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FRAGILE YET POWERFUL RURAL LANDSCAPE HERITAGE AS RESOURCE FOR INCLUSIVE AND SUSTAINABLE DEVELOPMENT IN ARCHAEOLOGICAL INHABITED SITES

1. Cultivations, water infrastructures, archaeological evidences and villages as components of an articulated site. An introduction to Pyu cities

The Pyu sites are considered the first example of cities with urban planning in Myanmar (U Kan Hla 1978). During the expansion of Bagan (XI-XIII century) Sri Ksetra, Halin and Beikthano reorganized their economy, moving from having a central political role to a predominantly rural one. What mostly characterizes the three sites is their almost in-line development along the course of the Irrawady river, which contributed to the configuration of the cities themselves on a system based on irrigation and cultivations (Fig. 1). Sri Ksetra is set at 5.6 km from Irrawady. In this context, Pyu cities have benefited from the creation of an advanced water collection and distribution infrastructure within the sites, which has contributed to the growth of rice crops, characterized by the need of consistent irrigation. In Sri Ksetra the water infrastructures dated as Pyu period are still used today for irrigation (UNESCO Myanmar 2013).

The water network serves not only as main resource for maintaining agriculture within the walls of the site but are also related to ritual and defensive purposes. As in other cases in South East Asia (e.g. Indonesia, Philippines) in Sri Ksetra the flow of water, coming from the SW towards the NE of the site, connects not only the major burial sites of the city, but also the main elements related to life and rituality. Besides, *in-gyi* and *in-aing* ponds are located near the city gates, contributing to strengthen the defensive ramparts; moats running along the walls reinforced the protection system, while serving to collect water (Stargardt 2002; Stargardt *et al.* 2012). The layout of Sri Ksetra was therefore partly determined by the need to preserve and better manage the water resource: furthermore, cultivations were (and still are) set within the city walls (Fig. 2). The development of the canals, having a strong symbolic connotation, defined the "matrix" of cultivated land and built evidences.

During the excavation campaigns that have been carried out since the colonial period until today, the evidences of 80 architectural artefacts, of which 57 belonging to the period of the Pyu civilization, have been found in Sri Ksetra (Hudson, Lustig 2008). The presence of stupas, pagodas and

