Ecosystem integrity and policy coherence for development

Tools aimed at achieving balance as the basis for transformative development

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> plus ça change, plus c'est la même chose (the more things change, the more they stay the same).
>
> —Jean-Baptiste Alphonse Karr

Introduction

If aliens were to look down on planet Earth and observe us, they might be led to believe that the natural state of humanity is crisis. Whether we focus on politics, economics, society or the environment, it seems that crises are perpetuated and possibly even expanded in global affairs. For example, we have recently witnessed war in places such as Afghanistan, Iraq and Syria, expanded flows of refugees and the resulting nativist fears expressed in those countries where they arrive or could potentially arrive, unprecedented global financial crises, the depletion of natural resources and our alleged contribution to deadly disasters (such as Typhoon Haiyan in 2013) through climate change. Borrowing from Jean-Baptiste Alphonse Karr's observation of 19th century French politics, we may argue that "the more things change, the more they stay the same." (http://www.histoire-en-citations.fr/citations/Karr-plus-ca-change-plus-c-est-la-meme-chose)

However, should we really argue that "crisis" represents the state of our times? While conflict certainly does exist, it is important to note that we are also witnessing unprecedented levels of international cooperation as evidenced by the consensus behind the 2000 Millennium Development Goals and the 2015 Sustainable Development Goals. These declarations are sym-

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bolically important because they have introduced the fight against poverty and the struggle for sustainable development into the global political consciousness. Nonetheless, in policy terms, their impacts have been limited. For this reason, this article contends that new paradigms and metrics should be proposed on which to base our global, national and local development debates. It proposes "balance" as a potential cornerstone for development discussions. First, this approach rejects the "North–South" paradigm often proposed in development debates. This distinction reinforces development divides instead of helping overcome them. The notion of "balance" is based on "interactive" development relationships in which policies and processes in one sphere or geographical region affect others in different spheres/regions. This approach reflects what Jens Martens of the Global Policy Forum has dubbed "universal development goals" (Martens, 2015).

Second, the notion of "balanced development" includes considerations related to the ecological, ethical and cognitive spheres of development processes. "Conservation," for example, favors ecological approaches (such as willingness to pay for ecological services), and it acknowledges the importance of preserving natural resource renewability. However, because it has often focused on the restriction of natural resource use and the maintenance of traditional economies, it also often "conserves" social marginalization as an unintended consequence. Similarly, "human development" focuses on processes aimed at reinforcing the capacity of individuals to control their own destinies without necessarily including environmental considerations.

For these reasons, this article contends that "balanced" development can be transformative in nature, meaning that it can address local problems and global inequalities simultaneously by aiming to promote equilibria within and between these systemic levels. In order to achieve this goal, the article proposes a partnership between two concepts that have been evolving for some time and now emerge as "conceptual attractors" inspired by the 2030 Sustainable Development Agenda: Ecosystem Integrity and Policy Coherence for Development. The combination of these paradigms includes both metrics aimed at balanced development strategies (the former) and policy tools aimed at "balance between policy arenas" (the latter). By combining these approaches, the analysis presented here aims to show pathways that could re-orient development policies towards measurable and achievable goals.

Ecosystem integrity: Sustainability through holistic means

How can science impact policy? One means is through the formulation and application of metrics that are used by decision-makers as the basis

for their deliberations. This has traditionally been problematic in the field of sustainable development due to the complexity of causal grids. Discussions over definitions of paradigms, such as "ecological footprints," "ecological shadows," "greenhouse development rights," and so forth, have dominated scientific and policy discussions, especially in relation to climate change, where debates have often been characterized by accusations related to the adage famously quoted by Mark Twain that "there are three kinds of lies: lies, damned lies, and statistics" (www.gutenberg.org/files/19987/19987-h/19987-h.htm). More recently (and more rationally), Nobel Prize Winners Amartya Sen, Joseph Stieglitz, and Jean-Paul Fitoussi have reminded us that "what we measure affects what we do" and more specifically "we often confuse means and ends" (2010, p. xvii).

