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Decision Support

Multi-level participation in integrative, systemic planning: The case of climate adaptation in Ghana

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ABSTRACT

Adaptation to climate change is impacted by a range of interrelated processes operating from local to global levels. There are often significant disconnects between different people's perceptions of responsibilities, capabilities and motivations, and divergent understandings of how the system works across actors, sectors and levels of governance. This results in misalignments of policies and practices, plus ineffective flows of resources and knowledge across the network of climate adaptation actors. As these disconnects are rooted in deep misunderstandings of the grounded realities of different actors, an experiential process of mutual discovery is required to build shared understanding and mutual respect. While it is common in the literature for people to talk about multi-level governance, most existing planning processes involve the production of separate plans at each individual level, based on the often-mistaken assumption that they will aggregate into an effective multi-level approach. This paper presents a new, multi-level integrated planning and implementation (MIPI) process, bringing together diverse actors from community, district, regional and national levels in the same workshop. The MIPI process creates a safe space that allows participants to interact directly in conducting systemic, cross-level analyses, as well as the multi-level integration of policies, plans and programs. The paper describes how the MIPI process was designed and facilitated in Ghana to address climate change, agricultural development and food security. This methodology has potential for much broader applicability to complex, multi-level planning and implementation processes.

1. Introduction

Adaptation to climate change is facilitated and hindered by a range of interrelated processes operating from local to global levels (Buizer et al., 2011; Cash et al., 2006; Gibson et al., 2000; Kok & Veldkamp, 2011; Vervoort et al., 2012). The scale and complexity of the climate challenge exceeds the capacity of any single actor to respond (Ferraro et al., 2015; Lazarus, 2009). The entire experience of climate change adaptation varies according to the perspectives of different actors involved, depending on where they are positioned within the system. There are often significant disconnects between different people's perceptions of responsibilities, capabilities and motivations, and there are divergent understandings of how the system works across actors, levels and sectors. This results in misalignments of policy and practice, ineffective flows of knowledge and resources across the network of climate adaptation actors, and ultimately it breeds mistrust

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that inhibits learning beyond the level at which any given actor is working.

There is a growing body of literature on multi-level or multi-scale policy and decision-aiding processes, and there is a need for the integration of policies, plans and programs across levels (Gupta, 2014; Termeer et al., 2010; van Lieshout et al., 2012). However, in practice, most current processes involve working separately at multiple levels, so there is 'horizontal' integration at each individual level, but little 'vertical' integration across them. Information is then passed between levels in multiple, separate engagements in an attempt to compensate for the initial lack of vertical integration (d'Aquino & Bah 2013; Vervoort et al., 2014). Cross-level analyses to contribute to this information provision are usually undertaken by researchers or consultants in 'expert' mode, and these analyses are fed back to various actor groups, who are generally passive recipients rather than active participants, so may not buy into the findings. While expert-driven or non-participative operational research (OR) has been subject to extensive critique for decades (e.g., Ackoff, 1979a, 1979b; Checkland, 1981; Churchman, 1979; De Geus, 1994; Espejo & Harnden 1989; Flood, 1995; Hoos, 1972; Lee, 1973; Rosenhead, 1989; Rosenhead & Mingers 2001; Sterman, 1994; Vennix, 1996), this is an example of how it can creep into apparently-participatory processes.

What is missing here is the deployment of participatory problem structuring methods with the explicit purpose of facilitating stakeholders in working together to co-create multi-level integration. All problem structuring methods (e.g., those represented in Rosenhead & Mingers, 2001) are participative, and therefore of potential utility for tackling multi-level issues, but none have been specifically designed for the purpose of multi-level integration.

Of course, single-level processes can be useful on occasion - particularly targeted processes for fleshing out the details of policies, plans and programmes at a given level of governance once the strategic or operational role of that level within the bigger picture has been determined (Sandström & Rova 2010; Schipper et al., 2014; Stein et al., 2011; Vignola et al., 2013). Also, *some* degree of cross-level coherence can be achieved through multiple pathways of influence and information flow. However, there is a limit to the effectiveness of these pathways for overcoming the disconnects mentioned earlier, especially when people have very different experiences, perceive each other stereotypically, find trust difficult, and do not have the means to develop a systemic understanding of how governance processes at multiple levels need to interact. It is the disconnects between different people's understandings that lead to misalignments in knowledge transfers, policies and practices. As these disconnects are rooted in deep misunderstandings of the grounded realities of different actors, experiential processes of discovery are required to build shared understandings, mutual respect and overcome blame cultures. In such cases, where possible, in order to be consistent with the participative theory and practice of problem structuring (Franco, 2006; Mingers & Rosenhead 2004; Rosenhead, 1992, 1996; Rosenhead & Mingers 2001; Smith & Shaw 2019), Community OR (e.g., Johnson, 2012; Midgley & Ochoa-Arias 2004; Midgley et al., 2018; Ritchie et al., 1994; White, 2018) and systemic intervention (e.g., Boyd et al., 2004; Midgley, 2000, 2006, 2015, 2018, 2023; Midgley & Rajagopalan 2021), the *stakeholders themselves* should assess the disconnects and misalignments in the system from their own perspectives, and suggest appropriate actions to remedy the situation (Helfgott, 2008, 2018). In cases where this is not advisable, perhaps because coercion or marginalization would compromise genuine participation, other interventions may be needed prior to or alongside this kind of participatory working to change the context that holds obstructions to open communication in place (e.g., Midgley, 1997).

To the best of our knowledge, the intervention reported in this paper represents the first published example of an integrated, multi-level, problem-structuring process bringing together a diverse suite of actors from community, district, regional and national levels in the same workshop, with the explicit purpose of allowing participants to interact directly in conducting systemic, cross-level analyses, which would be critical to enable the multi-level integration of policies, plans and programs. This process is henceforth referred to as Multi-level Integrated Planning and Implementation, or MIPI for short. The paper presents key principles and considerations for the design and implementation of MIPI processes, and is illustrated through an application in Ghana. While the paper focuses on just one country context, this case is typical of many complex social and environmental change situations around the globe. We suggest that the MIPI methodology that we have developed, applied and tested in Ghana has broad potential applicability to other complex, multi-level planning and implementation processes.

2. Background of the Ghana case

The MIPI process in Ghana was carried out within a broader Systemic Integrated Adaptation (SIA) research program (Helfgott et al., 2014). SIA was a Community OR initiative, based in Nepal and Ghana, focused on improving adaptive capacity and increasing food security and livelihoods of small-holder farming communities in the face of climate change. Ghana is ranked highly vulnerable to climate change, and is subject to increasingly-variable rains, floods and droughts that threaten livelihoods and food security (Maple Croft 2011; McSweeney et al., 2010).

The Upper West Region of Ghana is considered to have the lowest adaptive capacity to climate change and the highest level of food insecurity in the country. This is because of weak socio-economic development, reliance on rain-fed agriculture and already-adverse environmental and climactic conditions, which make food security and the maintenance of adequate livelihoods particularly difficult (Antwi-Agyei et al., 2012). The entire Northern region of Ghana experiences only one rainy season (while Southern parts of Ghana have two), which impacts production. The Upper East region is comparatively more developed than the West. The majority of farmers in the Upper West only have recourse to their own manual labour, which significantly impacts productivity. Accordingly, the Upper West was chosen as the region for the SIA research program.

Lawra District was chosen as the focal district within the region due to its manifest disadvantages, using the same criteria. Within Lawra District, villages were selected based on need and on the willingness of communities to be involved in the program. The primary focal village is called Orbili. Fig. 1 shows the administrative structure spread across the local (village), Lawra district, Upper West Region, Northern Ghana and national levels. The regional headquarters for the North of Ghana is located in Tamale. The regional headquarters for the Upper West is located in Wa. Lawra town, within the Lawra District, houses the district headquarters of relevant agencies.

Orbili has a population of 156 adults from 58 households. The community is ethnically and linguistically homogeneous, and all residents are smallholder farmers. No farms are sufficiently productive to avoid food shortages during the long dry season, when their grain stores become empty. In many ways, Orbili is typical of villages in the region, although its proximity to the river and to Lawra give it some advantages.

