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Introductory Essay

Mountain Forests and Sustainable Development: The Potential for Achieving the United Nations' 2030 Agenda

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The world is facing numerous and severe environmental, social, and economic challenges. To address these, in September 2015 the General Assembly of the United Nations adopted the resolution Transforming our World: The 2030 Agenda for Sustainable Development. *The United Nations' 17 sustainable development goals (SDGs) and their 169 targets are ambitious, broadly encompassing, and indivisible. They are intended to guide nations and communities toward attaining healthy and peaceful livelihoods free of poverty and hunger. Collectively the goals envision sound and safe environments, where global threats like climate change are successfully combated through both mitigation and adaptation. Agenda 2030 envisages sustainable production patterns with inclusive, effective economies and institutions. It is of specific relevance to mountain communities, where the population is predominantly rural and half of the rural inhabitants experience food insecurity and are often highly dependent on forest resources. Mountain forests also contribute to human welfare well beyond the local community: through functions such as climate and hydrological services provided at regional and global scales, and harvested commodities traded at multiple economic scales. In this introductory essay we argue that sustainable forest management in mountain areas disproportionately contributes to achieving the SDGs. We discuss (1) the potential of mountain forests to help achieve SDGs in mountainous regions and beyond, (2) the potential of the SDGs to help solve severe socioeconomic and ecological problems in forested mountain areas, and (3) challenges and opportunities associated with implementing the SDGs. We base our argumentation also on the 8 papers presented in this Focus Issue of* Mountain Research and Development. *Together, they establish a clear connection between sustainable use and protection of mountain forests and vital ecosystem services upon which many regions depend. We discuss challenges of understanding interactions between goals and targets, and highlight the role of science in achieving the SDGs. Finally, we stress the urgent need for establishing a new narrative of socioeconomic transformation to ensure that Agenda 2030 is successful.*

Keywords: *Sustainable Development Goals; Agenda 2030; mountain forests; ecosystem services; climate change; adaptation; inequality; narratives.*

Introduction

The world faces severe environmental, social, and economic challenges of unprecedented complexity. Close to 800 million people live with hunger (von Grebmer et al 2016), and 1.2 billion live in extreme poverty (Suresh and Johnson 2015). More than half of the world's arable land is degraded, undermining livelihoods for at least 1.5 billion people (UN General Assembly 2011). Climate change affects human welfare ubiquitously, even threatening basic human survival in some areas, such as island nations inundated by sea level rise and populations displaced by unprecedented drought or shifting precipitation patterns. Inequality is expanding and reducing social coherence, leading to civil strife and contributing to governance crises in many regions, such as parts of sub-Saharan Africa. To address these complex challenges, the resolution *Transforming our World: The 2030 Agenda for*

Sustainable Development (UN General Assembly 2015) was adopted by the General Assembly of the United Nations in September 2015. This document, which lays out the Sustainable Development Goals (SDGs), is the direct successor of the Millennium Development Goals (MDGs) and builds on the Rio Declaration on Environment and Development (UN General Assembly 1992) as well as the Rio+20 UN Conference on Sustainable Development (UN General Assembly 2012).

Although considered highly successful, at least for higher-income countries (Olinto et al 2013; Rosenbaum 2016) and for important issues such as reducing young child mortality by more than half and maternal mortality by 45% (UN 2015), the MDGs were criticized by some scholars for their "narrow conception of development" (Fukuda-Parr 2016: 45). This was seen as a simplification of the many causes of poverty for the sake of clear goals, effective communication (Suresh and Johnson 2015), and

outcome measurability. The multiple facets of sustainable development were reduced to only 8 goals, inevitably leading to the neglect of challenging dimensions like inequality and climate change. Also insufficiently incorporated were complex issues involving empowerment of people striving to overcome social and political structures causing persistent destitution (Fukuda-Parr et al 2014). Furthermore, the MDGs and their relatively simple indicators caused feedbacks on how development was framed as meeting basic human needs as the end goal, with technocratic measures as the means (Fukuda-Parr et al 2014).

