7000 years ago. Such a denuded grassland environment was encountered by the earliest explorers into the Upper Wahgi valley in 1933 (Figure 2.6). Today, grasslands carpeting the inter-montane...
2. Description

Valleys of New Guinea are considered to be anthropic and to characterize agricultural landscapes.

Figure 2.4. Disturbed mosaic of secondary forest, grasslands and garden sites in the Lower Jimi valley (Photo: Tim Denham 1990). The primary forest has been replaced by an anthropic landscape formed through shifting cultivation.

Figure 2.5 Palaeoecology of Kuk from the Pleistocene to the present (amended version of Denham et al. 2004b: Fig. 6).
2. Description

**Figure 2.6** Photograph of the Upper Wahgi valley in 1933 (Photo: Michael Leahy). Note the extensive grasslands with only a few isolated stands of trees.

**Figure 2.7** Photograph looking down from Ep Ridge onto Kuk (Photo: Tim Denham 1999). The tall *Eucalyptus* trees were planted along the major roads to aid drainage and prevent waterlogging.

Since drainage in the early 1970s, tea and other introduced crops have been planted on the Kuk Agricultural Research Station. Since the early 1990s, when the area was reoccupied by traditional landowners, more traditional forms of cultivation have been practiced (Figure 2.7).
2. Description

**Archaeology**

The global significance of the Kuk site comprises archaeological evidence of former plant exploitation and cultivation that has grounded claims for the early and independent origins of agriculture in Papua New Guinea. In total, over 200 trenches were excavated (Figure 2.8), and the stratigraphy and thousands of archaeological features were recorded in the walls of approximately 15 km of modern Station drains. In sum, the archaeological remains at Kuk comprise the following (see Annex A):

- 10,000 years ago: equivocal evidence of plant exploitation or cultivation
- 7000-6400: evidence of mounded cultivation
- 4000-present: successive periods of wetland drainage using ditches for cultivation

![Figure 2.8 Map showing the location of trenches excavated at Kuk during 1972-1977 and 1998-1999 (Denham 2004b: Fig. 1)](image)
## 2. Description

*Early traces: 10,000 year-old agriculture?*

The earliest and most contentious archaeological evidence of plant exploitation at Kuk (Phase 1) are sealed beneath a diagnostic ‘grey clay’, deposited 10,000-7000 years ago. The grey clay was created by forest disturbance and burning that increased erosion rates in the catchment and increased deposition on the wetland margin. Environmental reconstructions show persistent disturbance during this period with the creation of a mosaic of different vegetation communities at Kuk, including primary forest, secondary regrowth, disturbed habitats and grassland.

The 10,000 year-old features sealed beneath grey clay are consistent with planting and digging (pits), localised overland flow (runnels) and the staking and supporting of plants (stake and post holes), potentially within a cleared plot (Figure 2.5). Based on excavations to date, features are restricted to higher ground, potentially a levée of an adjacent and contemporary palaeochannel. The mode of formation of the early Holocene palaeochannel is uncertain and debated by archaeologists who have worked at the site.

Stone tools associated with early Phase 1 features display evidence for the processing of taro (*Colocasia esculenta*), a yam (*Dioscorea* sp.) and other starchy and woody plants. Although undiagnostic banana (*Musa* spp.) phytoliths are present in the Pleistocene, two different sections of banana (Eumusa and Ingentimusa) first occur during the early Holocene (Figure 2.10). As such, the archaeobotanical evidence at Kuk is important for understanding how bananas were domesticated. The presence of these starch staples from early Holocene contexts at Kuk corroborates recent genetic and phytogeographic interpretations for the origins and domestication of taro, bananas and some yams in the New Guinea region.
2. Description

**Figure 2.9** Photograph and excavation plan-view of archaeological features dating to 10,000 years ago. The 10,000 year-old remains at Kuk require further investigation to determine whether people were engaged in agriculture or another form of plant exploitation.
2. Description

<table>
<thead>
<tr>
<th>Figure 2.10 Photographs of archaeobotanical remains dating to 10,000 years ago (Denham in press: Fig. 5)</th>
</tr>
</thead>
</table>
| **5b Banana phytolith**  
Eumusa (banana) seed phytolith from a palaeo-channel fill (identified by Carol Lentfer; Denham *et al.* 2003: Fig. 41) |
| **5c Taro starch**  
Starch granules, interpreted to be derived from taro (*Colocasia esculenta*), extracted from a retouched chert artefact from the edge of a palaeosurface feature (analyses by Richard Fullagar and Judith Field; Fullagar *et al.* 2006: Fig. 8A) |
| **5d Yam starch**  
Starch granule, interpreted to be derived from yam (*Dioscorea* sp.), extracted from a pestle or pounding/grinding stone from a palaeochannel fill (analyses by Richard Fullagar and Judith Field; Fullagar *et al.* 2006: Fig. 8E) |
| **5e Aroid seed**  
Seed, interpreted to be derived from an aroid (*Araceae*), identified in a palaeochannel fill (courtesy of Nick Porsch, Simon Haberle and Peter Matthews) |
## 2. Description

<table>
<thead>
<tr>
<th>Mound cultivation: 7000-6400 years ago</th>
</tr>
</thead>
<tbody>
<tr>
<td>The earliest agreed, and generally accepted evidence of early agriculture in New Guinea are the truncated bases of mounds and associated remains dating to 7000-6400 years ago (Phase 2; Figure 2.11). Excavations at two other wetlands in the Upper Wahgi Valley (Warrawau and Mugumamp) uncovered similar circular and sub-circular features that have also been interpreted to be the preserved bases of former mounds. Only the bases of mounds have survived more recent drainage, cultivation and soil formation.</td>
</tr>
</tbody>
</table>

The mounds were constructed for cultivation of plants with different edaphic requirements. Water-tolerant plants, such as taro (*Colocasia esculenta*), were planted along the edges and in the bases of the lower features; whereas water-intolerant plants, such as bananas (*Musa* spp.), yams (*Dioscorea* spp.), edible *pitpit* (*Setaria palmifolia*) and mixed vegetables, were planted on the higher and drier mounds. Archaeobotanical evidence corroborates this interpretation: residues extracted from stone tools indicate that *Colocasia* taro and other unidentified plants were being exploited; and high frequencies of *Musa* banana microfossils suggest deliberate planting within multi-cropped plots. |

Around 7000 years ago, anthropic grasslands maintained by periodic burning were established in the Upper Wahgi Valley. Extensive grasslands carpeted sections of the valley floor from this time, persisting until the arrival of gold prospectors in 1933. |
2. Description

**Figure 2.11** Photograph and excavation plan-view of mound bases dating to 7000-6400 years ago

*Mound cultivation: 7000-6400 years ago*

*Ditches from 4000 years ago*

At Kuk, several successive phases of wetland drainage using ditches to construct field systems have been identified. The types of ditch, arrangements of ditch networks and field system alignments have changed through time. For all phases, ditch networks drain into major palaeochannels coursing across the wetland edge. Episodes of wetland drainage using ditches occur intermittently from 4000 years ago to approximately 100 years ago (Figures 2.12-2.16). The reasons for periodic abandonment
2. Description

of these field systems are unknown; however, rising water tables, warfare, climate change and volcanic eruptions may all have been significant. Recent drainage of the wetland for a Research Station represents a modern continuation of this practice.

![Figure 2.12 Photograph of multi-period ditches in the base of an excavation trench (Photo: Klim Gollan 1975)](image)

The earliest ditch networks and associated wooden artefacts in the highlands of New Guinea (Phase 3) date to c. 4000 years before present. The earliest ditches are found at Kuk and at Tambul (in the Upper Kaugel valley; Golson 1997). A wooden hastate-type wooden spade recovered from the base of a ditch at Tambul was dated to c. 4000 years ago (Figure 2.14). The most recent phases of wetland drainage at Kuk (Phases 4-6), representing the last 2000 years, consist of rectangular plots defined by drainage ditches. The alignments and scale of these field systems vary (see Figure 2.15).
2. Description

**Figure 2.13** Photographs and plan of the ditch networks (Phase 3) dating to c. 4000 years ago (early) and c. 2500 years ago (late)

**Figure 2.14** The Tambul spade (Photo: Jack Golson 2006)
2. Description

It is unclear why people began to dig ditches, or where the technological innovation came from. Based on a consideration of modern ditch systems in the New Guinea highlands, the earliest ditches may not have been constructed solely for drainage. They would have served additional functions, such as defense or boundaries to demarcate individual/group tenure of plots. Interpretations suggest that people became more reliant on fertile, wetland margins on valley floors of inter-montane valleys following the degradation of local environments to grasslands, which people in the western highlands regard as less attractive for cultivation.

Figure 2.15 Plans and cross-sections of ditch networks associated with Phases 4, 5 and 6 (Bayliss-Smith in press: Fig. 2)
2. Description

**Figure 2.16** Oblique aerial photograph of Kuk showing recently dug plantation drains, adjacent archaeological excavations (right-hand side of picture) and vegetation marks associated with Phase 6 field systems (view to northwest; Photo: Jim Bowler 1972)

These ditch networks vary in extent and have been mapped and investigated using aerial photographs, sections in modern drain walls and by excavation. The resultant field systems are similar to those dug in wetlands across the New Guinea Highlands in the recent and distant pasts.

*Summary*

Although the whole of the Upper Wahgi Valley and other parts of New Guinea, especially the highland interior, are products of long-term agricultural practices, Kuk Swamp is proposed for World Heritage listing because:

- it has been investigated in greatest detail,
- it preserves the greatest number of successive periods of human manipulation for plant food production from the beginning of the Holocene to the present,
- it preserves the oldest evidence of plant food production and agriculture in New Guinea, and
- it is the ‘type site’ against which similar evidence from other sites in the highlands and lowlands of New Guinea is compared (see Annexes A and B).

The Kuk site is one of the oldest and most intensively studied agricultural sites in the world. The multi-disciplinary evidence from Kuk – including archaeology, archaeobotany, geomorphology, palaeoecology and sedimentology - has
2. Description

confirmed the island of New Guinea to be an early and independent centre of agricultural origins (Denham et al. 2003; Hope and Golson 1995). Plant microfossil evidence from the site comprising *Musa* banana species, taro (*Colocasia esculenta*) and a yam (*Dioscorea sp.*) corroborate genetic (Lebot 1999) and phytogeographic (de Langhe and de Maret 1999) interpretations that New Guinea was a centre of domestication for these and other crops. The findings at Kuk require us to rethink the contribution of New Guinea to the development of agriculture in the Pacific, Southeast Asia and Africa (Denham et al. 2004b).

**Current land-uses**

Kuk Swamp was drained in the late 1960s and during the 1970s to establish a Tea Research Station, which subsequently became an Agricultural Research Station (Figure 2.17). The Research Station was abandoned in the early 1990s and since then has been gradually re-occupied by the traditional land holders, the Kawelka, as well as members of other groups invited to occupy blocks by the Kawelka (Strathern 1972; Strathern and Stewart 1998). Although the government of Papua New Guinea has a lease on the land, the property is effectively under customary use-based tenure and traditional management practices. The current landscape reflects the ditches, roads, houses, tree-planting and other activities associated with the development of the Research Station, as well as the horticulture, houses and everyday activities of the Kawelka.

![Figure 2.17 Kuk following drainage in the early 1970s; note Ep Ridge in the background and the grid-like vegetation marks associated with Phase 6 field systems between the plantation drains (view to north; Photo: Jack Golson 1972)]
2. Description

Since the mid 1990s, the Kawelka have been cultivating the land at Kuk using traditional methods, ie, using spades and digging sticks. Most of the core area and buffer zone are being cultivated (see Annex D for details). Land-holders have voluntarily agreed not to engage in activities that damage buried archaeological remains, ie, they have agreed not to plant deep-rooting trees or engage in mechanical cultivation of the land. Many of the deeper drains dug for the Research Station have partially filled in, leading to higher water tables and periodic standing water in the central portion of the site. Higher water tables, and resultant abandonment of cultivation on some blocks, are aiding the preservation of buried archaeological remains.

2.b History and development

As for most areas of New Guinea, historical records for the Wahgi swamps extend only as far back as the first explorers to visit the area. Anthropological studies have also documented recent events to some degree of chronological accuracy. From these records, the following historical summary of events can be established for the Kuk site.

- At the turn of the century, about 1910, Kuk was a major battlefield. The Kawelka, who had a reputation for belligerency, were routed by a coalition-style alliance of the Jika-Kilampi, Mokei and other Kwi tribes. Only a few lucky Kawelka fled to the other Kawelka territories at Mbukl, while most of the rest were slaughtered and buried in the Kuk swamp. Two prominent leaders, Kein and Kundi, sought refuge with their maternal uncles in the Roni and Jika Milakamb groups, respectively. The land remained unoccupied for many years until the Kawelkas return in the early 1960s. Victors rarely occupy vanquished territories for fear of retaliation by enemy spirits.

- The first reconnaissance flight over the Wahgi Valley took place on March 8, 1933. Australian gold prospector, Mick Leahy, and patrol officer, Jim Taylor, flew over the Wahgi and turned around over Ogelbeng near the foothills of Mount Hagen in March 1933. The following description encapsulates their view:

  …spread out for a hundred miles between the high mountains was the green, sunlit immensity of the Wahgi. A big river fed by innumerable streams ran through its centre, and oblong houses in homestead groups of four or five dotted across a continuous patchwork of neat, square gardens. The Wahgi, enormous, fertile and heavily populated, greatest of
### 2. Description

New Guinea’s highland valleys, had been ‘discovered’… (Connolly and Anderson 1987: 79).

- In April 1933, the first Europeans entered the Wahgi Valley. The patrol officer James Taylor and gold prospectors, Mick Leahy and his brother, Dan, set up camp at Kelua among the Yamka people later that year.

- The first missionaries to enter the Wahgi Valley were Catholic missionary Fr. William Ross in 1934 and Lutheran missionary, Georg Vicedom in 1936. Ross established the Rebiamul Station among the Mokei people, while Vicedom and his successor, Herman Strauss, who came to Mt. Hagen in 1938, established the Ogelbeng Station among the Jika people. Vicedom and Strauss published important works on the ‘Mbowamb’ of Mt. Hagen and their culture, while Ross published an ethnological work on Hagen tribes.

- The first road access reached the Wahgi Valley in 1950. The Kawelka, like most other groups, were conscripted to work on the Mt. Hagen-Ambra-Kotna road. This gave the Kawelkas an opportunity to enquire about the territories at Kuk, Mapa, Kenta and Roprei.

- The first coffee and tea plantations were established in the 1950s by Australian planters, William Manton (Wurup in 1958), Dick Hagon (Gumanch), John Collins (Tigi), Bob Gibbes (Penga), and by other expatriates throughout the Wahgi Valley.

- The Local Government Council was instituted in 1962 and the first Kawelka councilor was elected.

- The Kawelkas returned to Kuk and reclaimed territories in the upper Wahgi in the early 1960s.

- In 1968 the Australian Colonial Administration purchased Kuk Swamp from the Kawelka tribe. The Kawelka leaders, Goimba Onombe and Ken Ripa, acting as representatives of the landowners, entered into an agreement with the Administration to sell 310.84 hectares of land under a 99-year lease for AUD $7,771. The Kawelka shared the money with some neighboring groups, including the Jika-Kilampi clan, with whom they share special historical and contemporary relations.

- In 1969, under the supervision of the founding Officer-in-Charge (OIC), John Morgan, the Kuk Tea Research Station was established by the then Department of Agriculture, Stock and Fisheries (DASF). The DASF, now known as
2. Description

<table>
<thead>
<tr>
<th>DAL (Department of Agriculture and Livestock), initially conducted research into tea, but later expanded to cover other crops. The property was later renamed Kuk Agricultural Research Station to accurately reflect its broad research activities covering all crops. After draining the swamp, the DAL invested in the development of the Station. The developments include a central office, research annexes, workshops, garage, laborers compound (dormitories), sports grounds, and a tavern. In terms of agricultural research, the DAL developed large experimental blocks of fruits, nuts, tubers and vegetables, in addition to cash crops of tea, coffee, cardamom, herbs and spices. The Station blocks were divided by a network of crossing parallel roads hedged with <em>Eucalyptus</em> trees, ornamental shrubs and flowers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>- PNG was granted self-government in 1973 and gained constitutional independence from Australia in 1975.</td>
</tr>
<tr>
<td>- Under the direction of Prof. Jack Golson, major archaeological investigations at Kuk began in 1972. From 1972, the Australian National University research team, comprising specialists in environmental and landscape studies, as well as archaeologists, mostly studied the walls of recently dug plantation drains for traces of old drainage channels and garden ditches as well as to investigate the formation of swamp deposits. Although some limited excavations were undertaken each year, large area excavations occurred from 1974 to 1977 to map and investigate the ancient drainage systems in more detail. After 1977 only small and specialized investigations were carried out at Kuk.</td>
</tr>
<tr>
<td>- From 1991 onwards further research could not take place as a result of the closure of the Station, thereby raising concerns about the protection and future of the site itself. Local Kawelka began to reoccupy the abandoned Station.</td>
</tr>
<tr>
<td>- In 1997 the PNG Government recognized the international significance of the Kuk site and it became one of two sites (the other being the Huon Terraces) in PNG to be considered for nomination to the World Heritage List.</td>
</tr>
<tr>
<td>- In 1997 the PNG National Museum, with the assistance of academics from the University of Papua New Guinea and the National Research Institute, initiated negotiations with the Kawelka for the establishment of a World Heritage site at Kuk.</td>
</tr>
<tr>
<td>- Prof. Jack Golson returned to Kuk in 1998 and 1999 with</td>
</tr>
</tbody>
</table>
2. Description

Tim Denham, a then PhD student from ANU, to conduct further multi-disciplinary investigations.

- In May 1998 the Director of the PNG National Museum, Mr. Soroi Eoe, approached the National Research Institute to seek the assistance of Dr. Joseph Ketan, a Kawelka from Kuk, to assist in the preparation of a site management plan for Kuk. Several drafts of a nomination document have since been completed.

- From 1998 to 2006, talks have been ongoing with Kawelka leaders and land-holders at Kuk to ensure that archaeological remains are preserved and to devise a management plan. The local Provincial Government allocated funds for small development projects to benefit the Kawelkas in recognition of their support.

In summary, as far as it can be determined, the lands traditionally belong to the Kawelka clan; but were leased in 1968 for 99 years to the government. Besides traditional agricultural practices, a Research Station was established at the site wherein a variety of crops were grown experimentally. Despite successive periods of ancient and modern cultivation, including three decades after establishment of the Research Station, the archaeological evidence and stratigraphy are still well preserved at Kuk. The Research Station was abandoned 15 years ago and the landowners re-occupied the lands despite the lease agreement. The local Provincial Government and landowners recognize the universal value of the archaeological site and have collaborated to maintain it; currently only traditional gardening is happening on the best preserved parts of the core area.
### 3. Justification for Inscription

| 3.a Criteria under which inscription is proposed | The Kuk site is being nominated as a cultural landscape under the following criteria, following the *Operational Guidelines for the Implementation of the World Heritage Convention* (UNESCO 2005):

(iii) bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared.

The archaeological remains at the Kuk site bear an exceptional testimony to the origins and development of New Guinean and Pacific agriculture. Kuk Swamp preserves archaeological remains – and associated archaeobotanical and palaeoecological remains – that reflect a long history of agricultural development extending to at least 7000-6400 years ago, and potentially to 10,000 years ago. In contrast to early and independent agriculture in several other parts of the world that was based on the sexual reproduction of cereals and other seed-bearing crops, eg, Southeast Asia and Southeast China, agriculture in New Guinea was (and still is) based on the asexual reproduction of plants and was reliant on the vegetative propagation of plant parts (see Diamond 1997). These characteristics of New Guinean agricultural practice became incorporated into agriculture across the Pacific.

Today, most of the traditional staples of New Guinean (and Pacific) agriculture are vegetatively propagated, including bananas (*Musa* spp.), taro (*Colocasia esculenta*), yam (*Dioscorea* spp.), and sugarcane (*Saccharum officinarum*). As well as the archaeological evidence from Highland New Guinea, recent genetic and phytogeographic evidence suggests that many of these plants originated in the New Guinea region and were domesticated there first (Matthews 1995; De Langhe and de Maret 1999; Lebot 1999). Furthermore, most other types of plants were also vegetatively propagated including herbaceous vegetables and some trees, such as *Pandanus* in the highlands and sago (*Metroxylon sago*) in the lowlands.

(iv) be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

Kuk is one of the earliest and most intensively studied agricultural sites in the world. Multi-disciplinary lines of evidence from Kuk have grounded interpretations that New Guinea is one of the few places in the world where agriculture developed independently (Denham *et al.* 2003; Neumann 2003). Specifically, Kuk contains archaeological evidence representing... |
successive technological innovations including:

- the early and independent development of agriculture by at least 7000-6400 years ago and potentially by 10,000 years ago;
- the use of mounds to cultivate plants with different edaphic requirements by 7000-6400 years ago; and,
- the use of wooden spade-like tools to dig ditches to drain wetland margins by 4000 years ago.

However, and in contrast to many other parts of the world where agriculture similarly emerged, societies in New Guinea did not subsequently develop marked socio-political hierarchies or ‘civilisations’. Instead, traditional societies in New Guinea were relatively egalitarian and characterised by the unique ‘big man’ institution, where influence is largely consensual and persuasive. The evidence from Kuk signifies the potential diversity of societal development following the inception of agriculture and challenges unilinear interpretations of human history.

(v) be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change.

The archaeological evidence at Kuk represents an outstanding example of traditional New Guinean land-use, namely various types of plant exploitation and different types of cultivation, that represent changing human-environment relations over ten millennia. The finds at Kuk are outstanding because:

- they represent successive periods of plant exploitation and cultivation from 10,000 years ago to the present,
- they include the oldest evidence of plant food production and agriculture in New Guinea, and
- they comprise the ‘type site’ against which similar evidence from other sites in the highlands and lowlands of New Guinea is compared.

The Kuk site represents an organically evolved landscape which has relic (i.e., archaeological remains of past cultivation and plant exploitation activities) and continuing (i.e., ongoing cultivation, often referred to as ‘gardening’ in the contemporary New Guinean context) components.

**Criterion for cultural landscape nomination**

The Kuk site is proposed for nomination as a cultural landscape because it is, according to the definition in Annex 3 of the *Operational Guidelines* (UNESCO 2005), the result of the ‘combined work of nature and of man’. Indeed, Kuk is ‘illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or
opportunities presented by (its) natural environment and of successive social, economic and cultural forces, both external and internal’ (UNESCO 2005: Annex 3, p. 6).