Official development initiatives in Orbili are coordinated by the district assembly in Lawra, the lowest unit of elected administrative governance in Ghana, supported by the traditional governance system guaranteed by the country's constitution. The chief

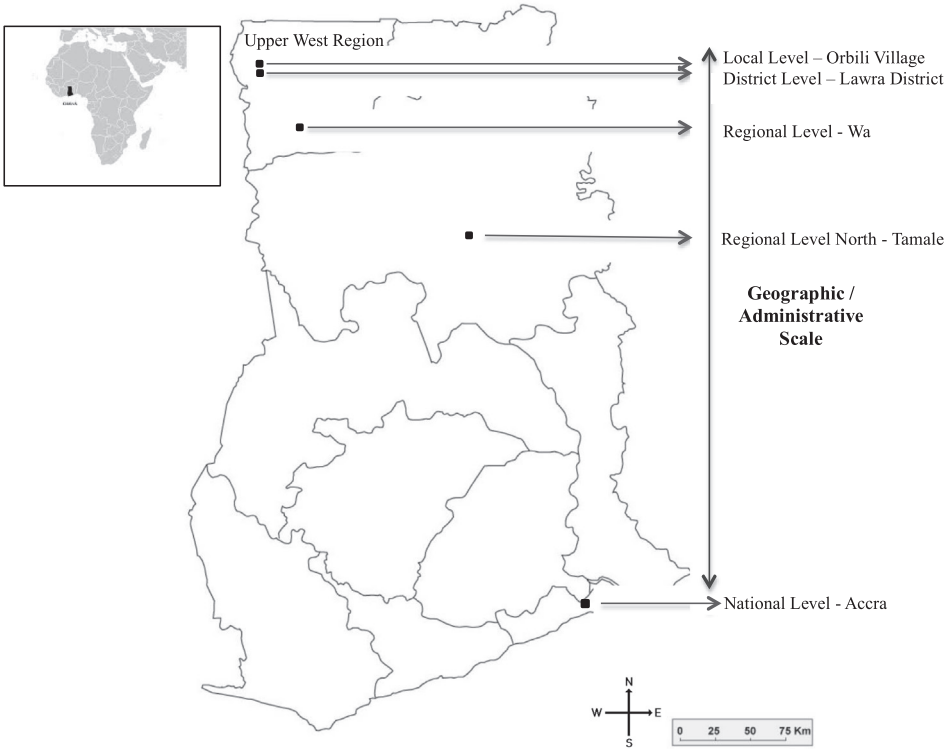


Fig. 1. Map of Ghana showing the geographical locations of governance levels.
Source: www.mapsoftheworld.com and author compilation

of the village serves as both the head of the community and as the spiritual leader under the traditional governance system, which operates in parallel with the government. A District Chief Executive (DCE), appointed by the President and approved by the Assembly, is responsible for administering development funding and pursuing priorities identified by the Assembly. As such, the local government system is a form of partnership between government actors, the chiefs and their people. There are, however, significant political, administrative and coordination challenges in Orbili (and surrounding communities). The DCE is a central appointment, whereas the chief is non-political, which often results in a lack of engagement between the two. Isolation of the Upper West districts deters central monitoring, which reduces Ghana's efforts at fiscal and administrative decentralisation. This has produced significant delays in allocating funds to those working in the region, and it has also increased politicisation of the allocation. However, despite these challenges, the above official and traditional decision makers remain key actors, from whom the local communities can access development and adaptation resources.

There are significant geographical separations associated with each of the governance levels engaged with in this research. These separations contribute to the disconnects in 'worlds' (Vervoort et al., 2015) and worldviews of actors in different locations. Travel to the Upper West Region from Accra, the capital city, is quite limited and can potentially take days. There is one direct night bus from Accra to Wa, which takes 12 hours (for those who can afford it), and the journey is an uncomfortable ordeal. While it is possible to fly from Accra to Tamale, the low quality of East-West roads in Ghana makes travel to Wa, Lawra and beyond extremely difficult. Actors in each location have detailed knowledge of the part of the system local to them, and often large misconceptions about what is happening elsewhere.

The results of the SIA program in Ghana, which itself included extensive participatory OR interventions within each governance level (from community to national), revealed large amounts of knowledge and capacity for action embedded within all the levels, even going down to individual households. However, there were challenges in integrating governance, policy, planning and implementation across levels. This highlighted the need for a multi-level process.

The published literature recognises that good collaborations are important for climate adaptation (Bodin & Crona 2009; Cassidy & Barnes 2012; Folke et al., 2005; Newman & Dale 2005), but there is little information on suitable frameworks and methods for coordinating roles across time and space, and across multiple levels of socio-political organisation. Much recent work on adaptation has either been at broad policy and governance levels (Sandström & Rova 2010; Stein et al., 2011; Vignola et al., 2013) or at stand-alone, local-community levels (Schipper et al., 2014), but it seldom integrates across levels. Even when the relevant actors and actions are identified, organising necessary communications and co-ordinating actions between them across multiple levels and sectors is difficult (Hajer & Wagenaar 2003; Hill & Engle 2013). Physically bringing together, in the same space, all of the actors assumed to be involved in everything from the formulation of national policies down to on-the-ground implementation rarely happens, let alone sweeping in a wider set of stakeholders in addition to those formally participating in governance and implementation (for instance, Burns, 2018, Ulrich, 1983, and Gregory et al., 2020, recommend including those who are affected but not involved). Not surprisingly, given the rarity of co-located, multi-level participation, there is also a lack of practical guidance on how to structure and facilitate processes to achieve useful results from it.

Accordingly, the SIA team designed a process to bring together around 60 actors from the community, district, sub-regional, regional, national and supra-national levels. These people were working across the food, agriculture, environment, climate, health, education, economics and finance sectors. They were in government, non-governmental organisations, private sector companies, academic institutions and civil society groups. A strengths-based

approach was adopted in designing the process: i.e., ensuring that everything to be done built on what already existed in order to avoid undermining current capacities and capabilities (Cooperrider & Whitney 2005; Foster & Mathie 2001). This involved working with both formal and informal decision-making and governance systems; identifying and capitalising on embedded knowledge; and being driven by local values and aspirations. The invitation of participants was based on thorough actor- and power-mapping exercises (Sova et al., 2016), mappings of relevant organisations and institutions (Chaudhury et al., 2016) and social network analyses (Chaudhury et al., 2017) carried out by the SIA team over the previous year.

A multi-level, integrated exploration and planning process of this magnitude had not happened before in Ghana. There were a number of unique challenges due to the geographical remoteness of the sets of actors from one another; different tribal languages across the country; large differences in wealth and power, and associated issues of symbolic violence; and large differences between people's perceptions of challenges, capacities and responsibilities. The Ghana MIPI process was designed and implemented to address these issues. The lessons we learned from designing and implementing the MIPI, which are communicated in this paper, address real difficulties in the implementation of participatory processes and in the theory and practice of multi-level governance.

The primary goals of the MIPI process in Ghana were articulated as:

(1) Building empathy between people through their immersion in the grounded realities faced by the different actors. The delegates had to understand that different actors inhabit different 'worlds' and therefore bring different values, perspectives, beliefs and emphases to the governance of climate change. Only through this realisation would they overcome misunderstandings and associated blame games being played by actors across levels.
(2) Creating a shared language and understanding of the system, which would include an enhanced appreciation of the structures of knowledge and resource distribution related to food, agriculture and climate adaptation.
(3) Facilitating the identification of key bottlenecks, disconnects, opportunities and challenges.
(4) Creating a shared vision and coherent multi-level policies, plans and actions.
(5) Building a sense of all people being able to do something.
(6) Clarifying and agreeing roles and responsibilities.
(7) Generating a desire for continued multi-level engagements – the delegates needed to understand why improved coordination and coherence is desirable, and be motivated to continue to work towards it in a manner that could go beyond dialogue to support implementation.

The collective work of the SIA program identified four major areas for improved coordination of policy, plans, programmes and actions that could strongly underpin the adaptive capacity of small-holder farmers to climate change. These were agricultural knowledge management and extension; land and water management; markets and finance; and basic health and education. The range of these areas highlighted the need to bring together actors from across food and agriculture, health, education, climate change, economic development and finance, operating across all levels from local to national within the MIPI process.

3. An overview of the MIPI process

MIPI draws its theoretical foundations and design principles from systemic intervention (Boyd et al., 2004; Midgley, 2000, 2006, 2015, 2018, 2023; Midgley & Rajagopalan 2021), problem structuring (e.g., Franco, 2006; Mingers & Rosenhead 2004; Rosenhead, 1992, 1996; Rosenhead & Mingers 2001; Smith & Shaw 2019); Community OR (e.g., Johnson, 2012; Johnson et al., 2018; Midgley & Ochoa-Arias 2004; Midgley et al., 2018; Ritchie et al., 1994; White, 2018), OR for environmental management, which is sometimes called 'green OR' (e.g., Bloemhof-Ruwaard et al., 1995; Midgley & Reynolds, 2001, 2002, 2004a, 2004b; Revelle, 2000), integrated natural resource management (Hagmann et al., 2002) and asset-based community development (Foster & Mathie 2001). The key attributes of MIPI can be summarised as:

- Process-based OR using problem structuring methods, in which ownership of the process sits with local actors.
- The application of systems thinking, as used in the Community OR and systemic intervention research communities, with emphases on learning-process approaches that allow exploration of the system from within, employing principles of boundary critique (e.g., Churchman, 1970; Foote et al., 2007; Helfgott, 2018; Midgley & Pinzón 2011; Midgley et al., 1998; Ulrich, 1983), theoretical pluralism (Midgley, 2011) and methodological pluralism (e.g., Gregory, 1992, 1996a, 1996b; Jackson, 1991, 2003, 2019; Midgley, 1992, 1996, 2001; Mingers & Gill 1997).
- Pluralism in facilitation: in the modes of representation employed, in the tools and methods employed, in the lenses of analysis, and in the stakeholders and beneficiaries of the process (White & Taket, 1994, 1997).
- Seeing the process as an intervention (Midgley, 2000): an action-learning process aimed to support the participants in gaining a more systemic and strategic perspective, as well as building improved interpersonal relationships and plans for moving forwards.
- Identifying and building on what exists (Cooperrider & Whitney 2005; Foster & Mathie 2001): working with existing strengths, through existing social and organisation structures, knowledge, expertise and resources in-country, rather than focusing on what is missing, gaps, weaknesses and external knowledge and resources (Helfgott, 2008).

