

the coupled heat and moisture transfer in building components, as well as relate conditions recorded in the walls to long-term predictions. A database would also be developed for logging long-term monitoring attributes (condition reports, climate data, microclimate data) and photographic records.

The analysis of monitoring and climate data collected through the project would enable the relationship with climate, climate change and earthen-architectural heritage to be explored and better understood. Where damage could be expressed in terms of damage functions, the potential damage in the future could be determined by coupling these to the likely future climate at the site.

This project also wished to move beyond the data to carry out qualitative analysis of the test walls, in order to understand earthen-architectural heritage and climate change in relation to the philosophical and reflexive context of heritage values. For example, recording of thoughts and opinions concerning the physical appearance of the test walls provides opportunities to reflect upon and document reactions to the varying conditions of the test walls, to understand how rates of transformation impact upon physical conditions and heritage values of earthen structures.

A key problem for such research is how to transform the very large quantities of data gathered into coherent research outcomes. It is easy enough given modern recording techniques to gather large amounts of data. However, this can become a descriptive end in and of itself. An important element of this research was to isolate key parameters such that they would be useful in understanding the types of change likely to occur into the far future, as well as to provide guidance for the management and protection of earthen-architectural heritage.

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CHALLENGES IN PRESERVING THE WORLD HERITAGE EARTHEN SITE OF CHAN CHAN, IN PERU

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Theme 2: World Heritage Earthen-Architectural Sites, Natural Disasters and Climate Change

Keywords: Chan Chan, World Heritage site, conservation, management plan

Abstract

Chan Chan is an archaeological site in Trujillo, on the north coast of Peru. The archaeological complex is the largest earthen site in the world and has been on the World Heritage in Danger list since being inscribed in 1986, following its classification as a UNESCO World Heritage site.

The aim of this paper is to address the state of the art, regarding the challenges and the current preservation status, and to understand why the site has been on the list for last 25 years. This paper also discusses the architectural and archaeological significance of Chan Chan, its assessment as a World Heritage site, the management-plan development, the conservation state of the site, the conservation practice on site, the conservation philosophy, reasons for conservation failure, key issues emerging from qualitative analysis, and finally, in conclusion, recommendations to consider.

1. INTRODUCTION

Chan Chan is an earthen archaeological site located in the Moche Valley, 5 kms northwest of Trujillo on the north coast of Peru. It is situated 600 km north of Lima. Chan Chan is considered to be the largest World Heritage site built of earthen materials in the world, and the largest pre-Columbian city in the Americas.

The inhabitants of the Moche Valley were the Mochica and Huari, when the Chimú culture arrived around the 9<sup>th</sup> century AD. In 1100 AD, following the collapse of its economy resulting from “el Niño phenomenon, as well as several tectonic movements” (Castellanos, 2000, p. 69), the Chimu state directed its attention to military activities “to conquer and dominate the neighboring valleys ... consolidating Chimu power” (INC, 2000, p. 5, Executive Abstract). It was in 1300 AD that the Chimú culture initiated the dynasty of the Chimor Empire (Briceño Rosario, 2004, pp.13-15).

Chan Chan became the religious and administrative capital of the Chimor Empire during the reign of the ten rulers, reaching its maximum splendor in 1450 AD, with an estimated 35,000 inhabitants living in the citadel (INC, 2000, p. 5, Executive Abstract). This empire extended throughout an area of 1,000 km, on the north coast of Peru (Valle Alvarez, 2004, p. 9) and fell under the Inca conquest between 1462 and 1470. Chan Chan was then almost abandoned as a living city and was again conquered by the Spanish, approximately 60 years later (Briceño Rosario, 2004, p. 15).

According to several authors, the meaning of Chan Chan in

the autochthon Yunga language is “City of the Sun” or “Warm City” (Pinillos, 1995, p. 24). At the present time, the complex has an area of 14.14 km²; however, its original area was about 20 km² (Valle Alvarez, 2004, p. 9).