Following Annex 3, paragraph 10 of the Operational Guidelines, it is here proposed that the Kuk site be considered an organically evolved landscape (category ii). It is the result of an initial social and economic imperative, shaped by the unique characteristics of the natural environment of the Upper Wahgi Valley, namely: highly fertile (because of volcanic ash and other nutrient deposition from nearby ranges), well-irrigated (because of high rainfall) swamps that were channeled and manipulated for drainage and to allow cultivation of crops.

Kuk is the result of an organic co-evolution between endemic plants and human settlers of the highlands of New Guinea. Over time several species (most significantly several carbohydrate-rich sources of food) were cultivated and became domesticated, including:

- tuberous plants, such as taro \((Colocasia \text{ sp.})\) and yams \((Dioscorea \text{ spp.})\);
- herbaceous plants, such as bananas \((Musa \text{ spp.})\), edible grasses \((Setaria \text{ palmifolia}, \text{ Setaria edule})\), sugarcane \((Saccharum officinarum)\); and,
- trees, primarily varieties of the \(Pandanus\) \(brosimoi/julianettii/iwen\) complex.

This adaptive process is also technological, as these settlers learned how to manipulate and drain the swamp through topographical manipulation and irrigation channels. Moreover, the process included the development and adaptation of tools. Highland cultures are thought to have changed in parallel to changes in agricultural practices.

Kuk constitutes two types of organically evolved landscape: relic and continuing landscapes (UNESCO 2005: Annex 3). The archaeological evidence shows phases of agricultural practice and plant domestication, as described in the nomination document and in the extensive literature list provided (Section 7e). These archaeological remains are relics of cultural, social and economic practices (which always occur together) that were present and, according to the evidence, were initially developed in the Upper Wahgi Valley.

Traditional agricultural practices and manipulation of plant stocks have not come to an end. Agricultural techniques and domesticated crops developed in New Guinea, the earliest expressions of which have been found in the Upper Wahgi
Valley, allowed for human population growth, expansion and colonization of most of Oceania; today these crops continue to represent the livelihood, culture and economy of the region. At Kuk, and all around Oceania, hundreds of plant stocks and varieties are constantly maintained and new ones developed. Most of the region remains undeveloped and most peoples continue to subsist by practicing the agricultural techniques and methods learned from their ancestors. At Kuk, the Kawelka and Jika clansmen practice cultivation that includes the suite of traditional crops domesticated by their ancestors (although they now use improved varieties of the same species), as well as exotic crops (such as sweet potato \( Ipomoea batatas \)). Thus Kuk is a continuing, organically evolved cultural landscape.

<table>
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<th>3.b Proposed statement of Outstanding Universal Value</th>
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<tr>
<td>The early agricultural site at Kuk is of outstanding universal value because it evidences a significant stage of technological development of humanity worldwide, namely the early and independent development of agriculture, specifically Pacific agriculture (Criterion iv). Indeed, Papua New Guineans were among the world’s earliest agriculturists. The antiquity and independent genesis of agriculture in New Guinea are generally accepted by international archaeological and scientific communities (Bellwood 1990: 16; Diamond 1997: 148; Kirch 2000: 79; Neumann 2003; Renfrew and Bahn 2004: 268-9). This technological leap shaped the numbers of humans, their food supply, and their cultures throughout Oceania (Criterion iii). Kuk contains the oldest evidence in Oceania, as well as successive phases, of manipulation of the environment for plant exploitation and agriculture (Criterion v). Relic time-slices of these interactions are preserved underground at Kuk and they continue to evolve through contemporary practices at the site.</td>
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In addition to providing evidence of a major technological leap, namely the transformation of plant exploitation (visible in 10,000 year-old remains) to agriculture (visible from 7000-6400 years BP), Kuk is of outstanding universal value because the agricultural chronology comprises intermittent and successive developments in the nature of agricultural practices and technology from at least 7000 years BP to the present. These developments witness:

- Transformations in the nature of agricultural practices through time: from the construction of mounds on the wetland margin for cultivation at 7000-6400 years BP to the episodic and successive drainage of the wetland using wooden tools to dig ditches from c.4000 years BP to the present.
- Evidence for the use of tubers, including taro (\( Colocasia esculenta \)) and a yam (\( Dioscorea \) sp.), from 10,000 years
BP and the cultivation of *Musa* bananas from 7000-6400 years BP; these finds are central to understanding the domestication of these important economic species and for understanding the development of Pacific agriculture to which they are central.

- The evolution of an agricultural landscape from 10,000 years ago to the present day, represented in well-preserved archaeological remains (features, artefacts), stratigraphy, and archaeobotanical assemblages (microfossil and macrofossil).

The agricultural chronology at Kuk evidences developments, in terms of plants and technologies, that were essential for the formation of Pacific agriculture. Pacific agriculture is based on the vegetative propagation of plants (asexual reproduction), ie, the planting of a cutting, root-part, tuber, sucker, or other plant part, and is distinctive from agricultural developments in Africa, the Americas and Eurasia that were based on planting seed (sexual reproduction).

The human-environment interactions at Kuk demonstrate a traditional land-use that has evolved from at least 10,000 years ago to the present-day. People began to disturb the rain forests in the Kuk catchment using fire during the Pleistocene, with increased levels of disturbance from c. 10,000 years ago. By 7000 years ago, the Kuk catchment was largely deforested; the landscape comprised grasslands maintained by periodic burning. An anthropic, grassland landscape persisted in the area until 1933 when the first European explorers entered the Upper Wahgi valley.

As well as its significance as an agricultural site, Kuk Swamp is of immense global significance for understanding the evolution of human societies. Even though cultures in the New Guinea region had developed agriculture at an early time in global terms, they followed a different societal trajectory to those in other regions. In Africa, the Americas and Eurasia, interpretations of early agriculture are often associated with the development of hierarchical social formations and, ultimately, ‘civilizations’. In New Guinea people developed relatively egalitarian and local-scale societies based around the ‘big man’ political institution. Big men are community leaders whose influence is persuasive and built around consensus, rather than through coercion, command and control. Consequently, the evidence at Kuk Swamp signifies the diversity of historical trajectories after the inception of agriculture and challenges unilinear, often evolutionary, teleological and Eurocentric interpretations of human history (Denham 2004a; 2005b;
In summary, the Kuk area has immense educational, historical, scientific and social values for past, present, and future generations of Papua New Guineans and Pacific islanders. The agricultural developments at Kuk contributed to the spread, settlement and growth of present-day cultures and societies across Oceania. Papua New Guineans are proud of this significant contribution to the world’s heritage and are committed to protect it for future generations.

The core area nominated for World Heritage listing at Kuk includes the most significant and well-preserved agricultural remains dating from 7000-6400 years ago to the present, as well as evidence of plant exploitation dating to 10,000 years ago. The buffer zone includes more extensive areas of later agricultural systems and settlements dating from approximately 2000 years ago. The community-based management plan will ensure the continuing preservation of the unique character and global significance of the agricultural remains at Kuk. The enshrining of ongoing, traditional land use practices in the management plan guarantees that the agricultural landscape at Kuk continues to evolve, as it has been for millennia.

Kuk is the first site evidencing early and independent agriculture to be internationally recognised for nomination to the World Heritage List. Despite its unique character, it is still possible to undertake comparisons of the nominated property with other national and international properties, including a summary statement outlining the key attributes that justify inclusion of the nominated property on the World Heritage List. Inter-site comparisons include properties that are World Heritage Listed and those that are not.

**World Heritage Listed sites**

No sites from the other regions of early and independent agricultural development – whether in Africa, the Americas, or Eurasia (see Bellwood 2005) - are currently listed on the World Heritage List. The absence of such sites is a major omission given that the transition to farming is perhaps the most significant demographic, social and technological change undertaken by modern humans. The development of agriculture has transformed human history over the last 10,000 years, such that every state on earth is now reliant on agricultural produce to feed its people. The environmental ramifications of the emergence of agriculture at the beginning of the Holocene are, however, still unfolding.
There are relatively few agricultural sites, or sites that include an explicit agricultural component, on the World Heritage List (Annex G). The sites currently listed based on their outstanding cultural values can be clustered into three groups:

1. Agricultural landscapes associated with distinctive crops: Viñales Valley (Cuba) with tobacco, Archaeological Landscape of the First Coffee Plantations in the South-East of Cuba with coffee, Tokaj Wine Region Historic Cultural Landscape (Hungary) with wine, and Rice Terraces of the Philippine Cordilleras with rice. These landscapes are all highly distinctive and excellent exemplars of monocultures that are today based on cash crops; an exception are the Rice Terraces of the Philippine Cordilleras that were originally constructed – and are still used – for cultivating rice for consumption and trade.

2. Irrigation and water management: Aflaj Irrigation Systems of Oman, Rice Terraces of the Philippine Cordilleras and Mount Qingcheng and the Dujiangyan Irrigation System (China). These properties are all excellent exemplars of water management practices dating back to 1500 years BP, up to 2000 years BP, and 2250 years BP, respectively.

3. Archaeological sites associated with ancient farming: Joya de Ceren Archaeological Site (El Salvador) and Ban Chiang Archaeological Site (Thailand). These two archaeological sites preserve archaeological remains associated with past farming practices. At Joya de Ceren, remains of a farming community are excellently preserved beneath volcanic ash resulting from a catastrophic eruption approximately 1400 years ago. Ban Chiang is a highly significant archaeological site that charts the transition from pre-agricultural to agricultural subsistence from 5600 years ago in this region.

Kuk exhibits agricultural characteristics that are on a par with, and in many respects surpass, those of sites on the current World Heritage List. Not only does Kuk incorporate characteristics of agricultural sites already nominated, more significantly, the nomination of Kuk diversifies the nature of agricultural, water management and archaeological sites on the World Heritage List. All sites, including Kuk, exhibit excellent preservation of significant cultural components.

Whereas the agricultural landscapes currently listed are primarily associated with monoculture, namely the cultivation of a single-crop, the Kuk Early Agricultural Site is associated with Pacific polyculture, namely the cultivation of multiple crops.
within the same plot (also referred to as inter-cropping). At Kuk, the agricultural landscape reflects the cultivation of crops mainly for subsistence purposes; trade and cash cropping have been, and continue to be, less significant components of production than direct consumption by community members. Furthermore, the archaeological evidence for the use of root crops, taro (*Colocasia esculenta*) and a yam (*Dioscorea* sp.), in the early Holocene and the cultivation *Musa* bananas from 7000-6400 years BP shows an enormous antiquity and continuity of practices in the one area, as well as contributing to our understanding of how these important food plants were domesticated in the past.

The World Heritage Listed properties are all excellent exemplars of irrigation and water management practices that continue in these regions today. Similarly, the Kuk Early Agricultural Site exhibits evidence of past wetland manipulation and drainage that is characteristic of practices currently employed by people in the highlands of New Guinea. Successive periods of wetland manipulation possibly date back to 10,000 years BP, and certainly date back to mound construction at 7000-6400 years BP, with ditched drainage from 4000 years BP (using wooden tools). People in Highland valleys still drain wetlands for cultivation, some periodically (Ballard 1995) and some on a more permanent basis (Heider 1979). In contrast to the currently World Heritage Listed properties, water management at Kuk focussed on drainage rather than irrigation.

The two archaeological sites most clearly associated with past agriculture on the World Heritage List are both settlements at which investigations have focussed on the nature of food consumption rather than production. In contrast, the Kuk Early Agricultural Site is primarily a site of food production. Evidence of past cultivation practices associated with the growing of food are preserved, including mounds for the cultivation of plants and ditched field systems. Settlements associated with later ditched drainage of the wetland at Kuk are also preserved; some potentially date back to over 1000 years. Moreover, although the *Ban Chiang Archaeological Site* in Thailand preserves highly significant evidence of the transition to agriculture in this region, it documents how local plants and technologies were incorporated into agricultural practices that, in part, diffused to and were adopted by people living in this region. The evidence at Kuk is of a different nature and order of significance; it charts the early and independent emergence of agriculture and how cultivation practices have changed through time in response to internal innovations and external stimuli.
Comparable sites/regions of early agricultural development
At present, there are between six and eight regions considered to have been independent centres of domestication and early agricultural development (Table 3.1). In part, the number of regions of early and independent agricultural development, as well as the nature and antiquity of early agriculture within each region, is a function of perspective. Depending upon how agriculture is delimited from other food-producing strategies, researchers use various types of archaeological, archaeobotanical, genetic, geomorphological and palaeoecological evidence to identify and date agriculture in the past.

Table 3.1 Regions of early and potentially independent agricultural development (based on Smith 1998: 13; Bellwood 2005: Fig. 0.1). Different authors attribute different ages to the earliest agriculture and domestication in different regions of the world: the dates presented are from Smith (1998: 13) and represent ‘approximate time periods when plants and animals were first domesticated’.

<table>
<thead>
<tr>
<th>Region</th>
<th>Time Period (years ago)</th>
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<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>4000</td>
</tr>
<tr>
<td>Southwest Asia</td>
<td>9500</td>
</tr>
<tr>
<td>China</td>
<td>8500-7800</td>
</tr>
<tr>
<td>New Guinea</td>
<td>10,000-7000</td>
</tr>
<tr>
<td>Eastern Woodlands (USA)</td>
<td>4500</td>
</tr>
<tr>
<td>Central Mexico</td>
<td>9000</td>
</tr>
<tr>
<td>Northern South America</td>
<td>7000</td>
</tr>
</tbody>
</table>

None of the key archaeological sites associated with debates of early agriculture in these regions have been nominated to the World Heritage List. Sites that have comparable significance to Kuk in terms of the nature of archaeological remains and antiquity include Abu Hureyra in Syria, Guilá Naquitz in Mexico, and Hemedu in southeast China. However, the preservation of these sites is uncertain; they have all been subject to extensive excavations over many years and assessments need to be undertaken at each site to determine the authenticity and integrity of undisturbed remains.

These types of site, of which there are only a handful in the world, and of which Kuk is one, are representative of the various kinds of early agricultural development in different regions and of the range of plants and practices employed. It is to be hoped that with time, such key sites for understanding human history across the world achieve World Heritage status and are preserved for future generations.
### Comparable sites within Papua New Guinea

Among wetland archaeological sites in Papua New Guinea displaying evidence of past agriculture, several elements of the archaeological remains are significant and unique to Kuk (see Annex B):

- No other sites in New Guinea contain as many successive episodes of wetland drainage or manipulation, and subsequently Kuk provides the most complete picture of the origins and evolution of agricultural technologies and plant exploitation practices.
- The multi-disciplinary investigations at Kuk – including archaeology, archaeobotany, geomorphology, palaeoecology and sedimentology, as well as anthropology and agronomy – have been more intensive than at any other site, or for any other community, in Papua New Guinea.
- The archaeological, archaeobotanical and palaeoecological remains at Kuk are the most continuous and well-preserved of any of the highland sites.
- No other sites in New Guinea, or Oceania, contain evidence of comparable antiquity, either for early agriculture dating to at least 7000-6400 cal BP, or for wetland manipulation for plant exploitation from 10,000 cal BP.
- The multi-disciplinary record from Kuk is the benchmark against which the remains at other sites across New Guinea and Melanesia, as well as other parts of Oceania, are compared.

### Summary statement

The nomination of the Kuk Early Agricultural Site is a major addition to the World Heritage List. The nomination of Kuk greatly augments and diversifies the nature of agricultural sites listed on the World Heritage List in three main ways:

1. Currently listed sites tend to be associated with monoculture, whereas the evidence at Kuk is associated with polyculture, subsistence agriculture and the domestication of important starch-rich staples, most notably *Musa* bananas.
2. Currently listed sites focus on water management for irrigation, whereas Kuk exhibits water management for drainage.
3. Currently listed archaeological sites focus on settlements and the consumption of agricultural products, whereas Kuk is primarily a site of agricultural production.
The Kuk site is the most significant and well-preserved for understanding the origins and evolution of agriculture and plant exploitation in Papua New Guinea, as well as Oceania. Kuk is the first site associated with the early and independent development of agriculture in any region of the world to be nominated to the World Heritage List. In these senses, the Kuk site nomination is unique and of outstanding universal value.

### 3.d Integrity and Authenticity

**Authenticity**

The authenticity of the Kuk site is proven by scientific research and multi-disciplinary research.

The Kuk site is one of the oldest and most intensively studied agricultural sites in the world. The multi-disciplinary evidence from Kuk – including archaeology, archaeobotany, geomorphology, palaeoecology and sedimentology - has confirmed the island of New Guinea to be an early and independent centre of agricultural origins (Denham et al. 2003; Hope and Golson 1995). The global significance of the Kuk site comprises archaeological evidence of former plant exploitation and cultivation.

The Kuk site contains successive periods of wetland manipulation for food production that extend from the present to 10,000 years ago (Bayliss-Smith and Golson 1992a, 1992b, 1999; Bayliss-Smith et al. 2005; Denham 2003a, 2003b, 2004b, 2005b, 2005c, 2005d; Denham et al. 2003, 2004a, 2004b; Golson 1977a, 1982, 1991; Golson and Hughes 1980; Gorecki 1982, 1986; Hope and Golson 1995; Muke 1998; see Annexes A, B, C and F). The oldest unequivocal agricultural activities at the site, consisting of mounded cultivation on the wetland edge, date to at least 7000-6400 years ago (Denham et al. 2003). The oldest evidence of human manipulation of the wetland edge, which dates to 10,000 years ago, is equivocal in terms of whether it represents agriculture (following Prof. Jack Golson and colleagues) or another form of plant exploitation (following Dr. Tim Denham and colleagues) (as debated in Denham et al. 2004a).

By 1970, a provisional antiquity of prehistoric, and pre-Ipomoean (sweet potato) cultivation in the Wahgi Valley was established following archaeological investigations at Warrawau Plantation in 1966 (also known as the Manton site; Golson et al. 1967; Lampert 1967; Powell 1970: 142-6), Minjigina in 1967 (Lampert 1970; Powell 1970: 172-4), Kindeng in 1968 (unpublished) and Kuk in 1969 (Allen 1970). From the record of vegetation clearance at Warrawau and Draepi-Minjigina (Powell 1970), agriculture was of greater antiquity than the provisional
time depth of 2300 ± 120 BP (ANU 43, Golson et al. 1967) obtained for a wooden digging stick at Warrawau.

Following Allen’s reconnaissance of the site, multi-disciplinary investigations commenced at the Kuk site in 1970. Six major field seasons were undertaken between 1972 and 1977 under the direction of Prof. Jack Golson, and based on these investigations claims for 10,000 year-old agriculture at Kuk were made (Golson 1977b; Golson and Hughes 1980; Hope and Golson 1995). Subsequent multi-disciplinary investigations were undertaken during 1998 and 1999 under the direction of Dr. Tim Denham, and based on these investigations the antiquity of agriculture at Kuk was dated to at least 7000-6400 years ago (Denham et al. 2003, 2004a). The archaeological remains at Kuk comprise the following (see Section 2a for detailed descriptions):

- 10,000 years ago: equivocal evidence of plant exploitation or cultivation
- 7000-6400: evidence of mounded cultivation
- 4000-present: successive periods of wetland drainage using ditches for cultivation

**Integrity**

The Kuk site is protected in Papua New Guinea under the *National Cultural Property (Preservation) Act (1965)*. Additionally, protection and management of the site have been overseen at various levels within the country, including:

- a case officer for the site since 1999 in the Archaeology Section, PNG National Museum and Art Gallery;
- a Kuk Heritage Management Committee established in 1999, sponsored by the Western Highlands Provincial government, comprised of Kawelka leaders, provincial representatives (including in the past the Provincial Governor and Administrator), and representatives of national institutions (variously National Commission for UNESCO, PNG National Museum and Art Gallery, Department of Environment and Conservation, University of Papua New Guinea, National Research Institute); and
- local Kawelka leaders and landholders have formed a Kuk Local Heritage Committee and since 1998 have consistently expressed a desire to ensure the protection of the site under customary landholder and land-use arrangements.

A number of initiatives regarding the management of the Kuk site have recently occurred, or are planned, at the national (Section 0), provincial (Section 5d) and local (Section 5e and Annex E) levels.
The remains of former agricultural practices are mostly buried and preserved underneath deposits that have accumulated in the wetland through the in-washing of sediments from the catchment, through in situ peat accumulation, and through air-fall tephras (associated with volcanic eruptions off the north coast of New Guinea). The remains of some recent (within the last 1000 years) ditches and house sites do form surface earthworks in parts of the swamp, whereas all the older archaeological remains associated with former cultivation and plant exploitation are buried underground.

Archaeological artifacts and features, as well as plant macrofossil and microfossil evidence and palaeosols, associated with plant exploitation and early agriculture dating from the early Holocene to the present are well-preserved at Kuk. Although there is evidence for alteration of deposits, primary attributes associated with former cultivation practices remain well-preserved at the site; indeed they are better preserved at Kuk than at any other wetland archaeological site in Papua New Guinea.

Traditional gardening, or agricultural activities, which are being undertaken and which have been undertaken for thousands of years at Kuk, do not seriously compromise the archaeological remains at the site. Cultivation practices and rooting of most grown crops are too shallow to seriously compromise the buried materials. Only following deep-drainage in the late 1960s and 1970s, where ditches lowered the water table below most of the buried archaeological remains, has there been alteration of the upper stratigraphy at the site, although recent research shows that these older and deeper remains have largely remained unaltered (Denham 2003a). As the ditches associated with construction of the Kuk Station in the 1960s and 1970s have filled in, the water table has risen and returned to pre-drainage levels. Waterlogging and shallow rooting have aided the preservation of any buried remains thereby ensuring the continued integrity of the site.

Providing the water table is not deeply drained and the swamp dried out, either by removing the vegetation cover and exposing the area to evaporation, or by draining the swamp at a lower point, or both, the integrity of the site will be preserved. Similarly, the planting of deep-rooting trees, digging below 0.5m and mechanical cultivation would cause substantial alteration of the stratigraphy and the buried archaeological materials contained therein. As long as these activities do not occur on the property, and they have not since the Research Station was abandoned, the site will maintain its integrity.
Continued monitoring of the site will check on, and ensure the maintenance of traditional cultivation practices in the core area and buffer zone, particularly through the maintenance of the existing water table and the planting of only shallow-rooting plants. Such monitoring, which is undertaken in close consultation with the local community, will ensure the continued preservation of the site.
4. State of Conservation and factors affecting the Property

4.a Present state of conservation

**Buried Archaeological Remains**
Archaeological remains associated with former cultivation, as well as evidence of past environments, are well-preserved at Kuk. These include (see Annex A):
- features – bases of mounds, ditches, pits, stake holes, post holes
- house sites – associated with Phases 5 and 6, and potentially Phase 4
- artefacts - stone tools and wooden digging implements
- deposits – soils, sediments, palaeosols and feature fills
- plant remains - microfossil (pollen, phytolith, starch grains) and macrofossil (seeds, wood).

