



# Developing an interdisciplinary and cross-sectoral community of practice in the domain of forests and livelihoods

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**Abstract:** *Although significant resources are being spent researching and fostering the relationship between forests and livelihoods to promote mutually beneficial outcomes, critical gaps in understanding persist. A core reason for such gaps is that researchers, practitioners, and policy makers lack the structured space to interact and collaborate, which is essential for effective, interdisciplinary research, practice, and evaluation. Thus, scientific findings, policy recommendations, and measured outcomes have not always been synthesized into deep, systemic understanding; learning from practice and implementation does not easily find its way into scientific analyses, and science often fails to influence policy. Communities of practice (CofPs) are dynamic sociocultural systems that bring people together to share and create knowledge around a common topic of interest. They offer participants a space and structure within which to develop new, systemic approaches to multidimensional problems on a common theme. Uniquely informed by a systems-thinking perspective and drawing from the scientific and gray literatures and in-depth interviews with representatives of established CofPs in the natural resource management and development domain, we argue that a well-designed and adequately funded CofP can facilitate interdisciplinary and cross-sectoral relationships and knowledge exchange. Well-designed CofPs integrate a set of core features and processes to enhance individual, collective, and domain outcomes; they set out an initial but evolving purpose, encourage diverse leadership, and promote collective-identity development. Funding facilitates effective communication strategies (e.g., in person meetings). We urge our colleagues across sectors and disciplines to take advantage of CofPs to advance the domain of forests and livelihoods.*

**Keywords:** collaboration, interdisciplinary, leadership, social-ecological systems, social learning, systems thinking

El Desarrollo de una Comunidad de Práctica Interdisciplinaria y Trans-Sectorial bajo el Dominio de los Bosques y los Medios de Subsistencia

**Resumen:** *Aunque se gastan recursos importantes en la investigación y el fomento de la relación entre los bosques y los medios de subsistencia para promover resultados mutuamente beneficiosos, aún existen vacíos críticos en el entendimiento. Una razón nuclear de dichos vacíos es que los investigadores, practicantes y legisladores carecen de espacio para interactuar y colaborar, lo cual es esencial para que la investigación, la práctica y la evaluación sean efectivas e interdisciplinarias. Por esto, los hallazgos científicos, las recomendaciones políticas y los resultados medidos no siempre se han sintetizado en un entendimiento profundo y sistémico; aprender a partir de la práctica y la implementación no encuentra fácilmente su camino dentro de los análisis científicos, y la ciencia comúnmente falla en influenciar a la política. Las comunidades de práctica (CofPs, en inglés) son sistemas socioculturales dinámicas que juntan a las personas para compartir y crear conocimiento en torno a un tema de interés común. Ofrecen a los participantes un espacio y una estructura dentro de la cual pueden desarrollar estrategias novedosas y sistémicas para problemas multidimensionales de*

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*un tema común. Informados de manera única por una perspectiva de pensamiento de sistemas y partiendo de la literatura científica y gris y entrevistas profundas con representantes de CofPs establecidas bajo el dominio de desarrollo y manejo de recursos, argumentamos que una CofPs bien diseñada y propiamente financiada puede facilitar las relaciones trans-sectoriales e interdisciplinarias y el intercambio del conocimiento. Las CofPs bien diseñadas integran un conjunto de características y procesos nucleares que aumentan los resultados individuales, colectivos y del dominio; exponen un propósito inicial pero cambiante, promueven el liderazgo diverso, y fomentan el desarrollo de la identidad colectiva. El financiamiento facilita las estrategias efectivas de comunicación (p. ej.: en reuniones de personas). Instamos a nuestros colegas en todos los sectores y disciplinas a sacar provecho de las CofPs para avanzar en el dominio de los bosques y los medios de subsistencia.*

**Palabras Clave:** aprendizaje social, colaboración, interdisciplinario, liderazgo, pensamiento de sistemas, sistemas socio-ecológicos

## Why the Domain of Forests and Livelihoods Needs a Community of Practice

Researchers, practitioners, policy makers, and donors working in conservation and development are increasingly interested in the domain of forests and livelihoods. This interest will only expand with mounting concerns about climate change: institutions engaged in conserving or restoring forests to sequester carbon and those attending to the most climate-vulnerable people are increasingly seeking strategies that improve both ecological and social outcomes (Scarano & Ceotto 2015). Forests are key to international agreements to reduce carbon emissions and promote sustainable development and are essential for the livelihoods of an estimated 1.6 billion people worldwide (World Bank 2008).

Although substantial resources are being spent researching and fostering forest-based livelihoods, critical gaps in understanding persist. Even basic terms are ambiguous. For example, some disciplines use *tree cover* and *forest* synonymously, whereas others apply a more nuanced definition of *forest* that incorporates ecological function and structure (Chazdon et al. 2016). Definitions of *forest-dependent people* similarly diverge; thus, few reliable global estimates of forest dependence exist (Newton et al. 2016). Also lacking are rigorous, empirically based impact evaluations that examine the complex synergies and trade-offs between improving livelihoods and conserving forests, an understanding of which is fundamental to policies and practices that aspire to meet long-term goals (Persha et al. 2011; Miteva et al. 2012). Scholarly generalizations are weak at best because the literature on community forestry is overrepresented by studies of southern Asia; most studies emphasize environmental rather than socioeconomic outcomes; and data supporting the links between population dynamics, market forces, and biophysical characteristics to environmental and livelihood outcomes are insufficient (Hajjar et al. 2016). Filling these gaps to create effective interventions and new leadership models requires work that integrates ecological, biological, regulatory, economic, and cultural components, thus bringing together peo-

ple from many disciplines and sectors. We argue that these gaps are best addressed through interdisciplinary systems thinking fostered through sustained engagement between diverse stakeholders and unified by a common purpose.