The complex is comprised of nine walled citadels, known as townships or palaces. There are also “thirty-five architectural units and semi-monumental ensembles, six huacas, ceremonial roads and four extensive popular neighborhoods” (INC, 2000, p. 6). The huacas were built as pyramidal-type structures dedicated to sacred ceremonies, related to the concept of transcendence. According to Campana, a huaca represented the idea of an ancestral power, which explains in certain cases the burial of men at huacas (2000, p. 120). Within the citadels, there were autonomous units containing ceremonial squares, temples, reservoirs, gardens, burial places, storehouses of the aristocracy, but also labyrinths and blind alleys (Pinillos, 1995, p. 15). Some authors believe that most of the population lived outside the citadels.

2. ARCHITECTURAL AND ARCHAEOLOGICAL SIGNIFICANCE

The citadels were built in different historical periods with similar architecture typologies. The overall complex emerged as a metropolis, and followed an outstanding method of town



Fig.1 Sector of Audiences, in Tschudi Palace, (credits: Mariana Correia, 2005).

planning. The Early Phase is composed of the township of ‘Chaiwac’, at the south end of the complex, and the “palace complexes of ‘Uhle’, ‘Tello’, ‘Laberinto’, in chronological succession” (Pinillos, 1995, p.14). In the second phase, named Transitional Phase or Middle Period, the palace of ‘Gran Chimú’ was built; while in the Late or Imperial Period the ‘Velarde’, ‘Bandelier’, ‘Tschudi’, ‘Rivero’ and ‘Squier’ palaces were built. The time period classification of the citadels was based on investigations made by Alan Kolata, who analyzed the “chronological sequence through a study of the adobes of Chan Chan according to their characteristics and uses” (Ibid., 1995, p. 14).

A high degree of control of the construction material and the building method can certainly be discerned related to adobe use in Chan Chan, with more than 17 different shapes of adobes identified at least for the complex walls (Campana, 2000, p. 117). For instance, a specific type of adobe with a truncated-pyramidal shape was applied for the citadels’ surrounding walls. These walls had major relevance at the time and were built for defensive purposes. In the case of Tschudi Palace, the citadel wall has a height of 12 m and is 1,500-m long (Pinillos, 1995, p. 28). To ensure strong and thick earthen walls, the citadel’s surrounding walls were built wider at their base and narrower at the top. With the increase of height, the wall thickness would decrease, as would the size of adobes. In this way, deterioration was avoided, due to “humidity and the salinity of the earth, and ensured that it [would be] earthquake-resistant” (Pinillos, 1995, p. 15).

Inside of the citadels, there are walls with very significant decoration, such as “raised friezes in which abstract motifs, anthropomorphic and zoomorphic subjects add to the exceptional splendor” of the ruins (World Heritage, 2007, p. 4). The grandness and the enormous scale of the complexes are impressive, in spite of the damaged structures and the great



Fig.2 Different dimensions of adobes at Tschudi palace (credits: Mariana Correia, 2005)

Fig.3 Section of partially destroyed citadel wall (credits: Mariana Correia, 2005)

deterioration of the site fabric. Due to the advanced decay, only Tschudi Palace is opened to visitors, as it is the citadel most excavated and best preserved (Correia, 2009).

### 3. WORLD HERITAGE SITE ASSESSMENT

In 1986, Chan Chan was listed as World Heritage site, and inscribed on the List of World Heritage in Danger. The criteria chosen to justify its nomination are:

*“Criterion (i): The planning of the largest city of pre-Colombian America is an absolute masterpiece of town planning. Rigorous zoning, differentiated use of inhabited space and hierarchical construction illustrate a political and social ideal, which has rarely been expressed with such clarity.”*

*“Criterion (iii): Chan Chan bears a unique testimony to the disappeared Chimu kingdom.”*

(World Heritage, 2007, p. 7)

Since then, the Peruvian authorities have developed several conservation actions, which have been focused “on controlling the rising water table levels at the property, as well as site management actions, security concerns and illegal occupations” (World Heritage, 2007, p. 4). However, the criticism of the World Heritage Committee (WHC) has increased concerning the strength of “institutional capacity for implementing the management plan. To date, there is no formal decision making, professional team working full time at the site, there is lack of prioritization in implementing actions and some of these continue to be politically driven” (Ibid., p. 5). The State Party addressed some of the recommendations by creating Supreme Decree (N°26-2006), Emergency Decrees (n°032-2006 and N°001-2007) and Ministerial Resolution (N°0714-2006) specifically related to the Archaeological Complex of Chan Chan (World Heritage, 2007, p. 12).

