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Ha Noi, Viet Nam



**ASEAN MULTI-SECTORAL FRAMEWORK FOR CLIMATE CHANGE: AGRICULTURE AND
FORESTRY TOWARDS FOOD AND NUTRITION SECURITY AND ACHIEVEMENT OF SDGs
(Proposed Integrated Framework for AFCC Component 4)**

2018

Executive Summary

Agriculture and forestry constitute 30.08% and 48.82% respectively, or a total of 78.89% (342,454,000 ha) of Southeast Asia's total land area of 434,070,000 ha. By the mere size of their coverage alone, it is no doubt that these sectors are important pillars in contributing to food and nutrition security in the region as well as to the achievement of sustainable development goals (SDGs). For instance, many ASEAN countries belong to the top 3 world ranking in many agri-food commodities produced. While both agriculture and forestry's contribution to gross domestic product (GDP) of the ASEAN countries is declining, they are still important sources of livelihood for many people especially in lower-income economies (Teng 2016). A study by the Center for International Forestry Research (CIFOR) estimated that forests and tree-based agricultural systems contribute directly and indirectly to the livelihoods of around one billion people globally (Sunderland et al. 2013). The same study argues that wild foods from forests are important for food and nutrition security while trees and forests are crucial in the provision of ecosystem services to agriculture.

Agriculture and forestry in the Southeast Asian Region, however, are among the more vulnerable sectors in terms of threats associated with climate change. Yet, they also offer great potential for safeguarding food and nutrition security and contributing to the attainment of SDGs. These are key sectors that can contribute to the stabilization of atmospheric greenhouse gas concentrations through the reduction of emission by source from deforestation and forest degradation and removals by sinks through forest rehabilitation, sustainable forest and land (e.g. wetlands) management, and improved agricultural practices, among others. More than other sectors, agriculture and forestry also offer great possibility to link mitigation and adaptation measures that can produce better outcomes.

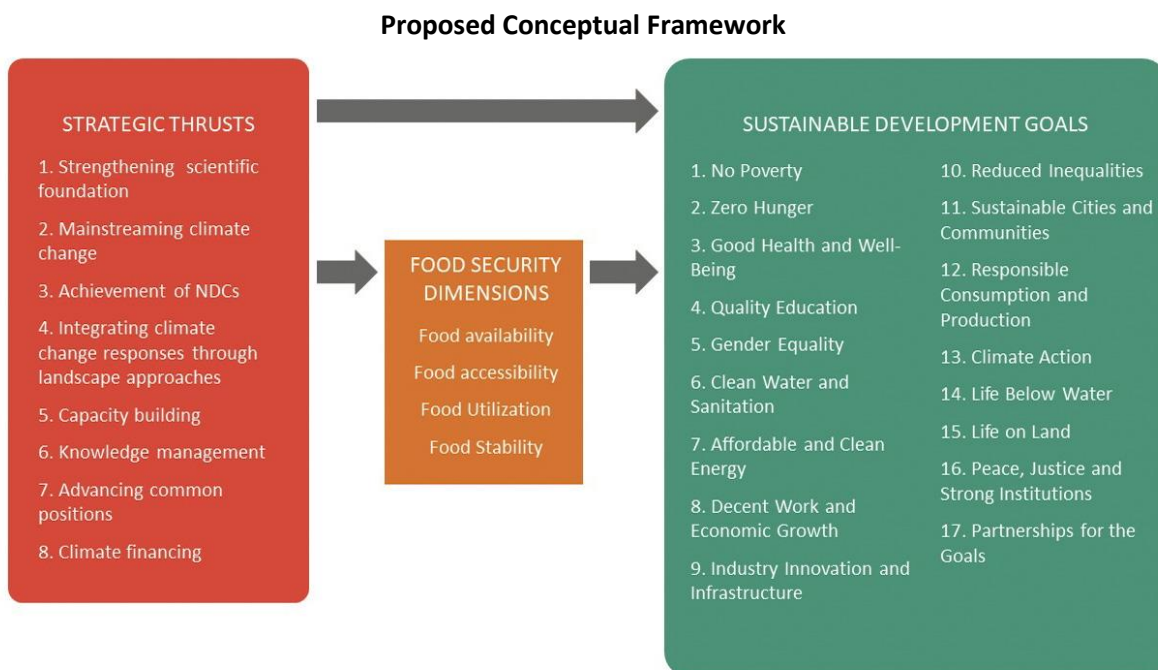
Recognizing that Southeast Asia is the one of the most vulnerable regions of the world in terms of adverse climate change impacts that can undermine food and nutrition security and the attainment of SDGs, and capitalizing on its potential to strengthen the resilience of its people and ecosystems towards a more sustainable future, the development of a more comprehensive multi-sectoral strategic framework that builds on the existing ASEAN Multi-sectoral Framework on Climate Change: Agriculture and Forestry Towards Food Security (AFCC) was deemed of central importance. The AFCC Ad Hoc Steering Committee recognizes the need to adopt a common conceptual understanding to guide the development of AFCC's Component 4, namely, a comprehensive multi-sectoral strategic framework and roadmap for implementation for 2020 and beyond. During its 5th AFCC Steering Committee Meeting held in Bali, Indonesia in December 2016 with Singapore Senior Officials Meeting of the ASEAN Ministers of Agriculture and Forestry (SOM-AMAF) as Chair, the AFCC agreed to develop such a conceptual framework and requested the ASEAN-Swiss Partnership on Social Forestry and Climate Change (ASFCC) through its support for the ASEAN Working Group on Social Forestry (AWG-SF), formerly the ASEAN Social Forestry Network, to take the lead.

The process of developing this Proposed Integrated Framework for AFCC Component 4 and a roadmap for its implementation is meant to facilitate dialogue and collaboration across the different sectors of the ASEAN Sectoral Ministerial Bodies, and promote regional cooperation on matters related to food security and climate change. A major challenge in crafting the framework is how to simultaneously address local and national needs and priorities such as food security while contributing to broader development goals particularly the SDGs. To address this challenge, the proposed framework has the following three core elements:

1. A set of strategic interventions consisting of strategic thrusts and actions based on proven and promising approaches that address climate change-related issues and in the food, agriculture, and forestry (FAF) sectors;
2. The dimensions of food security that are expected to be enhanced by these e strategic

interventions; and

3. The SDGs to which both the strategic interventions and the achievement of food security and its dimensions are expected to contribute.



Taking into consideration internationally accepted and officially adopted concepts, definitions and processes, the proposed integrated framework is grounded on the following conceptual building blocks: 1) governance and institutional mechanisms; 2) food and nutrition security; 3) livelihoods and asset building; 4) landscapes, ecosystems and well-being; and 5) climate change vulnerability, resilience, adaptation and mitigation. The framework is designed to contribute to food and nutrition security and achievement of the SDGs through the strategic thrusts and actions proposed below:

Strategic Thrust 1: Mainstreaming cross-sectoral, collaborative, inclusive approaches and mechanisms to addressing climate-related challenges and opportunities into regional, national, and local policies, programs, plans and investments to contribute to food security and Sustainable Development Goals (SDGs)

Action 1: Strengthen the legal basis and regulatory framework of climate change initiatives by creating enabling laws and policies in the food, agriculture and forestry (FAF), energy, transport, industry, water, urban, and other relevant sectors in support of food and nutrition security and SDGs.

Action 2: Establish appropriate institutional arrangements and support systems to effectively formulate, implement and monitor and evaluate climate-smart, rights-based and gender sensitive policies, programs, plans and investments in the FAF and other relevant sectors.

Action 3: Put in place appropriate mechanisms for stakeholder engagement and participatory/inclusive processes, including the active partnership of the private sector, and recruit climate change champions at different levels to mobilize stakeholders' support and facilitate successful implementation.

Action 4: Institute effective, accessible and transparent and participatory monitoring and evaluation systems to track progress on policies, programs and investments and assess outcomes and impacts in relation to food security and the achievement of relevant SDGs.

Strategic Thrust 2: Strengthening the scientific foundation with local knowledge on climate change and food security to improve decision-making at various levels with the participation of civil society and the private sectors

Action 1: Increase investment in research, development and extension services (RDE) for improved technologies and management systems to enhance resilience and facilitate climate-smart/friendly agriculture, land use, and fishery, in cooperation with research programs and networks on the basis of best practices.

Action 2: Institute national and regional climate change assessments similar to IPCC with special emphasis on food security.

Action 3: Support regional and national collaborative researches on climate change and food security similar to the approach of the Asia-Pacific Network for Global Change Research Asia-Pacific Network for Global Change Research (APN) within the context of capacity development including participatory action research (PAR).

Action 4: Formulate and implement innovative geographically-based climate-smart/friendly pilot projects (e.g. organic agriculture, drought/salt tolerant varieties, system of rice intensification, sustainable livelihoods, etc.) in vulnerable areas (e.g. coastal area) including participatory approaches to research, for possible upscaling.

Action 5: Conduct regular science-policy dialogues including different stakeholders (government, private and civil society) to ensure policy uptake of relevant researches.

Strategic Thrust 3: Facilitating the achievement of Nationally Determined Contributions (NDCs) in the agriculture and forestry sectors

Action 1: Establish national level data bases based on common standards, with provision for information sharing among ASEAN Member States in support of NDC implementation.

Action 2: Formulate, implement and communicate long-term low carbon emission strategies (low carbon society) and resilience-building adaptations in the relevant sectors under the AFCC umbrella in support of NDCs.

Action 3: Mobilize support of different stakeholders, including the private sector, from local to international level to ensure NDC compliance.

Action 4: Promote collective action among the ASEAN Member States to facilitate mobilization of financial support for NDC implementation, including through joint proposal development.

Action 5: Institute an effective monitoring, evaluation system and reporting system of NDC performance in the agriculture and forestry sectors to keep track of progress through time and promote transparency and accountability.

Strategic Thrust 4: Advancing integrated climate change mitigation and adaptation responses through landscape approaches to safeguard food and nutrition security, promote sustainable livelihoods, and improve climate resiliency especially among poor farmers and other vulnerable groups

Action 1: Develop and promote the adoption of appropriate climate-smart technologies, including indigenous practices for agriculture, fisheries and forestry that are suitable for landscape approaches and promote food security (e.g. organic agriculture that does not pollute water bodies and fisheries, rainwater harvesting technologies, community water storage system, etc.)

Action 2: Document and upscale existing good and innovative practices like agroforestry, climate-smart agriculture, integrated watershed/coastal resources management/ ridge to reef approaches, etc., and traditional knowledge and practices that contribute to food and livelihood security and sustainable natural resources management.

Action 3: Integrate ecosystem-based adaptation and sound climate mitigation strategies like Reducing Emission from Deforestation and Forest Degradation Plus (REDD+) and other mechanisms in land use planning and development using landscape approaches.

Action 4: Conduct long-term monitoring and assessment of environmental and social changes in

landscape/watershed areas and its impacts on food and livelihood security and climate resiliency with emphasis on smallholder farmers, fishers, indigenous people, and other vulnerable groups and provide responsive strategies to enhance their resilience.

Action 5: Adopt and continuously improve appropriate governance models suitable for landscape approaches to promote successful interventions.

Action 6: Create enabling policies, legislation and related institutional mechanisms including incentives to promote the wider application of landscape approaches that contributes to food security and sustainable development.

Action 7: Continue to assess the effectiveness of integrated climate change adaptation and mitigation responses, i.e., actions that reduce society's vulnerability while reducing greenhouse gas emissions, in the context of landscape approaches using appropriate metrics of effectiveness.

Strategic Thrust 5: Initiating and sustaining comprehensive capacity development of local, national and regional institutions to achieve food and nutrition security and sustainable development in the context of climate change

Action 1: Evaluate the impacts/effects of past and present climate-related capacity development initiatives in Southeast Asia including the potential for coordination and synergies among and within countries, to improve effectiveness and impacts of present and future capacity development efforts.

Action 2: Conduct comprehensive capacity need assessments at the local, national and regional levels on the human resource and organizational needs of relevant institutions to effectively tackle the challenge of food and nutrition security amidst changing climate.

Action 3: Invest more on continuing capacity development by developing and implementing comprehensive, collaborative, and long-term capacity development programs to address the challenge of climate change including safeguarding food security.

Action 4: Integrate climate science in school curricula (including extra curricula) from the elementary to the post-graduate level, linking climate change responses with the importance of environment-related initiatives like agroforestry, reforestation, organic agriculture, biodiversity conservation, landscape approaches and other activities that improve ecosystem services while promoting food security.

Action 5: Institute mechanisms and appropriate incentive systems to maintain the gains of capacity development.

Strategic Thrust 6: Strengthen knowledge management mechanisms to safeguard food and nutrition security amidst changing climate

Action 1: Evaluate the effectiveness of past and existing climate change capacity development for knowledge management systems at the national and regional level to enhance their effectiveness.

Action 2: Develop and institutionalize protocols for data and information sharing related to climate change and food and nutrition security at the national and regional levels.

