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Tortoise panopticon: Linkages between taboos and conservation management in Madagascar

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ABSTRACT

Species-specific taboos are relevant to nature conservation, yet the relation of conservation with such social mechanisms and connected traditional ecological knowledge (TEK) is underexposed in both conservation science and nature conservation practices. This paper researches taboos of the Mahafaly and Antandroy tribes in South and Southwest Madagascar in relation to the critically endangered radiated tortoise (*Astrochelys radiata*). We develop the idea that the collection of taboos denotes a 'panoptic' self-surveilling system, which we call a 'tortoise panopticon'. Theoretically, using performativity as a lens, we analyse the dynamic relation between practice and meaning in species-specific taboo systems, in the context of conservation management. Empirically, we define tortoise conservation potential and threats in the current state of the site-specific tortoise panopticon and the internal and external factors that shape it. This is particularly important in light of identifying favourable site locations for potential tortoise release. Based on (semi-)structured interviews with 282 Mahafaly and Antandroy respondents from 12 communes across 9 sites, we identify influential factors and components of the tortoise panopticon to measure its strength in each region and determine the extent to which favourable social situations for radiated tortoise conservation exists. Developing a connection between panopticon theory and practice theory, this paper presents a novel model that aides the assessment of the dynamics of species-specific taboo systems.

1. Introduction

Species-specific taboos are known to be important to nature conservation in various places around the world, yet the relation of conservation with such social mechanisms and connected traditional ecological knowledge (TEK) is still ill-researched in both conservation science and nature conservation practices (Berkes et al., 2000; Lingard et al., 2003; Shackeroff and Campbell, 2007; Berkes, 2008; Jones et al., 2008; Liu, 2017). A taboo can be defined as "a social prohibition of something that is regarded holy or unclean" (Lingard et al. 2003: 224). In relation to nature they may be referred to as resource and habitat taboos (RHT), of which species-specific taboos may be an element (Colding and Folke, 2001). Taboos are typically internalized as informal, customary rules rather than official legislations or formal institutions (Lingard et al., 2003). When considered in conservation efforts, taboos may help to improve communication and cultural understanding (Colding and Folke, 2000; Tengö et al., 2007; Jones et al., 2008; Liu, 2017). Indeed, under some circumstances, the stimulation and inclusion of species-specific taboos in conservation is argued to be the only effective option, for instance where external conservation implementation is limited or where enforcement of formal institutions fails (Jones et al. 2008; Colding and Folke, 2000). Still, others have warned against 'uncontrolled equivocation' (Viveiros de Castro, 2004) when differences in ontologies are neglected to the benefit of conservation purposes (Escobar 1998; Blaser, 2009; Pauwelussen and Verschoor 2017).

In this paper we critically appraise the role of species-specific taboos in nature conservation practices. Specifically, we focus on the Mahafaly and Antandroy tribes in South and Southwest Madagascar and their involvement in the conservation of the radiated tortoise (*Astrochelys radiata*), a critically endangered species with rapidly declining numbers (IUCN website 2020). International pet trade is a major driver of extensive illegal harvesting of small, juvenile radiated tortoises, due to

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the species' appealing carapace and its ability to survive in captivity (Pritchard, 2013). Other threats to the species include harvesting for its liver in response to an increased Asian demand, habitat loss, and large-scale collection for local human consumption as a delicacy, which mainly concerns larger adults tortoises (Pritchard, 2013; Leuteritz and Paquette, 2008; Ball et al., 2012; Hudson, 2013; Mittermeier et al., 2013).

The Mahafaly and Antandroy people traditionally follow various taboos on eating and harming radiated tortoises. These taboos are dynamic and have evolved locally throughout many generations. Still, current local practices are not always in line with taboos nor with national laws related to tortoise protection. Moreover, the local social context and related belief systems are changing due to an influx of migrants, delocalization of the people living in the area, and the spreading of other religions (Paquette and Lapointe, 2007; Cawthorn and Hoffman, 2016). People coming from the cities are frequently considered to be culturally and spatially detached from the rural areas of the South (Ball et al., 2012). Research shows that these migrants "adhere to taboos less strongly than historical inhabitants" (Golden and Comaroff, 2015: 41). Nonetheless, locally present tortoise conservation agencies actively use the taboo and tortoise-related beliefs as a means and incentive in promoting community involvement in their activities (Paquette and Lapointe, 2007; Hudson, 2013).

In this paper we focus specifically on a reintroduction programme for confiscated radiated tortoises, initiated by the Turtle Survival Alliance (TSA) and Utah's Hogle Zoo (UHZ) (Walker and Rafeliarisoa, 2012). Taboo-inspired practices are included in the programme's approach and focus on promoting the tortoise taboos' cultural values, for example by organizing tortoise-themed festivals and distributing educational materials on the tortoise's cultural and ecological value, with the aim of creating support for tortoise conservation among local people (Hudson, 2013). The social effects of such taboo-based conservation practices, however, remain understudied. Moreover, the current taboo-inclusive tortoise conservation practices partly connect external reward systems to the tortoise taboo, to incentivize adherence. This may introduce a risk of novel, unsustainable dependencies. Indeed, multiple examples exist in which the introduction of reward systems results in erosion of conservation goals (Travers et al., 2011; Narloch et al., 2012). The underlying issue is sometimes identified as motivational crowding, where new incentives neglect or 'crowd-out' pre-existing motivations (Rode et al., 2014; Kaczan et al., 2019; Moros et al., 2019). Additionally, local taboos and species conservation can interfere and cause conflicts when taboos are violated by conservation practices (Liu, 2017). Therefore, it is argued that such conservation interventions should be considered very carefully, while taking into account the context of the self-governing mechanisms already in place (Berkes et al., 2000; Narloch et al., 2012). The introduced reward systems and other interventions could be at risk of destabilising the already existing informal institutions connected to the tortoise, and may even result in their collapse when the incentives disappear.

Individual compliance with taboos is partly enabled by social and religious surveillance (Lingard et al., 2003). Following other examples, we connect this to surveillance theory (Galič et al., 2017), specifically Foucault's theory of the panopticon (Foucault, 1975). We develop the idea that the collection of taboos denotes a 'panoptic' self-surveilling system, which we henceforth call 'tortoise panopticon'. Our empirical objective is to define tortoise conservation potential and threats in the current state of the site-specific tortoise panopticon and the factors that shape it. Theoretically, our objective is to further understanding of the dynamic relationship between practice and meaning in panoptic, species-specific taboo systems in relation to conservation management. For the latter we employ the concept of performativity as a theoretical lens (Section 2). Following the Materials and Methods (Section 3), the Results (Section 4) delineates the relevant taboos and develops and analyses the tortoise panopticon in relation to local and external dynamics. Relating explicitly to our empirical objective, the thus deduced influential factors and components of the tortoise panopticon will be used to measure the strength of the tortoise panopticon and determine the extent to which favourable social situations exist in each site of focus.

2. Theoretical background

2.1. Panopticon theory and performativity

Panopticon theory focuses on the power of state institutions in their development of self-surveillance schemes, by means of the "promotion of a state of conscious and permanent visibility and thus vulnerability" (Dove, 2010: 123). This permanent surveillance is argued to result in a sense of observation and constant fear for repercussions, ultimately making the citizens themselves into a self-surveilling body that is suggested to be even more effective than state surveillance (Deyfus and Rabinow, 1982; Dove, 2010; Fletcher, 2010; Fletcher, 2017). Foucault defines his 'panoptic principle' as "seeing everything, everyone, all the time" (Foucault, 2006: 52). However, it is debated whether permanent surveillance is necessary in this model, since Bentham's earlier model involves the internalization of social rules where constant surveillance would ultimately not be needed anymore (Bentham, 1787; Galič et al., 2017). Still, Foucault's elaboration on Bentham's concept suggests a novel understanding of power; it is complex and multi-levelled, and involves 'subjectification' where members of a concerned society become submitted to societal discourses to enable self-formation, and simultaneously become submitted to others within those same discourses, hence creating a body of invisible panoptic power. Crucially for our research, the latter, as well as the associated 'microphysics of power' (Foucault, 1975) may also be identified in the context of social values and beliefs, including taboos (Lansing, 2003; Warnier, 2008; Dove, 2010).

