Responses to the guiding questions to the preparatory process of the UN High Level Political Forum on Sustainable Development, July 2020

Session: Protecting the planet and building resilience
Pursuing policies, investments and innovation to address disaster risk reduction and protect the planet from degradation

---

Georgina Catacora-Vargas, Ph.D.
Research Associate, Academic Peasant Unit "Tiawanacu", Bolivian Catholic University (UAC-UCB)
Vicepresident, Latin American Scientific Society of Agroecology (SOCLA)

1. ***Systems transformation***
What are the fundamental systems transformations needed to halt nature degradation, reverse loss and manage risk, while eradicating poverty, ensuring food security for a growing population, securing livelihoods and promoting resilience?

- **Mainstreaming biodiversity in development policies and production systems**. Based on the IPBES definition[1] and the provisions in Art. 6.b[2] and Art. 10.a[3] of the Convention on Biological Diversity, mainstreaming contributes to internalizing in-practice the values and goals of biodiversity conservation, sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, into development models, policies, programmes, funding and practices of the public and private sector. This has the purpose of reducing biodiversity loss while promoting its preservation, restoration and strengthening of related ecosystem functions and services.

The TEEB (2010) suggests mainstreaming biodiversity in six major sectors: (i) economic, trade and development policies; (ii) transport, energy and mining activities; (iii) agriculture, fisheries and forestry practices; (iv) corporate strategies and operations; (v) development policies and planning at local, regional and national levels; (vi) public procurement and private consumption. This broad range of sectors in which to mainstream biodiversity has the potential to reduce nature degradation and reverse loss and manage social-ecological risks, while contributing to eradicating poverty, ensuring food security, strengthening livelihoods and promoting resilience. This is possible due to the close linkages between biodiversity and the SDGs, and biodiversity with the food-water-energy nexus.

The connections between biodiversity and the SDGs are particularly important to the most vulnerable groups, e.g. the functions, services and non-commercial goods provided by ecosystems are 50% to 90% of the total sources of livelihood among the rural poor and forest-dwellers (CBD et al. n.d.). Hence, mainstreaming biodiversity in development policies particularly contributes to advancing SDG1 "No Poverty" and SDG 2 "No hunger" among other interrelated SDGs. When mainstreaming biodiversity in agriculture, fisheries and forestry, the impacts are much broader since biodiversity – at genetic, species

---

[1] "*Mainstreaming in the context of biodiversity, means integrating actions or policies related to biodiversity into broader development processes or policies such as those aimed at poverty reduction, or tackling climate change*", available at https://ipbes.net/glossary/mainstreaming-biodiversity

[2] "Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies", available at https://www.cbd.int/convention/articles/?a=cbd-6

[3] "Integrate consideration of the conservation and sustainable use of biological resources into national decision-making" https://www.cbd.int/convention/articles/?a=cbd-10

and ecosystem levels – is crucial to food production and nutrition (FAO 2019): More biodiverse agricultural systems show higher productivity (Catacora-Vargas, 2017) and diversity in sources of nutrients. Conversely, biologically simplified production systems, such as monocropping, contribute to land degradation, water pollution, ecosystem deterioration, high GHG emissions, erosion of biodiversity, and micro-nutrient deficiencies (IPES-Food 2016; IPBES 2018; IPBES 2019). Additionally, more than 75% of key global food crops depend, to different degrees, on animal pollination, equaling to 35% of the total global crop production (IPBES 2016).

With regard to the other components of the food-water-energy nexus, biodiversity is key to preserving watersheds for securing surface and ground water storage, supply and quality, as well as to preventing water-related hazards, disasters, runoff, soil erosion and others. Moreover, watershed conservation using ecosystem-based approaches contributes to secure renewable energy (e.g. hydropower) and biomass upon which an important portion of current populations – approximately three billion – depend for accessing energy (e.g. wood and coal) (CBD et al. n.d.).

