



# The potential of Amazon indigenous agroforestry practices and ontologies for rethinking global forest governance

Nidia Catherine González, Markus Kröger\*

Academy Research fellow, Development Studies, University of Helsinki, Unioninkatu 35, 00014, Finland

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## ABSTRACT

This article explores the potential of Amazon indigenous agroforestry practices and forest understandings for making global forest governance more nuanced and thus rethinking the value of forests in the context of multiple global crises. Indigenous forest practices and their inherent knowledge are included in current global governance in very limited ways. Onto-epistemological openings in forest policies are needed in the face of converging climate, food and health crises. The indigenous forest relations and practices analyzed here may offer possibilities for such onto-epistemological openings. The current FAO and UNFCCC forest definitions are contrasted with indigenous forest understandings. While the current national and global definitions of forests contain a wide range of discrepant definitions, making the application of a shared forest policy difficult and even impossible, most institutional definitions share a positivist and technical approach to forest defining and governance. National and global discrepancies in definitions exist within the politics-as-usual process of forest defining, politics that could be challenged by the political ontology of forests that questions the deeper level of how forests should be conceptualized, placing greater emphasis on care, reciprocity, and the type of relational approach present among Amazon indigenous communities.

## 1. Introduction

With the increasing severity of planetary and civilizational crises, many academics have started to demand a thorough rethinking of how to conceive the world, paying particular attention to re/imagining alternative lifeways and ontologies (Hosseini and Gills, 2020). Especially important is recognizing the prepolitical delimitations and assumptions of different varieties of development (Gudynas, 2016) and how these are interwoven into the existing definitions through and by which understanding and governance flow. In the field of forest policy, many have hoped that the technical forest definitions that are currently used in global policies, which are heavily influenced by industrial forestry lobbying (Boerema et al., 2017; Hall, 2013), would be adapted to local experiences and practices. Answering this call by many (e.g., Myers et al., 2018), we show how the current technical definitions used for forest governance, based, for example, on tree-height measurements, inhabit a distinct ontological realm in comparison to the forest practices of many indigenous people.

We seek to contribute to the rising and already extensive debate around what forests mean for different people and what are the right practices and policies to achieve these goods (Arts et al., 2013; Brockhaus et al. 2014, Lund, 2018). This critique of ongoing policies

and definitions aims to foster onto-epistemological self-reflection on the basis of providing a glimpse into other ways of seeing and being in forests. In practice, in many cases, policies aimed at safeguarding forests still mean expanding tree plantations or calculating and basing forest retainment policies on forest definitions revolving around tree-height measurements, with a particular focus on capturing carbon. In contrast, the Amazon indigenous peoples' experiences discussed herein do not even have a word to denote forests as a thing outside their existence; thus, they do not define a forest, but their existence is immersed in a broader understanding of what constitutes "forest" through practices. In these types of indigenous ontologies, what forest policy practitioners would typically understand as "forests" consist of a myriad of species and processes that develop via interconnected and ever-changing dynamics (Lajó, 2006; Lee, 2016). Analyzed in modern terms, these dynamics have been viewed as acknowledging a three-dimensional interconnection of biophysical, human and mystical elements and are embedded in a sacred dimension of the use of forest resources (Reichel-Dolmatoff, 1976; Posey, 1985, 2002; WinklerPrins and Barrera-Bassols, 2004).

The goal of this article is to step toward onto-epistemological openings, marking the limits of technical and positivist onto-epistemological worlds through an analysis of the Chagra agroforestry

\* Corresponding author.

E-mail address: [markus.kroger@helsinki.fi](mailto:markus.kroger@helsinki.fi) (M. Kröger).

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practices in the Amazon and the forest relations behind them. Amazon indigenous agroforestry practices, of which there is a wide variety, have been framed as an especially promising pathway to sustainable forest use (Miller and Nair, 2006). This agroforestry is based on deep local histories and knowledge of maintaining home gardens and other types of forests while producing food and other vital supplies. However, this potential has not yet been fully realized. One reason for this is the absence of dialogues between indigenous local knowledge and global spheres of forest defining and governance.

We start by canvassing the theory, situating this research within the literature, and discussing our ethnographic and other data and methods. Second, a critical analysis of an array of the existing forest definitions that are used in global governance is provided. Several gaps or mismatches, or both, between the existing global, national and local definitions of forests are identified. A common thread in these mismatches is also found: they are based on distinct technical measurements, thus sharing a similar onto-epistemological world of forest defining. We then analyze Amazon indigenous forest practices, especially the Chagra agroforestry practices of land use, as alternative forest practices and worlds. The conclusions suggest steps toward research to explore transferable lessons of this onto-epistemological opening for forest-policy making.

## 2. Theory: Rethinking forests within current global crises

Ontology refers to the understandings of and assumptions about how the world is conceived, known, and sensed, and these ontologies have been identified as being observable in the Amerindian context in the performative outcomes of the practices and embodied stories of indigenous people (Blaser, 2009). The term Political Ontology (with capital letters) has been suggested to designate specific political understandings on the rise, especially in Latin America, which has become visible when established scientific definitions have become insufficient for understanding people's practices in situations of complex ontological antagonisms that are typically also resource or land conflicts (but not only that) (De la Cadena and Blaser, 2018). For example, tree plantations or tree-height-based forest definitions might appear to be a solution for established forest governance practitioners, whereas the ontologies in them in fact sideline or cancel the political imagination of those practicing Chagra agroforestry because the indigenous imagery in these exceeds the recognizable political terms of, for example, Food and Agriculture Organization (FAO) forest definitions.