Interdisciplinary and cross-sectoral research is widely lauded, yet successful, sustained collaborations remain uncommon (Jarvis et al. 2015; Rose 2015). Disciplinary jargon, theoretical and methodological differences, and divergent goals can make collaboration cumbersome and create disincentives. Sectoral and disciplinary specializations often exclude contextual factors or reduce them to individual parts such that forests and livelihoods are treated as discrete even though they are intimately connected. Likewise, conventional notions of leadership that focus on individual agency are problematic (Case et al. 2015) and stymie collaboration because they ignore the complex systems' effects that emerge from inside and outside a specific social context. A systems view recognizes that larger goals of forest conservation and livelihood development are as irreducible as the people, roles, and structures that lead change (Ackoff & Emery 2005).

A community of practice (CofP) can provide a purposeful forum for interdisciplinary and cross-sectoral engagement, where knowledge can be harnessed and shared and where new forms of leadership can develop. A CofP is a group of people who share a common interest in a topic and deepen their knowledge and expertise through regular interaction (Wenger et al. 2002). Such groups heighten understanding and build trust through face-to-face contact, shared work, and informal conversations. Through social learning, a CofP can improve decision making through iterative, deliberative, and flexible interactions that strengthen relationships and increase problem-solving capacities (Cundill & Rodela 2012). For example, researchers can shape research questions to address on-the-ground issues raised by practitioners and directly disseminate findings to improve management. We argue that CofPs are critical to moving the domain of forests and livelihoods forward and that using systems thinking to design and sustain CofPs is essential for their success.

### Evidence of the Need for a CofP for Forests and Livelihoods

Large-scale efforts to bring together multiple voices in the forests and livelihoods domain exist but are generally designed to address specific data gaps rather than to forge long-lasting collaboration. For example, the Center for International Forestry Research (CIFOR)'s Poverty Environment Network brought together researchers and practitioners from natural and social sciences but with the end goal of producing a global socioeconomic and environmental data set (PEN 2007). The biggest, most persistent challenge facing the forests and livelihoods domain is the lack of recognition of the potential for forests to contribute to poverty reduction through either national-level economic plans or forest-management plans (PROFOR 2008). More collaborative, cross-boundary, and systems-based learning, rather than isolated initiatives and agendas, is needed to close the gaps between researchers, policy makers, and practitioners.

Within the research sector, knowledge is created and shared through traditional academic means (e.g., peer-review processes) that do not necessarily provide space for informal interaction. Further, stakeholders from all sectors are likely constrained by funding requirements and institutional or other incentive structures. Thus, scientific findings, policy recommendations, and measured outcomes have not always been synthesized into deep, systematic understanding and sustainable outcomes (Naughton-Treves et al. 2005). Building on past calls for more inclusive and integrated environmental and social-science networks (e.g., Bennett & Roth 2015), we offer a CofP as a structured space to increase exchange among diverse stakeholders and achieve sustainable outcomes in the forests and livelihoods domain.

To explore the need for a CofP in this domain, we conducted an exploratory survey with forest and livelihood stakeholders ( $n=180$ : researchers [81%], practitioners [10%], policy makers [2%], and other respondents [7%]) (Supporting Information). This research was conducted under a grant from the U.K. Department for International Development and was thus exempt from our institutional human-subjects protocol. No personally identifying information was collected, and data were not shared or used beyond this exploratory purpose. Virtually, all respondents (98%) were interested in participating in a CofP for a variety of reasons: to network and collaborate (91%), advance the state of knowledge in the domain (84%), to learn new information (82%), and share new information (78%). Collaborations produce outcomes such as knowledge dissemination (73%) and new partnerships (55%), but on-the-ground improvements in livelihoods (27%) and forests (18%) as well as policy change (22%) are less likely to result.

Respondents described the most pressing issues in the forests and livelihoods domain as socioecological threats to forests; inequitable social conditions and land rights;

the need for more data regarding management effectiveness; the need for increased communication across sectors and with communities; and the need to foster a link between research, policy, and practice (Table 1). The latter 3 issues reflect the need for tools and structures to assist in multistakeholder information development and sharing. Researchers emphasized gaps in the literature (what is unknown), whereas practitioners emphasized implementation issues (how what is known be applied). Although researchers were overrepresented in the survey, they illustrate the need for more targeted opportunities for cross-sectoral engagement. The need for increased communication and links with research reflects poor leadership and outdated modes of leadership that reward individual work over collaborative endeavors.