![Figure 4.1](attachment:image_url)

**Figure 4.1** Schematic diagram of the main stratigraphic units and tephras at Kuk with reference to the main phases of human manipulation, drainage and cultivation (based on Denham 2003b: Fig. 2)
The vast majority of these remains and materials are buried under layers of organic and mineral sediments that have accumulated at Kuk from the Pleistocene to the present-day (Figures 4.1-4.2). For most phases, the bases of former features, whether ditches, mounds, pits, or stake and post holes, are preserved underground. Successive phases of ancient cultivation have removed most of the palaeosols and shallow features associated with former periods of cultivation and manipulation, although these do survive in some areas. The only earthworks visible on the surface are house sites and field systems associated with the latest phase of agricultural development at Kuk (Phase 6).

**Figure 4.2** Jack Golson excavating black clay to reveal grey clay palaeosurface associated with mounded cultivation 7000-6400 years ago (Photo: Tim Denham 1998)

A schematic representation of the sediment deposits (omitting volcanic ashes) in blocks A, B and C at Kuk is shown together with the approximate antiquity of deposits (Figure 4.3). Grey clay takes the form of a low-angle fan extending from a southern catchment (block A) towards the middle of the Kuk swamp (blocks B and C). Overlying and more recent deposits, namely the black clay and garden soils, have a more even distribution as they formed through mineral and organic deposition although these have been subject to partial reworking during cultivation on the wetland. The bases of archaeological features for multiple phases are preserved beneath the zone of cultivation and reworking.
Figure 4.3 Schematic representation of the stratigraphy at Kuk; note the thinning of Holocene stratigraphy towards the middle of the wetland (provided by Pam Swadling).

Figure 4.4 X-radiograph of sediment collected from the fill of a 10,000 year-old palaeochannel (provided by Tim Denham and Alain Pierret). Horizontal banding represents original stratification, vertically oriented lines represent very limited root activity and faunal burrowing. This deposit has remained waterlogged for nearly all of the last 10,000 years, thereby aiding the preservation of stratification and organic materials.
The majority of archaeological remains at Kuk, from which it derives its significance, are well-preserved. Indeed, preservation is such that the fills of a 10,000 year-old palaeochannel at Kuk retain their original stratification, which is visible in the field and in X-radiographs (Figure 4.4), as well as exhibiting superb organic preservation; intact and immaculately preserved leaves can be pulled from the fill of this palaeochannel.

**Contemporary Land-uses**
The areas around the Kuk site are densely populated and modified by agriculture. The region has a population density of approximately 200 persons per kilometre. According to the 2000 census there were 403 people living on the proposed site, and there are currently at least 500 people. Several hundred more people live in the immediate vicinity and many cultivate land at Kuk. Refer to Annex D for descriptions of contemporary land-uses in the core area.

**Houses and other structures**
Kawelka, Jika-Kilampi and other invited groups have re-occupied Kuk after the Research Station was closed down. Many people living in the proposed site occupy houses originally constructed as part of the Research Station, most of which are located within the buffer zone. In recent years an increasing number of houses and other buildings, eg, a church, have been constructed across the wetland – including within the core area. In addition to houses, other buildings, roadways and facilities were constructed as part of the residential and administrative area of the Research Station, and are located within the buffer zone. These buildings and other structures have minimal below ground impacts; they either consist of elevated buildings built on metal stilts, or of ground-level buildings constructed on top of concrete pads. Some gravel-lined and earthen roadways have been graded, primarily on higher ground, whereas others have not.

The houses and other buildings that have been built since the mid-1990s on the wetland margin have been constructed using traditional methods, ie, bush materials and timber. Traditionally-built houses and other buildings are unlikely to significantly damage buried archaeological remains, except if pit latrines are constructed. These buildings are without foundations and have earthen floors, although some damage to shallow subsurface remains is anticipated due to house posts and stake holes. Consequently, the construction of larger buildings with larger posts is not encouraged. Fortunately, pit latrines have not been dug in re-occupied areas of the wetland because they are inappropriate due to the relatively high water table of the wetland, ie, they would be prone to flooding.
Figure 4.5 View along a major East-West Road at Kuk giving an impression of the contemporary landscape (Photo: Tim Denham 1999). Note discontinuous alignment of *Eucalyptus* trees.

*Station drains*

Limited disturbance to buried archaeological remains occurred when Kuk Swamp was drained for a Research Station in the late 1960s and early 1970s. Deep-drains were dug adjacent to roadways and around parts of the Station perimeter, with shallower block-dividing drains delineating individual blocks (Figure 1.4). The resultant road and major drain plan delineated large-scale blocks, eg, A10-12. These were divided by block dividing drains into smaller blocks, eg, blocks A10, A11 and A12 within A10-12, which in turn were divided by narrower drains approximately 22.5 m apart into a maximum of eight smaller units, eg, block A10 divided into A10a-A10h. Major drains were typically 1.8 m wide and deep, major block dividing drains were 1.2 m wide and deep, and minor block-dividing drains were 0.6-1.0 m wide and deep.

The drainage network for the Research Station was a major potential threat to the preservation of buried archaeological
remains, even though the archaeological significance of Kuk was only realized following these drainage works. With subsurface aeration following drainage, botanical and faunal materials preserved in the sediments begin to decay and the remains of buried archaeological features are progressively destroyed by soil forming processes, eg, bioturbation, weathering, root action and so on. However a comparison of the records and finds from archaeological excavations in the 1970s (following drainage) and in the late 1990s (25 years after drainage for the Station), indicate that only the upper peat layer that accumulated in the last 100 years has been severely degraded. These upper layers of organic-rich sediment would also have been degraded during periodic drainage in the past; this is nothing new. More deeply buried materials associated with ancient cultivation, particularly archaeological Phases 1-3, are still well-preserved (see Denham 2003a).

**Plants**

Villagers are mostly cultivating the proposed site in traditional ways, with sweet potato (*Ipomoea batatas*), banana (*Musa* spp.) and mixed vegetable plots (Figure 4.6), although some areas are planted with more deeply rooting coffee (*Coffea* sp.). Of greater potential concern were: the various species planted when the Station was operational, principally tea bushes (*Camellia sinensis*) and experimental tree-crops; the introduced *Eucalyptus* trees planted when the Station was constructed to aid drainage along roadways (Figure 4.5); and, some *Casuarina* trees and occasional fruit trees planted in recent years by villagers. Of these activities, the planting of *Eucalyptus* trees is most destructive and marks a significant departure from the types of practices that have been occurring for millennia at Kuk; although people in New Guinea have traditionally planted trees, bushes and other types of plant (see Powell 1976).

In recent years, areas formerly planted in tea and other introduced crops have been cleared and given way to more traditional gardens. Most of the *Eucalyptus* trees planted along roadways in the proposed core site at Kuk have been felled to sell for lumber (see Figure 4.5). The planting of coffee at Kuk is extensive and occurs in areas of high archaeological significance, ie, within the core area. However, the root system of the coffee plant is not highly destructive of buried archaeological remains (see Section 4b(i)).
Figure 4.6 Traditional cultivated plots in the highlands (Photos: Tim Denham 1990, 1998). Upper-left: tethered stands of sugarcane (*Saccharum officinarum*) and bananas (*Musa* spp.); Upper-right: inter-cropped taro (*Colocasia esculenta*), sugarcane, bananas and green vegetables; Lower-left: sweet potato gardens lining a roadway, with stands of bananas and sugarcane behind; Lower-right: taro planted in raised beds at Kuk.

**Rising water tables**

Following abandonment of the Research Station in the early 1990s, the water table has primarily been rising across Kuk. Most of the major, deeper road drains have not been maintained; they have gradually infilled and become clogged with sediment and vegetation. Although some landowners do periodically dig out sections of these major drains, they are not dug out to their former depth and this occurs on a piecemeal basis (thereby resulting in only a minor and local lowering of the water table). Individual block-holders do not systematically redig Station drains in the co-ordinated and integrated way that is necessary to fully drain the site. Indeed, in the last decade some areas of blocks C and the southern portion of blocks D within the core area are experiencing waterlogging and abandonment of areas of
cultivation. The waterlogging of buried deposits aids their preservation through the retardation of decomposition, oxidation and soil forming processes.

**Summary**

The area of greatest scientific interest lies in the southeast part of the Research Station (blocks A7-A12, B7-B12, C7-C12 and D7-D12). This is where most of the archaeological excavations were carried out. Although this area has been planted with coffee, bananas, and mixed vegetable gardens, these activities have not compromised buried archaeological remains at the site.

The cultural value of the property is associated with the preserved archaeological evidence as well as continuing traditional use of the site. Future management at Kuk is designed to enable the preservation of buried archaeological remains while at the same time permitting traditional cultural uses of the land. Of most importance, future management must prevent the wetland drying out in order to ensure the continued preservation of the stratigraphic layers, archaeological features, and the materials they contain. At present, water tables are rising and the impacts of current land-uses are less than those when the Research Station was in operation. Modern agricultural practices (involving deep drainage ditches) and the deep root penetration of trees (eg, *Eucalyptus* sp. and *Casuarina* spp.) have affected the prehistoric records beneath the villagers’ gardens to a limited extent. Much of what is unique to Kuk is intact, and is better preserved than anywhere else in New Guinea.

An assessment of the effects of current land-uses on the state of conservation at Kuk needs to be considered historically. For millennia, people at Kuk periodically drained the wetland for cultivation, including the construction of integrated drainage networks from 4000 years ago. People periodically cultivated the drained land and periodically built houses and other structures on higher ground within the wetland. Present activities merely represent the latest phase of periodic drainage, cultivation and occupation. Furthermore, present activities, like those of the past, have not erased the signatures of past activities, rather they contribute to the unique character of Kuk. The cumulative effects of these practices are what give Kuk its unique cultural significance as a relic and continuing, organically-evolved cultural landscape.

### 4.b Factors affecting the property

The Kuk site is currently threatened by several processes and factors within the boundaries of the proposed core area and buffer zone. The proposed core area and buffer zone are occupied by hundreds of villagers. Some of the activities and practices of crop and land management by the villagers, but not
all, do or can potentially negatively affect the archaeological value of the site.

Most traditional cultivation and house structures only impact the upper layers; the same activities have been occurring for millennia without destroying the significant archaeological remains. Some modern activities, such as deep drainage ditches and the planting of *Eucalyptus* trees, have adversely affected the buried archaeological remains to a limited extent, but it has been forever thus and the effects of these practices are decreasing through time due to rising water tables, felling of large trees for lumber and the resumption of traditional cultivation.

| (i) Development pressures | The high population densities around Mt. Hagen, including the proposed Kuk site, have caused extensive deforestation and landscape alteration in the area. These include the complete replacement of native vegetation by cultivars and invasive species, and the alteration of water drainage in the Upper Wahgi Valley. However, the transformation of the Upper Wahgi environment has been on-going since the late Pleistocene (see Section 2a). It is anticipated that Papua New Guinea’s population, and that in the Upper Wahgi valley, will continue to grow for the foreseeable future. Increased populations, both nationally and regionally, will result in an extension or intensification of existing cultivation practices by groups, depending upon their access to land.

Potential development-led pressures to the Kuk site include deep-drainage of the swamp for cultivation, and the planting of deep-rooted trees and cultivars. Since 1998, the Kawelka at Kuk have voluntarily agreed not to engage in these activities, and many leaders and block-holders recently signed a local consent Agreement to abide by future management practices at the wetland (see Section 5e below). However, both deep-drainage and deep-rooted plants will remain potential threats to the future preservation of the site, given people’s needs to grow food and desire to participate in the market economy through the growing of cash crops, and will require proactive community-relations, monitoring and management.

**Short-to-medium term pressure**

As explained previously, the physical archaeological aspects of the site are what deem it of outstanding cultural value. These include the archaeological evidence to be found buried in layers of soil underground. These can be seriously threatened by deep-drainage or drying up of the swamps, as this would preclude the natural preservation of the evidence and encourage soil formation processes that would alter, and eventually destroy, buried archaeological features.
Additionally, deeply rooted trees can affect the soil several meters below ground, whereas others have more limited impacts and are permissible. For example, villagers in many areas of the highlands plant coffee (Coffea sp.) as a cash crop. The root system of coffee plants, if planted within significant areas of the property, may damage the stratigraphy. Fortunately, the extent of damage is limited because the root system of coffee trees is largely shallow except for deeply penetrating tap root and coaxial roots; these roots are all relatively thin and would have limited impact on buried archaeological remains. Although coffee has been planted within the core area, it is unlikely to severely damage buried archaeological remains; the thin and deeply-penetrating tap and coaxial roots will only be a minor disturbance.

Although water is needed for agricultural activities and other uses, irrigation or pumping are not actively undertaken at Kuk or elsewhere in the vicinity. Rainfall is relatively abundant and even throughout the year in the Upper Wahgi valley; consequently, the artificial watering of cultivated plots is not necessary. Water for consumption and washing is available in creeks within and adjacent to the wetland, some of which have been artificially dammed to encourage the pooling of water.

**Long-term pressures**
A potential long-term threat to water tables at Kuk could be the re-drainage of the adjacent Tibi Tea Plantation (see Figure 1.2). However, this is unlikely in the short-to-medium term. Given law and order problems across the highlands, and particularly around Mount Hagen, as well as the poor maintenance of roads, there is a general economic deterioration in the region. Large-scale economic ventures, such as the deep-drainage of large plantations, are no longer undertaken; the socio-economic climate and viability of these enterprises are too uncertain to guarantee returns. Thus, the socio-economic deterioration of the region will contribute to the preservation of the archaeological remains at Kuk.

As long as there are high densities of people within and around the proposed site, potential threats to the buried archaeological remains will persist and will require active management and monitoring. However, current forms of burning, cultivation and occupation have only limited impacts on the integrity of the site, and represent the continuation of practices that have occurred for millennia.
(ii) Environmental pressures

It is important that the water table be maintained in the swamps and especially in the core area. However, the uncertain future impacts of global warming may include substantially lower precipitation levels. This may be an inevitable phenomenon and no reasonable management options can be conceived at present.

Episodic climatic events, such as droughts resulting from El Niño Southern Oscillation (ENSO), do stress highlands’ environments and the people who live there. El Niño, however, is not a new environmental phenomenon; it has occurred for thousands of years. Although these events do lower water tables in the wetland, the effects have not been sufficient to severely degrade buried archaeological remains during the Holocene, or since the Research Station was drained in the late 1960s/early 1970s. Sufficient moisture must be retained to minimize subsurface aeration, oxidation and degradation of buried materials.

Periodic droughts, such as those associated with El Niño, can sensitise the environment to human activities. In El Niño years, the environment is much drier than usual, a situation resulting in large-scale fires, as witnessed across Indo-Malaysia since the early 1990s. However, fire is not a major concern for the preservation of archaeological remains at Kuk. There is good evidence that the Kuk landscape has been maintained using fire for thousands of years without damaging buried archaeological remains.

_Eucalyptus sp._ trees have been planted lining the roads in and around the property. Many of these have already been cut down and sold for lumber. Given current land-uses at the site it is unlikely that they will regenerate or disperse. It will be recommended in the management plan that no new _Eucalyptus_ trees are planted at the nominated site.

(iii) Natural disasters and risk preparedness

The Kuk site is not exposed to major natural disasters, other than climate-related disasters (discussed above). The most likely natural disasters are:

1. Minor earthquakes that periodically cause tremors and occasional landslides in the Upper Wahgi valley.
2. Volcanic eruptions that have periodically deposited tephra at Kuk during the Holocene; however, these eruptions occurred at volcanoes hundreds of kilometers away off the north coast of New Guinea or, potentially, in the Owen Stanley Ranges to the east.

Both these natural disasters would impact heavily on people living in the area, but would have no negative impacts on buried archaeological remains. It has been hypothesised that the wetlands were periodically abandoned in the past following ash-
fall events during the Holocene. Volcanic eruptions and landslides would only contribute material to the site aiding its preservation.

Mount Hagen is a volcano, and the Upper Wahgi landscape was buried and transformed by its last eruption c. 40,000 years ago. Mount Hagen is considered to be extinct. If the volcano was to become active, tephra deposits several meters thick would bury the entire Upper Wahgi valley landscape.

| (iv) Visitor/ tourism pressures | Given the current socio-economic climate of the highlands, and Papua New Guinea generally, tourism is unlikely to impact the site in the short-to-medium term. As with the general socio-economic deterioration of the highlands in recent years, fewer tourists are visiting the region and only occasionally venture to the site. In the event that there were larger numbers of tourists to the region, the likely impacts of tourists and related service provision would need to be incorporated into the management plan of the site. |

| | Figure 4.7 Students from Mun community school visiting the excavations at Kuk in 1999 (Photo: Tim Denham) |
Visitors to the site are more likely to be local school students (Figure 4.7), who learn about Kuk as part of Papua New Guinea’s national curriculum, as well as occasional professionals and university students (Figure 4.8). However, these visits are episodic and are unlikely to impact the site in any way.

<table>
<thead>
<tr>
<th>(v) Number of inhabitants within the property and the buffer zone</th>
<th>Estimated population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core area of nominated property: about 150</td>
<td></td>
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<tr>
<td>Buffer zone: about 350</td>
<td></td>
</tr>
<tr>
<td>Total: around 500 people</td>
<td></td>
</tr>
<tr>
<td>Year of appraisal: 2000</td>
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</tbody>
</table>

There were 1928 Kawelka and 186 Jika Kilampi recorded living on, or in the immediate vicinity of Kuk swamp in the 2000 census (data from the Census Unit Register — Western Highlands Province; National Statistical Office, Port Moresby, 2002).
5. Protection and Management of the Property

<table>
<thead>
<tr>
<th>5.a Ownership</th>
<th>Traditional ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Constitution of Papua New Guinea grants customary ownership rights to the people and clans throughout the country. Indeed, only through exceptional means can this right be alienated by the Central Government. The Kuk lands are currently acknowledged to belong traditionally to a clan: the Kawelka.</td>
</tr>
<tr>
<td></td>
<td>Like most areas of PNG, ownership rights are complex because they are inextricably woven with the history of clans and family lines, which in turn are marked by tribal wars, inter-clan marriages and alliances, and other social and cultural processes. This history has been maintained through oral tradition and anthropologists have been able to record only the most notable events of the recent past. In oral societies, any legal claims or acknowledgements of ownership are always tinged with historical uncertainty and may be contestable, even though they appear solid and based on a wealth of historical facts. Claims to ownership must be weighed carefully, after long consultations and with the support of all relevant clans and neighbouring groups.</td>
</tr>
<tr>
<td></td>
<td>The Kawelka are recognized as the <em>mae pukl wua</em>, or ‘ground-root man’ of Kuk. Persons belonging to the Jika clan also live in the proposed property, but they like all other groups in the region recognize traditional ownership of the site by the Kawelka clan. In Hagen society, ground-root men have overriding power regarding: ‘matters to do with custodial rights over clan land, in granting gardening rights to group members, and in the protection of clan land’ (Ketan and Muke 2001).</td>
</tr>
<tr>
<td></td>
<td>The Meldpa perspective of land ownership is anthropologically translated as ‘the ground root man’ (<em>mae pukl wua</em>) and/or the one who ‘holds onto the ground bone’ (<em>mae ombil amborom</em>) (Strathern and Stewart 1998: 87-88). Root is a concept with multiple meanings involving references to botanical concepts of sexual reproduction, as well as social ideas of group strength, growth, expansion and divine life-giving substances. In his analysis of big-men and exchange among the Meldpa, as well as the Central Wahgi cultures, Andrew Strathern highlighted the multiple uses of the cultural idiom root to illustrate ownership, creativity, credit and debt relations, and inheritance. He has referred to (Strathern 1971, 1972):</td>
</tr>
<tr>
<td></td>
<td>• the instigators of tribal warfare as <em>el pukl wua</em>, ‘war root man’;</td>
</tr>
<tr>
<td></td>
<td>• <em>moi pulk wua</em>, ‘owners of the ground’, ie, persons who</td>
</tr>
</tbody>
</table>
The Kuk Early Agricultural Site
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| have a right to come and live at the place of their maternal kin provided they join the mother’s brother’s clan group; |
| manga puklum, leaf root place; |
| mam-nga, pukl kaklp ngond, ‘I straighten my mother’s root and give’; and |
| pulk wamb, ‘root people’. |

Root symbolizes values, assumptions, ideas, beliefs and meanings of the Central Wahgi traditions and shows how they continually re-negotiate and transform their inheritance to agricultural practices. This concept demonstrates how agricultural communities have modeled their social configurations on root and vegetative plant exploitation. Arguably, the Kawelka use the word ‘root’ as a chronological marker and they envisage themselves as the roots of the plant, and as the sole land owners.

**Legal ownership**

The land at Kuk was purchased under lease from the Kawelka by the Australian Colonial Administration of the Territory of Papua New Guinea in June of 1968 to develop a Research Station. The lease, by law, lasts 99 years. Following purchase, the Station was established and managed by the then Department of Agriculture, Stocks and Fisheries (DASF). The DASF, now known as DAL (Department of Agriculture and Livestock), abandoned the Station more than 20 years later. The Kawelkas, and their neighbours the Jika, reoccupied the land during the 1990s. The villagers nevertheless admit that the PNG Government retains legal title to the land and have engaged in negotiations in order to maintain their occupation of the land while at the same time accommodating the proposed World Heritage project.

**Bringing traditional and legal ownership together**

As part of the proposed management plan, the Kawelka acknowledge government ownership (under terms of the 1968 lease) of the land, and the national government (in this nomination document) acknowledges the rights of Kawelka, and those groups invited by them, to cultivate and occupy the land for traditional purposes. This mutually-beneficial arrangement is formalised in this World Heritage nomination document (on the part of the national government), is intrinsic to the concept of a cultural landscape proposed here, and accords with the management plan and proposed Organic Law that will regulate Kawelka use of the land at Kuk. Kawelka leaders and block holders, as well as those of other block-holding groups, have already signed a document agreeing to this principle and submitting themselves to abide by the requirements of the management plan once finalized (see Section 5e and Annex E).
### 5.b Protective designation

Enabling legislation for the nomination of World Heritage sites in Papua New Guinea is the *Conservation Areas Act* (1978) and mandate of the *National Executive Council (NEC)* (Decision NG 45/94). This NEC decision mandated the Department of Environment and Conservation (DEC) to assume responsibility as the implementing agency for the management, protection and preservation of World Heritage sites in Papua New Guinea. However, this NEC decision did not come into effect until after PNG became a State Party to the *World Heritage Convention* in 1997.