This point is present in contemporary climate change debates. Why do we wish to address climate change? Is it to prevent global warming itself, or to mitigate the destructive impacts of global warming on human populations? The question is not simply rhetorical because it affects policy. When we discuss mainstreaming of climate change mitigation by integrating these strategies in general governance systems, then we filter a single sustainable development tool, aimed at addressing one environmental issue through policy making in other arenas. Instead, shouldn't we be prioritizing the health of ecosystems more generally by adapting other policy strategies related to development toward their protection, thus addressing climate change along with other issues, such as biodiversity, the effective use of water resources, land governance, energy, and so on?

This paradigm shift that started with the "World We Want" Campaign and continued through the announcement of the 2015 Sustainable Development Goals focuses on the relational bases of development, including access to water and sanitation, food security, biodiversity, climate change, energy and equitable relationships between world regions (sustainabledevelopment.un.org/?menu=1300). For these reasons, this article highlights the use of "ecosystem integrity" as a methodology for the measure of human impacts on the environment and the ecological consequences of development models. It is a scientific paradigm that fits the political needs of the present global development agenda focused on complex human–environmental interactions.

Unlike methodologies traditionally referenced in policy debates, such as Integrated Water Basin Management, Integrated Land Management or Climate Change Mainstreaming, ecosystem integrity is not sector specific and it does not prioritize any single issue, so it focuses on bolstering sustainable development through a holistic approach. It also differs significantly from newer interactive barometers, such as the Global Climate,

Land, Energy and Water Strategies (CLEWS) measures developed for the Rio + 20 Summit (https://unite.un.org/sites/unite.un.org/files/app-global-clews-v-1-0/landingpage.html), because it aims to examine the impacts of policy changes on relationships in ecosystems rather than simulating the impacts of physical changes in one arena on physical changes in another. Whereas CLEWS documents impacts of global shifts in climate change on energy, land and water, ecosystem integrity attempts to actively promote monitored ecosystem alterations coupled with measurements of policy change impacts, and the methodologies proposed through this approach can be adapted to local, national or even supranational contexts.

Although the use of ecosystem integrity will not solve by itself the conflict between conservation of nature and social marginalization described earlier, it promotes balance in two specific ways: (a) it provides an operational conceptual framework to assess the interactions between human activity and natural systems; and (b) it supports practical measures for keeping the strain on the environment created by human activity within "acceptable limits" (a tough target given current ecological knowledge) by preserving enough areas with their natural functional ecosystems. Ecosystem integrity recognizes the interdependence between biological conservation and human impacts that compromise public health, vulnerability to disasters, economic potential of communities (which is a means to address poverty through sustainable development practices), and so forth. Moreover, the ecosystem integrity model can be applied equally well to urban and rural areas, which adds a comparative dimension to the analysis. Even though cities do not have the same robust ecosystem diversity found in many rural areas, the framework can propose reasonable standards for natural integrity in urban areas In this regard, the model can both document shifts in ecosystem integrity in defined territories, and it can prescriptively promote integrity standards and maintenance strategies, depending on the needs of stakeholders.

Another key characteristic of the ecosystem integrity approach is its focus on self-regulation. Integrity is defined as a system that maintains its organization in the face of changing environmental and socioeconomic conditions. In this regard, a balance between human–environment interactions is present in the ecosystem's regulatory dynamics. Both the natural system and human communities are participants in this regulatory system, and they must work in synergy for integrity to be maintained. It is this characteristic of the ecosystem integrity framework, which links the ethical, cognitive and environmental aspects of the model. This is discussed in the following section, which shows the empirical application of ecosystem integrity analysis to Mexico.