These ontological conflicts are also linked to epistemology. Political scientists studying political ontology (without capital letters) open up how “epistemological assumptions are invariably ontologically loaded” (Hay, 2006). Along this line, by onto-epistemological openings in the sphere of forest defining and understanding, we refer to politics that open up new ways of understanding both what exists to be known (ontology) and how one can acquire knowledge of that which exists (epistemology) (see Gudynas, 2017; Hay, 2006). Political Ontology is particularly useful for guiding attention toward ontological conflicts arising from the push of western-based modernizing understandings and practices and is a project of study and intervention that “wants to enable political thought and practice beyond the onto-epistemic limits of modern politics and what its practice allows” (De la Cadena and Blaser, 2018: 6).

Contemporary forest definitions focused on technical criteria are rooted in a particular history of technic-rational globalization and development (see Escobar, 2020). Colonialism, imperialism, and neoliberalism have globalized Western and modernistic notions of what forests are, what they should be, and whom they should serve (Perlin, 2005; Radkau, 2012). High-modernist approaches to forest governance focus on technical and positivist attitudes. Indigenous lived experiences are separated by several onto-epistemological chasms and conflicting interests with high-modernist approaches to land use in the Amazon. These approaches are part of the broader global forest policy dynamics.

Many have argued that international forest policy and its definitions have sidelined traditional and indigenous populations' practices and ontologies of forests already for decades in favor of more technical conceptualizations that focus on yields (Scott, 1998); carbon (Ojha et al., 2019); or other technical (Myers et al., 2018), quantifiable and globally manageable measurements that can be mapped, coded, and even traded through commoditization (Moore, 2015). In contrast, the forest practices of indigenous peoples and other forest dwellers are pre- and post-Cartesian (Blaser, 2013; De la Cadena, 2015; Escobar, 2020). In particular, indigenous communities resist the increased framing of forests as “resources” for the key reason that these communities consider themselves to belong to forests and thus to be part of that concept (Inoue, 2018; Danowski and Viveiros de Castro, 2017). The myriad forms of life and beings that live in forests are invaluable, but these existences and habited environments do not seem to yet have primary importance when forests are defined in global and national governance schemes.

An urgent need exists to make space through research on a variety of knowledge, dynamics, and ontologies, especially given the current planetary crises and the long history of violence against and silencing of the pluriverse—the world that consists of many worlds, all with their own ontologies (De la Cadena, 2015; Ehrnström-Fuentes, 2016; Escobar, 2020). An onto-epistemological opening can be viewed as starting to take place when one understands that limits exist to current ways of being able to understand and conceive of what exists, but that worlds also exist that go beyond those limits. A need exists for a Political Ontological analysis because many ongoing high-modernist practices affecting the world do damage and misrepresent other ways of living. De la Cadena (2015) elucidated on how the ontological “limit” and violence of modern politics are visible in, for example, the concept of culture, whose usage has been canceling the existence of the political-epistemic practices of other worlds and doing the work of reducing these to mere cultural beliefs or superstitions (see also De la Cadena and Blaser, 2018).

Our article participates in a critique of technocratic approaches in forest policy, particularly for their not capturing local knowledge and not giving enough space to nonmarketable values in policies (Arora-Jonsson, 2016). These technocratic approaches manage forest by focusing mainly on technical measurements (Scott, 1998). Despite repeated calls for more inclusive and deliberative governance (Nightingale and Ojha, 2013; Nightingale et al., 2019), the data on forests collected through these technical criteria represent the central pillar of many politics and policies (Di Gregorio et al., 2013). FAO forest definitions have been analyzed as representative of a technocratic approach in which deliberative spaces for governance contrast with internalized schemes of forest perceptions and habitude practices (Ojha, 2006). This definition is commonly used in forest governance and is based on biophysical parameters, where a forest is defined as land area spanning more than 0.5 ha with trees taller than 5 m and a canopy coverage denser than 10%, or trees in situ that are able to reach these thresholds (FAO, 2018). Thus far, the FAO definition (which we study specifically in section 4.1.1.) does not allow for the character and multiplicity of indigenous worlds in the Amazon to be spotted, for example.

We suggest that one fruitful avenue for better understanding the richness of other world views is through a deeper immersion of local knowledge in global governance. The work of, for example, Raffles (2003) on “situated intimacies” shows how the production of knowledge is always situated in a place in a relational manner. Raffles emphasizes the “ubiquity of affect as a mediator of rationality” and “the importance of the time and place of encounter” for which both humans and nonhumans participate in situated practices. Research needs to identify values that are transferable to global forest governance by observing the situated intimacies of sustainable forest dwellers (such as indigenous groups) and suggest ways to scale these values to policies at national and international levels. This article aims to engage with this

endeavor by participating in the budding conversation on this topic (e.g., Ojha, 2006; Ojha et al., 2019).

### 3. Methods and data

As primary material, this study uses two sets of interviews and participant observation data as well as material produced by a Colombian forest governance nongovernmental organization (NGO). Our interpretive analysis examines the interface of indigenous and global forest practices and definitions via the practice-based approach and political ontology.