Three pieces of national legislation enable the nomination of Kuk as a World Heritage site, and ensure its future protection and management (see Section 5c for discussion of legislation and implementation).

Papua New Guinea has existing legislation concerned with movable and immovable cultural property. Under the terms of the *National Cultural Property (Preservation) Act* and associated *Regulations* (1965), Kuk qualifies as a ‘national cultural property’ that ‘means any property, movable or immovable, of particular importance to the cultural heritage of the country’ (Chapter 156: 1). The Act and associated Regulations contain provisions regarding fines and imprisonment for the destruction of cultural property, access to and management of cultural/traditional properties, and a host of related matters.

In addition to the *National Cultural Property (Preservation) Act* and *Regulations* (1965), two other pieces of legislation are directly relevant to the nomination of Kuk and will be used in tandem to manage the site in a legally binding way. The legal structure reflects the mutually-beneficial arrangement for management of the property: legal tenure by the government, and traditional ownership with use rights by the Kawelka (and other invited groups).

On the part of the national government, the Kuk site will be declared a ‘Conservation Area’ under the *Conservation Areas Act* (1978). Under the terms of this Act, the national government can enter into agreements with local communities regarding the management of areas, including sites of cultural significance.

On the part of the Kawelka community, the management plan for Kuk will be voluntarily enshrined in an ‘Organic Law’ using the *Organic Law on Provincial and Local Level Governments* (1995/1997). The *Organic Law* empowers local communities to generate binding laws to protect their own cultural and natural resources (Section 43). Laws are generated by local
communities, approved by the local government council (in this case, Dei Council), endorsed by the provincial government (in this case, Western Highlands Province), and subsequently made into law by the NEC.

5.c Means of implementing protective measures

In 1968, the customary landowners, the Kawelka sold their traditional land under lease to the national government in accordance with Section 56 of the *Lands Act (Amendment 1996).* Most agricultural leases take a life span of 99 years, as per the *Lands Act (Amendment 1996).* Because the land has been leased, a special legal strategy for conservation is required that draws on three different laws, as detailed below.

First, Kuk qualifies as a ‘national cultural property’ under the terms of the *National Cultural Property (Preservation) Act* and associated *Regulations (1965).* The Act empowers the PNG National Museum and Art Gallery to ensure protection of movable and immovable cultural and historical materials. However, the provisions of this Act are insufficient to serve as the sole legal basis to manage a World Heritage site. The 1965 Act requires updating and amendment to bring it into line with contemporary Papua New Guinean social life.

Another piece of PNG domestic legislation potentially suitable for the management of World Heritage sites is the *National Parks Act (Amendment 1982).* Under the provisions of this Act, the state would initially acquire the land under the *Lands Act* and have it reserved for the purpose of a National Park, whereby the World Heritage status can then be applied and pursued. This requires further refinement and amendments to the *National Parks Act* and the *Lands Act* with negotiations for appropriate terms and conditions under which the traditional (customary) lands would be leased to the Director of National Parks, who is also in this case the Secretary of the Department of Environment and Conservation (the focal point for World Heritage in PNG).

The *National Parks Act (Amendment 1982)* is unlikely to provide a workable, long-term framework for the management of cultural and natural properties in Papua New Guinea. Under the provisions of this Act, the designated land is required to remain as state land. Perpetual state ownership of designated land, and its concomitant alienation from local communities, is unlikely to be an acceptable long-term option for most groups in Papua New Guinea, including the Kawelka at Kuk.

Second, the *Conservation Areas Act* provides the most effective legislative cover to inscribe World Heritage sites in PNG. Like the *National Parks Act (Amendment 1982),* the *Conservation Areas Act (1978)* relates to conservation of biological resources.
and areas of cultural and natural significance. In contrast to the *National Parks Act*, the *Conservation Areas Act* does not require the lease of lands to the national government; this offers two immediate advantages. First, discussions and negotiations with landowners are much simplified. Second, the landowners can be empowered to be the stewards of the site to be protected. The land remains in the possession of the traditional landowners at all times, as established by the *Constitution of Papua New Guinea*. Customary ownership is not in conflict with site management; rather, it is viewed as a management asset.

The *Conservation Areas Act (1978)* provides a mechanism for declaring a conservation area on customary land. The key provision of the legislation is in Section 12, which allows the Minister for Environment and Conservation, after advice from the National Conservation Council, to issue a recommendation to be prepared for an area to be declared as a Conservation Area if the appropriate requirements are met. Some of the requirements include biological, topographical, geological, historical/cultural, scientific, or social significance or value to present and future generations. Because Conservation Areas will mostly be declared over customary land the recommendation must include an inventory of persons living in the area, land ownership of the area, use to which the land is put within the area, and its boundaries. Most of this information is available and furnished as part of this World Heritage nomination.

The *Conservation Areas Act (1978)* makes provision for a National Conservation Council (NCC) under Section 4, which comprises five experts with technical and specialized knowledge in the required matters. The five experts were appointed through the National Government Gazette in 2003. This Council acts as the governing body of Conservation Areas. However, management is delegated locally to Conservation Area Management Committees (each Conservation Area has its own committee). These committees must reflect the interests of the landowners and the provincial government. The role of the committees is to execute the management of the Conservation Areas (including the preparation of a management plan), keep records, and inform the NCC of any relevant changes to the status of the property. Each Conservation Area must follow a set of rules, set by the Minister (Department of Environment and Conservation) after consultation with the Management Committee and the NCC. Penalties and fees for violators of the rules are specified by the Act.

As part of the Kuk nomination process, Kuk will be designated a Conservation Area under the terms of the Act (1978). As a result, Kuk will be afforded protection under the terms of the

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Act, while at the same time the Kawelka will be legally recognized as the traditional owners of the site (although under lease to the state) and empowered to be the custodians of the site. Given that Kuk is an organically-evolved cultural landscape, significant for both its relic and continuing evidence of traditional cultivation and occupation (see Section 3a), acknowledging Kawelka stewardship enshrines their continued rights to use the land in traditional ways. The traditional uses of the land at Kuk will be formalized in a management plan and will be incorporated into an ‘Organic Law’ (see frameworks and timelines for these in Section 5e).

Third, the Organic Law on Provincial and Local Level Governments (1995/1997) has been used by local communities and provincial governments to declare and protect significant traditional sites independent of the central government. Under Section 43 the local/traditional landowners and their locally elected ward/village leaders (councilors) are empowered to develop their own laws to provide for the protection of their own natural/cultural resources. The law can be generated by a local community, approved at the local government council level, endorsed by the provincial government, and then made into law by the National Executive Council.

Under PART III, Division 3, Subdivision A, Section 42(1) stipulates that subject to the Constitution of Papua New Guinea and this Organic Law, a provincial legislature may make laws which are recognized throughout PNG in accordance with PART I Division 4, Subdivision A, Section 8. This latter sections states:

Full faith and credit shall be given throughout Papua New Guinea to the laws, the public acts, records and proceedings of all Provincial Governments and Local-level Governments.

A provincial legislature may make laws regarding culture and cultural centers (e); museums and libraries (f); land and land development, including provincial titles and leases provided that the terms of such titles and leases shall not exceed the terms of titles and leases which may be granted by or under National laws (r); and, parks, reserves, gardens, scenic and scientific centers (y). Amongst other matters, a local-level government may make laws on local environment (p), local tourist facilities and services (q), human settlements (t), and the protection of traditional sacred sites (z).

On 22nd July 2006 at Kuk, Kawelka leaders and block-holders, as well as representatives of other block-holding groups, signed a local community, or consent Agreement to abide by traditional
management of the site (see Annex E). The major points of the Agreement that the Kawelka have signed up to include (for full details see Section 5e):

1. to endorse Kuk as a cultural landscape;
2. to endorse the national government to nominate Kuk as a World Heritage site;
3. to agree to abide by the eventual legal, scientific and technical measures to manage, protect and conserve Kuk as a cultural landscape;
4. to agree, in principle, to accept the designation of core area and buffer zone while simultaneously to cultivate and use the land in traditional ways.

The terms of the Agreement will be clarified and incorporated into a more comprehensive site management plan, which will in turn be incorporated into an Organic Law. The Organic Law will be generated by the Kawelka and submitted to, and approved by Dei Council in 2007.

5.d Existing plans related to municipality and region in which the proposed property is located

No regional plans exist of relevance to the management of the Kuk site. However, the Western Highlands Provincial government has been instrumental in developing and facilitating the Kuk nomination process.

In February 1999, the Western Highlands Provincial Executive Council (PEC) met with representatives of the PNG National Museum and Art Gallery and the University of Papua New Guinea (UPNG) in Port Moresby. This was followed by the establishment of the Provincial Kuk Heritage Management Committee, which had two meetings in Mount Hagen in mid-1999, with other meetings in Mount Hagen and Port Moresby over the next two years. Representatives on the Committee included the Provincial Governor, Provincial Secretary, a cultural officer (provincial), Kawelka and Jika big men, representatives from national institutions including DEC, National Cultural Commission (NCC), the PNG National Museum and Art Gallery, UPNG and UNESCO (PNG), as well as international archaeologists.

Following the 1999 meetings, the Provincial Governor (Fr. Robert Lak) visited ongoing archaeological excavations at Kuk (Figure 5.1) and Provincial Secretary (Dr. Thomas Webster) openly endorsed the proposed nomination of Kuk for World Heritage listing at a public meeting attended by several hundred Kawelka and neighbouring groups. The Western Highlands Provincial government allocated funds to the Kuk project from 1999 to 2001, after which funding was discontinued due to uncertainties over completion of the nomination process.
The new Provincial Secretary (Mr. Michael Wandil) recently re-endorsed the nomination of Kuk for World Heritage listing and advised that funds will be allocated for the provision of services to Kuk in the 2008 budget. Service provision will include a clean water supply, an aid post and road grading. Additionally, a Cultural Officer within the provincial administration will be assigned to the management and monitoring of Kuk; this role will be added to their existing portfolio.

The Provincial Cultural Officer will liaise ‘vertically’ with local and national authorities and groups, as well as ‘horizontally’ with other departments, agencies and organizations at the provincial level. The Provincial Cultural Officer will provide a key role in communicating issues between the Kuk community and Western Highlands Provincial government, particularly with regard to service provision and site management.

**5.e Property management plan**

**Local institutional framework**

The Kawelka are a putatively segmentary lineage, patrilocal and territorial group. Namely, the group as a whole is divided into major clans which marry exogamously, which in turn are divided into sub-clans and sub-sub-clans (see Figure 5.2). The segmentary lineage structure of the group has a spatial manifestation; segmentary units reside in discrete territorial units and the hierarchy of the segmentary lineage structure is reflected in the spatial clustering of use-rights to land. The local institutional framework envisaged for the management of Kuk comprises a two-tiered structure: three Local Heritage Officers and a Local Heritage Committee. The institutional framework will become operational in 2007.
Local Heritage Officers

Three Local Heritage Officers represent each of the main clans of the segmentary lineage groups of the Kawelka: Kawelka-Kundmbbo, Kawelka-Madembo and Kawelka-Membo. Each major clan nominates their own Local Heritage Officer, who must be a member of the Local Heritage Committee, i.e., a blockholder at Kuk. Given the spatial manifestation of the segmentary lineage structure, each Local Heritage Officer effectively oversees activities within a discrete spatial area.

The roles of the Local Heritage Officers are part-time and include the following:

1. Monitor day-to-day activities associated with the management of the site, as well as water tables on a regular basis; the monitoring of land-uses is largely passive, since each officer cultivates blocks of their own and is aware of activities in the vicinity.

2. Ensure compliance with the ‘Organic Law’ and management plan, especially with regard to deep-drainage, planting of deep-rooting trees and mechanical cultivation.

Figure 5.2 The Kawelka segmentary structure (based on Strathern 1972 and Ketan 1998)
3. Convene biannual meetings of the Local Heritage Committee, or additional meetings in the event they are needed to address important and pressing management issues.

4. Ensure that the Provincial Cultural Officer (Western Highlands Province; see Section 5d) and World Heritage Officer (DEC; see Section 0) are informed in sufficient time to attend meetings, of any significant management issues, and of any potential issues likely to arise over the coming months.

5. Conduct formal biannual assessment of the property together with the Provincial Cultural Officer and the World Heritage Officer, a report from which will be submitted to the World Heritage Secretariat at DEC for evaluation.

6. Attend, when needed, meetings concerned with the management of Kuk at the provincial and national levels; it is anticipated that such attendance will be required only when a major problem is identified and requires discussion at these levels.

Local Heritage Committee
The Local Heritage Committee is composed of all block-holders within the swamp, and represents all Kawelka clans and groups of non-Kawelka who have been invited to cultivate and occupy blocks at Kuk. These latter groups do not have separate Local Heritage Officer representation, rather they are represented by the mae pukl wua (ground-root-men) who invited them to Kuk. All block-holders have been asked to sign the voluntary local Agreement; all block-holders within the core area and most within the buffer zone have done so already. All block-holders will be proponents of the ‘Organic Law’.

The primary role of the Local Heritage Committee is to serve as a forum to bring all the Kawelka clans, as well as block-holders from other groups, together to discuss issues and problems associated with the management of the site. Additionally, the Local Heritage Committee will serve as the main forum for dissemination of information to the Kawelka regarding the management and monitoring of the site, as well as for public awareness campaigns.

Among the Kawelka, as for other groups across New Guinea, communities operate on a consensual basis, albeit under the persuasive influence of big men. It is not possible for one individual to tell another what to do on their land; rather, people can be persuaded to conform through open argument, discussion
and agreement. The Local Heritage Committee serves as a forum to resolve management issues.

It is essential that Local Heritage Committee meetings are open to all block-holders and require attendance by:

- the Local Heritage Officers to ensure that the perspectives of all the major clans are heard by block-holders;
- the Provincial Cultural Officer, to ensure that relationships between the Kawelka and Western Highlands Provincial government are maintained, and that both parties are informed of activities relating to management of the site, eg, the Kawelka are informed about service provision, and the provincial authorities are made aware of any issues in this, or other regards.
- The World Heritage Officer, to ensure that relationships are maintained with national authorities and that all parties are informed of activities relating to the management of the site, eg, the results of monitoring, and any DEC-sponsored initiatives promoting the site provincially, nationally or internationally.

The meetings provide a twice-yearly opportunity for the Provincial Cultural Officer (Western Highlands Province) and the World Heritage Officer (DEC) to visit the site; check on water tables, land-uses and social relationships; make a field assessment of on-going management; and liaise with Local Heritage Officers, block-holders and the community at large. Issues raised by different stakeholding groups can only be resolved through negotiation at the appropriate levels (whether local, provincial or national).

The local management structure at Kuk is linked heavily to the Hagen concept of mae pukl wua, or ‘ground-root-man’. Ground-root-men are acknowledged as having over-riding power regarding: ‘matters to do with custodial rights over clan land, in granting gardening rights to group members, and in the protection of clan land’ (Ketan and Muke 2001). Consequently the kin-based allocation of Local Heritage Officers reflects the primacy of mae pukl wua in matters concerned with land in Hagen society; whereas the place-based membership of the Local Heritage Committee is inclusive and is open to all block-holders, no matter what their kin affiliation.

A draft of the voluntary local Agreement has already been signed by most block-holders (see Annex E) and an ‘Organic Law’ will be drafted, signed by all block-holders, and approved by the Dei Council before the end of 2007. The ‘Organic Law’ will legally enshrine key themes of the local management plan for Kuk.
Figure 5.3 Recently planted garden at Kuk showing shallow linear ditches demarcating cultivated plots (Photo: Jo Mangi 2006)

Figure 5.4 Traditional house recently constructed at Kuk (Photo: Jo Mangi 2006)
**Local management plan**

The objective of the management of the site is to preserve the evidence of ancient agriculture at the Kuk site. Management of the site will be undertaken in close consultation with, and with the assistance of, local Kawelka land-owners as part of ongoing and traditional land management practices (Figures 5.3-5.4). The continuation of traditional agriculture and other activities contributes to, rather than detracts from, the ongoing significance of the cultural landscape at Kuk.

The first stage in the development of the management plan for Kuk has been completed. Block-holders at Kuk have entered into, through their signature, the following voluntary Agreement (see Annex E for discussion of the meeting and signatures, respectively):

- Endorse that Kuk is defined as a cultural landscape, expressing the links between nature and the centuries old interactions of local people with their environment, and an outstanding example of an egalitarian nature of contemporary New Guinea highland societies, characterized by largely persuasive big men and structured by small scale polities (such as the Kawelka tribe);

- Endorse the initiative of the Government of Papua New Guinea to have the Kuk Prehistoric Agricultural Site nominated as a cultural landscape, being illustrative of evolution of human society and settlement in the last 10,000 years, and is a continuing landscape which retains an active social role in the contemporary tradition way of life;

- Agree to abide by and pledge to adopt the general policies, established by relevant heritage organizations in PNG (the newly established National World Heritage Secretariat within the Department and Conservation, as per signatory to the WHC Convention) and services, and develop suitable legal, technical scientific and financial measures for the protection, conservation, and presentation of this cultural landscape.

- Accordingly, we the members of the Kawelka tribe and representatives of the neighbouring groups, currently using the portions of the state land agree in principle to:
  1. recognize Kuk as a cultural landscape and continue to cultivate this ancient landscape according to the skills and technologies of agriculture handed down from generation to generation, and at the same time incorporating sustainable development practices;
  2. accept the proposal to establish core and buffer zones, as prescribed for inclusion in the World Heritage Listing and such is done in accordance with sound technical advise of
relevant portions of land within and beyond the State boundary;

3. agree to incorporate our traditional land-use, conservation and preservation practices, and upon, technical advise, establish modern management and legislative framework in accordance with World Heritage management practices;

4. agree to establish appropriate local heritage management service based on rules and regulations pertinent to heritage matters of the nation together with customary management and conservation values.

The above resolutions have been agreed to by all members of the Kawelka tribe who were present at the meeting on Saturday 22nd July 2006, with subsequent signatures sought from absent blockholders following the meeting. The Kawelka are now bound to the continued management of the cultural site. Such voluntary agreements are commonplace at the local level in PNG. Support at the local level, ie, at grass roots, is essential for the planned management of Kuk, or any other site in PNG, to be effective.

The voluntary Agreement is a major step-forward in solidifying community participation in the management and conservation of Kuk. The voluntary Agreement is an enabling document that forms the basis for devising a more comprehensive management plan based on continuing traditional use of the land at Kuk. The management plan will in turn form the basis of an ‘Organic Law’.

The main points of the management plan to be refined focus on minimal intervention in ongoing land-use practices and the clarification of permitted and prohibited activities. Key management objectives are:

1) To ensure that the water table of the proposed site is not lowered to jeopardize buried archaeological features and materials buried underground within the core area or the buffer zone.
2) To ensure that deeply-rooted trees are not planted or allowed to grow within the core area.
3) To prevent activities that turn, remove or alter layers of subsoil from occurring within the core area, eg, mechanized cultivation or digging/redigging of deep drains.
4) To ensure that erosion in the core and buffer areas is minimized by maintaining substantial vegetation cover and through a public awareness campaign among villagers.

Prohibited activities will minimally include:
1. Deep-drainage (below 0.8 m), either through the digging of new drains or redigging of old drains, because any significant lowering of the water table will have major deleterious impacts on buried archaeological remains through decomposition and oxidation (of buried organic materials) and soil formation (that would destroy archaeological features and inter-mix deposits of different ages). Manual and mechanical deep-drainage are not permitted.

2. Any other form of digging below 0.5 m depth, whether for house foundations, pits, earth ovens, wells, or any similar activities.

3. Planting of deep-rooting trees that could contribute to the lowering of water tables, eg, *Eucalyptus*, as well as disturb buried material through the penetration of dense and thick roots.

4. Mechanised cultivation because it can cause irreversible damage to the fragile landscape, erosion of the soil, and eventual exposure and disturbance of buried archaeological remains.

5. Individuals or groups charging visitors, whether tourists, students or school groups for access or to view the site, although people can charge for specific services, eg, sale of goods, time spent as a guide, and so on.

The management plan should not come into conflict with existing sociopolitical relations (group structure), and should incorporate traditional human-land relationships as much as possible. The Kawelka can continue to occupy the land in accordance with traditional subsistence techniques (as found in the archaeological record), while at the same time transformations of these practices, as in the past, are allowed as long as they do not threaten buried archaeological remains at the site. For example, traditional gardening methods do not alter the cultural and environmental landscape as much as modern farming techniques.

Traditional forms of cultivation have occurred at Kuk for millennia; rather than destroying the remains of previous practices, each successive period of cultivation has added to the significance of the site. In this vein, the planting of the important cash-crop coffee is permitted at Kuk because this represents the transformation of agriculture in Papua New Guinea in response to a changing socio-economic context; the root systems of coffee trees are not a major threat to buried archaeological remains (see Section 4b(ii)). Just as innovations occurred in the past, new crops and techniques are permitted at Kuk as long as they do not threaten the authenticity and integrity of the cultural resources buried at the site.
Development and revision of management plan

Institutional, legal and operational frameworks already exist at the local (Kawelka; this Section and Annex E), provincial (Section 5d) and national levels (Section 0) for the management of Kuk as a World Heritage site. Kawelka and non-Kawelka block-holders, including all major leaders, have signed a voluntary local Agreement ratifying the nomination of Kuk as a cultural landscape to the World Heritage List and agreeing, in principle, to abide by the management plan. A management plan will now be drafted in consultation with local, provincial and national stakeholders, as well as international specialists in archaeology and cultural heritage management, by the end of July 2007. The Department of Environment and Conservation, and members of the PNG National World Heritage Committee and/or the PNG National World Heritage Secretariat, will liaise closely with the UNESCO World Heritage Centre in Paris during this process.

The management plan will be treated as an operational guideline to manage and monitor the day-to-day operations of the Kuk site. The primary principle guiding management will be minimal intervention in, and regulation of traditional land-use practices. By December 2007, the management plan will be incorporated into an Organic Law legally formalizing the arrangements for managing the World Heritage site at Kuk.