- **Scaling up agroecology.** From a technical perspective, agroecology is the application of ecological principles to the design and management of sustainable food systems (Altieri & Nicholls, 2006; Francis et al., 2003; Gliessman, 2015). Agroecology provides the foundation to re-design and manage agricultural and food systems in such a way that: (i) secures adequate levels of production in terms of quantity (productivity) and diversity; (ii) conserves and restores biodiversity, soils, water and forests; and (iii) decreases carbon emissions and increases resilience to natural disasters and climate change. These result from the locally-adapted implementation of the principle of preserving and enhancing biodiversity, which spurs multiple and interconnected ecological functions (e.g. regulation of pest populations, restitution of soil nutrients, water retention, climate regulation, and others) (Altieri & Nicholls, 2003; Lin, 2011) that result in stable and efficient production systems. In comparison to monocrops, biodiverse agroecological systems can increase yields by 20% to 100%, and in terms of energy efficiency, reports an output/input ratio of around 10:1 (Altieri et al. 2011). Agroecology is also acknowledged as a strategy to halt desertification, decrease pollution originating from high-synthetic inputs, diversify and stabilize income generation particularly among peasants and small-scale farmers, improve nutrition, and adapt to climate change (Holt-Giménez 2002; IAASTD Ed. 2009; Altieri et al. 2011; Lin 2011; IPES-Food 2016; IPBES 2018; UNEP 2019). In summary, agroecology has the capacity to: (i) reverse the negative effects of conventional systems when mainstreamed in agriculture, livestock production and forestry; and (ii) contribute positively to the food-water-energy nexus from the farm to landscape level (particularly at watersheds).

Agroecology adjusts particularly to small-scale farming conditions and possibilities due to its characteristics of food, energy and technology self-reliance (Altieri et al. 2011). This provides additional social relevance to small-scale farming, which represents 84% of total family farming (90% of the total farms worldwide) in plots smaller than 2 hectares, who hold 12% of the total agricultural land but produce more than 80% of the worlds' food in terms of value (FAO 2019). Although agroecology is particularly relevant to generally marginalized groups – such as peasants, indigenous peoples and rural women – and contributes to advance the principle of "no one left behind" in systems transformation, it also has the potential to be scaled up throughout territories to establish social-ecological multifunctional landscapes (Anderson et al. 2019; IPBES 2019).

- **Reduction of food loss and waste**. According to (FAO 2018) on average 30% of global food is wasted, the majority from urban areas, representing 1.3 billion tons (USD 936 billion) (Ishangulyyev et al. 2019). In developing countries, food is lost in mostly post-harvest and processing stages due to technical limitations. In the developed world, food waste mainly occurs at the consumption stage. In Europe in 2012, 88 million tons (€143 billion) of food are lost annually (Stenmarck, Jensen, Quested, & Moates, 2016). In the United States, it is calculated that 40% of food is wasted, representing 19% of land dedicated to agriculture, 21% of landfill capacity, 18% of fertilizers used, 2.6% of GHG emissions and 21% of water used in agriculture. This wasted food equals a value of approximately USD 218 billion a year (Gunders et al., 2017).

The levels of food loss and waste represent an environmental burden from the management point of view, and put pressure on soils, water, energy and other resources (FAO, 2019). It also requires deep ethical consideration in light of the levels of hunger and undernourishment: 2 million people have irregular access to sufficient food, 820 million suffer hunger, and one of seven babies present low birth weights (FAO et al. 2019). The food lost and wasted equals to the food needs of one-eight of the global undernourished population (Ishangulyyev et al. 2019).

2. ***Specific actions to drive transformation***
   Please describe 2-3 specific, promising actions at different levels that can drive these systems transformations. These actions could relate for instance to scaling up the use of nature-based solutions, sustainable consumption and production, or other approaches. How have these actions helped (or how could they help) break down siloes, support the systemic management of risk, and trigger positive changes in society? How can co-benefits between actions be maximized and the risk in trade-offs stemming from these actions (i.e. negative impacts on other aspects of the 2030 Agenda) managed?

- **Agroecology for mainstreaming biodiversity at different scales**. Mainstreaming biodiversity through agroecological design and management of agricultural, livestock and forestry systems contributes to integral and sustainable conservation and use of biodiversity, while generating social, economical and ecological benefits in an interrelated fashion. This is possible at different scales given that agroecology is based on social-ecological principles that can be locally adapted.

