

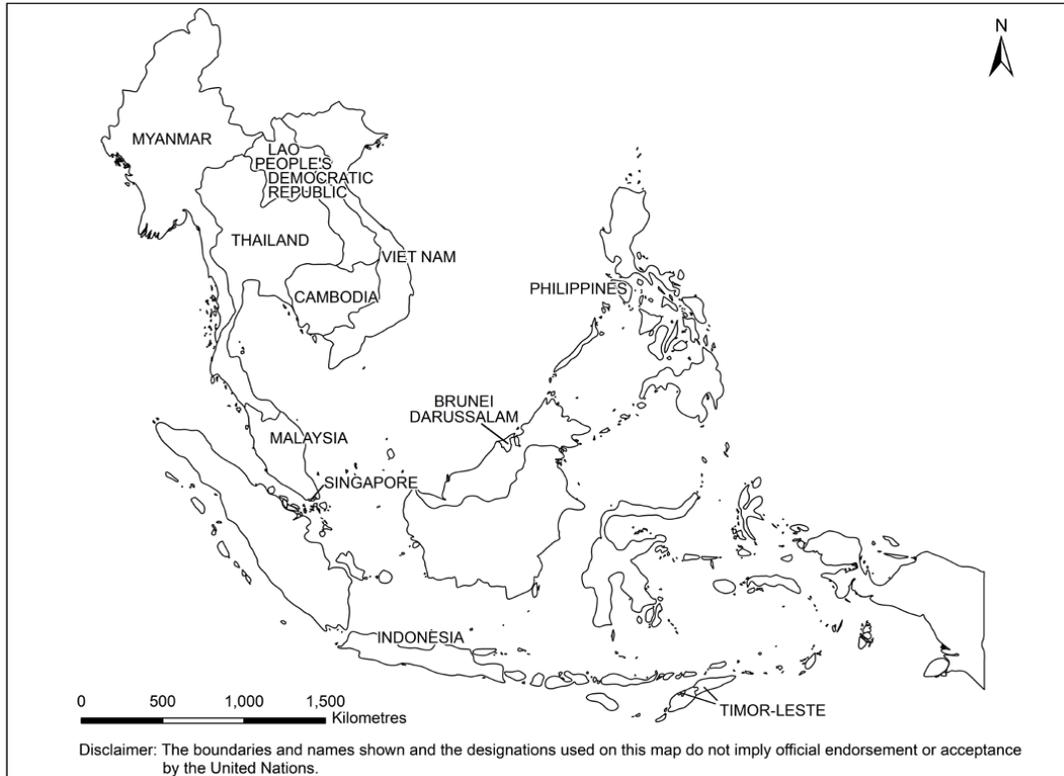
# Ready for the Dry Years

## Building resilience to drought in South-East Asia

*Second Edition*

**EXECUTIVE SUMMARY FOR POLICYMAKERS**





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# Ready for the Dry Years

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*Second Edition*

## Executive Summary For Policymakers

**Armida Salsiah Alisjahbana**

Under-Secretary-General of the United Nations and Executive Secretary of ESCAP

**Dato Lim Jock Hoi**

Secretary-General of the Association of Southeast Asian Nations

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About the cover

A herd of cattle walk through a dry field in Myanmar.

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## Forewords



The ever-present threat of drought, with devastating impacts across the South-East Asia region, is a hallmark of the climate crisis. This second edition of *Ready for the Dry Years* analyses in greater detail just how and where droughts happen. It maps recurrent hotspots across South-East Asia, where drought hits hardest at the region's most vulnerable people, especially rural communities and farmers.

Drought is not an isolated event; it is just one of many other pressures on the lives and livelihoods of these communities. With different intensities and time duration, these events can undermine national development efforts. The COVID-19 pandemic is not only threatening people's health but also slowing down drought response and recovery, essentially diverting government's scarce resources to other emergency socioeconomic priorities.

Yet, droughts can often be predicted as they tend to creep up slowly and repeat. Governments can take risk-informed measures to strengthen societal resilience so that populations, sectors and key institutions have the capacity to adapt. The best way to protect people in pandemics, droughts or other disasters, is not just to offer emergency aid but to also help people become more sustainably resilient. For droughts, there is more time for proactive measures. At the country level, solution-oriented policy measures should be adapted within a national comprehensive strategy framework.

