



Food and Agriculture Organization
of the United Nations

FOOD SECURITY AND CLIMATE BENEFITS THROUGH NATIONALLY APPROPRIATE MITIGATION ACTIONS IN AGRICULTURE

Armine Avagyan, Janie Rioux, Maria Nuutinen and Martial Bernoux



©FAO/Daniel Hayduk/FAO

KEY MESSAGES

- 1** Timely actions need to be taken to tap into the mitigation potential of agriculture if emission reduction targets are to be met and the increase in global temperature kept below 2°C.
- 2** In their Intended Nationally Determined Contributions (INDCs) 86 percent of all countries explicitly recognized that agriculture together with land use, land use change and forestry have significant potential to mitigate climate change.
- 3** Nationally Appropriate Mitigation Actions (NAMAs) enhance agricultural productivity, support food security and rural development, and at the same time reduce greenhouse gas (GHG) emissions.
- 4** NAMAs provide a mechanism that can support the implementation of INDCs and the achievement of a number of sustainable development goals (SDGs).
- 5** The experiences that have been gained and the lessons learned from NAMA development can contribute to the realization of INDCs and SDGs.

Collective efforts to address climate change

In 2015, world leaders demonstrated a strong commitment to tackling climate change and promoting sustainable socio-economic development.

In September 2015, all Member States of the United Nations adopted the Sustainable Development Goals (SDGs). SDG 13 addresses climate change. The inclusion of climate change in the SDGs is an explicit recognition that actions to address climate change and initiatives to achieve sustainable development are interconnected and complementary.

In December 2015, during the 21st Conference of the Parties (COP 21) of the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, government leaders reached a new global agreement on climate change, known as the Paris Agreement.

The Intended Nationally Determined Contributions (INDCs) submitted before the COP 21 reflected increased national ambitions to address climate change and provided the foundation for the Paris Agreement.



World leaders from 175 Parties signed the historic Paris Agreement on 22 April 2016.

Agriculture is a priority sector for developing countries to address climate change

A significant number of INDCs have highlighted the link between actions required to address climate change and efforts to meet national development priorities (UNFCCC, 2015). According to a FAO analysis, 86 percent of the countries included actions related to the agriculture, forestry and other land use sector (AFOLU) in their INDCs for climate change mitigation (FAO, 2016).

In the INDCs of developing countries, the AFOLU sector is often considered to be a sector where there are important synergies between climate change adaptation and mitigation and socio-economic development (FAO, 2016).

Efforts to reduce GHG emissions in the AFOLU sector create valuable opportunities to build on these synergies through activities related to sustainable agricultural intensification, improved production efficiency, climate change adaptation, food security and rural development. For example, net GHG emissions can be reduced by improving livestock health and diets, increasing the efficiency of the use of nitrogen fertilizers, alternate wetting and drying rice paddies, expanding agroforestry and sustainably managing organic and mineral soils.

Agricultural development provides opportunities to address climate change and foster food security

In many developing countries, agriculture accounts for a significant portion of the gross domestic product and employs a large part of the population. The agricultural sector, which includes crop and livestock production, fisheries and aquaculture, and forestry, has a central role in supporting livelihoods and improving food security.

According to the Fifth Report of the Inter-governmental Panel on Climate Change (IPCC), climate change is projected to negatively affect agricultural production. Smallholder farmers, forest dwellers, herders and fishers are particularly vulnerable to climatic variation, as they depend directly on natural resources and often have limited assets and reduced capacity to adapt to change.

In many countries, agriculture also contributes a substantial share of the total GHG emissions. It is estimated that GHG emissions from the AFOLU sector make up 24 percent of global emissions, making it the largest GHG emitting sector after energy (Smith *et al.*, 2014). Global emissions from agriculture are rising, with emissions from crops and livestock increasing by almost 100 percent between 1961-2012 (Figure 1).

