



**Safeguarding the Plain of Jars:  
Megaliths and Unexploded Ordnance in the  
Lao People's Democratic Republic**

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# Safeguarding the Plain of Jars: Megaliths and Unexploded Ordnance in the Lao People's Democratic Republic

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## **Historic Context— The Plain of Jars**

Throughout the Xieng Khouang plateau in north-central Lao People's Democratic Republic thousands of stone jars, varying in height from one to more than three meters, lie in clusters on prominent hills. Due to the presence of these enigmatic jars, the area has become known as the Plain of Jars. Although local oral legends state that the jars are enormous wine vessels used to celebrate a great victory 1,500 years ago, archaeological evidence suggests that the jars are in fact funerary urns carved by a Bronze Age people around 2,000 years ago.

**Figure 1**  
**Stone burial jars at jar field 2, Lat Sen (photo credits: author)**



During the 1930s, Madelaine Colani conducted archaeological research at the Plain of Jars, the results of which were published in 1935.<sup>1</sup> The excavation of a cave at the Bang Ang site (jar field site 1), close to present-day Phonsavanne Town, yielded burnt bones and a quantity of ash, which Colani interpreted as evidence of a crematorium. This, together with bronze and iron artifacts, carnelian beads and cowry shells excavated at other jar field sites and interpreted as grave goods, led Colani to the conclusion that the jars were in fact mortuary vessels. More recent excavations by Thongsa Sayavongkhamdy of the Ministry of Information and Culture have revealed in-ground burials, which add weight to Colani's hypothesis.

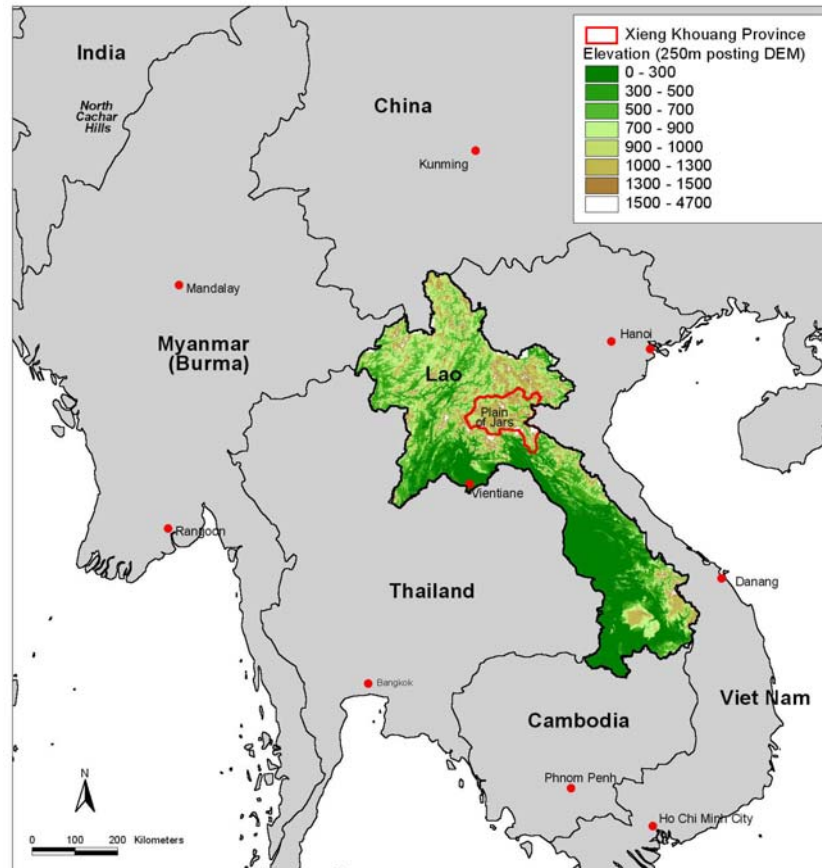
Evidence of burial practices similar to the burials at the Plain of Jars can be found along the coast of Viet Nam, south of the present-day city of Danang and in the North Cachar Hills in northeast India. All of these sites date to roughly the same period, ca 500 B.C.–

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<sup>1</sup> Colani, M. *Megalithes Du Haut-Lao*, Ecole Francaise d'Extreme-Orient, Paris, 1935.