A visual overview, summarising the stages of the MIPI process, is provided in Fig. 2. The process first involves immersion of participants from different levels in each other's 'worlds', in order to develop understanding, empathy and trust. This allows participants to become fully human to one another, which provides the basis for overcoming misunderstandings and blame. This takes time, but is the foundation for everything else that follows. Thus, in the Ghana process, an entire day was dedicated to achieving it through facilitated, direct, one-to-one interactions, multi-level story circles (Callahan & Schenk 2006; Mikkelsen, 1995) and rich pictures (Checkland & Poulter 2006) of each level.

In the second stage, the rich pictures from each level are used as the basis for cross-level co-analyses conducted together by participants. Cross-level co-analyses allow participants to identify misalignments, bottlenecks in policy and practice, and in the flow of knowledge and resources between actors across levels. This facilitates the creation of a common narrative about what is going on (also see Sydelko et al., 2021, for a different process with a similar purpose), and it provides a grounding for the next stage of co-designing potential changes.

The third stage is co-design of multi-level integrated plans for achieving the alignment of policies, plans, programmes and actions across levels and actors. This creates a clear vision for each actor of their part in the greater whole, as well as the linkages required to obtain necessary support.

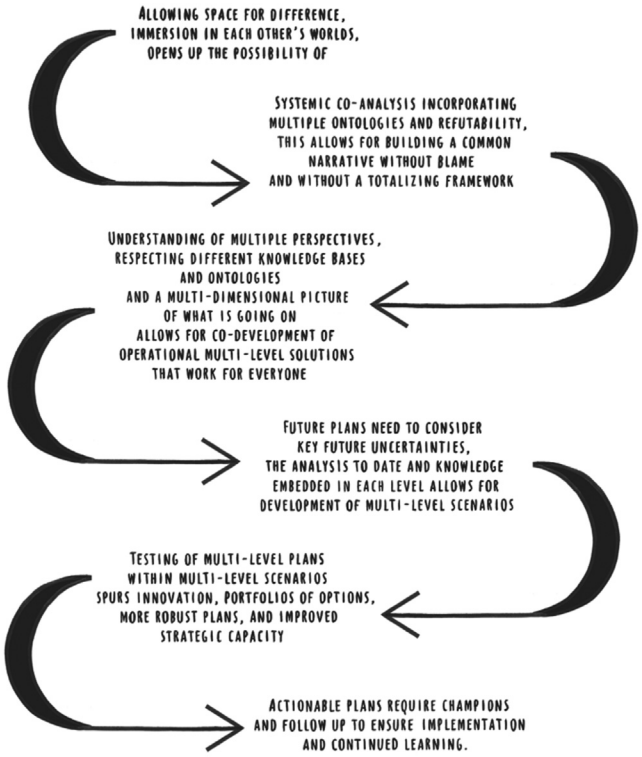


Fig. 2. Overview of the MIPI process.

In the fourth stage of the MIPI process, multi-level exploratory scenarios, incorporating the system knowledge embedded in each level, are developed to enable the systematic identification of uncertainties that could affect multi-level plans.

In the fifth stage, scenario testing of the multi-level plans generates a portfolio of diverse, innovative options, including the identification of the options that are most robust across the range of uncertainties considered (Ramirez et al., 2008).

The sixth stage in the process involves the finalisation of multi-level policies, plans and actions, plus the development of follow-up and implementation protocols, as well as the assignment of champions and responsible actors.

4. Creation of a safe space

Creation of a safe space is a golden thread that runs throughout the entire process, and it is relevant to every phase. Creation of a safe space for all participants involves addressing issues of symbolic power and violence, exposure to risk and recrimination, accessibility of activities, modes of representation, pluralism, diversity, respect for difference and the mode of facilitation. Each of these is dealt with in the subsections below.

Creation of a safe space is necessary for meaningful dialogues and participation (Anderson et al., 2004; Bohm, 1996; Buber, 1958; Cronin et al., 2014; Franco, 2006; Gergen et al., 2001; Midgley, 1997; Midgley & Pinzón 2011; Tannen, 1998). It is essential if we want people to open up and share their experiences, perceptions and knowledge. It is a major determinant of the quality and effectiveness of participatory processes and the outputs they generate (Richards et al., 2007), and is a primary concern in multi-level integrated processes where there are potentially-problematic power relations. Safe spaces are of paramount importance when there are high stakes for participants, tensions and/or the issues being dealt with are sensitive.

4.1. Symbolic power, symbolic violence and exposure to risk and recrimination

A primary goal of the MIPI process is to overcome misunderstandings and a tendency to blame actors at other levels for the situation. Achieving this requires the development of empathy and trust, and the capacity to listen to one another and be immersed in each other's worlds. It is important to meet human to human for this. Effective listening cannot be achieved through the indirect transfer of information between levels without contact between human beings. However, it requires more than just being in the same room. In order to lay the foundations for developing empathy and understanding and overcoming mistrust and blame, people need to become fully human to one another, rather than seeing them as a stereotype, a 'generalised other' or a representative of a (potentially antagonistic) abstracted group, ideology or organisation. This is about seeking respect for the personhood of each human being, as inspired by existentialism (Sartre, 2007) and a recognition of the value of other human lives, regardless of the differences between people (Freire, 1970; Roeser & Pesch 2015).

However, direct human to human interaction is challenging where issues of power and symbolic violence exist, which is the case in most multi-level processes. In the case of the Ghana MIPI process, issues of symbolic power and violence included dress: all the national-level policymakers dealing with climate adaptation were male, and we knew they would be likely to wear suits. In contrast, village-level participants would wear traditional dress, and they would probably pool their resources to buy a roll of fabric from which a larger group could all make clothing. Similarly, national-level people would most likely bring in laptops, mobile phones and other electronic devices not accessible to village-level participants. Further, some participants had formal titles while others did not. In order to tackle these issues, a dress code was set for the workshop of traditional attire for all participants; electronic devices were excluded from the workshop space (which also assisted participation in other ways); and badges were made to show first names only, without titles.

The issue of creating a safe space is not only about protecting participants at lower administrative levels from subjugation by higher levels, but also of enabling higher-level decision makers to be open about difficult realities, limitations, gaps or failings without fear or recrimination, and the risk of negative consequences for themselves or their organisations. It needs to be safe for higher levels to admit ignorance, weakness or failure to lower levels, in order for participants to work together to uncover systemic issues and support each other to find operational solutions without blame (Kelsey, 2017). In the Ghana project, this was achieved through trust-building and empathy-generating activities for the entire first day, with processes of immersion that included becoming fully human to one another. Supportive ground rules for interaction (including addressing what it is legitimate to talk about outside of the workshop context) and careful, skilled facilitation were vital.

Language barriers are an issue for equal participation in multi-level dialogues in Ghana. Participants coming from different parts of Ghana have different tribal languages. The pre-workshop interview process used to support the workshop design revealed, perhaps surprisingly, that English was the most common language, preferred by the great majority of participants to any particular tribal language or Pidgin. Nevertheless, there remained a small number of participants who were not able to speak English, such as some of the small-holder farmers from the Lawra District. Their first language was Dagaari, which was unfortunately not shared by many of the other participants. An individual translator/scribe was therefore personally assigned to each community member who required it in order to participate in a process in which English was the nearest thing people had to a common language. Prior to the

workshop, the facilitators made it clear that care would be taken to provide the time for translation and the full participation of non-English speakers. Ideally, the MIPI process should be carried out in the local language wherever possible, but in the case of Ghana, compromise on this couldn't be avoided.

4.2. Pluralism, diversity and respect for difference

An important component of creating a safe space is a refusal to use positivist and neo-positivist approaches, which can involve participants' individual and shared meaning-creation being labeled 'right' or 'wrong'. The participatory movement in the social sciences emerged from critiques of 'normal science ontology' (Chambers, 1997; Funtowicz & Ravetz 1994; Rolling, 1996), and a similar critique has been mounted in the OR literature (e.g., Ackoff, 1979a; Checkland, 1985; Churchman, 1979; Ulrich, 1987). It is arguably the case that, in designing many policy and planning processes, ways to escape positivism and neo-positivism have not been sufficiently explored (Gardner & Lewis, 1996; Sellamna, 1999). Letting participants feed their own empirical knowledge into a framework provided by scientists does not really involve a shift from neo-positivism (d'Aquino & Bah, 2013), but rather aims to 'reconcile' scientific frameworks and local knowledge by making the former dominant in the process and ensuring the latter is only included if it does not contradict or seek to overthrow that dominance (Meppem & Gill 1998; Smajgl, 2010). This is similar to early approaches to risk communication, which assumed that an objective picture of a given risk could be provided by scientists, and then the job of a dialogue forum was to convince non-scientists to agree with what the scientists were saying (Fischoff, 1998; Leiss, 1996; Morgan et al., 2002). This is doubly problematic because it not only assumes that scientists are the guardians of facts while lay participants make value judgements (and in neo-positivist approaches, facts trump values), but it hides the value judgements made by scientists (Cronin et al., 2014; Irwin & Wynne 1996; Wynne, 2000).