Action 3: Institutionalize innovative methods of climate information sharing at the grassroots level, e.g. effective early warning system from drought, floods and storms; market information on prices of commodities, etc., to support food and nutritional security and ensure more open access to relevant information.

Action 4: Strengthen national and regional dialogues, coordination and cooperation to distill and share experiences and knowledge on the impacts of and responses to climate change in agriculture, fisheries, livestock, and forestry sectors towards food and nutrition security and sustainable development.

Action 5: Put in place institutionalized mechanisms for relevant working groups to communicate and exchange information amongst themselves outside and in addition to regularly scheduled ASEAN meetings.

Strategic Thrust 7: Providing and strengthening platforms for developing and advancing ASEAN common interests on issues related to climate change and food security in international fora.

As the vision of ASEAN integration increasingly becomes reality, ASEAN Member States will have to better coordinate and more strategically communicate to advance their common interests in international forums. The ASEAN Vision for Food, Agriculture and Forestry along with a number of issue and sector-based regional cooperation frameworks, guidelines and action plans provide solid foundation for defining and advancing Member States' common interests in international forums related to climate change, food security and the SDGs. In order to facilitate the clarification of ASEAN common interests and planning of concerted efforts for their advancement, the following actions are proposed:

Action 1: Strengthen regional and cross-Ministerial coordination as follow-up on advancing ASEAN Common interests on food security at international fora.

Action 2: Strengthen the AFCC as a platform where all relevant sectoral bodies could be engaged in developing ASEAN common interests on issues related to food, agriculture and forestry and climate change at international fora.

Action 3: Strengthen the capacity of ASEAN Member States individually and collectively to implement decisions and resolution from UNFCCC COP SBSTA and other negotiation processes.

Strategic Thrust 8: Securing climate change financing to support climate change initiatives supportive of food and nutritional security and sustainable development

Action 1: Explore non-traditional sources of funding like carbon tax and payment for ecosystem services to finance food security-related initiatives.

Action 2: Strengthen partnership with the private sector to increase climate funding.

Action 3: Promote climate budget tagging to ensure government support for climate change initiatives.

Action 4: Coordinate efforts at the ASEAN regional level to secure funding under the Paris Agreement mechanism.

If adopted and implemented this proposed framework can serve as a starting point for a roadmap for action on climate change and food and nutrition security in line with the SDGs and the Paris Climate Agreement. It can facilitate dialogue, enhance sectoral and regional cooperation, and provide guidance in regional and national priority setting. The present AFCC Ad Hoc Steering Committee will need to evolve into a permanent Steering Committee with a strong mandate to lead in the implementation of the proposed framework and monitor progress. As a living document, the framework will have to be regularly reviewed, ideally every 3-5 years, and updated to keep up with new developments and effectively respond to the changing needs and priorities of the ASEAN region.

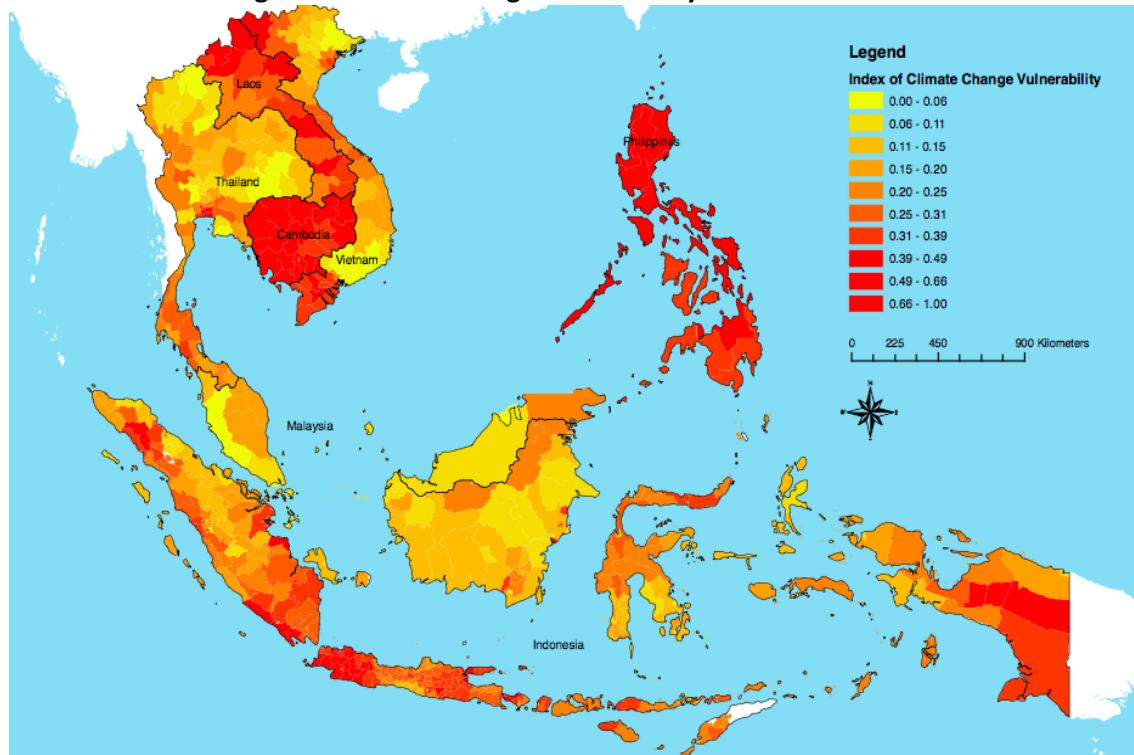
1. Context of ASEAN Regional Cooperation on Climate Change and Food Security

With most Southeast Asian economies heavily relying on agriculture for employment and natural resources for livelihood and well-being despite the sector's declining share of GDP, it is expected that the region will be immensely impacted by adverse effects of climate change. According to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), communities situated along coastal and delta regions are at risk of being flooded as sea level is expected to rise. Specifically, the Lower Mekong River Basin (LMB), which produces half of the world's rice supply, will be affected, submerging farmlands in Vietnam and decreasing rice production yield due to saltwater intrusion in Myanmar (IPCC 2014; Dasgupta et al. 2009; Wassmann et al. 2009). The area has also tallied erratic observations of climate change such as temperature rise, rainfall variability, intensified

flooding and drought and sea level rise (ICEM, 2010; IRG, 2010).

Specific areas in Southeast Asia have been identified as being susceptible to climate change impacts. To understand the current level of vulnerability to climate change in the region, the Environment and Economy Program for Southeast Asia (EEPSEA) has conducted a study that produced a climate change vulnerability index. The assessment in **Figure 1** shows that “all regions in the Philippines, the Mekong River Delta in Vietnam, almost all regions in Cambodia, North and East Lao PDR, Bangkok region in Thailand, and West Sumatra, Western Java, and Eastern Java of Indonesia are among the most vulnerable regions in Southeast Asia.”

Figure 1. Climate Change Vulnerability in Southeast Asia



Source: Yusuf and Francisco (2009); IDRC (2009)

Market impacts related to economic activity in farmlands and fisheries in Indonesia, the Philippines, Thailand and Viet Nam, will be affected, projecting a mean loss of 2.2% of GDP by 2100. Non-market risks such as health and ecosystems, as well as disaster and calamity risks, can cost up to 5.7% and 6.7% of GDP (ADB 2009).

Aside from climate change and natural resources degradation, food security is another pressing problem that has been a major area of priority in Southeast Asia following the food price crisis in 2007-2008 and 2010-2011. The region has demonstrated several issues in each of the four dimensions of food security as defined by the Food and Agricultural Organization namely, food availability, food accessibility, food utilization and food stability.

With approximately 625 million people and a rising middle class, the population of Southeast Asia has been undergoing dynamic changes in migration and employment in recent years. **Table 1** indicates the relevant statistics to food security in Southeast Asia. Most countries in the region have been experiencing rural to urban migration, given better employment opportunities and access to basic services in the metropolis (Amare et al. 2012). The migration of people has, one way or

another, led to a decline in the labor force for the agricultural sector in the region and a shift in employment to the services and manufacturing sector. With a rapidly growing population in need of more food supply and a decrease in people in rural areas and workers in the agricultural sector, the region's food availability is definitely at risk.

Table 1. Statistics Relevant to Food Security in Southeast Asia

	Rural-Urban Population (as % of population)				Share of Employment (%)				Share of GDP (%)			
	Rural		Urban		Agriculture		Non-Agriculture		Agriculture		Non-Agriculture	
	2000	2016	2000	2016	2000	2016	2000	2016	2000	2016	2000	2016
Brunei	28.8	22.5	71.2	77.5	-	-	-	-	1.0	1.2	99.0	98.8
Cambodia	81.4	79.1	18.6	20.9	73.7	64.3 (2014)	26.3	35.7 (2014)	37.9	26.3	62.1	73.7
Indonesia	58.0	45.5	42.0	54.5	45.3	31.9	54.7	68.1	15.6	14	84.4	86
Lao PDR	78.0	60.3	22.0	39.7	82.7 (2001)	72.2 (2010)	17.3 (2001)	27.8 (2001)	48.5	19.5	51.5	80.5
Malaysia	38	25.2	62	74.8	16.7	11.4	83.3	88.6	8.3	8.8	91.7	91.2
Myanmar	73.0	70.5	27.0	29.5	-	53.2	-	46.8	57.2	25.5	42.8	74.5
Philippines	52.0	55.7	48.0	44.3	37.1	27.0	62.9	73.0	14.0	9.7	86	90.3
Singapore	0	0	100.0	100.0	0.1	0.1	99.9	99.9	0.1	0.0	99.9	100
Thailand	68.9	55.5 (2013)	31.1	44.5 (2013)	44.2	31.2	55.8	68.8	8.5	8.3	91.5	91.7
Viet Nam	75.8	65.5	24.2	34.5	65.1	41.8	34.9	58.2	24.5	18.1	75.5	81.9

Source: ADB. 2017. *Key Indicators for Asia and the Pacific 2017*. Manila, Philippines: Asian Development Bank (ADB).

The food accessibility and food utilization dimensions of food security can be linked to rampant development issues in Southeast Asia. Despite the region's fast-growing economy, growth is still not inclusive and the poor have yet to reap the benefits of growth to combat hunger, malnutrition and undernourishment. According to the Global Hunger Index of 2015 (**Figure 2**), the Philippines, Indonesia, Lao PDR and Myanmar are experiencing serious level of hunger, while Thailand, Malaysia and Viet Nam have moderate levels of hunger.

Figure 2. Global Hunger Index 2015



Source: IFPRI (2015)

Malnutrition and undernourishment are good indicators of food insecurity. The “double burden of malnutrition” has been evident in especially in children, setting off the alarms to physical and mental health risks. ASEAN’s latest statistics on nutrition rates among Southeast Asian children under 5 years reported that an average of 31.5% or 17.7 million are stunted, 4 million are wasted and 4.5 million are either overweight or obese (ASEAN 2016).

Food stability can also be affected by climate variability. Intermittent changes in rainfall and temperature that cause the warming of surface waters pose serious threats on the region’s vast coastal regions and the already dwindling supply of fish and marine resources. Food production will be greatly affected, for example projections show that rice yields are estimated to decrease by 50% by 2100 (ADB 2009).

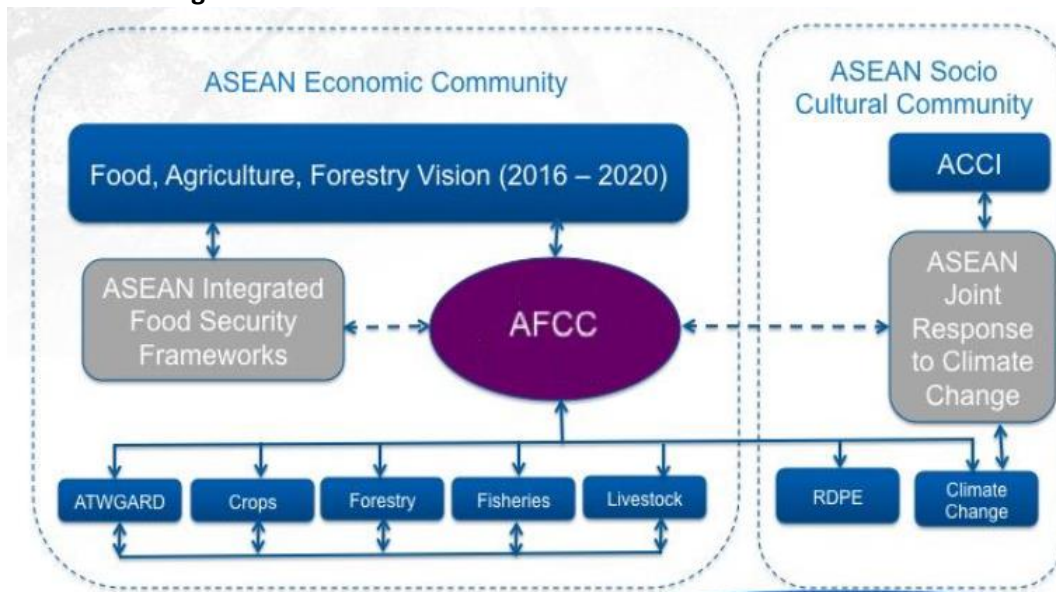
In response to the overriding concerns on climate change and food security, the ASEAN has addressed these issues through various policy responses and initiatives by its sectors and working groups. In 2009, the ASEAN adopted the ASEAN Integrated Food Security (AIFS) Framework, supported with the Strategic Plan of Action – Food Security (SPA-FS) 2009-2013, as a regional initiative and systematized approach to food security. Its two-fold aim is to ensure long-term food security in ASEAN and improve the livelihood of farmers in the region. It is now on its second phase as a new AIFS and SPA-FS 2015-2020 has been adopted.

