Ancient ferrous metallurgy sites (Burkina Faso) No 1602

Official name as proposed by the State Party
Ancient ferrous metallurgy sites

Location
Commune of Kaya, Sanmatenga province
Commune of Zitenga, Oubritenga province
Commune of Tougo, Zondoma province
Commune of Békuy, Tuy province
Commune of Douroula, Mouhoun province
Burkina Faso

Brief description
The five component parts of this serial nomination (Tiwêga, Yamané, Kindibo, Békuy, Douroula) include some fifteen furnaces still standing, several furnace bases, assemblages of slag, mines and some traces of dwellings. From the first millennium BCE, when ferrous metallurgy first appeared, there is tangible evidence of its importance across the whole of present-day Burkina Faso. Although iron smelting is no longer practised today, the blacksmiths in nearby villages still play an important role by supplying and maintaining the tools and instruments that are needed for everyday purposes and for numerous rituals.

Category of property
In terms of categories of cultural property set out in Article I of the 1972 World Heritage Convention, this is a serial property comprising five *sites*.

1 Basic data

Included in the Tentative List
24 January 2012

Background
This is a new nomination.

Consultations and Technical Evaluation Mission
Desk reviews have been provided by ICOMOS International Scientific Committees members and independent experts.

An ICOMOS technical evaluation mission visited the property from 24 to 31 August 2018.

Additional information received by ICOMOS
A letter was sent to the State Party on 8 October 2018 to request additional information concerning documentation, the comparative analysis, the justification of the serial property approach, the boundaries of the components and their buffer zones, factors affecting the serial property, conservation, protection and management. Additional information was received on 9 November 2018, and has been incorporated into this report.

An Interim report was provided to the State Party in December 2018, summing up the questions identified by the ICOMOS World Heritage Panel. Further information was requested in the Interim report about documentation, criterion (vi), conservation, management and tourism.

Additional information was received from the State Party on 27 February 2019 and has been incorporated into the relevant sections of this evaluation report.

Date of ICOMOS approval of this report
13 March 2019

2 Description of the property

Description and history
The five component parts of this serial nomination (Tiwêga, Yamané, Kindibo, Békuy, Douroula) include some fifteen furnaces still standing, several furnace bases, assemblages of slag, mines and some traces of dwellings.

The site of Tiwêga consists of three induced draft furnaces that are still standing, and fragments of slag and tuyères. The furnaces are of the natural air draft type. Some 2.6 metres high, the two best conserved furnaces are conical in shape, with a lower part built out of tuyère fragments and lined with clay, and an upper part made of slag fragments.

The site of Yamané has two main induced draft furnaces, that are still standing to a height of 2.1 metres. They are built on the same principle, with alternating layers of laterite soil, and fragments of tuyères and/or slag laid horizontally. Numerous bases for various types of furnace are visible, with scattered slag, mines and anthropogenic mounds. As indicated by the State Party in the documentation received on 9 November 2018, excavations on nearby furnaces have led to datings ranging between the 13th and 14th centuries AD. The furnaces were abandoned during the colonial period. Present-day traditions attribute the furnaces to blacksmiths of the Moosé community, who are still present in the village and continue to produce iron tools, now made from scrap metal.

The site of Kindibo includes three induced draft furnaces still standing, that are conical in shape, and up to 2.3 metres high. They are built out of successive circles consisting of rolls of earth laid obliquely. These furnaces, believed to date from the 10th and 11th centuries AD, were built by Prédagomba groups who predated the Moosé. Bases of furnaces of a later type, attributed to the Moosé and dated as post-15th century AD, have been identified, and also extraction mines, with ten access pits, and a former dwelling site characterised by mounds covered by

potsherds. Close to the site, a family of blacksmiths is continuing to perpetuate smithing skills.

Békuy is different from the other components in terms of its highly structured spatial organisation, and the quantity of slag heaps. The five furnaces are of the underground or semi-underground type, and are surrounded by a line of slag several metres long, inside which stand other dividing walls, also made of slag. The furnaces are built of blocks of slag, using clay as a binder. They are of the natural air draft type. Several dozen backfilled pits have also been found. On the edge of the buffer zone, the State Party has found what was probably an iron ore mine, which according to oral tradition is inhabited by sacred pythons.

Located in the same cultural area as Békuy, the site of Douroula includes the remains of a semi-underground furnace, dated to the 8th century BCE, which is the oldest discovered in Burkina Faso up to now. It takes the form of a conical bowl in the ground, with walls made of laterite earth that were partly baked during the use of the furnace. Fields of slag, an ore quarry, with cavities hollowed out of the laterite rock, and anthropogenic mounds have been documented. The additional information received in November 2018 throws further light on the Douroula complex: the examination of the 15 anthropogenic mounds has uncovered pottery, grinding equipment, iron tools and human tombs. Their distribution points to the existence of groups of mounds interpreted as villages with different quarters. The site is attributed to ancient ironworkers from the Bwaba community. Three smithing workshops are still operating in the village of Douroula.

Ancient ferrous metallurgy is an industry that has been practised across the whole African continent for millennia. The industry was developed in Africa over a period of more than 2500 years. Datings in most cases have been carried out on smelting residues showing that Africa was one of the most ancient ferrous metallurgy centres in the world. Ferrous metallurgy began in the first millennium BCE, and consisted of two components: the primary component (processes to transform the ore into iron) and the secondary component (associated with smithing). The importance of the industry is tangibly expressed by large amounts of remains, such as the former iron ore mines, and above all the smelting workshops, consisting essentially of assemblages of slag, and the remains of furnaces and tuyères.

Although the lifeway was primarily rural, with small communities whose main activities continued to be agriculture and livestock rearing, the metal ages were marked by an acceleration in the hierarchisation of society, and the birth of crafts linked to iron. Between the 7th and 16th centuries AD, powerful and prosperous political forces developed in Western Africa, thanks largely to the introduction of iron, with the emergence of the empires of Ghana, Mali and Songhai.

During the colonial period in Burkina Faso, traditional iron production was gradually abandoned in favour of production from scrap iron. Today, iron processing is the only remaining component of ferrous metallurgy. From a social viewpoint, metallurgy has had a powerful impact on the structuring of human groups, because of the importance of blacksmith castes. These roles are being perpetuated, and today the blacksmith remains an important and respected figure in the village.

Boundaries

The nominated property of five components represents a total area of 122.3 ha, with buffer zones representing a total of 797.5 ha. Each component has an associated buffer zone.

