

Issue Brief

A Marriage of Necessity

Building a Sustainability and Resilience Tool for the Future



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Summary: Resilience is a prerequisite to ensure long term sustainability. All resilience programming should therefore incorporate normative sustainable thinking based on the analysis of the relations between resilience and sustainability.

The Issue

The causal relationships between resilience and sustainability run both ways: unsustainable practices amplify the negative impacts caused by environmental and other types of disasters, and systems that are not resilient slip into undesirable, unsustainable development pathways (Cutter et al., 2008). Breaking this negative cycle requires intelligent program design that is based on an explicit attempt to embed the concept of resilience in core dimensions of sustainability. By linking long-term sustainability to the capacity to recover from adverse shocks, successful development interventions can prevent people from falling into recurring cycles of poverty that erode gains made toward development and well-being.

At COSA, we know that operationalizing a measurement system that brings the concept of resilience and sustainability into a single, pragmatic tool can be a daunting challenge for program managers, particularly when time and information constraints combine to add another layer of complexity to an already complicated task. For this reason, we developed the COSA Resilience Measurement approach. In doing so, our ultimate goal was simple: to create a

pragmatic, measurement approach and toolset that can be used by program managers to learn, manage and strategically plan program interventions that seek to enhance the resilience of communities so that they can achieve sustainable development impacts.

In this Issue Brief, the first of three issue briefs that showcase our approach, we make the link between resilience and sustainability explicit by positioning resilience indicators relative to dimensions of sustainability, as expressed in the [United Nations Sustainable Development Goals](#).

Resilience and Sustainability

In *Our Common Future*, the Brundtland Commission famously defined sustainable development as “development that meets the needs of the present without compromising the ability of future generation to meet their own needs.” Combined with the Millennium Development Goals (MDGs), and more recently, the Sustainable Development Goals (SDGs), the global community has collectively agreed on an ambitious development challenge that seeks not merely to reduce poverty in all its dimensions, but to do so sustainably and within just 15 years.¹

¹ SDG 1: End poverty in all its forms everywhere.

In this context, resilience becomes a prerequisite for ensuring long-term sustainable development. Resilience indeed represents the capacity of people, communities, or systems to prepare for and to react to shocks and stressors in ways that limit vulnerability and promote sustainability (Serfilippi and Ramnath, 2017). Sustainability, therefore, can be ensured only by building the resilience of those in need. This reality is foundational to the SDGs, which aim in Target 1.5 to “Build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters by 2030”.

COSA’s resilience measurement efforts and SDGs

In principle, the relationship between sustainability and reliance is reasonably clear. Building a workable measurement approach, however, is far more complex. COSA’s Resilience Measurement approach began with the premise that the relationship between resilience and sustainability must be explicit. From this premise, we created a set of ‘Resilience Key Performance Indicators’ (R-KPIs) and grouped them into nine domains or ‘global themes’.² These themes were then mapped to specific SDG Targets to reveal the intrinsic relationship between resilience and sustainability. A graphical representation of the overall set of Resilience Global Themes (R-GTs), KPIs and their connections to SDGs is provided in Table 1. In the following, we examine each of these themes and their related R-KPIs and SDGs.

² Shocks and Risks; Community and institutional environment; Living conditions (Poverty); Basic human rights and equity; Learning and innovation; Services and infrastructures; Producers’ livelihood; Financial resources; Climate change.

³ Target 1.1: 1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day

⁴ Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries. Target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations

1. Living Condition

Extensive research over the past 30 years has revealed that it is generally the poor who tend to suffer worst from disasters (Twigg, 2004; Wisner et al., 2004). Impoverished people are therefore more likely to live in hazard-exposed areas and are less able to invest in risk-reducing measures. Poverty is thus both a cause and consequence of disaster risk (Wisner et al., 2004). COSA includes poverty in our resilience analysis as an outcome indicator, in line with SDG Target 1.1³ which aims to “*eradicate extreme poverty for all people everywhere.*” COSA adopts a traditional way of measuring poverty through the use of the PPI (Progress out of Poverty Index) and then calculates the number of people living below the national poverty line accordingly to the same guidelines used to operationalize the SDG poverty indicator.