In 2008, the World Heritage Committee recommended that it was “critical that capacity building and technical training is considered inherently in the implementation of projects. The implementation unit should also consider a broad technical

participatory decision-making process, particularly enforcing collaboration between archaeologists, conservators and architects” (World Heritage, 2008, pp. 82-85). The four-page comprehensive revision of Chan Chan’s State of Conservation by the WHC, and its draft decision are a major resolution to force the State Party to undertake more participative and long-term action.

### 4. ADDRESSING THE MANAGEMENT PLAN

In 1997, the World Heritage Committee required the State Party to produce a management plan for Chan Chan (Castellanos, 2001, p. 111). The Management Plan of Chan Chan was prepared during 1998 and 1999, and published in 2000 as Supreme Decree N°003-2000-ED (INC, 2000, p. 3, Executive Abstract). The plan was assigned to the National Institute of Culture in Peru (INC), through its regional department in La Libertad. It received the contribution of World Heritage Fund, UNESCO’s representation in Peru, as well as collaboration of the Getty Conservation Institute (GCI) and ICCROM (Castellanos and Hoyle, 2000, p. 14) and the support of CRATERRE-ENSAG. The plan was composed of nine volumes, plus appendices. It incorporated seven programs with 24 subprograms and 140 projects for research, conservation and management of Chan Chan (Castellanos, 2000, p. 79).

A participative and interdisciplinary approach was fundamental to involve different stakeholders and disciplines, which also “provided a better knowledge of the values of Chan Chan and the understanding of its conservation issues” (INC, 2000, p. 2-3, Executive Abstract). This was possible through a broad consultancy of national and local stakeholders and a value-based approach undertaken during the process of creating the management plan. The process was so profound and extensive that it brought difficulties in its implementation. This was due to political reasons, but also due to demanding targets, resources and a wide-ranging plan to achieve the proposed goals.

The WHC/ICOMOS/ICCROM mission undertaken to Chan Chan in February 2007 emphasized that priority should be given to the course of action prescribed in the management plan. The State Party finally took positive actions by creating Ministerial Resolutions and Decrees designating a management plan and administrative director to the site, authorizing the implementation of emergency action at the site and updating its management plan (World Heritage, 2007, p. 12). However, at present, in September 2011, the site still bears a high risk of deterioration and decay.

### 5. CONSERVATION STATE OF THE SITE

The site is very exposed to cyclical strong rains originating from “El Niño”, as well as to floods and to seismic activity, as this region is located “in the earthquake belt of the Pacific Ocean. The last flood was in 1925 and the last earthquake in

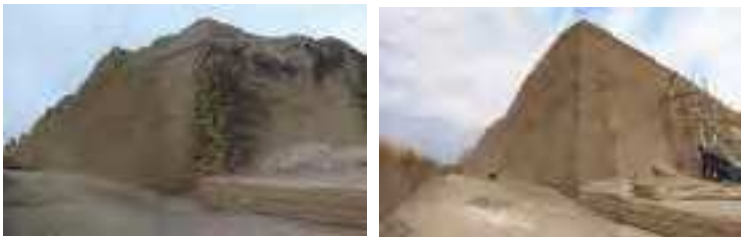


Fig.4 Before restoration: Tschudi citadel surrounding wall (credits: Mariana Correia, 2005)

Fig.5 Following restoration: Tschudi citadel surrounding wall (credits: Luis Guerrero, 2007)

1970” (Pinillos, 1995, p. 13). Several of the earthen structures are affected by the direct action of the “combined effects of wind and rare atmospheric precipitation; [but also] the proximity of the water table and the salinity of the soil and air ...” (World Heritage, 2007, p. 7). The presence of salts brought by the wind or by the groundwater also affects the particle cohesion of the earthen materials of the walls, resulting in their structural degradation. Moreover, this additionally has an impact on materials that are lost “on the capping layers and [in] both original and restored decorative components ...” (World Heritage, 2007, p. 13).