The relation of surveillance and power to religious beliefs follows Foucault's claim that "power is not an institution, and not a structure; neither is it a certain strength we are endowed with; it is the name that one attributes to a complex strategical relationship in a particular society" (Foucault 1978a: 93). This idea of a 'complex strategical relationship' can be applied to religious beliefs, which connect groups of people through a shared discourse that is maintained through such complex relationships, and is largely based on the sense that "the process of self-formation crucially involves the internalization of social norms", or "ethical systems" (Lansing, 2003: 374). In the context of taboos, this means that when these are violated, not only external rules are violated, but also oneself and the social norms that created this sense of 'self' (Lansing, 2003). This exposes a type of 'symbolic' power where taboos are part of the mentioned 'complex strategical relationship' that shapes people on a societal and individual level. It hence shows their so-called subjectivity; people become subjects of the power that shapes them. This phenomenon is also described as 'governmentality' (Foucault, 1978b; Fletcher, 2017), in which governing rules such as taboos are internalized and become part of people's mentality, interactions, and identity (Agrawal, 2005; Müller et al., 2017). More specifically, this may result in environmentality, where people become subjected to external environmental values, and consequently internalize and develop new environmental concerns (Agrawal, 2005).

While governmentality is a term more commonly used in conservation literature, this research builds on the application of the more visually comprehensive panopticon model of non-Western systems of surveillance, thus more effectively serving our aim to create a model of practical value to species conservation. For the panopticon model, this research follows the more fluid interpretation of Bentham's 'panoptic principle' and Foucault's interpretation of power as a strategical relationship, by applying it to the Mahafaly and Antandroy tortoise taboo systems (Section 4). However, the nature of the surveillance and the power of this tortoise panopticon is not static. Taboo systems are highly dynamic and constantly changing due to many internal and external

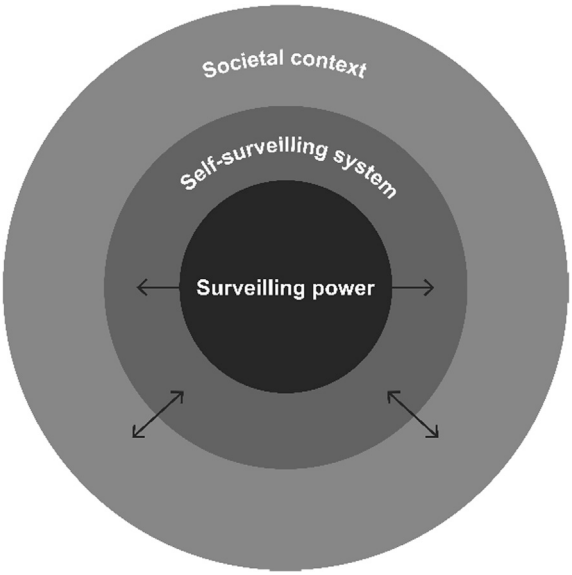

Fig. 1. A visualization of the hypothesis on the working of the tortoise panopticon, showing an assumed interaction between aspects in the societal context that need to be defined and the self-surveilling system of the tortoise panopticon, with a yet to be defined surveilling power within the self-surveilling system that is assumed to keep it in place.

factors, and are prone to motivational crowding due to incentivizing measures that barely, or do not, take into account the intrinsic motivations in place (Rode et al., 2014; Kaczan et al., 2019; Moros et al., 2019). Besides, the existence of taboos as such shapes reality as well, mostly by changing people's behavior towards that which is tabooed. To understand these dynamics of knowledge and practice, the theory of practice, and more specifically the concept of performativity, forms another conceptual pillar of this research.

2.2. Practice theory and the tortoise panopticon

Practice theory addresses the interaction between knowledge and practice (Hausermann, 2012). It takes into account the influence of personal background, uncertainty, variability, and random happenings in the creation of knowledge (Waterton, 2002). This makes the theory itself useful towards understanding the dynamics of practice and meaning in shaping taboos.

Performativity is one of the sensitizing concepts that enable practice analysis. It refers to the continuous process of shaping and reshaping knowledge that is developed within and shaped by practices (Arts et al., 2013; Behagel et al., 2017). Taboos are specific forms of normative dynamics. They have a performative power to shape people's behavior, while in turn this behavior influences reality and the content of the taboos (Fleming, 2011; Berkes et al., 2000; Wiersum et al., 2013).

As mentioned before, many factors are of influence in shaping behavior and the performativity of the taboo itself (see Section 4.3). Besides, taboo-inclusive radiated tortoise conservation in South and Southwest Madagascar involves education, cultural manifestations, and reward systems (Walker and Rafeliarisoa 2012; Ball et al., 2012; Hudson, 2013; Randriamahazo et al., 2014), which is yet another performance of the taboo that shapes, as well as is being (re)shaped, by reality.

As stated by Arts et al. (2013: 11-12), "performativity can be studied by observing the use of knowledge as constitutive of reality and involving power and unpredictability". This points out three components that operationalize performativity, 1. The connection between knowledge and practices; 2. Their connection to the tortoise panopticon; 3. Accounting for unpredictability by including other influential factors

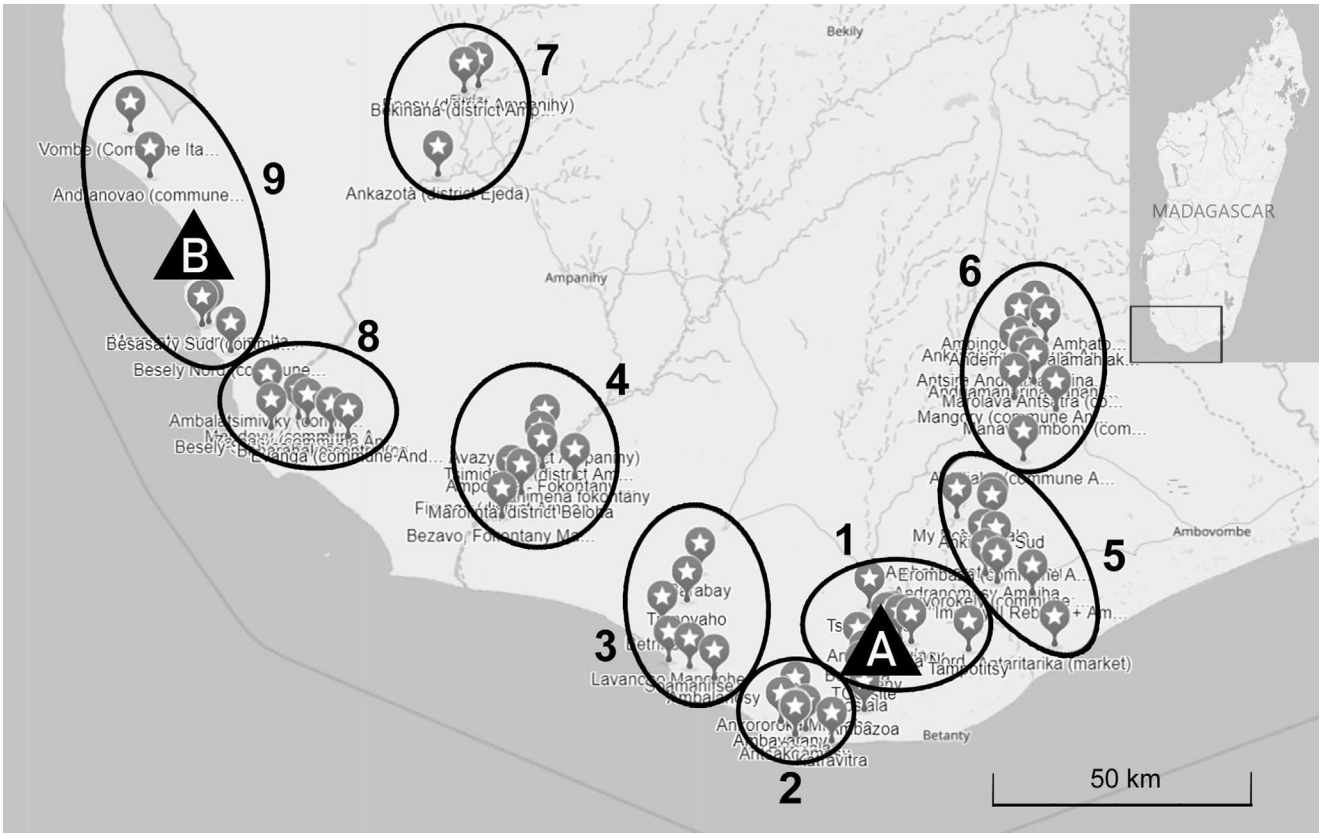

Fig. 2. Locations of the fokontany included in the research and indication of the division in nine sites for this research (map adapted from Maps.me). Triangle A roughly indicates the location of the TCC, triangle B indicates the location of the LTC – exact locations are not provided for safety purposes).

Table 1
The nine research sites across region, district and commune, and the number of respondents per site.

