

RESEARCH ARTICLE

# Silk Roads in the Kingdom of Bhutan and the Development of a National Heritage Inventory

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A UNESCO project, Support for the Preparation for the World Heritage Serial Nomination of the Silk Roads in South Asia, afforded the opportunity to research evidence for Silk Roads exchange in South Asia. The first part of the paper explores the challenges of archaeology in the Kingdom of Bhutan, located on the southern slopes of the eastern Himalayas. GIS-based approaches to model earlier settlement patterns and trade routes are considered. This led to a discussion with Bhutanese colleagues, in the Division for Conservation of Heritage Sites (DCHS), regarding the need for a digital national heritage inventory: to help manage and protect heritage resources, and to improve the communication of the rich heritage of the country to its people. The second part of this paper explores some of the issues around that debate, and the steps taken to implement the chosen solution: the Getty Conservation Institute/World Monuments Fund ARCHES heritage inventory system.

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## Introduction

The Kingdom of Bhutan is located on the southern slopes of the eastern Himalayas, between Tibet to the north and the Indian states of Sikkim, West Bengal, Assam and Arunachal Pradesh, to the west and south (**Fig. 1**). It is dominated by high mountains, the highest over 7,000 m, which are intersected by a network of snow-fed rivers that create fertile high valleys draining into the Indian plains. These high valleys create natural pathways for travel and trade. To the south, the foothills descend into the sub-tropical Doors Plain, an area fought over, at various times, by Britain, India and Bhutan.

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A UNESCO project, *Support for the Preparation for the World Heritage Serial Nomination of the Silk Roads in South Asia* (Williams, in press), itself a follow-on from the *ICOMOS Silk Roads Thematic Study* (Williams 2014), afforded the opportunity to explore the evidence for Silk Roads exchange in South Asia. Meetings and discussions in Bhutan revealed some of the challenges of exploring the archaeology of the Silk Roads in this country, and this is the focus of the first part of the paper.

Those discussions led to my Bhutanese colleagues, in the Division for Conservation of Heritage Sites (DCHS), raising the need for a digital national inventory. Extensive discussions on the purpose and form of such a project took place. The second part of this paper explores some of the issues around

that debate, the steps taken to implement the chosen solution (the Getty Conservation Institute/World Monuments Fund ARCHES heritage inventory system), and the implications this has for heritage management in Bhutan.

### **The Silk Roads in South Asia**

A number of trans-Himalayan routes connected western and south-western China (Yunnan, Sichuan and Xinjiang) to South Asia. These routes were of considerable importance to the development of the region (for example, see Tong 2013; Yang 2008). The Southwest Silk Roads, more commonly called the Ancient Tea and Horse Routes (Freeman and Ahmed 2011; Fuchs 2008; Mckillop 2012; Yang 2004), were important from the Tang dynasty (618–907 CE) onwards; and by the Song Dynasty (960–1279 CE), the tea trade from Sichuan was controlled by an official *Tea and Horse Bureau* (Yang 2004, 30). Similarly, routes using the valley systems of the southern Himalayas, the so-called ‘Salt routes’, provided vital contact between South Asia and the Tibetan plateau (Fisher 1992; Kurlansky 2002). At the subsistence level, food-stuff grown in the valleys was exchanged for wool and salt from the high-altitude Tibetan plateau, but the routes also supported long-distance trade in textiles, carpets, dyestuffs and narcotics between South Asia and eastern central Asia (Rizvi 1999).

As with other parts of the Silk Roads, the balance between trade, elite exchange, and the impacts of travel and contact provide a context for understanding long-distance movement within South Asia. These are often intermeshed: Aihwa Ong (1999) discussed how travellers can be crucial transnational actors in the making of new economies, and how individual agency is crucial in the large-scale flow of people, images, and cultural forces across borders. Takeshi Hamashita, for example, noted that in the 14th–17th centuries:

. . . under the tribute-envoy system, a tributary state sent periodic tribute

missions to the Chinese capital, and each time the ruler of a tributary state changed, the Chinese emperor dispatched an envoy to officially recognize the new ruler. This tributary relationship was at the same time a political, economic, and trade relationship. . . . This tribute trade was not limited to Chinese merchants from East and Southeast Asia; Indian, Muslim, and European merchants also participated, confirming the link among coastal ports (Hamashita 2011, 125).