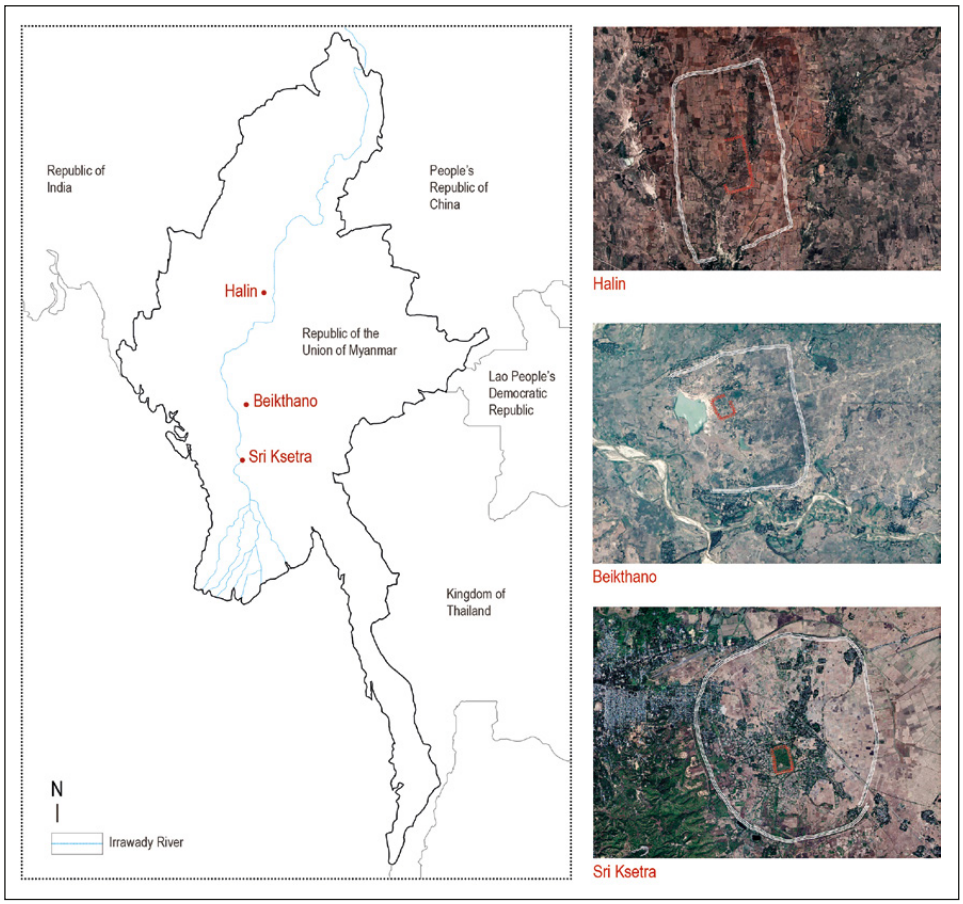

Fig. 1 – Disposition of Pyu cities along Irrawady river. Elaboration by the author from Google Earth (Maxar Technologies) satellite images of Halin, Beikthano and Sri Ksetra. Ramparts are evidenced in white, while the citadels are in red.

monasteries is distributed throughout the territory and, in most cases, is found without interruption within areas destined for the agricultural function. Unlike what happens in Halin and Beiktano, where the settlements still inhabited are placed outside the city walls, Sri Ksetra records the presence of 20 villages within the city: the irrigation system has contributed to the stability of the settlements and their development to date. It is estimated that around 15,000 people live within the archaeological area, most of which (12,537) are distributed nearby the city walls. Besides, 54 monasteries are active in the site (UNESCO Myanmar 2013).

Fig. 2 – Elaboration by the author from Google Earth (Maxar Technologies) satellite image of Sri Ksetra. In the site, within the ramparts, 20 villages are still inhabited and the presence of rural activities is prevalent, as evidenced. Ancient ponds and water infrastructures are represented in blue, as based on literature (Stargardt *et al.* 2012) .

2. Dealing with a living heritage. Management and preservation challenges

The Pyu cities, Sri Ksetra in particular, are inhabited archaeological areas (Fig. 3). The data referring to the amount of population present within the sites, to the distribution and to the number of villages inside the protection perimeter is extremely important to fully understand challenges that occur in the management of the sites. Considering this aspect, in proposing a plan

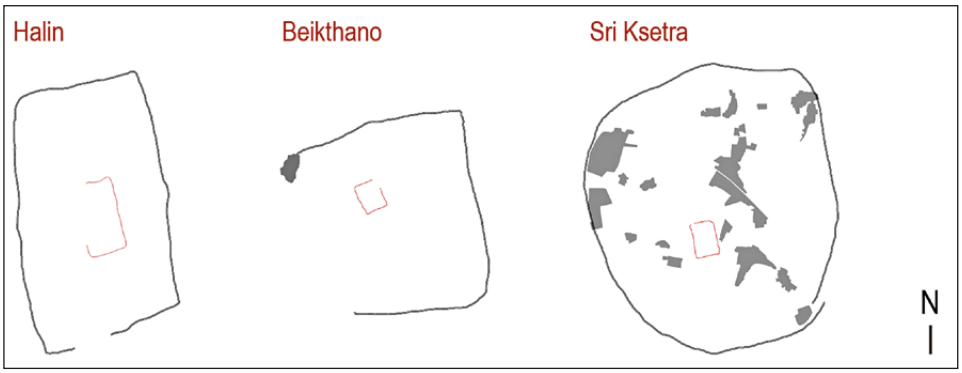

Fig. 3 – Conceptual representation of villages within Pyu sites. As shown in the diagram in Halin there are no villages within the ancient city Pyu, while in Beikthano there is only one settlement within the walls.

of protection the community, its habits, rituals, subsistence systems cannot be set aside, but must rather be involved in the planning phase first, and then effectively managed. Given this background, as confirmed by the in-situ investigation carried in Sri Ksetra in 2015, the site deals with a multifaceted set of factors and dynamics which impact significantly over the site.