Some buffer zone boundaries follow natural features (Tiwêga), others the boundaries of forest reserves (Békuy), and others artificial lines, with perimeters ranging from 100 metres (Kindibo) to 500 metres (Yamané). Following ICOMOS' request for clarification, the State Party – in the additional documentation provided on 9 November 2018 – indicates that the logic applied for the boundaries of the serial property is based on a participative and community-based approach, with local communities choosing the boundaries of the buffer zones within the limits of the land that they own. Land ownership in some cases is determined by natural landforms or artificial elements (such as a road). The State Party also stresses that the best conserved furnaces, together with the mines, iron ore pits and workshops, and all remains associated with ferrous metallurgy, are few in number, and have therefore been protected as a matter of priority. ICOMOS encourages the State Party to continue its archaeological research and ethnographic investigations that are not strictly linked to metallurgy, such as settlement sites and burial sites near the furnaces, to document them and consider their inclusion in buffer zones in the future.

State of conservation

The two furnaces at Tiwêga have been colonised by termite nests. To limit the degradation of the furnaces, a protocol has been implemented (involving the use of termite nest clay, chopped grass and sodium silicate). A conservation test has been carried out in one of the furnaces on a surface area of 50 cm^2, in conjunction with international partners (European Archaeological Centre, Bibracte). In the additional information provided in November 2018, the State Party indicates that, as the layer has not been rubefied, rainwater has leached certain parts of the layer, and that corrections will therefore be carried out during the dry season.

Two of the three furnaces at Kindibo have been colonised by termite nests in their base, while the third has been destabilised by a tree just next to it. Traces of cracks have been noted, and the upper part has been eroded. As the site is close to the village and surrounded by fields, the archaeological context has been disrupted in part of the buffer zone.

As for the Yamané site, the State Party indicates that the collapse of a section of the wall of one of the furnaces has

made visible the interior and details of construction. The wall section is also being lifted up by the roots of the tree just next to it. Despite this natural degradation, the archaeological context of the site has been preserved.

The site of Békuy, which is partly covered by vegetation, has thus become hard to access, but it remains in a good state of conservation, which is also the case at the site of Douroula.

Based on the information provided by the State Party and the observations made by the ICOMOS Technical Evaluation Mission, ICOMOS considers that the state of conservation of the sites is a cause for concern. ICOMOS wishes to stress the vulnerability of the attributes, particularly with regard to the furnaces that are still standing, and encourages the State Party to continue implementing the conservation measures so as to preserve them.

Factors affecting the property

Based on the information provided by the State Party and the observations made by the technical evaluation mission, ICOMOS considers that the main factors affecting the property are development pressures and environmental constraints.

The development pressures consist mainly of the expansion of farms. At Kindibo for example, where the village is 500 metres from the furnaces, cultivated fields formerly surrounded the property in part of the buffer zone, and disrupted the archaeological context as a result. At the moment, the population does not farm areas close to the site, which has been clearly delineated by a hedge to strengthen its identification and protection. Some fields are delineated by lines of slag at Tiwêga, Yamané and Douroula. Close to the site of Yamané there is some small-scale gold mining, which could ultimately pose a threat to the property's integrity. The State Party stresses however that the management system put in place will keep these threats under control.

In the additional information, provided on 9 November 2018, the State Party also explains that, thanks to a strong awareness raising initiative, local communities are realizing that it is necessary to conserve the serial property, by gradually avoiding the use of the assemblages of slag for private and domestic purposes. The gold mine at Yamané has also been prohibited by the local communities, as some of the nearby hills are considered to be sacred.

Based on the observations of the technical evaluation mission, ICOMOS notes that, particularly for Douroula, crop growing is having a direct impact on the property, and on almost the whole buffer zone (deep ploughing of the fields, and the use of pesticides). The presence of a burrow that could be a threat to the base of the furnace, dated to the 8th century BCE, has also been noted.

The environmental pressures consist of the termite nests that have colonised some furnaces (Tiwêga, Kindibo), the trees growing next to furnaces that lift them up and cause cracks (Yamané, Kindibo, Douroula), run-off water (Douroula), and straying domestic and wild animals that rub up against the furnaces (elephants in the case of the forest at Békuy).

ICOMOS considers that the termite nests can seriously damage the state of conservation of the furnaces (causing cracks and rain water infiltration, and maintaining residual dampness in the structure). It is also necessary to limit wherever possible the growth of trees near the furnaces, as this can affect the stability of the structures and cause them to collapse.

Visitor pressure is non-existent at present, as the serial property is not yet included in official tourism circuits, and is only a subject of scientific research.

In the additional information provided in February 2019, the State Party indicates that the conservation measures already taken are: the delineation of buffer zones by fences, the maintenance of the property by local communities (to keep vegetation under control near the furnaces), and visits led by a guide made fully aware of the different threats.

3 Proposed justification for inscription

Proposed justification

The nominated property is considered by the State Party to have Outstanding Universal Value as a cultural property on the following grounds:

- The components forming the serial property bear emblematic testimony to ancient ferrous metallurgy in Burkina Faso. The furnaces used for smelting the iron ore are associated with remains bearing witness to the whole technical system of traditional ferrous metallurgy.
- The property provides an insight into the different morphological types of furnace (above-ground, underground and semi-underground), the different working modes of induced draft furnaces (artificial or natural draft), and the diversity of materials used in their construction.
- The property bears witness to a cultural and technical iron ore smelting tradition that has lasted for three millennia. The property thus contains the earliest dated remains (8th century BCE) in Burkina Faso and Western Africa west of the Niger River.
- The metallurgical activity forms part of a major technological development, that of the adaptation of African people to their direct environment, whose demographic, economic and social effects were unprecedented in the region, i.e. the appearance of states and of long-distance commercial exchanges with the Arab world, through trans-Saharan trading in the case of Western Africa.
- Although iron ore smelting has ended, today's blacksmiths are still perpetuating the knowledge and

craft skills, and the rituals and social practices, linked to metallurgy through the manufacture of objects, peaceful conflict management and the treatment of disease.

Comparative analysis

The comparative analysis is presented in two parts: a comparison with properties in Burkina Faso and in Western Africa, and a comparison including sites inscribed on the World Heritage List and on the Tentative Lists, and other zones worldwide that are comparable on the basis of the proposed Outstanding Universal Value and the identified attributes.

The state of conservation of the furnaces, the representativity of the technical traditions, and the chronology were the criteria chosen by the State Party to select the sites that make up the current series.

The State Party stresses that with a dating of 8th century BCE, Douroula bears the most ancient testimony to iron production development identified in Burkina Faso up to now. Although only a furnace base structure remains, this component is presented as having outstanding universal value bearing witness to this first and relatively early phase of iron production development in Africa, and demonstrating that iron production technology was already widespread around 500 BCE.