The Report highlights the truly regional nature of drought; many of the impacts are transboundary, and no country is spared. It further suggests three tracks for transformation: reduce and prevent, prepare and respond, and restore and recover. The Report shows that these policy measures will not only safeguard hard-won development gains but will also bring many positive environmental co-benefits. It also provides a framework for policymakers to take actions through regional cooperation on drought management.

Through our strengthened engagement and strategic partnership, both ESCAP and ASEAN can mobilize rapid and large-scale collaboration amongst member States, development partners, stakeholders and relevant sectoral bodies to tackle a common and shared transboundary challenge. My hope is that the Report's policy recommendations will help provide the evidence base for the *ASEAN Declaration on the Strengthening of Adaptation to Drought* and the subsequent *Regional Plan of Action*.

A handwritten signature in black ink, appearing to read 'A. S. Alisjahbana'.

**Armida Salsiah Alisjahbana**

Under-Secretary-General of the United Nations  
and Executive Secretary of ESCAP



Throughout much of South-East Asia, drought is becoming the norm rather than the exception. As this trend is projected to worsen over the coming years, the prospect of severe dry conditions threatens the rich biodiversity of the region and the well-being of millions of people. Taking into consideration that communities with low levels of socioeconomic development tend to be more vulnerable to the consequences of drought, we must make every effort to ensure that these groups are protected and that no one is left behind.

In response to this challenge, a holistic approach to understanding the impact of drought is needed, by examining the issue from socioeconomic, health, environmental, and humanitarian perspectives. The second edition of the *Ready for the Dry Years* adopts this approach. Expanding on the findings of the first edition, this Report provides a more extensive analysis, particularly in identifying vulnerability hotspots and policy tracks for countries seeking to shift from response to adaptation.

I encourage relevant stakeholders to consider the Report's recommendations in developing the *ASEAN Declaration on the Strengthening of Adaptation to Drought* and the subsequent *Regional Plan of Action*. It is also important that strategic measures and priority actions identified in the Report are incorporated in the development of the new *ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme 2021-2025*. This includes strengthening of drought forecasting, monitoring and early warning systems.

This Report represents another successful collaboration between United Nations ESCAP and ASEAN. Drought resilience features as an integral part of the *ASEAN Vision on Disaster Management 2025* and the *United Nations 2030 Agenda for Sustainable Development*. Pursuing more of these complementarities is crucial to the region's progress in achieving the Sustainable Development Goals (SDGs), especially amidst a pandemic.

Combatting COVID-19 has underscored the urgency of promoting cross-sectoral cooperation in managing transboundary challenges. I hope the same sense of urgency is channelled in our efforts in mitigating the impact of drought in the region as we work towards building a more resilient ASEAN Community.

A handwritten signature in black ink, which appears to be 'Lim Jock Hoi'. The signature is fluid and cursive, written on a white background.

**Dato Lim Jock Hoi**

Secretary-General of the Association of Southeast Asian Nations (ASEAN)

Drought, forest fires and haze reduce air quality and threaten respiratory health in many South-East Asian countries.



**Drought is an ever-present threat in South-East Asia, especially to the region's poorest and most vulnerable people. Compared with other disasters, droughts are more predictable, yet policy responses still tend to be largely reactive. This Report argues, instead, for a more proactive approach along three policy tracks: reduce and prevent; prepare and respond; and restore and recover. Across all these activities, countries in South-East Asia can capitalize on each other's experience and expertise through more extensive regional cooperation.**