Region	District	Number defined site	Communes per defined site	Resp. count male	Resp. count female	Resp. total count
Androy	Tsihombe	1	Nikoly	25	12	37
	Tsihombe	2	Marovato	28	12	40
	Beloha	3	Tranovaho East	23	7	30
	Beloha & Ampanihy Ouest	4	Tranovaho West & Ampanihy	23	14	37
	Tsihombe	5	Imongy & Ankilivalo	19	16	35
	Antanimora	6	Antanimora	26	12	38
Atsimo-Andrefana	Ampanihy Ouest	7	Ejeda	8	7	15
	Ampanihy Ouest	8	Androka & Kaikarivo	15	10	25
	Ampanihy Ouest	9	Itampolo	22	3	25
Total				189	93	282

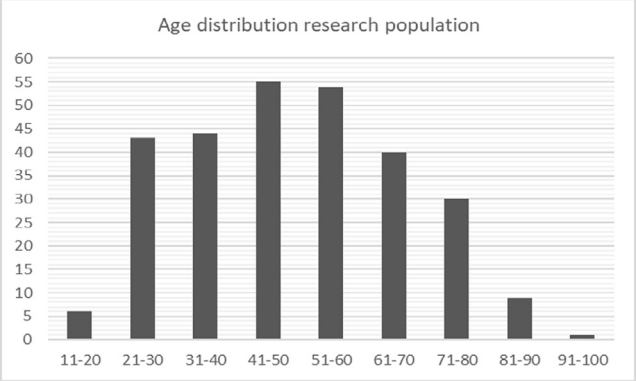

Fig. 3. Age distribution of the research population.

in the panopticon. Consequently, it is important to include the social, cultural, and conservation context of the panoptic tortoise taboo in the analysis of its performativity. Based on the theory, a first hypothetical model of the tortoise panopticon has been constructed (Fig. 1). Performativity, then, enables a better understanding of the interaction between practice and meaning in the tortoise taboo, and the relationship of this interaction to the panoptic power of the taboo's surveillance system. Such understanding and assessment could hence provide an insight in the stabilizing or destabilizing role of these contextual factors in the tortoise panopticon, and the potential risk on motivational crowding and breaking down the panoptic tortoise taboo when the tortoise conservation practices and contextual factors would change or even disappear.

3. Materials and Methods

3.1. Madagascar society and the TSA

The Malagasy population is divided into roughly 18 ethnic groups, described as 'tribes', which traditionally inhabit different regions of the country and which identify themselves through social and cultural characteristics (Ruud, 1960; Jolly, 2004; Sipa, 2013-2019). Each tribe is sub-divided into 'clans', which members typically define as a community sharing the same forefather. The radiated tortoise is only present in the South and Southwestern spiny forest, for which it is said to be iconic. The region is historically inhabited by the Mahafaly and Antandroy tribes which traditionally adopt the tortoise taboo as part of their *fady* (Paquette and Lapointe, 2007; Hudson, 2013). *Fady* refers to a whole set of prohibitions that are informally ingrained within parts of Madagascar (Ruud, 1960; Jones et al., 2008). Other tribes, who do not adopt a tortoise taboo in their *fady*, are present too in the region, yet they are less prevalent.

The TSA has two major temporary residence facilities in Madagascar, sheltering radiated tortoises that have been confiscated from poachers: the Tortoise Conservation Centre (TCC) in Tsihombe, Androy Region, and the Lavavolo Tortoise Centre (LTC) in Lavavolo, Southwest Region (see Fig. 2, triangle A and B). The aim of the TSA recovery programme is hence to release the tortoises back into suitable habitat (Hudson, 2013). The TSA focus is on "law enforcement, community outreach, reintroduction, and habitat preservation" (Randriamahazo et al., 2013; Goldstein, 2016; Gray, 2017), and this research has been conducted in this context. As part of the larger 'Confiscation to Reintroduction Strategy' by TSA, four months of fieldwork in the South and Southwest of Madagascar were conducted in 2018. The fieldwork primarily consisted of conducting open and (semi-) structured interviews. Personal adherence to taboos and the protective sentiments displayed by the respondents, was measured by means of related questions in the semi-structured interviews, as well as through experiences of defined experts in the field.

3.2. Data collection - sampling of research sites

Madagascar has several layers of administrative divisions, starting with 22 regions (City Population, 2014). These regions consist of several districts, which are sub-divided into multiple communes, each with their own mayor. On the lowest administrative level are the fokontany, generally consisting of one to three villages. The Chef Fokontany is the administrative head of the fokontany and is locally elected as well as employed by the government. Nine research sites were defined (Table 1; Fig. 2) using purposively sampling based on multiple criteria. These criteria included the existence of previous involvement with the TSA and radiated tortoise conservation, as well as the availability of suitable tortoise habitat or populations. For the district of Tsihombe in particular, the selection of communes was also based on their proximity to the TCC site. The fokontany selection was furthermore based on the criterium of accessibility with the TSA 4x4 vehicle, and a differentiation in clans and location to prevent a bias and cover as much of the commune as possible. The criterium of previous involvement with TSA activities and a believed existence of a 'strong' taboo among the community members were also used. This identification was based on previous TSA experiences, knowledge and experiences of a local field guide, and of mayors and other officials who were approached before or during the visits to the communes. Based on all these criteria, a shortlist of potential fokontany was created for each commune.

3.3. Data collection - sampling of respondents

The research focus on the tortoise taboo resulted in a research population exclusively including people from the Antandroy (n = 200) and Mahafaly (n = 82) tribes. A preferred number of respondents per fokontany had to be determined prior to selection. One fokontany is usually inhabited by around 30–50 households. We aimed to interview five respondents per fokontany.

The respondents were selected through snowball-sampling, usually starting with the Chef Fokontany, and also dependent on who happened to be in the village at the time of visiting. This resulted in a research population consisting of 189 men and 93 women (Table 1) and a near

Table 2
Frequency of the different tortoise taboo origin stories mentioned by Antandroy versus Mahafaly respondents, with the numbers referring to 1) The clay cooking pot (vilany tany), 2) The woman and her lady parts, 3) The dead son of the king, 4) The death of the two brothers, 5) A saviour from enemies, 6) Healing a wounded ancestor, 7) The king who was waiting for his people or: the Kokolampo of the Temilahe clan, and 8) The Antanosy ancestor of the Temitongoa clan (and Andriamaro). See Appendix 7 for the full stories connected to each number.

Story	Antandroy		Mahafaly		Total	
	Count	Percentage	Count	Percentage	Count	Percentage
1	146	72.3	46	57.5	192	68.1
2	15	7.4	4	5.0	19	6.7
3	5	2.5	–	–	5	1.8
4	1	0.5	–	–	1	0.4
5	1	0.5	–	–	1	0.4
6	–	–	2	2.5	2	0.7
7	–	–	5	6.3	5	1.8
8	–	–	7	8.8	7	2.5
1 & 2	13	6.4	1	1.3	14	5.0
1 & 2 & Other	–	–	2	2.5	2	0.7
1 & 3	1	0.5	–	–	1	0.4
1 & 5	1	0.5	–	–	1	0.4
1 & 8	–	–	1	1.3	1	0.4
1 & Other	–	–	4	5.0	4	1.4
2 & 6	–	–	1	1.3	1	0.4
Other	2	1	4	5.0	6	2.1
Does not know/ no story	17	8.4	3	3.8	20	7.1
Total	202	100	80	100	282	100

normal distribution of age as visible in Fig. 3. Respondents were paid 5000 Ariary each (about 1,38 USD), yet this exact amount was not mentioned in advance in order to avoid respondents participating only because of the reward.

3.4. Data collection - interview approach

Open and semi-structured interviews were conducted with experts present in and around the TCC, including with the Research Coordinator and head of the TSA Community Outreach. These interviews were partly recorded and transcribed and fed into the formulation of interview questions. An Antandroy man was hired as a local field guide and interpreter who had plentiful cultural knowledge, knowledge of the dialects, a relatively high social status as an elderly man, and existing contacts due to his Antandroy identity. He was employed by the TSA and had worked for other international organizations before, and was crucial to access the villages, to gain trust of the respondents, to be able to speak to villagers in their own dialect, and to ensure cultural sensitivity.

An interview guide was developed following the guidelines presented by Newing (2011). Based on some site characteristics and practical experiences obtained during the first interviews, the questions were adapted slightly. From a practice theory perspective, questions on both knowledge and practices were included. Our interpreter used the interview guide during the interviews which he conducted in the local dialect. For consistency reasons the interviews were fully structured. The answers of the respondents were translated directly into English by the TSA Research Officer and processed digitally at the end of each interview day. The interviews were also recorded to enable later checking of the data when deemed necessary.