500 A.D. Together, they form a mosaic of locales inhabited by a Bronze Age culture that were linked by trading routes<sup>2</sup> (please see Figure 2).

**Figure 2**  
**Location of the Plain of Jars site in relation to related archaeological sites in northeast India and central Viet Nam**



Colani's explanation for the apparently dense Bronze Age occupation of the Plain of Jars was that the Xieng Khouang plateau was a strategic central location for controlling trading routes from eastern India, southern China, and north-central Viet Nam. Colani further suggested that salt, available in the Laotian uplands, and still used today to make fermented fish paste, a dietary staple of the region, may have provided the dwellers of the Plain of Jars with a stable resource base and the capital to procure exotic imported goods.<sup>3</sup>

The Plain of Jars site is therefore an extremely important site that has great potential for increasing our understanding of the protohistory of Southeast Asia in the formative

<sup>2</sup> UNESCO, Safeguarding the Plain of Jars: Request for Technical Assistance. UNESCO internal document, Bangkok, 1999.

<sup>3</sup> Ibid.

period of 500 B.C. to 500 A.D., when movement of peoples and ideas across the Indo-Chinese peninsula from India to China opened the area to international commerce.

### **Contemporary Context**

Today, the Xieng Khouang plateau is of little agricultural value, largely comprising grassy or shrub-covered limestone and sandstone hills, ranging from 900 to 1,100 meters above sea level, supporting subsistence agriculture.

During the Viet Nam War, American forces dropped more than two million tons of bombs on Laos. The Plain of Jars, which was of strategic military importance during the Viet Nam War, suffered particularly heavy aerial bombardment and intense ground battles, during which 85 percent of the villages in the province were bombed.<sup>4</sup> It is estimated that 300,000 hectares, or 25 percent of the total land area of the province, is now contaminated by unexploded ordnance (UXO), which represents a very real threat to personal safety and a serious impediment to the socioeconomic development of the region.<sup>5</sup> People in Xieng Khouang Province have become used to handling and defusing unexploded ordnance, which are either sold for scrap metal or used for a wide range of everyday products including containers, boats, and fence posts. More recently, a market for selling defused UXO to tourists has developed.