Work exploring or critiquing CofPs as an approach to cocreation of knowledge is rare (Smith et al. 2017); thus, our view of CofPs as systems and our use of a systems-thinking lens to better understand, design, and sustain CofPs is a unique and important contribution to theory and practice. Further, in the vein of Case et al. (2015), we sought to challenge historically narrow views of leadership by unpacking the ways in which CofP leadership is exhibited by individuals, their actions (and interactions), and the outcomes of individuals working to produce purpose-driven outcomes. We drew from scientific and gray literatures and interviews with established CofPs in related domains to describe CofPs, theoretically and empirically, and suggest that a systems thinking lens—a method of inquiry dedicated to understanding complex interdependencies—is useful to understand CofPs as dynamic, evolving social entities. This lens and evidence elucidates how a new CofP can advance the interdisciplinary and cross-sectoral domain of forests and livelihoods. We aimed to motivate both the design of and participation in a forests and livelihoods CofP to produce novel and rewarding results for stakeholders and for the domain more broadly.

### Definition of a Community of Practice

A CofP is a form of strategic knowledge management in which information, skills, and experience are shared within groups to improve professional outcomes (Wenger-Trayner & Wenger-Trayner 2015a). This definition suggests intentionality within inter- and multidisciplinary work environments, as exemplified by Massachusetts Institute of Technology's Building 20, where significant advances in radar technology and modern linguistics were developed, or Andy Warhol's Factory, where artists congregated to create new art forms, publications, and cultural icons. Each brought together diverse groups who shared a common domain and ambition to learn from each other and produce more meaningful work. A CofP integrates a community (set of people), their domain (field of interest), and their collective

**Table 1.** Excerpts from exploratory surveys organized around the main themes derived from the analysis.**Theme 1: Socioecological threats to forest and land-use change**

Shrinking of forest area and loss of biodiversity from nonforestry land-use practices such as promoting industrial agriculture, mono plantations, converting forest into urban area, industrial area, and other land-use types (practitioner)  
 Timber business is profitable for only a few individuals and companies; collection of revenue goes to the government; only a small part of the revenue goes back to the villagers; village communities do not see the benefits of protecting forests and instead engage in illegal logging (researcher)  
 Balance income generation with conservation; productive activities usually lead to deforestation and degradation (practitioner)

**Theme 2: Inequitable social conditions, especially related to land rights**

Local people have no access to the forest; communities have no ownership in terms of forest tenure and relevant policies; lack of collective action in forest protection (practitioner)  
 Lack of (legal, political, and official) recognition of aboriginal or indigenous lands; thus, indigenous people do not have a say on how the land (the forest) is managed and do not have enough tenure to satisfy their economic, cultural, and social needs; wood harvesting and other industrial extractive industries (mining, oil and gas, hydropower dams, etc.) have precedence over cultural and subsistence activities (researcher)

**Theme 3: The need for more data on the effect of management strategies and creating new tools and methods**

Finding the right balance between leveraging the massive amount of forests and livelihoods data already collected (and underused) through strategic collection of new primary data (researcher)  
 Creating a space for natural and social sciences to interact and learn from each other, which is respectful yet critical without dismissing well-entrenched epistemological approaches (researcher)  
 Paucity of data on the economic viability of several forest-based livelihood activities and opportunities and their resultant exclusion from national data sets and national income-accounting profiles (researcher)  
 Lack of guidelines, frameworks, and tool kits for implementing policies (practitioner)  
 Lack of knowledge and understanding in using resource in sustainable ways and conservation; lack of skills related to management in the community user groups (practitioner)

**Theme 4: The need for increased communication across sectors and with communities**

Clearing of forests for agriculture (particularly on a commercial scale) is a serious threat; need to tear down the barriers between forestry and agriculture sectors. Need to realize forests can survive only if agriculture becomes more sustainable, which requires much more investment in effective extension and appropriate transport and market infrastructure (researcher)  
 Gaps in understanding between departments and community lead to conflicts between the 2 (other)  
 Unsustainable public policies in Latin American countries that are conflicted (i.e., environmental policies seek to conserve; agricultural policies incentivize the removal of cover to increase agricultural land and change land use); lack of communication and work between sectors (practitioner)  
 Lack of communication between academics and policy makers; even though sound scientific research shows that some long-standing models of forest and nature conservation do not work effectively across all contexts (e.g., based on economic evaluation of [unclear] strictly protected areas in poor areas), there are very few examples of integration of new models into mainstream policy making (researcher)

**Theme 5: Fostering links among research, policy, and practice**

Lack of adaptive comanagement relationships; researchers tend to go into communities, extract information, and feed this on to policy makers or publish the findings; more research needed to create real-life impacts (e.g., working with communities to make real-life policy decisions to design an appropriate benefit-sharing scheme), support practitioners in the implementation of livelihood projects (i.e., doing baseline studies or collating community perceptions) or design user-inspired technologies that support sustainable livelihoods; increase links between research institutions, practitioners, and government agencies (researcher)  
 Promoting REDD+ interventions with political interests, ignoring community governance of nature capital, and denying equitable access and reciprocal partnership in harvesting carbon credits (practitioner)  
 Determining how to ensure accountability of NGOs, agencies, and private sector to people through demonstrated results and outcomes (practitioner)

*Note: Surveys asked respondents to indicate whether they were a researcher, policy-maker, or a practitioner (e.g., implemented forest and livelihood-related programs).*

practice (interactivity and engagement) (Wenger-Trayner & Wenger-Trayner 2015a). These components, each a system in itself, are integrated in service of a common purpose and form a holistic system with properties and potentials that cannot be understood, or replicated, simply by analyzing its parts.