3.5. Methods of analysis

An Excel sheet was developed to summarize the interviews per question, and striking quotes were immediately highlighted to enable preliminary analysis. The Excel sheet was used to produce percentages for answers to questions of deemed relevance, which formed a basis for further quantitative and qualitative data analysis. In order to produce quantitative values for each site on its taboo adherence and protective sentiments, a selection of assessment steps was adapted from Strategic Environmental Assessment (SEA) strategies, which are generally used to evaluate policy options (Dalal-Clayton and Sadler, 1999; European Commission, 2001; Abaza et al., 2004; Fischer, 2007; Floroiu and Damianova, 2012; Ioppolo et al., 2018). The steps followed to create such a rating are elaborated on in Section 4.4, and an extensive explanation of the process can be found in Appendices A–D.

4. Results

4.1. Tortoise-related knowledge – The tortoise in Antandroy and Mahafaly society

To analyse the performativity of the tortoise panopticon, and the role tortoises play in local daily life, we first define the local knowledge of tortoises. From the answers that were given in the interviews, three types of knowledge can be distinguished: ecological knowledge of tortoises, taboo-related knowledge and knowledge connected to tortoise-related beliefs. These are outlined in more detail below.

4.1.1. Ecological knowledge

When respondents were asked about the tortoises around their village, they largely displayed only general knowledge of the tortoises' behavior, based on personal observations. When asked about what they know about tortoises or what they think would happen when tortoises disappear, respondents seemed to be less aware of the tortoises' ecological traits which would be difficult to deduct from personal observations only. Several respondents showed awareness of the seed dispersing role of tortoises in the ecosystem. Such a holistic insight in the function of tortoises in the ecosystem had also been expressed in a more general and metaphoric way several times, as is the case for one Antandroy respondent:

> *A hand has 5 fingers and when 2 fingers are missing, it is not a well-functioning hand anymore. So when the tortoises are gone, nothing will work anymore.* (Respondent 118, Tranovaho)

Scientific insight on the ecology of tortoises seemed to be lacking. Respondents indicated that radiated tortoises have disappeared from the northern regions, for example, whereas according to current scientific insight the radiated tortoise never occurred there. Androy respondents also mentioned that tortoises only occur in Antandroy areas, sent by Zanahary ('the creator', the equivalent of God). Respondents were hence displaying knowledge of the tortoise based more on what is locally observable in daily life or based on stories related to their spiritual beliefs that have been told by other (elder) community members. Scientific or popular scientific ecological knowledge of the tortoise was found to be limited among the Antandroy and Mahafaly research population.

4.1.2. Taboo-related knowledge

The taboo on tortoises is part of the larger *fady* system consisting of a variety of taboos which differ per tribe, clan, community, and even per family (Ruud, 1960). These taboos are largely connected to the ancestors, as stated by a respondent: "if it is something the ancestors did not eat, it is taboo for us too" (Respondent 250, Kaikarivo). Crucially, the *fady* beliefs define tortoises in part as "dirty or pests" (Ball et al., 2012: 9). In this way, the taboos of the *fady* are known to influence the social acceptance of certain types of meat and other food (Randrianandrianina et al., 2010; Cawthorn and Hoffman, 2016).

Animal taboos present in the *fady* all have different rationales, stories of origin, connected repercussions, and strengths (Ruud, 1960), Such a differentiation in taboos had been made by multiple respondents, as for example expressed by a Mahafaly respondent:

Table 3
The proportion (in percentages) of respondents mentioning any of the tortoise- related beliefs, expressed per belief and per research site. NB: The interviews conducted in Nikoly and Marovato did not yet include the question whether respondents were concerned about tortoises disappearing, hence these fields are kept empty in the table.

Expressed beliefs (% of respondents in location X)	1. Nikoly	2. Marovato	3. Tranovaho East	4. Tranovaho West & Ampanihy	5. Imongy & Ankilivalo	6. Antanimora	7. Ejeda	8. Androka & Kaikarivo	9. Itampolo
Connecting rain to tortoises	11	15	43	81	60	50	60	84	80
Connecting blessings to tortoises	68	43	47	62	54	61	7	68	56
Connecting good fortune/a good trip to tortoises	5	8	20	24	3	18	33	16	32
Connecting protection from diseases to tortoises	0	3	30	3	6	5	0	8	20
Expressing concerns when the tortoises would be gone	/	/	70	89	71	71	93	92	96

> *Lizards and snakes are taboo too, but these are just animals that we do not eat. We do not know the story behind them and just call it fady because we do not eat them. The tortoise taboo is also stronger because it came with a curse*. (Respondent 251, Kaikarivo)

Knowing the story of the taboo was perceived by our informants as contributing to the strength of a taboo, which is why these stories are of relevance to this research. Multiple stories on the tortoise taboo origin exist and their versions vary between and even within villages. Villagers usually indicate that these stories are learned from the elders of the village or their father, and the knowledge of those stories is typically orally transmitted by storytelling, as is common in traditional ecological knowledge (De Groot and Zwaal, 2007; Shackeroff and Campbell, 2007).

Despite the many different versions and ways of telling the stories, several stories reoccurred among both Antandroy and Mahafaly, as visible in the overview of stories mentioned by respondents displayed in Table 2 (for the stories' content, see Appendix G). From Table 2 it can be concluded that the factor of 'tribe' does not seem to have much influence on the type of story that is being told.

When looking at the different versions of the origin stories, some common components can be distinguished. For stories 1, 2 and 7, the taboo arose following something bad that happened as a result of the tortoise, this was further driven by ancestors connecting negative sentiment to the tortoise. In the case of story 3, the tortoise becomes regarded as an ancestor itself, hence adding an ancestral value to the tortoise. Positive sentiments were also connected to the tortoise in story 5 and 6, thus showing a positive role of the tortoise in the tribe or clan's past. Looking at the frequency at which each story is told, it seems that the stories with a negative connection to the tortoise prevail. Nevertheless, the respondents generally did not express considerable anger towards the tortoise, but rather an acceptance of the decision that their ancestor made a long time ago. The main component of the taboo's origin stories thus appears to be an ancestor of the tribe or clan deciding the tortoise to be taboo for all their descendants, and whose decision is still respected by many to this day. Possessing the knowledge of the origin story had been defined by the respondents as a main indicator for a strong taboo, yet the exact content does not seem to matter much in the level of respecting the taboo, since it is rather the respect for the ancestors and the *Hazomanga* (the sacred place where one can communicate with the ancestors) that ensures people also respect the taboo.

4.1.3. Tortoise-related beliefs

Aside from the taboo, multiple other beliefs related to tortoises can be distinguished. Tortoises are frequently encountered on the road and in the village. Especially when on an important trip, a tortoise is interpreted as a sign that this trip will be good, that good fortune will be upon the traveller, or that blessings can be obtained. As expressed by one respondent: "Tortoises are like ancestors to us, this means that we ask blessing from them" (Respondent 276, Itampolo). Most respondents believed something needs to be done in order to receive these blessings. When on the road, one may pick some green leaves and throw them on top of the tortoise, or in the village one would rather pour some water over their shell. Water and leaves are important for a tortoise's survival, hence with such and act of kindness something in return is expected. One may then either ask for blessings out loud saying "sokafo ty havelo" ("open the blessings") or receive them already via the act of kindness. The word for tortoise (*sokake*) thus also refers to the verb 'to open' (*manokake*) or 'opened' (*nisokake*) and they are frequently considered a means to open the way to, and communicate with, the ancestral realm.

Another belief is that tortoises can ask *Zanahary* for rain. As explained by one respondent:

> *The tortoises cannot grow anything as humans do and therefore Zanahary sends them rain. The rain makes trees grow which are like crops for the tortoises*. (Respondent 283, Itampolo)

In this reasoning, rain comes to the region because tortoises ask Zanahary for rain to make their food grow, to drink, and to survive. Seeing many tortoises is thus frequently said to be a sign that, and the reason why, rain will come.

In a region where water is scarce and can make the difference between life and death, rain is highly valued:

> *When there will not be any tortoises anymore, rain will not come because Zanahary sends rain to the tortoises. Everyone here will die (…) The tortoises make us live because they make rain to come every month.* (Respondent 275, Itampolo)

This quote shows a sharp contrast of life and death related to tortoise presence. No rain is indicated as a 'bad year', typically resulting in a bad harvest, famine, and death. A fear for such years has frequently been expressed by respondents, and the belief that the presence of tortoises can diminish the risk on such years thus seems a strong driver for people to ensure their presence. Some respondents also expressed the belief that the lack of rain may be caused by the wrath of Zanahary and the ancestors because too much tortoise blood has been shed and the taboo has been broken too many times.