Ecosystem integrity in Mexico: A preliminary study

Ecosystem integrity is based on a three-tier model focused to estimate the integrity condition of different ecosystems (see Figure 1 for a general description of the model). This condition is calculated using artificial intelligence techniques, Bayesian networks in particular. Contrary, to ad hoc indices, this is a data-driven approach from which the level of integrity (in the hidden tier) is obtained according to the patterns of correlation among variables (in the instrumental tier), which are specific for each type of eco-

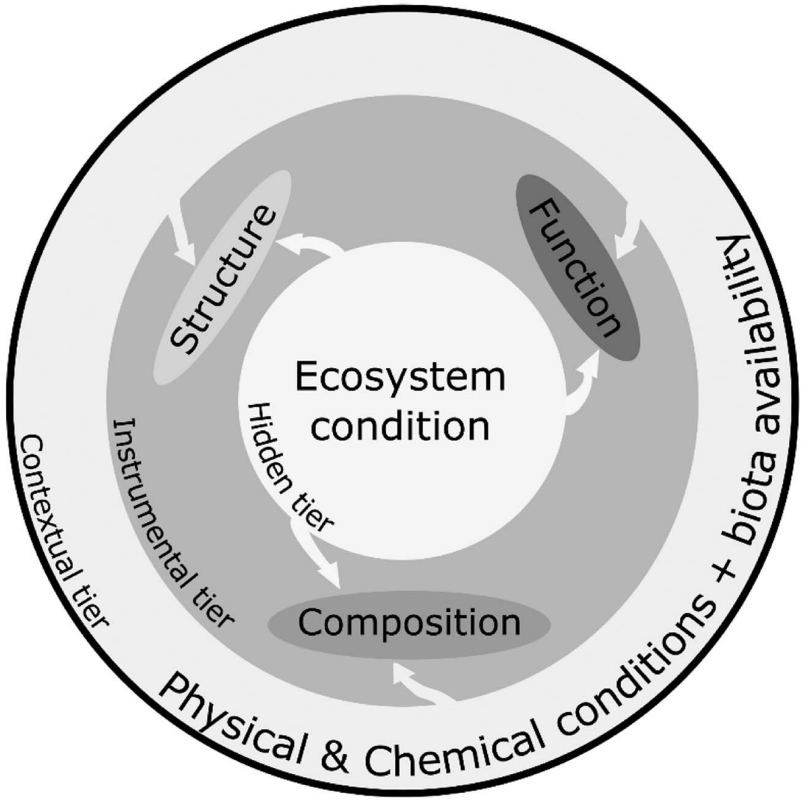

Figure 1 • Three-tier model of ecosystem integrity (3TEI)
The inner tier is hidden to the observer, but its status can be inferred by the information available at the instrumental tier as measurements on structure, function and composition, of course considering the context where the ecosystem is developing. Arrow tips indicate direction of assumed mechanistic influence, although information can go either way.
Source: Miguel Equihua, Octavio Pérez-Maqueo (concept), and Pedro Maeda (design)

system (as defined in the contextual tier). In adherence to this conceptual framework, we propose that it is possible to get an estimate of ecosystem integrity using the available data for each case. Obviously, for comparative purposes, data similarities or calibration exercises are required.

In order to apply the model, remote sensing and field variables are utilized, and in doing so, we can estimate the integrity of terrestrial ecosystems per square kilometer for any territory using Bayesian networks structured according to the three tier model (for the empirical application of this model to Mexico, see Equihua Zamora, et. al., 2014).

Furthermore, ecosystem integrity can be mapped and assessed over time, providing a suitable measure of "environmental change." Thus, the estimates of changes on ecological condition could be used to follow upon the impact of different policies, plans and projects over time. For example, the level of integrity assets that could be at risk given the potential development of a mine for metal ore extraction, can be analyzed in terms of the alteration of involved ecosystems with reference to their previous general assessment available for the location, and even followed up because of the national monitoring taking place, which of course could include additional data specific to the facility under scrutiny.

Ecosystem integrity can be spatially represented as maps, but it can also be related with other metrics. For example, we believe it is possible to devise different dose-response curves to estimate the cost of different policies in terms of ecosystem integrity. In the near future it will be possible to compare and analyze the impact of different development policies acting at the same time in a specific place, fostering a holistic perspective building upon the opportunities that the ecosystem integrity framework coupled to human evaluation of natural assets can provide.