Agenda 2030 is different: its 17 SDGs and their 169 targets are ambitious, broad, and as the UN puts it, "indivisible" (UN General Assembly 2015). It is intended to provide healthy and peaceful livelihoods free of poverty and hunger in sound and safe environments, where global threats like climate change are successfully combated through both mitigation and adaptation. It envisages sustainable production patterns and inclusive, effective economies and institutions.

Agenda 2030 is of specific relevance to mountain communities. In developing countries, poverty rates in mountains tend to be higher than those in lowland communities, with half of the population in mountainous rural areas experiencing food insecurity (Romeo et al 2015). Dependency on forest resources in mountain communities is high in both developing and developed countries. But ecosystem services provided by mountains in general and mountain forests in particular also contribute to the welfare of people beyond mountains. For example, they regulate the quality and quantity of up to 80% of drinking water originating from the mountains and are hotspots of biodiversity. Sustainable land management in forested mountain areas thus disproportionately contributes to achieving the SDGs. In this essay introducing the Focus Issue, we discuss (1) the potential of mountain forests to help achieve SDGs in mountainous regions and beyond, (2) the potential of the SDGs to help solve severe socioeconomic and ecological problems in forested mountain areas, and (3) challenges and opportunities associated with implementing the SDGs.

We argue that only a broad interpretation and systemic approach to sustainable development, as embodied in the SDGs, will allow humanity to tackle the challenges ahead. We base our argumentation also on the 8 papers presented in this issue. They collectively establish a clear connection between sustainable use and protection of mountain forests and vital ecosystem services on which many regions depend. The Focus Issue initially developed out of 2 sessions on mountain forests at the "Mountains of Our Future Earth" conference held in Perth, Scotland, on 4–8 October 2015. A subsequent call resulted in a wide and diverse array of submitted papers, of which 8 are published here, from 5 continents. The Focus Issue thus presents a partial status report on mountain forest challenges and perspectives at the beginning of the Agenda 2030 era. All studies presented in this issue were designed, and almost all also carried out, before the inception of the SDGs in September 2015. Consequently, they provide a starting point, highlighting some of the important topics connected with the fulfillment of the SDGs in forested mountain regions.

The potential of mountain forests to help achieve the SDGs

Mountain forests as a basis for livelihoods

In the UN's Agenda 2030 (UN General Assembly 2015), the importance of mountain ecosystems is explicitly recognized in the category Life on Land (SDG 15), in which a specific target is "to ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development" (target 15.4). The need to conserve mountains is also emphasized in target 15.1, to "ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements." The link between forests and mountains is not explicitly acknowledged, but forests are a key component of mountain ecosystems in many areas around the world. Almost 15% of mountainous land area is covered by forests, and mountain forests comprise 28% of the world's forests (Price 2005).

While all 8 papers in this issue address targets 15.1 and 15.4 directly, they also identify a broader range of inter-relationships between mountain forests and multiple SDGs, often in unexpected or poorly recognized ways, such as those related to poverty reduction or gender equality (SDGs 1 and 5, respectively) and forest resource access and management.

Natural forests in developing countries provide more than a fifth of rural poor households' livelihoods. Of this, 30% is for food, 35% for fuel, and 25% for building materials and fibers, with the remaining 10% for medicine, fodder, manure, and other uses (Angelsen et al 2014). This crucial and often neglected forest role has only recently been quantified by the Poverty and Environment Network (Wunder et al 2014). While that network does not explicitly focus on mountain forests, we assume that the contribution of mountain forests to household incomes is within a comparable range. Nischalke et al (2017, in this issue) found, however, that harvesting of wild food by the rural poor in Ethiopia is associated with famine and is otherwise not popular. Mountain forests may further provide "pathways out of poverty" (Vedeld et al 2007) if high-value forest products are harvested sustainably.

However, mountain forests are also highly biodiverse, and many are well protected (Duguma et al 2011).