The people comprising the community in a CofP are mutually invested in a particular topic. Membership implies commitment and competence in a domain and thus

a shared identity with other members (Wenger-Trayner & Wenger-Trayner 2015a). Core members coordinate regular activities and foster wider engagement (SDC 2007). Active members develop discussion topics, share and produce knowledge, and guide the broader agenda. Peripheral members learn from and support others' contributions without substantially contributing themselves (Holmes & Woodhams 2013). Members may move between types and inhabit different forms of leadership

as the CofP evolves. Community members share a topic of interest (i.e., domain). The domain can evolve with or without the community, which reinforces the need for constant engagement and adaptation. In practice, the community acts together to push the domain forward and shape its identity. Meetings, coauthored papers, shared databases, and analytical and applied collaborations are common practices. Communities develop their collective practices through shared problem solving, reuse of assets, mapping of knowledge, and identification of gaps (Wenger-Trayner & Wenger-Trayner 2015a). The practice is sustained over time through collaborative means and produces a distinct type of community and cultural context (Duguid 2005). Like the domain, practices often evolve, but continue to influence identity.

### Applying a Systems-Thinking Lens to CofPs

A systems-thinking lens—a method of inquiry dedicated to understanding complex interdependencies—can be used to design and strengthen a CofP in 3 key ways. First, it offers a theoretical model for a forests and livelihoods CofP that closely parallels the subject matter: highly interdependent, complex, and purposeful. Second, it frames the CofP as a whole system within its context, where relationships within the system are just as important as its individual parts. Third, it empowers participants to challenge existing institutional jurisdictions, hierarchies, and leadership typologies. A sociocultural system elevates experiences and values to the same level as sanctioned information and metrics, which in turn allows new ideas and structures to be developed.

Systems thinking suggests that although the basic components of a CofP—community, domain, and practice—are easily defined, the powerful emergent properties, such as committed participation, better information sharing, and innovative outputs, are considerably more complex and not reducible to individual parts. A system is defined as a set of things organized and interconnected in a pattern or structure that produces a set of behaviors—its function or purpose—within a particular context (Ackoff & Emery 2005; Meadows & Wright 2008). A system is not the sum of the performance of its parts but rather a product of their interactions (Ackoff & Emery 2005). A systems approach requires that the CofP be viewed as a purposeful whole with multiple functions, an understanding which offers clarity in CofP design and leadership possibilities.

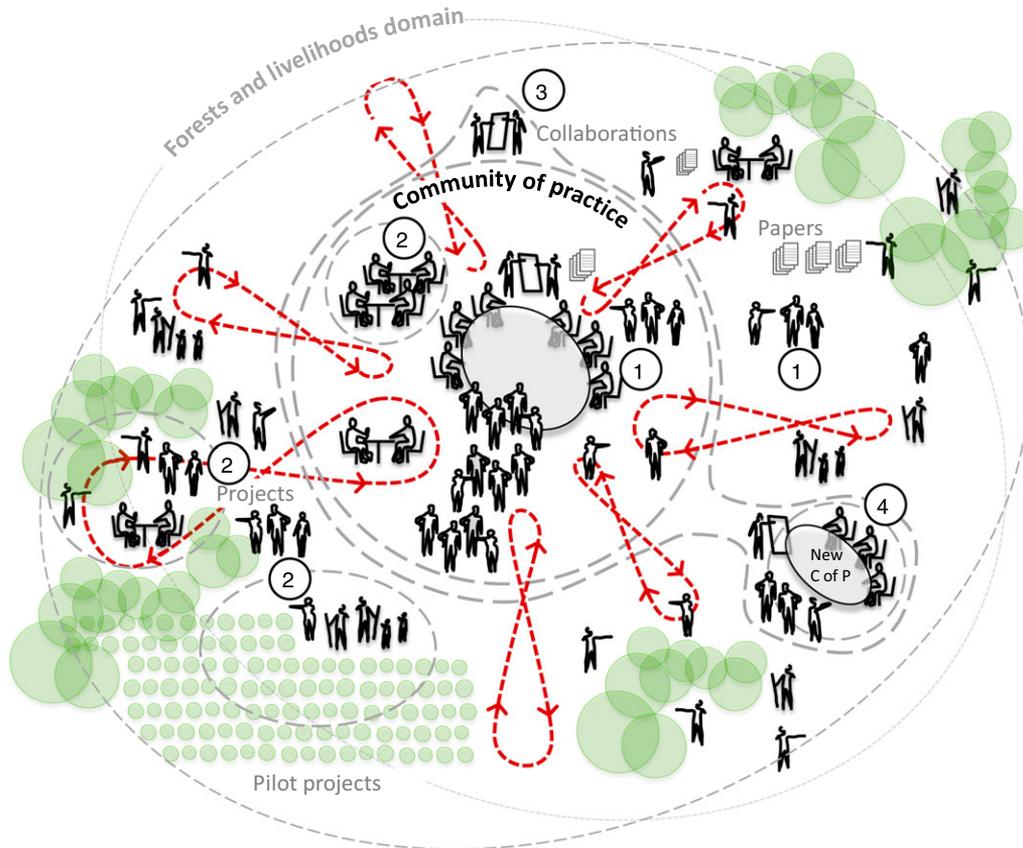
The systems lens is critical for CofP leaders because complex systems, particularly sociocultural systems, exhibit both predictable and unpredictable behaviors. The first set of behaviors stems from the purposefulness of the system's structure and the second from its internal or contextual complexity. Understanding this can help leaders design a system that aligns with the shared vision