In **Sucre, Bolivia**, the Plurinational Urban and Peri-Urban Agriculture Programme (PNAUP) (2016 -2019) under the auspices of the Ministry of Productive Development and Plural Economy with the Municipality of Sucre supported 116 low-income families to establish biodiverse agroecological vegetable gardens (in approximately 12 -20 m^2) in their backyards. In less than a year, the production surpassed self-consumption needs, allowing families to commercialize the excess. Currently, 1,500 women carry out this initiative, generating diverse, healthy food for themselves and local consumers, income and women's agency through self-reliant agroecological production[4].

In Benito Juárez, **Buenos Aires, Argentina**, "The Aurora" Farm (650 hectares) combines sequential legume-cereal crop associations followed by, in the same plot, free-range double purpose cattle after the cereal harvest, which is used for organic flour processing. This biodiverse system results in similar productivity than neighboring conventional farms (5.1 ton/ha in agroecological vs. 5.4 in conventional) and production stability even in periods of drought, with lower direct costs (USD 148/ha in

[4] Data base of the Plurinational Urban and Peri-Urban Agriculture Programme (PNAUP).

agroecological vs. USD 417/ha in conventional) and with a higher return rate (5.15 in agroecological vs. 1.31 in conventional)[5]. This case shows high ecological, climate and economic performance.

In **Valle del Cauca, Colombia**, the community of Bella Vista, located in a watershed started a process of reforestation (391 ha) using agroforestry and silvopastoral systems in 1986, in order to regenerate the tree cover of the watershed to restore water cycles. For this purpose the community organized a local committee for reforestation and over time, with the increase in production as a result of the regenerated biodiversity and restored water cycles, the abundant yields motivated women to process the harvest in a local communal micro-enterprise. By 2014, the watershed was completely restored through tree-based agroecological management, allowing communal agency and securing of diversified sources of income, including for women[6].

Cuba, after the collapse of the Soviet Union and economic embargo, went into a profound technological agricultural transformation due to discontinuity in access to synthetic inputs. The process of agricultural transformation based on agroecological management resulted in 100 thousand farmers producing 65% of the national demand for food in 25% of the agricultural land available (Rosset et al., 2011). Currently, most farms apply agroecological management in 46% to 72% of their cultivated areas, producing 70% of the food consumed in the rural areas, while 380 thousand urban farmers cultivate on 50 thousand hectares the 4 million tons that represent 60% of the total food demand of its capital (Altieri et al. 2011).

These experiences at different scales result in food, energy and technological self-sufficiency, water and soil conservation, restoration of ecosystem functions and income generation.

3. ***Means of implementation and the global partnership for development (SDG 17):***
   Achieving the 2030 Agenda relies on a combination of means of implementation to catalyse action and engagement, harness synergies and reduce tradeoffs. Please discuss the means of implementation, including finance, partnerships, and capacity building, needed to make the necessary transformations. How can science, technology and innovation (STI), including social innovation and local and indigenous knowledge, be mobilized to advance these transformations?

Sustainability and resilience are multifactorial and dynamic (Leach et al. 2010); accordingly, the means of implementation have the challenge of responding to these properties while complementing each other. In light of this, some the following means of implementation are suggested:

- Promoting knowledge exchange and inclusion of diverse sources of knowledge – academic and non-academic – in the assessment, decision-making, implementation, and evaluation and monitoring of actions that drive transformation. The establishment of the conditions for including the knowledge and voices of diverse key actors who in general terms are marginalized or vulnerable, e.g. indigenous peoples and local communities, peasants, small-scale holders, women and youth, is relevant.

---

[5] Presentation of E. Cerdá entitled "Aplication of the agroecosystem approach in extensive systems. The case of "The Aurora" in the South-east of Buenos Aires Province, Benito Juárez, Argentina" [in Spanish], at the Seminar "Sustainable Agricultural Systems", La Paz, Bolivia, 2015.

[6] Presentation of J. Giraldo entitled "Communal process of the micro-watershed "Los Saínos": Experience of the ecological restoration and production conversion" [in Spanish], at the II International Course on Agroecology and Ecological Restoration: Sustainable and Resilient Agricultural Landscapes", Valle del Cauca, Colombia, 2016.