Policy coherence for development: A strategy for achieving policy balance

Like our metrics related to development, policy approaches have also favored sector-specific strategies. For decades development aid promoted indicator-based and specialized projects that focused on specific objectives, many of which were material and focused on promoting economic growth (see Mawdsley, Savage, & Kim, 2014). Development policies forwarded by international organizations, such as the World Bank defined development as interconnectedness in global markets and "development" was measured through increased production (Rich, 2013). Development performance was based on the efficient achievement of project deliverables (Denizer, Kaufmann, & Kraay, 2013). Natural resources such as water

and land were integrated into visions of development based on the provision of goods with less visible attention to human rights or the transfer of ownership of development programs related to these essential goods (many of which were tied to privatization schemes) to aid recipients.

This scenario has shifted significantly since 2010. By 2011, The Busan Partnership for Effective Development Co-operation established international criteria for development aid partnerships between public, private and civil society organizations including: (a) ownership of development priorities by developing countries; (b) a focus on results as sustainable impacts should be the driving force behind investments and efforts in development policy making; (c) the promotion of partnerships for development, which depends on the participation of all actors and recognizes the diversity and complementarity of their functions; and (d) transparency and shared responsibility (http://www.oecd.org/development/effectiveness/busanpartnership.htm). These "post-aid" partnerships were integrated into the 2015 Sustainable Development Goals as SDG #17. Furthermore, these development partnerships were the focus of the Third International Conference on Financing for Development held in Addis Ababa, Ethiopia in 2015.

The field of sustainable development is moving away from vertical organization and institutionalization through the emergence of development partnerships and shared responsibility. This paradigm shift actually makes development policy frameworks more compatible with ecosystem integrity. Specific policy tools have been identified by international organizations, such as the United Nations, the Organization for Economic Co-operation and Development (OECD), and the European Union (EU) as well as development aid donors in order to promote development strategies that include a plurality of actors and focus on relationships between development spheres.

The most prominent of these tools is policy coherence for development (PCD), which has been recognized as a key policy paradigm for the implementation of the 2030 Sustainable Development Agenda. PCD is defined as "working to ensure that the objectives and results of a government's (or institution's) development policy are not undermined by other policies of that same government (or institution), which impact on developing countries, and that these other policies support development objectives where feasible" (OECD, 2005, p. 28). At the minimum, coherence means "doing no harm." More ambitiously, it calls for "the systematic promotion of mutually supportive policies…to help achieve mutually agreed international goals" (OECD, 2005, p. 23).

Political and academic recognition of the importance of PCD has evolved significantly since the early 1990s. The EU first adopted PCD with

the Maastricht Treaty in 1993 (Hoebink, 2004) and the Cotonou Partnership Agreement in 2000 (Laakso, et al., 2007). However, only in 2005 was PCD established on the EU agenda with the Commission adopting a communication with a focus on PCD and the EU Council adopting conclusions on PCD (CEPS 2006). PCD was also integrated into the EU development policy program, (European Consensus on Development, EU 2006). The Lisbon Treaty of 2009 further reinforced the Union commitment to PCD, stating that "the Union shall take account of development cooperation in the policies that it implements which are likely to affect developing countries" (Art. 208). The EU is also committed to a biannual PCD reporting process (EC 2007, 2009, 2011). In 2007, the decision was made to focus on five priority areas: trade and finance, climate change, global food security, migration, and security. In 2010, the European Commission presented the PCD Work Programme (EC 2010) for the years 2010 to 2013, structured around the five priority areas.

PCD has also been on the OECD agenda since the early 1990s. The 2002 Ministerial Statement (OECD Action for a Shared Development Agenda) points out that, when formulating policies across the policy spectrum, OECD countries should take account of the potential impact on developing countries. In response to the 2002 Ministerial Statement, the OECD launched a program on PCD (OECD 2005). In 2008, ministers of OECD countries adopted the Declaration on Policy Coherence for Development (OECD 2009). The Development Assistance Committee (DAC) of the OECD, which includes most EU member countries and the European Union, has organized peer reviews of its member states' development policies, where policy coherence has received growing importance. In 2007, the Development Co-operation Directorate and the Development Centre of the OECD jointly created the OECD Network of National Focal Points for Policy Coherence for Development ("the PCD Network") "to establish better communications between the OECD and officials in capitals on policy coherence for development." At the meeting on 9 February 2012 in Paris, the Network envisioned that PCD would be a core element of the new sustainable development paradigm (OECD 2012).