Depending on the type of protected area (eg strict reserve vs cultural landscape) and the degree of involvement of local communities in management, this can limit access to forest resources and may create trade-offs between conservation and poverty alleviation in developing countries (Angelsen and Wunder 2003). This potential for negative interaction calls for pro-poor approaches to combat poverty in and around such areas. Options for ensuring that local communities benefit from protected areas include ecotourism, sustainable use of non-timber forest products, and zoning to include indigenous and community use areas (Keeton 2007). This is corroborated by recent findings from Cambodia (Clements et al 2014). There, communities living in protected areas experience less poverty than communities in similarly remote but unprotected landscapes. This was attributed to secure access to land and resources and the reduced threat from resource extraction and land grabs by outsiders. Nischalke et al (2017, in this issue) highlight another reinforcing interaction between SDG 15 (land-based conservation) and SDGs 1 and 2 (ending poverty and hunger): the long tradition of coffee production in forests in southwestern Ethiopia, where coffee's value as a cash crop, as well as its deep roots in the cultural identity of local communities, leads to high acceptance of forest conservation.

The idea that mountain forest conservation and management (targets 15.2. and 15.4) are intrinsically linked to our ability to develop vibrant, sustainable rural communities underlies Toscani and Sekot's (2017, in this issue) investigation of the economic determinants of sustainable small-scale forestry in the Austrian Alps. Their paper shows that mountain forestry in this European country is associated with above-average family incomes, even in climatically harsh conditions. Thus mountain forests in Austria help achieve the target of reducing poverty, since small mountain farms are considered disadvantaged and vulnerable to poverty (Wiesinger 2014).

Another example of the link between forests and sustainable communities is described by Min et al (2017, in this issue). They discuss forest degradation and economic risks associated with increasingly pervasive and intensified rubber farming in mountainous portions of southwestern China. The paper highlights the economic effects of transforming subsistence farming to commercial rubber farming. While this form of land management is profitable and has reduced poverty (and thus contributes to SDG 1), risks associated with price volatility are high. This intensive type of land use has also led to biodiversity losses and reduced carbon storage (Ziegler et al 2009). Extensive rubber plantations and the associated high water demand strongly affect catchment hydrology through reduced water storage and increased water losses via evapotranspiration (Guardiola-Claramonte et al 2010). This creates trade-offs with SDG targets 15.1, 15.2, 15.4, and 6.6.

Mountain forests also play a critical role in protection of mountain habitats for human populations (Duguma et

al 2011). In the Mountain Forest Protocol of the Alpine Convention (European Community 1996: [2]), this role is acknowledged by the statement that "mountain forests are a form of vegetation that can provide to a territory often far more extensive than just the mountainous areas the most effective and economical protection appropriate for the landscape against natural hazards, particularly erosion, flooding, avalanches, landslips and falling rocks."

Mountain forests as regulators of hydrology

Regulation of water supplies used for drinking and irrigation in mountain and lowland communities is a key service provided by mountain forests (Gratzer, Duguma, and Hager 2011). This is addressed in SDG 6.6, which aims to protect and restore "water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes." Two of the papers in this issue address this target: Nischalke et al for Ethiopia, the "water tower of Africa," and Wangdi et al (2017, in this issue) for the Himalayas. In the 15-year research agenda for Andean forest landscapes proposed by Mathez-Stiefel et al (2017, in this issue), almost all research themes and sub-themes address SDG 6.6. This confirms the relevance of mountain forests' water-regulating services, in the context of a shared vision of sustainable Andean landscapes and the transformative action needed to achieve it.

Mountains as refuge areas and species pools in times of climate change

Climate change (addressed in SDG 13) is expected to lead to pronounced shifts in species ranges, across both latitudes and elevations (Chen et al 2011; Batllori et al 2017). This will influence ecosystem services provided by mountain forests and create pressure on mountain communities to adapt. Mountain ecosystems present both risks and advantages in this regard: while mountains are particularly sensitive to such range shifts because of their sharp temperature and precipitation gradients over relatively short distances, the risk of species loss is lowered by the fact that species migration distances are shorter and thus less at risk of blockage of corridors.