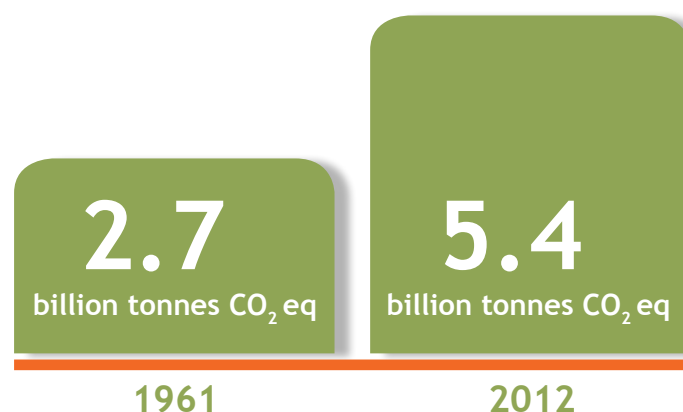


Figure 1: Global emissions from crops and livestock increased almost 100 percent in the last 50 years. Source: FAOSTAT, 2016.

According to FAO estimates, if trends in food consumption patterns do not change, global food production will need to increase by 60 percent over the next 30 years to meet demand (Alexandratos and Bruinsma, 2012). Increased food production is expected to result in higher GHG emissions.



For this reason, it is important to transform agricultural systems; to set them on a low-emission, climate-resilient development pathway that reduces the GHG intensity of food by lowering the amount of emissions per unit of agricultural product.

In agriculture, there are many opportunities for reducing GHG emissions and increasing resilience to climate change. The mitigation potential of agriculture is high, and 70 percent of this potential is in developing countries (Smith *et al.*, 2014). Much of this mitigation potential can be reached by improving existing agricultural practices and increasing production efficiency. For example, in the livestock sector, a 30 percent reduction in GHG emissions would be possible if every producer would adopt the technologies and practices already being used by the least emission-intensive producers (Gerber *et al.*, 2013). These findings demonstrate the importance of expanding the uptake of improved practices, which can be accomplished through the policy harmonization, technology transfer and extension services.

The integration of NAMAs, SDGs and the Paris Agreement offers a unique opportunity to simultaneously address food security and climate change.

NAMAs can serve as one of the instruments for the implementation of INDCs and the realization of SDGs (Figure 2). The NAMA concept, introduced in the UNFCCC's Bali Action Plan in 2007, refers to any action that reduces GHG emissions and is implemented under the umbrella of a national governmental initiative for sustainable development (UNFCCC, 2008).

NAMAs should be sustainable, scalable and replicable, and lead to transformational change. NAMAs can play an essential role in the new climate landscape and enable countries to attract funding for initiatives that both reduce GHG emissions and strengthen food security (FAO, 2015).

As of July 2016, interventions in the AFOLU sector were included in around 18 percent of all NAMA submissions to the UNFCCC NAMA Registry (www4.unfccc.int/sites/nama).

The majority of AFOLU NAMAs have been submitted by countries in Latin America and the Caribbean (Figure 3). All the AFOLU NAMAs that have attracted funding are from middle-income countries.

Submitted AFOLU NAMAs cover many different areas, including livestock production, fertilizer application, manure management, rice cultivation, and mangrove restoration and reforestation. A high proportion of AFOLU NAMAs (44 percent) are multi-sectorial, linking agricultural production, waste management and energy production.

A limited number of NAMA proposals in the AFOLU sector have received financing. However, there is still a gap between NAMAs development and implementation. Countries have reported bottlenecks related to barriers in technology adoption and capacity, and the limited engagement of various stakeholders along the value chains of the food system.



Figure 2: NAMAs can be one of the instruments for achieving Nationally Determined Contributions and SDGs.