#### 3.1. Primary data

The first primary dataset includes 15 semistructured interviews carried out with indigenous people and indigenous representatives in Colombia in the periods of June–July 2017 and March and November 2019 during research visits to the indigenous communities of the Inga, Andoque, Nonuya, Embera and Nasa tribes in the Putumayo region. Discussions were also held with indigenous representatives and experts of these tribes in the city of Bogotá. The second dataset works as a comparative check and is based on long-term, multisited political ethnography, participant observation, interviews and field research since 2004 across South America, especially among the forest-dwelling indigenous and traditional populations of the Amazon (Colombia, Peru, and Brazil), by all the authors of this article. The excerpts from interviews and other documents have been translated by the authors from Spanish: all the excerpts are from indigenous people, who do not speak Spanish as their native language, and contain many concepts that are difficult to translate into English. We have tried to retain the original meanings of indigenous concepts and to open these up in more detail.

Third, we use as primary sources a selection of project reports from indigenous communities in the northwestern Colombian Amazon published by the NGO Tropenbos International Colombia, which has worked in the territory for more than 16 years (none of the authors of this article have worked for it or cooperated closely with it). We chose this data source because research on forest governance should pay attention to long-term on-the-ground practical efforts to transcend the boundaries of forest research subjects and objects. The selected material has been written by indigenous investigators and focuses on participatory research with communities in a collaborative methodological approach. The project reports that we use as data here thus transmit the understandings of indigenous researchers who are studying the concept of Chagra in their own communities. Through paintings, drawings and writings, the reports reveal a sophisticated knowledge of these millennial practices. We reproduce these drawings, which have been used as essential tools to facilitate communication and share understanding between the indigenous people and different levels of local, regional, national and international governance through the NGO. This data source has potential for nuancing existing forest definitions and creating ontological and epistemological changes between different groups and levels. Nonetheless, future research should more systematically, deeply and broadly collect data and analyze the onto-epistemological differences and schisms in indigenous agroforestry practices similar to those introduced here as a new point of departure for forest defining and rethinking forest governance.

#### 3.2. The practice-based approach to forests and Chagra

The practice-based approach to forest research is used to analyze the contexts and effects of the practices of people who inhabit forests and then to interpret the possible political potential of these practices (Krott and Giessen, 2014; Behagel et al., 2019; Arts et al., 2013). We used this method to first collect data and generate an understanding of how the forest inhabitants of the northwestern Colombian Amazon understand and interact in and with forests. More specifically, we analyzed the

practices that retain Chagra (see below) agroforestry-type forest relations and how these practices and context-specific techniques are managed. Thereafter, we identified and assessed the potential political impact of key Chagra practices based on an interpretation of how a more widespread knowledge and understanding of these practices and the underlying context could help in forest governance. We offer tables in which we list how distinct Chagra management practices could have political potential for challenging and thus transforming existing institutional and global forest definitions. The Chagra techniques that we identify are not merely technical but have potential to onto-epistemologically challenge the current definitions: they cannot be easily rendered into technical principles; thus, they are helpful in the sense of creating onto-epistemological openings into how forests should be conceived in policies.

The practice-based approach that we used suggests a need to rethink Chagra-type land and forest use practices. The existing scientific literature on Chagra frequently characterizes it simply as an itinerant cultivation system that includes plant gardens that mimic the diversity of forests (Van der Hammen, 1992). The forest governance literature understands Chagra-type soil use as agricultural and counts these areas as part of subsistence agriculture. This article shows that for the communities we studied, it is not possible to distinguish the Chagra from the forest. Subsistence farming is an activity in the Chagra system but is not the only objective, as Chagra practices include a return to forest during a restoration phase (Abel Rodríguez, 2013). In the practices that are found in the northwestern Colombian Amazon, the Chagra and the forest are not separate concepts but rather are two states of a territory that should always alternate as time passes. The symbiosis between these two concepts has major political relevance for global forest retention.

#### 3.3. Political ontology of forests

The indigenous local knowledge studied here relies on ancestral ways of being and knowing forests and respecting them in a reciprocal manner and shies away from numerical, monetary, and technical criteria on the basis of, for example, tree sizes. From this indigenous perspective, forests are connected to Chagra, to food, to the life of the primary forests, to the multiplicity of species, and to the relations of familiarity within the community and with other species (Matapí and Matapí, 1997). In section 4.1.2, we provide concrete facts of these ways of relating to forests.

Through this understanding, the relations of care and reciprocity with forests are the onto-epistemological core of what it is to be in relation to and in forests: one is always in a relationship with them within the natural world as one part of it and not as an outside observer. This condition of being part of a forest is explained by an indigenous person's own words:

"All I sow are [like] my children; at the same time it [all that I have sown] will be my body; this is what I am going to eat; this is what my children are going to eat; my neighbors, my colleagues and my brothers are going to survive from this" (Rodríguez, 2013: 13).

This statement signifies living in continuity in forests. The forest is part of the network of species that exists in a forest that interacts and changes continuously, through which their interactions in the Chagra are not definitive but are part of a process that allows life. When indigenous people work in the Chagra, forestry practices result in something concrete that will emerge. A forest appears as a composed complex condition that has evolved over the long term. The heritage and ecological practices of forest inhabitants need to be linked more effectively to institutional forest definitions (Craig, 2002; Nepal and Weber, 1995; Eklund and Mar, 2017). Indigenous agroforestry practices can offer a basis for shaking the foundation on which many current forest policies and definitions are based. We use the lens of political ontology to offer tools to rethink and imagine how forests can and

**Table 1**  
Global forest definitions of the FAO and KP-UNFCCC.

Type of Parameter	Parameter	KP-UNFCCC	FAO
Binary Parameters	Young stands	0	0
	Temporarily unstocked areas	0	0
	Nonforest land uses	1	0
	Agroforestry	1	0
Threshold Parameters	Min. area (ha)	0.05–1.0	0.5
	Min. height (m)	2–5	5
	Crown cover (%)	10–30	10
	Temporary (years)	n/a	~10
	Strip width (m)	n/a	20

Source: Created by the authors, adapted from [Schoene et al., 2007](#): 5–6.

should be seen and felt more broadly, not just in the indigenous communities on which we focus here.