and identity of the community. Leaders can design and organize the relationships among parts—people, identity, intentions, and practices—into an entity with emergent properties synonymous with getting the job done. Leaders and members adapt the system to changing contexts, changing personalities, and new information, effectively realigning the emergent properties with the shared and, in some cases, evolving purpose. Like any cultural system, a CofP relies on symbolic elements: identity, social capital, shared language, values, and common purpose. Although these elements are fluid, if any are compromised the system may no longer function as intended. It is thus the prerogative of members within a CofP to emerge as leaders with new ideas in response to shifting interpretation of the domain.

At any point in time, CofP multiplies synergistic results by simultaneously improving individual member performance and producing unique, collaborative outputs (Fig. 1). They do so by enhancing resource accessibility and more importantly by creating systems practitioners (Wenger-Trayner & Wenger-Trayner 2015b) and new types of leaders who go beyond accumulating knowledge to understand both the how and the why (Ackoff & Emery 2005; Paas & Parry 2012). As the combination of individual member accomplishments and collaborative group outputs is realized, CofP identity is strengthened, leading to a virtuous systems cycle of increasing influence and impact among its practitioners and within the domain.

### Core Features and Their Interactions in a Functional CofP

To understand the core features of a CofP and how they operate in practice, as systems, we reviewed the literature on CofPs and considered insights derived from interviews with CofP leaders focused on natural resource management and livelihood development. We located these CofPs through referrals and an internet search. We included only groups that self-defined as a CofP; operated in a domain related to natural resource management; and offered several membership types and practices (Table 2 & Supporting Information). We interviewed representatives of 8 CofPs (>50% of the cases identified) with a range of ages, membership sizes, and practice modalities. We did not find any CofPs that focused explicitly on forests and livelihoods with the goal of bringing together researchers, practitioners, and policy makers. Rather, the identified CofPs were broadly concerned with increasing information flow, member capacity, and collaboration between relevant stakeholders in their domain (Supporting Information). Hour-long, semistructured phone interviews focused on how and by whom the CofP was conceived and initiated; its main goals, structure, and engagement practices; and lessons



**Figure 1.** Simplified diagram of a community of practice (CofP) system at a single point in time (green circles, relationships and feedback loops between people, programs, projects, and forests; red arrows, flow of inputs [people, ideas] and outputs [tangible products such as new groups, ideas, and pilot projects or initiatives]). Numbers indicate different types of transformation that occur: 1, discussions within the CofP space (physical or virtual); 2, extended collaborations or projects that take on their own identity; 3, changes in individuals' work in their respective disciplines; and 4, forming new CofPs on sub- or different topics. All activities and relationships are concurrently functioning and interdependent.

learned (Supporting Information). Questions focused on CofP core features identified in the literature and how they interacted with one another, thereby applying the systems lens to the interviews. We took detailed notes and made audio recordings of interviews so that qualitative content analysis could be conducted (Miles et al. 2013). We obtained permission from each interviewee to present the CofP name, relevant information, and interview quotes. Individual respondents are referred to as R1 (respondent 1), R2, etc. (R1–R8).

All interviewed CofPs had an advisory or steering committee, administrative support, and a system for admitting members, ranging from an expertise-based application process to a sign-up process in which membership was granted universally. Beyond these components, our interviews supported, built on, and added nuance to the core features identified in the literature (purpose, leadership, identity, and engagement) and suggested that shared vision, cocreation, forethought and flexibility, sustained

communication, and above all, trust, are vital to CofP success.

### Purpose

Any CofP has an explicit primary purpose often delineated in a mission statement or charter. However, like all sociocultural systems, CofPs have multiple purposes. Members join for secondary purposes such as social networking, professional status, individual learning, or even entertainment. Managing the systemic interdependencies of a CofP's purposes is the prerogative of leaders and members through ongoing and adaptive dialogue and practice. From a systems perspective, we found that purpose is defined by a combination of founding or charismatic leadership and emerging leaders. Together, leaders encourage the development and evolution of a cocreated purpose and identity.

Community of practice leaders have 3 vital roles: cast a compelling vision that others will follow, organize and guide the community toward productive collaboration and member-directed adaptation, and emerge to address new systems challenges. Charismatic (or founding) leaders manage dominant members and encourage wide participation from diverse and periphery members by “giving voice to different and often unheard perspectives” (McLure Wasko & Faraj 2000:104). These systems conveners create “lasting change across social and institutional systems . . . through partnerships that exploit mutual learning needs, possible synergies . . . and common goals across traditional boundaries” (Wenger-Trayner & Wenger-Trayner 2015b:99-100).