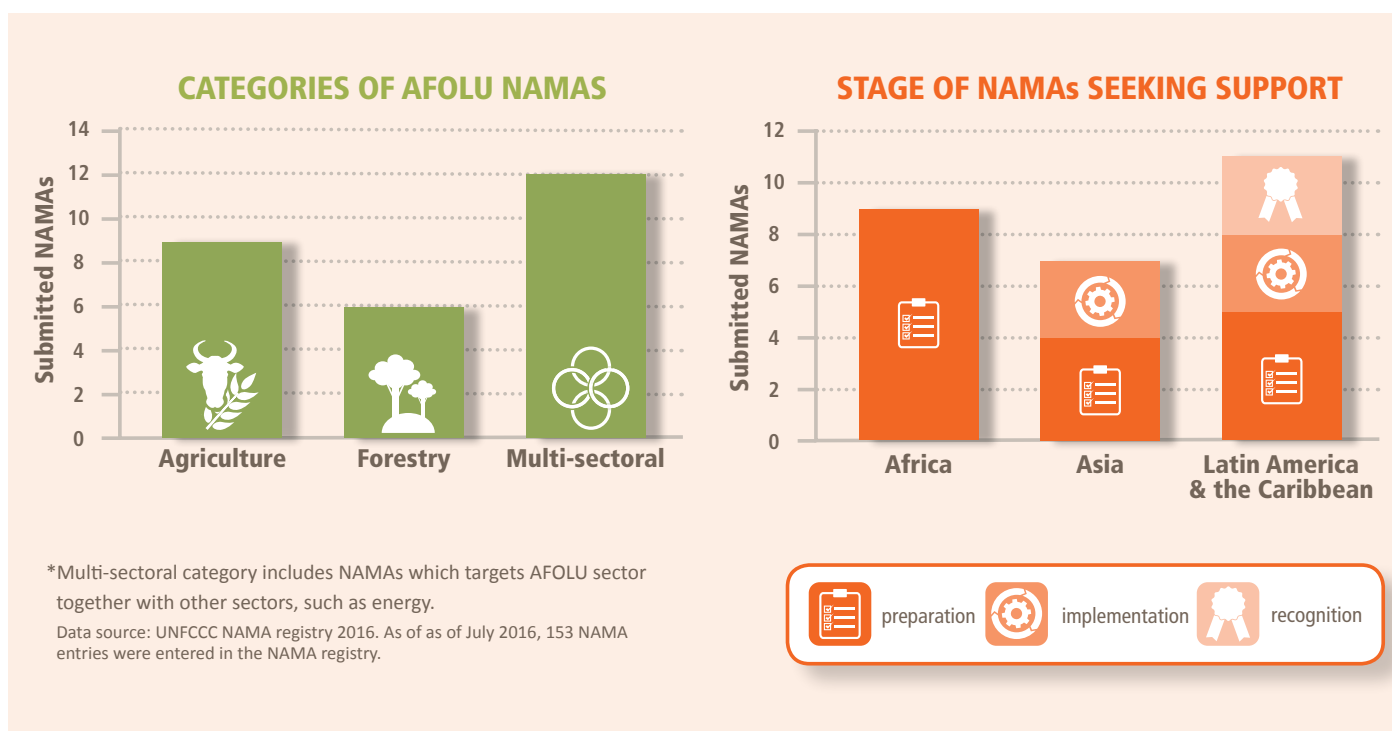
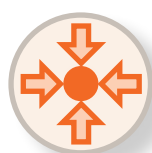


Figure 3: Overview of NAMAs in the AFOLU sector.

Actions to support NAMAs implementation



Policy and institutional framework: Create an enabling environment with supportive policies, regulations and an adequate institutional framework to implement mitigation actions.



Coordination: Develop and strengthen capacities of national officials and establish effective coordination mechanisms between national and subnational institutions.



Finance: Provide accessible climate finance through a combination of financial instruments, such as risk guarantees, insurance schemes and grants, to agricultural stakeholders throughout the value chain.



Knowledge: Promote research and identify context-specific mitigation options; build the knowledge base for mitigation technologies and practices; and strengthen regional and international cooperation to facilitate an exchange of knowledge.