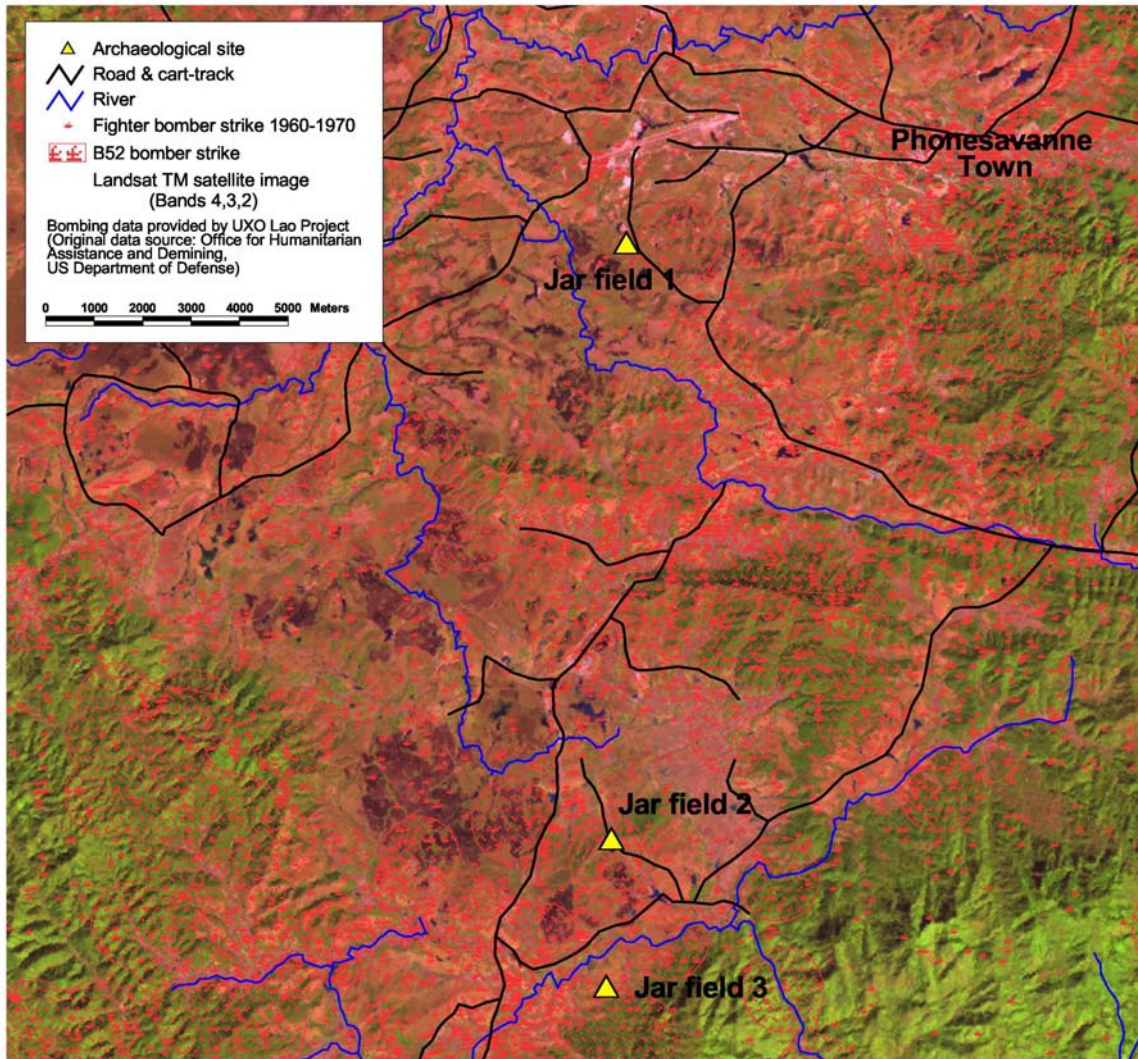
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<sup>4</sup> Handicap International, Province and District Report—Province of Xieng Khouang: National Study on the Socio-Economic Impact of Unexploded Ordnance. Handicap International, Vientiane, 1998.

<sup>5</sup>Ibid.



**Figure 3**  
**Bomb craters scattered throughout the Xieng Khouang Plateau from a one-meter resolution panchromatic IKONOS satellite image viewed at approximately 1:5,000 scale**



**Figure 4**  
**Bomb craters viewed from a hilltop between jar fields 1 and 2 (photo credits: author)**



Tourism at the site remains largely unexploited due to UXO contamination, lack of awareness and understanding of the site, and a lack of infrastructure required to support tourism. The development of the site as a tourist destination offers tremendous income-generation potential for Xieng Khouang, which lacks both natural and human resources and is one of the most economically depressed regions of Southeast Asia.

### **The Project**

In 1998, UNESCO, in conjunction with the Ministry of Information and Culture of the Lao People's Democratic Republic, initiated a project to safeguard this important site. The overall aims of the project were to

- Create a GIS-based cultural heritage resource inventory of the Plain of Jars to enhance understanding and management of the cultural resources of the site.
- Define and map site boundaries for the three most frequently visited jar field sites and request clearance of unexploded ordnance from these sites.
- Evaluate the cultural and other resources of the Xieng Khouang plateau to identify priorities for further research, conservation, and tourism development.



In the longer term, it is anticipated that a management plan for the site will be developed to guide its conservation and development, together with a submission of a nomination for inclusion of the site on the UNESCO World Heritage list.