In the additional information provided on 9 November 2018, the State Party notes however that several sites in Africa may be more ancient, but that the datings are subject to debate amongst the scientific community. This is the case for example with the sites of Oboui and Gbabiri I, in Central African Republic; Lejja in Nigeria; and Do Dimmi in Niger.

ICOMOS considers that, even if this particular component may not be as ancient as the sites in Niger, the Great Lakes or Central Africa, it is outstanding as the earliest ferrous metallurgy dating throughout the large zone west of the Niger River.

The State Party notes that the comparative analysis of furnaces (and of their base structures) documented in Benin, Côte d'Ivoire, Mali, Niger and Togo shows a certain degree of homogeneity in practices as regards construction modes, styles (cell furnaces, column furnaces, and chamber furnaces), and smelting techniques. In the additional information provided in November 2018, the State Party indicates that the serial property bears exceptional testimony to the variety of traditional iron ore smelting techniques in Western Africa in view of the comprehensive character of its furnaces, which have conserved all or almost all of their elevation. These are the only furnaces with elevation in Burkina Faso, and they are located in a preserved landscape. They are massive production sites which, with their large scale, illustrate the intensification of iron production in the second millennium AD, at a period when West African societies became increasingly complex. Other remains associated with the furnaces, such as vast assemblages of slag and traces of mining extraction, together with technical traditions that are still alive, strengthen the outstanding universal value of the serial property.

ICOMOS considers that the nominated property presents furnaces that are representative of multiple use smelting structures and bears witness to the various stages of the metallurgical process. Furthermore, Yamané, Kindibo, Békuy and Tiwêga have furnaces that are still standing, which is exceptional in Western Africa, where in most cases only bases are found.

The State Party compares the serial property with properties inscribed on the Tentative Lists: such as the ore extraction mines of the serial property "Les curieuses mines de fer de Télé-Nugar" (Chad), "Le site métallurgique de Begon II" (Chad), "Les sites paléo-métallurgiques de Bangui" (Central African Republic), "Le Parc National de 'W' " (Niger), "La Réserve naturelle nationale de l'Aïr et du Ténéré", "Ancien site industriel de Mantasoa" (Madagascar); and with the "Archaeological Sites of the Island of Meroe" (Sudan) and "Sukur Cultural Landscape" (Nigeria), inscribed on the World Heritage List.

It emerges from these comparisons that the nominated property differs from the above because of the state of conservation of its smelting structures, which complements the technical information relating to the iron smelting and transformation process. Furthermore, the State Party indicates that, unlike the Sudanese and Nigerian properties, inscribed because of their assemblages of slag, the nominated serial property includes all the attributes of the whole ferrous metallurgy technical system. The State Party explains that, unlike Sukur Cultural Landscape, the serial property also makes visible a different organisation of working space, well away from all dwellings.

The State Party stresses finally that the nominated property differs from the archaeological sites of the Island of Meroe, Sukur Cultural Landscape, the W-Arly-Pendjari Complex, and the Ecosystem and Relict Cultural Landscape of Lopé-Okanda, as the above form part of larger archaeological complexes and are not specifically related to metallurgical knowledge.

Lastly, a comparison is made with other properties inscribed on the World Heritage List in a wider geographical perspective, such as the Steel Works of Völklingen, Germany, and the Forges of Engelsberg, Sweden, selected because they bear testimony to a close relationship between a production activity and a human society. The State Party stresses that these properties are related only to indirect iron reduction (cast iron), unlike the serial property, which specifically represents direct smelting. The State Party also notes that the nominated property differs from the above properties, as it is related to a traditional (pre-industrial) technology which evolved autonomously in the continent of Africa and attained high efficiency and mass production.

ICOMOS considers that the comparative analysis, made deeper and more comprehensive by the additional information provided in November 2018, sets the property into the context of the history of ferrous metallurgy in Western and Central Africa, and enables an understanding of its importance and exceptional nature.

ICOMOS considers that the comparative analysis justifies consideration of this property for the World Heritage List.

Criteria under which inscription is proposed
The property is nominated on the basis of cultural criteria (iii), (iv) and (vi).

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

This criterion is justified by the State Party on the grounds that the ancient ferrous metallurgy sites bear exceptional testimony to a unique iron ore smelting tradition, passing on to the present-day communities a rich technical and cultural heritage. Douroula illustrates this initial phase of iron production development in Africa, and demonstrates that iron production technology was already widely disseminated at around 500 BCE, and probably during the first half of the first millennium BCE, throughout the region. Tiwêga, Yamané, Kindibo and Békuy are massive production sites, whose scale is illustrative of the intensification of iron production throughout the Sahelian zone of Burkina Faso in the 2nd millennium AD, at a time when societies in Western Africa became increasingly complex.

ICOMOS considers that the nominated property bears witness to the ancient nature and importance of the iron production, and its impact on pre-colonial societies throughout the Sahelian zone of Burkina Faso. It bears testimony to advanced technological expertise in iron production, a technology which led to the establishment and development of empires in Western Africa whose last remaining heirs are today's blacksmiths. The nominated property is also a rare example of ancient anthropogenic activity visible in a rural setting. The nominated serial property is exceptional in that it is the earliest dated example of ferrous metallurgy throughout the whole zone west of the Niger River, with the site of Douroula.

ICOMOS considers that criterion (iii) has been justified.

Criterion (iv): *to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrate (a) significant stage(s) in human history;*

This criterion is justified by the State Party on the grounds that the ancient ferrous metallurgy sites are outstanding examples that illustrate the variety of traditional iron ore smelting techniques in Burkina Faso. The furnaces have conserved all or almost all of their elevation, and they have morphological features (size, shape, arrangement of tuyères, situation in relation to ground level, etc.) that enables differentiation. Other remains are associated with the furnaces, such as huge assemblages of slag and traces of mining extraction, together with technical traditions that are still alive today. The very early appearance of this technology in worldwide terms has had significant consequences for the history of African peoples.

ICOMOS considers that the components of the nominated property are particularly well conserved and exceptional examples of technological construction types that illustrate the Iron Age in Western Africa, from its beginning up to the contemporary period. Mastery of ferrous metallurgy marked a turning point in the history of civilisations in Sub-Saharan Africa, fostering the development of agriculture, contributing to the emergence of complex social structures, with castes in this part of the continent, particularly of blacksmiths, and celebrated kingdoms.

ICOMOS stresses that the nominated property has furnaces that are representative of multiple-use smelting structures, and bears witness to the various stages of the metallurgical process. Furnaces that are still standing have also been conserved, which is exceptional in Western Africa, where usually only bases are found.