It is important to note that the “best explored and restored palaces (Tschudi, Gran Chimú, Laberinto) present damages in minor scale compared to those still to be restored” (World Heritage, 2007, p. 13). The Executive Abstract also calls attention to the fact that several of the excavated components have been left without protection, which has created serious erosion problems (INC, 2000, p. 23). It underlines that it is possible to recognize some deficiency in conservation interventions derived from reconstruction concepts, which generated structural and stability issues when addressing the original problems (Ibid., p. 23). The lack of continuity of the conservation works and lack of full management-plan implementation caused disruption to previous efforts. This affected the authenticity and integrity of the site and it was one of the main reasons for the WHC draft decision concerning reassessment of authenticity and integrity principles at the site. This will provide justification and definition of priorities of action, to keep the site listed as a World Heritage site.

### 6. CONSERVATION PRACTICE ON SITE

Chan Chan has had several conservation interventions in the last 50 years. Castellanos considers the existence of two conservation phases (2000, p. 71). The first phase was between 1964 and 1969 and relates to the Tschudi Palace intervention with a “type of highly criticized pastiche ... to satisfy the demands of mass tourism” (World Heritage, 2007, p. 8). Castellanos states that this was “largely oriented toward reconstruction for formal presentation” (2000, p. 71). The reconstruction of walls and frieze decorations can be observed in the Grand Ceremonial Plaza at the Tschudi Palace. Morales Gamarra supports the





Fig.6 Grand Ceremonial Plaza with reconstructed walls during the 1960s, Tschudi palace, Chan Chan (credits: Mariana Correia, 2005)

Fig.7 The reconstruction of the surrounding wall done during the 1960s is identified on the exterior of Grand Ceremonial Plaza, Tschudi palace, Chan Chan (credits: Mariana Correia, 2005)

criticism about the arbitrary reconstruction undertaken in Chan Chan (2007, p. 264). After 1974, “a stronger emphasis was placed on ... stabilization of structures, through the application of sacrificial renders and capping ...” (Castellanos, 2000, p. 71-72). As previously mentioned, capping with soil cement was addressed on some of Chan Chan’s earthen friezes (Alva Balderrama and Chiari, 1995, p. 105). Morales Gamarra directed criticism to some UNESCO experts who applied a stabilized mortar of soil-sand-cement as capping (1983, p. 112). As an alternative solution, the use of lime-soil was first proposed for capping and for the stabilization of the friezes, and the use of acrylic emulsion, as well as other chemical substances, such as Polyvinyl Acetate. Morales Gamarra stated that results were not satisfactory as there was recurrent exfoliation due to the high humidity (1983, p. 113).

According to Morales Gamarra, the only satisfactory solution was to use treatments with ethyl silicate, a solution applied by Chiari in 1975 in Tschudi Palace (2007, p. 266). Alva Balderrama and Chiari also confirmed the “good results despite torrential rain in spring 1983” (1995, p. 109). However, the irreversible character of the treatment still does not convince all of the experts (Morales Gamarra, 1983, p. 113).

Also during this second conservation phase, attention was addressed to the reburial of exposed decorated surfaces (Castellanos, 2000, pp. 71-72). For instance, this happened in the Ribero Palace, which was intensively archaeologically excavated and had the different components reburied after conservation measures, but this did not manage to mitigate the acceleration of decay.

Alva Balderrama and Chiari underlined the problem of excavating, backfilling, re-excavating several times and backfilling repeatedly, as it creates an unstable environment to the fragile earthen friezes and also makes them vulnerable to illicit diggers (1995, p. 112). In 1997, more archaeological excavations were carried out at the site, as well as conservation practice to eliminate salts from earthen decorations (INC, 2000, p. 14, Executive Abstract).

