



Spatial context matters in monitoring and reporting on Sustainable Development Goals

Reflections based on research in mountain regions

By committing to the 2030 Agenda, countries have promised to work towards sustainable development through the Sustainable Development Goals (SDGs), pledging to leave no one behind. Yet, there is a risk of exclusion for those living in remote regions or those who fall through the cracks. Data collection methodologies and review schemes that account for SDGs at sub-national and regional levels need to be developed, which would facilitate decision-making and allow the growth of development agendas that are better aligned to the targets. However, so far little guidance is available for countries to account for spatial considerations.

Aino Kulonen, Carolina Adler, Christoph Bracher, Susanne Wymann von Dach

Spatial context matters for monitoring and reporting on Sustainable Development Goals. Reflections based on research in mountain regions | GAIA 28/2 (2019): 90–94 | **Keywords:** 2030 Agenda, disaggregated data, localization, monitoring, mountains, SDGs, sustainable development

Since the launch of the *2030 Agenda for Sustainable Development* in 2016, the *Sustainable Development Goals (SDGs)* mark an opportunity for the world to address sustainable development in a comprehensive and targeted manner (UN 2015). Ensuring that the disadvantaged and marginalized people are accounted for in this process requires that their context and development plight are visible. National governments agreed to take on the responsibilities to review on and achieve the *SDGs* until 2030. While actions are being implemented across different spatial scales, evidence-informed review processes play a significant role as a means to monitor progress, detect gaps, learn from experience, and guide future actions that account for the realities of communities in areas with particular challenges.

In this paper, we discuss why spatial context matters in monitoring and review processes, and how this can effectively support efforts to fulfill member states' pledges and commitments. Based on experiences in mountain regions, we provide reflections on scientific and political motivations for spatial considerations for

sustainable development and how spatial dimensions need to be accounted for in the *SDGs* framework. We complement these considerations with our collective insights from efforts exercised by the community of mountain researchers and practitioners within the frame of the *Promoting Sustainable Mountain Development for Global Change (SMD4GC)* program.

Call for localizing the SDGs

Science and policy have long acknowledged that regions face distinct challenges linked to local socio-economic and political contexts, as well as environmental conditions. For mountain regions, there is a long history and precedent in place where the scientific community contributed to the establishment of chapter 13 in *Agenda 21* (UN 1992). Since then, mountains have been politically acknowledged in this process, and have kept their place in global agendas (UN 2016). Despite these past efforts, the *SDG* framework offers little opportunity to explicitly account for sub-national and regional contexts, thereby risking that existing context-specific agendas are neglected at national level efforts of achieving the *SDGs*. Given the pledge to leave no one behind, the usefulness of this framework in assessing sustainable development is questionable if it cannot adequately account for those at risk of being excluded.

Localizing priorities to tackle context-specific challenges

The *2030 Agenda* acknowledges that countries, according to their own realities, capacities, and level of development, may define their own priorities and focus on specific needs at national and sub-national levels to ensure consistent development pathways within countries (UN 2015). To adequately account for socio-economic inequalities within countries, the UN has launched the initiative

Dr. Aino Kulonen | aino.kulonen@giub.unibe.ch

Dr. Carolina Adler | ETH Zurich | Department of Environmental Systems Science | Transdisciplinarity Lab (TdLab) | Universitätsstr. 16 | 8092 Zurich | Switzerland | carolina.adler@giub.unibe.ch

Christoph Bracher, MSc, MA | ch.bracher@gmx.ch

all: Mountain Research Initiative | c/o University of Bern | Institute of Geography | Hallerstr. 12 | 3012 Bern | Switzerland

Susanne Wymann von Dach, MSc | University of Bern | Centre for Development and Environment (CDE) | Mittelstr. 43 | 3012 Bern | Switzerland | susanne.wymann@cde.unibe.ch

© 2019 A. Kulonen et al.; licensee oekom verlag.
This Open Access article is published under the terms of the Creative Commons Attribution License CC BY 4.0 (<http://creativecommons.org/licenses/by/4.0>).
<https://doi.org/10.14512/gaia.28.2.5>
Submitted October 6, 2018; revised version accepted March 18, 2019.