- Fostering responsible science, technology and innovation, by focusing on collective social and ecological welfare by embracing precautionary, anticipatory, reflexive, inclusive and responsive approaches.

- Gender responsiveness to promote gender equity as crosscutting goal, and securing the conditions for the exercise of women's and girls' rights, including participation in governance and justice. This is particularly important in the context of multiple crises, e.g. climate change, where the realization of women's rights is at risk (Maguire & Lewis, 2018; Nobre et al., 2017).

- Capacity building on social-ecological resilience and ecosystem-based thinking, among other fields and approaches relevant to sustainability.

- Re-designing economic measures, by: (i) removing incentives and subsidies that harm the welfare of societies and ecosystems, (ii) promoting incentives with positive social-ecological impacts, and (iii) redirecting funding to the implementation of regulation, policies, programs, initiatives and actions that address the welfare of right holders.

- Promote nexus and synergies among initiatives for strengthening the interconnectedness of policy frameworks, institutions, knowledges and resources, for achieving coherence and a systemic approach in implementation.

4. ***Covid-19 crisis***
   What does the Covid-19 crisis reveal about the human-nature relationship and systemic risk creation? How can nature-based solutions contribute to a post-COVID-19 economic and social recovery that is more sustainable, equitable and resilient? What immediate and medium-term steps are needed to ensure that the post-COVID-19 economic and social recovery is sustainable, equitable and resilient. How can we redirect financial flows and direct recovery efforts to create better outcomes for people, prosperity and planet?

The Covid-19 crisis reveals the relevance of ecological integrity, which also directly affects economic stability, social welfare and public health. In this sense biological simplification poses multiple risks by leading to vulnerable and inequitable social-ecological systems. Ecosystem-based approaches have the capacity to re-build social-ecological resilience in terms of restoring ecological functions that sustain ecosystem services, particularly in the nexus of food-water-energy and health. Accordingly, an immediate step is supporting and strengthening the mainstreaming of biodiversity in development and production initiatives, starting with food-related systems (i.e. agriculture, livestock and forestry) due to their crucial relevance and capacity to restore ecosystem components and functions. A parallel step is creating the institutional and procedural frameworks that prevent different types of violence and breaches of human rights. This is directly related to protecting the planet and building resilience in two ways: First, it is documented that in social and environmental crises violence (particularly towards women, girls and children) increases as well as does the infringement of human and civil rights (Maguire & Lewis, 2018; Nobre et al., 2017). Second, in a context of disparity, inequality, violence and the failure to protect rights, social-ecological resilience is not attainable.

Bibliography

Altieri, M. A., Funes-Monzote, F. R., & Petersen, P. (2011). Agroecologically efficient agricultural systems for smallholder farmers: Contributions to food sovereignty. *Agronomy for Sustainable*