Moreover, with the increasing relevance of climate change and its effects on various sectors of the regional economy, the Vision and Strategic Plan for ASEAN Cooperation on Food, Agricultural and Forestry (FAF) was endorsed and adopted during the 37th SOM-AMAF in 2015. The FAF envisages a “competitive, inclusive, resilient and sustainable Food, Agriculture, and Forestry (FAF) sector integrated with the global economy, based on a single market and production base contributing to food and nutrition security and prosperity in the ASEAN community”.

The ASEAN Socio-Cultural Community (ASCC) Pillar supervises all ASEAN programs for cooperation and joint activities on climate change through the ASEAN Climate Change Initiative (ACCI) that works under the purview of the ASEAN Senior Officials on Environment (ASOEN). The ASEAN Working Group on Climate Change (AGWCC) is the implementing arm of the ACCI through the ASEAN Joint Response to Climate Change.

All aforementioned frameworks and bodies (**Figure 3**) work in cooperation and coordination with one another and are relevant to AFCC, which will be comprehensively discussed in the next section.

Figure 3. ASEAN Frameworks and Bodies Relevant to the AFCC



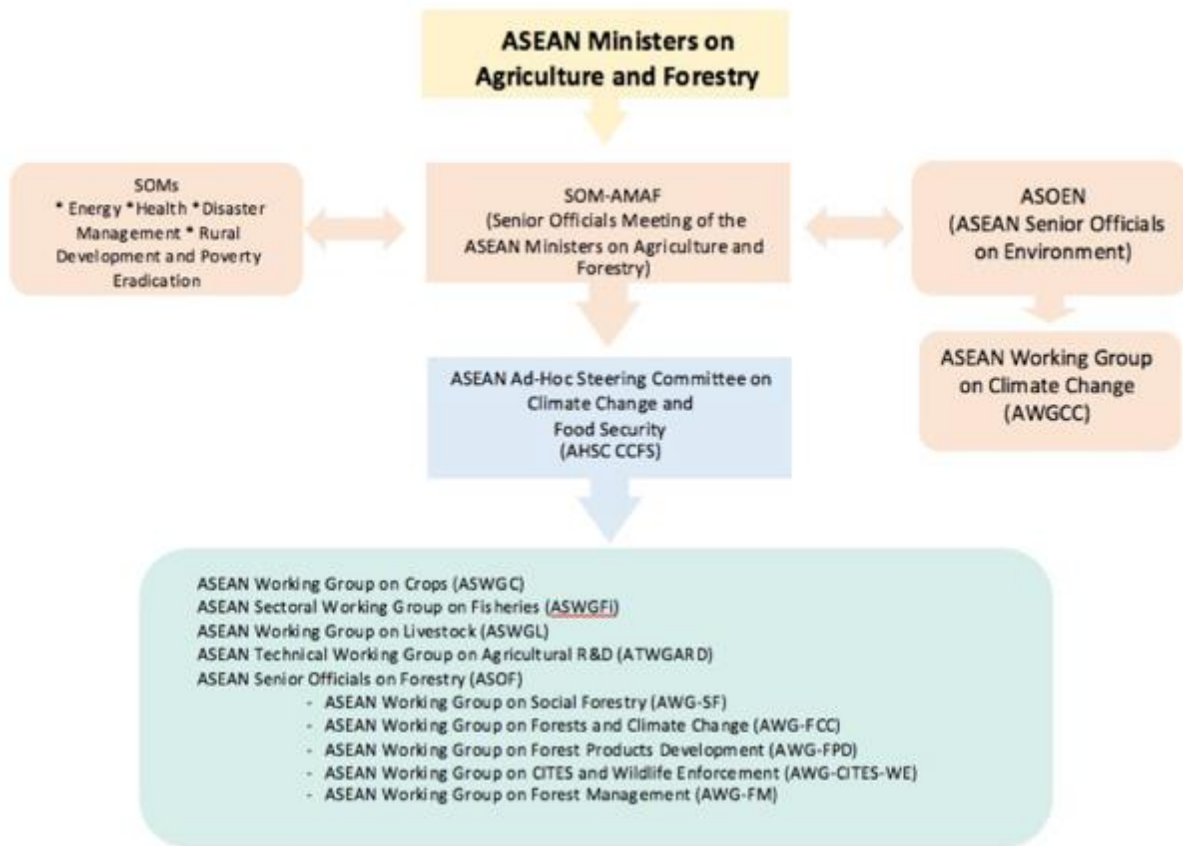
Source: ASEAN (2015)

2. Overview of AFCC and its Modalities

The ASEAN Multi-Sectoral Framework on Climate Change: Agriculture, Fisheries and Forestry Towards Food Security (AFCC) was created to address Strategic Thrust 6 (Identify and address emerging issues related to Food Security) of the ASEAN Integrated Food Security Framework (AIFS) and Strategic Plan of Action on Food Security (SPA-FS) 2009-2013. The AFCC Framework links the three ASEAN Community pillars, namely ASEAN Economic Community (AEC), ASEAN Political Security Community (APSC) and ASEAN Socio-Cultural Community (ASCC) to comprehensively tackle the region's persistent issues on climate change and food security. It also captures related components of the Initiative for ASEAN Integration (IAI) Strategic Framework and IAI Work Plan 2.

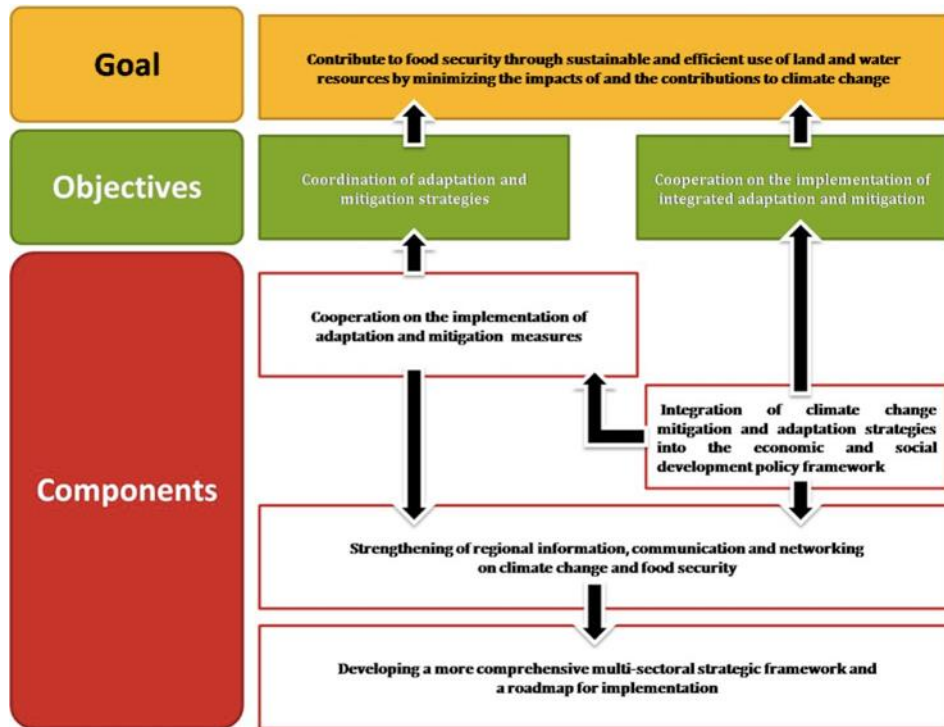
The AFCC was created under the purview of the Ad-Hoc Steering Committee on Climate Change and Food Security (AHSC-CCFS), headed by the Senior Officials Meeting of the ASEAN Ministers of Agriculture and Forestry (SOM-AMAF). The Framework is implemented by working groups under the ASEAN Ministers on Agriculture and Forestry (AMAF) that deals with livestock, crops, fisheries, forestry and agricultural R&D (**Figure 4**). It further extends to coordination and collaboration with other sectoral bodies on environment, rural development and poverty eradication, disaster management, health and energy.

Figure 4. AFCC Coordination Structure



In general, the Framework aims to contribute to food security through sustainable, efficient and effective use of land, forest, water and aquatic resources by minimizing the risks and impacts of climate change. It provides an organized platform for the creation of actions and activities and supports open dialogue and cooperation amongst different ASEAN bodies and working groups to address current threats, challenges and concerns. To ensure that the goal of this Framework is fully realized, two main objectives are highlighted: (1) coordination on the development of adaptation and mitigation strategies; and (2) cooperation on the implementation of integrated adaptation and mitigation measures. The goal and objectives support the Strategic Plan of Action (SPA) which is further explained by components and its thrusts as shown in **Figure 5** and elaborated in **Box 1**.

Figure 5. AFCC Goal, Objectives and Components



Source: ASEAN (2009)

Box 1. AFCC Components and Strategic Thrusts

(ASEAN, http://www.asfnsec.org/www2/wp-content/uploads/2016/10/Flyer_AFCC_web_version.pdf. Retrieved 24 April 2017)

Component 1: Integration of climate change mitigation and adaptation strategies into the economic and social development policy framework

Strategic Thrust 1: Assess the impacts of climate change on and risks for Agriculture, Fisheries, Livestock and Forestry and contributions of those sectors to climate change (in line with AEC A6 and A7, ASCC B3 and B7, IAI D 10);

Strategic Thrust 2: Assess environmental impacts and risks, specifically on biological diversity (in line with ASCC D8);

Strategic Thrust 3: Assess the socio-economic impacts and risks of climate change, and identify the most vulnerable and priority geographic areas and communities for climate change adaptation and mitigation;

Strategic Thrust 4: Formulate food security measures to address and respond to climate change to enhance sustainable development and strengthen livelihoods (in line with AEC A7);

Strategic Thrust 5: Incorporate climate change adaptation and mitigation measures and strategies into national development strategies, policies and programs (in line with AEC A6 and A7, ASCC B3, S3).

Component 2: Cooperation on the implementation of adaptation and mitigation measures

Strategic Thrust 1: Strengthen land- and water-use planning at national and sub- national levels (AEC A6 and A7);

Strategic Thrust 2: Cooperate on the promotion of integrated adaptation and mitigation of agricultural production systems including crops and livestock management (in line with AEC 7, ASCC B3, B7, S1, S2);

Strategic Thrust 3: Cooperate on the promotion of adaptation and mitigation in forestry (in line with AEC A6 and A7, ASCC D 11, IAI D 11, S1, S2);

Strategic Thrust 4: Cooperate on the promotion of adaptation and mitigation in fisheries (AEC A6 and A7);

Strategic Thrust 5: Foster co-benefit approaches integrating environmental concerns such as biodiversity conservation into climate change-related measures (in line with ASCC D1 and D8, S1, S2);

Component 3: Strengthening of national and regional knowledge sharing, communication and networking on climate change and food security

Strategic Thrust 1: Synergize databases and information systems related to climate change and food security (in line with AEC A7, ASCC D6);

Strategic Thrust 2: Strengthen national and regional cooperation, coordination, consultation and communication on the impacts of and response to climate change on agriculture, fisheries, livestock and forestry towards food security (in line with AEC A6 and A7, AIFS C3);

Strategic Thrust 3: Strive for coordinated or common positions on climate change and food security (AEC A7);

Strategic Thrust 4: Strengthen regional partnerships and coordination with ASEAN partners on climate change and food security (AEC A7).

Component 4: Developing a more comprehensive multi-sectoral strategic framework and a roadmap for implementation.

Note: AEC – ASEAN Economic Community; ASCC – ASEAN Socio-Cultural Community; IAI – Initiative for ASEAN Integration; AIFS – ASEAN Integrated Food Security Framework

These components and thrusts are solidified and supplemented by the proposed Key Performance Index (KPIs) wherein key contributions, expected results and contributing thrusts are identified.

The AHSC CCFS, chaired by the SOM-AMAF, meets once in a year and is attended by the Chair of the ASEAN Working Groups related to the AFCC, the relevant Divisions of the ASEAN Secretariat, and Partner Organizations. During the 5th AHSC Meeting held in Bali, Indonesia on 1-2 December 2016 which was chaired by Singapore, important recommendations were made that relate to the development of a common conceptual understanding to guide the development of AFCC's

Component 4 and facilitate learning and collaboration across different sectors impacted by issues of climate change and food security. The 5th AHSC Meeting agreed to: 1) develop multi-sectoral conceptual framework for climate change and food security in the context of the SDGs, Paris Agreement and the ASEAN Vision on FAF with the ASEAN-Swiss Partnership on Social Forestry and Climate Change (ASFCC) as the lead; 2) ensure the participation and representation of all AMS and relevant AWGs in developing said conceptual framework and in identifying priority areas for collaboration; and 3) engage cross- sectoral working groups on the proposed framework from all concerned SOMs.