But these travellers and merchants are just one aspect of a much larger whole: as Appadurai (1986) argued, the ‘total trajectory’ of commodities (from production, through exchange and distribution, to eventual consumption) involves different stages, and is enmeshed in complex intersections of economic, political, and cultural factors.

### **The Silk Roads in Bhutan**

This is not to say that trade was unimportant. Bhutan played a significant part in long-distance networks, most notably in the movement of tea and salt, but also spices, wool, musk, silk, pearls, metals and many other goods. From Bhutan’s perspective, most of this trade was about the transit of materials over long distances, although some commodities were being produced in the mountain kingdom, most notably foodstuffs from the fertile high valleys. From the early modern era, Bhutan was carrying out regular caravan trade over the rugged Himalayan terrain, particularly with Bengal to the south and Tibet and China to the north and north-east (Sarkar and Ray 2006). Bengali literature, for example, refers to several Bhutanese commodities and, in 1626, a traveller noted that Bhutan was “well provided with Chinese merchandise such as silk, gold and porcelain” (Deb 1976, 56). Nevertheless, perhaps most significantly, those networks were hugely important in the formation of Bhutan and perceptions of national identity, most obviously in terms of the spread and development

of Buddhism, the impact of which cannot be overestimated (e.g. Akasoy et al. 2011; Elverskog 2010; Fogelin 2005; Neelis 2011; Wong and Heldt 2014; Wriggins 2004).

There are significant problems, however, in understanding the nature of pre-modern exchange in Bhutan, and the impact that trade and the movement of peoples had on the development of Bhutanese culture. Very little archaeological research has taken place in Bhutan: modern archaeological excavations/surveys are only just starting to take place (under the auspices of the Bhutan-Swiss Archaeological Project, organised by Helvetas, the Swiss-Liechtenstein Foundation of Archaeological Research Abroad) (Della Casa et al. 2014; Fux et al. 2013; SLSA 2012; 2016), and at present we have little data beyond historical accounts. As a result, historical awareness in Bhutan today reflects the introduction of Buddhism into the area, and the foundation of the Kingdom in 1616 (with the arrival of Zhabdrung Ngawang Namgyel), with which came perceptions of nationhood. The tangible evidence for this history is largely seen in the monumental architecture of monasteries, chortens (stupas) and dzongs (fortified complexes, with massive exterior walls surrounding a complex of courtyards, combining secular administrative offices and religious functions).

The earliest indication of high valley settlement in Bhutan comes with an abrupt shift to dry climatic conditions on the Tibetan Plateau around 5000 to 4500 BP. Palynological (pollen) evidence, including the sudden disappearance of juniper and rhododendron pollen and the onset of cereal pollen, has been linked to human arrival in the high valleys of Bhutan around ca 4280 ± 130 cal a BP; while extensive charcoal horizons dating to 4745 ± 250 and 4680 ± 155 cal a BP have been interpreted as evidence for forest clearance (Meyer et al. 2009).

In terms of settlement evidence, almost nothing exists after that up to the 16<sup>th</sup> century CE. Only one excavation, at Jakhar, has produced material significantly earlier, with a reported C14 date of the late 8<sup>th</sup>/early 9<sup>th</sup> century CE, although it is not

clear what activity this material relates to (SLFA 2000). Burial mounds found in the Phobjikha Valley have been compared to Tibetan mounds of the 4–9<sup>th</sup> centuries CE (Fux et al. 2013, 36–39), but no clear dating evidence has yet been published for the Bhutanese sites.