## 4. Results and discussion

### 4.1. Global forest definitions and the indigenous perspective

#### 4.1.1. Global forest definitions at odds with indigenous forest ontologies

This section analyzes the similarity of two existing dominant global forest definitions and their limits in relation to the indigenous agroforestry practices characterized in the next section. In addition to the FAO definition mentioned in section 2, another commonly used forest definition is provided by the Kyoto Protocol (KP), in which the UNFCCC defines forest as an area of a minimum 0.05 to 1.0 ha with tree crown cover greater than 10–30% and a minimum height of maturity in situ of 2–5 m. Even if a political debate exists between these two definitions on the inclusion of nonforest land uses and agroforestry, as [Table 1](#) shows, both reduce a forest to a technical understanding of tree species that can be useful for wood industries. [Table 1](#) compares the forest definitions presented by the FAO and the KP-UNFCCC ([Trines, 2002](#); [UNFCCC, 2003](#); [Schoene et al., 2007](#)).

[Table 1](#) reveals how both KP and FAO forest definitions are based primarily on numerical assessments of trees. Both of these institutional forest definitions are determined through modern techniques that focus at the reference levels (RLs). These threshold parameters are based on tree height, percentage of crown cover, minimum area, estimation of carbon stock, and biomass flow ([Simula, 2009](#)). Scientists and officials use RLs to, for example, allocate resources and assess the environmental damage of deforestation, afforestation, reforestation, and forest degradation ([Armenteras et al., 2016](#); [Trines, 2002](#)). The FAO ([Schoene et al., 2007](#)) definition of “forest” does not include regions such as young forests, secondary forests, and areas of other types of trees that are less than 5 m high but still provide important ecosystem services ([Trines, 2002](#)). The KP definition includes young forests, which appears to improve what the KP calls budding “sustainability” initiatives in “developing countries”, facilitating the investment in palm oil, corn, potatoes, cacao, and avocado crops as well as pastures and silvopastoral systems ([UNFCCC, 2003](#)). Because governments are free to adopt RL national parameters (regarding variables such as anthropogenic forest-related greenhouse gas emissions by sources and removals by sinks in a country's greenhouse gas inventory), the meaning of these RLs has generated serious discrepancies for forest governance because these measurements can be used for technocratic commitments or the interests of private groups. Both definitions have been criticized for their fallacies even by technical standards. For example, if governments do not consistently establish the RLs over a broader time, a serious risk is that apparent changes in emissions or forest removals will not reflect reality ([Grassi et al., 2017](#); [UNFCCC, 2003](#)).

These gray areas around the leading global forest definitions have serious effects on the implementation of national forest policies and thus concretely on the ground. For example, as shown in [Table 2](#),

governments have both included and excluded oil palm plantations in their own “forest” definitions. If a government includes oil palm, the conversion of rainforest into oil palm plantations is not considered forest loss. However, this practice in fact represents a replacement of natural forests with monoculture plantations. [Table 2](#) illustrates possible correlations between forest definitions, exclusions and changes in forest area in different countries. The table highlights the impossibility and practical failure of the positivist dream and imagination that a shared and scientifically backed definition of forests could be found for global governance purposes. The politics-as-usual around forest defining suggests that the basic character of this politics is the creation and even abuse of nationally discrepant definitions for the sake of buttressing the interests of nationally or globally strong, forest-cover-transforming sectors or actors (see [Kröger, 2014](#); [2017](#)).

For decades, technical reports have argued that it is urgent to harmonize forest-related definitions ([Trines, 2002](#)), but [Tables 1 and 2](#) show that this has not happened. The schism between global positivist and technical approaches and national politics seems to be a systemic feature of the global politics-as-usual around forest defining. Currently, governments agree to follow certain “principles” when determining their forest laws and regulations, forest definitions, and forest monitoring measurements; however, these principles are nonbinding, and when determining whether and how to apply them, governments typically consider their own national sovereignty, people's justice claims and transaction costs ([De Vos et al., 2017](#)).

Forests and human territorial relations in forest spaces need to be conceived over a broader timeline and wider spaces than the parameters presented in [Tables 1 and 2](#), including strains of knowledge that precede the industrialization period or have not participated in this timeline (see [Miller, 2007](#); [Perlin, 2005](#); [Radkau, 2012](#)). For this reason, in the rest of this article, we offer an analysis on indigenous agroforestry practices, how they could inform the current definitions, and how they could nuance the current politics of forest defining, leading to rethinking owing to an onto-epistemological opening, or at least to new ideas and more space for indigenous viewpoints.