The management plan will be revised every 10 years by the World Heritage Secretariat at DEC following the completion and submission of comprehensive monitoring reports on social mapping and land-uses (every 5 years) and on scientific and technical monitoring (every 10 years). These monitoring assessments are in addition to continual monitoring by Local Heritage Officers and biannual assessments by the Local Heritage Officers, Provincial Cultural Officer and World Heritage Officer. The timing of monitoring exercises is based on the insufficient periodicity of previous and current assessments:

- Social and land-use mapping occurred in 1997 (Araho 1998; Mandui 1998; Moutu 1998) and in 2006 (Mangi and Muke 2006), with incomplete studies undertaken in the early 2000s.
- The known impacts of traditional land-uses on buried archaeological remains at Kuk are based on comparisons between data generated during archaeological investigations in the early 1970s and late 1990s (Denham 2003a).

Emergency monitoring and emendation of the management plan may be required at any time if deemed necessary given

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<tr>
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management issues at the site, ie, primarily related to changes in land-use that are non-traditional or considered inappropriate by the Local Heritage Officers (Kawelka), Provincial Cultural Officer (Western Highlands Province), or World Heritage Officer (DEC).

### 5.f Sources and levels of finance

The nomination of Kuk as a World Heritage site is based on a principle of minimal intervention; Kuk is a relic and continuing organically-evolved landscape that people still occupy and cultivate in traditional ways. Minimal intervention and the continuity of traditional practices minimize costs associated with the management of the site. Greater levels of intervention, regulation and prohibition of activities would require compensation payments to block-holders for perceived losses of income, which can be large and raise unrealistic financial expectations. A minimal intervention strategy lowers people’s expectations, permits them to continue their daily activities, and does not require large financial inputs for successful management.

**National level**

The operations of World Heritage Sites and other similarly managed sites, such as Man and Biosphere sites, will be coordinated under the existing functional responsibilities of the Protected Areas Management Branch of the Department of Environment and Conservation. The Protected Areas Management Branch of the Department will, for the time being, act as the PNG National World Heritage Secretariat. It will include in its annual budgetary requirements an operational budget to cover the following in regard to the Kuk site:

- Funding of a World Heritage Officer (full-time position)
- Funding of three Local Heritage Officers (part-time basis)
- Travel/accommodation costs associated with attendance of World Heritage Officer at biannual Local Heritage Committee meetings at Kuk, as well as occasional attendance of Local Heritage Officers at meetings of the National World Heritage Committee
- Production of status reports and, particularly, collecting and maintaining monitoring data (including the participation of local block-holders in monitoring)
- *Ad hoc* expenses related to the minimal intervention management of the site, eg, signs, printing of leaflets and other educational/public awareness materials

It is the Department’s intention to prepare a PNG Government Policy Submission for the formal establishment of the PNG National World Heritage Committee. The PNG National World
Heritage Committee will minimally include the Department of Environment and Conservation, PNG National Museum and Art Gallery, The National Cultural Commission, The Tourism Promotion Authority, The Office of the Chief Secretary, the University of Papua New Guinea, the PNG National Commission for UNESCO, and other close allies such as the National Research Institute (see Section 0).

The PNG National World Heritage Committee, as per the PNG National Executive Council (NEC) Decision NG 45/94, will be under the management of an appropriate branch of the Department of Environment and Conservation. Funding will be allocated by the NEC from the annual PNG Government Operational Budget through the Planning Office. These funds will be used for the usual planning and management duties of the Committee, such as updating the Tentative List, salaries for staff at the main office, and preparation of new nominations.

Funds to meet extraordinary activities, potentially related to technical assistance, training of officers, educational and public awareness issues will be sought from UNESCO (Paris) and from the Asia-Pacific Focal Point (Department of Environment and Heritage, Government of Australia).

**Provincial level**

The appointment of a Provincial Cultural Officer will have no cost implication as the responsibility will be added to an existing portfolio. However, the provision of services to Kuk will require action on the part of the Western Highlands Provincial government to ensure the provision of clean water, an aid post and road grading. These costs will be met by the allocation of funds or resources from existing budgets.

**5.g Sources of expertise and training in conservation and in management techniques**

Expertise and training facilities for cultural heritage management are currently limited in Papua New Guinea. Our vision of Kuk as an archaeological site and cultural landscape will require a synthesis of Western and traditional Melanesian conservation and management techniques. Expert advice will be sought from both local and international communities on the best possible ways to conserve and manage the property.

The PNG National Museum and the Department of Environment and Conservation can provide some assistance in terms of expertise in conservation and management techniques. The PNG National Museum and the J.K. McCarthy Museum (Goroka) will also assist in community-led heritage management initiatives, as well as establishing permanent exhibits on Kuk and its World Heritage significance. The University of Papua New Guinea
offers a heritage management course to senior undergraduate students, and could provide a short-course for heritage officers associated with the Kuk World Heritage site.

In addition, international researchers have conducted initiatives in Papua New Guinea related to archaeology and heritage management. These include:

- Archaeological training excavations at Kuk in 1998 and 1999 by Tim Denham and Jack Golson
- Workshops on heritage management in 2002 and 2003 by Glenn Summerhayes and Matthew Leavesley

These training initiatives were designed for museum staff, provincial educational officers, and university staff and students.

The PNG Government will seek assistance from UNESCO and the Australian Heritage Commission for specialist heritage management training, and to provide opportunities for PNG heritage managers through staff exchange programs, workshops and seminars. Assistance will also be sought from UNESCO to provide the services of an international specialist in heritage management to train people from within the local community in technical aspects of heritage management, conservation, monitoring and record keeping.

5.h Visitor facilities and statistics

The nomination of Kuk as a World Heritage site is based on a principle of minimal intervention; Kuk is a relic and continuing organically-evolved landscape. People will be permitted to continue their traditional occupation and cultivation of the land. The management plan will formalise activities that the Kawelka are effectively already undertaking, with some important prohibitions.

At present no major tourist facility exists on the property, and none is planned as part of this nomination. Local, small-scale initiatives have occurred at Kuk, principally a cultural centre established by Stephen Goi (a Kawelka man living at Kuk). Provisions for such initiatives are not included as part of the DEC-sponsored management strategy for the site given that they would require funds to establish and maintain, and are likely to ferment jealousy and grievances among different clans of Kawelka. Such entrepreneurial activities are permitted as long as they do not come into conflict with the management plan.

Given the current and potential (short-to-medium term) levels of tourism within the highlands, largely reflecting socio-economic and ‘law and order’ problems, it is not appropriate to base site management around tourism, either through the construction of tourism-related facilities or through the need to generate revenue.
to successfully manage the site. Occasional travelers and school groups may visit Kuk, and may provide incidental revenue for the local economy.

<table>
<thead>
<tr>
<th>5.i Policies and Programs related to the presentation and promotion of the property</th>
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<tr>
<td>There are provisions under existing legislation which allow for preparing appropriate regulations to manage the area, including fines and other penalties against defaulters (Sections 5b and 5c). Day-to-day management of the site will be overseen by the individuals, groups and institutions at local, provincial and national levels (outlined in Sections 5e, 5d and 0, respectively). Ongoing and planned educational and promotional activities to accompany the nomination of Kuk include:</td>
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<td>- Permanent public exhibitions on Kuk at the Western Highlands Provincial offices (Mount Hagen), PNG National Museum and Art Gallery in Port Moresby, and at the J.K. McCarthy Museum in Goroka (to be completed in 2007)</td>
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<tr>
<td>- A well-illustrated, colour booklet in New Guinea pidgin and English (c. 50 pages) illustrating the site, its significance, and the people who live there; intended largely for the PNG public (Tim Denham and John Muke; to be published in late 2007)</td>
</tr>
<tr>
<td>- GIS/Web interface to be made freely available on the World-wide web and a free CD-ROM (to be distributed to every educational institution in PNG) that includes key archaeological data, history of the investigations, pictures of the site and people who live there, and interviews with researchers and locals (Tim Denham with DEC; to be completed in early 2008)</td>
</tr>
<tr>
<td>- Educational kits integrating the site into community school, national high school and university curricula; some of which will draw on GIS/Web interface (DEC; to be completed in 2008)</td>
</tr>
<tr>
<td>- A book summarizing the archaeological finds at Kuk and associated cultural issues for distribution within PNG and internationally; aimed at the educated public and students (Golson et al. in prep.; to be published in 2008)</td>
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<td>These initiatives will promote Kuk and the Kawelka within Western Highlands Province, across Papua New Guinea and among the international community.</td>
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<th>5.j Staffing levels</th>
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<td>Staffing requirements for the management of the Kuk site are as follows:</td>
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<tr>
<td>- Three part-time Local Heritage Officers at Kuk (new positions)</td>
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<tr>
<td>- Provincial Cultural Officer, Western Highlands Province (existing position, Kuk management to be included into</td>
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Staffing and costs associated with the establishment of the World Heritage Secretariat constitute an element of PNG’s World Heritage Strategy and are not associated with this nomination.

Additional specialist staff will be required to be hired on an ‘as needed’ basis to conduct the following tasks:

- Update management plan for the Kuk site (every 10 years)
- Conduct social mapping and land-use monitoring at Kuk (every 5 years)
- Conduct scientific and technical monitoring at Kuk (every 10 years)

Membership and participation in other committees at the national and local levels do not require additional staffing, or require additional labour costs; they are conducted either as part of an individual’s existing position (national level), or as an interested block-holder (local level).
6. Monitoring

6.a Key indicators for measuring state of conservation

Ideally, regular monitoring of the property would be conducted to ensure that archaeological materials are preserved, namely, periodic analyses of soil profile samples to ensure preservation. However, the realities of management in PNG dictate that a more economical and simple approach is employed. Consequently, monitoring will be multi-layered (Table 6.1):

- Day-to-day monitoring of land-use activities to ensure compliance with goals of the management plan and regular monitoring of water tables by Local Heritage Officers (with oral communication and discussion with local block-holders, provincial and national authorities);
- Biannual assessment of land-uses and water tables at the property by Local Heritage Officers, Provincial Cultural Officer and World Heritage Officer (with submission of assessment report to the World Heritage Secretariat);
- Comprehensive social mapping and land-use assessment every 5 years, and scientific and technical assessment every 10 years (with formal submission of written reports by specialists to World Heritage Secretariat, DEC);
- Emergency monitoring activities in the event of unforeseen climatic or land-use threats (with submission of written reports by specialists to World Heritage Secretariat, DEC).

Table 6.1 Summary of monitoring indicators, periodicity and location of records

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Periodicity</th>
<th>Location of Records</th>
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<tbody>
<tr>
<td>Land-use</td>
<td>Monthly (LHO)</td>
<td>All records will be kept at the World Heritage Secretariat, Department of Environment and Conservation, Port Moresby</td>
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<tr>
<td></td>
<td>Biannual (LHO, WHO, PCO)</td>
<td></td>
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<tr>
<td>Water table</td>
<td>Monthly (LHO)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biannual (LHO, WHO, PCO)</td>
<td></td>
</tr>
<tr>
<td>Social mapping and land-use</td>
<td>5 years</td>
<td></td>
</tr>
<tr>
<td>Scientific and technical</td>
<td>10 years</td>
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Note: LHO=Local Heritage Officer, PCO=Provincial Cultural Officer, WHO=World Heritage Officer
### Day-to-day monitoring
Indicators of the state of the conservation at the site need to be easily and unambiguously identified by the local landowners. The involvement of the landowners in the management of the site offers the best opportunity to communicate and pass on the values of the site to those people most likely to eventually determine its fate. With this premise in mind, the primary indicators of the state of conservation are land-uses (principally the absence of deep-drainage and digging, deep-rooting trees and mechanical cultivation), as well as approximate measures of water tables across the swamp.

Local Heritage Officers would, in addition to an understanding of land-uses through their living in the landscape, conduct periodic walks through the core area and buffer zone of the Kuk site, at least once a month, to ensure compliance with management objectives. This activity requires good relations with block-holders and knowledge of traditional cultivation techniques and crops. Such knowledge is traditionally passed orally and experientially from generation to generation in PNG. The monitoring of the property offers, therefore, a cultural and economic incentive for this knowledge to be learned and passed on. Additionally, Local Heritage Officers will gauge water tables across the wetland based on the monthly monitoring of water retention in the base of major ditches at points across the wetland. Records of land-uses and water table levels would be incorporated into biannual assessment reports to the World Heritage Secretariat (DEC).

### Biannual assessments of land-uses and water tables
Local Heritage Officers would undertake an assessment of the property with a Provincial Cultural Officer and the World Heritage Officer twice a year. At this time, the local community officers can communicate any outstanding issues associated with land-uses, water tables and potential threats to the provincial and national officers; simultaneously, the provincial and national officers can make their own independent assessments of site management.

The World Heritage Officer would be responsible for documenting the outcome of the assessment and submitting it to the World Heritage Secretariat for review and action, if required. The Provincial Heritage Officer would report back the results of the assessment to the provincial government in line with standard operating procedures.

### Comprehensive assessments by specialists
Comprehensive monitoring reports on social mapping and land-
uses will be conducted every 5 years, and on scientific and technical monitoring every 10 years. The timing of monitoring exercises is based on the insufficient periodicity of previous and current assessments.

Social and land-use mapping occurred in 1997 (Araho 1998; Mandui 1998; Moutu 1998) and in 2006 (Mangi and Muke 2006), with incomplete studies undertaken in the early 2000s. Land-use mapping is essential to maintain effective management of the site, and social mapping is essential to know who the block-holders are through time. In contrast to ongoing monitoring and biannual assessments, the social mapping and land-use assessment will be comprehensive; it will include a study of land-uses and block-holding for the whole property every 5 years. These studies have considerable potential to build capacity for self-assessment among the Kawelka; educated villagers can assist and be trained during monitoring exercises. Through time, external consultants would play a decreasing role, and Kawelka an increasing role, in the social mapping and land-use assessments.

The known impacts of traditional land-uses on buried archaeological remains at Kuk are based on comparisons between baseline data generated during archaeological investigations in the early 1970s and late 1990s (see reports on both reported in Denham 2003a). Scientific and technical assessments will focus on:

- water tables (to assess the degree of aeration/inundation at the site);
- detailed topographic survey of the whole property (to assess land degradation, shrinkage and erosion of the wetland due to continued cultivation);
- soil/sediment geochemistry (to assess weathering);
- soil/sediment macro-, meso- and micro-characteristics exhibited in the field, X-rays and thin sections, respectively (to assess soil forming processes that could destroy buried archaeological remains); and,
- preservation of macrobotanical and microbotanical materials (to assess deterioration of organic materials within buried deposits).

These assessments will not require archaeological excavations but will focus on monitoring the burial environment in areas adjacent to known archaeological remains. Archaeological excavations are inappropriate as a means of monitoring the site since archaeology is a destructive science. Monitoring activities will not directly impact on buried archaeological remains; rather, they will recur at five control areas across the wetland (two in the core area and three in the buffer zone), namely, they will be
Meteorological data will be incorporated into the technical assessment in order to monitor the interactions among climate, water tables, land-uses and burial environments through time. Shifts in climate may require changes in management strategy at the site.

**Emergency monitoring activities**
Emergency monitoring and emendation of the management plan may be required at any time if deemed necessary given management issues at the site, ie, primarily related to changes in climate, or land-uses that are non-traditional or considered inappropriate by the Local Heritage Officers (Kawelka), Provincial Cultural Officer (Western Highlands Province), or World Heritage Officer (DEC).

**Revision of the management plan**
The management plan will be revised every 10 years following ongoing and specialist monitoring of the property. Additionally, the management plan may be revised or amended at any time if a significant threat to the property is identified.

<table>
<thead>
<tr>
<th>6.b Administrative arrangements for monitoring the property</th>
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<tbody>
<tr>
<td>The World Heritage Secretariat (DEC) will oversee, co-ordinate and facilitate all monitoring activities at the site, in conjunction with provincial authorities and local block-holders. Contact details are as follows:</td>
</tr>
<tr>
<td>World Heritage Secretariat,</td>
</tr>
<tr>
<td>Parks and Protected Areas Branch,</td>
</tr>
<tr>
<td>Department of Environment and Conservation,</td>
</tr>
<tr>
<td>P O Box 6601,</td>
</tr>
<tr>
<td>Boroko, NCD,</td>
</tr>
<tr>
<td>Papua New Guinea.</td>
</tr>
<tr>
<td>Tel: (+675) 325 0180</td>
</tr>
<tr>
<td>Fax: (+675) 325 0182</td>
</tr>
<tr>
<td>E-mail: <a href="mailto:odir@daltron.com.pg">odir@daltron.com.pg</a></td>
</tr>
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</table>

The World Heritage Officer to be employed by DEC will undertake a biannual assessment of the site following the Local Heritage Committee meeting and field visit together with the Local Heritage Officers and Provincial Cultural Officer. The World Heritage Officer will co-ordinate and communicate with local (Local Heritage Officers and Committee), provincial (Provincial Cultural Officer) and national (World Heritage Secretariat and National World Heritage Committee) authorities regarding management of the property.
The Local Heritage Officers at Kuk are employed by DEC to:

- co-ordinate the Local Heritage Committee;
- undertake ongoing monitoring of land-uses, social issues and water tables at the site; and,
- conduct biannual assessments of the site together with the World Heritage Officer and Provincial Cultural Officer.

Specialist monitoring services to be undertaken every 5 years for social mapping and land-use assessment, and every 10 years for scientific and technical assessment, will be contracted by the World Heritage Secretariat. The use of external specialists is recommended for two reasons:

1. It will ensure that the most appropriate specialists in the required fields are contracted to conduct the monitoring assessments; furthermore, some scientific and technical expertise and equipment are not available within DEC, or currently within PNG.
2. It will provide an independent monitoring assessment; all other assessments will be undertaken by people employed by DEC (World Heritage Officer and Local Heritage Officers) and the use of external consultants will avoid any conflicts of interest and institutional bias in reporting on the management of the site.

### 6.c Results of previous reporting exercises

**Social mapping and land-use assessments**

Social mapping and land-use assessment occurred in 1997 (Araho 1998; Mandui 1998; Moutu 1998) and in 2006 (Mangi and Muke 2006), with incomplete studies undertaken in the early 2000s. These studies documented and mapped:

- Block-holders
- Land-uses (traditional cultivation, coffee, houses, other buildings, and so on)
- State of drainage and water tables
- Potential impacts of land-uses on buried archaeological remains
- Potential threats to the future management of the site

**Scientific and technical assessments**

Archaeological and multi-disciplinary investigations of the site occurred in the early 1970s and late 1990s (see Denham 2003a for reports on all investigations). The 20+ years gap between the original investigations directed by Prof. Jack Golson and colleagues in the 1970s and those directed by Tim Denham and colleagues in the late 1990s enable an assessment of the effects of Research Station drainage and subsequent land-uses on the site. Findings included:

- Archaeological features, especially those associated
with early and mid-Holocene practices, showed no signs of deterioration

- Major stratigraphic units, minor stratigraphic units (tephras) and the cuts and fills of archaeological features had undergone only minor alterations both geochemically and structurally, with most marked changes occurring in the upper stratigraphy deposited over the last 100 years
- The preservation of macrobotanical (seeds and wood) and microbotanical (charcoal, phytoliths, pollen and starch grains) fossils, documenting former cultivation practices and past environments, was very good-to-excellent and sufficient for respective analyses
### 7. Documentation

#### 7.a Photographs, slides, image inventory and authorization table, and other audio-visual materials – SEE ANNEX H FOR DISC