Finally, tortoises have been connected to the protection of chickens and humans from diseases, most frequently in the research site of Tranovaho East where it was mentioned by about 30% of the respondents. Madagascar has many cases of impactful outbreaks of infectious diseases, including measles and plague. The respondents, who often have limited access to regular health care, showed a fear for such diseases. However, multiple respondents claimed that the presence of tortoises in the South has protected the region from the last plague outbreak. As expressed by one Antandroy respondent:

> *When the tortoises would be gone from this area, diseases would come because the tortoises make you healthy. When they would not be here, the diseases will get you.* (Respondent 94, Tranovaho)

Table 3 shows the distribution of adopted beliefs among the villages. All tortoise-related beliefs show a practical value of tortoises, which connects to a fear of losing those benefits. This is also visible in the high

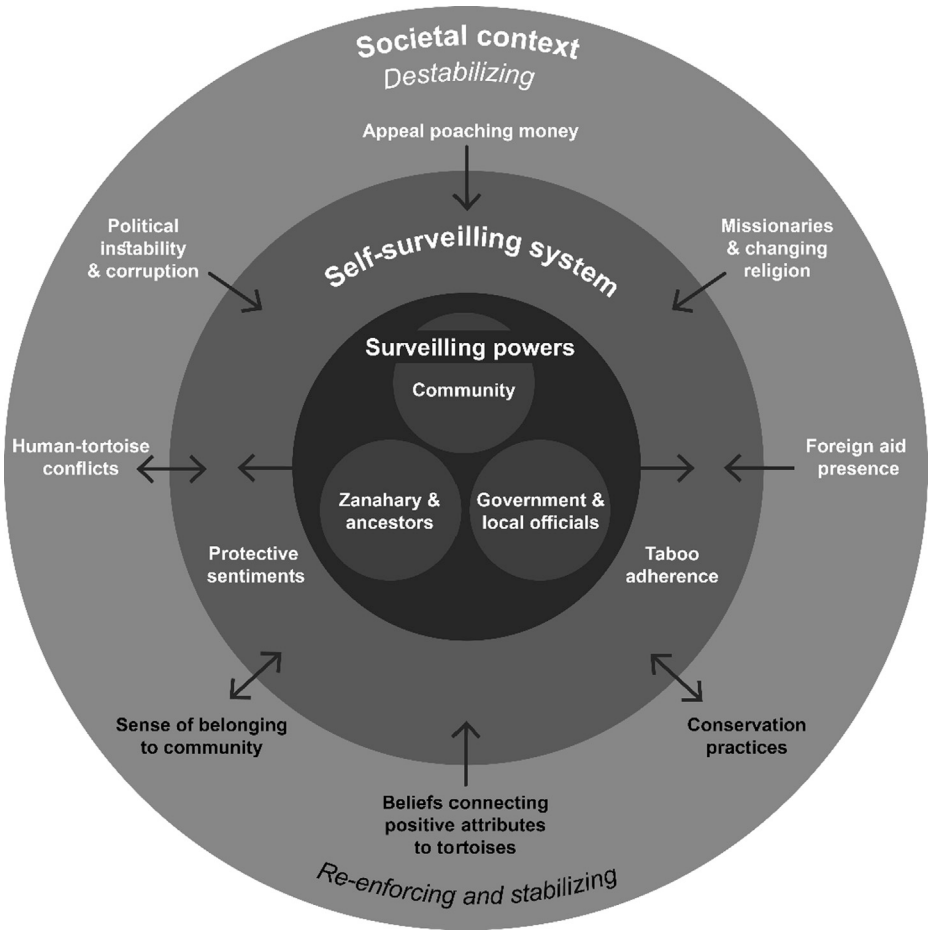

Fig. 4. The final visualization of the hypothesis on the working of the tortoise panopticon, adapted based on the analysis of the Results (Section 4).

percentages of respondents expressing concerns about tortoises disappearing (Table 3), which shows a potential for protective sentiments towards tortoises that can be beneficial in tortoise conservation.

4.2. Connection of tortoise-related knowledge and practices

Different influential factors determine if and how the knowledge connected to the tortoise taboo is put into practice and is transformed due to these practices. Therefore, the connection between knowledge and practices will be discussed in this section, by looking at the repercussions connected to the taboo and by defining three main bodies of surveilling power within the tortoise panopticon model (Fig. 4). These repercussions are shaped by multiple factors in the societal context, as visible in the model, of which three main influential factors are defined and elaborated on.

4.2.1. Taboo-related practices: customary repercussions

Multiple repercussions are connected to the tortoise taboo, coming from different bodies of surveilling power (see Fig. 4 for their place in the tortoise panopticon model). From our data, three main types of repercussions emerged: 1) Repercussions when the taboo is broken by a community member – coming from the **community** and the realm of ***Zanahary and ancestors***; 2) Repercussions when someone from outside the community breaks the taboo – coming from the **community** only; and 3) Legal repercussions coming from the **government and local officials**.

When the taboo is broken by a community member, the repercussions differ per community. Based on the interviews, the repercussions are grouped into those carried out by the community and those that result from the wrath of *Zanahary* and the ancestors, hence affecting the physical body of the violator directly. Community-related repercussions largely entail the banning of the violator, referring to denying access to the village or a social banning from the community. The latter generally means losing the respect of the community and family members as well as the connected rights on accessing community water and food, the family burial place, or the *Hazomanga*. For a Malagasy person, this is generally perceived as disastrous. It had even been mentioned that one who violates the taboo is not considered a human anymore and hence loses every human right. Such a drastic social impact can affect close family members too:

> *No one wants to marry her* [the violator] *anymore, nor any of her kids. All of them still live in the same village but no one wants to interact with them.* (Respondent 175, Antanimora)

Aside from the social exclusion one may experience when breaking the taboo, the ancestors and *Zanahary* enact punishments which are generally connected to a curse by the ancestor who first started the taboo. According to respondents, such a curse broadly refers to the start of a bad life coloured by misfortune, such as having no more children, or bad luck with cattle, growing crops or finding jobs. After passing away, one will not be welcomed by the ancestors anymore. Moreover, one may become physically and mentally affected, with common examples of losing one's mind, skin rashes, mentally ill new-borns, and even death. Punishments may even affect the entire community. Most of these punishments are not uncommon for when a taboo of the *fady* is broken and an extensive study of Malagasy taboos in the mid-twentieth century showed very similar outcomes (Ruud, 1960), thus indicating a limited change in tradition over at least the past 60 years.

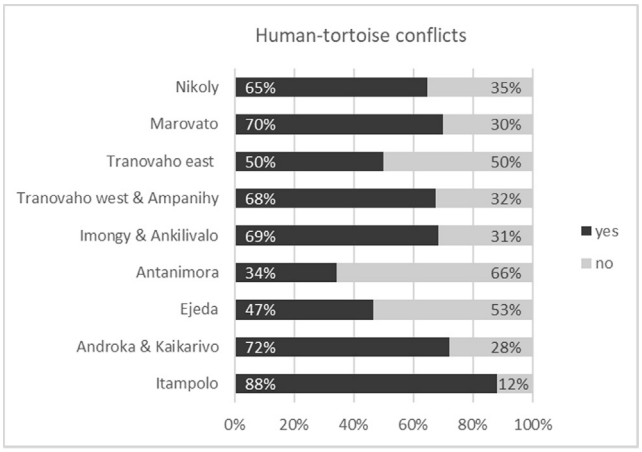

Fig. 5. Percentage of respondents indicating any type of human-tortoise conflict, displayed for each research site.

Repercussions may be permanent, but some may be undone. About 45% of the respondents stated that nothing can clean the violator or undo that what is caused by a curse, yet over 50% of the people stated that something could be done. Most of the time this includes a sacrifice, and since the tortoise taboo is generally considered to be a strong taboo with severe effects, this often requires a zebu. Zebus are the highest rank of animals that can be sacrificed due to their value (Ruud, 1960), followed by goats and sheep, and chicken as the lowest sacrifice that is mainly used for offences that are less severe – although a few respondents claimed that a chicken sacrifice may be sufficient for tortoise taboo violators.

The prevalence of the more traditional knowledge of repercussions as presented before may change, however, due to practice-based experiences. Stories of people who violate the taboo, yet who do not experience consequences, made some respondents doubt the strength of the taboo. Such stories were most prevalent in and near towns like Tsihombe, Ambovombe or places further away from Antandroy and Mahafaly traditional grounds, where an increasing number of people do not adhere to the taboos of their clan anymore. People who have travelled seemed more likely to be involved with practices not in line with the more 'traditional' knowledge.