Escape from neo-positivism requires acknowledgement that there is not just one legitimate way to understand the world or to seek and organise knowledge (Bradbury, 2015; Checkland, 1981; Churchman, 1979; Maturana & Varela 1992; Rosenhead & Mingers 2001). It requires a profound pluralism in relation to many things: stakeholders, beneficiaries and who counts as an 'expert'; the modes of representation employed and their accessibility to participants; the adaptation of methods for the situation at hand; and philosophies and techniques of facilitation (White & Taket 1997).

The refusal to impose a totalising paradigm implies Gregory's (1992, 1996a, 1996b) notion of *discordant pluralism*. Discordant pluralism acknowledges that, often, different theoretical perspectives clash or contradict one another, and cannot be resolved into a single overarching theory or be forced into a meta-framework without distortion and loss of nuanced information that is contained in each perspective. Each perspective should be appreciated for what it is or what it can offer (as far as possible, given that there is no neutral standpoint for any practitioner to observe from), and tensions between perspectives are not a problem – they are keys to deeper understanding (Gregory, 1996a, 1996b). Accordingly, continued discussion and communication between people with different perspectives is encouraged throughout the entire MIPI process. Participants are allowed to contest claims made by others based on their own experience (not just 'the facts'), but with the aim of coming to a deeper understanding than would be achievable by either a win/lose argument or mere acknowledgement of difference that doesn't involve further engagement: i.e., differences of perspective are welcomed, but as a spur to learning for all parties (Gregory & Romm, 2001). Following Gregory (1996a, 1996b), this approach also accepts the local, contingent and historically-situated nature of any consensual understanding of the plurality that people might develop, so it resists or reinterprets the imposition of supposedly-universal meta-theories.

Matthews (2004) argues that "discord is perhaps the most fundamental characteristic of 'true' pluralism; a pluralism devoid of any totalizing attempt to reduce or control the diversity of viewpoints offered". The MIPI framework requires practitioners and participants alike to adopt the practice of the "critical appreciation of alien paradigms" (Gregory, 1992) when working with the diverse stakeholders and experts in the process, and when seeking to understand and manage issues that cross levels, sectors and social worlds. The methodology is based on acceptance of the notion that the knowledge generated by different actors across levels, sectors and social worlds is sometimes discordant or conflicting, and we can achieve greater insight by improving dialogue. 'Greater insight' does not necessarily imply consensus: as Checkland and Scholes (1990) argue, in the absence of consensus (which is generally an unrealistic expectation in situations where diverse stakeholders with different perspectives are collaborating), insights in the form of better mutual understanding and accommodations enabling action are very often still possible.

4.2.1. Pluralism in the nature of stakeholders, beneficiaries and 'experts'

Pluralism is advanced by acknowledging and respecting the views of a wide range of stakeholders, beneficiaries and 'experts' in the intervention (White & Taket 1997). The presence of different views of the problem, or system(s) of interest, may require the practitioner to work with several rationalities simultaneously. Different stakeholders have different appreciative systems (Vickers, 1965), informed by different boundary judgments, purposes and values (Churchman, 1970; Córdoba & Midgley, 2003, 2006; Foote et al., 2007; Foote et al., 2021; Midgley, 2016; Midgley & Pinzón 2013; Midgley et al., 1998; Ufua et al., 2018; Ulrich, 1983).

Multi-level integrated planning and implementation requires a suite of actors from community to national level. The MIPI process involves the broadest possible diversity of actors involved in and affected by a focal topic, ranging from local community to national and supra-national levels. Importantly, actors whose input is necessary to achieving an effective outcome, who have an important critical perspective, or who may traditionally have been excluded (for instance, because of administrative silos or because certain stakeholders are regarded as 'profane') need to be explicitly considered for inclusion, and they should only be denied entry to the room if there is a really strong justification (e.g., see Midgley et al., 1998, and Sydelko et al., 2021, for discussions of exclusion dilemmas).

4.2.2. Pluralism through the accessibility of activities, methods and modes of representation

An important consideration in the design of the MIPI process was ensuring that the activities and modes of representation employed were equally accessible to all the participants. These activities and modes of representation had to be engaging, salient and credible to participants ranging from illiterate and innumerate farmers to national level policy makers familiar with qualitative and quantitative strategic planning and OR methods.

Chambers (2002) discusses techniques that do not require the participants to read and write, and that can be empowering when used with people who would otherwise be marginalized from the process. White and Taket (1997) suggest that practitioners need to develop modes of representation *in partnership* with participants. This involves the practitioner being open to interrogation by all categories of participant, so that 'ownership' of the justification and decision-making processes comes to be genuinely shared. Each of the following activities meets this requirement: story circles;

rich pictures; the identification and discussion of issues and the representation of links across those rich pictures; the verbal suggestion by illiterate participants of potential ways to address issues (written down by scribes paired one-to-one with those who needed their help); the imagining and description of scenario narratives; the testing of plans in each scenario; and the assignation of responsibility for actions. Pluralism in modes of representation can be advanced by disputing uncritical assumptions about objectivity suggested by certain types of representation (see Gelman and Hennig, 2017, for a discussion of why objectivity can be an unhelpful concept when discussing statistics).

4.2.3. Pluralism through the nature of facilitation

The MIPI process requires a style of facilitation that "aims to break down stereotypes of the "expert", the "professional" and reduce the perceived distance between practitioner and client" (White & Taket 1994). For any participatory planning or analysis, pluralism in the facilitation process is advanced by a strategic reduction in the expert's authority. The MIPI process adopts the model of the facilitator as "a post-modern expert", who "would be more of an interpreter, and would recognize any project of interpretation as something that must be carried out collaboratively" (White & Taket 1997). Following White and Taket, we subvert the traditional understanding of a practitioner as holding the privileged position of 'expert'. They state, "It is a mistake to accept the expert as having the final word as to the meaning of the client's problems". Highly-skilled facilitators take care to ensure that their own ontologies (understandings of the world) do not shape their credulity towards different perspectives, and they monitor their own interventions in dialogues between participants to ensure that those interventions enable the *process* of creating emergent models and decisions rather than inform their content. Thus, the participants are the experts in what they are discussing, not the facilitator (Checkland, 1981; Gregory & Romm 2001). This mode of facilitation requires a great deal of skill, personal awareness, emotional responsibility and accountability, which is a different form of expertise. Incompetent facilitation could have a major impact on the quality of the process, even with all of the design considerations that have been embedded in our methodological description in this paper. Many participatory processes produce less than participatory results when facilitation is carried out by low-skilled researchers who believe that 'anyone can run a workshop'.

4.3. Allowing enough time

A key dimension of achieving all of the components involved in creating a safe space is to allow enough time for participants to build trust, engage emotionally and develop the confidence that they can collectively handle conflicts and complexities. According to Richards et al. (2007), "Past experience shows that any [participatory] method can potentially exacerbate conflict if handled insensitively. The collapse of a process is often attributed to not allowing enough time… the iterative and potentially open-ended nature of a process requires sufficient time and support until a natural end-point is reached".

5. Immersion in each other's 'worlds': sharing multiple ontologies, experiences and knowledge bases

Immersion in each other's 'worlds' is the first, formal stage of the MIPI process. It is well established in the literature that decision-support systems have to do more than merely process knowledge: the knowledge needs to be organised according to the "perception framework" (Campbell & Masser 1995; Hisschemoller et al., 2001) or "appreciative system" (Vickers, 1965) of decision makers. Vickers argues that our human experience develops within us a propensity to notice particular aspects of our situation, to categorise them in particular ways, and to measure them against particular standards, norms or values. Thus, we have an 'appreciative system' to enable selective attention and judgment, and of course this implies the inevitability of blind spots and partialities (e.g., Simon 1955; Churchman, 1970; Midgley & Pinzón, 2011; Lilley et al., 2022; Ulrich, 1983). It is the "appreciative system which creates for all of us, individually and socially, our appreciated world" (Checkland, 1981). In a multi-level context, since the actors involved have very different daily experiences, they quite literally inhabit different 'worlds'[1], and accordingly they have different, potentially-irreconcilable perceptual frameworks or appreciative systems. The challenge is to allow space for difference, for pluralism, while negotiating collective, operational solutions.

Participants do not only bring different scientific and empirical knowledge bases with them into collaborations, even though this is one of the more commonly-cited reasons for bringing multiple stakeholders together (Gibbons et al., 1994). They also have very different explanations of what is actually going on; different perceptions of relationships, power and individual/group behaviours; different values concerning what is 'good', 'bad', 'important' and 'irrelevant'; and different perspectives on who is responsible for issues and/or is capable of doing something about them. All of these differences will affect a group's capacity to make decisions in order to achieve multi-level integration and coherent action. As d'Aquino and Bah (2013) put it, "this diversity of perceptions masks a range of possible ontologies, even paradigms about how we view the world, especially the world we have to manage while producing decisions". Within the MIPI process, the participants not only share different knowledges, but different ontologies too. Many participatory interventions collapse, are ineffective or are perceived as unsatisfactory by participants because their facilitators fail to acknowledge and question the different ontologies and moral frameworks that people bring in, including the facilitator's own (Arce, 1995; Barnaud et al., 2011; Midgley & Pinzón 2013; Pinzón Salcedo, 2002; Sellamna, 1999).