#### 4.1.2. Chagra (agro)forest(ry) practices and the associated ontological challenge

Indigenous people living in the northwestern Colombian Amazon (such as the Nonuya, Andoque, and Ceima Chacivera communities) offer good examples of Chagra as a dynamic and inclusive system of practices in a sustainably used forest. Commonly, Chagra has been defined as a traditional agricultural system (also defined as “migratory agriculture” or agricultural technology) of family subsistence production on a plot that is approximately one hectare; however, it is more than that definition ([Van der Hammen and Rodríguez, 1996](#); [Rodríguez Fernández et al., 2011](#)). We define Chagra as a system of different indigenous (agro)forest(ry) processes that refer to a forest as an integrated system composed of ever-changing dynamics, including (agro) forest(ry). Indeed, indigenous forest ontologies are not related to carbon sinks or timber stocks but rather are articulated as a holistic understanding of reciprocal processes that supply subsistence food, medicinal products, housing, and recreation ([Kröger 2013a](#); [Toivanen and Kröger 2019](#)). All these connections promote the reflective practice of recognizing reciprocity between the human and other-than-human worlds ([Schroeder and González, 2019](#)). Chagra practices seek to maintain the life and existential continuation of the beings present in the area at the time of cultivation because the forest with its animals is expected to return to the area in a cyclical manner, and this cyclicity has inherent reciprocity. An indigenous elder explains this as follows:

“I am not going to play with the jungle, much less with the trees, because they are alive. I am not going to destroy for the sake of destroying. If I destroy the jungle, I have to also replace this [the jungle] with fruit trees; if I destroy the wild cassava, I have to replace this [wild cassava] with my own cassava, with other tubers;



**Table 2**  
Forest definitions: variations by selected countries.

Country	Area (ha)	Canopy Cover (%)	Height (m)	Exclusions (the parameters below are not considered forest)
Brazil	0.5	10	5	Land predominantly under agricultural or urban land use
Chile	0.5	10/25	Min. width 40 m; tree species required to predominate	Self-sown trees of an introduced species
Colombia	1	30	5	Commercial forest plantations, palm crops and trees planted for agricultural production
Congo	0.5	30	3	–
Costa Rica	1	30	5	–
Ecuador	1	30	5	–
Ethiopia	0.5	20	2	–
Guyana	1	30	5	–
Indonesia	0.25	30	5	Nonnatural forested peat.
Malaysia	0.5	30	5	Oil palm and rubber plantations.
Mexico	50	10	4	Lands subject to a land use that is predominantly agricultural or urban.
Paraguay	1	10/30	3/5	Urban areas, grasslands, plantations that are predominantly agricultural, and agroforestry and silvopastoral systems whose primary purpose is agriculture
Peru	0.09	Detection of forest depends on the classification algorithm at the pixel level	5	–
Vietnam	0.5	10	5	–
Zambia	0.5	10	5	–

Source: Extracted from Reddcompass resources org, Chapter 2, section 2.3.2. Forest definitions, <https://www.reddcompass.org/forest-definition?fid=%2Fmgd%2F2.3.1&ver=v2> (GFOI, 2016).

and when I am working, I do not want to see confusion, I do not want nasty wind or poisonous animals....” (Rodríguez, 2013: 12–13, authors’ translation from Spanish).

In this indigenous view, each individual gives and receives, and all have a role that is complementary.

Figs. 1 and 2 were created by an indigenous person, Abel Rodríguez of the Nonuya indigenous community. It refers to a one-hectare area in Peña Roja, Caquetá, in the Colombian Amazon (Rodríguez, 2013). These figures and the following excerpts from our interviews and publications on Chagra by indigenous people illustrate that Chagra is a system nested in multiple interrelations of different beings in the middle of a forest. The figures and excerpts reveal that human beings are intimately interconnected with a large number of different beings, all of whose futures depend on each other. Tomás Román, an indigenous Colombian researcher from the Uitoto tribe, describes the relations among the Chagra in didactic material made to serve as communicative material within indigenous communities, as in the following excerpt:

“In order to make the Chagra, a primary forest area must be cleaned from scrub, and trees must be felled; a forest is where there are places serving as animals’ homes. Birds nest in the trees; there are palm trees whose fruits are consumed by animals and humans, such as the Milpeso palm. In the primary forest, there is biodiversity such as hives, vines, pineapple, yam from the mother mountain area,<sup>1</sup> and many species of ants, wasps, thorns, and many medicinal and timber trees, as well as ferns. The forest is rich in fauna and flora, and its ecosystem is fundamental for the life of everything that lives and coexists in the primary forest. The area of the primary forest is cleaned from weeds, and then the trees are felled. Once dry, the chopped trees are burned. The biodiversity that was alive in the primary forest is burned and serves as fertilizer for planting vegetables, fruit trees and all the plants that are cultivated in the Chagra. The vision and mission are to enrich the primary forest much more than it was used; therefore, all the species that have been destroyed

when the Chagra was made should be replaced and improved.” (Tomás Román 2011: 53 in Rodríguez Fernández et al., 2011, authors’ translation from Spanish).

This textual excerpt should accompany the drawings; otherwise, seeing the forest from the trees in them might be difficult. Figs. 1 and 2 are examples of indigenous “local knowledge” that understands forest as landscape with a large number of different species. Fig. 2 illustrates the planting of more than 35 vegetal species in the same area. The drawings expose significant diversity. Analyzing the excerpt by Thomas Román in connection with the Chagra drawings reveals that, instead of seeing the drawings simply as referring to vegetal species usable for humans, the indigenous people were also thinking of care for other-than-human beings: for large animals (domestic and wild) and the insects that the Chagra will feed, for example. Rather than considering only the tree species with a certain height or crown cover, this indigenous view focuses on the interactions and interconnections of the forest as a populated place full of life. He also talks naturally of transforming the primary forest: cutting and burning certain areas at certain times is presented as part of a natural process. Thus, the relation of Chagra-type swidden commons with sustainability needs to be reassessed.