ICOMOS considers that criterion (iv) has been justified.

Criterion (vi): *to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance;*

This criterion is justified by the State Party on the grounds that the ancient ferrous metallurgy sites are directly associated with living traditions embodied by the blacksmiths as a socioprofessional group. The traditions are expressed today by symbolic values linked to iron technology in the communities that include the descendants of the blacksmiths and metallurgists. As the masters of fire and iron, the blacksmiths perpetuate ancestral rites and social practices that confer on them an important role in their communities at Yamané, Kindibo and Douroula. The smithing workshops are places where specific cults are carried out to obtain good harvests or success, to protect against lightning strikes and to treat certain diseases. The smithing workshop's cult altar can also be used as a mediation space for the resolution of conflicts.

ICOMOS considers that the role of the blacksmith is fundamental in traditional beliefs and craftsmanship. The primary and secondary ferrous metallurgy embodied in tangible form is the result of cultural interactions between several groups who are perpetuating this activity, particularly at Kindibo. Although iron ore is no longer smelted, the blacksmiths in nearby villages still play an important role by supplying and maintaining the tools and instruments that are necessary for everyday life and in numerous rituals.

ICOMOS considers that criterion (vi) has been justified.

ICOMOS considers that the nominated property meets criteria (iii), (iv) and (vi).

Integrity and authenticity

Integrity

The nominated property contains all the elements necessary for the expression of its outstanding universal value, and is of an appropriate size for the satisfactory preservation of the conditions of integrity.

ICOMOS considers however that the conditions of integrity of the nominated property are rendered fragile by the expansion of farming activities, causing disruptions of the archaeological context (Tiwêga, Yamané, Douroula); by gold mining activities (in the case of Yamané); by the presence of termite nests colonising certain furnaces (Tiwêga, Kindibo), and of trees growing just next to them (Yamané, Kindibo, Douroula); by soil erosion caused by water and wind; by the straying of domestic or wild animals that rub against the furnaces, in the absence of any physical protection, giving rise to clear and present risks.

ICOMOS notes however that the conservation measures already carried out or envisioned, set out in detail in the additional information provided in February 2019, and included in the site's management plan, will provide sufficient guarantees to maintain the integrity of the property.

ICOMOS considers that the selection of the components of the series is justified. It has been guided both by a concern to represent the different techniques that exist in the country, and by a determination to preserve furnaces that are still particularly well conserved, which is exceptional in Western Africa, and bear testimony to the various stages of the metallurgical process.

Authenticity

ICOMOS considers that the conditions of authenticity of the serial property have been met. The component parts of the serial property are still in their original location and in the posture for which they were designed. A few interventions have taken place to restore some furnaces that had been broken and to maintain others in their standing position.

ICOMOS notes the lack of chronological continuity between the oldest component, Douroula, dated to the 8th century BCE, and the other components, considered to be the most significant in terms of the country's metallurgical history, which appear in the most recent periods (15th-18th centuries AD). For some components, such as Tiwêga, datings are based solely on oral tradition.

ICOMOS considers it necessary to validate these datings by means of the radiocarbon method, to provide additional documentation of the chronology of the furnaces.

ICOMOS encourages the State Party to continue its efforts to document the property, the traditions connected to the smithing work, and the elements located in the buffer zones, in order to strengthen the conditions of authenticity of the serial property.

The resilience of the traditions linked to the smithing work should be treated as a specific aspect of the management of the property, in order to maintain the conditions of authenticity.

ICOMOS considers that the conditions of integrity and authenticity are vulnerable because of factors affecting the property.

Evaluation of the proposed justification for inscription

The outstanding universal value of the serial property is based on the presence of furnaces that are still standing, bearing witness to socio-technical knowhow that is centred on outstanding furnace construction skills, evidenced by the stylistic diversity, and on geological knowledge and quarrying skills (iron ore).

The serial property is of Outstanding Universal Value because of the monuments still standing, some of which are ancient, the involvement of several cultural groups and certain modes of transmission and maintenance.

The comparative analysis justifies the inscription of this property on the World Heritage List. The nominated property meets criteria (iii), (iv) and (vi). The selection of the sites in the series is appropriate. The conditions of integrity and authenticity however remain vulnerable, because of factors affecting the property.

Attributes

The tangible attributes of the serial property are the archaeological structures and sites, containing some fifteen furnaces still standing, several furnace bases, assemblages of slag, mines and some traces of dwellings. The serial property is also characterised by a set of intangible attributes, linked to smithing work. The blacksmiths still play an important role today in supplying and maintaining the tools and instruments necessary for everyday life and in numerous rituals.

ICOMOS considers that the nominated serial property meets the conditions of integrity and authenticity, and meets criteria (iii), (iv) and (vi).

4 Conservation measures and monitoring

Conservation measures

The conservation initiatives put in place by the State Party consist of taking measures (legal instruments and tangible actions) to ensure the security of tenure and

physical security of the land; ensuring the restoration of the furnaces and other remains; running structures to encourage concertation in the conservation of the sites (via local and national bodies); strengthening the capacities of the stakeholders in terms of cultural heritage conservation to ensure sustainable management of the sites; ensuring the routine upkeep of the sites; and finally ensuring the monitoring of each site.

Conservation and valorisation efforts are being undertaken by protecting what remains of the most ancient low furnace and the creation of the ethnographic museum at Douroula, and by experimental constructions of furnaces at Kaya. A conservation test has also been carried out on one of the furnaces at Tiwêga, on a surface area of 50 cm2. As a result, a protocol has been drawn up to attenuate the degradation of the furnaces.

The awareness of the local communities has also been raised, and they are being involved in the conservation, protection and valorisation of the ancient ferrous metallurgy sites. At Kindibo, the local community has initiated conservation actions by setting up lines of stones (*diguettes*) to mark the boundaries of the furnaces. The State Party also indicates that the administration of the different communes is beginning to play an active role in the process of conserving and valorising the cultural properties.

Under the management system, local committees, and local communities take care of maintenance work on the components of the nominated property.

In the additional information provided in February 2019, the State Party indicates that the management system includes an action plan for the conservation of each component, and indicates for each one the strategic objectives and actions, the expected results, the indicators, the persons responsible and the partners, the implementation schedule and the funding envisioned. The action plan for 2018-2022 provides for a strategic effort focused on strengthening the conservation and protection of the serial property. The objectives are to ensure the conservation and protection of the ancient ferrous metallurgy sites (by ensuring the physical security of the furnaces and by making the management structures more dynamic) and the safeguarding of the intangible cultural heritage elements linked to traditional ferrous metallurgy (by collecting and raising awareness about metallurgy-related elements and supporting the transmission of knowledge and craft skills).