The analysis of the distribution of properties within the boundary of Sri Ksetra returns a picture characterized by heterogeneity and by the presence of very different actors. According to a 2012 survey, land ownership in Sri Ksetra is divided into two groups: approximately 32% of the area investigated is publicly owned, while the remaining 68% is private (UNESCO Myanmar 2013). The percentages alone simplify an urgent issue: the management and protection of widespread heritage, infrastructures, environmental resources are in charge of different actors, which cannot be simplistically reduced to the public/private subdivision. Another critical aspect is the association between the presence of cultivated areas, privately owned, and water infrastructures, public and administrated by the community. Is there then a shift concerning cultivated land "owned in common by the community" but classified as "private": water infrastructures and agricultural fields have been managed as a common by the inhabitants for centuries, efficiently and rationally.

Moreover, if archaeological and religious heritage is under "univocal" management and correlated policies seem precisely outlined, concerning the other components of the site there is not a defined model of reference. This clarification must be made as a prerequisite for the issues that affect the management of the site. The threat to the integrity of the site represented by the introduction of mechanical ploughing and intensive cultivation is urgent. The entire area of Sri Ksetra is in fact to be considered as potentially suitable

for future archaeological excavation campaigns; this is suggested by the on field archaeological investigations conducted in the last ten years within the sites. The traditional agricultural techniques and use of land, besides being a primary subsistence activity, represent a "soft" way to exclude harming to potential archaeological areas.

Furthermore, a coordinated management becomes even more urgent since the city of Pyay, confining with Sri Ksetra, has expanded its urbanization towards the ancient settlement, overcoming and damaging the ramparts and the irrigation network. The new city of Khittaya, with its population of about 5500 inhabitants (2012 census) is the most densely populated settlement within Sri Ksetra. The presence of the modern city within the ramparts, albeit limited, increases the exposure of the Pyu site to risks, such as: the use of materials different from the traditional ones for the construction of buildings, the expansion of the urbanization without plan and regulations, the introduction of non-native crops within the site.

Besides, the preservation indications addressed to Pyu cities is structured within two different "levels". Myanmar legislation classifies heritage by a "zoning" procedure. Pyu cities are identified as Cultural Heritage Regions and subdivided then in three preservation categories: Ancient Monumental Zone (MZ), Ancient Site Zone (AZ), and Protected and Preserved Zone (PZ) (The Protection and Preservation of Cultural Heritage Regions Law 1998). Even if legislation of 1998 sets the sites in their "entirety" under national protection, built heritage within the area identified as Cultural Heritage Region considered as "most significant" is instead classified for "punctual" protection, rather than as a system that contributes to the formation of the site.

3. Coming under the international spotlight. The path of Pyu cities towards World Heritage nomination

The first UNESCO supported program in Myanmar was developed between 1981 and 1983 (UNESCO, UNDP 1984). The mission set the importance of creating a management plan for the Bagan area, which would then be used as a model for other archaeological sites in Myanmar. In order to favour the communication between the different departments of competence active within the sites (e.g. archaeology, infrastructure, agriculture) the suggestion was to develop an intersectoral masterplan (Pichard 1983). Emphasis is set on integrating policies to safeguard the rural landscape with planning at the local level, considering the two actions as intertwined: the report anticipates the critical and delicate issue of intersectoral management of a living and multifaceted site. Among others, rural development of the sites is set as a priority; this denotes how rural landscape was considered as one of the cornerstones to structure a suitable management of the sites.