Similarly, the proximity of different climate zones (tropical and temperate) is believed to have been a major determinant of the high temperate tree diversity in Asia (Rees et al 2001). Current species gene pools in many mountain areas were shaped by cyclic climatic shifts during the Pleistocene epoch and have high degrees of endemism (Schmitt 2009). Increasing isolation of species within mountain refugia may affect both persistence and speciation rates, thereby playing a direct role in both resistance (through population survival) and resilience (through genetic adaptation) to climate change. Mountains thus will be an important future refuge for biodiversity, a role that deserves attention in the

delineation of protected area networks with future climatic conditions in mind (Batllori et al 2017).

Mountains are also characterized by strong microclimatic differences reflecting variations in topography and elevation. Geological parent materials and forest soils in mountains are frequently heterogeneous. This is not only a driver of high levels of biodiversity, but will provide niche variability and associated opportunities for future climate refugia. Geophysical diversity in mountain systems also enhances the potential for range shifts through dispersal, colonization, and formation of novel species assemblages (Webb et al 2003). Mountains and mountain forests are thus likely to be crucial hubs for maintenance of biodiversity under altered climates. This is relevant to discussions on payment for environmental services and bolsters the argument for strong financial support for sustainable forest management benefitting mountain communities.

The potential of the SDGs to help solve mountain forest challenges

Just as sustainable management of mountain areas can contribute to achieving the SDGs, work towards reaching the SDGs will provide a strong lever to solve critical problems in mountains. Three key challenges for mountain areas are poverty, gender inequality, and knowledge inequality.

The poverty challenge

Extreme poverty is disproportionately associated with rural areas. Globally, about 78% of people experiencing extreme poverty as defined by income live in rural areas, and of these, 63% work in agriculture (Olinto et al 2013). In sub-Saharan Africa, 86% of people experiencing multidimensional poverty (defined in terms of health, education, and living standards) live in rural areas (Alkire and Housseini 2014). Within rural areas, poverty rates are often higher in mountains than in lowlands. This has been attributed to poor suitability of mountain areas for agriculture, with only 2% of the land ranked as having good to very good arability, compared to 22% in non-mountainous areas (UNEP 2002). In mountain areas, access to education, health and sanitation services, markets, and job opportunities is poor (Romeo et al 2015). Of the 915 million people living in mountainous areas globally, almost 36% are vulnerable to food insecurity. Since the year 2000, this ratio increased by 30%. In rural mountain areas, the food insecurity rate was 50% in 2012 (Romeo et al 2015).

Mountain forests often occupy areas unsuitable or of marginal use for agriculture and have therefore not been cleared or developed (Gratzer, Duguma, and Price 2011). People living in these areas are more likely to experience persistent poverty than people in less-forested areas. This finding has led to the notion of spatial poverty traps (Jalan

and Ravallion 2002) in forest areas in poor countries (Sunderlin 2008)—hotspots of poverty within the poor rural areas in developing countries.

In September 2014, at a high-level meeting with 300 global leaders, UN Secretary-General Ban Ki-moon spoke of the MDGs as the "greatest anti-poverty push in history" and continued, "new partnerships have been established. New actors have been engaged. Now we must finish the job" (UN Millennium Campaign 2014). Clearly, ending poverty in mountain regions is one of the unfinished jobs of the MDGs. This is recognized in the Agenda 2030 preamble, which states that "eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development" (UN General Assembly 2015: 1). Thus, we anticipate that issues of poverty in forested mountain areas will receive special attention in implementation of, for example, SDG targets 1.A and 1.B.

SDG 15 (Life on Land), addressed by all papers in this issue, is clearly cross-cutting and embraces many themes relevant to mountain forests. These include biodiversity, ecosystem services, freshwater ecosystems, invasive species, deforestation, and restoration. But several of the papers are equally if not more relevant to other SDGs as well. For example, the social-ecological drivers of sustainable resource consumption (SDG 12) are a primary focus of Mathez-Stiefel et al (2017, in this issue) (sustainable forest governance in the Andes) and Manral et al (2017, in this issue) (community use of forests for fuel and fodder in the Himalayas), while both papers also address issues of affordable energy (SDG 7) in the form of fuelwood and biomass energy.