Before her CofP was formed, R1 recounted there was no space for people to discuss biodiversity conservation and poverty alleviation. She described how her manager “knew [and approached] several people working [on these issues] who were already networked.” Respondent 1’s manager recognized a gap, envisioned a solution, and filled it. This is critical role for a CofP leader, but it is also just a first step. Respondent 2 advised, “[Do not] think that you need a very clear plan at the beginning . . . I needed the first year to strategize.” This initial brainstorming is a key to creating a CofP that engages people, welcomes new leaders, and collectively builds shared identity and purpose. From a systems perspective, this illustrates how leaders, identity, and purpose are intertwined. All respondents indicated that starting a CofP takes vision, charisma, and the confidence to act outside the norm—characteristics of systems conveners (Wenger-Trayner & Wenger-Trayner 2015b). Results of our interviews and the literature indicate that good CofP leaders inherently recognize CofPs as systems (i.e., they are a collection of parts that must all work together without being centrally controlled).

As a CofP develops, new leaders emerge, producing a unique culture with its own shared language, narratives, and icons. Creating a shared identity can fulfill people’s desire to seek greater meaning and engagement in their work. As members invest in practice, accountability develops and identity deepens (Wenger-Trayner & Wenger-Trayner 2015a). Founding leaders (systems conveners) influence identity and facilitate emergent leadership by allowing members to “make the endeavor their own – part of who they are and what they want to do” (Wenger-Trayner & Wenger-Trayner 2015b:106).

Although people want to “know that there is a real person actively working on the CofP” (R3), from the outset, leaders must “give the sense that it’s not about one person” (R4). Put another way, “[The CofP] needs to be cocreated with the network. It is a large chicken and egg exercise. You need leadership, but you also need to be listening for a response” (R2). Two examples illustrate how leadership can emerge based on topical interests. One CofP developed country-specific groups to better

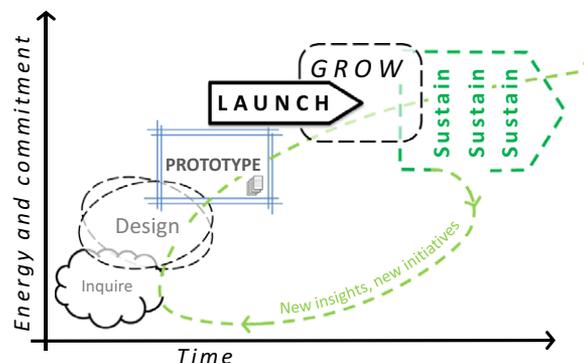


Figure 2. The diachronic view of a community of practice showing the iterative phases of development that transpire over time.

address contextual issues (R1), whereas another experienced a surge in member engagement when a key hot topic was brought into collective discussion (R2). Further illustrating the evolution of a CofP as a system of interacting parts, R3 suggested that although the topics in a given CofP are not necessarily unique, the relationships between members, fostered by shared practices, are.

Like any social system, CofPs are constantly adapting as leaders, both founding and emergent, assess the CofP’s purpose and structure and members’ interests over the course of the system’s development and operation (Fig. 2) (Wenger et al. 2002; Gharajedaghi 2011). Individual engagement resembles a “revolving door” (R4), with fluctuations depending on members’ career stage and interests. Several respondents described undertaking formal evaluations of their CofP, but self-reflection can begin from the outset. Respondent 5 said her CofP, only in its second year, was already thinking about going “beyond the academic realm . . . to really start to influence the on-the-ground stuff. That’s the ultimate objective, and that will take a lot more time.”

### Opportunities for and Sustenance of Engagement

Beyond pragmatic rationale, people participate in CofPs because they find them socially and professionally rewarding. Engagement activities fall into 4 interconnected categories: developing relationships and building trust; learning and expanding skillsets; producing collaborative, tangible results; and cocreating knowledge based on shared innovation and experiences (Fig. 1) (Cambridge et al. 2005). These interdependent processes create new knowledge, language, meaning, and leadership that simultaneously feed back into the system and are thereby among its most important outputs.

Like all sociocultural systems, CofPs rely on personal relationships and trust. They are developed through sustained interaction and shared practices (Francisco 2010); thus, they are “difficult to build but easy to destroy”

Table 2. Summary of the interviewed communities of practice (CoP).

<i>CoP (respondent code)</i>	<i>Size</i>	<i>Geographic reach</i>	<i>Regional focus</i>	<i>Membership process</i>	<i>Practice</i>
Poverty Conservation Learning Group (PCLG) (R1)	>600 individuals; >100 organizations	global	global, Uganda, Democratic Republic of Congo, Cameroon	email request for individuals; online membership form for organization	website (event listings; organization and initiative database; bibliographic database; news blogs; discussion of papers, research reports, meeting reports; outputs from work of national PCLG groups); general and thematic mailing lists; monthly newsletters; learning events; presence on social media (Facebook and LinkedIn)
Sustainable Use and Livelihoods Specialist Group (joint initiative of SSC and CEESP) (SULI) (R2)	300+ individuals	global	global	application required—admission by chair on basis of expertise; may be personally invited	development of activities and products to generate, mobilize, and synthesize knowledge and to influence policy and practice, including development of guidelines, briefing papers, workshops, and symposia and actively engaging in policy and decision-making arenas at national, regional, and global level. Members engaged through quarterly email newsletter, document circulation, email thread discussions; soliciting calls for expertise to review documents; topical working groups; occasional meetings added on to other larger meetings or conferences
FRAMEWeb (R3)	3000+ individuals	global	Strong Africa focus	membership request via online form; password sign in for website	news; events; online community discussion; community-built library (documents, presentations, videos, and webinars); blog; email newsletter
World Bank Group, Collaboration for Development (R4)	7000 registered and 1000 active users	global	global	password sign in for website; World Bank Group staff direct access; external member email registration	online social collaboration platform

*Continued*

Table 2. Continued.