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<tr>
<td>Kuk1</td>
<td>JPEG</td>
<td>A characteristic agricultural landscape of the Upper Wahgi valley in the 1970s</td>
<td>c.1970</td>
<td>Jack Golson</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk2</td>
<td>JPEG</td>
<td>Extensive swamplands of the Upper Wahgi valley (view to north showing Ep Ridge in left foreground)</td>
<td>c.1970</td>
<td>Jack Golson</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk3</td>
<td>JPEG</td>
<td>View across Kuk to north (Ep Ridge) showing vegetation, recently dug Station drains and surface topography of abandoned Phase 6 garden plots</td>
<td>1972</td>
<td>Jack Golson</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk4</td>
<td>JPEG</td>
<td>Oblique aerial photograph of Kuk showing recently dug Station drains and vegetation marks of Phase 6 ditches and gardens</td>
<td>1972</td>
<td>Jim Bowler</td>
<td>Jack Golson</td>
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<td>Kuk5</td>
<td>JPEG</td>
<td>Stratigraphic section in the northern portion of Kuk Swamp (exposed in a Station drain)</td>
<td>c.1972</td>
<td>Jack Golson</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk6</td>
<td>JPEG</td>
<td>Stratigraphic section in the southern portion of Kuk Swamp (exposed in a Station drain; staff graduated in 20 cm intervals)</td>
<td>c.1972</td>
<td>Jack Golson</td>
<td>Jack Golson</td>
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<td>Kuk7</td>
<td>JPEG</td>
<td>Wooden paddle-shaped spades dug up at Kuk</td>
<td>c.1970</td>
<td>Bob Mitton</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk8</td>
<td>JPEG</td>
<td>Oblique aerial photograph showing house excavations at Kuk in 1972</td>
<td>1972</td>
<td>Jim Bowler</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk9</td>
<td>JPEG</td>
<td>Oblique aerial photograph of the Station showing: Ep Ridge in the background, recently dug Station drains, ancient palaeochannel alignments, and Phase 6 field systems</td>
<td>1972</td>
<td>Jim Bowler</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk10</td>
<td>JPEG</td>
<td>Stratigraphy of an ancient Phase 3 palaeochannel at Kuk</td>
<td>1974</td>
<td>Jack Golson</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk11</td>
<td>JPEG</td>
<td>Stratigraphy of an ancient Phase 2 palaeochannel at Kuk (the 4m wide and 4 m deep channel section is</td>
<td>1974</td>
<td>Jack Golson</td>
<td>Jack Golson</td>
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Department of Archaeology and Natural History, Research School of Pacific and Asian History, Coombs Building, Australian National University, Canberra ACT 0200, Australia

jack.golson@anu.edu.au
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<td>Kuk12</td>
<td>JPEG</td>
<td>clearly discernible against white clay). Korowa is standing in the base of the trench. Kuk. The fills of this palaeochannel are well-stratified and well-preserved.</td>
<td>1975</td>
<td>Klim Gollan</td>
<td>Jack Golson</td>
<td><a href="mailto:jack.golson@anu.edu.au">jack.golson@anu.edu.au</a></td>
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<tr>
<td>Kuk13</td>
<td>JPEG</td>
<td>Close-up of stratigraphy of the ancient Phase 1 palaeochannel at Kuk. The fills of this palaeochannel are well-stratified and well-preserved.</td>
<td>1975</td>
<td>Klim Gollan</td>
<td>Jack Golson</td>
<td><a href="mailto:jack.golson@anu.edu.au">jack.golson@anu.edu.au</a></td>
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<td>Kuk14</td>
<td>JPEG</td>
<td>Bed and eastern bank of the ancient Phase 1 palaeochannel at Kuk (staff gradations every 20 cm). The basal fill of the palaeochannel is rich in preserved organic materials, especially twigs and leaves.</td>
<td>1975</td>
<td>Klim Gollan</td>
<td>Jack Golson</td>
<td><a href="mailto:jack.golson@anu.edu.au">jack.golson@anu.edu.au</a></td>
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<tr>
<td>Kuk15</td>
<td>JPEG</td>
<td>Trench at Kuk containing multiple cross-cutting ditches belonging to Phases 3 and 5</td>
<td>1975</td>
<td>Klim Gollan</td>
<td>Jack Golson</td>
<td><a href="mailto:jack.golson@anu.edu.au">jack.golson@anu.edu.au</a></td>
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<td>Kuk16</td>
<td>JPEG</td>
<td>Trench at Kuk containing the preserved bases of Phase 2 cultivation mounds (visible as circular and subcircular patches of grey clay in the trench base prior to their full excavation)</td>
<td>1975</td>
<td>Klim Gollan</td>
<td>Jack Golson</td>
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<td>Kuk17</td>
<td>JPEG</td>
<td>Trench at Kuk containing the preserved bases of Phase 2 cultivation mounds (visible as circular and subcircular rises in the trench base after full excavation). Later prehistoric ditches cross-cut the Phase 2 palaeosurface.</td>
<td>1975</td>
<td>Klim Gollan</td>
<td>Jack Golson</td>
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<td>Kuk18</td>
<td>JPEG</td>
<td>Trench at Kuk containing the preserved bases of Phase 2 cultivation mounds (visible as circular and subcircular rises in the trench base after full excavation). Later prehistoric ditches cross-cut the Phase 2 palaeosurface.</td>
<td>1975</td>
<td>Klim Gollan</td>
<td>Jack Golson</td>
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<td>JPEG</td>
<td>Trench at Kuk containing the preserved bases of Phase 2 cultivation mounds (visible as circular and subcircular rises in the trench base after full excavation).</td>
<td>1975</td>
<td>Klim Gollan</td>
<td>Jack Golson</td>
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<td>Kuk20</td>
<td>JPEG</td>
<td>Depiction of late Phase 2 curvilinear channel draining across a palaeosurface (and cross-cut in several places by more recent prehistoric ditches)</td>
<td>1977</td>
<td>E.C Harris</td>
<td>Jack Golson</td>
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<td>Kuk21</td>
<td>JPEG</td>
<td>Close-up of late Phase 2 curvilinear channel draining across a palaeosurface</td>
<td>1977</td>
<td>E.C Harris</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk22</td>
<td>JPEG</td>
<td>Stratigraphic section showing grey clay dipping down to fill an underlying Phase 1 feature</td>
<td>1975-6</td>
<td>Jack Golson</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk23</td>
<td>JPEG</td>
<td>Phase 1 palaeosurface below grey clay with some features already excavated of grey clay fills and some features retaining grey clay fills</td>
<td>1977</td>
<td>E.C Harris</td>
<td>Jack Golson</td>
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<tr>
<td>Kuk24</td>
<td>JPEG</td>
<td>Close-up of repetitive Phase 1 feature types, a stake hole (on right) accompanied by a wider, shallower pit.</td>
<td>1977</td>
<td>E.C Harris</td>
<td>Jack Golson</td>
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<td>Kuk25</td>
<td>JPEG</td>
<td>Stake holes and shallow pit containing a chert flake on the Phase 1 palaeosurface</td>
<td>1977</td>
<td>E.C Harris</td>
<td>Jack Golson</td>
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<td>Kuk26</td>
<td>JPEG</td>
<td>Inter-cutting Phase 1 pits (after excavation and cross-cut by a later ditch)</td>
<td>1975</td>
<td>Klim Gollan</td>
<td>Jack Golson</td>
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<td>Kuk27</td>
<td>JPEG</td>
<td>Pits and inter-connecting features on Phase 1 palaeosurface</td>
<td>1977</td>
<td>E.C Harris</td>
<td>Jack Golson</td>
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<td>Kuk28</td>
<td>JPEG</td>
<td>Two prehistoric house mounds side by side at Kuk</td>
<td>1972</td>
<td>Jack Golson</td>
<td>Jack Golson</td>
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<td>Kuk29</td>
<td>JPEG</td>
<td>Excavation of house mound at Kuk showing deep horse-shoe shaped ditch and raised floor capped with grey clay</td>
<td>1972</td>
<td>Ron Lampert</td>
<td>Jack Golson</td>
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<td>Kuk30</td>
<td>JPEG</td>
<td>Excavation of a round men’s house at Kuk; surrounding ditch, entrance (foreground) and post and stake holes are clearly visible.</td>
<td>1972</td>
<td>Ron Lampert</td>
<td>Jack Golson</td>
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<td>Kuk31</td>
<td>JPEG</td>
<td>Oblique aerial photograph of 1977 excavations, including of multiple Phase 5 house sites on higher ground in the foreground</td>
<td>1977</td>
<td>E.C. Harris</td>
<td>Jack Golson</td>
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<td>Kuk32</td>
<td>JPEG</td>
<td>Traditional-type house in the mountainous interior of New Guinea</td>
<td>1990</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<tr>
<td>Kuk33</td>
<td>JPEG</td>
<td>Forest-grassland mosaic landscape in the mountainous interior of New Guinea</td>
<td>1990</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<tr>
<td>Kuk34</td>
<td>JPEG</td>
<td>Swidden cultivation in the mountainous interior of New Guinea; newly planted plot in the background and older inter-cropped plot in the foreground with bananas <em>(Musa sp.)</em>, sugar cane <em>(Saccharum officinarum)</em> and taro <em>(Colocasia esculenta)</em>.</td>
<td>1990</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<tr>
<td>Kuk35</td>
<td>JPEG</td>
<td>Swidden cultivation in the mountainous interior of New Guinea; newly planted inter-cropped plot.</td>
<td>1990</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<tr>
<td>Kuk36</td>
<td>JPEG</td>
<td>Semi-permanent inter-cropped plot in the highlands of New Guinea; note mounds planted with sweet potato <em>(Ipomoea batatas)</em> adjacent to the road</td>
<td>1990</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk37</td>
<td>JPEG</td>
<td>Inter-cropped plot in the highlands of New Guinea; bananas <em>(Musa)</em> in the foreground and bound stands of sugar cane <em>(Saccharum officinarum)</em> in the background.</td>
<td>1990</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk38</td>
<td>JPEG</td>
<td>Inter-cropped plot in the highlands of New Guinea</td>
<td>1990</td>
<td>Tim Denham</td>
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<td>Kuk39</td>
<td>JPEG</td>
<td>Cultivation of taro <em>(Colocasia esculenta)</em> in raised beds at Kuk in 1998</td>
<td>1998</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk40</td>
<td>JPEG</td>
<td>View south over Kuk from Ep Ridge in 1998</td>
<td>1998</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk41</td>
<td>JPEG</td>
<td>Roadway at Kuk in 1998 showing <em>Eucalyptus</em> trees and abandoned land overgrown with <em>pitpit</em></td>
<td>1998</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk42</td>
<td>JPEG</td>
<td>Community discussions at Kuk prior to excavations in 1998</td>
<td>1998</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk43</td>
<td>JPEG</td>
<td>Stratigraphy at Kuk in 1999 (red ruler is 1 m); note</td>
<td>1999</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>root-penetration in the upper garden soil</td>
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<td>Kuk44</td>
<td>JPEG</td>
<td>Jack Golson excavating the Phase 2 palaeosurface in 1998</td>
<td>1998</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk45</td>
<td>JPEG</td>
<td>Jack Golson discussing excavations with former provincial governor (Father Lak) at Kuk in 1999</td>
<td>1999</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk46</td>
<td>JPEG</td>
<td>Community discussions during excavations at Kuk in 1999</td>
<td>1999</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk47</td>
<td>JPEG</td>
<td>Training of PNG National Museum staff and local Kawelka at Kuk in 1998</td>
<td>1998</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk48</td>
<td>JPEG</td>
<td>Ru (left) and relative; Ru is a Kawelka big man who has long supported archaeological investigations at Kuk and the World Heritage nomination</td>
<td>1999</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
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<td>Kuk49</td>
<td>JPEG</td>
<td>Mun Community School visit to excavations at Kuk in 1998</td>
<td>1998</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kuk50</td>
<td>JPEG</td>
<td>Kawelka children visiting excavations at Kuk in 1999</td>
<td>1999</td>
<td>Tim Denham</td>
<td>Tim Denham</td>
<td></td>
<td></td>
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</tbody>
</table>
### 7.b Texts relating to protective designation

A full management plan is in preparation and will be in place by the end of July 2007. The management plan will be implemented by DEC and key elements will become incorporated into an Organic Law to be sponsored by the Kawelka.

Annexes D and E contain information that bears on the management of the site.

### 7.c Form and date of most recent records or inventory of property

**Social mapping and land-uses**


Comprises:
- History of proposed protection and management of Kuk as a cultural site
- Report on current community sentiment at Kuk regarding World Heritage nomination
- Survey of block-holders and land-uses in the core area
- Details of community meetings, local Agreement and signatory pages
- Discussion of potential threats to the integrity of the site

**Archaeology, stratigraphy and multi-disciplinary investigations**


Comprises:
- A main volume detailing the results and significance of multi-disciplinary investigations of early and mid-Holocene practices (including early agriculture) at Kuk
- A volume of appendices that detail archaeological, stratigraphic, dating and palaeoecological investigations at the site, which have a direct bearing on its authenticity and integrity as a site of outstanding universal value that exhibits early and independent agricultural development

### 7.d Address where inventory, records and archives are held

**Social mapping and land-uses**

Block-holder records, photographs, inventories and original signature pages for fieldwork in 2006 and the Local Agreement are held by the Social Research Institute Ltd contactable at PO Box 172, University Post Office, National Capital District, Papua New
Additional records of social mapping and land-uses resulting from fieldwork in 1997 are held at the PNG National Museum and Art Gallery, PO Box 5560, Boroko, National Capital District, Papua New Guinea.

**Archaeology, stratigraphy and multi-disciplinary investigations**
The site archive (paper and material) from the 1990s investigations is held by Dr. Tim Denham, School of Geography and Environmental Science, PO Box 11A, Monash University, Victoria 3800, Australia.

The site archive (paper and material) from the 1970s investigations is held by Prof. Jack Golson, Department of Archaeology and National History, Research School of Pacific and Asian Studies, Australian National University, Canberra, ACT 0200, Australia.

Once research is completed, the archives (paper and material) from the multi-disciplinary investigations at Kuk will be deposited at the PNG National Museum and Art Gallery, Port Moresby.

### 7.e Bibliography


Harris, D.R. 1995. Early agriculture in New Guinea and the Torres Strait divide. Antiquity 69 (Special Number 265): 848-54.


<table>
<thead>
<tr>
<th>105-26.</th>
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<tbody>
<tr>
<td><strong>Strathern, A.</strong> 1972. <em>One father, one blood</em>. Canberra: Australian National University.</td>
</tr>
</tbody>
</table>

### 8. Contact Information of responsible authorities

| 8.a Preparers | Tim Denham, Ph.D.  
School of Geography and Environmental Science,  
P.O. Box 11a,  
Monash University,  
VIC 3800, Australia  
Tel: (+61) (0)3 9902 0109  
Fax: (+61) (0)3 9905 2948  
E-mail: Tim.Denham@arts.monash.edu.au  

John Muke, Ph.D.  
National Cultural Commission of Papua New Guinea  
P.O. Box 7144  
Boroko, NCD  
Papua New Guinea  
Tel: (+675) 323-5111  
Fax: (+675) 325-9119  

Leonardo A. Salas, Ph.D.  
The Wildlife Conservation Society  
P.O. Box 277, Goroka, EHP, Papua New Guinea  
Tel: (+675) 732-3836  
Fax: (+675) 732-3837  
E-mail: LeoASalas@netscape.net or lsalas@global.net.pg  

Vagi Genorupa  
Head, Parks and Protected Areas Branch  
Department of Environment and Conservation  
P O Box 6601  
Boroko, NCD  
Papua New Guinea.  
Tel: (+675) 325 – 0180  
Fax: (+675) 325 – 0182  
E-mail: vgenorupa@yahoo.com.au |
|---|---|
| 8.b Official Local Institution/Agency | National government contact:  
Dr. Wari Iamo  
Secretary  
Department of Environment and Conservation  
PNG National World Heritage Authority  
P.O. Box 6601  
Boroko, NCD  
Papua New Guinea.  
Telephone: (+675) 325 – 0180 |
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<th>8.c Other Local Institutions</th>
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<tr>
<td></td>
<td>Mr. Michael Wandil</td>
</tr>
<tr>
<td></td>
<td>Provincial Administrator</td>
</tr>
<tr>
<td></td>
<td>Western Highlands Provincial Government</td>
</tr>
<tr>
<td></td>
<td>P O Box 17</td>
</tr>
<tr>
<td></td>
<td>Mount Hagen, WHP</td>
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<tr>
<td></td>
<td>Papua New Guinea</td>
</tr>
<tr>
<td></td>
<td>Tel: (+675) 542 – 1627 / 542 – 1626</td>
</tr>
<tr>
<td></td>
<td>Fax: (+675) 542 – 2316</td>
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<td></td>
<td>Local level government contacts:</td>
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<td></td>
<td>Please refer to the same contacts as shown above under the Western Highlands Provincial Government</td>
</tr>
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<p>| 8.d Official Web address      | None exists. At present no plans have been made on this regard. |</p>
<table>
<thead>
<tr>
<th>9. Signature on behalf of the State Party</th>
</tr>
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</table>

This document is submitted to the World Heritage Committee, UNESCO headquarters, for the consideration of the Kuk Early Agricultural Site of Papua New Guinea to be nominated a World Heritage Site.

On behalf of the Government of Papua New Guinea,

Dr. Wari Iamo  
Secretary  
Department of Environment and Conservation  
National World Heritage Authority
## 10. Annexes

| 10.a List of Annexes | Annex A - Archaeological phases at Kuk Swamp, Wahgi Valley  
Annex B - Wetland archaeological evidence for prehistoric agriculture in highland Papua New Guinea  
Annex C - Early and mid-Holocene plant exploitation chronology for the highlands  
Annex D – Social mapping and land use assessment at Kuk in 2006  
Annex F – Key scientific and anthropological publications on the Kuk site and the Kawelka  
Annex G – Comparison of Kuk with other sites on the World Heritage List  
Annex H – Photographic documentation of Kuk  
Note: GIS/Web interface is under construction for the Kuk site |
Annex A - Archaeological phases at Kuk Swamp, Wahgi Valley
(after Denham et al. 2003: Tables 1, S1 and S2; Denham et al. 2004b: Table 1). Another possible Phase 2 sub-phase pre-dates ash deposition at 3980-3630 cal BP, although it is not well-characterized and is not included.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Age (cal BP)</th>
<th>Description</th>
<th>Stone artefacts</th>
<th>Wooden artefacts</th>
<th>House sites</th>
<th>Ditches</th>
<th>Cultivation features</th>
<th>Artificial channels</th>
<th>Key references</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>260-100</td>
<td>rectilinear field systems</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Golson 1977b, 1982</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>420-260</td>
<td>rectilinear field systems</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Bayliss-Smith et al. 2005; Golson 1977b, 1982</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4350-3980</td>
<td>early sub-phase: rectilinear ditch networks</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes

1 No wooden artefacts were collected from Phase 1-3 contexts (contra Powell 1982: Table 2).
2 E.C. Harris (1977) noted unexcavated house remains at a multi-occupation house site and these could pre-date Phase 5.
3 Occasional features interpreted to represent ‘within plot’ cultivation features have been recorded for late Phase 3.
4 Palaeochannels have been differentiated from ditches at Kuk on the basis of scale, although the mode of formation of some palaeochannels is uncertain (Denham et al. 2004a). Golson and Hughes have argued for the artificiality of all palaeochannels (after Golson 1977b: 613-5; Golson and Hughes 1980: 298), whereas Denham has suggested that the Phase 1 and 2 palaeochannels may not be human-made (after Denham 2003b: 163-4, 2004b: 47-53).
Annex B - Wetland archaeological evidence for prehistoric agriculture in highland Papua New Guinea

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Altitude (m)</th>
<th>Location</th>
<th>Main Field Seasons</th>
<th>Phases Represented</th>
<th>Principal Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindeng</td>
<td>1600</td>
<td>U. Wahgi Valley</td>
<td>1968</td>
<td>n/a</td>
<td>Unpublished</td>
</tr>
<tr>
<td>Kuk</td>
<td>1560</td>
<td>U. Wahgi Valley</td>
<td>1972-7</td>
<td>1, 2, 3, 4, 5, 6</td>
<td>See Table 1 for detailed phase references</td>
</tr>
<tr>
<td>Mugumamp</td>
<td>1560</td>
<td>U. Wahgi Valley</td>
<td>1977</td>
<td>2, 5 (6)¹</td>
<td>Harris and Hughes 1978</td>
</tr>
<tr>
<td>Kana</td>
<td>1480</td>
<td>M. Wahgi Valley</td>
<td>1993-4</td>
<td>(2)², 3, 4, 5</td>
<td>Muke and Mandui 2003</td>
</tr>
</tbody>
</table>

Notes
1 Other wetland sites were inspected by archaeologists, although none was investigated in detail. For example, the site at Kotna (1580 m) in the Upper Wahgi Valley was village land under drainage for coffee. The site was visited by Jack Golson and John Muke in 1988, at which time they sought permission to record features exposed in drain walls. Permission was refused, but while waiting they were able to look at some stretches of drain wall, in which ditches comparable to those of Phase 5 at Kuk were exposed (Jack Golson pers. comm. 2002).
2 The archaeological finds at Kindeng have not been cross-correlated to those at other wetland sites (Jack Golson pers. comm. 2001).
3 Phases in brackets indicate provisional identifications (after Denham 2003b).
### Annex C - Early and mid-Holocene plant exploitation chronology for the highlands


<table>
<thead>
<tr>
<th>Date (cal. BP)</th>
<th>Sub-phase</th>
<th>Archaeological remains</th>
<th>Plant exploitation</th>
<th>Palaeoecological signal</th>
<th>Archaeobotany: plants present/used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pleistocene (Pre-Phase 1), plant-food procurement and production</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-10,200</td>
<td>None</td>
<td>None</td>
<td>Plant-food procurement and production</td>
<td>Sustained burning of primary forest by 19,100-16,800 cal. BP for hunting and plant exploitation</td>
<td>Indigenous suite of plants present in the catchment including Castanopsis sp., Coleus sp., Musaceae, Oenanthe javanica, Pandanus spp., Rubus spp., cf. Setaria palmifolia, Solanum nigrum and cf. Zingiberaceae</td>
</tr>
<tr>
<td><strong>Early Holocene (Phase 1), plant-food production or swidden cultivation?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,200-9910</td>
<td>None</td>
<td>Palaeosurface of pits, runnels, stake and post holes, artefacts</td>
<td>Plant-food production (or swidden cultivation?)</td>
<td>Intensified disturbance using fire of primary forest, creation of habitat mosaic including secondary forest and open communities</td>
<td>Earliest evidence for the presence and use of Colocasia taro and Dioscorea sp.</td>
</tr>
<tr>
<td><strong>Early Holocene (Grey clay), plant-food production or swidden cultivation?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-10,200-9910 to pre-6950-6440</td>
<td>Between Phases 1 and 2</td>
<td>Artefacts</td>
<td>Plant-food production (or swidden cultivation?)</td>
<td>Intensified disturbance with gradual and cumulative decline of primary forest in catchment and local successions on the wetland</td>
<td>Musa spp. bananas (Eumusa and Ingentimusa sect.) present at the onset of grey clay deposition and probably coincident with Phase 1</td>
</tr>
<tr>
<td><strong>Mid-Holocene (Phase 2), mounded cultivation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6950-6440</td>
<td>Early</td>
<td>Palaeosurface of subcircular ‘island beds’, stake and post holes, artefacts</td>
<td>Mounded cultivation</td>
<td>Dramatic degradation to grassland maintained by fire</td>
<td>High frequencies of Musaceae phytoliths suggestive of planting</td>
</tr>
<tr>
<td>Pre-3980-3630 (c. 4840-4440)</td>
<td>Late</td>
<td>Amorphous palaeosurface (runnel)</td>
<td>Mounding? (digging/ditching?)</td>
<td>Grassland maintained by fire</td>
<td>High frequencies of Musaceae phytoliths suggestive of planting</td>
</tr>
<tr>
<td><strong>Mid-Holocene (Phase 3), ditched cultivation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. 4350-3980</td>
<td>Early</td>
<td>Ditch networks/ Palaeochannels</td>
<td>Ditching</td>
<td>Grassland maintained by fire</td>
<td></td>
</tr>
<tr>
<td>Pre-3260-2800</td>
<td>Late</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Annex D - Social mapping and land use assessment at Kuk in 2006

The social mapping and land uses reported here only concern the core area of this proposed nomination. This annex has been extracted in edited form from *Social Mapping and Land-Use Assessment of the proposed World Heritage site at Kuk, Western Highlands Province, Papua New Guinea*, by Jo Mangi and John Muke (Social Research Institute, Inc. for the Department of Environment and Conservation, 2006). The land use and block-holder assessment was conducted over a two week period beginning on Thursday 17th 2006. The field team was accompanied by respective block holders each day, and activities on each block were noted and photographed. GPS readings were taken for the core area.

![Figure D.1 Summary diagram of land uses in the core area](image)

*Figure D.1 Summary diagram of land uses in the core area*
Block A12
This is the southeastern corner of the core area with Tibi Creek running along the southern boundary and turning northwards at the corner.

 KEY & NOTES
1. Andrew Wek’s chicken house
2. Andrew Wek’s home
3. William Pek’s newly constructed pigsty

Over eighty percent (80%) of this block is under coffee cultivation with canning trees for shade and some banana. Only twenty percent (20%) in the northwestern corner is taken up be food garden. The block is well drained.