The gender empowerment challenge

"Women empowerment and economic development are closely related: in one direction, development alone can play a major role in driving down inequality between men and women; in the other direction, empowering women may benefit development" (Duflo 2012: 1051). The nexus between development and empowerment of women in mountain areas is addressed by both Lama et al (2017, in this issue) and Nischalke et al (2017, in this issue). They describe traditional gender roles that limit female participation—in forest management (Nepal) and wild food collection (Ethiopia), respectively. This diminishes community capacity to respond to shifting demands or demographic trends, such as outmigration by men looking for work abroad (Lama et al 2017) or harnessing forest plant diversity as a food source (Nischalke et al 2017). Gender inequality was addressed in the MDGs, and measures to combat it were proposed (UN General Assembly 2000). Agenda 2030 addresses the problem even more broadly (Fukuda-Parr 2016). To overcome the MDGs' often-criticized "silo" approach, in which each goal was discretely defined with little interaction among

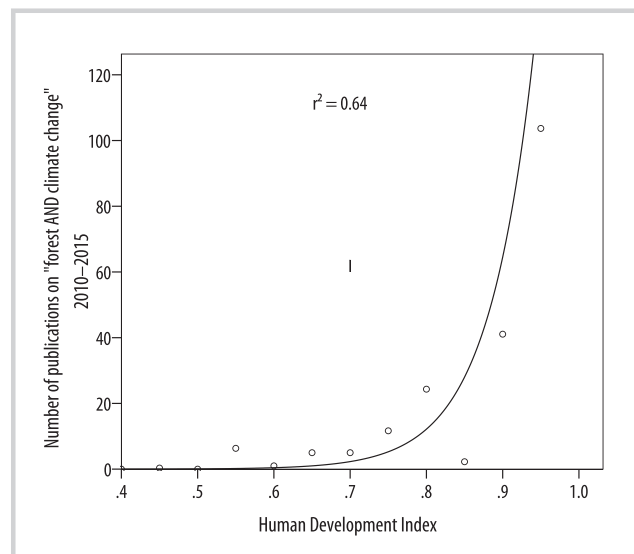them, the SDGs incorporate gender targets in several goals (eg targets 1.4, 2.2, 4.5, 6.2, 8.5, and 8.8).

Lama et al (2017, in this issue) point to an important yet often neglected aspect of gender relations: the impact of outmigration of men, a frequent phenomenon in poor mountain regions, on gender relations in forest management. Male outmigration often has not led to more participation by women in community forest management, as might have been expected to fill the labor gap. Rather, outmigration has increased women's work burden and time poverty. This dynamic creates trade-offs between SDG 1 (ending poverty, in this case through income from remittances) and SDG 5 (achieving gender equality and empowerment of all women and girls). It also highlights the strength of a broad agenda in which targets are integrated across multiple dimensions. As these goals are implemented, trade-offs will become explicit, provided that interactions with all other targets are considered. This may lead to better-informed development-related decision-making.

The knowledge inequality challenge

Other sustainability goals, such as climate action (SDG 13), form the crux of the climate adaptation and resilience network developed for the Rocky Mountain region of the United States, described in Halofsky et al (2017, in this issue). Valuing the role of sustainable mountain forest management for rural communities, as described by Toscani and Sekot (2017, in this issue), is not an easy task because of a widespread lack of monitoring data on the economic performance of small farms. Toscani and Sekot demonstrate the value of long-term datasets for such analyses and describe a method for combining datasets not originally designed for comparison. Target 17.18 aims to enhance the capacity of developing countries to increase the availability of "high-quality, timely and reliable data." Robust socioeconomic data for mountain systems, in particular, are lacking for many parts of the world. This target will contribute to the development of sound global databases on mountain communities, economies, and forests as illustrated by the design set up by Wangdi et al (2017, in this issue).