Documentary evidence suggests the foundation of early Buddhist monastic settlements as early as the 7<sup>th</sup> century CE, with the founding of two Buddhist temples, Kyerchu Lhakhang in the Paro Valley in the west and Jampa Lhakhang in the Choekhor Valley (Phuntsho 2013, 76–84). By the 8<sup>th</sup> century there is mention of the meditation centre at Taktsang Palphug (Pommaret 2009, 136). There are a number of monastic foundations dated to the 12<sup>th</sup> and 13<sup>th</sup> centuries, such as Tharpaling and Choedrak Monasteries (Pommaret 2009, 222–223) and numerous examples dating from then to the unification of Bhutan in 1616. Most of the dzongs are dated on historical sources to the period after unification, although at Drapham Dzong, a ruined site in the Chamkhar Chhu valley, it is suggested that construction may have started in the second half of the 16<sup>th</sup> century (Meyer 2010).

Overall, the existence of the early monasteries and temples suggests that there was a developed settlement system in the fertile valleys of Bhutan significantly pre-dating the standing monuments of the post-unification era. Similarly, the network of dzongs, fortified religious and administrative centres, constructed after the unification of Bhutan in 1616, seems to have been designed to secure existing polities within the important valley systems of western and central Bhutan. It is evident that the fertile valleys were capable of supporting agricultural communities, and it is likely that these were important to control for the emerging Bhutanese elite. We can also hypothesise that routes within and through Bhutan are likely to reflect the complexity of the societal responses to the environmental and geographic nature of the area (high plateaus, mountain passes, high mountain valleys, low-lying subtropical Doors Plain, etc.); and the empire system, polities

and religions which developed through the interaction with, and control of, the routes.

The valley systems to the west (**Fig. 1**), via the Paro valley, Drukgel (**Fig. 2**) and the Tremo La pass, would perhaps have been the most significant in terms of contact with

Tibet, Sikkim and Nepal. The route north from Punakha (the early capital) via the Wāgya La pass, and in the east, the route via the Bod La Pass, were probably also important. However, the northern passes, at nearly 5,000 m, and even the Tremo La pass



**Figure 1:** Distribution of major dzongs (red), monasteries (blue), and the most significant mountain passes (La in Dzongkha) (yellow). Suggested major routes through the high valleys marked in orange.



**Figure 2:** Drukgyel Dzong, ‘fortress of the victorious Drukpas’, built in 1647 to commemorate victory over the attempted invasion by Tibeto-Mongol forces in 1644 (Pommaret 2009, 138). The location is strategically vital to protect the Paro valley and it became important for controlling the trade with Tibet via the Tremo La pass (Photo author).



at 4,600 m, would have been impassable for parts of the year. To the south, routes through the lowlands to Bengal would have been easier.

It seems likely that numerous elements – way stations, villages, market towns, palaces, staging posts, etc. – must have existed within the pre-1616 landscape, but none have yet been identified or explored. An obstacle in identifying such sites is the nature of deposit formation in the high valley systems: the western and central valley floors, at altitudes ranging from 1100 to 2600 m, have substantial alluvial deposits, while the valleys in eastern Bhutan are cut deeper, with steep convex side slopes, narrow V-shaped valley floors and negligible alluvium (Norbu et al. 2003, 66). In the western and central valleys, the alluvial deposits were deposited at different stages in the down cutting of the rivers, and remnants of older deposits now form river terraces on the sides of the valleys, with the clearest and most complex sequence of terraces in the Bumthang section of the Chamkar Chhu valley, where the highest river terrace so far identified lies at 250–300 m above the present river level (Norbu et al. 2003, 67). These depositional and erosive actions, in places, will have either buried earlier settlement sites, or destroyed them. However, the limited space within the steep valley systems, probably means that settlement sites have been continually occupied over centuries. What is needed is more archaeological research of the valley floors and the river terraces.