#### 4.1.3. Chagra practices engage in sustainable and inclusive agroforestry

The reason for reproducing the indigenous drawings in Figs. 1 and 2 is to offer an onto-epistemological opening in relation to the many claims that these swidden cultivation areas would result in deforestation and merely represent subsistence agriculture that displaces forests. This is how many national and global agencies currently classify these areas in their statistics and it is misleading to equalize their impact on deforestation. Agroforestry in Chagra differs dramatically from monocultural industrial plantations, whereas monocultural industrial-scale practices can be viewed as extractive (“pulling out”) soil and land uses (Kröger 2013b; 2014). A young indigenous activist interviewed by an author in Bogotá in November 2019 explains: “Large-scale monoculture agricultural business clears forests, breaks the animal’s life chain, imposes modified seeds, pollutes water with chemicals, takes water away from wildlife” (authors’ translation from Spanish).

These points highlight the dangers of the positivist project in its assumption that all (or most, meaning the most important factors) can be rendered statistical, commensurate, calculable, and comparable via numbers. This project has had major policy consequences. For example,

<sup>1</sup> For many indigenous communities, sacred sites, such as the “mother mountain” referred to here, are special locations in their territories that are associated with their myths of origin and where ritual ceremonies are held according to their ontologies and cultural ecological calendar (Rodríguez Fernández et al., 2011).



Fig. 1. Chagra.

Source: Extracted from Abel Rodríguez, 2013: 19.

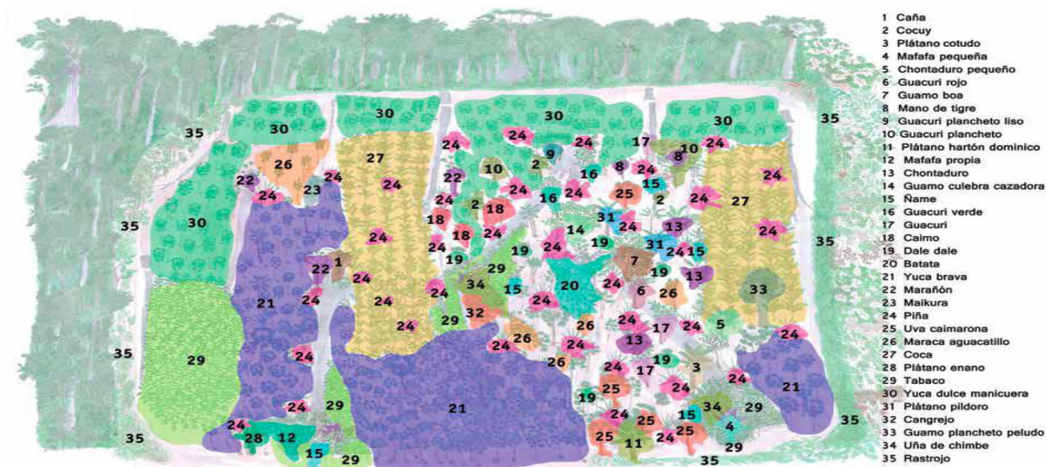


Fig. 2. Chagra species diversity.

Source: Extracted from Rodríguez, 2013: p. 20.

FAO reports on the role of agriculture in deforestation combine subsistence/local agriculture and commercial agriculture, and FAO statistics suggest that these practices jointly cause deforestation. This hides the indigenous practiced ontology, where not replacing what is destroyed is viewed as having negative consequences, leading to, for example, difficulties such as poisonous and dangerous animals becoming predominant in the cultivated areas. Similar relations to time frames and places, with forests that are largely preserved in the long term even though swidden agriculture and swidden commons are practiced in them, have been found elsewhere around the world (Scott, 1998; Fox et al., 2009; Toivanen and Kröger 2019).

#### 4.1.4. Swidden commons can offer ontological openings

Another onto-epistemological opening offered by Chagra forest practices is that they may make it possible for those seeing them to think about forests differently. Thus, people may start to speak, write and act differently in relation to forests. The following excerpt offers an ontological opening to pay more attention to existences: it recognizes what exists and what is transformed during the indigenous interactions

(practices) in forest. An indigenous woman explained this concept to one of the authors of this article in her own words:

“When we make the Chagra, the woman chooses the place for each seed, thinking where and how each product is distributed. Good attention to each product must be given, in order to manage our cultivation so that there will be no times of shortage. For example, when you do not have food in abundance, you should take a basket and put it on your back and tear off herbs and throw them into the basket; then you go around the Chagra’s edges and burn them. When this is done, the cassava matures quickly, because we take care of the cassava. In this way Chagra is cleaned. One must turn around the entire field and make a fire in the center so that the smoke expands on all sides of the field and covers the entire Chagra. This is the first traditional fertilizer: if these processes are not carried out, there is no food. La chaguera (the woman who takes care of the Chagra) is the mother of cassava, the cassava realizes the cleaning, because she thinks the mother (the chaguera) loves us: she comes often to visit us! So, plants grow up until they mature. A chagrera teaches her daughters and granddaughters how to do these household chores.

The harvest should be arranged well, in a spiral formation towards the center, very similar to how fish are fished” (author's interview, Caquetá, November 2019, translated by the authors from Spanish).