The Plain of Jars Project is one of a number of demonstration projects under a joint US/ICOMOS-UNESCO Cultural Site Analysis Initiative (CSAI), the aims of which are to implement and develop best practices for the application of GIS as a cultural resource management tool. Support for the CSAI in the form of software and training grants were kindly provided by the ESRI Conservation Program.

## **Documentation Methodology**

To map the heritage resources of Xieng Khouang, a multiscale documentation methodology has been adopted. The overall documentation strategy focuses on the production of three scales of spatial and associated attribute data.

- Level 1: Basemapping and a reconnaissance survey of cultural heritage at an overview scale of between 1:100,000 for the whole of Xieng Khouang Province
- Level 2: Large-scale site plans for the selected pilot sites
- Level 3: Detailed archaeological site surveys of priority sites (This activity will be undertaken when more funding becomes available.)

## **Level 1 Documentation— Cultural Landscape Basemaps**

Although jar fields and other megalithic features are distributed throughout central and northern Laos and extend well beyond the borders of the Lao PDR, a project of this scope could not attempt to document such a vast area. Instead, the project focuses on creating a cultural resource inventory for Xieng Khouang Province, which has a high density of archaeological sites.

However, producing basemaps for even a limited area in the Lao PDR poses problems due to the lack of suitable topographic maps. The best available topographic maps were published in the 1980s at a scale of 1:100,000. At the outset, it was determined that the project would only be feasible if the required map data could be obtained from other agencies.

Following an initial investigation of the availability of cartographic data for Xieng Khouang, the digital data sets, listed below, were procured from the following agencies:

- Science Technology and Environment Agency, Prime Ministers Office, Lao PDR
  - First and second order administrative boundaries (provinces and districts)
  - Settlements
  - Roads
  - Cart tracks and footpaths
  - Rivers
- UXO Lao Project<sup>6</sup>

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<sup>6</sup> Bombing data was supplied to the UXO Lao project by the Office for Humanitarian Assistance and Demining, Department of Defense, United States of America.

- Fighter bomber strikes 1960–1970
- B52 bomber strikes
- National Geographic Department, Lao PDR
  - 100 m elevation contours (from which DEM hill-slope grids will be generated)
- Mekong River Commission, Watershed Classification Project
  - 250 m posting DEM of the Lao PDR
- Tropical Rainforest Information Center, Michigan State University
  - Portion of Landsat TM satellite image

The author gratefully acknowledges the agencies listed above for the provision of these data sets, without which, this project would not have been possible.

**Reconnaissance  
Survey of the  
Cultural Resource of  
Xieng Khouang  
Province**

The HLA methodology has developed from the seminal work carried out in Cornwall (Herring 1998), which mapped the landscapes according to "Historic Character Types," a paper-based exercise. Work in Scotland further developed the approach by mapping "Historic Landuse" using a geographic information system (GIS) (Dyson–Bruce, 1998; Dyson–Bruce, et al, 1999). Wales defined a "Register of Landscapes" of specific or outstanding interest (Cadw, 1998). English Heritage (EH) has used a wide variety of paper or increasingly GIS-based methodologies to determine "Historic Landscape Character" in different counties (Fairclough, 1999).

To produce an initial inventory of the cultural resources of the Province, it was decided that a participatory approach, mobilizing district officers of the Ministry of Information and Culture and village chiefs would be used.

The provincial office of the Ministry of Information and Culture in Phonsavanne organized seminars for its district culture officers to teach them how to create simple heritage inventories for their districts. Subsequently, district officers met with the heads of villages in their districts to compile a list of sites that village heads and other members of the community knew about.

Simple inventories that comprise village name, number of sites located within the village administrative boundary, and number of features (jars or megaliths) found at each site, were compiled. The identified archaeological sites will be geocoded by cross-referencing the village name listed in the inventory with the name and location of villages in the village GIS theme to produce a very rough picture of the distribution of sites within the Province. Following analysis of this distribution map, provincial staff, after being given training in rudimentary archaeological documentation techniques and equipped with GPS, will be tasked with conducting rudimentary archaeological documentation at selected sites. An initial assessment of the survey, which is currently being compiled, indicates that approximately 60 villages have reported the presence of previously unrecorded sites.