Another significant problem with identifying (and dating) earlier settlement stems from the lack of research into material culture and especially ceramic typologies. The latter may have considerable potential to provide a dating framework for the region. On the positive side, significant quantities of ceramics have been recovered during the recent excellent Swiss-Bhutanese project, including blue painted Chinese porcelain and coarse wares (Meyer 2010, 240–242), which suggests that it may well be possible to develop a regional ceramic sequence.

Recently published research on Ogyen Choling (Choden and Roder 2012) also demonstrates the ability of local studies to begin to understand the development of earlier settlement landscapes.

Overall, it seems that the potential for archaeological research related to the routes through the mountains in Bhutan is very high. But this also raises issues regarding the general awareness of archaeological resources, and how to encourage their protection. Continued settlement and agriculture in the valley bottoms, and even more destructive, urban expansion of the capital Thimphu, pose a significant threat to understanding pre-modern Bhutan.

### **A national heritage inventory in Bhutan** *Objectives*

The need for a digital national inventory in Bhutan was identified during discussions with the Bhutan Division for Conservation of Heritage Sites (DCHS). In part this arose from our discussions regarding the evidence for the Silk Roads and pre-1616 settlement patterns. We recognised the potential of a Geographic Information System (GIS) to combine existing archaeological and historical data, with geographic and topographic information on the valley systems and passes, and to enable predictive modelling of the routes and landscapes. The modelling of past settlement patterns and landscapes from incomplete evidence is a well-established archaeological approach (Bevan and Wilson 2013) and such a research tool could also serve as a platform to develop a national inventory for Bhutan. However, the real impetus in these discussions came from the DCHS, who identified the need for a national inventory as a tool to raise public awareness and access to heritage in Bhutan.

After discussion, the priorities were articulated as:

1. To disseminate information and raise awareness of cultural heritage sites in Bhutan, to both national and international audiences;

2. To create a knowledge-based context for the preservation, promotion and management of cultural heritage in Bhutan;
3. To document the condition, state of conservation, management planning, and changing circumstances of the heritage in Bhutan;
4. To provide a robust under-pinning for the selection of monuments, sites and landscapes for any potential World Heritage nomination project. While the Silk Roads nomination project started this debate, it was recognised that any such nomination would be some years off, given the need to collect primary data on sites and routes. Nevertheless, Bhutan already has a number of sites on the UNESCO World Heritage Tentative List, including a serial nomination of 'Dzongs: the centre of temporal and religious authorities' (UNESCO 2012).

From an archaeological perspective, it would also aid the use of existing data on later settlement patterns to model the potential

for earlier landscapes and to focus their investigation.

The inventory would also need to reflect the three categories of cultural heritage proposed in the draft *Heritage Sites Bill of Bhutan* (Ministry of Home & Cultural Affairs 2014):

- Heritage Buildings (including sub-categories of religious buildings, vernacular architecture, etc.);
- Archaeological Sites;
- Cultural Sites (which encompass landscape areas and agglomerations of historic and archaeological elements).

It was also important that the project provided capacity building opportunities for the DCHS in heritage management, specifically including database and GIS skills.

### System requirements and the selection of ARCHES

A workshop in Bhutan in August 2014 (Williams in press), involving staff from University College London (UCL) and the DCHS (**Fig. 3**), focused on approaches to



**Figure 3:** The August 2014 workshop members outside the National Archive building (Photo author).

heritage site documentation, especially photographic and 3D recording, the application of GIS systems, and the requirements of a heritage inventory system for Bhutan. This discussion then focused on the how to develop a digital inventory, and what software to use, and a list of requirements was formulated (**Table 1**).