The description of Sri Ksetra is particularly relevant. Unlike Beikthano and Halin, where no mention is made of cultivations, the site is described as «plain cultivated with rice, which gradually rises towards the forests» (UNESCO, UNDP 1984): the need to describe the rural aspect returns how this characteristic was already considered as structural in defining Sri Ksetra. The activities by the Organization in Myanamar continued during the years; in 1994 the Country accepted the Convention, while in 1996 the first "tentative list" was structured (UNESCO Convention 1997). In 2012 the process for the drafting of the dossier concerning Pyu cities for World Heritage nomination started. The path that led to the nomination in 2014 was not without difficulties.

At first instance an important effort was required to achieve an adequate level of coordination between the different institutions managing heritage protection at the national level in the three Pyu sites. To overcome these issues the Myanmar National Committee for World Heritage (part of Ministry of Culture) was established, so as to enhance communication between the different actors involved in the process. Furthermore, to facilitate the preparation of the sites in perspective of listing, the management of Pyu cities was entrusted by the Government to the Pyu Ancient Cities Coordinating Committee (PYUCOM). The main task of PYUCOM was to coordinate existing regulations and planning strategies to newer planning, management and safeguarding policies to be adopted for the nomination. The management plan outlined within this institutional and regulatory framework was developed from 2012 to 2014. In 2014, the Pyu cities were listed as World Heritage "cultural" sites (UNESCO 2014).

Although in the justification of the appointment as a World Heritage Site in 2014 the role that traditional agriculture covers within the formation of sites is reported as one of the structural elements of the sites, Pyu cities were not classified as "cultural landscape" properties; the focus was therefore set mainly on archaeological evidences. However, the management plan recommends the preservation of historical rural landscape within the site by avoiding the cultivation of non-native crops, prohibiting the introduction of modern irrigation systems in the property and not allowing the use of mechanical ploughing (UNESCO Myanmar 2013). As of the on-field research by the author in 2015, some of the abovementioned indications were not followed, such as the introduction of non-autochthone cultivations and the limited use of mechanical ploughing. These matters are recalled in the State of Conservation Report submitted by Myanmar in 2017 on which are also based the analyses developed by Advisory Bodies in 2018 (UNESCO Convention 2018): the issue related to inhabitants living conditions and traditional agricultural practices are set as urgent, recognizing how rural heritage can represent a resource for sustainable development and preservation of the living

site. The challenge is therefore to understand how it is possible to quantify the impact of management plans and of dynamics on such complex sites, so as to cope with them.

4. Assessing fragilities and empowerment in management plans. Indicators as tool (and beyond)

In order to assess the impacts of transformations and, consequently, indicate and structure which mitigation policies of the phenomena encountered may represent an effective response, an in-depth investigation must be carried out into the sources of statistical data and the information measuring the indicators. The usefulness of the indicators is reflected in the restitution of a synthetic meaning: they are developed on the one hand to reduce the number of measurements necessary for returning an "exact state of the art", and on the other to improve the communication of results measurements to end users. Instead of structuring a rigid set of parameters, the indicators derive from the analysis of the phenomena common among the investigated sites to identify which data could be the most suitable to determine, and counteract, the possible negative impacts on the rural landscape examined. This is particularly important as the flexibility of the parameter is a consequence and anticipation of the adaptability of the management and protection plan itself: in fact, the indicators establish the degree of success of the plan, allowing for ongoing corrections.

The methodology adopted is based on two levels of specificity: a common set of indicators, potentially applicable to all the cases analysed; a more detailed framework of parameters, referring specifically to the individual case examined. The parameters proposed should not result in an abstract simplification of complex issues and dynamics but might be introduced as a protocol to test the management and safeguard policies applied to a site. The indicators must be useful to the stakeholders involved in the management of the site, as objective data to outline ongoing transformations, so as to address targeted and specific indications. An inclusive strategy is crucial: the assessment of the multiplicity of actions that transform a site must be accompanied with a necessary historical, economic and political contextualization of the roles that different stakeholders have, or have had, in the site investigated.