In addition to the reconnaissance cultural heritage survey data, jar fields coordinate data from historical sources (primarily Colani's research) will be incorporated in the GIS. Following conversion of the Colani data from a grid coordinate system based on Paris meridian and Hanoi datum, to UTM (WGS84 datum), these data will be incorporated into the GIS.

**Level 2  
Documentation—  
Site Plans**

To produce detailed site plans of the jar field sites, a panchromatic IKONOS image with 1 m ground resolution was acquired in August 2000. The IKONOS imagery was geocoded using ground control points (GCP) acquired by the National Geographic Department of Laos. In addition to the GCPs, permanent geodetic monuments were established at each of the three jar field sites to ensure that data from future archaeological surveys can be accurately tied to the common coordinate system utilized for this project.

Interpretation of IKONOS imagery and field surveys are currently being undertaken to determine the full extent of the three main jar fields. Site plans comprising jar clusters, site boundaries, visitor facilities, roads, tracks and paths, hydrological features, and land use will be produced from the imagery and ground survey. To ensure the safety of the project team members, a UXO Lao team, responsible for locating and disposing of UXO, will accompany all field survey teams during their site visits.

The vector site plan data, together with IKONOS imagery, will be supplied in digital format to the UXO Lao project for incorporation within their GIS. This data will be used by UXO Lao to plan and manage the survey and clearance of UXO at the three main jar field sites.

**Figure 5**  
**A UXO Lao survey team member searching for UXO prior to digging foundations for a permanent geodetic control point at jar field 3**



**Conclusion** UNESCO has been providing technical assistance to implement GIS at Cultural World Heritage sites in the Asia Pacific region since 1992 when GIS was first used to develop a zoning and environmental management plan for the Angkor Wat World Heritage Site in Cambodia. During the Angkor Wat project and subsequent GIS projects in Laos, Viet Nam, and the Philippines, GIS has proven itself to be an invaluable tool for assisting in the documentation, protection planning, and management of cultural heritage resources.

At the Plain of Jars site, the use of GIS has enabled the implementation of a systematic survey of the natural and cultural heritage resources of the Plain of Jars. Data collected will be used to view, analyze, and interpret the cultural heritage resources of the site in the context of related environmental, sociocultural, and topographic data. This will lead to an improved understanding of the site and thus, it is hoped, enhance management and conservation. Provided data of sufficient quality can be collected, predictive modeling may be undertaken to identify areas of potentially high archaeological value within the province, enabling the site managers to effectively mobilize their limited resources to document and proactively conserve these areas. It is also anticipated that maps and other interpretative materials for on-site display and distribution will be produced using the GIS.

The use of a GIS at the Plain of Jars has facilitated the incorporation of data from a wide variety of sources at many different scales. However, more important, this project

highlights the potential for enhanced interagency collaboration to achieve mutually beneficial development objectives through the use of GIS. The Plain of Jars project was conceived as a collaborative effort to safeguard both the cultural resources of the Plain of Jars together with the lives of local inhabitants and tourists that use the sites, necessitating the collaboration of UNESCO and its counterpart agency, the Ministry of Information and Culture with the UXO Lao Project and its counterpart, the Ministry of Labor and Social Welfare. The main dialog between these participating agencies has been in the form of geographic data transfer, facilitated through the medium of GIS.

This project also highlights the ever-present problem of the high cost of spatial data generation in situations where existing spatial data is unsuitable or unavailable. Cultural heritage resource management GIS projects typically operate under severely restricted budgets that are often only sufficient to cover the cost of generating cultural heritage resource data. The use of GIS for cultural heritage resource management projects, therefore, is often only feasible if basemap, and other data generated by third parties, can be procured for little or no cost.