*Localizing the SDGs*¹. While useful in mentioning what is considered relevant for localizing the *SDGs*, it is still up to national governments to decide and further specify how this localization is to be accounted for in their country. Providing sound and integrated knowledge on the current development status at sub-national level is a first step in supporting policy makers in selecting priorities that align with diverse policy frameworks.

A range of approaches are recommended to assess such interactions in specific contexts and setting respective priorities, also highlighting the importance of participatory methods for integrating local knowledge in the process (Allen et al. 2018, Bracher et al. 2018). Assessing these local interactions becomes particularly important when priorities need to be set in a context of limited resources, which is the case for many areas or communities at risk of being excluded (figure 1).

Reviewing *SDGs* at sub-national level

Regular voluntary national reviews (VNRs), conducted by all member states, are the cornerstone of the *SDG* review process, also providing the foundation for complementary regional and global reviews (UN 2015). VNRs lead national processes towards progress on the *SDGs* by providing evidence for policy and decision-making (HLPF 2018). The VNR guidelines specifically ask for reviews

based on data that are disaggregated by income, sex, age, race, ethnicity, migration status, disability, as well as geographic location (HLPF 2018). Hence, through disaggregation, the VNRs hold potential to enhance a broad understanding of the prevailing development situation by pointing out if specific social groups or sub-national regions lag behind, and where further implementation action may be needed.

Collection of statistical data used for *SDG* monitoring is mostly organized following administrative divisions and then aggregated to national level. This can, however, cover processes and issues specific for an environmental area not following administrative boundaries. Szabo et al. (2018) have argued that climate change hot-spots crossing administrative boundaries have limited political representation and are absent from the focus of direct policy actions, affecting the monitoring of sustainable development efforts and well-being of local populations. Therefore, identifying spatial interactions at the level of different environmental contexts crossing administrative boundaries such as mountain, coastal, or arid areas help identify context-specific factors that are crucial for promoting sustainable livelihoods.

¹ www.localizingthesdgs.org

FIGURE 1: Brick-making for the vibrant construction sector is competing with efforts to intensify agriculture close to Dhulikhel, Nepal. Guiding efforts towards achieving the *Sustainable Development Goals* requires assessing not only benefits and trade-offs, but also assessing who gains and who loses at the local level.



© Susanne Wymann von Dach



Most countries so far refer to data aggregated at the national scale to review their *SDG* progress, with not much accounting evident to report on sub-national disparities (Bizikova 2017). In addition to data availability, countries likely face other, less studied challenges that limit possibilities for spatial disaggregation. For example, Nepal has defined three ecological belts and conducted national statistical analyses following this spatial differentiation (Central Bureau of Statistics 2011), but does however, not utilize these classes in its VNR (National Planning Commission 2017).

Some countries already address the specific challenges faced in their mountain areas through national mountain agendas, for example, in Uganda (Ministry of Water and Environment 2016), Switzerland (Schweizerischer Bundesrat 2015), and Georgia², which can serve as bases also for directing financial support in agriculture or critical infrastructure. Such agendas require a clear and justifiable method for defining and differentiating mountains from their surrounding lowlands (Price et al. 2018). Given that such delineations are mostly based on physical attributes of moun-

Countries working towards meeting the Sustainable Development Goals still miss the full potential that spatially disaggregated data could provide in targeting locally specific development needs.

Hence, countries working towards meeting the *SDGs* still miss the full potential that spatially disaggregated data could provide in targeting locally specific development needs. The research community needs to take stock of the many plausible reasons why they may be facing these challenges.

tains (e.g., elevation and steepness), it is relevant to ask if all mountain areas with locally specific sets of conditions deserve the same policies, or if a more nuanced understanding of local conditions is needed to support local sustainable development. Localization of the *SDG* framework would facilitate evidence-informed decision-making and the rise of better-targeted development agendas for mountains.

Lessons from mountains

Patchwork of mountain realities

Mountain areas of the world are highly diverse in local environmental, economic, social and cultural aspects, as well as institutional and political factors that influence local conditions and development pathways. Such mountain specificities are not easily identifiable within large administrative units, calling for more detailed analyses on characteristics and interactions of different socio-economic, institutional, and environmental conditions that shape a locally specific set of opportunities and challenges.