As PCD emerged in policy documents emitted by the OECD and the EU, academics began to take note of the importance of this policy tool. The first academic studies by scholars such as Forster and Stokke (1999), Hoebink (2004), Carbone (2008) and Picciotto (2004) examined the state of PCD in different polities (the EU, European states, the United States, Japan). As the literature began to develop, scholars began to examine specific issue arenas such as security (Picciotto, 2004), trade (Stocchetti, 2016), and migration (Nyberg-Sorensen, 2016). More importantly, great conceptual strides have been made in defining PCD and identifying typologies (see Table 1).

Table 1 • Typologies of policy incoherence for development

Horizontal incoherence	Incoherence between development aid and non-aid policies
Vertical incoherence	Incoherence between policies of regional organizations and member states
Inter-donor incoherence	Incoherence between development policies of a region's different member states
Internal incoherence	Inconsistencies between the objectives and means of a given policy
Inter-organizational incoherence	Incoherence between the development policies of a donor country's government and civil society organizations
Multilateral incoherence	Incompatibility between the development goals and procedural norms of international organizations such as the EU, OECD, the UN, and the international financial institutions
Donor-recipient incoherence	Incoherence between development strategies in donor states and those in aid receiving states
Normative incoherence	Incoherence between policy strategies in development and nondevelopment policy arenas and core values of liberal democratic societies

Source: Koff, H. (forthcoming). "Diaspora Philanthropy in the Context of Policy Coherence for Development: Implications for the post-2015 Sustainable Development Agenda." *International Migration*.

The recognition of different coherence/incoherence frameworks and the combination of these frameworks re-focuses policy paradigms away from specific objectives and more toward holistic impacts. In the field of sustainable development, PCD has received prominent attention in fields such as agricultural policy (see Carbone, 2009; Matthews, 2008), fisheries (Kazcynski & Fluharty, 2002), biodiversity (Nilsson, et. al., 2012), energy (King, et. al., 2013), food security (Lundstrom Sarelin, 2007), climate change (Kok & de Coninck, 2007) and water (Koff & Maganda, 2016). While this rich literature recognizes the relevance of PCD to sustainability debates, it applies this analysis to specific development projects or development aid programs. As Siitonen (2016) has illustrated, PCD studies have been limited to the actions of donors. Instead, there is dearth of PCD analysis focusing on development aid recipients or relationships between regions. This article argues that PCD can become innovative from a policy standpoint when applied to specific development contexts, such as water basins or clearly defined ecosystems. While current uses of PCD as a policy tool highlight its strengths because they prioritize sustainable development over competing policy arenas and they identify specific challenges re-

garding development policy implementation, contemporary approaches only scratch the surface of PCD's potential contributions to transformative development as previously defined. Instead, the application of PCD to different scales of analysis could maximize its policy impact.

This approach is highly salient to ecosystem integrity debates. As stated earlier, ecosystem integrity is an approach to sustainable development that highlights relational mechanisms. Like ecosystem integrity, PCD not only examines the mechanisms that affect policy implementation within specific arenas but also investigates the relationships between policy arenas, policy actors, policy levels and policy norms (see Figure 2). PCD analysis can be used to map policy-making within specific ecosystems and examine how policy arenas, levels, norms and actors affect each other in development policy systems. Also, like ecosystem integrity, PCD focuses on self-regulation mechanisms as it includes analysis of social participation in the definition, implementation and monitoring of policies.