3. Building Blocks for the Proposed AFCC Component 4 Framework: Towards a Common Conceptual Understanding

The AFCC Component 4 framework proposed below is anchored on officially adopted and internationally accepted concepts and definitions as well as proven and promising approaches and strategies that relate to agriculture and forestry in the context of safeguarding food and nutrition security considering climate change challenges and the 2030 Sustainable Development Goals (SDGs). It has five building blocks which include concepts and approaches on: 1) governance and institutional mechanisms; 2) food and nutrition security; 3) livelihoods and asset building; 4) landscapes, ecosystems and well-being; and 5) climate change vulnerability, resilience, adaptation and mitigation. These building blocks are briefly summarized here and elaborated in Appendix A.

3.1. Governance and institutional mechanisms

Keen interest in advancing a more sustainable development base has triggered the establishment of various governance and institutional mechanisms that simultaneously address the need for socioeconomic development while sustaining the natural resource base. The last few years have witnessed the emergence of such mechanisms at the global and regional levels to serve as the framework to guide the collective action of the community of nations towards a set of common goals.

At the international level, the year 2015 was a breakthrough in the history of development and environment fields with the creation of two major international frameworks relevant to sustainable development and climate change that will impact on food security: 1) the **Sustainable Development Goals (SDGs)** covering the period of 2016 to 2030 adopted in September 2015 by the UN General Assembly in New York; and 2) the **Paris Climate Agreement**, which was agreed in December 2015 and entered into effect on 4 November 2016 with the ratification of majority of the UN-member countries.

At the heart of the SDGs, officially known as “Transforming our world: the 2030 Agenda for Sustainable Development,” is a set of 17 “Global Goals” and 169 targets (**Table 2**). The overarching challenge is *“to eradicate poverty and hunger in all forms, to combat inequalities within and among countries, to build peaceful, just and inclusive societies, to protect human rights and promote gender equality and the empowerment of women and girls, and to ensure the lasting protection of the planet and its natural resources by 2030”* (UN 2015).

Table 2. Sustainable Development Goals

1. No Poverty	End poverty in all its forms everywhere
2. Zero Hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3. Good Health and Well-Being	Ensure healthy lives and promote well-being for all at all ages
4. Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5. Gender Equality	Achieve gender equality and empower all women and girls
6. Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all
7. Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable and modern energy for all
8. Decent Work and Economic Growth	Promote sustained, inclusive and sustainable economic growth full and productive employment and decent work for all.
9. Industry Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10. Reduced Inequalities	Reduce inequality within and among countries
11. Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient and sustainable
12. Responsible Consumption and Production	Ensure sustainable consumption and production patterns
13. Climate Action	Take urgent action to combat climate change and its impacts
14. Life Below Water	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
15. Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and biodiversity loss
16. Peace, Justice and Strong Institutions	Promote just, peaceful and inclusive societies
17. Partnerships for the Goals	Revitalize global partnership for sustainable development

Source: UN (2015)

On the other hand, the Paris Agreement is an agreement within the UNFCCC involving a comprehensive strategy of addressing the global challenge of climate change through greenhouse gases emissions mitigation, adaptation and finance starting in the year 2020. An important feature of the agreement is the "nationally determined contributions" (NDCs) which is the contribution that each individual country should make in order to achieve the worldwide goal that sets the limit for carbon emissions. **Table 3** provides the checklist on NDCs for the Southeast Asian ADB developing member countries. As reflected in the table, the Paris Agreement advances an innovative policy that provides a balanced treatment between climate change mitigation and adaptation which is an improvement of the previous international efforts that mainly favored climate change mitigation measures.

Table 3. Summary of Intended Nationally Determined Contributions (NDCs) of ASEAN Member States

	Conditionality		Mitigation Targets					Sectoral Measure					Adaptation Measures	Financing Requirements	
	Conditional	Combined	Increased Use of Renewable Energy	Enhanced Energy Efficiency	Reduced Carbon / GHG Emission Intensity	Reduced Carbon / GHG Emission	Carbon Neutral / Ecosystems Neutral GHG Emission	Agriculture and Natural Resources	Energy	Industry and Trade	Transport	Urban			Water
Brunei*															
Cambodia	✓					✓		✓	✓	✓	✓			✓	✓
Indonesia		✓					✓	✓	✓	✓	✓			✓	
Lao PDR	✓		✓					✓	✓	✓		✓	✓	✓	✓
Malaysia		✓			✓			✓	✓	✓		✓		✓	
Myanmar	✓							✓	✓	✓	✓	✓	✓	✓	
Philippines	✓					✓								✓	
Singapore**	n/a	n/a	✓	✓	✓			✓	✓	✓		✓	✓	✓	
Thailand		✓				✓		✓	✓	✓		✓	✓	✓	
Viet Nam		✓			✓	✓		✓	✓	✓		✓	✓	✓	

Source: Amponin and Evans (2016); Note: Checklist does not include Brunei and Singapore

* not available

** the analysis of Singapore's NDC was not part of the original source but used the same methodology

At the ASEAN regional level, food security and climate change initiatives and commitments are governed by the following frameworks and initiatives:

1. ASEAN Integrated Food Security (AIFS) Framework – a regional umbrella for food security-related initiatives, including bioenergy, climate change;
2. ASEAN Climate Change Initiative (ACCI) – a comprehensive and cross-sectoral platform for coordination and cooperation; and
3. ASEAN Multi-Sectoral Framework on Climate Change: Agriculture, Fisheries and Forestry towards Food Security (AFCC) – an initiative under AIFS Framework that provides inputs to ACCI

3.2. Food and nutrition security

Article 25 of the 1948 Universal Declaration of Human Rights recognized the right to food as part of the right to an adequate standard of living which is also enshrined in Article 11 of the 1966 International Covenant on Economic, Social and Cultural Rights. Moreover, the United Nations Committee on Economic, Social and Cultural Rights adopted the General Comment No. 12 in 1999 which states that “the right to adequate food implies the right to food in quantity and quality sufficient to satisfy the dietary needs of individuals, the right to food that is free from adverse substances and acceptable within a given culture, as well as sustainable access to this food” (Gordillo and Jeronimo 2013).

There are four widely acceptable pillars of food security as stated in the in 2009 Declaration of the World Summit on Food Security: availability, access, utilization, and stability (FAO, 2008). **Box 2** specifies the definition of each of the four pillars as contained in the AIFS Framework Document (2014).

Box 2. Four Dimensions of Food and Nutrition Security

(FAO, www.foodsec.org/docs/concepts_guidepdf. Retrieved 24 April 2017)

Physical AVAILABILITY of food. Food availability addresses the “supply side” of food security and is determined by the level of food production, stock levels and net trade.

Economic and physical ACCESS to food. An adequate supply of food at the national or international level does not in itself guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives.

Food UTILIZATION. Utilization is commonly understood as the way the body makes the most of various nutrients in the food. Sufficient energy and nutrient intake by individuals is the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.

STABILITY of the other three dimensions over time. Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status.

For food security objectives to be realized, all four dimensions must be fulfilled simultaneously.

The nutritional dimension is integral to the concept of food security. As contained in the AIFS Framework Document (2014):

Nutrition security exists when all people at all times consume food of sufficient quantity and quality in terms of variety, diversity, nutrient content and safety to meet their dietary needs and food preferences for an active and healthy life, coupled with a sanitary environment, adequate health, education and care.

Agriculture, which in the 2009 Declaration of the World Summit on Food Security comprises crops, livestock, forestry and fisheries, is at the core of advancing food and nutrition security. The same AIFS document therefore defines the characteristics of nutrition-enhancing agriculture as follows:

Nutrition-enhancing agriculture: When agriculture [that] effectively and explicitly incorporates nutrition objectives, concerns and considerations to improve nutrition through increasing the availability, access to and consumption of a nutritionally adequate diet from a variety and diversity of nutritious and safe foods.

3.3. Livelihoods and asset building

The concept of **Sustainable Livelihood (SL)** was developed in response to the challenge of addressing poverty in an integrated manner instead of the traditional narrow view of “livelihood” associated mainly with economic improvement. The idea of sustainable livelihoods was first introduced at the global level by the Brundtland Commission on Environment and Development and was further expanded in the 1992 United Nations Conference on Environment and Development (UNCED) which advocated for the achievement of sustainable livelihoods as a broad goal for poverty eradication. Such broader conceptualization is captured in the early work of Chambers and Conway who defined livelihood in the following manner:

A livelihood comprises the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other

livelihoods at the local and global levels in the short and long term (Chambers and Conway, 1991, p.6).

The concept of Sustainable Livelihood Approach (SLA) has been adopted as a useful framework not only for reducing poverty among poor rural poor communities across sectors but also for reducing vulnerability and enhancing adaptive capacities of upland and coastal communities to climate and weather-induced disasters. SLA involves the transformation of six types of capital assets: 1) human (e.g. education and training, health); 2) physical (e.g. roads, communication facilities); 3) social (e.g. social network, trust, reciprocity); 4) financial (e.g. savings, credit); 5) natural (land, water); and 6) political (e.g. distribution of rights and power) in order to produce desirable outcomes like improved income, increased in well-being, reduced vulnerability, improved food security, and more sustainable use of natural resource-base.

3.4. Landscapes, ecosystems and well-being

The concepts of *landscapes* and *ecosystems and well-being* have gained prominence among scholars and researchers in various fields as well as development agencies, policy makers, and development practitioners. They have been powerful conceptual tools in policy and decision-making, integrated environment and natural management, and the promotion of sustainable development through area-based interventions.

Sayer et al. (2017) defined landscape approach as follows:

***Landscape approach** is “a long-term collaborative process bringing together diverse stakeholders aiming to achieve a balance between multiple and sometimes conflicting objectives in a landscape or seascape”.*

On the other hand, interest in the links between **ecosystems** and **human well-being** has gained momentum at the international and national levels with the conduct and completion of the **Millennium Ecosystem Assessment (MA)**. The 2005 MA report defines ecosystem as follows:

*An **ecosystem** is a dynamic complex of plant, animal, and microorganism communities and the nonliving environment, interacting as a functional unit. Humans are an integral part of ecosystems. A well-defined ecosystem has strong interactions among its components and weak interactions across its boundaries. A useful ecosystem boundary is the place where a number of discontinuities coincide, for instance in the distribution of organisms, soil types, drainage basins, or depth in a water body. At a larger scale, regional and even globally distributed ecosystems can be evaluated based on a commonality of basic structural units.*

The MA reports highlighted the strong link between ecosystem condition and human well-being. The Executive Summary of Chapter 3 and the MA framework define the elements of human well-being and how these are linked to the condition of ecosystems and the services they provide:

***Human well-being** has several key components: the basic material needs for a good life, freedom and choice, health, good social relations, and personal security. Well-being exists on a continuum with poverty, which has been defined as “pronounced deprivation in well-being.”*

Ecosystems are essential for human well-being through their provisioning, regulating, cultural, and supporting services.

3.5. Climate change vulnerability, resilience, adaptation and mitigation

With the recognition of climate change being one of the greatest threats to human and biophysical

systems in the 21st century, there has been an explosion of related concepts to better understand this phenomenon and implement effective responses to minimize adverse impacts from the global to local level. The following key concepts which are officially adopted by the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC) in its 2014 Fifth Assessment Report are helpful in these regard¹:

Climate change, based on IPCC 2014, “refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use.”

Climate variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).

Vulnerability. The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt”.

Resilience. The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation.

Adaptation. The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effect.

Mitigation (of climate change). A human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs). This report (IPCC 2014) also assesses human interventions to reduce the sources of other substances which may contribute directly or indirectly to limiting climate change, including, for example, the reduction of particulate matter emissions that can directly alter the radiation balance (e.g., black carbon) or measures that control emissions of carbon monoxide, nitrogen oxides, Volatile Organic Compounds and other pollutants that can alter the concentration of tropospheric ozone which has an indirect effect on the climate.

4. The Proposed Framework

The proposed ASEAN Multi-Sectoral Framework on Climate Change: Agriculture and Forestry Contributing to Food Security and Sustainable Development Goals (AFCC-SDGs) otherwise known as the proposed “AFCC Component 4 Framework”, builds on the AFCC that was endorsed by the ASEAN Ministers of Agriculture and Forestry (AMAF) in November 2009 in Bandar Seri Begawan, Brunei Darussalam. It incorporates salient points of the recent global agreements of the United Nations (UN) that relates to climate change and sustainable development particularly the 2015 Paris Agreement and the 2030 SDGs. At the regional level, it also incorporates the existing initiatives of the ASEAN such as the IFS Framework and Strategic Plan of Action, ACCI, AFCC, and the Vision and

¹ Except when indicated, the following definitions are from the Glossary of Terms of the IPCC 2014.