Considering these requirements, we decided to employ the ARCHES system (The Getty Conservation Institute and World Monuments Fund 2016). This bespoke heritage inventory platform has been developed by Getty Conservation Institute and the World Monuments Fund, working with Farallon Geographics Inc., specialists in geo-spatial services (Carlisle et al. 2014; Myers et al. 2012; Myers et al. 2013). At the time we made the decision, in late summer 2014, ARCHES was at version 2. We had some reservations about its ability to deliver the functionality that we needed, but the promised upgrades to the system (version 3.0) seemed to address many of our concerns. At the time it was being customised to deliver the Los Angeles Historic Resources Inventory (Office of Historic Resources 2016), which suggested that our concerns regarding condition assessment, documenting standing structures, and the relationship between actors (excuse the pun) and monuments, would be resolved. In addition, ARCHES is an open source software development, which allows it to be freely available to download and customise by users.

### Implementation

With UNESCO/Korean Funds-in-Trust support the implementation project commenced in late 2015. A UK team, led by Bryan Alvey of Cultural Heritage Information Consultants, customised the ARCHES 3.0 system for Bhutan. The Bhutan National Inventory was installed on a secure virtual server, to facilitate the online access of the system by the DCHS for testing and trial data entry. In Bhutan, additional staff were recruited to start the process of data gathering. In February 2016 a workshop was

held in Thimphu to provide a comprehensive demonstration of the features offered by the customised ARCHES system, to introduce the Bhutanese team to the system, and to work towards thesauri to provide standardisation and control in data entry (**Fig. 4**).

A live system is now operational, and we are in the process (April 2016) of cleaning existing digital data and transferring this into the system.

However, a number of challenges remain. First, the work to add existing non-digital records to the system, and thus the ability of the online inventory to deliver a sufficient body of data to the general public, depends upon the scale of resources available for data entry, scanning and checking. This is likely to be a long-term activity. As a result, the DCHS has established priorities, based on the expected development challenges facing Bhutan.

Secondly, the development of thesauri, used to provide standardised input and to improve the integrity of the database, has proved to be complex. Some could be easily adapted from the existing term lists in ARCHES, covering conventional/widely used architectural terminology for aspects of, for example, domestic architecture. Good progress has been made with the main monument types, reflecting specific Bhutanese architectural and functional form (for example, the component elements of Lhakhangs, Buddhist monasteries). However, some issues are proving difficult: for example, cultural periods, reflecting the paucity of literature and established terms referring to anything 'Medieval' or earlier.

Thirdly, during the workshop, the Bhutanese staff assessed the elements offered by ARCHES and compared these with their current documentation systems, enabling them to identify information required in their day-to-day management activities. One major issue that arose was the current paper-based *Application forms for works*, which are routinely submitted by the managers/owners of monuments to request restoration work or new builds.

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## Requirements

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## Arches

**Semantic data structuring:** any inventory system needs to explicitly address the semantic and ontological framework for organizing information from many different components of historical data: different forms of monument, monument components, landscapes, etc. – different originators, collectors, creators, etc. – different historical events, individuals, etc. The development of the semantic structure is massively complex, as the long and often torturous development of the National Record of the Historic Environment, and Sites and Monuments Records (now Historic Environment Records) in England demonstrates (English Heritage 2012; Fernie and Gilman 2007). Bhutan needed to build on discussions that had taken place elsewhere, enabling them to focus on adapting thesauri, terminology, etc. to their specific needs.

The overwhelming advantage of ARCHES is that it delivers an explicit semantic framework for organizing information within a national inventory context. It provides the key documentation and management areas required in such a heritage inventory. The combination of its genesis as an archaeological site and landscape-based system in MEGA-Jordan (The Getty Conservation Institute and World Monuments Fund 2010), and its subsequent adaption for the LA Historic Resources Inventory, means that it has addressed an appropriate range of monument types and documentation needs.

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**A web-enabled system:** to enable public access to the inventory data whilst providing security for sensitive information (e.g. maintenance costs, legal disputes, etc.).

The ARCHES system is very front-facing, and has the ability to password-control access to any specific field of information. It is also designed to integrate with GeoServer to support publishing cultural heritage data as a web service.