For example, payment for ecological services (PES) have become an important policy mechanism for conservation in Mexican water basins. One area where PES programs have been implemented is La Antigua Basin in the Mexican State of Veracruz. La Antigua is a basin that extends 2,326.43 square km from the Gulf of Mexico to the center of the state. The

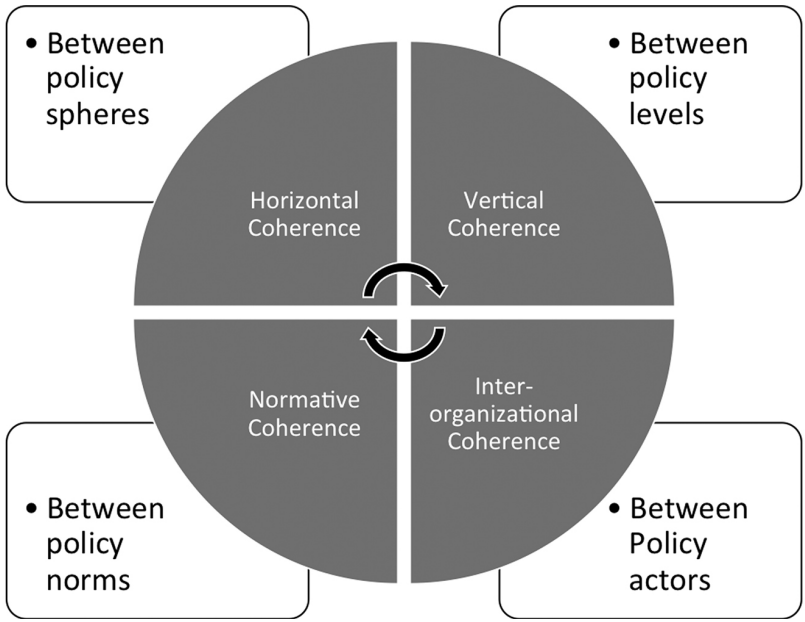

Figure 2 • Main dimensions of ecosystem PCD
Source: Harlan Koff (concept and design)

basin is characterized by high biodiversity including pine-oak forest, cloud forest, deciduous forest, riparian vegetation, induced and cultivated pasture (http://www.conabio.gob.mx/conocimiento/regionalizacion/doctos/rhp_077.html). In addition to the wide variety of plants found in the different forests in the basin, numerous fish and amphibious species live there as well. In terms of economic activities, the basin fosters shrimp fishing, coffee (some under forest cover) and sugar cane production and seasonal agriculture. Moreover the sustainable tourism sector has begun to emerge around the Antigua River and its tributaries, where rafting and other outdoor sports have become popular.

These economic activities, especially farming and the limited industry that exists in the basin have threatened the local ecosystem. The Antigua River has been polluted by the runoff of chemicals used for agriculture and domestic use as well as waste associated with coffee production. Moreover, clandestine logging has led to deforestation, the uncertainties in coffee pricing to sugar cane expansion and a recent attempt to build a dam near the town of Jalcomulco in order to provide energy for the national interconnected system and fresh water to Xalapa (the State capital), threatens sustainable tourism in the region, which attracts more than 40,000 visitors per year (personal interviews with tour operators and political organizers, 14 March 2016, Jalcomulco). Research has shown that the deterioration of water quality includes substantial increases in e-coli bacteria which augmented the incidence of disease in the basin (Mokondoko Delgadillo & Manson, 2010). Furthermore, CONABIO (Mexico's National Commission for Knowledge and Use of Biodiversity) has found that water pollution has undermined the population of tree frogs in the basin, which are used as indicators of ecosystem integrity because they depend on pure water (http://www.conabio.gob.mx/conocimiento/regionalizacion/doctos/rhp_077.html).

In response to these threats, PES programs have been introduced in the basin by both local and national agencies. These policies, instituted by Mexican federal agencies like CONAFOR and local governments (FIDECOAGUA), pay landholders between 500 pesos/ha per year and 1,000 pesos/ha per year in order to conserve both forests and water resources (Fuentes Pangtay, 2012). Some of the policies, such as the local government program in the town of Coatepec, bill water users for PES in the Pixquiac micro-basin in order to broaden public participation in the program. These increases in local water bills have created controversy amongst some local participants.