Strategic Plan for ASEAN Cooperation in FAF (2016-2025) and the proposed ASEAN public-private partnership framework for technology development which has now been expanded to cover technology development for the food, agriculture and forestry sector. Moreover, it integrates some of the officially adopted and generally accepted concepts in the fields of agriculture, forestry, rural development, climate change, and governance as well as some of the proven and promising approaches in these fields relevant to food security and sustainable development.

4.1. Goal

The proposed integrated framework for AFCC aims to contribute to food and nutrition security through people-centered, equitable, efficient and sustainable use and management of land, forest, water, and aquatic resources by minimizing the risks and enhancing resilience to climate change and weather-induced disasters towards the achievement of the Sustainable Development Goals.

4.2. Proposed Strategic Thrusts and Actions

Drawing from the conceptual building blocks discussed in section 3, this section proposes a set of strategic interventions consisting of strategic thrusts and actions based on proven and promising approaches to deal with the potential adverse impacts of climate change while safeguarding food security, with the end view of contributing to the SDGs. These approaches and strategic interventions are proposed as AFCC's Component 4 Framework.

Strategic Thrust 1: Mainstreaming cross-sectoral, collaborative, inclusive approaches and mechanisms to addressing climate-related challenges and opportunities into regional, national, and local policies, programs, plans and investments to contribute to food security and relevant Sustainable Development Goals

In the context of climate change, mainstreaming refers to the incorporation of climate change considerations into established or on-going development programs, policies or management strategies, rather than developing adaptation and mitigation initiatives separately (FAO, 2009). The close linkage between development and climate change responses has put to fore the idea of 'mainstreaming' to tackle both issues in an integrated way (Ayers et al., 2014). Mainstreaming involves the integration of information, policies and measures into ongoing development planning and decision-making to address climate change and a way of making more sustainable, effective, and efficient use of resources than designing and managing policies separately from ongoing activities.

Progress towards mainstreaming climate change concerns in the ASEAN region from national down the local level varies. In general, however, more efforts are needed to mainstream climate change concerns in the region to advance food security and help achieve the SDGs. To effectively mainstream climate change concerns into regional, national, and local policies, programs, plans and investments in ASEAN towards contributing to food security and relevant sustainable development goals, the following strategic actions should be pursued:

1. Strengthen the legal basis and regulatory framework of climate change initiatives by creating enabling laws and policies in the FAF, energy, transport, industry, water, urban, and other relevant sectors in support of food and nutrition security and SDGs.
2. Institute appropriate institutional arrangements and support systems to effectively formulate, implement and monitor and evaluate climate-smart, rights-based and gender sensitive policies, programs, plans and investments in the FAF and other relevant sectors.
3. Put in place appropriate mechanisms for stakeholder engagement and participatory/inclusive processes, including the active partnership of the private sector, and recruit climate change champions at different levels to mobilize stakeholders' support and facilitate successful implementation.

4. Institute effective, accessible and transparent and participatory monitoring and evaluation systems to track progress on policies, programs and investments and assess outcomes and impacts in relation to food security and the achievement of relevant SDGs.

Strategic Thrust 2: Strengthening the scientific foundation with local knowledge on climate change and food security to improve decision-making at various levels with the participation of civil society and the private sectors

Sound scientific foundation is the bedrock of successful climate change responses. Policies and decision-making should therefore be based on sound scientific researches instead of the rule of thumb or political interests. ASEAN lags behind in terms of scientific studies that relate to food production systems and food security involving both observed and projected climate change impacts (Hijioka et al. 2014). It has also limited studies on the terrestrial and inland ecosystems as well as on the projected impacts of climate change on human health, security, livelihoods and poverty. In the area of technology development, ASEAN is also in urgent need of post-harvest technologies to minimize post-harvest losses. Moreover, studies on the contribution of local and indigenous knowledge in addressing climate change issues are wanting. To strengthen the scientific foundation of decision-making in the region on matters that concern climate change and food security, the following key strategic actions may be pursued:

1. Increase investment in research, development and extension services (RDE) for improved technologies and management systems to enhance resilience and facilitate climate-smart/friendly agriculture, land use, and fishery in cooperation with research programs and networks on the basis of best practices (Action Program 4.1 of the Strategic Plan for the FAF Sector 2010-2025).
2. Institute national and regional climate change assessments similar to IPCC with special emphasis on food security.
3. Support regional and national collaborative researches on climate change and food security similar to the approach of the Asia-Pacific Network for Global Change Research Asia-Pacific Network for Global Change Research (APN) within the context of capacity development including participatory action research (PAR).
4. Formulate and implement innovative geographically-based climate-smart/friendly pilot projects (e.g. organic agriculture, drought/salt tolerant varieties, system of rice intensification, sustainable livelihoods, etc.) in vulnerable areas (e.g. coastal area) including participatory approaches to research, for possible upscaling.
5. Conduct regular science-policy dialogues including different stakeholders (government, private and civil society) to ensure policy uptake of relevant researches.

Strategic Thrust 3: Facilitating the achievement of Nationally Determined Contributions in the agriculture and forestry sectors

All the ASEAN countries are signatories to and have ratified the Paris Agreement. It will therefore be beneficial not only to the region but also to the global community to facilitate the NDC achievement of each of the ASEAN Member States towards food security and to contribute to the achievement of SDGs in the ASEAN region. Towards this end, the following strategic actions are presented for consideration:

1. Establish national level databases based on common standards, with provision for information sharing among ASEAN Member States in support of NDC implementation.
2. Formulate, implement and communicate long-term low carbon emission strategies (low carbon society) and resilience-building adaptations in the relevant sectors under the AFCC umbrella in support of NDCs.
3. Mobilize support of different stakeholders, including the private sector, from local to

international level to ensure NDC compliance.

4. Promote collective action among the ASEAN Member States to facilitate mobilization of financial support for NDC implementation, including through joint proposal development.

5. Institute an effective monitoring, evaluation system and reporting system of NDC performance in the agriculture and forestry sectors to keep track of progress through time and promote transparency and accountability.

Strategic Thrust 4: Advancing integrated climate change mitigation and adaptation responses through landscape approaches to safeguard food and nutrition security, promote sustainable livelihoods, and improve climate resiliency especially among poor farmers and vulnerable groups.

Landscape approaches are driving a paradigm shift in the international environmental and development community (Freeman et al. 2015). A landscape approach is a long-term collaborative process bringing together diverse stakeholders aiming to achieve a balance between multiple and sometimes competing objectives in a landscape. It has the potential to holistically balance multiple goals related to both environmental and non-environmental processes, for example, livelihoods and sustainable resource management in a given geographic scale. It has also been recognized by the Convention on Biodiversity (CBD) as a promising approach in improving the sustainable use of biodiversity (UNEP 2011; Sayer et al. 2013). Assessment of literature and experiences on landscape approaches points to its great potential to contribute to food security and to achievement of SDGs.

Despite its increasing prominence and the great potential of landscape approaches to realize multiple and competing objectives, such potentials have yet to be fully realized owing to its limited application in the ASEAN context especially as a key component of addressing the threats of climate change. It is therefore crucial to advance integrated climate change mitigation and adaptation responses through landscape approaches to safeguard food security, promote sustainable livelihoods, and improve climate resiliency especially among the poor farmers and other vulnerable sectors. In view of this, the following key strategic actions are proposed:

1. Develop and promote the adoption of appropriate climate-smart technologies, including indigenous practices for agriculture, fisheries and forestry that are suitable for landscape approaches and promote food security (e.g. organic agriculture that does not pollute water bodies and fisheries, rainwater harvesting technologies, community water storage system, etc.).

2. Document and upscale existing good and innovative practices, e.g. agroforestry, climate-smart agriculture, integrated watershed/coastal resources management/ ridge to reef approaches, etc., and traditional knowledge and practices that contribute to food and livelihood security and sustainable natural resources management.

3. Integrate ecosystem-based adaptation and sound climate mitigation strategies like Reducing Emission from Deforestation and Forest Degradation Plus (REDD+) and other mechanisms in land use planning and development using landscape approaches.

4. Conduct long-term monitoring and assessment of environmental and social changes in landscape/watershed areas and its impacts on food and livelihood security and climate resiliency with emphasis on smallholder farmers, fishers, indigenous people, and other vulnerable groups and provide responsive strategies to enhance their resilience.

5. Adopt and continuously improve appropriate governance models suitable for landscape approaches to promote successful interventions.

6. Create enabling policies, legislation and related institutional mechanisms including incentives to promote the wider application of landscape approaches that contributes to food security and sustainable development.

7. Continue to assess the effectiveness of integrated climate change adaptation and mitigation responses, i.e., actions that reduce society's vulnerability while reducing greenhouse gas emissions, in the context of landscape approaches using appropriate metrics of effectiveness.

Strategic Thrust 5: Initiating and sustaining comprehensive capacity development of local, national and regional institutions to achieve food and nutrition security and sustainable development in the context of climate change.

Experience in development work indicates that building institutional capacity and human resources are among the best investments to address the challenge of climate change. It is therefore important to develop the technical and organizational capacities of relevant institutions from regional down to the local level to effectively tackle the long-term and compounding impacts of climate change. Capacity development initiatives on climate change in SEA vary considering the different contexts and levels of institutional capacities that exist among nations. By and large, however, there appears to be very limited coordination and synergy among capacity development initiatives even within the same country that leads to waste of resources and limited impacts. Considering the fast development in the climate and related sciences and the need to address pressing climate change concerns, a continuing capacity development program should be instituted in Southeast Asia regardless of the current state of institutional capacities in these countries. There is also the need to strengthen coordination and collaboration within and among nations to promote synergy, conserve resources, and achieve better outcomes. The following strategic actions are therefore proposed:

1. Evaluate the impacts/effects of past and present climate-related capacity development initiatives in Southeast Asia including the potential for coordination and synergies among and within countries, to improve effectiveness and impacts of present and future capacity development efforts.
2. Conduct comprehensive capacity need assessments at the local, national and regional levels on the human resource and organizational needs of relevant institutions to effectively tackle the challenge of food and nutrition security amidst changing climate.
3. Invest more on continuing capacity development by developing and implementing comprehensive, collaborative, and long-term capacity development programs to address the challenge of climate change including safeguarding food security.
4. Integrate climate science in school curricula (including extra curricula) from the elementary to the post-graduate level, linking climate change responses with the importance of environment-related initiatives like agroforestry, reforestation, organic agriculture, biodiversity conservation, landscape approaches and other activities that improve ecosystem services while promoting food security.
5. Institute mechanisms and appropriate incentive systems to maintain the gains of capacity development.

Strategic Thrust 6: Strengthening knowledge management mechanisms to safeguard food and nutrition security amidst changing climate

Knowledge management involves the practice of capturing, storing and sharing knowledge to distill lessons from the past and apply them in the future (Egan 2003). There has been a growing movement in recent years that emphasized the importance of improved application of knowledge management as a means to improve development work and outcomes. In the Southeast Asian context, as the impacts of climate change continue to intensify, threatening the food security and livelihoods of millions, there is a pressing need to enhance the way knowledge is translated into advocacy, policy, and action. Despite on-going efforts there remains the necessity to strengthen knowledge management on climate change at the local, national, and regional levels to maximize their contribution towards climate resiliency. The following strategic interventions are proposed to

strengthen knowledge management mechanisms in Southeast Asian countries towards food security and climate resiliency:

1. Evaluate the effectiveness of past and existing climate change capacity development for knowledge management systems at the national and regional level to enhance their effectiveness.
2. Develop and institutionalize protocols for data and information sharing related to climate change and food and nutrition security at the national and regional levels.
3. Institutionalize innovative methods of climate information sharing at the grassroots level like effective early warning system from drought, floods and storms; market information on prices of commodities; etc. to support food and nutritional security and ensure more open access to relevant information.
4. Strengthen national and regional dialogues, coordination and cooperation to distill and share experiences and knowledge on the impacts of and responses to climate change in agriculture, fisheries, livestock, and forestry sectors towards food and nutrition security and sustainable development.
5. Put in place institutionalized mechanisms for relevant working groups to communicate and exchange information amongst themselves outside and in addition to regularly scheduled ASEAN meetings.

Strategic Thrust 7: Providing and strengthening platforms for developing and advancing ASEAN common interests on issues related to climate change and food security in international fora.

As the vision of ASEAN integration increasingly becomes reality, ASEAN Member States will have to better coordinate and more strategically communicate to advance their positions in international fora. The ASEAN Vision for Food, Agriculture and Forestry along with a number of issue and sector-based regional cooperation frameworks, guidelines and action plans provide solid foundation for defining and advancing Member States' common interests in international fora related to climate change, food security and the SDGs. In order to facilitate the clarification of ASEAN common interests and planning of concerted efforts for their advancement, the following actions are proposed:

1. Strengthen regional and cross-Ministerial coordination as follow-up on advancing ASEAN Common interests on food security in international fora.
2. Strengthen the AFCC as a platform where all relevant sectoral bodies could be engaged in defining and advancing ASEAN common interests on issues related to food, agriculture and forestry and climate change in international fora.
3. Strengthen the capacity of ASEAN Member States individually and collectively to implement decisions and resolutions from UNFCCC COP SBSTA and other negotiation processes.