## The severity of droughts during 2015-2020 exceeds anything recorded in the past two decades

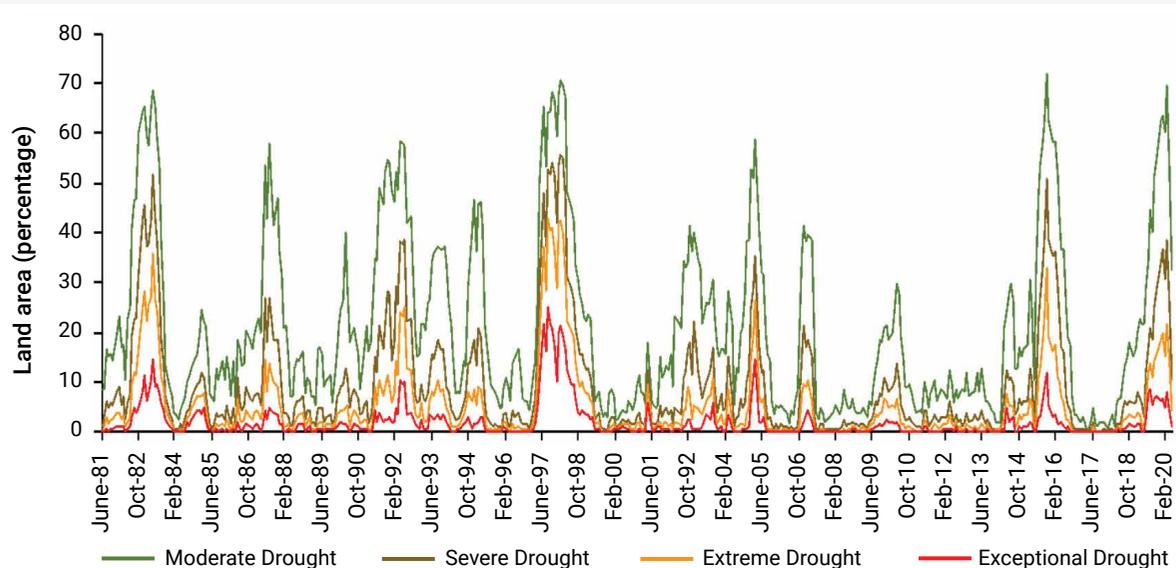
To present a comparable analysis of drought across countries, the Report uses a widely-accepted indicator, called the Standardized Precipitation Index (SPI), to

explore the occurrence of droughts across the region during 2015-2020, situate them in a longer historical context, and explore their climatic drivers. This is the first regionally standardized analysis performed for the ASEAN to inform policymaking.

## Drought is regional, perhaps more than any other hazard

The SPI compares the accumulated rainfall with the amount of rainfall that would have been, historically, received for that period under average conditions, thereby classifying drought severity as being moderate, severe, extreme or exceptional. Figure 1 presents the results of the SPI analysis for the region from 1981 to 2020, revealing that there have been seven times during this period, when at least one-quarter of South-East Asia's land area has been affected by severe drought.

**Figure 1 – Percentage of land area affected by drought in South-East Asia, 1981 to 2020**



Source: Precipitation data from CHIRPS.  
Note: This shows the SPI6 drought index.

Figure 1 also reveals that extensive drought conditions were recorded in the region during 2015-2016 and 2018-2020, interspersed by a period of very little drought and the geographic coverage was significant. During the peaks of each drought episode, moderate drought conditions simultaneously affected more than 70 per cent of the land area, with over 325 million people exposed.