Once the issues affecting the site have been determined, indicators are structured accordingly. By making an analysis, the evolution and modification of the phenomena that affect historical rural landscapes over a given time interval can be better understood. This allows to identify the dynamic factors that affect the conservation of the site. As regards the case study analysed in detail, the most significant risk phenomena include (but are not limited to) the following:

– change of land use;
– loss of Traditional Ecological Knowledge (TEK);
– introduction of non-native crops;
– substitution of traditional management of the resources with top-down policies;
– migration;
– lack of investments related to conservation and heritage management (tangible and intangible).

From this derive the indicators listed in the following table (Fig. 4).

Indicator	Unit
Conservation and valorisation actions on listed heritage	n.
Funds for capacity building programs concerning conservation and valorisation	€/local currency
Protected areas on local level	Δ Ha
Protected areas on national level (within defined boundaries of the site)	Δ Ha
Protected areas on supra-national level (within defined boundaries of the site) e.g. IUCN, UNESCO, FAO	Δ Ha
Presence of listed architectural and archaeological heritage (within defined boundaries of the site)	Surface area (HA)/n. of
Funds to support plans for enhancement of traditional agricultural practices	€/local currency
Soil use: agricultural traditional practices	Δ Ha
Capacity building programs concerning rural areas (e.g. funds to support traditional ecologic knowledge)	Number of training days / operator
Protected rural areas on local level	Δ Ha
Protected rural areas on national level	Δ Ha
Protected rural areas on supra-national level (within defined boundaries of the site) e.g. IUCN, UNESCO, FAO	Δ Ha

Fig. 4 – A selection of the indicators defined by the analysis of the sites.

Taking the example of World Heritage sites, in the context of candidancy and nomination, measurable parameters ensure not only the possibility of making a comparison between the development of the management plan and its application, but also concerning the achievement of the minimum standards required for the correct management and protection of the site. Merely descriptive parameters do not allow the reading of the variation of phenomena over time. The parameters must be easy to obtain and reliable: indicators should be retrieved from organizations that can certify their systematization and statistical collection. These data, if not available in statistical form, can be partially recovered through direct/indirect survey, using for example satellite images: they can be identified in their specific dimensions and characteristics. The indicators, besides referring to statistical data, can therefore be of a quantitative or geospatial nature; in the second case, these introduce the theme of the features of the site investigated. The geospatial

indicators in fact define the degree of specificity of the characters of rural landscape sites through the highlighting of determined characteristics by using remote-sensing technologies (e.g. identification of water basins or traditional cultivation). Such indicators might return the variations of extension of land uses over time, in a diachronic reading.

Data collection through the use of GIS technologies and remote sensing for the purpose of monitoring transformations and defining indicators was institutionalized by the approval in 2015 of the Agenda for Sustainable Development; in this context it was specified the need to trust on information as reliable as possible to verify the achievement of the global development Goals and monitor its progress over the 2015-2030 period (Earth Observations for Official Statistics Satellite Imagery and Geospatial Data 2017). The information related to satellite observation is already used to quantify the variations related to different issues (e.g. biodiversity, changes in land use, urbanization, etc.). Global geospatial data collection is performed by the Committee on Earth Observation Satellites (CEOS); this collaborates with the United Nations body dedicated to the collection of Big Data (Global Working Group on Big Data – UN GWG) which deals with the systematization of the information gathered and their return.

In relation to the case studies examined, the use of this type of data for monitoring changes in rural landscapes can be found in the PRiSM project – Philippines Rice Information System, started in 2016. The program foresees the monitoring of the country rice production, by cataloguing and systemizing data relating to the cultivation of rice (e.g. crop conditions, change in land use, etc.) obtained through remote sensing and statistical information provided by the Philippine statistical institute. The transmission of information to the interested users is then entrusted to an application and a web portal, which facilitates the monitoring phase (Department of Agriculture – IRRI – Philrice 2016). In the case of Sri Ksetra, investigation using remote sensing carried since the 1980s have highlighted the presence of the ancient irrigation system and its present use, at least in the sub-surface level (Stargardt *et al.* 2012).