For violators of the taboo who come from outside the community, repercussions appeared to be less pronounced. Respondents showed divergent answers when asked what would be done when someone comes to the village to take or poach tortoises. Three approaches emerged. The first consisted of people indicating that no action would be taken, frequently following the reasoning that those violators often come from tribes that traditionally do not have the tortoise taboo. However, tortoise blood had been mentioned as the highest level of taboo by many respondents, which means that this blood should not touch the land. For this reason, the villagers usually do not want the poachers to kill the tortoises near to their village, crop area, water source, or places where their zebus feed. Respondents indicated that poaching is only accepted when the tortoises are killed and buried elsewhere. The second approach is to ask the poachers to leave when they are encountered, without involving any punishment for the poachers other than a warning to not return or else the authorities would be informed. This approach generally followed the reasoning that even if the poachers would pay a fine to the community, this community would not be able to accept it since it would come from tortoise blood. The third approach involved punishment of various degrees. This could vary from informing authorities, demanding a zebu or another animal for a cleaning sacrifice, or even violence, which was vividly described by a few respondents.

Aside from customary repercussions, tortoises are protected by law. In national law "it is illegal to eat, sell, or take tortoises", which is in line with international conservation objectives (Leuteritz et al. 2005: 459). Besides, a *Dina* law for the tortoise taboo is now officially implemented in the Androy region following a TSA lobby. *Dina* law is a 'traditional' legislative agreement on regulations and includes strict guidelines what to do when *fady* taboos are violated (Randriamahazo et al., 2014). A *Dina* needs to be started with a sacrifice ceremony and it is locally enforced, hence it varies per fokontany (Hudson, 2015). The *Lilintane* is a more specific type of *Dina* which was developed in 2006 and especially applies to cases of tortoise poaching (TSA field expert, email interview, 17-01-2019). In accordance with the local justice system, this includes a fine, the obligation to provide the community with a zebu for a cleaning sacrifice and a goat, and two years of imprisonment (TSA field expert, email interview, 17-01-2019). Applying the *Lilintane* aims to incentivize villagers to not let poachers come to their forests and to report cases of poaching, and has been adopted in many communes and districts especially surrounding Tsihombe and Beloha, but it has not reached the Southwest yet. Enforcement still proves to be an issue due to a lack of capacity (Randriamahazo et al., 2011; Hudson, 2013; Goldstein, 2016; Gray, 2018) and since multiple respondents indicated that even money and zebu coming from poachers were also taboo, this legislative framework does not seem to completely align with some of the local situations.

4.2.2. *Societal factors influencing taboo-related practices*

Based on the taboo content, three factors in the societal context influencing the self-surveilling system of the tortoise panopticon can be distinguished locally (see Fig. 4). The first is community, i.e. the extent to which people experience a **sense of belonging to, and a connection with, the community**. The community has been defined as one of the three powers in the surveilling tower of the tortoise panopticon. Repercussions coming from the community largely related to exclusion from its social benefits. Hence, we argue that the strength of community surveillance in determining taboo adherence is dependent on the extent to which someone relies on and feels emotionally connected with this community. Most of the research sites showed a low accessibility of villages due to limited infrastructure and means of transport, and respondents expressed high valuation of their family ties. In these cases, dependency on the community and a sense of belonging was high and so was its surveilling power.

A second influential factor is the extent to which beliefs connecting **positive attributes** to tortoises are prominent. Such beliefs include those of tortoises bringing rain, blessings, good fortune, and protection from diseases. When respondents were asked about what they would think when tortoises would disappear from their environment completely, expressed concerns usually related to being unable to benefit from those positive traits. In this way, these beliefs contributed to both protective sentiments and taboo adherence, in order to continue to receive the benefits. This denoted an alternative way of benefitting from tortoises without harming them, as opposed to poaching. Which benefits were valued highest – money obtained from poaching or those connected to the beliefs – depended on the strength of those beliefs and other situational circumstances that could vary on even a personal level. The beliefs did include an incentive in the tortoise panopticon that can strengthen both the components of taboo adherence and protective sentiments.

Third is the existence and prevalence of **human-tortoise conflicts**. People in the villages live outside most of the time and are mostly farmers, and tortoises are numerous in many places that were visited. This situation resulted in a high rate of human-tortoise encounters which were not always experienced as positive by the respondents (see Fig. 5 and see also Camperio-Ciani et al., 2016; Galapagos Conservancy, 2019). As crop areas are usually not completely fenced, tortoises make their way into these areas and eat young crops, resulting in frustration and anger expressed by respondents. Opinions differed on the extent to which tortoises were destructive, which seemed to depend on the density of the tortoise population and the quality of fencing. It was

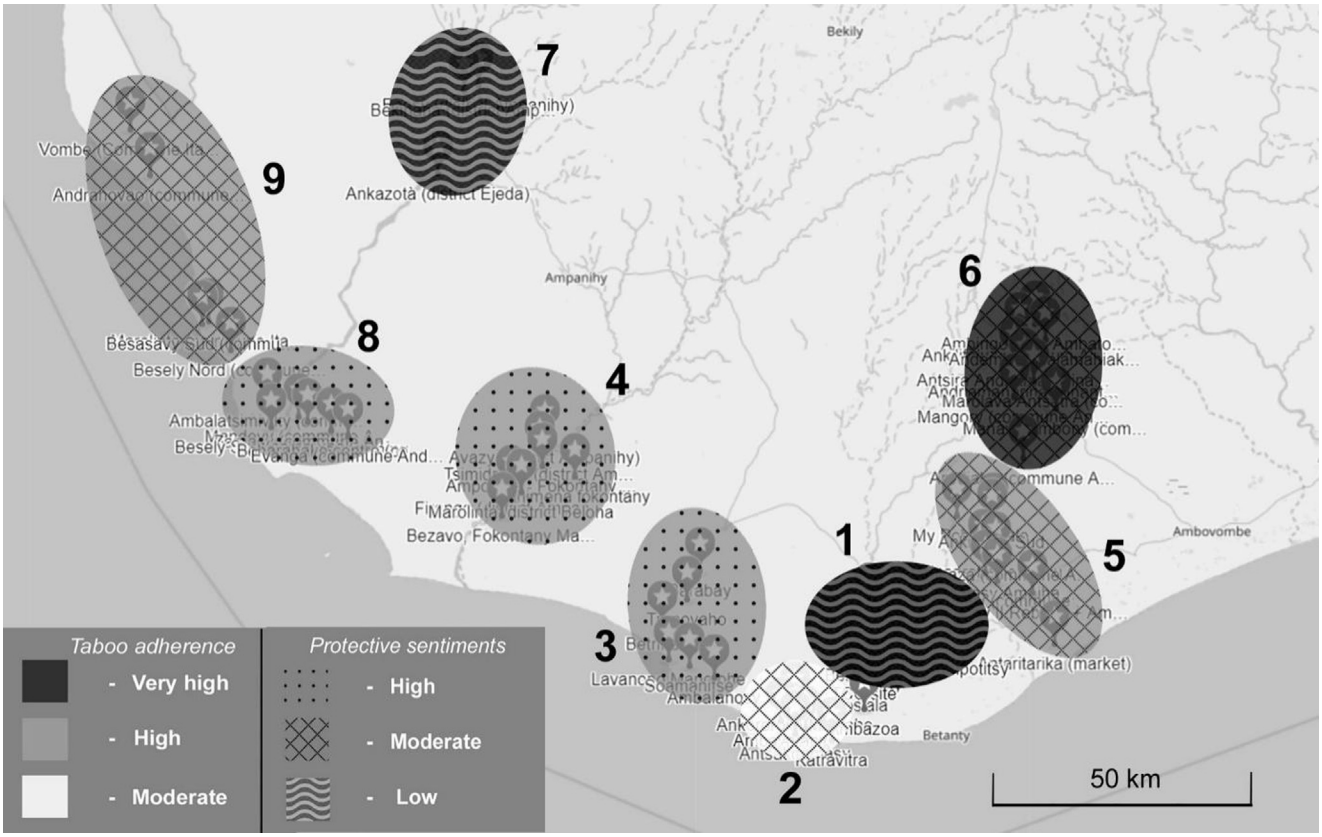

Fig. 6. The research sites and their final valuations for taboo adherence and protective sentiments (map adapted from Maps.me).

mentioned that tortoises were sometimes harmed, yet most frequently respondents indicated that they adhered to their taboo by carefully removing the tortoises from their cropland despite their frustrations. Our observations beyond the interviews supported these statements yet more systematic and long-term observations are needed to provide further evidence.

A two-way interaction can hence be seen in the tortoise panopticon: human-tortoise conflicts may weaken, especially the protective component of the panopticon, yet the already existing strength of taboo adherence appears to influence people's practical response to the human-tortoise conflicts by making them less likely to harm the tortoises in their crop land in turn.