Accordingly, the first stage of the MIPI process is to make this explicit, allow participants to share different ontologies, experiences and knowledge; to immerse participants in each other's 'worlds', and thereby provide the basis for subsequent activities of joint, cross-level, systemic analyses and the development of operational solutions without the imposition of a totalising framework. In Ghana, this phase comprised the entire first day of the process, and was achieved through stories, rich pictures and rotating, pairwise, cross-level, interpersonal interactions.[2] This enabled a first step towards building mutual understanding, respect and overcoming extant feelings of resentment or blame across levels – for example, for not providing necessary support, or for not implementing actions desired by people at another level.

In the case of the MIPI process in Ghana, as mentioned previously, there were significant geographical disconnects associated with each of the levels, as well as differences in languages; moral and aesthetic assumptions; wealth and lifestyles; and access to education, infrastructure and markets. All these factors exacerbated the disconnects between the 'worlds' and worldviews of the actors in the different locations.

The process began with a rotating, one-to-one meeting, so each participant met every other one on an individual basis. During the

[1] In our project, the 'world' of a community member in a village in the Upper West of Ghana could hardly have been more different to the 'world' of a national policymaker in Accra.

[2] The SIA team conducted the same exercises amongst themselves in a separate, externally-facilitated workshop, prior to the Ghana process, to make their own ontologies explicit and transparent.

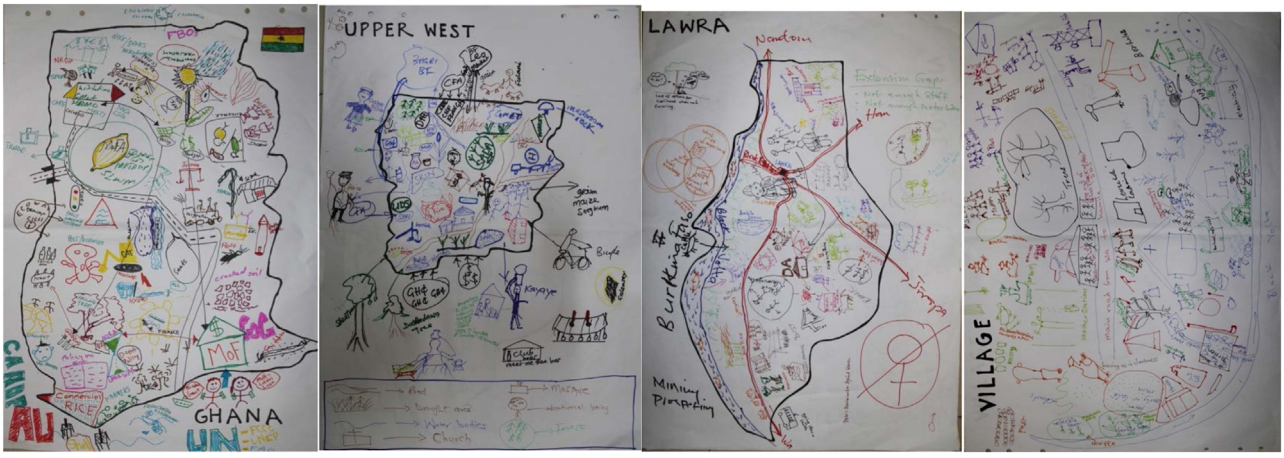


Fig. 3. Rich pictures of each level: The national level is on the far left; regional is left-middle; district is right-middle; and the village level is at the far right.

rotations, participants were facilitated to share their personal interests and histories.

Story circles were then conducted in groups containing representatives from each level, and each sector within each level. Prior to the story circles, the participants were primed with concepts drawn from Gregory's (1996a, 1996b) theory of discordant pluralism. The facilitators explained that

> "every time one person listens to another whose thinking is based in another paradigm, he or she can only interpret what they are saying through his or her own terms of reference. ... Care is needed not to be either dismissive or to think that full understanding has been achieved. If care is taken to appreciate the other, in the knowledge that full understanding in the other's own terms is impossible, then one's own learning ... can be enhanced" (Midgley, 2000).

Gregory (1996a, 1996b) calls this process "a critical appreciation of alien paradigms", and suggests that it helps shift the emphasis of interaction from knowing to learning, and creates more space for openness and preparedness to listen to alternative positions.

Participants each shared a set of stories describing their greatest challenges; their greatest sources of hope, inspiration and opportunity; the achievement they have been most proud of; and a time they felt most disappointed. The telling of these stories represented the first stage in immersing actors from each level in the worlds of the actors from other levels. Appendix A, in the online supplementary material, provides some excerpts from the story circles, highlighting the different daily realities faced by actors at different levels.

The next stage of the immersion phase was the generation of rich pictures of each level, and the cross-level sharing of these rich pictures, together with their associated narratives. Actors from each level, from community to national, produced a rich picture of their own situations. They were facilitated to think of the main features of their situations in terms of physical, social, cultural, environmental, political and any other dimensions that sprung to mind. They were asked to consider aspects they liked and disliked, to include themselves, to include emotions, and to include as much nuanced information as they could. The participants were free to structure (or not structure) their rich pictures as they saw fit. We did not impose rules in this regard.

The rich pictures constructed by the within-level groups revealed enormous differences in the worlds inhabited at each level. Fig. 3 illustrates that each level contains different sets of elements, and they are structured in different ways. The narratives told by each group to explain their rich pictures also reveal different ontologies, experiences and knowledge bases. For example, the national and regional rich pictures contained symbols representing microfinance schemes, which simply did not appear at the district and village levels. During cross-level sharing, the participants from the national and regional levels were surprised, if not shocked, to observe this. The village and district-level participants responded, "they are not part of our lives". The rich pictures highlighted very different ideas about what was going on, and what opportunities and mechanisms existed to gain access to knowledge and resources. This provided the basis for extensive discussion during the sharing phase of the activity.

The rich pictures helped participants across the levels to "recognize difference and work with it (difference as generator of multiple possibilities, acting to increase choice rather than constraining it) but work non-hierarchically" (White & Taket 1997). Each representation was presented and described, and they were all accepted as the experiences of those participants. No ontology was given preference, and each was acknowledged as containing nuanced information about different experiences of the situation, which were all relevant for multi-level integration. Clear, non-judgemental acknowledgement of different experiential 'worlds' is an important part of the creation of a safe space for participants to share their experiences, perspectives and knowledge. This also allows participants to refute claims that might have been made about them based on ignorance, stereotyping or prejudice, without the risk of being labelled inferior, uneducated, stupid or malicious – each group simply represented what their level meant to them, to the best of their ability.

The activities on the first day were extremely revealing of the different worlds inhabited by the different actors, the differences in what each 'has to work with', and the opportunities and challenges each confronts. Their expressed experiences undermined what might previously have been assumed by others. The initial speed-meeting gave each participant an opportunity to have a one-on-one, face-to-face encounter with everybody else and, following on from this, the story circles allowed people to really get to know each other in more depth as human beings, so that by the time the rich pictures were drawn and presented by each group to the rest, they were real and alive to the other participants.

6. Multi-level integrated systemic analysis

The second phase of the MIPI process is multi-level integrated systemic analysis. This involves multi-level groups of participants mapping out how policies, plans and interventions interact and

are implemented across levels, and how knowledge and resources flow. The rich pictures from the previous phase are very useful here. A composite rich picture is constructed by placing the rich pictures from each level end to end from village to national level. The composite diagram provides the basis for exploring systemic flows between levels. Participants work together in multi-level groups to mark out cross-level linkages on the composite diagrams. During the construction of the linkage diagrams, participants are given different colours of pen to represent different types of linkage.

As the rich pictures represent the different ontologies created by the actors at each level, the linkage analysis process embodies discordant pluralism. In the Ghana project, it became evident how knowledge and resources created at one level, based on a given set of assumptions about the social reality, were interpreted and acted upon (or not) at other levels, based on very different ontological assumptions. The participants naturally engaged in the discussion of what was going on at each level with respect to cross-level interactions, based on their experiences and perspectives. This involved dialogical boundary critique (Midgley, 2016; Midgley & Pinzón 2011; Sydelko et al., 2021; Ulrich, 1983), as participants discussed what was and wasn't represented in the rich pictures of each level, and why they had made particular assumptions, at least up until this exercise.

This is an effective way of addressing the methodological difficulty of managing conflicting worldviews. Multiple worldviews are preserved in the rich pictures of each level; actors from each level are not forced to conform to any hierarchically-enforced ontology; and system boundaries, system elements and interdependencies between them are kept in transparent and refutable form. Engagement between worldviews relies on dialogues between people with different perspectives, experiences and forms of knowledge. Accordingly, achieving a balance between worldviews is not the job of the facilitator or given in a model, but is primarily the responsibility of participants. Thus, the methodological process serves to put knowledge from the actors from the different levels in a refutable mode, which several authors (d'Aquino & Bah, 2013; Kuhn, 1970) have argued is the best way to achieve constructive deliberation. This methodological paradigm is 'post-normal', as it replaces the right/wrong binary (which risks putting people in dialogue into an attacking and/or defensive dynamic) with conversation about whether things are refutable or non-refutable (Funtowicz & Ravetz 1994). For further thoughts on the role of refutation (and falsification) in OR, see Ormerod (2009).