Wangdi et al explore critical elements of climate action (SDG 13), particularly understanding the effects of altered precipitation regimes, drought, and forest hydrology, including the growing likelihood of monsoon failures in the Himalayan Mountains. The research this paper describes was motivated by a lack of knowledge on adaptation potentials of ecosystems in the Himalayas. There is an information gap of this nature not only for this region but for many poor regions worldwide (Blicharska et al 2017). Knowledge of climate change has a rich-country bias, with scientific information being less available in poor and vulnerable regions (Pasgaard and Strange 2013; Pasgaard et


al 2015). This is also true of scientific knowledge on forests and climate change.

For example, Figure 1 relates the number of scientific publications (2010–2015) that mention "forests AND climate change" in the title with the Human Development Index of the country where the research was conducted. The Human Development Index is a measure combining key dimensions of human development: a long and healthy life (as expressed by life expectancy at birth), knowledge (as expressed by mean of years of schooling for adults and expected years of schooling for children), and living standard (as expressed by per capita GNI). It is the geometric mean of these normalized indices and ranges between 0 and 1 (for the highest possible human development) (UNDP 2017).

As the Index increases, the number of publications increases exponentially. The knowledge divide is pronounced between rich countries—often having higher carbon emissions, less vulnerability, and greater capacity for mitigation and adaptation (Pasgaard et al 2015)—and poorer, more vulnerable countries, with many mountain areas particularly affected. The divide increases with inequality between countries. This can undermine progress toward SDGs on reducing inequality and ending poverty and hunger. Agenda 2030 addresses this at various points by calling for enhanced research and education through provision of funds as well as transfers of technology, innovation, and effective partnerships. Regarding mountain forests, this should lead to an increase in funds for grants for research on climate change adaptation and mitigation, as well as advanced educational opportunities. An example of the latter is the Austrian University of Natural Resources and Life Sciences master's degree program in mountain forestry, which focuses on sustainable land use in mountain regions of developing countries (Gratzer and Lennkh 2011).
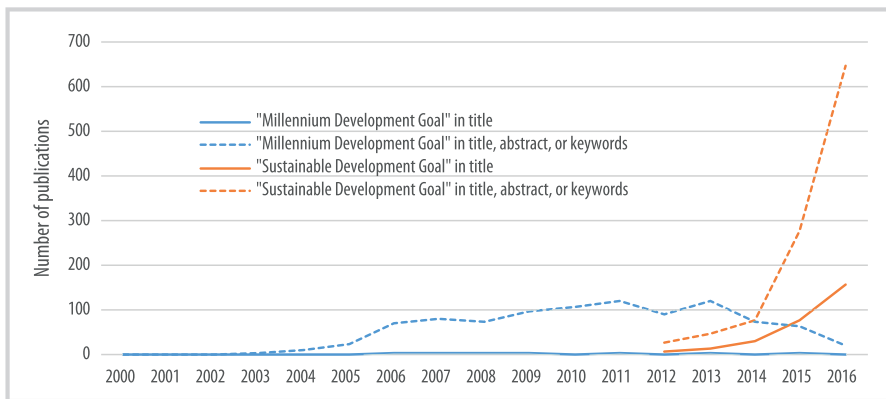
Implementing the SDGs

The reception of the SDGs in science

Generation of scientific knowledge on an agenda as complex as the SDGs is of paramount importance for its successful implementation. Since Agenda 2030 addresses inequality explicitly and the preamble pledges that "no one will be left behind" (UN General Assembly 2015: 1), it can be assumed that science on the SDGs will also contribute to closing the knowledge gap described above. This will be crucial for improving conditions in disadvantaged mountain regions.

The SDGs have been well described, referenced, and received in scientific publications (Figure 2). While the MDGs were mentioned in the title, abstract, or keywords of 121 studies in their peak year (2011), the SDGs were referenced by almost 650 publications just over 1 year after adoption. This represents a striking success for Agenda 2030. Assuming that scientific studies will influence political outcomes, this publication record could support SDG implementation. However, whether the SDGs are translated into meaningful action, rather than used merely as a fund-raising vehicle or research justification, remains to be seen. Success or failure of science for the SDGs may depend heavily on whether and to what degree effective science–policy interfaces are developed (Perrings et al 2011; Posner et al 2016).