A third phase can be considered work after 1998 following

the El Niño phenomenon, which greatly affected the site. This phase was partially focused towards preventive conservation. This can be observed through the erection shelters “made of canes and woven thatch, [which] provided a low-cost alternative to mitigate the extensive damage” (Castellanos, 2000, p. 72). In 2007, the WHC/ICOMOS/ICCROM joint mission emphasized that the conservation “interventions undertaken have not addressed priority conditions” (World Heritage, 2007, p. 5). This was also due to the fact that interventions have not been carried out systematically, but “basically on an emergency basis” (Castellanos, 2000, p. 74). Later in 2007, the reconstruction of the surrounding walls of the Valerde Palace started, as well as the Tschudi Palace. The same type of contemporary adobe technology was applied throughout the overall intervention.

## 7. CONSERVATION PHILOSOPHY

In the Venice Charter, Article 9 states that restoration “is based on respect for original material and authentic documents. It must stop at the point where conjecture begins, and in this case moreover any extra work which is indispensable must be distinct from the architectural composition and must bear a contemporary stamp” (ICOMOS, 2004, p. 37). Additionally, the Cracow Charter (2000) in its Article 4 underlines that “reconstruction of entire parts “in the style of the building” should be avoided. Reconstruction of very small parts having architectural significance can be acceptable as an exception on condition that it is based on precise and indisputable documentation” (Charter of Cracow, 2000, p. 2). The Gran Plaza de Ceremonias in Tschudi Palace was to a great extent reconstructed. In Fig. 7, when comparing new and ancient fabric, it can be observed in the background of the plaza the part that was reconstructed, which is a positive aspect. However, when visiting the interior of the plaza, the lack of physical indication and interpretation material concerning the new intervention, but also the unified image given by the new intervention transmits a false interpretation of being ancient fabric, and it partially contradicts the aforementioned Article 9 of the Venice Charter. This intervention relates with the first phase intervention, mentioned by Castellanos (2000, p. 71).

It is also recognized that throughout the years, different responses have been applied for wall-conservation treatment, as shown in the criteria for intervention, which are inconsistent with international conservation policy. An illustration of this situation is “the current decision of not differentiating the new from the original adobes in walls; or the decision to apply a finishing superficial layer against the old criteria (INC) of leaving the faces of adobes exposed and marked (World Heritage, 2007, p. 14). This was a procedure that allowed the visitor to accurately read the sequences of applied treatments.

Another aspect to consider is: when will the Chan Chan complex be considered a ruin beyond recovery? Brandi studied this issue and associated the response with the recognition of

the potential unity of the object (Jokilehto, 2004, p. 232).

It is difficult to identify the turning point of unrecoverable damage. For the recognition of site significance, UNESCO usually requires the assessment of the principles of authenticity and integrity. Both were identified in Chan Chan, when the site was nominated for the World Heritage List. Recently, due to the increase of decay, UNESCO requested a new assessment of “Outstanding Universal Value, including the conditions of integrity and authenticity” (World Heritage, 2008, p. 38).

Chan Chan’s cultural significance was established as emerging from the following values: historic, aesthetic, scientific, urban and social. They are a reference for the projects and the development of the work programs, as well as the decision-making management (INC, p. 25, Executive Abstract). The value-based approach recognized in Chan Chan’s management plan is related to the Burra Charter and its Article 2.2 in which “the aim of conservation is to retain the cultural significance of a place” (ICOMOS, 2004, p. 64). Fernandes emphasizes that during Chan Chan’s PAT 96 course, the site assessment of significance was identified according to different values, as for some conservators, “conservation was a question of values” (Jorge, Correia and Fernandes, 2005, p. 136). This argument is valid considering that in the literature review, the value-driven approach is part of the overall conservation process. However, it should not become its main goal (Correia, 2009).