In the additional information supplied in February 2019, the State Party also indicates that the measures already put in place to deal with the different threats to the property are: the delineation of the buffer zones by fences, the maintenance of the property by local communities (control of vegetation around the furnaces), and visits accompanied by a guide who is fully aware of the threats faced.

The measures to be developed will consist of reinforcing and capitalising on expertise in the preservation of earthen architecture, preserving and consolidating the furnaces in place, developing heritage valorisation systems that are located at a distance from the serial property sites, and continuing archaeological research. The measures envisioned to conserve the furnaces are the installation of a reinforcement with exogenous materials, to prevent the furnace chimneys from splitting, the filling of cracks with a material as close as possible to the original material, the evaluation of the impact of termite nests on the stability of the furnaces, and the protection of the furnaces against bad weather. The State Party points out that some of these measures may raise authenticity problems, and that they must be implemented in a way that complies with the recommendations of the Venice Charter.

The State Party also indicates that only non-destructive processes will be used for archaeological research. The objective will be to better characterise the extent of the sites by prospection (pedestrian prospection, photographic and photogrammetric surveys using a drone, or geophysical prospection). Excavations, which are the only method enabling the gathering of detailed information about iron smelting technologies and the dating of the furnaces, will only be developed on sites that are similar to those of the serial property in order to establish points of comparison.

ICOMOS considers however that it is important that the archaeological research programme is specifically linked to the conservation of the property, and that it is specifically focused on research questions related to the proposed statement of Outstanding Universal Value.

As for the research collaborations envisioned, the additional information supplied in February 2019 stresses that the Ministry of Culture, Art and Tourism has close relationships with the national and international institutions actively involved in implementing the policies for conservation, research and valorisation of the metallurgical heritage in Burkina Faso. At national level, the State Party can rely on the support of the History and Archaeology Department of the University of Ouagadougou. At international level, a partnership arrangement is currently being set up with the *Réseau des Grands Sites de France* for the management and enhancement of the paleo-metallurgical sites. Several international archaeological programmes on ferrous metallurgy are active in Burkina Faso and in the neighbouring countries. The State Party also points out that the communes of Kaya (Tiwêga) and Dourouga are twinned with French communes, which has resulted in the provision of signage at Tiwêga and the creation of a museum at Douroula.

ICOMOS congratulates the State Party for the documentation activity it has set up for the conservation of the property, and encourages it to continue in the same vein. However, ICOMOS also notes that the workload for the conservation effort put in place, and for the

maintenance of the property and its components, is extremely challenging. These actions require a large and regular supply of financial resources, which must be backed up by a vigilant strategy of funding collection, and by public-private partnerships, and must be supported by solid institutional, technical and administrative capacities.

Monitoring
The monitoring indicators and monitoring frequency are described in the nomination dossier. The monitoring of the property and the implementation of the management system are carried out by the national ferrous metallurgy site management committee and by five local management committees. The nomination dossier states that the key indicators to measure the state of conservation are checked annually (furnaces, archaeology, slag, anthropogenic mounds).

In view of the threats linked to erosion and stability of structures, ICOMOS considers that the state of conservation of the property should be monitored on a more frequent basis. ICOMOS also notes that the monitoring system must include risk management as a monitoring indicator.

In conclusion, ICOMOS considers that the conservation measures put in place constitute one of the most important challenges for the management of the property, and require strategies to ensure the stability of financial resources, and the providing of substantial qualified human resources and considerable institutional and technical capacities. The state of conservation of the property should be monitored more frequently, and risk management should be included as a monitoring indicator.

5 Protection and management

Documentation
The archaeological and ethnographic research work has produced a huge amount of documentation about ferrous metallurgy and the place of the blacksmith in Burkina Faso, and more generally in Western Africa.

ICOMOS considers that, in the additional information provided in November 2018, the maps indicate the situation of all the archaeological structures in detail. The locations of the furnaces, the auxiliary facilities, the waste zones and the important topographic elements are specified, which enables a better understanding of spatial organisation and the chronological relationship between the sites, while relating them to land use.

ICOMOS notes however that the attributes will need to be better documented and dated by means of archaeological research, which up to now has only been carried out on the sites of Douroula and Yamané.

In the additional information provided in November 2018, the State Party indicates that archaeological research is considered at Békuy, Kindibo and Tiwêga, and that the management system provides for the continuation of research at 2 year intervals. The archaeological programme will consist of systematic prospection in the buffer zones in order to produce an overall plan of remains, and thus understand the relationships between the different archaeological sites. Excavations will also be conducted on each site, focused on its specific characteristics.

The additional information provided in February 2019 also provides details about the relationships between the local communities and the sites, particularly as regards the blacksmiths, notably at Kindibo. Rituals to obtain rainfall and fertility rituals are carried out in the central zone of Békuy. The mine, which is inhabited by sacred pythons, is also a place of rituals carried out by the local communities. The site of Douroula is believed to be inhabited by the spirits of those who once lived there. At Kindibo, the proximity of the blacksmiths makes the site alive and dynamic through the smithing, pottery and the treatment of some diseases. Cults are also carried out some 500 metres from Tiwêga, to solicit the well-being of the community. As at Yamané, the furnaces are believed to be inhabited by genies. In general, fear of the genies actively contributes to the protection of the furnaces.

The additional information provided in February 2019 indicates that the location of the iron ore smelting sites was based on the availability of natural resources such as iron ore, wood, clay and water. The ferrous metallurgy workshops were set up close to water sources providing water and clay, and wood (often transformed into charcoal). They are also located close to places where ore was extracted. In the case of natural draft furnaces, the orientation of the furnace openings was determined by a strict rule based on the direction of dominant winds. The State Party stresses that the iron production activity has left traces on the landscape of varying degrees of visibility. The most easily identifiable elements are the assemblages of slag and the quarries. The use of some plant species as fuel has modified their population density and morphology, and in some zones has led to their rarefaction.

Legal protection
The nominated property is protected by Law 024-2007/AN of 13 November 2007 on cultural heritage protection in Burkina Faso, and on the creation of a public structure for the management of listed World Heritage sites, decree no. 2014-1019/PRES/PM/MCT/MEDD/MATS/MATDS of 28 October 2014 on the classification of cultural and natural properties and their inscription on the tentative heritage list of Burkina Faso; and Order 116/SE of 28 January 1940 on the classification of the Forest of Maro. Ownership rights are governed by Law n°014/96/ADP of 23 May 1996 on agricultural and land reorganisation in Burkina Faso; Law 055-2004/AN of 21 December 2004 on the general local authorities code in Burkina Faso; Law 003-2011/AN of 05 April 2011 on the forestry code in Burkina Faso; and Law 006-2013/AN of 02 April 2013 on the environment code in Burkina Faso.