Chagra-type forest practices can be partial solutions that simultaneously address the global food and biodiversity crises and offer other socioenvironmental benefits. Studies have verified that indigenous territorial practices, including cutting and burning of trees, activate soil biomass (Bilbao et al. 2010, Mistry et al. 2016, Mistry et al. 2019) and promote a balance between people's wellness and ecological wellbeing. Furthermore, these practices offer many indirect benefits for retaining forests in their vicinities (such as reducing deforestation and wildfires and maintaining carbon stocks and biodiversity); these aspects cannot be ensured or promoted by the current technical concepts in their limited view of compartmentalized “forest” spaces and temporalities (Mistry et al. 2016).

Many modern forest uses, epitomized by industrial forestry and the expansion of tree plantations, continue to attempt to hide the impacts of their actions on forests and the species living in them (Kröger, 2014; 2018; Nylund and Kröger, 2012). In contrast, indigenous ontologies related to “forests” often recognize and value the full spectrum of what exists within the web of life. Likewise, this ontology values gradual transformations for the collective benefit, taking into account that which have been destroyed in a forest, which needs to be restored to support multiple existences—the pluriverse. The juxtaposition of these indigenous practiced relations with western ways of relating to forests may thus serve as an ontological opening for people to start to see how forests can be understood and managed more diversely and broadly.

#### 4.1.5. Perpetual spiritual continuity of reciprocal relations

Some of the practices in Chagra are traditional and related to the perpetual continuity of biophysical, human, and spiritual dimensions, while others specifically address the purposes attained through Chagra's biophysical dimensions. For example, the first practice in Table 3 (next section) is “traditional management of energy balance”, referring to elders creating rituals, which is an essential component of retaining these (agro)forest(ry) areas. The below excerpt (author's interview, Caquetá, November 2019) from a member of the Yucuna indigenous tribe illustrates the ontologies behind the practices:

“Our land is populated with spirits, they are the owners, they tell us to keep the order of the Chapune [the elder of the Yucuna indigenous community who maintains their law of nature]. Relations

with the Chagra need to comply with these rules to maintain a certain dynamic balance in energy between all beings in the world. In the order maintained by the Chapune, one should not sow without a reason, one does not eat without a reason; one should ask for permission, and one should clean oneself first [energetically, before planting anything].”

This text explains how an indigenous person understands forest transitions as part of the web of life. Every being has a function in this relation and is imbued with a spiritual connection. In these practices, the time frame is different from that in the west and focuses on life projects; many vectors of difference exist. First, as the previous excerpt shows, the concept of private property or land possession does not exist for many indigenous people because they are dwelling on the earth, whereas spirits are the owners (see Nichols, 2020). Instead, at the core are relations of care and reciprocity, a focus on what they have received from the earth. Thus, claiming for example that indigenous people would be dispossessed from their lands is to take a western modernist onto-epistemological position that assumes land ownership relations to be ontologically universal and epistemologically observable (Nichols, 2020).

Indigenous local knowledge places a key focus on ancestral ways of being and knowing forests, respecting them in a reciprocal way, and living in them in perpetuity, representing an ontological challenge to technical forest definitions. The following excerpt from an author's interview (Putumayo, July 2009, translated by the authors) provides an example:

“The jungle is our beloved land, it has received us at birth, it has given us everything that has allowed us to grow, it gives us food while we live, and when we are about to die, it prepares us to return to it. We are a granite of earth that circulates, with a beginning and an end, which is part of a spiral of life, delicate, we are responsible for not breaking it (the spiral of life).”

#### 4.1.6. Chagra and global forest governance

In practical terms, we suggest that current forest definitions could be complemented interpreting different aspects of the indigenous forest practices outlined thus far. The indigenous forest ontology could enrich the Global Forest Landscape policy approach and other forest governance initiatives in specific ways. First, we suggest that forest conservation should be thought of in a relational and gradual manner.

**Table 3**

Chagra practices of the Andoque, Nonuya and Ceima Chacivera indigenous people and their possible relevance to climate crises.

Chagra traditional practices with their activities	Relevance for contemporary policies
Traditional management of energy balance	Ensuring sustainable land use via respect for forests and forest beings
Renewal of traditional knowledge associated with forest practices	Sustainable forest use
Land selection	Sustainable land use
Maintenance of the soil nutrient system: cleaning, cutting, and burning	
Maintenance of medicinal plant gardens	Food security and biodiversity
Traditional food storage	Food security
Seed exchange	
Strengthening of seed banks in situ	
Soil analysis and land selection	Biodiversity maintenance and sustainable land use
Protection of key natural cycles and species	
Continuous distribution of fields in farms defining different units for landscape maintenance	
Increase in diversity in the Chagra	
Selection of varieties of products resistant to droughts	Adaptation and mitigation
Selection of varieties of products resistant to floods	
Changing the size of the Chagra depending on drought or flood periods	

Source: Created by the authors.

Management of energy balance refers to, for example, an elder performing a ritual to ask the sacred spirits, or spiritual tree owners, for permission to use the selected area. This intervention simultaneously prevents accidents and improves soil fertility.

Land selection refers to crop distribution in the Chagra. Plants that require fewer soil nutrients can be farmed on slopes, while those that need more nutrients are farmed on plains (Ramakrishnan, 1992).

The seed collection method refers to the process of storing seed in periods of abundance or due to particular complex production processes.



Giving “local knowledge” more importance in the National Contributions reports, policies should include indicators that analyze the relevant effects as well as the time and place of local practices related to forests. Second, practitioners and researchers could start to view their work as participation in a coproduction of knowledge, which is important to highlighting the relevance of reciprocal and gradual understandings of forest within governance policies.