Linkages are categorised in different ways: links that exist and are functioning well, those that officially exist but are not functioning well, and links that are missing and need to exist if multi-level integration is to be effective. This categorisation is important from the perspective of a strengths-based approach, since it is necessary to ensure that the subsequent solutions developed by participants 'build on what exists'. Also, existing functional linkages need to be respected and worked with, not undermined.

In the Ghana MIPI process, the participants worked together within four thematic groups, corresponding to the factors that strongly underpinned the adaptive capacity of small-holder farmers to climate change, identified through earlier SIA participatory processes: (1) agricultural knowledge management and extension; (2) land and water management; (3) markets and finance; and (4) basic health and education. The composite rich picture was reproduced four times to allow each group to work across levels.

During the construction of the linkage diagrams – in which a green line represented a functional link, a red line a non-functional link, and a blue line a missing link – some groups of participants requested another colour of pen to show *links that exist, which officially shouldn't be there*. These were mostly examples of corruption, including leakage of government supplies of fertiliser to Burkina Faso for cash. The highlighting of corruption was a very interesting development, and the process was adapted accordingly.

In all the themes, the flow of knowledge was largely unidirectional, going from the national down to the community level. Significant knowledge was embedded in each level without mechanisms for multi-directional sharing. In all the themes, the flow of resources was also unidirectional, going from the national level in the direction of the village, but with very limited resources making it through, and visible bottlenecks along the way. For example, the deficit in extension services and resources for extension workers at district and village levels represented a major bottleneck in the flow of knowledge from the national level to farmers. We provide the results of the agricultural knowledge management and extension theme as an illustrative example. Fig. 4 shows the linkage analysis diagram and a tabular summary of the linkages. Similar analyses were conducted within each of the themes. A list of acronyms and their meanings is provided in Appendix B, in the supplementary online material.

The linkage diagrams from all the themes provide an extremely powerful visualisation of the significant knowledge and financial resources that flow from the national level, and how an increasingly constricted flow passes through established actor groups down to district level, in many cases never reaching the target communities. Building on this insight, Chaudhury et al. (2016) provide a detailed analysis of the development and structure of meta-organisations involved in climate adaptation in Ghana. Based on the linkage diagrams, detailed discussions between the participants on the nature of feedbacks, bottlenecks, disconnects, misalignments, opportunities and challenges (as shown in Fig. 5) were stimulated.

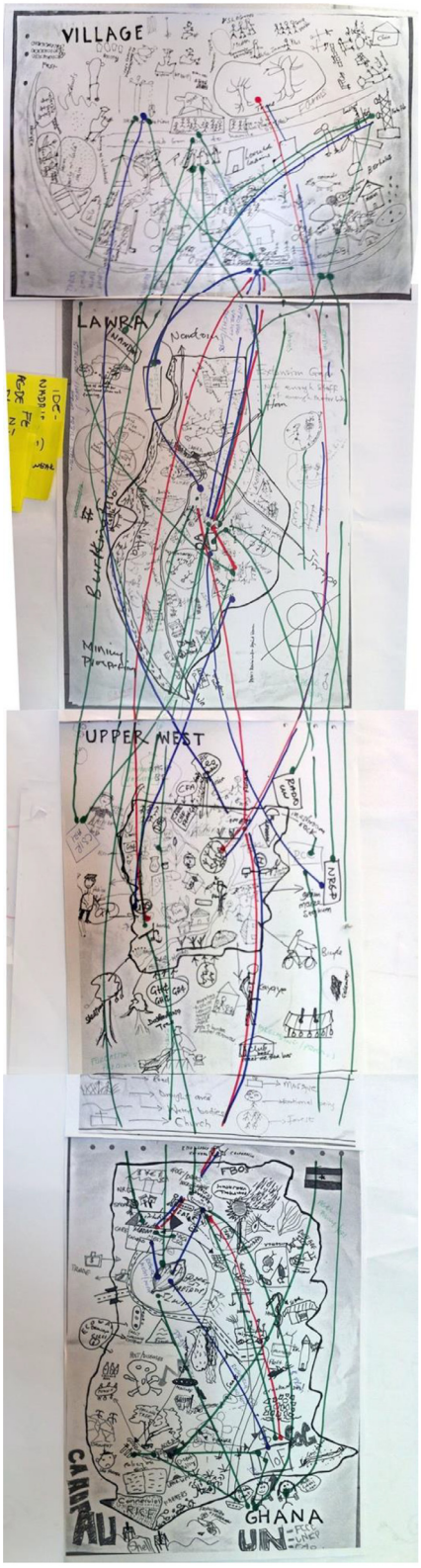
7. Multi-level, integrated co-design

The goal of the MIPI process is to work towards the multi-level integration of policies, plans and interventions, and facilitate the flow of knowledge and resources to achieve desired outcomes in relation to the focal topic. Thus, the third phase is a process of *co-design* or *co-creation* (e.g., Bammer, 2018; Metz & Bartley 2015; Metz et al., 2019; Nicholas et al., 2019; Voorberg et al., 2015) of operational solutions to the issues identified in the linkage analysis. As previously mentioned, a strengths-based approach is taken here, seeking to enhance existing links and create new ones that improve the effectiveness of existing activities. The co-design is conducted within the same thematic groups as were formed in the previous phase.

In Ghana, for each of the missing, non-functional or superfluous links identified in the previous phase, participants proposed, discussed and agreed upon appropriate solutions. For each solution, participants were then asked, "what would need to be in place at all of the other levels in order for this to work? What other support is required?" Corresponding actions at each level were compiled and developed into multi-level plans.

In the case of the agricultural knowledge management and extension theme in the Ghana MIPI process, the goal was to produce a comprehensive agricultural extension policy and accompanying legislative instrument, and an agricultural information management system (AIMS) to close the gap between the needs of local farmers and the then-current support provided by the government. The AIMS would disseminate information on appropriate adaptation strategies and technologies into the formal and informal education programs, with knowledge flowing in both directions between the community and national levels.

Participants examined the challenges facing extension services, including knowledge gaps, a shortage of extension staff, lack of resources, funding shortages and lack of coordination among the



Functional Existing Links (green in the rich pictures)

- Donors to NDPC to the GSGDA II medium term plan.
- The NDPC to the MoF for the funding of GSGDA plans.
- Donors to CSIR, research funding through projects.
- MoF to CSIR for payment of wages.
- NDPC to the RCC for preparation of medium-term plans, including agricultural extensions activities.
- Donors to MoFA for projects.
- The SARI secretariat in Accra and the head office in Tamale for coordination and administration.
- MoFA Accra to the MoFA region on extension policy and practices, and MoFA region to Department of Agriculture.
- GMET to NGOs in Lawra District for collection and utilization of weather information.
- NRGP to community for dry season vegetable gardening.
- Radio Upper West to Lawra for forecasting and market information.
- NANDOM radio to Lawra community.
- Seed inputs from Lawra agrovets to Orbili.
- Orbili weather station data to CSIR - the problem here is that GMET doesn't receive the data, only CSIR that funded it.
- UDS and other University research to community levels.

Non-functional Existing Links (red in the rich pictures)

- GMET national to region for data collection and coordination.
- SADA to the community, 'all the trees have died'.
- SARI to the Babili demonstration station.
- NRGP to the DA for coordination purposes and plan integration.
- GMET regional to national office.
- MoFA and CSIR for purchase of foundation seed and improved varieties, and CSIR with Ghana's grain board for the supply of foundation seed.
- CSIR-ARI small-ruminants program and the Oribili community.
- Extension provision from Department of Agric in the community (only 4/20 extension agents provided).
- Wa NGOs (very few) and Community for the plugging of the extension gap.
- Orbili weather station data to GMET regional office.

Non-existent Links (blue in the rich pictures)

- SARI to community for feedback on technology transfer and uptake.
- MoF to CSIR for sustained research budget.
- GMET Regional office to NGOs at the district level.
- The DA and the Babili agricultural demonstration station.
- West Link 88.3 radio station and Lawra community.

Fig. 4. Agricultural knowledge management and extension: linkage analysis results.

Fig. 5. Detailed analysis of multi-level feedbacks, disconnects, misalignments, challenges and opportunities.

various actors. As one head of an NGO pointed out, "whatever new technology has been discovered, it needs to be communicated to the farmer. Capacity building for program officers and technical and agricultural extension officers is key, and that is where the bulk of the funding should be going" (personal communication, 2013). Similarly, an extension officer attributed low extension support to a shortage of funds, saying that "as an extension worker, you get frustrated... because you do not have the resources for your plans. So, when you see the farmer, you start avoiding him" (participant statement during workshop, 2013). Some said formal extension service staff were so resource constrained that they had to rely on the help of NGOs in order to offer services.

The AIMS project envisioned an improved agricultural extension system backed by funding to overcome the current knowledge and support gap. A pluralistic model was planned to allow service provision by both government and the private sector, including non-traditional and e-extension services to meet immediate challenges, while maintaining long-term support by extension provision. Regional government actors were identified as ideal bridges between national and local actors to improve collaboration, knowledge transfer and offer support to farmers across the country. The community also suggested ways it could better organise itself to receive such extension services and adopt new techniques, enhancing traditional practices. These ways to better organise included capacity development through training of local-level extension volunteers, with a focus on female extension workers. Knowledge and information transfer enable the exchange of traditional and expert ideas between local communities and external actors, and this addresses climate risks and encourages suitable adaptive practices.