This legislation governs ownership and land administration at national level. The components of the serial property are all located on public land, which is managed by local communities, except for the site of Békuy, located in the classified Forest of Maro (Act n°116/FE/17 January 1939).

Traditional protection is ensured by the local communities, on the basis of customary law and the respect in which the blacksmiths are held. The minutes of palavers (the traditional system of concertation and conflict prevention and resolution), have been recorded to obtain the agreement of the traditional authorities for the ceding of the land selected by the State Party for the serial property. With regard to this nomination, the State Party indicates that Municipal Orders will be issued by the communes to officialise the protection of sites and facilitate their conservation. In the additional information provided in November 2018, the State Party also indicates that all the minutes of the palavers will gradually be replaced by land titles.

ICOMOS considers that a form of combined protection, incorporating both traditional and institutional stewardship, is an advantage in terms of involving local populations and increasing their awareness of, and participation in, the safeguarding and management of the nominated property. ICOMOS encourages the State Party to continue issuing Municipal Orders for the officialisation of the protection of all the sites in the series.

Management system

The management system for the ancient ferrous metallurgy sites of Burkina Faso, approved for the period 2018-2022, and submitted to ICOMOS in February 2019, is based on the whole set of management plans for Yamané, Tiwêga, Kindibo and Douroula, which have an identical structure.

The overall objective of the management system is to strengthen the measures for the conservation of the archaeological heritage associated with the long history of iron in Burkina Faso, to raise the awareness of the public, in Burkina Faso and internationally, about the importance of this heritage, and to share these ambitions with other states at regional level.

The management system is articulated around three strategic priorities common to all the components: the strengthening of the conservation and protection of the site (ensuring the physical security of the furnaces, making the management structures more dynamic, collecting and promoting metallurgy-related elements, supporting the transmission of knowledge and craft skills); the development of research and partnerships (support for scientific research, support for the dissemination of research results to the general public, support for scientific and technical cooperation initiatives, support for efforts to obtain funding); and finally the promotion and valorisation of the property (support for the providing of facilities, support for promotion initiatives).

This common management framework is managed, for all practical purposes, by the World Heritage Listed Sites Department, which is attached to the Ministry of Culture, Art and Tourism. With regard to reflection and orientations, a national management committee exercises authority and control over all questions related to the serial property. It is supported by five local management committees, each in charge of one component of the serial property, which will oversee the conservation of the sites at local level. The State Party stresses that the texts that created the local management committees provide for the participation of officials from the commune. The World Heritage Listed Sites Department also coordinates conservation and management activities in conjunction with the local committees. The State Party will also consider setting up a scientific committee responsible for conceiving, examining and supervising research, conservation and valorisation work. At national level, 45 provincial departments in charge of culture have been set up to relay the efforts of the central administrations at grassroots level and ensure better protection of the sites. At local level, the State Party indicates that the protection of the serial property is the responsibility of the local communities and their authorities, which manage serial property conservation on a permanent basis. The local communities have developed endogenous management systems that play an active role in maintaining the integrity of the sites. The management of the site of Békuy, located in the classified Forest of Maro, is carried out by the Water and Forestry Department.

The State Party also indicates that each municipality has a communal development plan. These plans do not yet include a specific policy for metallurgy, but some initiatives are being taken to promote the protection, conservation and valorisation of the ancient ferrous metallurgy sites.

The State Party stresses that the public bodies in charge of the heritage (World Heritage Listed Sites Department) and the research institutions are sources of expertise on ancient ferrous metallurgy at national level. It is intended that the State Party will support the strengthening of the expertise of the managers of the tangible cultural heritage and the continuing education of the central, local and associative actors concerned, in the areas of furnace restoration, the management of the world heritage sites, and the promotion and valorisation of the ancient ferrous metallurgy sites. The State Party also indicates that the communities of blacksmiths and certain associations for the promotion of ancient ferrous metallurgy have access to endogenous expertise.

International partnerships have been set up with eminent structures dedicated to the conservation of earthen architecture.

The State Party indicates that it will invest in the conservation and protection of the serial property, and that it will strive to mobilise financial resources from its partners. Local authorities will also contribute to adding to the facilities at the serial property, to strengthening the

capacities of the communities and to supporting local festivals. Civil society will also contribute in the areas of training, dissemination of information, awareness raising, conservation and encouraging arts and crafts. Local communities will be closely involved in the conservation, protection and valorisation of the serial property. Research and higher education institutions will contribute by focusing on ferrous metallurgy research topics.

ICOMOS considers that the serial property is organised with a structured management plan, and that a considerable amount of work has already been done. Priority actions and scheduled actions have been defined, with indicators and checking sources that enable better monitoring.

ICOMOS notes however that no intervention plan is described in the nomination dossier to deal with foreseeable risks of natural disasters (fires, storms, earthquakes), or of climate change. In view of the fragility of certain attributes, ICOMOS recommends that an appropriate risk preparedness strategy is drawn up for inclusion in the management plan. It could also be used as a basis for devising better monitoring mechanisms.

Visitor management
The State Party indicates that the serial property is not yet included in official tourism circuits, and that it does not have appropriate facilities and infrastructures for visits. The management system however does provide for the construction of facilities to encourage visits to the serial property, and for the creation of a metallurgy interpretation centre. At the moment, interpretation is provided by an open-air museum of African furnaces at Kaya, close to the site of Tiwêga, an ethnographic museum at Douroula, and a temporary international exhibition on ferrous metallurgy at the National Museum in Ouagadougou.

The additional information provided in November 2018 indicates that a tourism management plan will be drawn up by the local management committees and that facility projects are planned at Kindibo and Tiwêga. In the additional information submitted in February 2019, the State Party indicates that visitor facility and infrastructure projects at Kindibo and Tiwêga are scheduled outside the management zones. For Kindibo, the facility zone will cover an area of 9 ha, and the facility zone at Tiwêga is currently being discussed. International tourism is very limited because of the lack of security in this subregion. The groups targeted for visits are a very small number of international tourists interested in the history of metallurgy, but above all school students, through a partnership that has been stepped up with the Ministry of Education and local authorities. Investment will as a matter of priority be directed at training local guides, and raising the awareness of teachers and local players, together with the setting up of information desks for tourists and urban interpretation centres (as at the museum at Kaya) and the publication of an iron heritage guide.