Strategic Thrust8: Securing climate change financing to support initiatives that promote food and nutritional security and sustainable development

Many national and local governments in the ASEAN Region have committed or are mandated by law to allocate financial resources to support climate change programs of various kinds. International funding institutions like the Asian Development Bank, World Bank, as well as the overseas development agencies also provide resources to support climate change efforts. Yet, given the limited resources of many governments in Southeast Asia, the long- term sustainability of the different climate change initiatives will largely depend on the continuous flow of financial support. In addition to government budget, and funding from donor agencies, tapping the contribution of the private sector and other groups in financing climate change programs is crucial. To mobilize

adequate financial support to achieve food security, the following strategic actions are proposed:

1. Explore non-traditional sources of funding like carbon tax and payment for ecosystem services to finance food security-related initiatives.
2. Strengthen partnership with the private sector to increase climate funding.
3. Promote climate budget tagging to ensure government support for climate change initiatives.
4. Coordinate efforts at the ASEAN regional level to secure funding under the Paris Agreement mechanism.

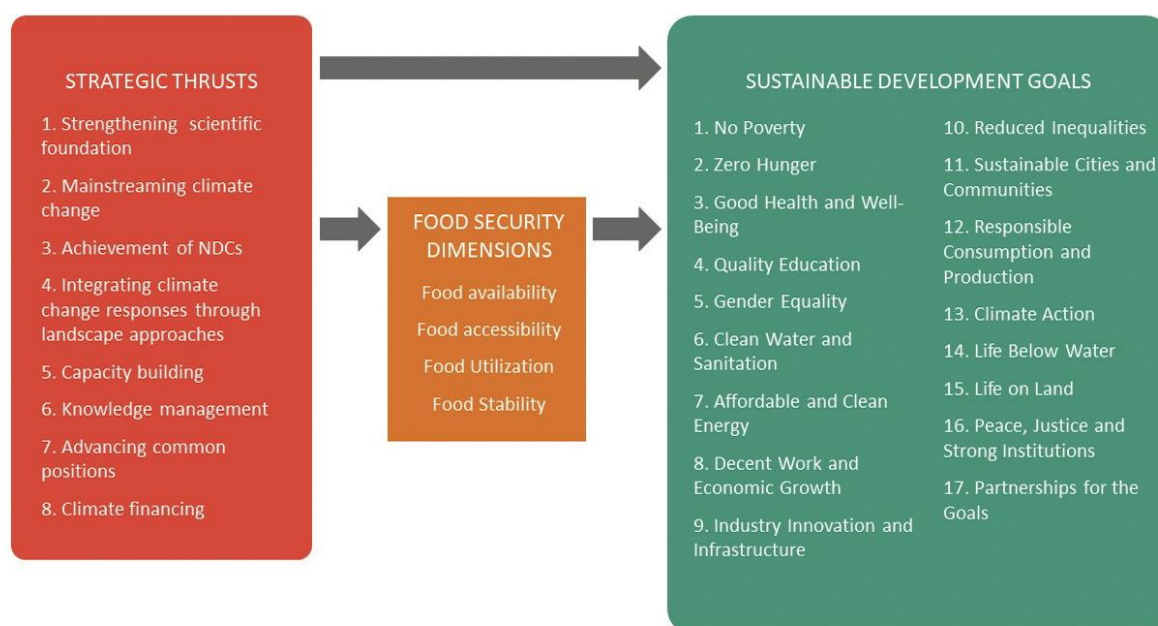
4.3. Elements of the Framework and their Linkages

A major challenge in implementing the proposed AFCC Component 4 Framework is how to simultaneously address local and national needs and priorities such as food security while contributing to broader development goals particularly the SDGs. Thus, the proposed framework has the following three core elements:

1. A set of strategic interventions consisting of strategic thrusts and actions based on proven and promising approaches (the details of which are discussed above) that address climate change-related issues and challenges in the FAF and other relevant sectors;
2. The dimensions of food security (i.e. availability, accessibility, utilization and stability) that are expected to be enhanced by these strategic interventions; and
3. The SDGs to which both the strategic interventions and the achievement of food security are expected to contribute.

Figure 6 presents a schematic diagram of the proposed framework. As shown in the figure, the different approaches serve as the “inputs” (or climate change interventions) to contribute to food security and ultimately to the different sustainable development goals. Here, food security serves as the “outputs” of the climate change approaches while the SDGs may serve as the ultimate impacts of the different approaches as well as the safeguarded food security brought about by the successful implementation of the different approaches. In essence, food security serves as an “intermediary variable” between the “approaches” or climate change interventions and SDGs. This implies that different approaches, when successfully pursued, can contribute to food security and ultimately to SDGs.

Figure 6. Proposed Conceptual Framework



5. Operationalizing the Framework

As indicated earlier, the proposed AFCC Component 4 Framework and the roadmap for its implementation is designed to facilitate dialogue and collaboration across the different sectors of the ASEAN Sectoral Ministerial Bodies on matters related to food security and climate change with the end view of contributing to the achievement of the SDGs in the ASEAN Region. Inputs from and ownership of the framework not only by the FAF sector but also of the other relevant ASEAN sectors are therefore essential for the framework and the roadmap to serve their purpose. To realize this, the following sections discuss the uses and users of the framework, required institutional mechanisms, progress monitoring, as well as how the framework can evolve over time. The final section proposes some initial steps and activities towards operationalizing and implementing the framework.

5.1. Uses and Potential Users of the Framework

As the ASEAN strives to fully develop into a unified economic and socio-cultural community, it should simultaneously address major threats that can undermine the realization of this goal, one of which is climate change. One can therefore never overemphasize the importance of a comprehensive multi-sectoral strategic framework to collectively address climate change challenges that threatens the potential of FAF and other relevant sectors to contribute to food and nutrition security in the region and to SDGs as a whole. Specifically, following are the anticipated uses and users of the proposed framework:

1. Promote common understanding of important concepts, approaches and terminologies relevant to addressing climate change and food and nutrition security which may be useful to policy makers and other groups who may not have technical expertise in the field
2. Serve as a starting point for defining a roadmap for regional action on climate change and food and nutrition security
3. A tool to facilitate dialogue and enhance collaboration on climate change and food and nutrition security-related actions across the different sectors in the 3 ASEAN pillars
4. Guide in setting regional and national priorities in the ASEAN FAF sectors on matters concerning climate change, food and nutrition security and sustainable development

Aid in mobilizing resources for integrated, cross-sectorally coordinated actions on climate change, food and nutrition security and sustainable development

5.2. Institutional Mechanisms Required

Central to the effective operationalization of the framework is an appropriate institutional mechanism that will be responsible carrying out the operationalization of the framework. The ASEAN Ad-Hoc Steering Committee on Climate Change and Food Security (AHSC CCFS) will have a crucial role to play in translating the framework into a roadmap and in monitoring progress and learning. Towards this end, AHSC CCFS has to facilitate the following key strategies:

1. Put in place enabling mechanisms for continuous and spontaneous sharing of information among technical working groups across sectors and stakeholder groups, and facilitate cross-sectoral meetings (whole or part of the group) even outside of or in addition to formally scheduled ASEAN meetings, including for example, inviting cross-sectoral representation in individual/sectoral working group conferences, technical group meetings etc.
2. Organize and enable procedural flexibility within ASEAN support mechanisms to encourage different sectoral bodies to directly link with each other
3. Facilitate linkages between this proposed framework/mechanism with existing and emerging national-level mechanisms for cross-sectoral coordination e.g. those related to NDCs, SDGs, food and nutrition
4. Define explicit key performance indicators (KPIs) for progress under this proposed framework/mechanism and establish their links with FAF KPIs and SDGs and NDC targets
5. Institutionalize effective monitoring system as discussed below.

In order to be effective, the AHSC CCFS must evolve into a permanent Steering Committee with a strong mandate to lead in the implementation of the proposed framework and monitor progress.

5.3. Monitoring Progress and Learning

Appropriate monitoring systems should be developed and effectively implemented to determine the progress of the operationalization of the framework and the roll out of the AFCC road map for action. Lessons learned in adopting the framework and in implementing the roadmap should likewise be captured to improve processes and outcomes. With measurable outputs, outcomes and impacts, indicators should be specified and baseline values measured to determine the contribution of the roadmap implementation to food and nutrition security and to achieving SDGs in the ASEAN Region.

5.4. Further Evolution of the Framework

This framework is meant to serve as a living document to guide ASEAN Bodies dealing with climate change and food and nutrition security policies, programs and projects in the FAF and other relevant sectors. It needs to be regularly reviewed, ideally every 3-5 years, and updated to conform with new developments and adapt to the changing needs and priorities of the Region. The regular review of the framework should be initiated by the fully mandated Steering Committee of the AFCC with support from relevant ASEAN Bodies, technical working groups and partners

5.5 Initial Steps Forward

The 6th AHSC CCFS Meeting held in Lombok in January 2018 broadly supported this proposed framework and adopted a set of recommendations to SOM AMAF to support its implementation. These included the strengthening of the AHSC CCFS as a permanent committee to oversee the implementation of the AFCC with a mandate to engage with relevant Bodies and Working Groups across ASEAN. The 6th AHSC CCFS Meeting also recommended that the SOM AMAF Chair lead and coordinate with other relevant SOMs, notably ASOEN and AWGCC, to implement the framework. The Meeting and Member States also encouraged activities to be pursued to initiate the

implementation of the framework to guide the AFCC going forward.

Accordingly, building on these decisions and guidance from the 6th AHSC CCFS, the following initial activities are proposed:

1. Convene expert workshops to clarify and further develop details of the framework, with priority on:
 - Clarifying the meaning of integrated climate change adaptation and mitigation responses in the context of landscape approaches and how these may be operationalized;
 - Defining key performance indicators (KPIs) for progress under this proposed framework and establishing their links with FAF KPIs and SDG and NDC targets;
 - Establishing national level databases based on common standards, with provision for information sharing in support of NDC implementation;
 - Clarifying strategies and tactics for collective action among ASEAN Member States to facilitate joint financial resources mobilization;
 - Defining indicators and establishing baseline values to be used for monitoring progress; and
 - Defining priority activities under the framework's strategic thrusts with emphasis on activities to support the achievement of NDCs.
2. Facilitating dialogues, information exchange and coordination to ensure cross-linkages and consistency among relevant FAF guidelines, particularly on:
 - Agroforestry;
 - Public-Private Partnership;
 - Promotion of Responsible Investment; and
 - Gender Mainstreaming
3. Developing a regional capacity building program to support and facilitate the implementation of integrated, cross-sectoral strategic actions within the framework of AFCC

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Appendix A. Building Blocks for the Proposed AFCC Framework: Towards a Common Conceptual Understanding

To facilitate dialogue and enhance collaboration across the different sectors, the AFCC Steering Committee recognized the need to foster a common conceptual understanding of key terminologies to guide the development of AFCC's Component 4, namely, a comprehensive multi-sectoral strategic framework and roadmap implementation for 2020 and beyond. Such conceptual understanding is anchored on officially adopted and generally accepted concepts and definitions that relate to agriculture and forestry in the context of safeguarding food and nutrition security considering climate change challenges and the 2030 SDGs. More than the definitions however, the context by which these concepts evolved and the major institutions that espoused them are briefly discussed in this section to better understand these concepts.

1. Governance and institutional mechanisms

Keen interest in advancing more ecological sustainable development has triggered the establishment of various governance and institutional mechanisms that simultaneously address the need for socioeconomic development while conserving or enhancing the natural resource base. The last few years have witnessed the emergence of such mechanisms at the global and regional levels to serve as the framework to guide the collective action of the community of nations towards a common goal.

1.1. International frameworks

The year 2015 was a breakthrough in the history of development and environment fields with the creation of two major international frameworks relevant to sustainable development and climate change that will impact on food security. In September 2015, a new set of development goals—the **Sustainable Development Goals (SDGs)** covering the period of 2016 to 2030 were adopted by the UN General Assembly in New York. This was followed by a new climate change agreement—the **Paris Agreement**— under the UNFCCC which was agreed in December 2015 and entered into effect on 4 November 2016 with the ratification of majority of the UN-member countries.

1.1.1. Sustainable Development Goals

At the heart of the Sustainable Development Goals (SDGs), officially known as “Transforming our world: the 2030 Agenda for Sustainable Development,” is a set of 17 "Global Goals" and 169 targets. The overarching challenge is *“to eradicate poverty and hunger in all forms, to combat inequalities within and among countries, to build peaceful, just and inclusive societies, to protect human rights and promote gender equality and the empowerment of women and girls, and to ensure the lasting protection of the planet and its natural resources by 2030”* (UN 2015).

The SDGs builds on the Millennium Development Goals (MDGs), a global development framework with 8 goals, 21 targets and 60 indicators. The progress of this earlier framework varied across countries, continents and goals with least developed and landlocked developing countries in Africa and small island states unable to sufficiently attain their health-related and other goals.