Data: Improve data availability; develop new data collection systems or improve existing systems for monitoring GHG emissions and SDG co-benefits; and establish a measurement, reporting and verification (MRV) system.



Awareness: Raise awareness, build a common understanding, and share knowledge on the benefits of improved agricultural practices with mitigation co-benefits.


HOW TO FOSTER NAMAs IMPLEMENTATION RATE?

To increase their implementation rate, NAMAs need to be explicitly linked to INDCs and SDGs. The experiences that have been gained and the lessons learned from NAMA development, and from efforts to overcome the technical, financial and institutional barriers to NAMA implementation, can contribute to the success of INDCs and the realization of SDGs.

A holistic approach must be taken when promoting climate change mitigation activities in agriculture. Mitigation actions should not be proposed in isolation. To unlock the significant climate change mitigation potential of agriculture, policy makers should establish supportive policy frameworks that provide incentives for private sector engagement; connect climate change issues with rural development; and foster synergies between the multiple benefits derived from the sustainable transformation of agricultural production.

It is especially important to demonstrate to farmers, herders, fishers and foresters and other stakeholders in the agricultural value chain that tangible benefits (e.g. increased production, higher incomes, reduced costs and improved livelihoods) can be obtained by adopting low-emission practices. If these benefits are not evident, food producers, processors, distributors and marketers will be unwilling to modify their practices.

Climate change mitigation actions should be considered in national budgets and linked to the national agricultural development plans, food security and climate change strategies. There is also a need to develop and strengthen the capacities of national officials and establish coordination mechanisms between national and subnational institutions. As many agricultural NAMAs involve multi-sectorial interventions, it is important at a very early stage to engage with other government ministries and with the private sector.



Agriculture is essential
in responding to
climate change.

Acknowledgements

The financial support for this brief was provided by the Government of Finland to the Mitigation of Climate Change in Agriculture (MICCA) Programme of the Food and Agriculture Organization (FAO) of the United Nations.

References

- Alexandratos, N. and J. Bruinsma. 2012. World agriculture towards 2030/2050: the 2012 revision. ESA Working paper No. 12-03. Rome, FAO.
- FAO, 2015. Learning tool on Nationally Appropriate Mitigation Actions (NAMAs) in the agriculture, forestry and other land use (AFOLU) sector by Avagyan, A., Karttunen, K., DeVit, C., Rioux, J. Rome, 162 pp (available at: <http://www.fao.org/3/a-i4642e.pdf>).
- FAO, 2016. *The agriculture sectors in the Intended Nationally Determined Contributions: Analysis*. Environment and Natural Resources Management Working Paper 61. Rome (available at: <http://www.fao.org/3/a-i5687e.pdf>).
- FAOSTAT, 2016. Emissions-Agriculture. FAOSTAT database Rome, FAO (available at http://faostat3.fao.org/browse/G1/*/E).
- Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, 2013. *Tackling climate change through livestock - A global assessment of emissions and mitigation opportunities*. Rome, FAO.
- Smith P., M. Bustamante, H. Ahammad, H. Clark, H. Dong, E.A. Elsiddig, H. Haberl, R. Harper, J. House, M. Jafari, O. Masera, C. Mbow, N.H. Ravindranath, C.W. Rice, C. Robledo Abad, A. Romanovskaya, F. Sperling, and F. Tubiello, 2014 : Agriculture, Forestry and Other Land Use (AFOLU). In: *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- UNFCCC, 2008. Report of the Conference of the Parties on its thirteenth session, held in Bali, 2007. FCCC/CP/2007/6 (available at <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf>).
- UNFCCC, 2015. Synthesis report on the aggregate effect of the intended nationally determined contributions. FCCC/CP/2015/7 (available at <http://unfccc.int/resource/docs/2015/cop21/eng/07.pdf>).
-



Climate and Environment Division, FAO

www.fao.org/climate-change

www.fao.org/in-action/micca