4.3. Societal context and the tortoise panopticon

Five influencing factors have been deduced in relation to the panopticon. First, tortoise **conservation practices**. The TSA action plan includes the reestablishment and strengthening of the tortoise taboo with the aim to increase community involvement (Walker and Rafeliarisoa 2012; Mittermeier et al., 2013). This is being done in multiple ways, involving increased media attention, educational materials, the inclusion of local people in monitoring and patrolling activities, and initiating tortoise-themed festivals that appear to be popular (Walker and Rafeliarisoa 2012; Ball et al., 2012; Castellano and Hudson, 2013; Hudson, 2013; Randriamahazo et al., 2014). Hence, a protective component is stressed, with the aim of including new (extrinsic) motivations that result in the internalization of conservation sentiments and the development of environmentality. From the interviews, it seems this influence is visible to a certain extent. As one interviewee stated:

> *When the government started an awareness campaign, we were told that something bad would happen to the land when the taboo was broken.* (Respondent 165, Antanimora)

This quote shows how awareness campaigns can increase protective sentiments as well as taboo adherence, hence re-enforcing or even introducing the protective component among the local communities.

Second, the level of **appeal of poaching money** emerged as another influencing factor. In Madagascar over 70% of the population lives under the national poverty line, and this percentage is even higher for the rural areas (World Bank Group, 2001; 2012; World Bank 2014). The Androy region has even been measured to be the second poorest region in the country in 2010, with 93% living under the national poverty level in rural areas (World Bank, 2014). Famine is not uncommon to the research population and obtaining sufficient water and food is a challenge many households face daily (Randrianandrianina et al., 2010; Hudson, 2013; Cawthorn and Hoffman, 2016). Respondents indicated that the taboo has been broken by some community members especially in times of famine, yet most of the respondents strongly stressed that even in such times they would never eat a tortoise and break the taboo. Nevertheless:

> *Your belly makes you do many things and directs you in many ways. It is all about the belly.* (Respondent 275, Itampolo)

Poaching was said by multiple respondents to be lucrative, and the combination of poverty and money offered by traffickers signified a major factor that weakened the panopticon.

Third, **political instability and corruption.** Wildlife laws were said to be little enforced and communication between enforcers on local, regional and national levels suboptimal. Moreover, multiple cases have been mentioned where money or goods ended up in the wrong hands, and multiple statements of respondents indicate the existence of poacher networks into the highest layers of Madagascar society, including national politics. In this uncertain and corrupt political situation, enforcement of tortoise conservation tends not to receive priority:

Those poachers have no other options and if they would steal something they would end up in jail. This is not the case for collecting tortoises and that is why this is the easiest option. (Respondent 171, Antanimora).

Fourth, the presence of numerous **foreign aid agencies** undercuts the panopticon. Interviewees pointed out that projects come and go and are frequently left unfinished due to a lack of money or for other reasons. Various informants mentioned instances of programmes that seemed to do more harm than good, creating dependencies and false expectations rather than providing sustainable solutions. Moreover, free distribution of food and money in past years has created an expectation among villagers to always receive something from foreigners. Some pointed out that this attitude is not in line with the tribes' traditional values of hospitality and receiving guests. Arguably, such a change had made some people more receptive to outsiders who offer large sums of money for activities that are not in line with other 'traditional' values like the tortoise taboo. In addition, the presence of the many NGOs with their diverse approaches and many short-term projects provided an unstable social and economic environment for the tortoise taboo system and tortoise conservation more generally.

Fifth, **missionaries and a changing religion** presented another societal factor that weakened the tortoise taboo and panopticon. During the fieldwork, Christian missionaries were found to be actively imposing their views onto communities. In the interviews, the spreading of 'external' religions in the region was mentioned multiple times, and was considered to weaken traditional belief systems. The following observation was provided by a respondent:

A long time ago, people got holes in their throat when they would eat a tortoise. But at that time no one prayed to the Christian god. Now Christianity has more power. The majority of the people are Christian and the fady *has less power, which means that it is not powerful enough to destroy your throat.* (Respondent 6, Nikoly)

The power of the Christian god thus seems to not only weaken traditional belies, but also the power of the ancestors themselves. The change towards Christianity has not necessarily resulted in complete abandonment of the ancestral beliefs, however. According to Christian respondents, the taboo is still frequently respected by them.

4.4. Opportunities for species conservation based on the panopticon

The surveilling powers of the panopticon, the influencing factors in the societal context, and the two components of the self-surveilling system have been analysed, yet the strength of the components and powers vary per site. This place-dependency of the taboo asks for further definition of the tortoise panopticon for each site. The practical objective of this paper was to define tortoise conservation potential and threats in the current state of the site-specific tortoise panopticon and the factors that shape it. For this purpose, a systematic rating process for policy options was used, inspired by Strategic Environmental Assessment (SEA) methodology. This research has defined two main factors of relevance to determining a suitable site for tortoise release: personal adherence and protective sentiments. In order to connect a rating to these two factors for each research site, the two factors (or overarching aims) have been divided into 'key aims' that may contribute to a desired level of both factors in tortoise conservation (see Appendices A and B for further clarification). These key aims were rated by making use of indicators deduced from the interviews. Percentages were transformed into levels of impact differing from very high (++), high (+), medium (+/-), low (-), to very low (–) (see Appendix A for further clarification on the ratings process and Appendix C for final percentages per indicator). Based on these scores per indicator, Multi-Criteria Analysis (MCA) was carried out and weighted scores were calculated for the factor of personal taboo adherence and the factor protective sentiments, for each site (see Appendix A for the final MCA scores). The final valuation of both taboo adherence and protective sentiments have been indicated in the map of the research sites, as visible in Fig. 6 (see Appendix D for the final valuations per indicator).

The SEA approach can thus be used to define priority sites by defining a social environment able to facilitate both taboo adherence and protective sentiments (see Appendix E for practical opportunities and threats as defined based on this information). The importance of favourable site location is considerable in light of potential tortoise release. It shows which sites already possess a high potential for facilitating both components, such as Tranovaho East (site 3), Tranovaho West & Ampanihy (site 4), and Androka & Kaikarivo (site 8), and which sites need extra attention to one or both components, as may be the case with Nikoly (site 1) and Ejeda (site 7) which score low on protective sentiments. From this more quantitative approach using weighted MCA scores, it can be concluded that especially protective sentiments are a factor of concern when a favourable social environment is aimed to be identified amongst a collection of sites. This conclusion coheres with the knowledge acquired from the qualitative data, which shows that protective sentiments are not necessarily included in the taboo content.

5. Discussion and conclusion

In the paper we have argued that the tortoise taboo system is embedded in a complex panopticon to which people adhere, based on (predominantly) social surveillance (Fig. 4). The dynamics of the societal context shaping and reshaping the surveilling powers, and vice versa, illustrate the prominence of performativity in the tortoise panopticon. The interaction between knowledge and practice is addressed in practice theory, while accounting for uncertainty and (individual) variability (Waterton, 2002; Hausermann, 2012). Performativity further sensitizes this dynamic interaction, by focusing on the practices in reality as opposed to knowledge embedded in normative systems (Hall, 2000; Arts et al., 2013; Behagel et al., 2017). This paper presents a case in which normative systems are developed under the power of three defined surveilling bodies, and are based on (traditional) knowledge connected to the tortoise. However, literature on performativity points out that individual behavior is not solely steered by one's knowledge and connected values (Hall, 2000; Arts et al., 2013; Czarniawska, 2016; Behagel et al., 2017) and this case shows no exception. Despite the respondent's mentioning of a deep respect for and adherence to the taboo, individual violations are reported and frequently connected to unexpected events such as droughts and the lure of money; in the context of low income and a lack of alternative livelihood opportunities. This outline of complex interaction in the tortoise panopticon, as visualized in Fig. 4, further strengthens practice theory in its claim that reality is constantly being shaped and reshaped by knowledge-practice interactions. It stresses reality cannot be fully understood by solely looking at abstract constructs of knowledge, as is largely being done in discourse theory (Elgert, 2011; Turnhout et al., 2015), but needs to be placed in a context of practices and other influencing factors by using performativity as a concept in a more practice-based approach.

For species conservation this implies that the focus cannot be limited to a taboo alone, when aiming to establish community support and engagement. Our collection of stories on the taboo origin show a narrative of the tortoise as a dirty animal (story 1 and 2, Appendix G) and of the tortoise having spiritual value as a connection to the ancestors (story 3 to 8, Appendix G). Despite the first two stories being the most prominent, the other stories with a more positive connotation appear important too. Besides, the belief that the tortoise brings luck and blessings strengthens the more positive narrative. This finding opposes Lingard et al.'s observation that a "clear element of the tortoise carrying a spiritual value" cannot be found (Lingard et al., 2003: 238). Nevertheless, our data analysis shows that tortoise protection is not inherent in the tortoise taboo and that more components than only the taboo are of influence on the connected system of self-surveillance. The concept of the tortoise panopticon thus expands to two components of the self-surveilling system deduced from the data: protective sentiments and

taboo adherence. For tortoise conservation, this paper stresses the high value of the simultaneous presence of both components, to define and create a favourable social environment that facilitates community support.