Development, *32*(1), 1–13. https://doi.org/10.1007/s13593-011-0065-6
Altieri, M. A., & Nicholls, C. I. (2003). Soil fertility management and insect pests: harmonizing soil and plant health in agroecosystems. *Soil and Tillage Research*, *72*(2), 203–211.
Altieri, M. A., & Nicholls, C. I. (2006). *Agroecología. Teoría y práctica para una agricultura sustentable* (2da ed.). México D.F.: PNUMA / Universidad Autónoma de Chapingo.
Anderson, C. R., Bruil, J., Chappell, M. J., Kiss, C., & Pimbert, M. P. (2019). From transition to domains of transformation: Getting to sustainable and just food systems through agroecology. *Sustainability (Switzerland)*, *11*(5272). https://doi.org/10.3390/su11195272
Catacora-Vargas, G. (2017). Agrobiodiversidad, un camino hacia la soberanía alimentaria. Análisis desde la productividad y el autoconsumo. In *VI Congreso Latino-Americano de Agroecología / X Congreso Brasileño de Agroecología* (Vol. 13(1)).
CBD / FAO / WB / UNEP / UNDP. (n.d.). *Biodiversity and the 2030 Agenda for Sustainable Development. Technical Note.* Montreal.
FAO (Food and Agriculture Organization of the Nations). (2019). *The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction*. Rome.
FAO (Food and Agriculture Organization of the United Nations). (2018). *Gender and food loss in sustainable food value chains – A guiding note*. Rome.
FAO (Food and Agriculture Organization of the United Nations). (2019). *The State of the World's Biodiversity for Food and Agriculture*. *The State of the World's Biodiversity for Food and Agriculture*. Rome: FAO.
FAO (Food and Agriculture Organization of the United Nations) / IFAD (International Fund for Agricultural Development) / UNICEF (United Nations International Children's Emergency Fund) / WFP (World Food Programme) / WHO (World Health Organization). (2019). *The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns*. Rome.
Francis, C., Lieblein, G., Gliessman, S., Breland, T. A., Creamer, N., Harwood, R., … Poincelot, R. (2003). Agroecology: The Ecology of Food Systems. *Journal of Sustainable Agriculture*, *22*(3), 100–118.
Gliessman, S. R. (2015). *Agroecology. The Ecology of Sustainable Food Systems* (3rd ed.). Boca Raton: CRC Press / Taylor & Francis Group.
Gunders, D., Bloom, J., Berkenkamp, J., Hoover, D., Spacht, A., & Mourad, M. (2017). *Wasted: How America is losing up to 40 percent of its food from farm to fork to landfill*. New York.
Holt-Giménez, E. (2002). Measuring farmers' agroecological resistance after Hurricane Mitch in Nicaragua: a case study in participatory, sustainable land management impact monitoring. *Agriculture, Ecosystems & Environment*, *93*(1–3), 87–105.
IAASTD (International Assessment of Agricultural Knowledge Science and Technology for Development) Ed. (2009). *Agriculture at a Crossroad. Global Report*. (B. McIntyre, H. Harren, J. Wakjungu, & R. Watson, Eds.). Washington D.C.: Island Press.
IPBES (Intergovernmental Science - Policy Platform on Biodiversity and Ecosystem Services). (2016). *Summary for policymakers of the assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production*. Bonn.
IPBES (Intergovernmental Science - Policy Platform on Biodiversity and Ecosystem Services). (2018). *Summary for policymakers of the assessment report on land degradation and restoration.* Bonn.
IPBES (Intergovernmental Science - Policy Platform on Biodiversity and Ecosystem Services). (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.* Bonn.
IPES-Food. (2016). *From uniformity to diversity. A paradigm shift from industrial agriculture to diversified agroecological systems*. Retrieved from www.ipes-food.org

Ishangulyyev, R., Kim, S., & Lee, S. H. (2019). Understanding food loss and waste-why are we losing and wasting food? *Foods*, *8*.

Leach, M., Scoones, I., & Stirling, A. (2010). *Dynamic Sustainabilities: Technology, Environment, Social Justice*. London / New York: Earthscan.

Lin, B. B. (2011). Resilience in Agriculture through Crop Diversification: Adaptive Management for Environmental Change. *BioScience*, *61*(3), 183–193.

Maguire, R., & Lewis, B. (2018). Women, human rights and the global climate regime. *Journal of Human Rights and the Environment*, *9*(1), 51–67.

Nobre, M., Hora, K., Brito, C., & Parada, S. (2017). *Atlas de las mujeres rurales de América Latina y El Caribe "Al tiempo de la vida y los hechos."* Santiago de Chile.

Rosset, P., Sosa, B. M., Roque Jaime, A. M., & Ávila Lozano, D. R. (2011). The Campesino-to-Campesino agroecology movement of ANAP in Cuba: social process methodology in the construction of sustainable peasant agriculture and food sovereignty. *Agroecology and Sustainable Food Systems*, *38*(1), 161–191.

Stenmarck, Å., Jensen, C., Quested, T., & Moates, G. (2016). *Estimates of European food waste levels*. Stockholm.

TEEB (The Economics of Ecosystems and Biodiversity). (2010). *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB. Sukhdev, P., Wittmer, H., Schröter-Schlaack, Nesshöver, C., Bishop, J., ten Brink, P., Gundimeda, H.* Geneva.

UNEP (United Nations Environmental Program). (2019). *GEO-6. Global Environmental Outlook 6. Healthy Planet, Healthy People*. Nairobi.