## 8. REASONS FOR CONSERVATION FAILURE

In Chan Chan, besides the natural factors affecting the site, there is failure related to the control of pressures affecting the site fabric. State authorities have difficulties in discerning its origin, as there is lack of care and awareness of Chan Chan’s Outstanding Universal Significance by a part of the local population.

Several factors affecting the site were identified during the observation field trip to Chan Chan, as well as during the analyses of the reports related to the World Heritage Committee decisions. The factors contributing to failure are construction incursions into the buffer zone, garbage dumping, graffiti, vandalism, motocross rallies, agricultural pressures, plundering of tombs for tourism artifacts to sell, soil extraction for adobe manufacturing, etc. Castellanos also underlines that the “low-income levels of the adjacent communities promote looting and deterioration of the site’s structures, which are also increased by uncontrolled access to the site” (2000, p. 73). The World Heritage Committee underlined this, emphasizing the importance for the State Party to define “the limits of the property in order to avoid further encroachment” (World Heritage, 2007, p. 9).

Recognized reasons for failure to enhance the site originate from lack of decision-making and commitment, but also a lack of determination to manage and to continuously conserve the complex of Chan Chan. This can be due to political pressures and weak local decision-making in conservation

practice matters, even though there was published legislation answering to the WHC requirements and there was also some “recovery of illegally occupied sectors used for agricultural and industrial activities” (Castellanos, 2000, p. 73). However, according to the WHC/ICOMOS/ICCROM report, there is still a “lack of expertise in conservation and a certain unwillingness to follow the prescribed course of action, already defined in the management plan” (World Heritage, 2007, p. 16).

Failure is also recurrent due to pressure originated from continuous archaeological excavations, without preservation procedures being addressed and conservation interventions being applied. There is additionally recurrent failure to control tourism in the overall complex, with visitors and cars openly accessing any exposed and unprotected remains.

In Chan Chan, several factors are contributing to a negative impact on the quality of visitors’ experience at the site. There are insufficient prepared infrastructures for public use, lack of conservation and maintenance measures throughout the site, missing overall site promotion and interpretation material (except some at the Tschudi Palace), “uncontrolled tourism with no visitor management strategies in place” (Castellanos, 2000, p. 73), etc. However, according to the WHC/ICOMOS/ICCROM joint mission, some of the access and parking was improved, but not finalized (World Heritage, 2007, p. 16). If compared with other cultural sites that are not World Heritage listed as, for instance, Huaca de la Luna, the number of visitors is decreasing drastically (Morales Gamarra, 2006). Other reasons for failure are related to a lack of permanent site-conservation policies, lack of implementation of the management plan and of a site conservation unit (Correia, 2009).

## 9. KEY ISSUES EMERGING FROM QUALITATIVE ANALYSIS

The main concerns are presented below, rising from the qualitative analysis emerging from questionnaires addressed to local and international experts in 2008. The main results embraced the management plan, the site condition and management, and politics.

9.1 Regarding the management plan, the key points arising were:

- **Community and stakeholders participatory process:** This was a participatory management tool with a strong impact on the content of the plan. There was a great effort engaged in involving national and international stakeholders and consultants. This contributed to a collective and interdisciplinary vision, with solutions based on those consultations.
- **Content of the management plan:** The management plan was very sophisticated, complete, detailed and considered the comprehensive regional and urban scale with constructive details included.



Fig.8 A sacrifice layer of gravel is used to protect the top of the walls. Audiences sector, Tschudi palace (credits: Mariana Correia, 2005)  
Fig.9 Reconstruction of the surrounding wall in Velarde palace, Chan Chan (credits: Luis Guerrero, 2007)

- **Size of the management plan:** The large size of the management plan was a weakness and brought difficulties to its implementation, as it was composed of nine volumes and more than 100 projects.
- **Management plan implementation remains difficult:** Implementation remains an issue, as there are limited resources, both human and financial. There are difficulties arising from external pressures, execution of sound and consistent conservation treatments and overall approach to such large site. Difficulties are also due to the Trujillo urban expansion growing towards Chan Chan.