A post-workshop actor-network analysis based on these results demonstrated that participants did not need to identify any new actors for these interventions, highlighting the benefits of a strengths-based approach: leveraging existing networks is more useful than unnecessarily introducing new actors and their accompanying bureaucracies (Chaudhury et al., 2017), and it is empowering because the fate of the network is visibly in the hands of its members rather than being dependent on the mobilisation of resources from a third party. The study revealed that, by creating only a few new links (just 5% of the total number already in existence), a more strongly-connected network with clearer pathways emerged (Chaudhury et al., 2017). For example, connecting the Ghana Meteorological Agency (GMET) to the local NGOs allowed the community to become informed about changing local weather patterns and the selection of suitable crops, rather than relying on direct communication with limited individual extension staff.

8. Multi-level scenario development, testing and planning

The multi-level action plans developed within each theme inevitably rely on assumptions about the future context. This includes assumptions about which drivers are most important, what kinds of actors will play which roles, the conditions in which linkages will be formed and maintained, and which actions will work and why. It is important to surface and test these assumptions, and determine which elements of the plans are robust under a range of future uncertainties, and what kinds of innovations will be necessary in different plausible future contexts in order to achieve the goals that the participants have defined in the MIPI process.

This is achieved through the participatory development of diverse, plausible, alternative-future scenarios (Van Notten, 2003; Wilkinson & Eidinow 2008). Scenarios allow for the continued critique of system boundaries (Gregory et al., 2020; Helfgott, 2018), in that they involve systematic consideration of factors that might have been left out, and/or a re-examination of the future roles of factors that are perceived to be important now or in the past. Scenarios can also help critique the linking of system elements, the actors who exist and the structure of the way they relate to each other (Wilkinson & Eidinow 2008). Importantly for the MIPI process, scenarios can be used to capture the uncertainties that could affect the success or failure of policies, plans and interventions (Vervoort et al., 2014).

Within the Ghana MIPI, a novel, multi-level scenario-development process was enacted, building on the CCAFS Regional Scenarios for the future of food security, environments and livelihoods in West Africa (Palazzo et al., 2014, 2016), which resulted from an intensive, multi-year, multi-actor development process. These scenarios effectively capture many key uncertainties affecting the region, including climate change, political stability, governance priorities, and various aspects of socio-economic and land use development.

The goal was to test each multi-level plan within each scenario, and through this process, flesh out previously un-thought-of details, plus generate innovations in the context of each scenario. To do this, participants were split up and re-divided into

scenario teams, rather than remaining in their planning groups, to ensure that the expertise across the themes and plans was well spread across all the scenarios. The participants first listed the key uncertainties that they could see would affect the success or failure of their own multi-level plans, and runners co-ordinated these lists of uncertainties between groups. Participants were then given textual and graphical representations of West African scenarios from the CCAFS Regional Scenarios for the future of food security. A process of immersion, reflection, discussion and reinterpretation was facilitated. The participants were then successively asked to envision what would be happening in Ghana, in the Upper West, in Lawra and in villages such as Orbili, in the context of each regional scenario. After describing what would be going on at each level and in each regional scenario, participants were facilitated to describe the implications for each of their listed key uncertainties.

This approach proved a successful and efficient way of generating relevant and challenging multi-level scenarios, building on regional contexts while offering enough space for level-specific interpretations – creating "coherent scenarios" (Zurek & Henrichs 2007) that combine flexibility with cross-level links. These scenarios were developed using a 2030 time-horizon (adapted from the CCAFS regional scenarios, which have a 2050 time-horizon). Summaries of the four multi-level future scenarios are described in Appendix C, in the online supplementary material. The titles of and basic concepts in the scenarios are:

- **Scenario 1: Civil Society to the Rescue?** A scenario where non-state actors are dominant and long-term issues have priority. Government capacities and resources are low, and civil society and private sector actors enter into both conflicts and collaborative activities, depending on the issue.
- **Scenario 2: Save Yourself.** A scenario where non-state actors are the driving force and short-term priorities dominate. Amid chaotic governance of economic growth and political instability, resources are exhausted by an opportunistic private sector while vulnerable groups are left to their own devices.
- **Scenario 3: Self-Determination.** A scenario where state actors are dominant and long-term priorities prevail. This scenario presents a long and difficult road toward resilience and sustainability at all levels.
- **Scenario 4: Cash, Control, Calories.** A scenario about short-term priorities with state actors as the dominant force. Throughout the scenario time line, pressing and politically-popular concerns are given priority over long-term investment and sustainability.

Each of the multi-level plans was tested within each of the multi-level scenarios. Participants considered each action within the multi-level plan and asked the question, 'would this work in this scenario?' Often actions did not work in multiple scenarios and, in such cases, participants generated novel alternatives to achieve their desired outcomes in the context of the scenario.

The scenario testing resulted in more detailed fleshing out of the steps of the plan, how those steps would be taken, and who would be responsible for them. Following the scenario testing, the participants returned to their plan groups with the results of the performance of their plan in each scenario, and they then conducted a cross-scenario assessment and finalised their operational plans – choosing, from the options developed, which ones would be taken forwards 'for now', and which would be retained within a portfolio of options to be drawn upon if faced with different eventualities. Because the scenarios were primarily focused on actors and modes of governance, they proved to be relatable at national, regional, district and village levels, and translating them proved relatively easy – perhaps easier than when less actor-focused drivers are used. For instance, the scenario 'Civil Society to the Rescue?' (where civil society and private-sector actors clash and collaborate over issues of food insecurity, sustainability and climate adaptation) was easily translated to a village-level scenario where different representatives of various organisations were constantly asking for the villagers' time to get involved in many disconnected projects.

9. Operational multi-level plans, roles and responsibilities, and a common narrative

The purpose of the last phase of the MIPI process is to ensure that all of the work done and insights gained throughout the workshop process are translated into action and impact. This involves review and finalisation of the operational multi-level plans, plus clarification of and commitment to roles and responsibilities for carrying out all the activities. Once the specifics have been detailed, this then provides a basis for drafting a common narrative, to be shared by all participants across levels, for achieving systemic change.

Participants conduct this phase in their thematic teams. They begin by reviewing the lists of actions agreed to be included in the current operational plan from the previous stage, and they check cross-level compatibility of all the actions. A RACI Matrix (see below for details of this acronym) is used to assign specific roles and responsibilities for each action within the multi-level plan. The RACI Matrix is a technique from organisational and management practice for ensuring that roles and responsibilities are clear in cross-functional projects (Jacka & Keller, 2009). Each row of the RACI Matrix contains a specific action. The columns identify who is **R**esponsible (who will champion the task and make sure it gets done), **A**ccountable (who has the power to approve the task), **C**onsulted (whose input is sought) and **I**nformed (who needs to be briefed). For the MIPI workshop, we relaxed the definition of 'Responsible', since not everyone required to do the work was in the workshop. Instead, we had Champions who nominated themselves to carry the work forwards, identifying those Responsible and Accountable for implementation. An example RACI matrix from our project can be found in Appendix D, in the online supplementary material.

Finally, participants draft the common narrative together. In Ghana, this common narrative represented a major breakthrough, since before the MIPI process there were major disconnects in understandings of how the system worked, and what the roles, responsibilities and capabilities of the different actors were. There was also a lot of mistrust and blame between actor groups. It is possible to achieve negotiation of a common operational narrative even in the face of very different worldviews (e.g., Ackoff, 1979b; Foote et al., 2007; Laouris & Michaelides 2018; Sydelko, 2023; Sydelko et al., 2017, 2021).

We continue here with the illustrative example of the agricultural knowledge management thematic group from the Ghana MIPI process. Recall that the overarching goal was to produce a comprehensive agricultural extension policy, an accompanying legislative instrument, and an agricultural information management system (AIMS) to close the gap between the needs of local farmers and the then-current support offered by the government. In addition, following the scenario development and testing, the participants decided to introduce climate-smart agricultural principles into the extension curriculum and programming. Specific objectives further developed through the MIPI process were to increase the proportion of female extension officers from the current 1 female to 10 males; meet or improve on the target of having 1 extension officer for every 3,000 farmers; and improve the dissemination of community-supported agriculture (CSA) practices.

The multi-level narrative for agricultural knowledge management, highlighting key actions to be taken, is provided below, using the levels as headings:[3]

9.1. National Level

Action at the national level first involves a suite of advocacy activities regarding the current extension gap and illuminating the investment losses from subsidising the training of Agric officers in Ghanaian Universities, and then failing to hire those same individuals into the extension workforce. These advocacy activities will highlight the limitations presented by the current hiring freeze and replacement policy. It is envisioned that the financing for the development of the 2014 Extension Policy will come from increasing budget allocations to the agricultural sector in order to comply with CAADP and Maputo Declaration targets of 10% of total budget investment in agriculture. It is likely that this will require empirical evidence of the current status of agricultural budgeting. The MoFA Directorate of Extension Services and PPMED will be responsible for drafting the policy document and program of action, as well as serving as the policy's principle advocates and champions. They must consult current extension-related components of the FASDEP II and METASIP document, as well as the 2002 Extension Policy. SRID (Statistics) will be consulted for the current state of extension service provision. A pluralistic model for the policy will be adopted, which allows for extension service provision by both government and non-government actors (CSOs, Private Sector), including non-traditional, e-Extension services. Commercial extension services and out-grower/nucleus farmer schemes will be evaluated and included. The Agricultural-Sector Working Group will be a key stakeholder to be consulted at the national level, given its diverse composition.