Thus far, reviews of these policies have focused on the distribution of economic costs and benefits of these payment programs as well as the need for social participation in their definition and implementation in

order to promote buy-in among potential contributors (especially water users). However, a preliminary PCD analysis of these programs indicates that economic incentives and political participation are not the only factors that impact the success of these policies. Numerous policy incoherences exist that undermine the success of PES programs. In terms of the conservation of the ecosystem, PES projects are weakened by horizontal incoherences, such as a lack of health and sanitation regulations for livestock, which contaminate water resources and contradicting subsidies as CONAFOR, Mexico's forestry service, pays landholders to plant trees on their properties while SAGARPA, Mexico's agriculture service provides subsidies to promote the raising of goats that eat the saplings (personal interview with development official, 23 June 2016, Xalapa). Other incoherences, to name a few, include: (a) vertical incoherence as CONAFOR utilizes national mapping as the basis for its subsidy programs that do not break down districts into the micro-basins represented by municipalities (some of which have their own PES projects); (b) internal incoherence as PES programs are based on subsidies that do not promote economic transformations toward sustainability, thus promoting financial dependence on these programs; and (c) normative incoherence as PES focuses on conservation of natural resources without significantly addressing social marginalization, thus limiting the long-term transformative impacts of the programs. Identifying these policy weaknesses can already contribute to the establishment of ecosystem integrity-based policies because weaknesses in sustainable development relationships are highlighted, and thus, they can be collectively addressed by water basin stakeholders. This informs balanced sustainable development strategies.

Conclusion

The year 2015 was supposed to represent a seminal moment in the global development agenda because of the declaration of the Sustainable Development Goals. First, the number of goals was expanded from eight objectives included in the Millennium Development Goals to 17 declared objectives under the SDGs. Second, the Sustainable Development Agenda derived from the UN-sponsored "World We Want" campaign in which citizens, civil society organizations and businesses were invited to provide input to the post-2015 global development agenda. Thus, the SDGs are intended to reflect a more inclusive approach to development policy-making. Finally, the SDGs, as previously mentioned, include a stronger focus on the relational aspects of poverty, especially through the inclusion of SDG #10 (Reduced Inequalities), SDG # 11 (Sustainable Cities and Communities),

SDG # 12 (Responsible Consumption and Production), SDG # 16 (Peace, Justice and Strong Institutions) and SDG # 17 (Partnerships for the Goals).

The 2030 Sustainable Development Agenda is in fact an impressive and ambitious policy framework. The 17 goals include 169 targets and 230 indicators. The question remains however, how transformative the SDGs will be. For the SDGs to be more than a quantitative expansion of the MDGs, a qualitative change must occur in the implementation of the goals. The inclusion of the relational goals mentioned earlier is a productive platform from which balanced transformative development can emerge. However, the way that the different goals are addressed must become more coherent. Transformative and balanced development should, for example, discuss how water security, food security and sustainable production and consumption mutually interact. Also, relationships between sustainable energy sources, climate change and biodiversity need to be highlighted. Policy coherence for development has already been identified as an important tool for the implementation of the 2030 development agenda in response to these issues.

However, the impact of PCD can be limited if it is only used as a policy tool aimed at improving the efficiency and effectiveness of development aid. PCD's influence can be expanded should its normative aspects be prioritized. What kind of sustainable development does PCD promote? Another important question asks: sustainable development for whom? This article contends that PCD should not be limited to development aid programs. Instead, its impacts can be magnified should PCD be systemically applied to different levels of analysis, such as territorially defined ecosystems or water basins. This shift in focus is important for two reasons. First, it applies PCD to development actions on the ground, where development policies are implemented on a daily basis. Second, by applying PCD to ecosystems, water basins, and so forth, leaders are making a political statement that development policies should focus on natural boundaries instead of political or administrative ones. This promotes a vision of balanced transformative development that highlights human–environment interactions.

This holistic approach should also have a strong ethical foundation. Ecosystem integrity provides such bases. Like PCD, this paradigm focuses on the relationships between different policy arenas and their impacts on the health of ecosystems and the communities that interact with them. The approach integrates cognitive, ethical and environmental policy considerations and most importantly, it provides a defined vision of sustainable development that is both conceptually ambitious and operationally practicable on the ground. In short, it provides an appropriate framework for the needs of the 2030 Sustainable Development Agenda. Combined with

PCD as a policy methodology, ecosystem integrity can contribute to transformative development through actions aimed at introducing balance to an unbalanced world.

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