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**System costs:** a low or no-cost system, preferably open source, which could be expanded and developed to meet local needs. Realistically, the DCHS do not have extensive financial resources and expensive proprietary software, expensive customisation and development, and long maintenance/upgrade contracts, were likely to be unsustainable.

It is free and open source. It is built on python (<https://www.python.org/>) and Django (<https://www.djangoproject.com/>), and implements core libraries: Require.js (<http://requirejs.org/>), Backbone.js ([backbonejs.org](http://backbonejs.org/)), jQuery (<https://jquery.com/>), and Bootstrap (<http://getbootstrap.com/>).

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**Ability to document monument condition and change:** given the current emphasis on standing monuments in Bhutan, and that most of the existing paper-based documentation relates to these monuments, it was important that any system could handle multiple records, reflecting point-in-time condition records and management actions.

The LA Historic Resources Inventory customisation provided a solid platform for monument condition documentation and change over time.

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**Data entry:** given that much of the existing data in Bhutan consisted of paper-based records, along with conventional photographs and drawings, there needed to be the ability for any system to import and attach simple scanned data (pdf documents, images, etc.).

Many of the database fields/forms can be customised to link to attached files. While this is not ideal in terms of search facilities, it does allow for the rapid addition of existing data as a short to medium term strategy.

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**Contd.**



## Requirements

**GIS capabilities & the exchange of geo-spatial data:** the development of geospatial systems was important to the DCHS. In the short-term, any inventory system must be able to provide basic mapping functions, both in terms of site distribution and visualisation, but also legal and conceptual boundaries to monuments and landscapes (simple point data would not be sufficient). It was also vital that the DCHS could exchange geo-spatial heritage data with other government agencies, to develop the integration of heritage management into wider strategic decision-making in Bhutan.

**Language:** while much of the administrative documentation in Bhutan takes place in English, and the majority of the population have good English language skills, the ability of a national inventory to handle Dzongkha would be important.

## Arches

ARCHES has good front-facing GIS capabilities. It supports OGC (Open Geospatial Consortium) standards and emerging geospatial data formats, such as GeoJSON, as well as web formats (KML) and traditional GIS data formats (e.g. shapefiles). These enable geospatial data to be easily exported and imported from other GIS applications such as ESRI's ArcGIS, Quantum GIS or Google Earth™.

The MEGA-Jordan inspiration for the project included the requirement to be able to have a user interface in both English and standard Arabic. As a result, ARCHES has simple functionality to enable it to have interfaces in multiple languages, making a Dzongkha interface easily realisable.

**Table 1:** System requirements and ARCHES selection rationale.



**Figure 4:** Hands-on training and discussion during the February 2016 workshop (Photo author).

As many as ten of these can be received each week. A record of decision-making, expenditure, materials requested, etc. is kept and plays a key part in current Bhutanese built heritage management. This would be a substantial addition to the system and not one that ARCHES, an inventory system,

is perhaps best suited to deliver. It may be that better standalone management tracking and workflow systems could be developed to accommodate this information, with a summary report, reflecting the outcomes of the process, loaded in to the ARCHES inventory to ensure that a record of past interventions to specific monuments is maintained.

## Conclusion

Overall, we hope that the National Inventory system will be an important step in collating and presenting the wide range of Bhutanese tangible heritage both to an international audience and to the people of the Kingdom. It will also support the work of the DCHS, and help to develop the links between them and partners in other governmental agencies, enhancing strategic and holistic approaches to heritage management in the country.

We also hope that providing the inventory platform will promote discussion of the earlier, pre 17<sup>th</sup> century, archaeology of the country. Research into earlier settlement, and the role that long distance communication

played in the development of the region, will be a long-term activity – it is likely that the identification of specific sites and landscapes will take some time – but the potential is considerable.

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### Competing Interests

The author has no competing interests to declare.

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