9.2. Regional (sub-national) Level

Actors at the regional level have an important role in consulting with Ghana's university system to assess the current curriculum for agricultural extension students, ensure a sustainable extension workforce in years to come, and align the existing curriculum with the new Extension Policy to ensure that CSA and other concepts are included in extension staff training. The regional agricultural monitoring and evaluation (M&E) officer will be responsible for aggregating district data regarding existing extension provision (coordinating with SRID at the national level). Finally, the Regional level will improve collaboration between GMET and e-Extension services like ESOKO to ensure that localised forecasting is available to farmers in extension zones across the country. The RPCU will be consulted throughout the development and implementation of the Extension Policy.

9.3. District Level

The district's role in the new extension policy will be heightened by fiscal and administrative decentralisation. The District Assembly will be responsible for the hiring and firing of extension staff, reducing the trend of Accra choosing the location of 'replacement' staff. National service in the area of agricultural extension will also be promoted, with national service staff hired through the District Assembly and Department of Agriculture. Regular Research/Extension Committees' (RELC) meetings will be budgeted for in the policy, allowing for greater feedback between research agencies (CSIR), extension workers and farmers. The MIS (management information systems) Officer will be responsible for providing data to the regional M&E officer, and for providing district-specific policy requirements during the policy development stage. This will include differentiating extension requirements for different farmer classifications (e.g., subsistence, commercial, export-oriented). The District Director of Agriculture will be provided a budget within the policy for greater coordination and monitoring of extension agents. That is, information regarding the geographical coverage and projects managed by a given agent, so that M&E and demonstrations can be better coordinated and duplications avoided. Mobility of extension agents will serve as a key pillar of the policy, and this will require the offer of a regular budget for fuel and motorcycle transport. District Agric officers (AEAs) will be trained and equipped with ESOKO mobile phone technology for surveys and the delivery of remote extension consultation. The DPCU will be key for consultation during the development and implementation of the Extension Policy.

9.4. Community Level

The community will be involved through processes convened by the DA in the drafting stage of the Extension Policy, so that their needs and appropriate means for reaching the community are included, and so that appropriate M&E indicators can be identified and included in the Policy Logframe to ensure accountability. Indicators like 'number of visits', which are not reflective of actual outcomes, will be replaced by more appropriate results-orientated indicators. The community will organise itself to receive extension services and promote adoption of new CSA technologies. Community-based extension workers and the Training of Trainers (ToT) will allow for more farmer-to-farmer exchanges. Additional Farmer Field Schools and demonstration centres will be a major feature of the Extension Policy. Motorcade mobile information-sharing vehicles will be marshalled in the policy. ESOKO mobile-phone technology will be provided to farmers in pilot districts, along with necessary phone top-up credit to ensure the sustained use of the e-extension resource.

Similar multi-level narratives were produced for each thematic area, but there is insufficient space to include them all here. A detailed report containing the full results is presented by Helfgott et al. (2014).

10. Implementation Stewardship

Following up with the individuals involved in the MIPI process is critically important, since events might not always pan out as the participants anticipate during the workshop. People need to be contacted to ensure that actions are indeed being taken forwards, the process hasn't stalled, and the resources and support required are available. So many participatory diagnostic and planning activities do not achieve their goals because of a lack of adequate follow-up and integration into post-workshop decision making, even if the processes themselves are excellent and the participants completely commit to actions during the workshop (Johnson et al., 2010; MacIntosh et al., 2012). This follow-up is so necessary because the roles and resources (including staff time) required to complete the actions are often new and therefore not yet fully institutionalised, and people therefore need support in handling competing priorities for their time and energy (including the prioritisation of embedding the new actions). Also, collaborating across traditional sectoral, organisational and other boundaries takes effort, and needs to be incentivised and managed.

In the case of the Ghana MIPI process, the need for the cross-level integration workshop was identified towards the end of the SIA programme as an innovation resulting from the insights gained

[3] Acronyms for institutions have not been spelled out, as they were known and meaningful to the participants in Ghana, but will be less important to international readers. We believe that the latter will be more concerned with the agreed actions.

from the collective research activities of the programme. Ideally, an integration process, such as MIPI, would be built into the programme design from the start. In this case, linkages were made with other programmes so that the required follow-up could take place. In one example, members of the CCAFS Climate Policy Platform, who participated in the workshop, were subsequently involved in the review of Ghana's National Livestock Policy, where their experience with the scenarios was extremely useful.

11. Conclusions

Multi-level integrated planning and implementation (MIPI) processes are needed to *complement* work already being done at separate system levels. This addresses a major gap in participation for multi-level, integrated governance. While some degree of cross-level coherence can be achieved through multiple, linked, individual-level processes, there is a limit to their effectiveness for overcoming the disconnects in experience, trust and systemic understanding that lead to misalignments in policy and practice, and in the flow of knowledge and resources throughout the system. It is these disconnects that breed mistrust and inhibit learning beyond single levels. As misunderstandings are rooted in the different lived experiences and different grounded realities of diverse actors, an experiential process of mutual discovery is required to build shared understanding, respect and overcome blame cultures. This is not meant to replace planning at the separate system levels, but is an important addition in order to achieve integrated, multi-level governance.

The MIPI process in Ghana proved extremely useful to this end, as demonstrated by the results of each activity described in this paper. The process identified numerous, experiential disconnects, misalignments between policies and practices, and disconnects or misalignments in the flows of knowledge and resources throughout the system. These had significant impacts on the effectiveness of resilience, adaptation and development interventions aimed to assist small-holder farming communities.

To the best of our knowledge, this paper represents the first published example of an integrated, multi-level process bringing together a diverse suite of actors in a single workshop, drawn from community, district, regional and national levels, with the explicit purpose of allowing participants to interact directly in the process of conducting systemic, cross-level analyses and the multi-level integration of policies, plans and programmes. The MIPI process creates a safe space for interaction, involves importing or designing methods that are accessible to all the participants, and attends to the significant practical and logistical considerations that accompany implementation.

The process was designed to carefully deal with a plurality of worldviews and ontologies, as well as potentially-problematic power relations and accessibility issues, in the context of a range of tensions between different actors. The curation of the space, and the provision of time and structured activities in the workshop process, allowed for people to become fully human in each other's presence, going beyond formal roles. This created empathy and built good will, which was important for all the subsequent activities.

The order of activities was also extremely important, as each one opened people's hearts and minds for the next stage of the process. The speed-meeting gave an opportunity for face to face, one-to-one encounters, while the story circles allowed people to really get to know each other as human beings. By the time the rich pictures were drawn and presented at each level, these representations were real and alive to members of other levels, particularly when explained by the participants themselves. The rich pictures allowed people to express their own ontologies rather than conform to any externally-imposed framework. Throughout the cross-level co-analyses, system boundaries, elements and interdependencies were made transparent, and discussions kept them in a refutable format. The visualisations created by the cross-level co-analyses were extremely powerful, demonstrating the largely unidirectional and ever-dwindling flow of knowledge and resources through each level, from the capital to the villages in the Upper West, so very little impact was seen on the ground.

The co-design of multi-level plans integrating the results of the cross-level co-analyses allowed for the development of operational solutions that embodied the knowledge embedded within each level. The multi-level scenario process proved successful, and was an efficient way of generating relevant and challenging multi-level scenarios, building on regional contexts while offering enough space for level-specific interpretations – this was about creating 'coherent' scenarios (Zurek & Henrichs 2007) that combine flexibility with cross-level links. Importantly, scenario testing allows for continued systemic boundary critique (Gregory et al., 2020; Helfgott, 2018) as well as dealing with uncertainties and spurring innovation in each scenario context.

During the participatory process, local actors at all levels conducted the diagnosis of issues and developed the actions required to remedy them. They then wrote shared multi-level narratives. Given the extant conditions at the starting point of the process, moving from misunderstanding (and in certain cases outright conflict) to shared multi-level narratives is an amazing outcome.

In-country replication is feasible, since this is an efficient and adaptable process. The MIPI makes a significant contribution to multi-level integration in a limited time frame (in our case 3 days). Note that this 3-day process is not meant as a stand-alone activity. Of course, not everything is solved in 3 days, and the workshop itself requires follow-up to support implementation and continued learning.

While the theory behind the approach is extensive, the activities themselves are very simple and accessible, even to individuals with low levels of formal education. The first MIPI process was externally facilitated by the SIA to show that this is indeed possible and valuable. Ideally, MIPI processes would be institutionalised alongside other participatory planning and decision-making processes, and regularly carried out by actors in-country. The motivation for the institutionalisation of such processes lies in the dramatic improvements in efficiency and effectiveness of the hard work and resources being invested at all levels, if these efforts are aligned. The MIPI process can be applied to any topic, is efficient and adaptable, and thereby contributes practically towards the goal of systemic, multi-level improvement.

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Supplementary materials

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