The complex terrain and steep agro-ecological gradients of mountain areas limit the potential to increase agricultural production, access to markets, and provision of social services and critical infrastructure. Large proportion of the 915 million people living in mountains face challenges in securing sustainable livelihoods and are vulnerable to food insecurity (FAO 2015). Moreover, mountains count among the areas most sensitive to climate change (Pepin et al. 2015) and are at the same time susceptible to multiple natural hazards (Stäubli et al. 2018). Owing to the institutional periphery of mountainous areas, mountain people and milieus are prone to marginalization in political negotiation processes, and management decisions concerning these areas may not be based on relevant information on the specific needs of mountain people.

Utility of regional and transboundary efforts

Mountains are in constant interaction with lowlands through natural and man-made pathways providing a range of ecosystem services, such as fresh water supply and products and services derived from mountain agriculture and forests (Grêt-Regamey et al. 2012). Understanding how patterns in *SDG* targets occur in space across scales, for instance, between highland and lowland or in relation to rural and urban areas, would add crucial information to the implementation of the *2030 Agenda* across administrative levels and offer justification for financial compensation. For instance, the spatial analysis of the *SDG indicator 15.4.1 Coverage by protected areas of important sites for mountain biodiversity* and the *SDG indicator 6.1.1 Proportion of population using safely managed drinking water services* in Ecuador revealed different patterns for the coastal, mountain, and Amazon regions, and between rural and urban areas (Wymann von Dach et al. 2018).

Tackling such challenges also requires transboundary collaboration among mountain countries. Many countries, in a mountains context, have already committed to regional development policies, for example, *Alpine and Carpathian Conventions*³ (Messerli 2012), and ideally the local priorities set on *SDGs* would complement these existing policy frameworks. A recent conceptual framework was suggested as a means to organize monitoring and reporting efforts to accelerate progress toward sustainability in cross-

² www.ilo.org/dyn/natlex/docs/ELECTRONIC/104537/127659/F1097580316/4036%20eng.pdf

³ www.alpconv.org, www.carpathianconvention.org



boundary climate change hot spots, such as mountain ranges, with key steps in recognizing and capitalizing cross-boundary interdependencies and setting up a regional scale framework for greater accountability (Szabo et al. 2018).

Participatory approaches needed in local context

It is widely acknowledged that local stakeholders need to be involved in the *2030 Agenda* localization process in order to ensure relevance, ownership, commitment, and the effective means for implementation of transformative policies (Global Taskforce 2016), but few efforts exist that provide guidance on methodology for sub-national regions such as mountains. A promising example of a mountain agenda comes from Bangladesh, where a framework stressing multi-stakeholder engagement throughout the implementation of the *SDG* framework was presented to ensure that the region of Chittagong Hill Tracts would not lag behind other regions (Rasul and Tripura 2016). Participatory approaches also play a key role in the *Hindu-Kush Himalayan Monitoring and Assessment Programme*, where expert judgement was used to identify key challenges and to define objectives for sustainable mountain development (Sharma et al. 2016). Although participatory approaches require time and resources, the benefit of local participation in such case studies encourages further inclusion of local stakeholders in the localization processes. However, the success of participatory approaches also lies in the adequate quality of such frameworks and criteria applied to assess their efficacy with the community concerned. Context and mechanism for achieving desired results through participatory engagement and consultation may be more relevant and important for scaling and transferability of successes to other contexts of potential marginalization (Adler et al. 2018).

FIGURE 2: Experts in Kyrgyzstan assess the interactions between *SDG* targets that are of high priority and help to strengthen the resilience of mountain people and ecosystem in the Kyrgyz mountains.



© Alma Uzbekova

As part of the *SMD4GC* program initiated by the Swiss Agency for Development and Cooperation, the *Mountain Research Initiative*⁴ and the Centre for Development and Environment at the University of Bern, Switzerland, have been developing initial steps for an approach to assess sustainable mountain development using the *SDGs*. In collaboration with *SMD4GC* partner organizations, expert assessments were conducted in Nepal, Uganda, Kyrgyzstan, Ecuador, and Switzerland to identify local development priorities (Wymann von Dach et al. 2018) (figure 2). Due to locally specific socio-economic contexts, it is not surprising that the expert assessment revealed priorities specific to each of the five countries. For example, in the Swiss Alps demographic and structural changes in agriculture were considered as critical targets, whereas the experts from Kyrgyzstan and Ecuador raised the control of mining on their lists of key challenges, and in Uganda land conflicts and fragmentation were highlighted (Wymann von Dach et al. 2018).