9.2 Key issues that emerged from the site condition and management:

- **Not enough conservation professionals:** Local professionals have the constructive knowledge, but very few have enough conservation-intervention knowledge. Besides, local professionals do not have access to resources, which can facilitate decision-making.
- **Difficulties assessing physical condition:** Although there is profound knowledge of the natural variables affecting the site deterioration, there should be more studies and research related to the decay of the physical condition of Chan Chan, especially causes and effects of decay. For instance, the crust formation existing on the top of the walls is prominent and deserves further analysis and examination to detect its origin.
- **Monitoring control:** The management and control of the buffer zone is an important issue to address. Effective and continuous monitoring should be implemented, as there are some groups from the local community that do not respect the site, and daily cause destructive impacts.
- **Important missing actions to address:** There is a need to address several important actions at the site, such as recovery of perimeter walls to control erosion, discontinuity of archaeological excavations, enlargement of public-use activities, addressing the urban pressure on the site's surroundings, etc.

9.3 Regarding political issues, the key-points raised were:

- **There is competition between earthen sites:** There is fierce competition between different sites in the region (*Huaca de La Luna, Huaca Esmeralda, Huaca El Brujo, Chan Chan site, etc.*). This can affect collaborations, stakeholder's engagement, political decisions, etc.
- **Difficulties within the centralized management of INC:** The fact that local site-conservation decisions directly depend on the direction of INC, which in turn depends on political power, enforces a lack of decision-making at the site.

10. CONCLUSIONS: SUMMARY OF RECOMMENDATIONS TO CONSIDER

Some of the key issues emerging from site observations and undertaken analysis, crossed with the evaluation of the questionnaire are mentioned below, as well as recommendations to consider:

- **Decentralized decision-making:** Problems related to political pressures, lack of local decision-making, and lack of long-term continuity on the site's direction and management have a negative impact on the site's degradation and decay. Also, there is a lack of implementation of the management plan and too much centralized decision-making. As a result, in spite of the enormous effort of site teams, the response has been more reactive (and not proactive), and has addressed in particular, emergency issues. An implementation strategy taking into consideration the existing resources could contribute to a more feasible and realistic approach regarding the management-plan implementation.
- **It is lacking continuous conservation intervention practice:** There is a high pressure for archaeological excavations and not enough conservation intervention protecting the exposed remains. The large extent of the site and the lack of human and funding resources to address preservation actions is an increasing problem. Furthermore, it appears that there is a lack of expertise in conservation-intervention knowledge regarding earthen architecture; continuous maintenance and preventive conservation are non-existent at the site. Also, there are no continuous conservation activities, workshops or systematic intervention reports, as there are in other World Heritage sites in Peru.
- **Need to develop conservation standards:** There is the need to reinforce site conservation standards and laws to protect earthen heritage. In general, there is neither precise protective legislation, nor earthen site conservation recommendations, as well as there is no site maintenance or conservation plans. To create recommendations for physical stabilization of structures at risk and in decay, as well as recommendations for criteria in conservation intervention, and for intervention methodology regarding

the preservation of the property would contribute for site teams to have a consistent and comprehensive approach towards such large site.

- **Lack of seismic retrofitting and awareness:** In spite of being an area exposed to seismic activity, there is no seismic awareness at the site; neither is there seismic-retrofitting of the earthen structures, or a seismic-mitigation plan.
- **Lack of community awareness:** There is not enough effort to develop long-term awareness and respect for the site by the surrounding community. This results in the rise of human factors and pressures affecting the site. Also, masons have a tendency to use the site for a source of materials. To involve the local community through awareness-raising, but

also through capacity building, can be an effective way for site monitoring.

Chan Chan exhibits a unique and exceptional character sustained by its authenticity and integrity, and expressed by the masterpiece of its town planning and exceptional fabric, both presently at risk. This immense archaeological complex with major threats to its fabric and Outstanding Universal Value needs to be conserved in the long term with criteria, consistency, and perseverance. Appropriate measures should be considered for the management and conservation of the site, before it is too late and Chan Chan becomes a complete ruin beyond any possible intervention.

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