1.1.2. Paris Agreement

The Paris Agreement is an agreement within the UNFCCC involving a comprehensive strategy for addressing the climate change problem through greenhouse gases emissions mitigation, adaptation and finance starting in the year 2020. Article 2 of the Agreement stipulates that it “aims to strengthen the global response to the threat of climate change in the context of sustainable development and the efforts to eradicate poverty”, including by:

- “(a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above

- pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;
- (b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production;
 - (c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development."

An important feature of the agreement is the "nationally determined contributions" (NDCs) which is the contribution that each individual country should make in order to achieve the worldwide goal that sets the limit for carbon emissions. The contributions should be reported every five years with each further contribution more ambitious than previous ones representing the principle of "progression."

The Paris Agreement emphasizes adaptation and loss and damage issues. Article 7 focuses entirely on adaptation issues where collective long-term goals are included. The global goal on adaptation focuses on enhancing adaptive capacity, increasing resilience, and limiting vulnerability. Acknowledging the significant need for adaptation, the Agreement urges governments and related stakeholders to undertake measures that embody the Cancun Adaptation Framework for sharing information, strengthening institutional mechanisms, strengthening scientific knowledge, assisting developing countries in identifying suitable adaptation practices, and improving effectiveness and durability of adaptation actions.

The Paris Agreement also calls for a balance of climate finance between adaptation and mitigation, highlighting the need to increase adaptation support for parties most vulnerable to the effects of climate change, including Least Developed Countries and Small Island Developing States. It also prompts parties on the importance of public grants, because adaptation measures receive less investment from the public sector.

2. Food and nutrition security

Concerns about food security throughout history well documented and its definition has developed through time. The concept has evolved from "freedom from hunger" (Wüstefeld 2013) to an emphasis on supply, and the more recent comprehensive definitions that incorporate access and demand issues associated with rights.² A more holistic and rights-based definition was officially adopted during the 2009 World Food Summit:

The State of Food Insecurity in the World 2001 published by the Food and Agricultural Organization (FAO) the following year further refined the definition as follows:

"Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (World Food Summit 1996).

Conversely, *food insecurity* exists when people do not have adequate physical, social or economic access to food as described in the above definition.

As maybe gleaned from the above two definitions, the nutritional dimension is integral to the

² For instance, the 1974 World Food Summit defined food security as "availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" which focus on the supply side (United Nations 1975). Please refer to FAO, UN, 2003 [Trade Reforms and Food Security: Conceptualizing the Linkages](#) for the evolution of the definitions of food security.

concept of food security. Despite the strong linkage between food security and nutrition security, they evolved from a quite different context (Wüstefeld 2013). Food security evolved over time from the discourse on “freedom from hunger” in the early 1940s to a broad concept encompassing four dimensions. Nutrition security on the other hand, developed from the “multi-sectoral nutrition planning” approach in the 1970s and the United Nations Children’s Fund (UNICEF) conceptual framework with three determinants, namely, 1) access to adequate food; 2) care and feeding practices; and 3) sanitation and health. This later conceptual framing is reflected in the current definition of human security as contained in the AIFS Framework Document (2014), to wit:

***Nutrition security** exists when all people at all times consume food of sufficient quantity and quality in terms of variety, diversity, nutrient content and safety to meet their dietary needs and food preferences for an active and healthy life, coupled with a sanitary environment, adequate health, education and care.*

Agriculture, which in the 2009 Declaration of the World Summit on Food Security comprises crops, livestock, forestry and fisheries, is at the core of advancing food and nutrition security. The same AIFS document therefore defines the characteristics of nutrition-enhancing agriculture as follows:

***Nutrition-enhancing agriculture:** When agriculture [that] effectively and explicitly incorporates nutrition objectives, concerns and considerations to improve nutrition through increasing the availability, access to and consumption of a nutritionally adequate diet from a variety and diversity of nutritious and safe foods.*

Consistent with the rights-based approach, other actors, such as NGOs and Civil Society Organizations (CSOs), coined the term ‘food sovereignty’ to expand the concept of food and nutrition security. The Nyéléni 2007 Forum for Food Sovereignty held on February 23 - 27, 2007 in Sélingué, Mali proposed the following six pillars of food sovereignty: 1) focuses on food for the people; 2) values food providers; 3) localizes food systems; 4) places control at a local level; 5) promotes knowledge and skills; and 6) works with nature.

Climate change and the degradation of natural resource base for production are among the mid- to long-term challenges confronting the ASEAN food and nutrition security (Lassa et al. 2016; Teng 2013). Considering the observed and projected detrimental impacts of climate change in the region, especially on food production in agriculture and fisheries, as well as in the forestry sector, the threat to food security will likely multiply. The combined effects of declining land area for agricultural production and environmental degradation compounded by the adverse impacts of drought, floods and changing precipitation pattern, will bring significant challenges in food production for ASEAN, especially after 2050 (Lassa et al. 2016). Extreme weather events continue to inflict agricultural loss and damage, especially rice production, and will likely increase in the future. Particularly vulnerable are the marginal farmers, fishers, and forest-dependent communities especially indigenous people considering their limited capacity to cope with and recover from extreme weather conditions. Governments in the ASEAN region should therefore mainstream climate change in the national development plans, programs and investments to safeguard food and nutrition security.

3. Livelihoods and asset building

According to the USAID’s (2009) Livelihood and Food Security Framework, the term “livelihood” is often associated with economic improvement and refers generally to economic production, employment and household income. This conventional perspective was found to be too narrow focusing only on certain aspects or manifestations of poverty, particularly low income, and missing other vital aspects of poverty such as vulnerability and social exclusion. There has been a recognition through time that a more holistic understanding of livelihood should incorporate other dimensions

of poverty such as reduced vulnerability and environmental sustainability in addition to economic development.

The concept of **Sustainable Livelihood (SL)** was developed in response to the challenge of addressing poverty in an integrated manner. The idea of sustainable livelihoods was first introduced at the global level by the Brundtland Commission on Environment and Development and was further expanded in the 1992 United Nations Conference on Environment and Development (UNCED) which advocated for the achievement of sustainable livelihoods as a broad goal for poverty eradication. Such broader conceptualization is captured in the early work of Chambers and Conway who defined livelihood in the following manner:

*A **livelihood** comprises the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living: a **livelihood is sustainable** which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels in the short and long term (Chambers and Conway, 1991, p.6).*

The concept of asset building as a perspective and tool for advancing agricultural and poverty reduction initiatives has gained wide interest not only among academics and development practitioners, but also among funding institutions (see for instance Constanza et al. 1997; Daily 1997; Oliver 1998; Pretty 1999; Pretty and Hine 2000; and Pretty 2001). In an important contribution to the literature on sustainable agriculture, Pretty and Hine (2000) advanced that “agricultural and rural systems at all levels, from farms, livelihoods, communities to national economies, rely for their success on the total stock of natural, social, human, physical and financial capital” that constitute the rural sectors’ most valuable assets (See **Appendix Box 1** for definition of these assets). Appropriate agricultural interventions shaped by agricultural policies and institutions in a given context can improve livelihoods, well-being and equity as well as the protection of natural resources that can result in the accumulation of these assets and contribute to more sustainable production systems.

Appendix Box 1. Livelihood Assets

(USAID, <http://theliftproject.org/wp-content/uploads/2013/03/Livelihood-and-Food-Security-Conceptual-Framework.pdf>. Retrieved 24 April 2017)

Human assets refer to the livelihood knowledge and capabilities possessed by individuals, in addition to the intangible character traits (ambition, drive, persistence, etc.) and health status that determine how effectively individuals apply their knowledge and capabilities to livelihood activities. Critical determinants of human assets include individuals' access to education and training, health services, sanitation, clean water, and adequate amounts of nutritious food.

Physical assets include the physical economic infrastructure along with the household's productive and other assets that enable the household to pursue its livelihood. The physical economic infrastructure includes, among other things, roads, rail networks, communication facilities, ports, etc. The household's productive assets include land, machinery, tools, and draft animals. Other household physical assets include moveable assets that can be converted into cash or exchanged for goods or services, such as jewelry, furniture, electronics, appliances, or animals.

Social assets are commonly referred to as social capital. Social capital is generated by the household's connections in a social network, and the trust, reciprocity, and resource-sharing qualities of those connections. It can be activated by households to gain social support or social leverage, or by communities to facilitate organization and collective action. Social capital is a resource in which households can invest with the expectation of a future flow of benefits. Social capital is commonly viewed as a positive resource, but can become negative when used to exclude outsiders, impose social sanctions, or advance special interests that are detrimental to the greater good.

Financial assets are financial resources that are available to the household and include savings, credit, insurance, remittances, pensions, cash transfers from social welfare programs, and assets held as a store of value, such as livestock or jewelry. To act as a store of value, assets must be able to be saved and retrieved at a later time and have a predictable value when liquidated or exchanged.

Natural assets include the physical environment and the natural resource stocks that can be controlled by the household and used to expand or enhance livelihoods. Natural assets include land, water, wildlife, biodiversity, and forests.

Political assets are defined as the ability to use power to further political or economic positions, which in turn affects livelihood options and outcomes (Baumann and Sinha, 2001). They refer to the legitimate distribution of rights and power, and how illicit operations of power can frustrate efforts of households to access and defend entitlements. Illicit use of political power by state officials and community elites can divert significant resources away from vulnerable households.

Parallel to this development is the emergence of the Sustainable Livelihood Approach (SLA) developed by the Department for International Development (DFID) of the United Kingdom (DFID, 1999) in collaboration with the Institute of Development Studies as described in **Appendix Box 2**. SLA has been adopted as a useful framework not only for reducing poverty among poor rural poor communities across sectors but also for reducing vulnerability and enhancing adaptive capacities of upland and coastal communities to climate and weather-induced disasters. Many researchers have also used it as an analytical tool on climate-related vulnerability assessments and in defining appropriate interventions to achieve climate resiliency.

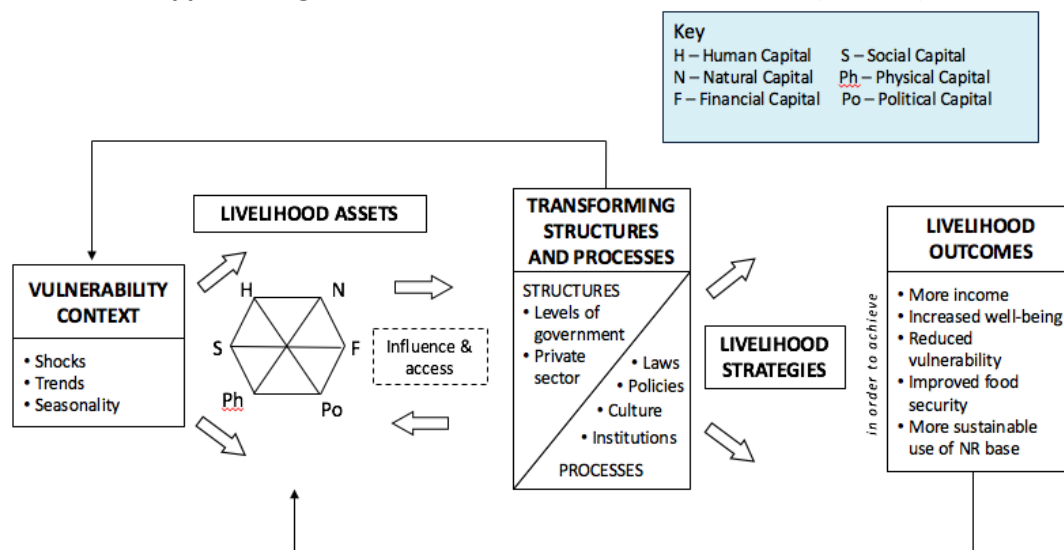
Appendix Box 2. The Sustainable Livelihood Approach

(IFAD, <https://www.ifad.org/topic/resource/tags/sla/2179541>, retrieved 24 April 2017)

The **Sustainable Livelihood Approach (SLA)** is a way to improve understanding of the livelihoods of poor people considering the main factors that affect their livelihoods and the typical relationships between these factors. It has two components: 1) a framework that helps in understanding the complexities of poverty; and 2) a set of principles to guide action to address and overcome poverty. The SL framework places people, particularly rural poor people, at the center of a web of interrelated influences that affect how they create a livelihood for themselves and their households (See Figure below). Closest to the people at the center of the framework are the five capital assets. The extent of their access to these assets is strongly influenced by their vulnerability context, which takes account of trends (for example, economic, political, technological), shocks (for example, epidemics, natural disasters, civil strife) and seasonality (for example, prices, production, employment opportunities). Access is also influenced by the prevailing social, institutional and political environment, which affects the ways in which people combine and use their assets to achieve their goals through different livelihood strategies.

The sustainable livelihood approach is guided by the following principles: people centered, holistic, dynamic, build on strengths, promote micro-macro links, encourage broad partnerships, and aim for sustainability.