Community involvement
The State Party indicates that local communities will be closely involved in the conservation, protection and valorisation of the serial property, through participation in the dissemination of knowledge about the sites, and through visitor reception, cultural activity organisation, guided tours, and making their knowledge accessible to the general public. The additional information of November 2018 stresses that local communities will be given preferential access to the jobs generated by tourism, and that the mechanisms put in place will lead to fairer sharing of the benefits generated by tourism.

The additional information provided in February 2019 indicates that the local communities are involved in the local management committees, almost all of whose members belong to the local community. The active involvement of the local communities is also reflected in the way they have made themselves available throughout the process of preparing the nomination. It is the local communities themselves who identified the buffer zones and ceded the corresponding land to the State Party.

ICOMOS has also taken note of the workshop held on 22 November 2018 at Ouagadougou, where a document was drawn up setting out the strategy of conservation and management of the ferrous metallurgy sites, with representatives of the local communities and the persons responsible for property management. The additional information provided in February 2019 indicates that the workshop was intended to enable the validation of the management system by all the stakeholders.

Evaluation of the effectiveness of the protection and management of the nominated property
ICOMOS considers that the legal protection in place and the traditional measures for the protection of the property are appropriate.

The attributes are not sufficiently documented, resulting in the lack of an absolute chronology that archaeology could provide. With this aim in mind, archaeological prospection must continue, as must the inventory and documentation of the ancient ferrous metallurgy sites inside the boundaries of the property and in the buffer zones, to provide a basis for monitoring and conservation.

The measures put in place by the State Party to deal with the threats that could damage the conservation of the serial property, and the way in which these measures will be incorporated in the conservation plan, will also need to be strengthened.

In addition, in view of the fragility of the attributes, the property is exposed to risks as a result of various factors. The management system must therefore include risk prevention strategies and measures for intervention in the event of a disaster, and interconnection between excavation activities and conservation activities, which must go hand in hand.

Lastly, ICOMOS encourages the State Party to continue issuing Municipal Orders to officialise the protection of all the sites in the series, and also recommends the finalisation of the tourism management plan, which must be included in the management system.

ICOMOS considers that the management system should be developed, in order to incorporate a risk preparedness plan, and action plans with clear priorities in terms of conservation intervention and budget proposals. Measures are necessary to consolidate and reinforce research, by continuing archaeological prospection, the inventory and the documentation of the ancient ferrous metallurgy sites inside the property boundaries and in the buffer zones.

6 Conclusion

ICOMOS considers that the comparative analysis justifies consideration of this property for inscription on the World Heritage List. The nominated property meets criteria (iii), (iv) and (vi). The selection of the sites forming the series is appropriate. The conditions of integrity and authenticity are vulnerable because of the factors affecting the property.

The serial property, because of its monuments that are still standing, and the ancient nature of some of them, the involvement of several cultural groups and certain transmission and maintenance modes, has Outstanding Universal Value. In the context of the long iron sequence in Africa, the presence of furnaces that are still standing in Burkina Faso bears witness to socio-technical knowhow that was centred on great skill in furnace construction, which is observable in stylistic diversity, geological knowledge and quarry working (iron ore).

In view of the fragility of the cultural attributes and the threats facing them, ICOMOS recommends that an appropriate risk preparedness strategy should be devised and integrated into the management system, together with a strengthened monitoring system.

ICOMOS considers that the conservation measures put in place represent one of the most important challenges for the management of the property, and require strategies to guarantee the stability of financial resources, qualified human resources in sufficient numbers, and considerable institutional and technical capacities.

ICOMOS also congratulates the State Party for the additional information provided in November 2018 and February 2019, which was extremely useful for an understanding of the property.

7 Recommendations

Recommendations with respect to inscription
ICOMOS recommends that the Ancient ferrous metallurgy sites, Burkina Faso, be inscribed on the World Heritage List on the basis of **criteria (iii), (iv) and (vi)**.

Recommended Statement of Outstanding Universal Value

Brief synthesis

The five components of the property bear witness to the ancient nature and importance of iron production, and its impact on pre-colonial societies in the Sa helian zone of Burkina Faso. Dated to the 8th century BCE, Douroula bears the most ancient testimony to the development of iron production currently identified in Burkina Faso, and illustrates this first and relatively early phase of the development of iron production in Africa. Tiwêga, Yamané, Kindibo and Békuy all have remarkably well conserved iron ore smelting furnaces. They are also the only sites in Burkina Faso to have furnaces in elevation. They are massive production sites that, through their scale, illustrate the intensification of iron production during the second millennium AD, at a time when Western African societies were becoming increasingly complex. The property is directly associated with living traditions embodied by the blacksmiths at Yamané, Kindibo and Douroula. These traditions are expressed today by symbolic values linked to iron technology among the communities of descendants of the blacksmiths and metallurgists.

Criterion (iii): The ancient ferrous metallurgy sites bear exceptional testimony to a unique tradition of iron ore smelting, passing on to today's Burkina Faso communities a rich technical and cultural heritage. Douroula illustrates this first phase of iron production development in Africa, and demonstrates that the iron production technology was already widely disseminated by around 500 BCE across the whole region. Tiwêga, Yamané, Kindibo and Békuy are massive production sites that illustrate iron production throughout the Sahelian zone of Burkina Faso in the second millennium AD.

Criterion (iv): The ancient ferrous metallurgy sites are outstanding examples that illustrate the variety of traditional iron ore smelting techniques in Burkina Faso. The furnaces have conserved all or almost all of their elevation, and have morphological features that enable their differentiation. Other remains are associated with the furnaces, such as the huge assemblages of slag and traces of mining extraction, together with technical traditions that are still alive today. The very ancient appearance of this technology in global terms has had very significant consequences for the history of the African peoples.

Criterion (vi): The ancient ferrous metallurgy sites of Burkina Faso are directly associated with living traditions embodied by the socioprofessional group of the blacksmiths. These traditions are expressed today by

symbolic values linked to iron technology in the communities that descend from the blacksmiths and metallurgists. As the masters of fire and iron, the blacksmiths perpetuate ancestral rites and social practices that confer on them an important role in their communities at Yamané, Kindibo and Douroula.

Integrity

Within their boundaries the ancient ferrous metallurgy sites contain all the essential attributes of Outstanding Universal Value. They have all been preserved in their integrity and in their environment, with no major disruption down the centuries. No furnace has been dismantled, moved or damaged by vandalism. Only the furnace base at Douroula with the earliest dating has been physically protected. The distance at which dwellings are located, and the sacred nature of these zones, which are connected to the blacksmiths, are a guarantee of the protection of integrity. Nevertheless, the conditions of integrity are vulnerable because of soil erosion by water and wind, drought cycles and in some cases desertification, the colonisation of some furnaces by termites and trees, and small-scale gold mining.