The analysis of features allows to investigate the changes, through the diachronic reading of the historical rural landscape characters. Features define which are the constitutive or determining elements for the characterisation of rural landscape site, by interpreting variations and possible risks in time. If taken individually, the statistical data do not return a complete picture of the phenomena analysed; however, when combined, the data provide the general (and surface level) framework of the current situation. Beyond indicators, it is still clear that the complex issues that such a multifaceted heritage has to deal with cannot be deduced limiting the analysis to geographical and statistical data.

5. Some remarks. Rural landscapes are fragile and powerful

The methodology presented, applied to a rural, living, archaeological site as the one of Sri Ksetra, returns some reflections. As stated, indicators and statistics alone are not enough to delineate the complexity of a multi-dimensional site, which is not based only on "components" but is defined by the dynamics and relationship between them. Indicators, being objective resources, may be useful as "roadmap" to understand impacts of policy decisions and management plan: but the investigation must not be limited to the interpretation of these information.

It is therefore crucial to investigate and experience in person a site, through direct comparison with the stakeholders involved in the management and preservation. By understanding the needs and priorities, these should be then verified through the indicators. Besides, a direct knowledge of the site and of the needs of the inhabitants is essential; as it is crucial that professionals involved in heritage preservation and management set a mutual exchange of knowledge with the community inhabiting the site. Alongside the objective knowledge, therefore, the subjective experience must be placed: the application of an interdisciplinary methodology such as the Landscape Biography (Renes *et al.* 2015) can help to understand the palimpsest of a site, and to structure protection and management policies accordingly.

As stated, rural landscape heritage is fragile, yet powerful.

Its susceptibility to sudden changes, its own dynamic essence and the impact of transformations must be accounted not only as a threat, but also as a potential and as a tool. The study of the influence of different dynamics on the rural landscape, taking place so quickly, can direct and "calibrate" the drafting of management plans: in a sense, impacts of transitions on rural heritage might anticipate effects on all its components. In the case of Sri Ksetra the rural landscape is powerful, being closely linked to the subsistence and well-being of the community that inhabits the site: as described, without rural landscape there would have not been the community, but without the community the rural landscape ceases. The continuous use and maintenance of this heritage bring prevention of abandonment and at the same time "protect" the archaeological area.

Yet, the balance is fragile: if inhabitants are removed from the villages, the site is deprived from its first (and experienced) keepers: rural landscape and archaeological heritage are therefore closely related. This represent not a "shift" of attention from the archaeological and architectural heritage to the historic rural landscape in "exclusive" mode, but a reading that can bring the two components of the cultural landscape on an equivalent level of meaning, towards a protection and management of the sites developed

in interdisciplinary perspective. Changes, being inevitable, imply modifications that might be needed in dealing with inhabitants' updating necessities, outlining different challenges: thus, strategies of management and safeguard must be developed appropriately, by framing the context of the internal and external phenomena that bring transformation over this heritage.

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ABSTRACT

Sri Ksetra, in Myanmar, is an inhabited archaeological area in which rural landscape, widespread built heritage and archaeological evidences are intertwined with presence of numerous villages. In 2014 the three Pyu cities were named as the first UNESCO World Heritage Site in Myanmar: despite the premises, Sri Ksetra, Beikthano and Halin were not listed as "cultural landscapes" sites but recognized as "cultural" sites. Field research in 2015 highlighted emerging issues in the management and safeguarding of inhabited archaeological sites. The investigation raises critical issues concerning the conservation and management of the rural landscape as heritage, in view of a sustainable development of the site in favour of those who live there.