Appendix Figure 1. Sustainable Livelihood Framework (Revised)



Source: Adapted from DFID (2001) with the addition of political capital introduced by Baumann and Sinha (2001)

4. Landscapes, ecosystems and well-being

The concepts of *landscapes* and *ecosystems and human well-being* have gained prominence among scholars and researchers in various fields as well as development agencies, policy makers, and development practitioners. They have been powerful conceptual tools in policy and decision-making, integrated environment and natural management, and the promotion of sustainable development through area-based interventions.

4.1. Landscapes and landscape approaches

Frost et al (2016) defined landscapes in the following manner:

Landscapes are place-based systems that result from interactions between people, land, institutions (laws, rules and regulations) and values. These interactions shape the dimensions of

peoples' lives and either produce the food, fuel, fiber they need, or generate the income to buy these from elsewhere. Landscapes shape ecological services and the social and economic relationships on which people depend (Frost et al. 2006).

Based on ICRAF (2015), there are three outstanding interlinked aspects that define a landscape: functional interactions, negotiated spaces and multiple scales.

1. *Functional interactions*: Ecological, economic and social processes in a landscape interact. Landscapes can be seen as a mosaic of components, named land units by Zonneveld (1989), who defined these as ecologically homogenous areas of land with associated variation in land use. The management of the various land units is linked to multiple and different sectors of a national economy (including agriculture, forestry, water management, infrastructure, rural development), and also to actor interests and biophysical characteristics.
2. *Negotiated spaces*: Landscapes typically have a diverse set of stakeholders with different perspectives, interests, power and ambitions, which can often be conflicting. Hence, negotiations are needed for the different actors to accept and live within decisions shaping the landscape. Therefore, landscapes are negotiated spaces, differing in degree of achieving harmony.
3. *Multiple scales*: Landscapes often have households, farms and other institutions (e.g., community-based organizations or the private sector) as elements, potentially engaged in collective action. Landscapes are interacting with neighboring landscapes and are nested in coarser-scale subnational units, watersheds/basins or eco-regions. A convenient landscape scale is one that is large enough to contain the heterogeneity of biophysical characteristics as well as social, economic, political and cultural dimensions, but small enough to be socially coherent.

In the past two decades, the term “**landscape approach**” has been used broadly to describe a more integrative and transdisciplinary approach and increasingly used by aid agencies, governments, and conservation organizations in attempts to reconcile competing claims on land in geographically defined areas (Sayer et al. 2017). The approach is recognized as a mechanism for achieving the Aichi targets of the UN Convention on Biological Diversity and a widely accepted strategy to achieve climate smart landscapes that integrate climate change mitigation and adaptation measures. Landscape approach is being embraced by large environmental nongovernmental organizations (NGOs) such as the World Wildlife Fund, the International Union for the Conservation of Nature, the African Wildlife Foundation, and Conservation International; international research organizations such as the World Agroforestry Centre and the Center for International Forestry Research; and international organizations such as the Food and Agriculture Organization of the United Nations, the World Bank, and the United Nations Environmental Programme (Freeman et al. 2015).

Sayer et al. (2017) came up with succinct definition of landscape approach as follows:

***Landscape approach** is “a long-term collaborative process bringing together diverse stakeholders aiming to achieve a balance between multiple and sometimes conflicting objectives in a landscape or seascape”.*

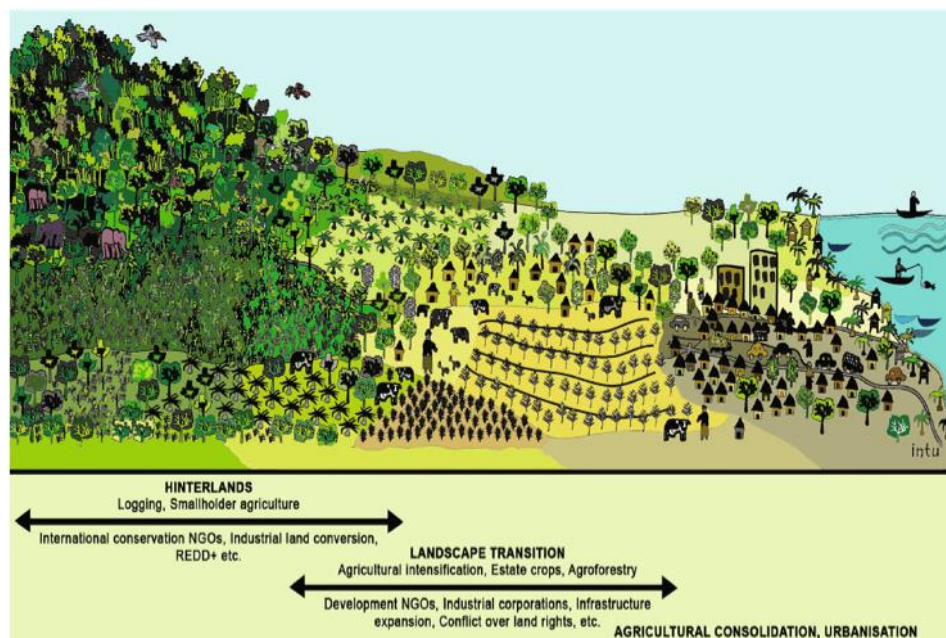
According to Reed et al. (2017), there are two general overarching objectives of the landscape approach:

1. *Enhancing sustainability*. Sustainability should encompass social, economic, environmental, cultural, and often political objectives and relate to the ability of the system of interest to increase resistance to stochastic changes and resilience to future shocks—whether natural or market-induced.

2. *Multi-functionality within the landscape to achieve multiple outcomes.* Multi-functionality in this context means functional integration with multiple concurrent functions operating on the same unit of land. Implementation efforts should therefore address the complexity of balancing the objectives of multiple stakeholders—potentially across a range of sectors (e.g. extractive resources to forest conservation) and scales. This suggests that stakeholder engagement, sufficient institutional support, and effective structures of governance at various levels are necessary for success.

In their recent assessment of 150 case studies from unpublished grey literature and 24 peer-reviewed studies that exhibit basic characteristics of landscape approaches, Reed et al (2017) find that landscape approaches show potential as a framework to achieve the following: 1) reconcile conservation and development and improve social capital; 2) enhance community income and employment opportunities; and 3) reduce land degradation and conserve natural resources. The same study suggests that multi-level, or polycentric, governance structures are crucial in implementing landscape approaches and relate well with intervention success.

Appendix Figure 2. Landscape Dynamism Curve



The diagram shows a spectrum of situations where landscape approaches are used. It shows generic changes in land cover and social processes as areas develop. Transitions occur when management intensity increases and infrastructure expands across development gradients from remote hinterlands to more developed regions. The key participants and the objectives that are pursued at different points on this trajectory are identified in the lower part of the figure. (Source: Sayer et al. 2017)

4.2. Ecosystems and well-being

Interest in **ecosystems** and **well-being** gained momentum at the international and national levels with the conduct and completion of the **Millennium Ecosystem Assessment (MA)** - a major assessment of the human impact on the environment called for by the United Nations Secretary-General Kofi Annan conducted from 2001-2005. The first product of the assessment was a book entitled “Ecosystems and Well-Being”, released in 2005 that provided the conceptual framework for the assessment and the foundation concepts needed by participants in moving forward. The Executive Summary of Chapter 2 of the assessment framework defines ecosystem as follows:

*An **ecosystem** is a dynamic complex of plant, animal, and microorganism communities and the nonliving environment, interacting as a functional unit. Humans are an integral part of ecosystems. A well-defined ecosystem has strong interactions among its components and weak*

interactions across its boundaries. A useful ecosystem boundary is the place where a number of discontinuities coincide, for instance in the distribution of organisms, soil types, drainage basins, or depth in a water body. At a larger scale, regional and even globally distributed ecosystems can be evaluated based on a commonality of basic structural units.

The same section of the book also provides a simple and useful description of environmental services:

***Ecosystem services** are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth.*

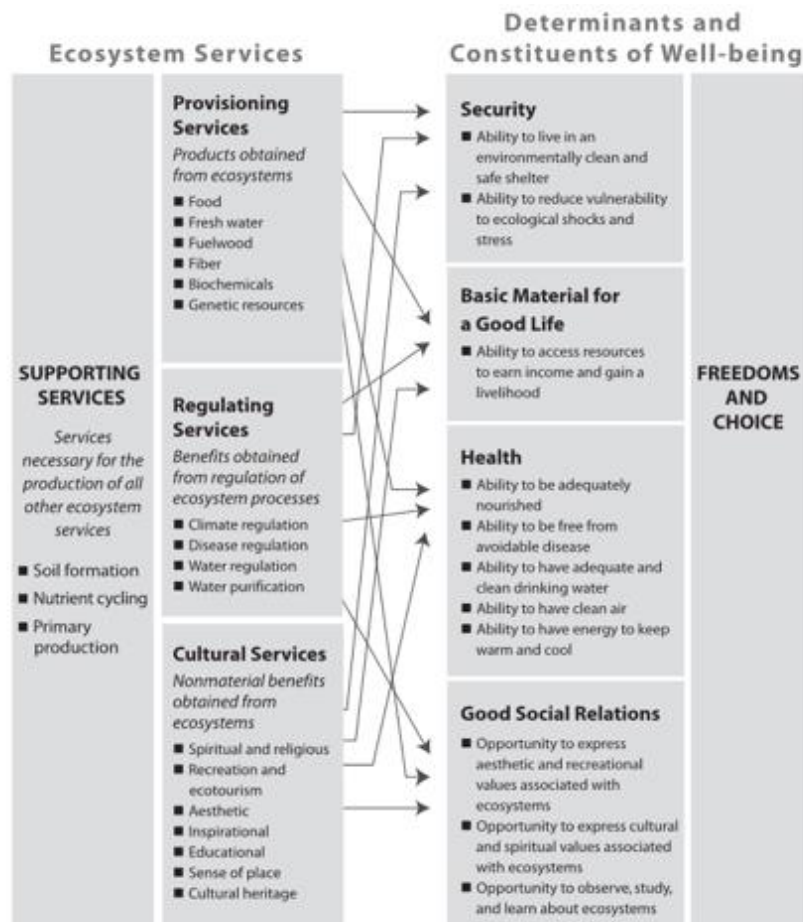
The MA reports highlighted the strong link between ecosystem condition and human well-being. The Executive Summary of Chapter 3 and the MA framework define human well-being and its strong links to the condition of ecosystems and the services they provide, as presented below. Such link is also illustrated in **Appendix Figure 3**.

***Human well-being** has several key components: the basic material needs for a good life, freedom and choice, health, good social relations, and personal security. Well-being exists on a continuum with poverty, which has been defined as “pronounced deprivation in well-being.” Ecosystems are essential for human well-being through their provisioning, regulating, cultural, and supporting services. Evidence in recent decades of escalating human impacts on ecological systems worldwide raises concerns about the consequences of ecosystem changes for human well-being.*

Human well-being can be enhanced through sustainable human interaction with ecosystems with the support of appropriate instruments, institutions, organizations, and technology. Creation of these through participation and transparency may contribute to people’s freedoms and choices and to increased economic, social, and ecological security.

Indigent, poorly resourced, and otherwise disadvantaged communities are generally the most vulnerable to adverse ecosystem change. Spirals, both positive and negative, can occur for any population, but the poor are more vulnerable.

Appendix Figure 3. Ecosystem Services and Their Links to Human Well-being



Source: Millennium Ecosystem Assessment (2005)

5. Climate change and related concepts

The Intergovernmental Panel on Climate Change (IPCC) in its 2014 Fifth Assessment Report (AR5) concluded that the “warming of the climate system is unequivocal” and that “changes in climate have caused impacts on natural and human systems on all continents and across the oceans”. Recognizing the imminent threats associated with climate change, there has been an explosion of related concepts to better understand this phenomenon and implement effective responses to minimize adverse impacts from the global to local level. The following key concepts which are officially adopted by the United Nations Framework Convention on Climate Change (UNFCCC) and the IPCC (2014) are helpful in these regard³:

Climate change “refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forces such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use.” Note that the **Framework Convention on Climate Change (UNFCCC)**, in its Article 1, defines climate

³ Except when indicated, the following definitions are from the Glossary of Terms of the IPCC 2014.

change as: “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods”. The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition and climate variability attributable to natural causes.

Climate variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).

Vulnerability. The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt”.

Impacts. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system. Impacts are also referred to as consequences and outcomes. The impacts of climate change on geophysical systems, including floods, droughts and sea level rise, are a subset of impacts called physical impacts.

Resilience. The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation.

Responses to climate change. There are two general responses to climate change: adaptation and mitigation:

Adaptation. The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effect.

Mitigation (of climate change). A human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs). This report (IPCC 2014) also assesses human interventions to reduce the sources of other substances which may contribute directly or indirectly to limiting climate change, including, for example, the reduction of particulate matter emissions that can directly alter the radiation balance (e.g., black carbon) or measures that control emissions of carbon monoxide, nitrogen oxides, Volatile Organic Compounds and other pollutants that can alter the concentration of tropospheric ozone which has an indirect effect on the climate.