Authenticity

The sites bear witness to continuity of production over more than 2700 years, to mastery of the processes of iron smelting and transformation, and to the essential contribution of this technology to the history of African settlement, and not only to the history of the peoples of Burkina Faso. The five metallurgy sites of the property express Outstanding Universal Value in terms of the age of the phenomenon, the form of the smelting structures, the completeness of the metallurgical complex elements, the diversity and richness of the architectural techniques, and the blacksmith traditions that are still alive today. The limited state of documentation in the property zones and in the buffer zones however means that the conditions of authenticity are vulnerable. Maintaining authenticity should be an important priority in the management of the property, to ensure the resilience of smithing traditions.

Management and protection requirements

The property is protected at national level by a set of laws, and by traditional protection provided by local communities on the basis of customary law. Management is also ensured at local level by communities, except for the site of Békuy, located in the Maro forest reserve.

A management system, drawn up for the period 2018-2022, is based on the management plans for each of the five sites, and constitutes the main sustainable management tool for the property. The property is managed in terms of reflection and orientations by a National Management Committee and in practical terms by the Listed World Heritage Sites Department. The national management committee exercises authority and control for all questions relating to the sites. At the level of each individual site, a local committee has been set up to ensure the sustainable management of the property by the local communities. The committee is guided by the site management plan and the orientations of the national management committee.

Additional recommendations

ICOMOS also recommends that the State Party give consideration to the following points:

a) Continuing issuing Municipal Orders to officialise the protection of all the sites in the series,

b) As the conservation measures are one of the most important challenges for the management of the property, developing strategies to ensure the stability of financial resources, sufficient numbers of qualified human resources, and multiple institutional and technical capacities,

c) Setting up the scientific committee in charge of conceiving, examining and supervising research, conservation and valorisation work on the property,

d) Developing the management system so as to include action plans with clear priorities as regards conservation intervention and budget proposals, and to include a risk preparedness plan and strengthened monitoring systems,

e) Finalising the tourism management plan,

f) Continuing archaeological prospection, the inventory and documentation of ancient ferrous metallurgy sites inside the boundaries of the property and in the buffer zones,

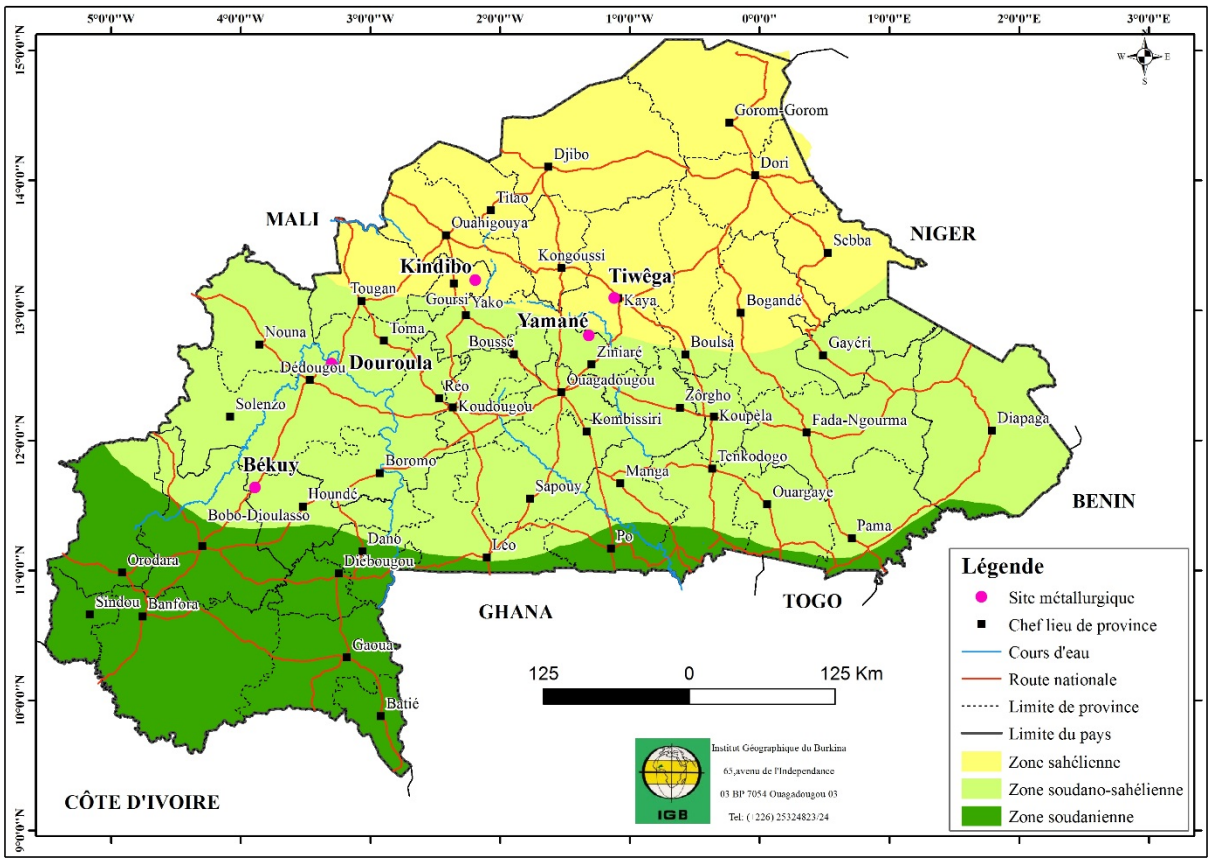
g) Continuing archaeological research and ethnographic investigations that are not strictly linked to the metallurgical phenomenon, such as settlement sites and burial grounds near to the furnaces, document them and consider their inclusion in the future in buffer zones,

h) Submitting to the World Heritage Centre and to ICOMOS, by 1st December 2021, a report on the implementation of the recommendations set out above;

Moreover, ICOMOS recommends that the name of the property be modified in order to specify the geographic location of the sites, and to become: “Ancient ferrous metallurgy sites of Burkina Faso”.

ICOMOS encourages international cooperation to support the protection and conservation of the property.

ICOMOS also encourages countries in the Region to commit themselves to a procedure of nominating metallurgical sites in their territory so as to provide a selection of properties that are representative of the whole metallurgical phenomenon across Western Africa.



Map showing the location of the nominated components

Furnaces, conical in shape, Kindibo

Furnace, natural air draft type, Tiwêga

Furnaces and anthropogenic mound, Douroula

Blacksmithing in workshops