Spatially disaggregated data needed for monitoring mountain development

Monitoring and reporting on the *SDGs* by 2030 still present substantial challenges that require the attention of the global data and research communities (TRENDS 2018). A desktop study for four countries (Ecuador, Chile, Nepal, Bangladesh) revealed that the availability of data is clearly inadequate for monitoring *SDGs* in a mountain context (Bracher et al. 2018). Either the required indicator data are not regularly collected or internationally established methodology, or standards for data collection do not even exist. Also, the countries' capacities to analyze the existing spatially disaggregated *SDG* indicator data were found to be low (Bracher et al. 2018). Good news is that the problems have been noted, and Nepal and Bangladesh clearly highlighted lack of disaggregated data as a major challenge, calling for development of suitable methodologies (Bracher et al. 2018). Requirements for spatially disaggregated data need to be supported by strengthening national statistical offices' capacity and administrative systems, especially at the local level as well as in countries of the Global South where data constraints are more pronounced (IEAG 2014). Different types of national censuses still form the basis of socio-economic data in many countries, and extending and modernizing data sources is an important step forward as well as improving access to existing data (Bracher et al. 2018). Encouraging countries to collaborate with local partner organizations who often have knowledge of and access to suitable proxy data, needs to be part of the solution.

⁴ www.mountainresearchinitiative.org



Conclusions

We call for the development of data collection methods, frameworks and review schemes that account for SDGs at sub-national and regional scales and build on the existing policy agendas. First, we emphasize the need for research that yields spatially disaggregated data to identify patterns of socio-economic disparities within countries. Second, studying how such patterns occur in space and across scales would allow for a more detailed picture of interactions of goals and emerging patterns of development challenges and their dynamics in a specific place. Finally, to ensure the inclusion of the knowledge of local stakeholders in the localization of the SDG framework in subnational contexts, we encourage further examples of structured participatory approaches. Making new methods available and sharing experiences on platforms like *Localizing the SDGs* can greatly speed up the learning process. Enhancing VNRs with insights from the sub-national reviews enables a more evidence-informed and differentiated debate on achievements of SDGs that also inform at the regional and global level.