<i>CoP (respondent code)</i>	<i>Size</i>	<i>Geographic reach</i>	<i>Regional focus</i>	<i>Membership process</i>	<i>Practice</i>
<b>People and Reforestation in the Tropics: a Network for Education, Research and Synthesis (PARTNERS) (R5)</b>	250+ individuals	global	global tropics	online membership form; password sign in for website	synthetic interdisciplinary working groups involving researchers, NGOs, and practitioners; production of scholarly articles based on synthesis group activities; development of education modules and associated games and activities; production of policy briefs; networking opportunities for research and training; interactive workshops; website to disseminate information and news; Facebook and Twitter feed
<b>Climate Knowledge Brokers (CKB) (R6)</b>	250+ individuals; 150+ organizations	global		contact administrator at coordination hub, complete online form; but no one turned away for workshops	small email groups; email newsletter, webinars, publications, and LinkedIn group; annual workshops
<b>Forestry Adaptation CoP (FACOP) (R7)</b>	300+ individuals	national	Canada	email request; password sign in for website	news articles; events; online discussion forums; e-newsletters; webinars (and archived recordings); case studies; photos; links; library (resources on impacts and adaptation, best practices, adaptation plans and frameworks, planning and decision support tools, data, statistics, etc.)
<b>ICRAF, Capacity Development Unit (R8)</b>	50 individuals	global	global	nominated by internal unit	email discussions; face-to-face events; no virtual events; online learning resources

(Loss et al. 2007:26). Face-to-face interactions allow opportunity for real-time, frank discussion, create community energy, creativity, and interpersonal linkages (Paas & Parry 2012), and enable new leadership to emerge. They encourage members to have a stake in the community; provide opportunities to brainstorm research questions and novel ways to answer them; discuss methodological gaps and weaknesses; and develop funding, research, and on-the-ground collaborations. Information and communication technology (e.g., online forums, webinars, and listservs) can bridge geographic boundaries to support collaboration between individuals who may not otherwise interact face to face if the technology is easy to use and appropriately customized (World Bank 2012). However, without complementary face-to-face engagement, technology can prove counterproductive and may undermine social engagement and constrain learning, craftsmanship, and innovation (Cambridge et al. 2005; Francisco 2010).

Interviews brought to light a nuanced view of creating and sustaining member engagement. Face-to-face interactions, continuous financial support, and regular communications are keys to building trust between members, enabling them to share and communicate freely.

Respondents described the value of recruiting widely: “You can get a long way by connecting with other communities” (R3). One CofP has never turned (tense change) away interested participants because “attendance demonstrates dedication” (R6). In all interviewed CofPs, active members were a small minority (around 10%) but were the key to success: “You must engage people who are enthusiastic and have time. Expertise is important, but enthusiasm and time are critical” (R5). To seek new members, R5 said,

Cast as broad of net as you can, even if it means reaching out to people who you think are on the fringe . . . Err on the side of being inclusive. . . You do occasionally get people who . . . are really not as interested in some of the central questions, but they will often bring some perspectives and experiences that are very valuable.

Our respondents described a need to be flexible and attentive to the needs of the members considering inevitable changes in membership, leadership, and practice—a key feature of a sustainable system and what R2 described as adaptive management that builds a CofP’s identity as a trustworthy leader in the domain. Over time, “People come to know your name. The more people talk about it and it becomes familiar, then they’ll trust the information you send out” (R7).

Respondents emphasized that the value of face-to-face interactions cannot be underestimated: “If you do not meet face-to-face, you do not really connect” (R8). In-person meetings increase productivity and are key to member engagement because “bringing people together often leads to collaboration beyond the meeting” (R1).

But meetings also require intentional structure and coordination: “Everything is done interactively . . . [In a CofP you have] an enormous amount of expertise . . . You have to design exercises that keep people engaged the entire time” (R6). Ultimately, R6 said, “there is no substitute for human facilitation.”

Several respondents lamented that over time procuring and sustaining funding for face-to-face meetings was a challenge (R1 and R3). Most CofPs relied heavily on some form of online communication to sustain membership. With minimal funding, CofPs implement creative ways of personalizing online engagement. For example, webinars are popular and produce membership surges (R7). When an online platform is user friendly and regularly provides “fresh content” (R3), members engage; however, “People are hopeless with information technology. They want easy communication involving something they already use” (R2). Still, having face-to-face engagement opportunities, particularly in the early stages of CofP development, can contribute to building a trusted identity in the long term. Although funds have diminished for in-person meetings, explained R1, the CofP “has been active for a very long time [and has] achieved momentum and reputation . . . people know each other when they [are able to] go to meetings.”