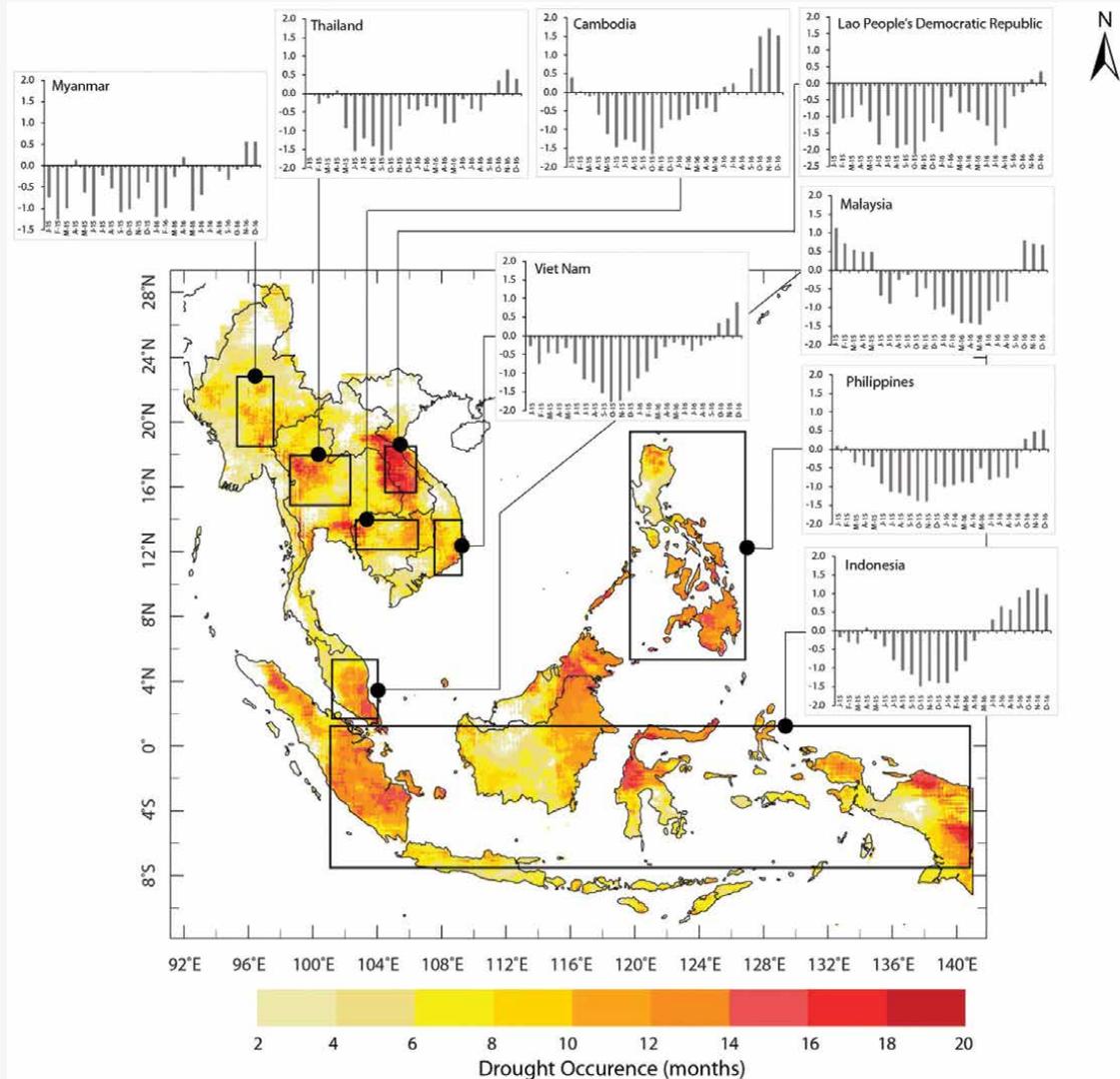
Furthermore, over 210 million people were exposed to severe drought conditions in each event. Figure 1 shows that these two events were the most severe, since the major El Niño of 1997-1998, in several parts of South-East Asia, with even larger land areas covered by succeeding drought episodes.

## No country in South-East Asia has been spared

From 2015 to 2016, almost the entire land area experienced at least six months of moderate drought (Figure 2). Furthermore, all countries contain areas which experienced longer periods of drought. The earliest onsets

and longest durations of drought were recorded in parts of Lao People's Democratic Republic, Myanmar, Philippines and Viet Nam. Drought emerged a few months later in parts of Cambodia, Indonesia, Malaysia and Thailand.

**Figure 2 – Occurrence of moderate drought in South-East Asia, January 2015 to December 2016**



Source: ESCAP calculations, based on Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS), January 2015 to December 2016.

Note: Shading indicates the number of months a given location experienced at least moderate drought (SPI6 is less than -0.8) between January 2015 and December 2016. Time series show the SPI6 across countries. A value of zero indicates average conditions while increasingly negative values are indicative of increasingly dry conditions.