References

- Adler, C., G. Hirsch Hadorn, T. Brey, U. Wiesmann, C. Pohl. 2018. Conceptualizing the transfer of knowledge across cases in trans-disciplinary research. *Sustainability Science* 13/1: 179–190.
- Allen, C., G. Metternicht, T. Wiedmann. 2018. Prioritising SDG targets: Assessing baselines, gaps and interlinkages. *Sustainability Science*. DOI: 10.1007/s11625-018-0596-8.
- Bizikova, L. 2017. *Disaggregated data is essential to leave no one behind*. www.iisd.org/blog/disaggregated-data-essential-leave-no-one-behind (accessed January 15, 2019).
- Bracher C., S. Wymann von Dach, C. Adler. 2018. *Challenges and opportunities in assessing sustainable mountain development using the UN Sustainable Development Goals*. Bern: Mountain Research Initiative and Centre for Development and Environment.
- Central Bureau of Statistics. 2011. *Nepal living standards survey 2010/11*. Statistical report, Volume 1. http://siteresources.worldbank.org/INTLSMS/Resources/3358986-1181743055198/3877319-1329489437402/Statistical_Report_Vol1.pdf (accessed January 15, 2019).
- FAO (Food and Agriculture Organization). 2015. *Mapping the vulnerability of mountain peoples to food insecurity*. Edited by R. Romeo, A. Vita, R. Testolin, T. Hofer. Rome: FAO.
- Global Taskforce (Global Taskforce of Local and Regional Governments). 2016. *Roadmap for localizing the SDGs: Implementation and monitoring at subnational level*. www.uclg.org/sites/default/files/roadmap_for_localizing_the_sdgs_0.pdf (accessed September 16, 2018).
- Grêt-Regamey, A., S. H. Brunner, F. Kienast. 2012. Mountain ecosystem services: Who cares? *Mountain Research and Development* 32/S1: 23–34.
- HLPF (High Level Political Forum On Sustainable Development). 2018. *Handbook for preparation of Voluntary National Reviews*. https://sustainabledevelopment.un.org/content/documents/17354VNR_handbook_2018.pdf (accessed August 15, 2018).
- Messerli, B. 2012. Global change and the world's mountains: Where are we coming from and where are we going to. *Mountain Research and Development* 32/S1: 55–63.
- Ministry of Water and Environment. 2016. *Uganda national sustainable mountain development strategy*. Kampala, Uganda. <http://arbims.arconetwork.org/library-mnt/op/op.ViewOnline.php?documentid=87&version=1> (accessed January 15, 2019).
- National Planning Commission. 2017. *National review of Sustainable Development Goals*. Government of Nepal. <https://sustainabledevelopment.un.org/content/documents/16513Nepal.pdf> (accessed January 25, 2019).
- Pepin, N. et al. 2015. Elevation-dependent warming in mountain regions of the world. *Nature Climate Change* 5: 424–430.
- Price, M. F., T. Arnesen, E. Gløersen, M. J. Metzger. 2018. Mapping mountain areas: Learning from global, European and Norwegian perspectives. *Journal of Mountain Science* 15. DOI: 10.1007/s11629-018-4916-3.
- Rasul, G., N. B. K. Tripura. 2016. *Achieving the Sustainable Development Goals in Chittagong Hill Tracts – challenges and opportunities*. Kathmandu: International Centre for Integrated Mountain Development.
- Schweizerischer Bundesrat. 2015. *Politik des Bundes für die ländlichen Räume und Berggebiete. Bericht in Erfüllung der Motion 11.3927 Maissen vom 29. September 2011. Für eine kohärente Raumentwicklung Schweiz*. Bern: Schweizerischer Bundesrat.
- Sharma, E. et al. 2016. The Hindu Kush Himalayan Monitoring and Assessment Programme: Action to sustain a global asset. *Mountain Research and Development* 36/2: 236–239.
- Stäubli, A. et al. 2018. Analysis of weather- and climate-related disasters in mountain regions using different disaster databases. In: *Climate change, extreme events and disaster risk reduction*. Edited by S. Mal, R. Singh, C. Huggel. Cham: Springer. 17–41.
- Szabo, S. et al. 2018. Accelerating progress toward the zero hunger goal in cross-boundary climate change hotspots. *Environment: Science and Policy for Sustainable Development* 60/3: 18–27.
- TRENDS (Thematic Research Network on Data and Statistics). 2018. *Monitoring the SDGs by means of the census*. Research Brief. <http://unsdsn.org/wp-content/uploads/2018/01/180124-trends-brief-census.pdf> (accessed September 16, 2018).
- UN (United Nations). 1992. *Agenda 21. The United Nations program of action from Rio*. New York: UN.
- UN. 2015. *Transforming our world: The 2030 Agenda for sustainable development*. <https://undocs.org/A/RES/70/1> (accessed April 23, 2019).
- UN. 2016. *Resolution adopted by the United Nations General Assembly on sustainable mountain development at 71st session*. <http://undocs.org/A/RES/71/234> (accessed January 20, 2019).
- Wymann von Dach, S., C. Bracher, M. Peralvo, K. Perez, C. Adler. 2018. *Leaving no one in mountains behind: Localizing the SDGs for resilience of mountain people and ecosystems*. Bern: Mountain Research Initiative and Centre for Development and Environment.



Aino Kulonen

Born 1984 in Lahti, Finland. Studies in geography, PhD in ecology. Scientific Project Officer at the Mountain Research Initiative. Research interests: sustainable mountain development, alpine and global change ecology.



Carolina Adler

Born 1975 in Santiago, Chile. Studies and PhD in geography and in environmental sciences. Executive Director at the Mountain Research Initiative. Research interests: climate change, climate and environmental policy, governance, transdisciplinary research, assessments and evaluation methodologies.



Christoph Bracher

Born 1985 in Huttwil, Switzerland. Studies in geography and in environmental history (MSc, MA). Research assistant at the Mountain Research Initiative. Research interests: functioning mechanisms and resilience of social-ecological systems in mountain areas and beyond.



Susanne Wymann von Dach

Born 1963 in Bern, Switzerland. Studies in geography. Senior research scientist at the Centre for Development and Environment (CDE) at the University of Bern, Switzerland, and Associate Editor of *Mountain Research and Development*. Research interests: sustainable mountain development, innovation and transformation processes, communication for development.