Block B12

 KEY & NOTES
The bulk of the land in this Block is also under coffee with only two small areas set aside for gardening.

The first garden is in Block B12. The second photo is an example of a modern drain in the adjoining Block (C12). It was dug to drain water out from the coffee plot in the background.
Block C12

KEY & NOTES
Block C12 is predominantly mixed gardens as shown below.
The first garden has cassava along the drain, ginger, banana, yam, kau-kau, corn, peanut, spring onion and even marigold for decoration.
The second was a new mixed garden with winged beans, cassava, yam, pumpkin, cucumber, chooree and banana growing in it.
The land is well drained though some blockage was noted in the main drain running parallel to the road.

4. Apokes Kapa in the garden (Block C12).
5. Anthony Wal's garden (Block C12).

Block D12

KEY & NOTES
1. Paul Tik's house, Pandanum (mango) in the foreground
2. Oldmm Tik's house, Marum trees in the foreground
3. Joseph Tik's house
4. Rod Kemia's house in the northwestern corner of D12
Also included here is the photo of M executives who were in the northeastern corner.

This is the northwestern boundary of the area.
The block is predominantly garden area with desks in the northeastern corner.

9. Joseph Tik's house
10. Joseph Tik's pili house and toilet
6. Paul Tik's house
12. Rod Kemia's house
15. M exile Tik at his homestead
Block A11

**KEY & NOTES**

This block is predominantly taken up by garden with some large plots. The bush area as well as previous archaeological excavations have been conducted. The area has not been cultivated under instructions for Noah Ru Kundii. It is worth noting that coffee is being grown along the western boundary of the block.

Block B11

**KEY & NOTES**

1. Ogmum Kor's house
2. Ogmum Kor's house

Ogmum Kor has built his house right on the old road. It is worth noting that people have started planting gardens and even coffee on the road in some part of the blocks.

As the view from the north western corner looking southeast shows, the whole area is under garden cultivation. The new plot in the foreground was planted with peanuts.

16 Ogmum Kor's house
17 Ogmum Kor's house
14 Looking south east onto Block B11
Block C11

KEY & NOTES

1 & 2  See notes in B11

Apart from some coffee along the southern border, this block is fully gardened over.

15 Garden in C11 looking north

Block D11

KEY & NOTES

This block is totally under gardens. Most of these are large plots of sweet potato interspersed with mixed garden plots.
Block A10

KEY & NOTES
This block is generally recognised as belonging to Ru Kandii and his sons. Ru has insisted that the area of archaeological importance is left alone (seen in the foreground of the photo). The drainage is good and the gardens are mainly sweet potato and peanut plots.

18 Preparing garden. Bush in background is Golon's archaeological site reserve

Block B10

KEY & NOTES
1 Nema Hur's house
2 Nema Kur's house
Luke Aset house in the foreground
This block was previously planted with citrus as evidence by some surviving trees as well as dying ones. Whilst the garden areas are drained it is the area that has reverted back to bush that is of interest here. This was previously planted over with coffee as the coffee trees can be seen in different stages of wilting.
by all appearances, the land is being reclaimed back by nature owing largely to poor outlet drains.

11 Nema Kur's house
12 Luke Aset's house in the background
KEY & NOTES

1. Kanjiel Kopi’s house
   This block appears to be right at the water shed of the two drainage systems draining out of Kuk. This was obvious from discussion with Kanjiel Kopi who had expended considerable time and effort to try and drain the coffee plot that he had planted beside his house.

   Despite an extensively elaborate drain system that he had dug, he pointed out that he could not get rid of the water because of poor drainage in the immediate surrounding areas.

Block C10

13 Kanjiel’s house

Block D10

KEY & NOTES

1. Wap’s (from Kandeep district in Enga) home
2. Wap’s other home

   This block is totally cultivated over with food-crop gardens. It is interesting to note that the northwestern portion of the block is owned by Peter Minimbi and he has leased it to some people from the Kandeep district of the Enga province to use.

   A similar case was observed in block D12.

56 Kandeep Enga Wap’s home
57 Wap’s house
Block A9

KEY & NOTES
1. Gabriel Kel's pig house/shed
2. Gabriel Kel's gouse
3. Fred Rob's house
4. Kid's partially built tobacco drying/storage shed
5. Gumatu Kel's house
6. Michael Jaru's house

Gabriel has gone into growing tobacco for sale. He is the only one growing tobacco in the core area itself for sale. The block is equally divided between gardens and coffee.

Block 9B

KEY & NOTES

Nearly half of this block is under coffee cultivation. What is of interest here is that the part that has reverted to bush appears to have been cultivated before by the Kawelkas. One coffee tree was noted as well as dead casuarina trees. It seems that the swampland is encroaching upon the cultivated area.
Block C9

KEY & NOTES
This block has reverted back to swampland and is covered in bush apart from a very small plot in the southwestern corner that is under garden. According to the informants the block was initially claimed by individuals but none of them have worked the land. The informants were not able to even give the names of the block holders, saying that this was bushland as far as they were knew and that no one was cultivating it.

Block D9

KEY & NOTES
A third of the block to the north is under coffee whilst the rest is used for gardening.
Block A8

KEY & NOTES
The block is well drained and is equally divided up into coffee and garden plots.

Block B8

KEY & NOTES
1 & 2 These are houses that belong to some people from the Enga province. Most of the block is garden plots and appears to be well drained. It was claimed by one of the informants that the actual block had been sold outright by the 'owner' to these people from Enga. This is an issue that has to be seriously addressed when it comes to the question of Kuk being declared as a cultural landscape.
Block C8

KEY & NOTES
Apart from a small strip of the southern end of the block being gardened over, the rest of the block has reverted back to swampland and is covered in bush. The story is similar to what is happening to the other surrounding blocks.

Block D8

KEY & NOTES
1 Moses Ruminys' house
2 Moses Ruminys' house
No photos were taken as this block was surveyed under a deluge of rain
The souther part of the block has reverted back into bush. There are coffee plots on the northern end where there is higher ground.
A narrow strip is gardened upon along the southern side
This block is nearest to the Kuk Station and is dominated by gardens and residential houses. The team observed new houses being built on the blocks. A total of 15 houses – including pigs’ houses and a kitchen - were counted in that block. This looks rather like a normal homestead found elsewhere in the area and is an extension of the village located next to the old Kuk station.
Block B7

KEY & NOTES
1 Jim's house
2 Jim's house
It was not possible to view the two buildings but according to the informants, there are two houses there belonging to Jim from Enga. This may also be another case where the land may have been sold outright by the 'owner' of the block to Jim. The informants could not confirm this. The centre of the block extending to the northeastern corner has reverted back to bush and become swampland.

Block C7

KEY & NOTES
1 Peter Womum's house
Apart from a small strip of land along the western side of the block that is used for gardening, the bulk of the block has reverted back to swampland and is presently covered in bush. We were not able to visit Womum's house.
Discussion

According to the results from the land use survey over half (54.2%) of the land within the core area is under gardens; just under one third (29.2%) is under coffee; and the remaining (16.6%) is bush. Areas designated as bush in blocks A10 and A11 are areas where the bush was ‘allowed’ to grow in order to ‘preserve’ buried archaeological material. In all the other instances, particularly the southern portions of blocks D7 and D8, the northern portions of block C7 to C9 and parts of blocks B9 and B10, the land is not cultivated because of inundation and it is reverting back to swamp (see discussion below).

Problems of inundation and attempts at drainage are illustrated by Kangiel Kopi, who has a garden and coffee plot beside his home located in the southwestern corner of block C10. He has dug extensive drains around his coffee plot in the hope of getting rid of access water. However, the end result was the complete opposite with water from the surrounding areas flowing back into the drains he had dug. He stated that unless the run-off drains were cleared, he saw no immediate solution to the problem he was facing.

The above example will affect low lying areas within the core area that were swampland prior to the extensive drainage system put in place and regularly maintained by the management of the Kuk Tea/Agricultural Research Station. In a sense, nature is recovering back the land, which is a blessing in disguise from the preservation of buried archaeological materials. However, a potential danger is that the block-holders, upon
realising what is happening to their blocks, may mobilize and clear the main outlet drains. Such activities will be prohibited by the management plan.

**Block-holder identification**

The team traversed all the blocks within the core area (see Figure D.1). Physical observations of the crops grown within the respective blocks were noted. The names of the individuals or families who were block-holders were recorded (see Table D.1). As part of this study, it was only possible to identify the ‘owners’ of each block and plots of land within the blocks. In some instances, the individuals who were cultivating these areas were different people, who had been invited and permitted to use the land by the block-holders.

**Table D.1 List of block-holders**

<table>
<thead>
<tr>
<th>Block ID</th>
<th>Name</th>
<th>Clan</th>
<th>Tribe</th>
</tr>
</thead>
<tbody>
<tr>
<td>A10-A12</td>
<td>William Pik</td>
<td>Kundmbo</td>
<td>Kawelka</td>
</tr>
<tr>
<td></td>
<td>Kuipi Onda</td>
<td>Kundmbo</td>
<td>Kawelka</td>
</tr>
<tr>
<td></td>
<td>Wai John</td>
<td>Kundmbo</td>
<td>Kawelka</td>
</tr>
<tr>
<td></td>
<td>Anis Ruing</td>
<td>Kundmbo</td>
<td>Kawelka</td>
</tr>
<tr>
<td></td>
<td>Timba Pup</td>
<td>Kundmbo</td>
<td>Kawelka</td>
</tr>
<tr>
<td></td>
<td>Enock Berem</td>
<td>Kurupmbo</td>
<td>Kawelka</td>
</tr>
<tr>
<td></td>
<td>Nixon Koi</td>
<td>Kundmbo</td>
<td>Kawelka</td>
</tr>
<tr>
<td></td>
<td>Kundi Pup</td>
<td>Kundmbo</td>
<td>Kawelka</td>
</tr>
<tr>
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<td>Tom Rot</td>
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<td>13 Rupre Kupagi</td>
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Notes:
1. Akelimo are people from Tambul. They came and settled with the Kawelka and are now regarded as members of Kawelka. As a matter of convenience, one could refer to them as Kawelka No 2.

2. Lgamake are from the Kotna area. The block-holder is married into the Kawelka and resides with them. A similar case can be made for Kopi Kangiel who is from the Komblo tribe of Warakar near Banz. In his case, he is regarded as being a full member of the Kawelka.

3. Kenge is a clan with the main Tipeka tribe who live around Mbuk and Kotna.

4. People from Kandep in Enga Province live in portions of the area at the invitation of the Kawelka.

This annex details a meeting of Kawelka leaders and block-holders at Kuk to discuss World Heritage nomination, future management of the site and agreement with (through signature) a voluntary local Agreement. The annex has been extracted in edited form from Social Mapping and Land-Use Assessment of the proposed World Heritage site at Kuk, Western Highlands Province, Papua New Guinea, by Jo Mangi and John Muke (Social Research Institute, Inc. for the Department of Environment and Conservation, 2006).

Figure E.1 Amos Kei, prominent Kawelka leader, addressing crowd at the Kuk meeting, Saturday, 22nd July 2006 (Photo: Jo Mangi)

Historical context of Kuk nomination

In a sense, the nomination process for Kuk commenced three decades ago with attempts to recognize the importance of the site at the national level. In 1975 Jack Golson submitted a proposal to the Melpa Area Authority of the then Western Highlands District (now Province) for the preservation of Kuk as an historic site. A select committee recommended that the site be preserved for both archaeological and tea research significances. Copies of the proposal were also sent to various relevant authorities, including the Institute of Papua New Guinea Studies (IPNGS), National Museum and Art Gallery, and the then Office of Conservation and Environment.

In 1976 Jack Golson was approached by W.C. Clarke of the Department of Geography, UPNG, who sought areas of mountains and swamps in the highlands to be recommended for preservation. The possibility of Kuk as a protected area was brought before the National Parks Board Advisory Committee, which passed on the responsibility to the PNG National Museum and Art Gallery to have an area gazetted as an archaeological site under the National Cultural Property Ordinance.
In 1982, the Director of the National Museum and Art Gallery requested Jack Golson to provide a plan for the preservation of the priority areas at Kuk. A document, "A Proposal to Proclaim a Historic site at Kuk Agricultural Research Station Mount Hagen, Western Highlands Province" (Golson 1982) was presented to the National Museum and Art Gallery. Nothing eventuated.

In 1991 Jack Golson held a meeting with John Muke at St. John’s College, Cambridge, UK. He reported that he had met with Martin Gunther, Officer-in-Charge (OIC) at Kuk, who told him that as a result of the closure of Panguna Copper Mine, North Solomons Province and the reduced Government income, top-level Department of Primary Industry (DPI) discussions looked at the possibility of the closure of some of its agricultural research stations.

The Department of Primary Industry mothballed or effectively abandoned the Kuk Agricultural Research Station at the end of 1991. The partitioned blocks were divided among the major subclans of the neighbouring tribes and by 1997 large areas had been cleared of the tall swamp grass cover and put under cultivation, which had the potential to damage evidence of prehistoric cultivation.

In 1993 the staff of the PNG National Museum and Art Galley, together with John Muke and undergraduate students of UPNG, began a series of field expeditions to Kuk. These were aimed at monitoring the destruction of the Kuk archaeological site and creating an awareness of the possibilities of nominating it as a World Heritage site. The collective efforts paved the way for greater awareness, appreciation and support for Kuk.

At the administrative level, the National Museum and Art Gallery was the focal point for a number of activities relating to the promotion of Kuk as a World Heritage site, including a preparation of a ‘first draft’ of the Kuk nomination document, designing a Kuk heritage poster, representation by staff from stakeholder institutions to a number of international meetings, and literacy discussions and debates (Stewart and Strathern 1998; Golson et al. in prep.). An outcome of community consultation in 1997 was to seek approval from the Kawelka for Tim Denham to conduct field investigations into the early phase of agriculture and plant exploitation at Kuk as part of his PhD research.

Whilst the Kuk Heritage project was gaining momentum, Papua New Guinea became the 148th State Party to ratify and sign the instrument of acceptance of the World Heritage Convention. The *World Heritage Review* acknowledged that:

> Papua New Guinea, only the third Pacific nation to join the World Heritage Convention, is likely to offer challenging opportunities for the application of the concept of World Heritage cultural landscapes, linking nature and the centuries old interactions of local people with their environment (1997:79).

Such comments were illustrative of an international interest in PNG to take advantage of its member status and nominate natural and cultural properties suitable for the inclusion on the World Heritage List. This interest was communicated through the PNG National Commission for UNESCO. Up until 1998, the National Museum and Art Gallery (NMAG) played a lead role in promoting Kuk as a potential World Heritage Site. Without a statutory authority dealing purely with heritage matters, it was not able
to fully comprehend administrative, financial and legal matters relating to cultural heritage and resource development in the country. As a result, in 1999, when the UNESCO WHC (Paris) pledged to release a financial assistance grant for the preparation of the Kuk nomination document, the National Commission for UNESCO assumed the functions of grant administrator, focal point and participant in the Kuk project.

By 1998, the National Commission for UNESCO was the focal point, which drew together local representatives, the Western Highlands Provincial Government, Department of Environment and Conservation and the National Cultural Commission to form the National Heritage Committee. The first task of this Committee was to commission a Kuk Study team, representatives being nominated from the critical stakeholders, to prepare the Kuk nomination document.

Activities at the national level encouraged the Western Highlands Provincial Government to take a proactive approach. In February 1999, the Western Highlands Provincial Executive Council (PEC) met with representatives from the National Museum and Art gallery and University of Papua New Guinea in Port Moresby. The Kuk case was officially presented to the PEC members, in which they appreciated the importance to Western Highlands Province and made political commitments towards its development.

This was followed by the establishment of the Provincial Kuk Heritage Management Committee, which had its first meeting at the Mount Hagen Club Conference Room in July 1999. During the meeting, it was agreed that the Western Highlands Provincial Government would put aside a sum of K10,000 every year for the Kuk project. Funds in excess of this were made available for the next three years totaling K80,000 by the end of 2001. Financial support also came from the National Commission for UNESCO, the World Heritage Commission and the PNG National Museum and Art Gallery.

The Kuk Study team commenced the preparation of the Kuk nomination document in 2002. A substantial component of the funding came from the World Heritage Centre. As part of the Phase 2 Activity Financing Contract, the National Commission for UNESCO was supposed to submit to the World Heritage Centre three copies of the nomination dossier by 1 February 2004 and provide a concise summary report and a detailed statement justifying the use of the whole contribution from UNESCO no later than 30 March 2004. Whilst six versions of the nomination document were completed by mid 2004, divergent and conflicting interests emerged amongst national institutions sharing responsibilities for heritage matters, as well as access to and spending of funds, and resulted in the near-complete abandonment of the project. The National Commission for UNESCO was about to close the project, when a team of individuals, after being made aware of the existence of a National Executive Council Decision, pushed for the completion of the Kuk Nomination Document.

Until 2003, many of the key players were not aware of the existence of a National Executive Council (NEC) Decision (No. NG 45/94) made in 1994 that nominated the Department of Environment and Conservation as the focal point for World Heritage matters. The relevant decisions summarized are:

- DEC was approved as the primary implementing Agency of the World Heritage Convention, its protocols, directives and guidelines.
- NEC invited DEC to investigate with Dept. of Finance to establish an Heritage Foundation and report progress back to NEC.

In 2003, the Chief Secretary held a meeting with the strategic stakeholders for heritage matters and briefed them that the above decision was yet to be implemented.

By 2004, after learning that the National Commission for UNESCO was seeking to abort the Kuk nomination because of dissatisfaction with the performance of the Kuk Study Team, a non-formal working committee was established through the leadership of Vagi Genorupa, Assistant Secretary, Protected Areas, DEC. Relying on a team of committed individuals, Vagi Genorupa was able to fast-track the NEC Decision by formulating a conceptual framework for establishing a National Heritage Secretariat and recognizing DEC as the focal point for heritage matters. In 2005, all the key stakeholders (National Commission for UNESCO, National Museum and Art Gallery, National Cultural Commission, Tourist Promotion Authority) accepted the NEC Decision and supported DEC to implement some of the directives, including the establishment of a National Heritage Secretariat.

In 2005, the National Commission for UNESCO (PNG) was able to secure from the World Heritage Centre (Pairs) an extension of the deadline for submission of the Kuk nomination to November 2005. To meet this, it resolved to place an advertisement for open bidding to complete the nomination document. Whilst the contract was awarded to Social Research Institute, lack of funds prompted Department of Environment and Conservation to establish a working committee. As per existing contractual agreements, the purpose of the committee was to furnish the existing document and fulfill the requirements of the deadline for submission. Between December 2005 and January 2006, a nomination document was revised, updated and submitted through the focal point – Department of Environment and Conservation- to the World Heritage Centre, Paris, December 2005. This document was deemed to be incomplete.

At the National World Heritage Workshop (20th -23rd March 2006), Tim Denham and John Muke were asked to coordinate the remaining tasks and through the Department of Environment and Conservation re-submit a revised nomination document.

In July 2006, John Muke and Jo Mangi of Social Research Institute were given the task of completing the field component, whilst production of the final nomination document was to be carried out together with Tim Denham of Monash University, Melbourne.

**Terms of reference for fieldwork in 2006**
The former Kuk Agricultural Research Station is currently used by the local communities but the PNG government holds leasehold title to the land. Whilst many of the tasks set out below may not have been achieved, the most important and historic contribution to the nomination process was the agreement by the representatives of the entire Kawelka tribe (and their neighbours) to declare Kuk a cultural landscape. This action fulfills one of the crucial requirements pf the nomination: resolution of the landownership issue and devising a local management framework. To these ends, specific tasks were set out to be achieved during a recent fieldtrip to Kuk conducted by John Muke and Jo Mangi (SRI):
Task 1: Community Awareness Meetings
- Brief the community on the latest developments on the Kuk World Heritage nomination process
- Record community perceptions and seek continued support for the completion of the nomination process

Task 2: Social Mapping
- Define community perception of the nominated core area and buffer zone of the Kuk cultural landscape
- Landownership issues (lease and lease back arrangements; cultural landscape)
- Compile an inventory of the landowners in the southeast corner of the station, namely within blocks A7-A12, B7-B12, C7-C12 and D7-D12
- Compile an inventory of the nature and types of crops under cultivation, buildings and other types of usage in the ‘core’ and ‘buffer’ areas
- Use Global Positioning System (GPS) to define the core area and buffer zone

Task 3: Management and Legislative Issues
- Examine ways of drafting a Community Agreement for the Protection of Kuk as provisioned in the Organic Law on Provincial Governments
- Ascertain existing national enabling laws that recognize the concept of Kuk as a cultural landscape
- Liaise with Western Highlands Provincial Government to seek ways supporting the conservation, protection and further development of the Kuk site through the provision of services (eg, water supply, aid post and graded road).
- Seek local support for a local management service that promotes the continuity and preservation of traditional knowledge, skills and practices

The fieldwork
The fieldwork was carried out by John Muke and Jo Mangi from the Social Research Institute over a period of three weeks from Monday 17th July to Monday 7th August 2006. A further field trip was carried out by John Muke in late August and early September 2006.

The initial component of the fieldwork involved raising community awareness of the purpose of this particular trip. Once, the Kuk community knew that their participation and collective decision making in the future of Kuk as a World Heritage site was the key to a successful nomination, Kawelka leaders invited the study team to address a public gathering on 22nd July 2006. An open invitation was extended to those who had specific interest or would be affected by the eventual nomination to discuss the nomination process and management of the site. The lack of finance and capacity prompted the need for a sustainable management organization that utilized the traditional ways of managing a cultural landscape. The signing of a document of consent for declaring Kuk as a cultural landscape was a milestone achievement for this meeting since the Kawelka recognized Kuk as a potential world heritage site and acknowledged their role as custodians of the site.

Meeting of Kawelka tribe (Saturday 22nd July 2006)

Main issues
Some of the main issues discussed at the meeting are highlighted below:
Verdict on nomination document: A nomination document was completed in December 2005 and submitted by the Department of Environment and Conservation, on behalf of the Government of PNG to the UNESCO World Heritage Centre in Paris. A panel of experts reviewed the document and judged that it was incomplete. The Director of WHC advised the Government of Papua New Guinea, through its newly established National Heritage Secretariat to complete the missing sections.