The complexity challenge

Agenda 2030 is grounded in the concept of indivisibility, which means that the SDGs must be considered collectively and not in isolation; implementation of one target must take into account its effect on our ability to achieve all other targets. The papers in this Focus Issue exemplify this approach, illustrating linkages between research results and proposed measures to address different goals and targets. For an agenda as broad as the SDGs, this is a substantial challenge. It has spurred studies using mapping of interlinkages (Nilsson et al 2016; ICSU 2017) or systems modeling (Obersteiner et al 2016; von Stechow et al 2016)

to identify interactions that are mutually reinforcing or canceling (ie trade-offs). Such studies are crucial for choosing appropriate policy options—for example, overcoming the (often false) notion of having to choose between environmental protection and economic growth (Beddoe et al 2009). They may also counteract the temptation to selectively implement ("cherry-pick") the SDGs, which could adversely affect implementation of other important goals.

In this essay we have discussed some of the trade-offs and reinforcements presented in the papers in this Focus Issue. Success or failure of the SDGs, however, may not be determined by the level of coherence between goals and knowledge of their interactions: this is corroborated by a recent exercise that thoroughly scored target-level interactions between SDGs 2, 3, 7, and 14, which found these interactions to be 75% positive, 4% neutral, and 21% negative. None of the interactions caused goals to cancel each other out (Griggs et al 2017). Rather, the SDGs as a transformative agenda call for a research focus on both transformative and target knowledge—the former with a focus on how to reach the envisaged state and the latter on the common vision of sustainable development—as proposed also by Mathez-Stiefel et al (2017, in this issue). Transformative knowledge could lead to "transformative literacy" in society, defined as "the ability to read and utilize information about societal transformation processes, to accordingly interpret and get actively involved in these processes" (Schneidewind 2013: 120). This, in turn, could support successful implementation of the goals.

Developing a narrative of transformation

A critical question for SDG implementation pertains to the causes of the "multiple crisis." This idea refers to the "inner logic of a fossil fuel driven industrial system which only generates welfare while in its expansion or growth mode and, at the same time, shifts the real costs of growth to vulnerable income groups and future generations. This may occur in the form of social degradation, rampant public debt or by destroying natural resources" (Kraas et al 2017: 3).

WBGU (2011) identified 5 preconditions for political transformation: (1) a positive, mobilizing idea—a model of a society after transformation or a central promise that overcomes fear; (2) ideas, solutions, innovations, and projects which move from niches into the center of society; (3) the presence of change agents that pioneer transformation; (4) societal alliances that cross classical political and cultural boundaries; and (5) a state that takes action, formulates guiding principles and goals, and has inclusive political participation.

The first point, the positive mobilizing idea, may be critical since it could create ripple effects promoting the other points. To be successful, such an idea has to become a generally accepted narrative within society. A narrative legitimizing "collective identity of groups in regions" (Currie 2011: 6) provides a normative reference frame for societies and creates a general understanding between actors (Turowski and Mikfeld 2013). In line with Kraas et al (2016), we argue that Agenda 2030 has the potential to substantially improve intergenerational and global fairness. For it to become a new narrative, intensive debates at different levels of society are required. Without strong and concentrated efforts to hold such debates at regional and national levels, the new narrative may not develop and the transformation envisaged by Agenda 2030 may not take place.

Readers of this Focus Issue will likely see a pattern emerge of important interactions between efforts to achieve sustainability goals in mountain forests and eradicate poverty and hunger, the ability of ecosystems to adapt to global change (climate, invasive species, human populations, trade, etc), and ultimately the continued provision of ecosystem services to communities at multiple scales (local, regional, and global). Perhaps the urgent necessity of adaptation (Noble et al 2014) and transformation will become the critical link motivating mountain communities around the world to seek alternatives for sustainably managing and conserving their life-giving forest resources and ecosystems. We, the Guest Editors, hope this Focus Issue will encourage efforts toward that end across all relevant sectors, particularly among institutions involved in forest governance, conservation-oriented nongovernmental organizations, and international development assistance and lending agencies.

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