Table 3 highlights how specific Chagra traditional maintenance techniques (left column) use “situated” knowledge, which has a clear and correlated impact for current climate policies (right column). We elaborated the left column in Table 3 based on information collected by indigenous researchers (Andoque and Castro, 2012; Rodríguez Fernández et al., 2011; Rodríguez, 2013; Uribe and Uribe, 2012; Matapí and Matapí, 1997; Matapí and Yucuna, 2012). Table 3 suggest concrete connections between specific Chagra activities that are effective in relation to biodiversity conservation, food security, waste management, and land use.

Based on our ethnographic research, we (and our indigenous colleagues, see Diver, 2017) find that these ontologies, in contrast to trees and forests being seen simply as resources to be freely extracted at will, could be helpful in ensuring greater respect for forests and thus more sustainable relations in and with them. Indeed, these practices do challenge the blindly positivist and technical aspects of modern forestry, but not the basic premises of science, to continue expanding the horizons and possibilities of knowledge and knowing.

A caveat in the global lessons to be drawn directly for policymaking from these notes is that political ontology is viewed to be deeply related to particular contexts, given their power relations. However, putting light on them helps start a conversation in the context of global forest politics and policymaking, and global forest management. The fact is that these politics rely heavily still on technocratic stances and technical criteria, and western modern notions of land ownership and object relations to trees and forests are already being evermore strongly challenged by global indigenous mobilizations and the overall critique of modern progress that has failed to safeguard the world from a climate catastrophe. In the indigenous mobilizations, argues Nichols (2020: 159–160, *italics in original*): “Indigenous peoples may be transforming the constituent frame of reference. In this regard, I consider one of the most important features of Indigenous politics today to be its modeling of *expressive insurgency*: a long-term, multigenerational struggle that operates under radically asymmetrical power conditions to reorient the very terms of contestation by forcing us to confront the possibility of relating to the earth as something other than an object to be possessed.” Political ontological readings can challenge and counterbalance “the mainstream’s characteristic silence on its most central assumptions” (Hay, 2006) regarding how forests are viewed and should be conceived. Similarly, the Chagra/forest indigenous perception materialized in the drawings and their explanations that we highlight here, challenge and resignify [or redefine] what forests are and can be. Chagra and indigenous understandings of forest can complement technical criteria as part of global practices nested in different climate mechanisms, such as the importance of care and reciprocity with forests that comes from living in, of, and for forests through indigenous long term cycles.

## 5. Conclusion

This article has highlighted forest relations that may be helpful for nuancing the current ways of understanding and governing forests, based on an analysis of local knowledge and agroforestry practices developed by Colombian Amazon indigenous people and the FAO and KP forest definitions. We argued that the current ways of defining forests, for purposes of global and national forest governance, typically share a technical and positivist approach, although major definitional discrepancies exist that may make the implementation of policies, for example, to curb or monitor deforestation, hazardous. We labeled this

as politics-as-usual, the modern and Western-based politics of forest defining. This politics was contrasted with the ways of understanding forests inherent in the Chagra agroforestry practices, dynamics and ontologies of Amazon indigenous people in Colombia. Partaking in the calls for greater inclusion of indigenous and other non-Western viewpoints in the face of planetary crises (Blaser, 2013; Escobar, 2020; Hosseini and Gills, 2020) and to improve forest governance (Ehrnström-Fuentes, 2016; Ohja et al., 2019), we highlighted how the Chagra practices pose an onto-epistemological challenge to the current politics-as-usual, a potential for opening and rethinking what forests are and how they could be conceived. This type of exercise can shed light on practices that challenge and extend beyond and under positivist assumptions, such as the positivist dream that it is possible to find and govern global forests through numerical data that can incorporate the wide variety of forest relations.

We also suggested that the practices of indigenous agroforestry, the “local knowledge” created through “situated intimacies” (in terms of Raffles, 2003), may be highly relevant for addressing multiple and converging global crises and thus improving the possibilities for climate change mitigation, food production, resilience and socio-environmentally just solutions that provide broad benefits and are not limited to particular localities (Table 3 offers a condensed list). However, more research is needed on this topic. A key problem that must first be overcome is how to make space for possible transferable lessons, as many indigenous forest-related practices face resistance due to the different ontological and epistemological worlds inherent in them.

This article offered possibilities for reflecting on different types of forest relations and thus to nuance and perhaps challenge and transform existing and underlying onto-epistemological assumptions in forest governance and defining. Onto-epistemological openings have already provided more space and power for indigenous (agro)forest(ry) processes to be included in policies, so the types of Chagra practices presented herein seem to be expandable to (at least some) wider scales. The expansion of *de jure* ethnoterritorial rights within Latin American constitutions, although often (but not always) lacking long-lasting *de facto* implementation, is one political process that offers several successful examples of accommodating ontological pluralism in terms of what forests are for different groups (Kröger 2020; Kröger and Lalander 2016; Schroeder and González, 2019). Research can help in these endeavors, and future work should focus on identifying transferable practices and how to scale these practiced forest relations to international and national levels, or between local areas that share similar characteristics, in a mutual learning process. The scaling up of the kind of indigenous agroecological agroforestry practices depicted here and similar practices offers potential solutions to the complex and multiple intertwining global crises around the provisioning of healthy, lived environments that sustain life in its myriad forms.

## Credit author statement

**Nidia González and Markus Kröger:** Conceptualization, Methodology, Investigation, Resources, Writing - Original Draft, Writing - Review & Editing, Visualization, Project administration, Funding acquisition.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.



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