Despite the assumed high value of the taboo in facilitating community support for tortoise conservation (Colding and Folke, 2000; Tengö et al., 2007; Jones et al., 2008; Liu, 2017), the presented model of the tortoise panopticon shows that various societal processes are influential factors that cannot be neglected. A major threat to the radiated tortoise has been mentioned to result from outsiders who collect tortoises for consumption and pet trade (Leuteritz and Paquette, 2008; Ball et al., 2012; Hudson, 2013; Mittermeier et al., 2013; Pritchard, 2013). Therefore, we argue that a taboo needs to include a component of protection from others in order to fully contribute to the species' survival. In the case of the tortoise taboo, it was frequently found that such protective sentiments are limited among respondents. However, some respondents did indeed mention cases where poachers were punished, especially when the taboo was broken within the boundaries of the village. Moreover, current introduction of the traditional Lilintane law seems to have caused a notion among local community members that such breaching of the taboo can be reported to local officials. We hence highlight the need to define and address other related factors within the societal context that relate to locally present taboos, as in line with much literature addressing the wickedness of conservation issues (Nadasdy 2007; DeFries and Nagendra, 2017).

The model of the self-surveilling system of the tortoise panopticon suggests that for tortoise release, favourable locations should ideally score high on both the components of local taboo adherence and protective sentiments. For this purpose, we adapted an MCA rating method more frequently used in SEA (Dalal-Clayton and Sadler, 1999; European Commission, 2001; Abaza et al., 2004; Fischer, 2007; Floroiu and Damianova, 2012; Ioppolo et al., 2018). This method has revealed differences in conservation potential per community, which contributes to defining suitable locations for tortoise release. A more extensive qualitative discussion of the release potential by site can be found in Appendix F. Future research could elaborate on such a rating method and its use in defining release sites for species conservation.

While assessing the tortoise panopticon for conservation, we see three potential measures emerging that may further ensure the tortoise's survival: 1) further introducing and/or strengthening a component of protection in the local tortoise panopticon, 2) further supporting local adherence to the taboo, and 3) increasing and strengthening the surveilling power of government and local officials by further ensuring law enforcement. Considering the multifaceted nature of the tortoise panopticon, a simultaneous focus on each of the three options seems ideal, yet each element presents challenges that need to be discussed.

For the first measure, it should be considered that concerns about motivational crowding resulting from incentivizing conservation measures have been raised in literature before (Rode et al., 2014; Kaczan et al., 2019; Moros et al., 2019). Such incentivizing measures would 'crowd-out' conservation motivations that are locally present yet, for example those connecting to a local species-specific taboo (Rode et al., 2014; Kaczan et al., 2019; Moros et al., 2019). In this case study, however, protective motivations connected to the local tortoise taboo appear to be not very prominent among the research group yet. This case therefore does not provide clear indications for crowding out motivations for protecting tortoises. On the contrary, we even argue that tortoise conservation rather shows to provide an addition to the tortoise panopticon by strengthening its protective component.

Species conservation activities thus present an opportunity to stimulate and even introduce components in local panopticons, without significantly destabilizing them, yet sensitivity to already existing social structures and institutions is required and asks for their constant assessment.

This does raise the ethical question to what extent conservationists as 'outsiders' have the right to influence and even change local traditional knowledge systems, which in some cases may result in appropriation (Shackeroff and Campbell, 2007; Foale et al., 2011; Schwarz, 2021). With the presence of tortoise conservation organizations, narratives focusing on the tortoises' need to survive for purely conservation reasons may indeed ultimately penetrate local knowledge systems and become more prevalent, and potentially spark sentiments of environmentality. Especially in communities where the TSA is active, it is already visible that at least some locals are becoming increasingly sensitive to a kind of intrinsic value of tortoises. The tortoise taboo is part of the traditional *fady* system, however, and therefore most commonly connected to ancestral narratives. For this reason, a conservation narrative is expected to exist alongside the taboo, rather than changing the taboo's underpinning stories. This supports Foale et al. (2011) in their conclusion that both narratives are needed in successful conservation.

The stories underpinning the taboo, or at least their prevalence, may however change if conservationists choose to reinforce those parts of the taboo that aid the conservation of tortoises. As shown in this paper and in practice theory, however, knowledge systems are always highly performative and constantly subjected to change, and this taboo is no exception. Changes to local knowledge systems are already induced by many aspects in the societal context, hence it is debatable if those induced by conservation organizations are necessarily problematic. Based on this case study, it can be argued that they are not, nor do they appear to become problematic in the future.

However, when local social institutions are used in an instrumental way by conservationists, there is not only a risk of conflicting interests, but also of uncontrolled equivocation because ontologies may not be aligned (Viveiros de Castro, 2004; Howitt and Suchet-Pearson, 2006). The second measure of further supporting local adherence faces challenges that should be considered too. In literature, the societal context of a changing religion has frequently been mentioned as a factor that makes people abandon traditional beliefs and practices (Murphy et al., 2016). However, Christian respondents have indicated that they still respect the local taboos out of respect for the rest of the community, which coheres with past research on the tortoise taboo in the same region (Lingard et al., 2003) and other cases where indeed a coexistence of traditional practices and changing religion is observed (Murphy et al., 2016; Murray and Agyare, 2018). Therefore, increasing local valuation of their more traditional beliefs and culture may support taboo adherence even in a societal context of increased conversion to Christianity and other religions. In conservation it may hence be beneficial to increase focus on spreading awareness of the wide variety of connecting ancestral stories on the taboo, and to advocate local valuation and pride of this cultural and intellectual heritage since cultural protection of species and landscapes has been proven effective in other cases too (Foale et al., 2011; Gao et al, 2013; Adom, 2016; Fraser et al., 2016; Asante et al., 2017). It can be argued that with such an approach, taboos may become a more self-conscious practice, rather than just 'how things are'. However, only few respondents indicated that they follow the taboo without considering its related knowledge systems of ancestral stories and connected punishments for breaking the taboo. The taboo's practices thus appear to emerge from conscious decisions already, hence indicating that spreading further awareness of this cultural heritage may substantially change the already conscious nature of the taboo.

The third measure of increasing and strengthening law enforcement connects to the defined importance of the legal surveilling power of the government and local officials in protecting tortoises from poachers. This topic has only briefly been covered in this research, which largely focused on local communities. Nevertheless, the *Lilintane* law appears to effectively connect to local societal structures and traditions, yet a lack of visible presence of law enforcers has been mentioned by respondents as a reason to omit reporting illegal poaching activities. Increased visible presence will require an increase in law enforcers patrolling and visiting remote places, which in turn raises concerns of increased 'militarization' of conservation (Lunstrum, 2014; Duffy et al., 2015, 2019). Finding a

balance in increased law enforcement thus seems key.

In conclusion, this research shows that linking conservation practices to pre-existing societal taboos, does indeed provide opportunities for species conservation, while also highlighting its limitations. For those engaged with species conservation, this paper thus presents, by means of a panopticon model, a novel way to define such opportunities and limitations per location, and to better assess the dynamics of species-specific taboo systems in the future.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: This research has been conducted for N. Ploos van Amstel's master thesis research at Wageningen University, Netherlands. K. Arts was under paid employment of Wageningen University and Research, and functioned as a thesis supervisor. To enable the on-site field work, Ploos van Amstel received 2000 EUR from the Scholten-Cordes Fund. Additionally, the research costs in the field were largely covered by 5000 USD which was acquired as a fund from the Andrew Sabin Family Foundation through the UHZ (Utah Hogle Zoo). Rakotondrainy and the driver were under paid employment of the TSA (Turtle Survival Alliance) at the time of the research. The field guide was paid by the UHZ budget. Remaining research costs were covered by Ploos van Amstel. In order to acknowledge people's participation in the interviews, respondents were paid 5000 Ariary each (around 1.20 EUR), since abundant NGO surveys have previously been conducted in the region, and people are used to receiving money for such activities. This means that Free Prior and Informed Consent (FPIC) could not be established, and only Prior and Informed Consent (PIC) was adopted. We aimed not to inform about the payment in advance, in order to avoid participation solely for the money. Nevertheless, a payment was frequently demanded by the Chef Fokontany beforehand, and in such cases it was unavoidable to share that payment would be included. The exact amount was never disclosed in advance, however, since this was likely to result in bargaining for more. This procedure involved an ethical choice to equally distribute money across respondents. The price was non-negotiable, and in case the Chef Fokontany or respondents demanded more or refused to do the interview for financial reasons, the interview was stopped.

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Appendices A–G. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.geoforum.2021.10.013.

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