To sustain member engagement, CofPs need administrative support to complement strong leadership. Our respondents warned against underestimating how time-consuming administrative and communication tasks can be: “It takes a huge amount of effort to build the engagement momentum” (R1). Indeed, “You can’t just throw people in a room and expect magic to happen. The real work comes once people have gone home” (R5). Keeping people engaged and connected requires a “ringleader, someone who can encourage members to participate and is known to the community as the dedicated facilitator” (R7). Respondent 2 bemoaned, “We could be doing so much if we had a full-time admin and communications person,” and R5 stressed that although incredibly valuable, temporary staff, like postdocs, “won’t last. . . that energy doesn’t last.”

### Fostering Trust and Commitment

Respondents noted that the specialized spaces that researchers, practitioners, and policy makers normally occupy do not provide regular opportunities for sharing information and unlocking synthetic understanding. A CofP offers a space for sharing perspectives, experiences, and passion. With emergent leadership, engagement opportunities, and processes for community identity development, trust among members will deepen over time. Regarding trust within her CofP, R5 said:

That’s one of the achievements of a community of practice or a network like this. There’s a sense of partnership,

camaraderie, collegiality, [and] collective goals. The success of any one group feeds back into everyone's portfolio because it's enriching the field and creating this excitement and space for new ideas. We're all reaping the benefits of that.

Trust can unlock tacit knowledge and produces deeper understanding that can mutually reinforce (or challenge) member experiences. Productivity and interaction “rely on a relatively high degree of trust between one another and of one another's intentions” (R6). Trust also enables people to prioritize long-term work beyond the immediate meeting or workshop:

You can enter this space that the community creates and throw off all your junk and just be a kid again . . . It's ok to be naïve, because everyone's learning; it's ok to push yourself outside your comfort zone. You get to learn everyone's personality... and they learn who is very critical and who you can count on for really hard comments; who just reads things and gives a stamp of approval. All of us are beginning to see more clearly where there are big gaps between disciplines and where certain kinds of research are just not being done.

Respondent 5's vivid description of how trust leads to frank discussion that ultimately pushes the domain forward is an apt illustration of the successful design and execution of a CofP.

### Investing in Collaboration for Conservation and Livelihood Outcomes

Conserving forests while supporting local livelihoods around the globe is critical and can be better understood through a systems lens that acknowledges diverse stakeholders, perspectives, and systems. We have described the need for better understanding of the interdependencies between forest and livelihood systems, including more consistent terminology, better quality of data, and an improved ability to interpret both knowledge and data so that it can be integrated into real-world policy and practice. We argued that within this domain, a CofP is a socio-cultural system that can help build relationships, create and share knowledge and tools, support charismatic and emergent leadership, and achieve on-the-ground impacts for both forests and livelihoods. We described real CofPs in terms of their structure, purpose, engagement efforts, and sustainability. The challenge that follows is for stakeholders in the forests and livelihoods domain to create, join, sustain, or reshape CofPs to harness their unique potential to bring people together and advance collective goals in the domain.

Using a systems-thinking perspective to highlight the systemic interdependencies of a CofP's purpose, identity,

leadership, and engagement is an important contribution of our work. Although leaders need to understand the individual parts of a CofP, the real value is often produced by the intangible relationships between these parts and the resulting structure and identity that define its emergent properties (i.e., the way in which members come to trust and rely on a CofP (as described by R7) and the unique opportunity to explore new ideas collectively and unabashedly (as described by R5). Communities of practice evolve through iterative processes and are constantly reshaped as members and leaders face new challenges and insights.

Our interview results illustrate how well-designed CofPs bring together all the key features (common purpose, effective and diverse leadership, face-to-face engagement, and collective identity) to produce desired outcomes. We learned that forethought and structure is critical but not more than flexibility and integration of member motivation and interests. Perhaps not surprising, we found that sustained funding support is a challenge and that thinking about how a CofP will overcome this challenge is wise. Although online engagement is one adaptation strategy, all agree that nothing replaces face-to-face engagement. Practically speaking, this means that joining or starting a CofP will be full of unknowns and risks. A CofP requires time, money, leadership, and, if working well, may—or perhaps even should—provoke uncomfortable conversations that challenge the assumptions and habits of its members. But a CofP can also harness the best of human potential, drawing on personal and collective experience to cocreate innovative solutions to on-the-ground problems.

These insights can be used to enhance the formation and effectiveness of a new CofP on forests and livelihoods as well as strengthen existing networks that may not yet be designed or fully operate as CofPs. They can also be applied broadly to other natural resource and conservation domains. Indeed, all conservation problems are inherently interdisciplinary cross-sectoral and systems based (e.g., global fisheries, invasive species management, and climate change), as is evidenced by the ever-increasing demand for research that integrates science, policy, and on-the-ground practice. The power of a CofP is to produce new knowledge, relationships, and leaders in a systems context that parallels the domain and challenges institutional jurisdictions and hierarchies. For stakeholders in the forests and livelihoods domain, we believe we have provided evidence and rationale for the utility of a CofP and guidance and excitement for joining or building one.

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## Supporting Information

Our exploratory CofP survey and additional sampling strategy details (S1); descriptions and webpages of each interviewed community of practice (S2); and interview questions (S3) are available online. The authors are solely responsible for the content and functionality of these materials. Queries (other than absence of material) should be directed to the corresponding author.

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