2. Shocks and Rises

SDG indicators associated with ‘Shock and risk’ are included in SDG Target 1.5 (resilience) and all other SDG targets that apply to climate-related hazards and natural disasters (e.g., Target 13.1 and 11.5).⁴ As we have noted, the logic here is unassailable: unsustainable practices amplify the negative impacts caused by environmental and other types of disasters, and systems that are not resilient are more likely to be affected by shocks. This global theme includes shocks and risks, along with all the strategies in place to reduce the exposure to risks, such as early warning systems, preparedness strategies (Target 2.5)⁵, disaster management (Target 3d)⁶ and so on. COSA has identified six main R-KPIs related to this theme. These include the occurrence and severity of shocks, recovery ability, individual preparedness and coping strategies, and early warning systems.⁷

⁵ Target 2.5: “By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.” Target 13.2: “Integrate climate change measures into national policies, strategies and planning.”

⁶ Target 3.d: Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

⁷ The measurement of these indicators respects the guidelines of the SDG Resources Website, in which the operationalization of the targets related to shocks and risks

3. Basic Human Rights and Equity

This RGT includes topics such as food security and education. SDG Target 2.1⁸, for example, relates food insecurity to the vulnerability of people. Similarly, SDG Target 2.4⁹ positions resilience as an instrument to create sustainable food systems.¹⁰ Accordingly, COSA uses as a R-KPI the number of days that household members have experienced without sufficient food. On the educational side, SDG Targets 4.1¹¹ and 4.3¹² underline the importance of access to education to ensure sustainable development and to build the ingenuity required to adapt to changing environments. Education is also portrayed within the SDGs as an essential instrument for action against climate change, as stated by SDG Target 13.3¹³, which calls for “awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.” To keep data collection manageable, the COSA Resilience Measurement approach measures simply the number of household members with a primary education or above.

4. Learning and Innovation

Learning and innovation suggest the ability and willingness to take risks, exploit new

should be realized using measures of economic losses, together with measures related to Disaster Risk Reduction (DRR) strategies (e.g., coping and preparedness strategies), with an approximation of the shock incidence through the number of deaths and missing persons.

⁸ Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious, and sufficient food all year round.

⁹ Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

¹⁰ Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

¹¹ Target 4.1: By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

¹² Target 4.3: By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.

opportunities, make errors, and to create applied knowledge based on experience (Oxley, 2013; USAID, 2013). COSA’s R-KPIs capture innovation through the adoption of new seed varieties and new agricultural technologies, while learning is embedded in access to training, weather, health, and market price-related information. All of these R-KPIs are directly connected to SDG Targets 12.8¹⁴, 4.7¹⁵ and 8.2¹⁶, which as a group promote sustainable global learning and technological innovation.

5. Community and institutional environment

A transparent, accountable and participatory political and institutional environment is paramount for resilience and long-term sustainable development. The importance of good governance is recognized by SDG Targets 16.6,¹⁷ which calls for the achievement of “*effective, accountable and transparent institutions at all levels,*” and Target 16.7,¹⁸ with its call for “*responsive, inclusive, participatory and representative decision-making at all levels.*”

COSA’s resilience analysis relates this R-GT to the capacity of governance systems to ‘transform’. For example, transformational responses are required for major changes in

¹³ Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

¹⁴ Target 12.8: By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

¹⁵ Target 4.7: By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development).

¹⁶ Target 8.2: Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high value-added and labor-intensive sectors.

¹⁷ Target 16.6: Develop effective, accountable and transparent institutions at all levels

¹⁸ Target 16.7: Ensure responsive, inclusive, participatory and representative decision-making at all levels

the system's structure and function when the adaptive capacities of the household, community, or ecosystem are overwhelmed by the magnitude of a shock(s) (e.g., the outbreak of a severe crop disease). Transformation should be accomplished with the help of local and national government to ensure access to basic services, infrastructure, and good governance and supported through the existence of a social safety net. This R-KPI is considered in the SDG Target 1.3¹⁹, which focuses on the implementation of nationally appropriate social protection systems. The COSA vision of 'safety nets' for resilience extends this concept, looking at safety nets provided through social protection initiatives and informal channels (NGOs, family, and friends).

6. Basic services and infrastructure

The resilience of a system depends on the availability of efficient and functioning infrastructure to meet a wide variety of needs and aspirations.

For this R-GT, COSA considers R-KPIs that ensure basic human needs, such as access to sanitation facilities, schools, health facilities, roads, and information and communication technology (ICT).