Revision of nomination document: During the World Heritage Workshop held in Port Moresby, Tim Denham and John Muke were nominated to revise the incomplete document for re-submission in September 2006. Some of the missing sections in the document required fieldwork. The SRI team was here to ‘fill in the blanks’.

Final effort: John Muke stressed that he had spent nearly 15 years attempting to make Kuk a World Heritage site. He made it very clear this was potentially his last trip because this was the last opportunity to get Kuk on the World Heritage List. If we failed this time around, there is a very high probability that UNESCO will not entertain this any further.

Community support: John Muke pointed out that the most critical missing gap in the nomination document lack of support from the local Kawelka community. The Kawelka’s support needed to come in two ways: firstly, there needed to be landowner agreement that the land upon which the archaeological properties were present would be set aside as a World Heritage site; and, secondly, an agreement was reached that the Kawelka would continue traditional land-use practices, thereby indirectly promoting a local management framework that ensured the protection of the physical remains.

Cultural landscape: John Muke discussed the importance of declaring Kuk as a cultural landscape. He endorsed Max Yuh’s (Kawelka leader) suggestion of a form of development that involved the Kawelka. It was about culture and development; the word culture was in fact about the Kawelka and therefore, this new form of development was essentially about cultural development. The Kawelka’s decision to declare Kuk as a cultural landscape would be historic and set precedence for other communities in the country.

The meeting lasted for three hours and many issues were discussed. As many as twenty speakers addressed the meeting including most of the Kawelka leaders including Noah Ru Kundil, Amos Kei, William Pik, Nicholas Namba, Yap Goimba and Steven Pekeri Goi, elders like Magla Kundi and Ken Umukri, and many youths.

Outcomes
The meeting was successful in two ways. First, the Kawelka leaders agreed to the consent Agreement in which the people agreed to support the project and endorse the concept of Kuk as a cultural landscape (see below). Second, an unexpected outcome of the meeting was a final reconciliation amongst the leadership of the Kawelka, who had been split into two groups in a dispute over the Kuk project.

The split amongst the Kawelka related to questions of ownership and access to assumed benefits generated from the Kuk nomination process. It involved members of the Membo clan and the other groups who were block-holders within which the
archaeological site isolated, namely the Kundmbo and Kurupmbo clans. After going through the traditional act of public confession, denial and reconciliation, the disputing parties resolved that there was no real substance to any allegations. Leaders agreed that events of the recent past were obstructing the road towards completion of the nomination progress. The representatives of the disputing parties apologized to each other and shook hands to reconcile their differences. Together, they urged the Kawelka to move forward by signing the Agreement and declaring Kuk to be a cultural landscape. The meeting ended late in the afternoon with leaders and block-holders signing the document.

**Figure E.2** John Muke, representing the interest of the government, lobbying support from the locals to declare Kuk as a cultural landscape (Photo: Jo Mangi 2006)

**Figure E.3** William Pik, former Deputy Premier of Western Highlands Provincial Government, representing the Kurupmbo–Kundumbo segment of the Kawelka tribe (Photo: Jo Mangi 2006)
Figure E.4 Nicholas Namba, former Kawelka Councilor, representing the Kawelka Membo clan (Photo: Jo Mangi 2006)

Figure E.5 Stephen Pekri Goi, an enterprising young man, who has established a Kuk cultural centre, representing the Kawelka Membo clan (Photo: Jo Mangi 2006)
**Figure E.6** Paul Wamp of the Kawelka Membo Clan, who lives in the vicinity of the administrative complex of the former Kuk Station (Photo: Jo Mangi 2006)

**Figure E.7** Ru Kundil, representing the Kawelka Kundumbo, who is recognized at the local level as the ‘father’ of the efforts towards nominating Kuk as a World Heritage site (Photo: Jo Mangi 2006)
Agreement and Resolutions
Many speakers came out to openly declare their support for the project. They were very grateful for the occasion because to many it was the first time that the whole project had been explained to them in a manner that they understood. The leaders debated the issues and they demonstrated overwhelming support for the continuation of the Kuk heritage project and also wholeheartedly accepted the proposal that the entire land leased to the State for the Research Station be declared a cultural landscape. In order to crystallise this local initiative, John Muke proposed that the leaders of the Kawelka tribe and block-holders of the core area sign a document granting their consent for Kuk to be recognized and managed as cultural landscape. The substance of this document with resolutions and signatures are noted below.

The Resolutions: that the members of the Kawelka tribe in the first instance and in the second, the block holders, made the following resolutions:

- Endorse that Kuk is defined as a cultural landscape, expressing the links between nature and the centuries old interactions of local people with their environment, and an outstanding example of an egalitarian nature of contemporary New Guinea highland societies, characterized by largely persuasive big-men and structured by small scale polities (such as the Kawelka tribe)

- Endorse the initiative of the Government of Papua New Guinea to have the Kuk Agricultural Site nominated as a cultural landscape, being illustrative of evolution of human society and settlement over the last 10,000 years, and is a continuing landscape which retains an active social role in contemporary ways of life

- Agree to abide by and pledge to adopt the general policies, established by relevant heritage organizations in PNG (the newly established National Heritage Secretariat within the Department and Conservation, as per signatory to the WHC Convention) and services, and develop suitable legal, technical scientific and financial measures for the protection, conservation, and presentation of this cultural landscape

- Accordingly, we the members of the Kawelka tribe and representatives of the neighbouring groups, currently using the portions of the state land agree in principle to:
  - recognize Kuk as a cultural landscape and continue to cultivate this ancient landscape according to the skills and technologies of agriculture handed down from generation to generation, and at the same time incorporating sustainable development practices;
  - accept the proposal to establish a core area and buffer zone, as prescribed for inclusion in the World Heritage Listing and to be done in accordance with sound technical advise of relevant portions of land within and beyond the State boundary;
➢ agree to incorporate traditional land-use, conservation and preservation practices, and upon, technical advise, establish modern management and legislative framework in accordance with World Heritage management practices;

➢ agree to establish an appropriate local heritage management service based on rules and regulations pertinent to heritage matters of the nation together with customary management and conservation values.

The above resolutions have been agreed to by all members of the Kawelka tribe who were present at the meeting on Saturday 22nd July 2006. Signature pages are reproduced below.
The Signatories

We, the undersigned, representing the different clans of the Kawelka tribe:

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Clan</th>
<th>Signature</th>
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<td>NICHOLAS NAMBA</td>
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<td>MAX YAH</td>
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We, the undersigned, representing the different clans of the Kawelka tribe:

<table>
<thead>
<tr>
<th>Name</th>
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The Signatories

We, the undersigned, representing the different clans of the Kawelka tribe:

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Annex F – Key scientific and anthropological publications on the Kuk site and the Kawelka

Archaeology (and related disciplines)


**Anthropology**


**Ethnoarchaeology and ethnoagronomy**


**Ethnohistory and heritage management**


## Annex G - Comparison of Kuk with sites on the World Heritage List

<table>
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<tr>
<th>Site</th>
<th>Country</th>
<th>Criteria</th>
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<tr>
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<td>Viñales Valley</td>
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<td>Tobacco cultivation</td>
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<td>Archaeological Landscape of the First Coffee Plantations in the South-East of Cuba</td>
<td>Cuba</td>
<td>iii, iv</td>
<td>Coffee cultivation</td>
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<td>Vine cultivation</td>
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<td>iii, iv, v</td>
<td>Rice cultivation</td>
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<td>Kuk</td>
<td>Papua New Guinea</td>
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<td>Polyculture, subsistence agriculture, plant domestication</td>
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<td>Aflaj Irrigation Systems of Oman</td>
<td>Oman</td>
<td>v</td>
<td>Irrigation for domestic/agricultural use</td>
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<td>Mount Qingcheng and the Dujiangyan Irrigation System</td>
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<td>iii, iv, v</td>
<td>Drainage for agricultural use</td>
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<td>El Salvador</td>
<td>iii, iv</td>
<td>Farming settlement</td>
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<td>Ban Chiang Archaeological Site</td>
<td>Thailand</td>
<td>iii</td>
<td>Pre-farming/farming settlement</td>
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<tr>
<td>Kuk</td>
<td>Papua New Guinea</td>
<td>iii, iv, v</td>
<td>Cultivation plots/field systems</td>
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Annex H – Photographic documentation of Kuk
Dear Regina Durighello,

RE: WORLD HERITAGE LIST 2008 – NOMINATION OF 'THE KUK EARLY AGRICULTURAL SITE, PAPUA NEW guINEA

Many thanks for your letter dated 7th December 2008 in regard to the nomination of the ‘Kuk Early Agricultural Site’ to World Heritage Listing. Following our eventual receipt of a copy of this letter, only approximately two weeks ago, your three queries can now be addressed.

Firstly, there are two significant points relating to the timetable for the designation of Kuk as a Conservation Area and also for establishing the formal agreement with the local community. The designation of Kuk as a Conservation Area is a process that has been initiated and is anticipated to take at least a year. While designation under the Conservation Areas Act (1978) is being completed, the management plan at Kuk will be incorporated into an Organic Law (namely the formal community agreement). Taking into account the necessary requirements at the local, provincial and national levels, the Organic Law is anticipated to be in place by the end of 2008. The first step in the drafting of this Organic Law is currently occurring; Dr. John Muke is at present working with the Kaulafka at Kuk and Western Highlands Provincial government to ensure the local and provincial-level steps of this process are complete by mid-2008.
However, I would like to point out that Kuk is currently protected as a 'national cultural property' under the National Cultural Property (Preservation) Act and associated Regulations (1965), as well as through a voluntary agreement on the part of landowners that was agreed on 22nd July 2006 (see Annex E to the original nomination).

Secondly, a management plan was drafted by Dr. John Muke, Social Research Institute, Inc., in 2007 following extensive consultation at local, provincial and national levels. The plan requires some minor revisions prior to formal proposal to, and acceptance by, the Kawelka landowners at Kuk (which forms part of the Organic Law process). Given that the community-based management plan process is well in hand, the formal implementation process should be complete by mid-2008.

However, the framework for the community-based management plan was outlined in the nomination document, and the main principles of the management plan have already been accepted and put into practice by landholders at Kuk (see Annex E to the original nomination). Effectively, the management of the site is already being implemented even though it has not formally been incorporated into an Organic Law.

Thirdly, formal memoranda of understanding were not envisaged as part of the original nomination process, although there is nothing to preclude the formulation of a MOU between national (Department of Environment and Conservation), provincial (Western Highlands Provincial government) and local (Dei Council) government authorities. The formulation of MOUs between these levels of government can be undertaken in concert with the formulation of the Organic Law and the implementation of the management plan, which require participation at each of these levels of government. Given that local and provincial levels of these processes will be complete by mid-2008, it is envisaged that MOUs can be established at the same time. These MOUs would formalise ongoing and effective relationships between these levels of government with respect to the management of the Kuk site.

I trust that the above sufficiently addresses all outstanding concerns regarding the Kuk nomination process. I look forward to formal acceptance of the site to the World Heritage List at the 32nd meeting of the World Heritage Committee in July 2008 in Quebec.

If you have any questions regarding the above, please do not hesitate to contact me by telephone (675 325 0180) or fax (675 325 0182). Email is not a preferred method of contact and is unlikely to evoke a response. Can you please acknowledge the time and date of receipt of this letter.

Yours sincerely,

[Signature]

DR. WARI IAMO
Secretary
Culture Sector

Mr. Yori Yei
Acting Secretary General
Papua New Guinea National
Commission for UNESCO
Paradise Haus
PO Box 588
WAIGANI National Capital District
PAPUA NEW GUINEA

WHC/APA/08/301 16 September 2008

Subject: Inscription of Kuk Early Agricultural Site (C 887), Papua New Guinea, on the World Heritage List

Dear Sir,

I have the pleasure to inform you that the World Heritage Committee, at its 32nd session (Quebec City, Canada, 2 to 10 July 2008), examined the nomination of the Kuk Early Agricultural Site and decided to inscribe the property on the World Heritage List. The decision of the Committee concerning the inscription is attached below.

I am confident that your Government will take the necessary measures for the proper conservation of this new World Heritage property. The World Heritage Committee and its Secretariat, the World Heritage Centre, will do everything possible to collaborate with you in these efforts.

The Operational Guidelines for the Implementation of the World Heritage Convention (paragraph 168), request the Secretariat to send to each State Party with a newly inscribed property a map of the area(s) inscribed. Please examine the attached map and inform us of any discrepancies in the information by 1 December 2008.

The inscription of the property on the World Heritage List is an excellent opportunity to draw the attention of visitors to, and remind local residents of, the World Heritage Convention and the outstanding universal value of the property. To this effect, you may wish to place a plaque displaying the World Heritage and the UNESCO emblems at the property. You will find suggestions on this subject in the Operational Guidelines for the Implementation of the World Heritage Convention.

In many cases States Parties decide to hold a ceremony to commemorate the inscription of a property on the World Heritage List. Upon request to the World Heritage Centre by the State Party, a World Heritage Certificate can be prepared for such an occasion.

I would be grateful if you could provide me with the name, address, telephone and fax numbers and e-mail address of the person or institution responsible for the management of the property so that we may send them World Heritage publications.
Please find attached the brief descriptions of the site, prepared by ICOMOS and the World Heritage Centre, in both English and French. As these brief descriptions will be used in later publications, as well as on the World Heritage website, we would like to have your full concurrence with their wording. Please examine these descriptions and inform us, by 1 December 2008 at the latest, if there are changes that should be made. If we do not hear from you by this date, we will assume that you are in agreement with the text as prepared.

Furthermore, as you may know, the World Heritage Centre maintains a website at http://whc.unesco.org/, where standard information about each property on the World Heritage List can be found. Since we can only provide a limited amount of information about each property, we try to link our pages to those maintained by your World Heritage property or office, so as to provide the public with the most reliable and up-to-date information. If there is a website for the newly inscribed property, please send us its web address.

As you know, according to paragraph 172 of the Operational Guidelines for the Implementation of the World Heritage Convention, the World Heritage Committee invites the States Parties to the Convention to inform the Committee, through the World Heritage Centre, of their intention to undertake or to authorize in the area protected under the Convention major restorations or new constructions which may affect the outstanding universal value of the property.

May I take this opportunity to thank you for your co-operation and for your support in the implementation of the World Heritage Convention.

Please accept, Sir, the assurances of my highest consideration.

[Signature]

Francesco Bandarin
Director
World Heritage Centre

cc: Permanent Delegation of Papua New Guinea to UNESCO
Mr Wari IAMO, Secretary, Department of Environment and Conservation
ICOMOS
UNESCO Office in Apia
Extract of the Decisions adopted by the World Heritage Committee at its 32nd session (Quebec City, Canada, 2008)

Decision: 32 COM 8B.26

The World Heritage Committee,

1. Having examined Documents WHC-08/32.COM/8B and WHC-08/32.COM/INF.8B1,

2. Inscribes the **Kuk Early Agricultural Site, Papua New Guinea**, on the World Heritage List as a relict cultural landscape on the basis of criteria (iii) and (iv);

3. Adopts the following Statement of Outstanding Universal Value:

The Kuk Early Agricultural Site, a well-preserved buried archaeological testimony, demonstrates an independent technological leap which transformed plant exploitation to agriculture around 7,000-6,400 years ago, based on vegetative propagation of bananas, taro and yam. It is an excellent example of transformation of agricultural practices over time from mounds on wetland margins around 7,000-6,400 years ago to drainage of the wetlands through digging of ditches with wooden tools from 4,000 BP to the present. The archaeological evidence reveals remarkably persistent but episodic traditional land-use and practices where the genesis of that land-use can be established and changes in practice over time demonstrated from possibly as early as 10,000 BP to the present day.

**Criterion (iii):** The extent of the evidence of early agriculture on the Kuk site can be seen as an exceptional testimony to a type of exploitation of the land which reflects the culture of early man in the region.

**Criterion (iv):** Kuk is one of the few places in the world where archaeological evidence suggests independent agricultural development and changes in agricultural practice over a 7,000 and possibly a 10,000 year time span.

Archaeological investigations have been intensive rather than extensive and excavations have affected only a minor proportion of the core area of the site. Modern farming activities at Kuk remain relatively low-key and do not intrude upon the archaeological features of the site. The integrity of the site is thus maintained. The excavations and scientific work that have been done at the site are of the highest international professional standard and thus the excavated remains retain their authenticity. Contemporary land-use has been restricted to modern versions of traditional activities and is supportive to the authenticity of the core evidence on the site.

The legal protection in place is adequate, but customary protection needs confirmation as soon as possible through the designation of the property as a Conservation Area and through the associated formal land management agreement with the local community for aspects of site management. The Management Plan should be completed as soon as possible and formally resourced and implemented, and a formal memorandum of understanding established among relevant national, provincial and local government
authorities and other stakeholders concerning management responsibilities on the ground and reporting lines.

4. **Recommends** that the State Party submits by 1 **February 2009**:
   
   a) the completed Management Plan and confirmation of its approval by the Kawela landowners, and of its implementation;
   
   b) progress with the establishment of Organic Law;
   
   c) progress with designation of the property as a Conservation Area, and of the associated formal land management agreement with the local community for aspects of site management;
   
   d) progress with the establishment of a formal memorandum of understanding between relevant national, provincial and local government authorities and other stakeholders concerning management responsibilities on the ground and reporting lines;

5. **Requests** the State Party to provide a commitment to:

   a) resource heritage management training for local people and appropriate local, provincial and national government officers;

   b) putting in place planning policies to protect the wider setting and to extending the buffer zone as land tenure issues are resolved.
Surface and coordinates of the property inscribed on the World Heritage List by the World Heritage Committee at its 32nd session (Quebec City, Canada, 2008) in accordance with the Operational Guidelines.¹

<table>
<thead>
<tr>
<th>State Party</th>
<th>ID N</th>
<th>Area</th>
<th>Buffer zone</th>
<th>Centre point coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papua New Guinea</td>
<td>887</td>
<td>116 ha</td>
<td>195 ha</td>
<td>S5 47 01.36 E144 19 54.2</td>
</tr>
</tbody>
</table>

¹ Information abstracted from document WHC-08/32.COM/8B presented to the 32nd session of the World Heritage Committee (Quebec City, Canada, 2008).
EXECUTIVE SUMMARY

Map of the Kuk Early Agricultural Site, showing boundaries and buffer zone
Base map: Hagen (Sheet 7786), 1:100,000 topographic map series (Royal Australian Survey Corps, 1978), grid zone 55M, Transverse Mercator Projection, area of map depicted covers Eastings 190000 to 210000 and Northings 9340000 to 9370000
**Brief Description in English**

**Kuk Early Agricultural Site** consists of 116 ha of swamps in the southern highlands of New Guinea 1,500 metres above sea-level. Archaeological excavation has revealed the landscape to be one of wetland reclamation worked almost continuously for 7,000, and possibly for 10,000 years. It contains well-preserved archaeological remains demonstrating the technological leap which transformed plant exploitation to agriculture around 6,500 years ago. It is an excellent example of transformation of agricultural practices over time, from cultivation mounds to draining the wetlands through the digging of ditches with wooden tools. Kuk is one of the few places in the world where archaeological evidence suggests independent agricultural development and changes in agricultural practice over such a long period of time.

**Brief Description in French**

**L’ancien site agricole de Kuk**, en Papouasie Nouvelle Guinée, comprend 116 ha de marécages dans le sud de l’île de la Nouvelle-Guinée, à 1500 m d’altitude. Des fouilles archéologiques ont révélé que ces marais ont été cultivés presque continuellement depuis 7000, voire 10 000 ans. Le site présente des vestiges archéologiques bien conservés montrant l’évolution technologique qui a transformé l’exploitation des plantes en agriculture, il y a environ 6500 ans. C’est un excellent exemple d’évolution des pratiques agricoles à travers les âges depuis la culture sur des buttes jusqu’au drainage des marécages par le creusement de fossés avec des outils en bois. Kuk est l’un des rares endroits au monde où des vestiges archéologiques montrent un développement indépendant de l’agriculture sur sept à dix millénaires.
My Name is Jim Onga. I am the Interim PNG World Heritage Sites Secretariat. I worked under the Office of the Secretary for the Department of Environment and Conservation (DEC) Dr. Wari iamo. I report directly to him on Heritage Matters here in PNG and abroad.

I acknowledge receiving copy of your email dated 22nd September 2008 regarding the above.

Few things to update and comments as requested.

1.) Newly inscribed property of a Map. Check for any discrepancies as required by the “Operational Guide lines” for the implementation of the World Heritage Convention which request and sent out by the Secretariat to the State Party.

I didn’t confirm my views with our National Stakeholders and individuals. My own search and confirmation from the copy of the Nomination Document that I have and the PNG National Mapping Bureau find no changes needed. The Map of the site remains the same. The map can be enlarged by the PNG Mapping Bureau if needed with all information remains the same.

2.) Placement of Plaque displaying World Heritage and the UNESCO emblems at the property.

For your information, I mentioned to Takimoto Megumi and Mr. Kyung-Hoon Yi on the matter through email on the 11th November 2008. DEC as State Party and Focal Point for World Heritage Matters held National Stakeholders Meeting on the 5th November 2008. Most of the things highlighted in your emails have been discussed. For the Plaque, we will require locals to do given brief description of the site as it suggested under the Operation Guidelines for the implementation of the World Heritage Convention. I am sure that will complete before end of January 2009. I will update more on this in mid December 2008.

3.) World Heritage Certificate

It will be great to have the World Heritage Certificate on opening and unveiling of the Plaque on Site. The State Party already announced through local Media on the 11th September 2008 but this will be our big occasion to commemorate Kuk inscription. As soon as our Plaque is complete, I will request WHC to send the World Heritage Certificate to be announced and present at the opening and unveiling of the Plaque on site. I will also update you on this in Mid December 2008. On this occasion, I would probably request WHC assistance and bit of support.

4.) Contact Address

The Department of Environment and Conservation(DEC) is the State Party and Focal Point for World Heritage.
5.) Description of the Site

There needs to be a slight change in the First Sentence of the Description of the Site. The Word “Southern Highlands” Change to “Western Highlands”. The others remain the same.

Apart from the above, I will update more on;

a) Part of the Management Plan and confirmation of its approval by the Kawelka Landowners
b) Progress with the establishment of Organic Law
c) Progress with the Designation of the property as a Conservation Area and formal land management agreement with the Community
d) Formal Memoranda of understanding between the relevant government authorities and stakeholders.

Thank you and I look forward to hear from you.

JIM ONGA
Interim PNG Heritage Sites Secretariat
Department of Environment and Conservation
Papua New Guinea.