Regarding water, we consider access to safe water as a R-KPI. This indicator directly relates to SDG Target 6.1²⁰, which aims to "*achieve universal and equitable access to safe and affordable drinking water for all.*" In regards to health, access to sanitation²¹ is measured through the proportion of the population using safely managed sanitation

¹⁹ Target 1.3: Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable

²⁰ Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all

²¹ Target 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

²² Target 3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

²³ Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations,

services, while access to health care is measured by the distance of the household to the nearest health center.²²

Other KPIs included in the basic services and infrastructure R-GT are access to safe, affordable, transport systems for all (Target 11.2),²³ and access to electricity, both in general terms and in terms of renewable energy (Target 7.1 and 7.2).²⁴ The picture is completed by access to schooling and information and communications technologies.

7. Producer livelihoods and financial resources

On the purely economic side, COSA identified three main KPIs: access to credit, assets and income diversification. Diversification of income and access to credit are key risk reduction strategies in many areas, from financial investment to disaster planning. In particular, SDG Target 11.c highlights how access to credit is strategic for building both resilience and sustainability.²⁵

Livelihood improvements often emerge from the ability of households to engage in a variety of sustainable income-generating activities (Target 8.2).²⁶ That is to say, diversification itself allows families to face transitory shocks that might otherwise have long-term negative consequences to their income, that might, in turn, lead to changes in asset investment decisions. This is why COSA regards assets as a critical R-KPI since they not only contribute to the income generation process (productive assets) and to the households' wealth (durables) (Target 2.3),²⁷ but they may

women, children, persons with disabilities and older persons

²⁴ Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services measured as proportion of population with access to electricity. Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix.

²⁵ Target 11.c. Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.

²⁶ Target 8.2: Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour intensive sectors.

²⁷ Target 2.3: By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services,

also represent a form of coping strategy. For example, in case of shocks, households can reduce their consumption to preserve their assets (asset smoothing), as noted by Barrett and Carter (2005), or they can sell their assets to protect consumption (consumption smoothing).

8. Climate Change

Appropriate prevention and mitigation measures include a range of technologies, practices, and approaches that help to increase the resilience of communities and households and to prevent and mitigate the impact of future disasters. SDG Target 11.b²⁸ invites “cities and human settlements to adopt and implement integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.” In other words, the environmental conditions in which people live enable or limit their risk exposure and the opportunity to absorb, adapt, and transform in the face of shocks. Meanwhile, SDG Target 13.3²⁹ advocates for increased education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning. Thus, a range of environmental factors should be considered for the enhancement of resilience.

COSA focuses on climate change KPIs that are related to different mitigation and adaptation strategies, such as restoration of

markets and opportunities for value addition and non-farm employment.

²⁸ Target 11.b: By 2030, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels

²⁹ Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

³⁰ Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally. Target 15.5: Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020,

degraded land, and reforestation (captured in SDG targets Target 15.5 and Target 15.2).³⁰ In addition, biodiversity is included as a COSA KPI for its fundamental role in increasing risk management and adaptation, as suggested by SDG Target 15.9,³¹ which aims to “integrate ecosystem and biodiversity values into national and local planning, development processes.” At COSA, we focus on the genetic diversity of in local and non-local crop varieties and animal breeds. The idea is that local varieties, together with improved seeds, can contribute to increased tolerance and resistance to pests and diseases. In addition to conservation and utilization of local genetic resources and breeding for local adaptation, we consider as KPIs all resource management practices that contribute to enhance resilience, such as integrated pest management, fertilization and pesticide use efficiency, along with other climate-smart agricultural practices (their importance was highlighted in SDG Target 12.4 and 6a).³²

Conclusion

Resilience is integral to achieving many of the SDGs. Resilience defines the capacity of a system to withstand stresses and shocks, to transform in response to change and to adapt during a crisis. Agro-ecosystems that are managed sustainably will be more resilient and, in the long-term, far more productive. In this Issue Brief, we have attempted to illustrate with specific examples points of overlap between the COSA Resilience Measurement approach and relevant, globally accepted

protect and prevent the extinction of threatened species.

³¹ Target 15.9: 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

³² Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment. Target 6a: By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programs, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

sustainability targets identified within the UN's SDG framework.

In the next issue brief, we build on our analysis by examining the measurement differences between resilience and sustainability. While the two concepts are deeply related, measurement difficulties imply the need for care in the operationalization of a resilience

measurement tool. Recognition of these differences is the first necessary step to measure goals and progress in ways that are functionally useful to reach resilience and long-term sustainability.

For more information about COSA and its resilience measurement system, please send an email to info@thecosa.org.

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