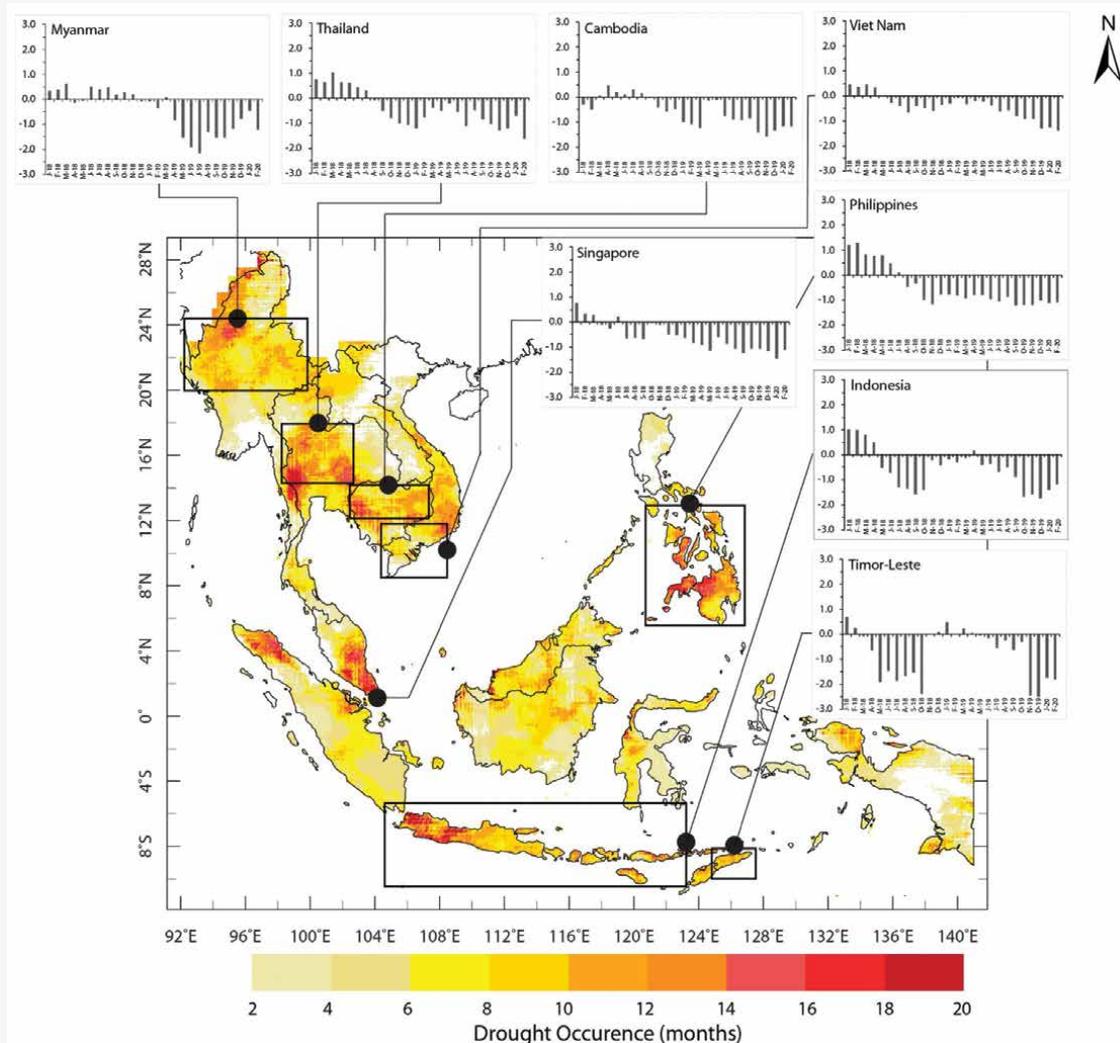
Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Again, during 2018-2020 almost the entire region experienced at least six months of moderate drought (Figure 3). The duration and onset varied between affected areas. For example, parts of Cambodia, Philippines, Singapore, Thailand and Viet Nam have experienced drought consistently since July 2018, whilst Indonesia experienced two distinct episodes of drought in 2018, and then in late 2019, and Myanmar did so in 2019 and 2020.

## Droughts will definitely recur

Severe droughts can be expected to recur once every five years on average. While the recent droughts have been exceptional, this Report shows that they fit into a broader historical pattern; since 1981, severe drought conditions have covered at least one-quarter of South-East Asia's land area on seven occasions (Figure 1). The region therefore needs to prepare for the episodic occurrence of severe drought conditions.

**Figure 3 – Occurrence of moderate drought in South-East Asia, January 2018 to February 2020**



Source: ESCAP calculations, based on Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS), January 2018 to February 2020.

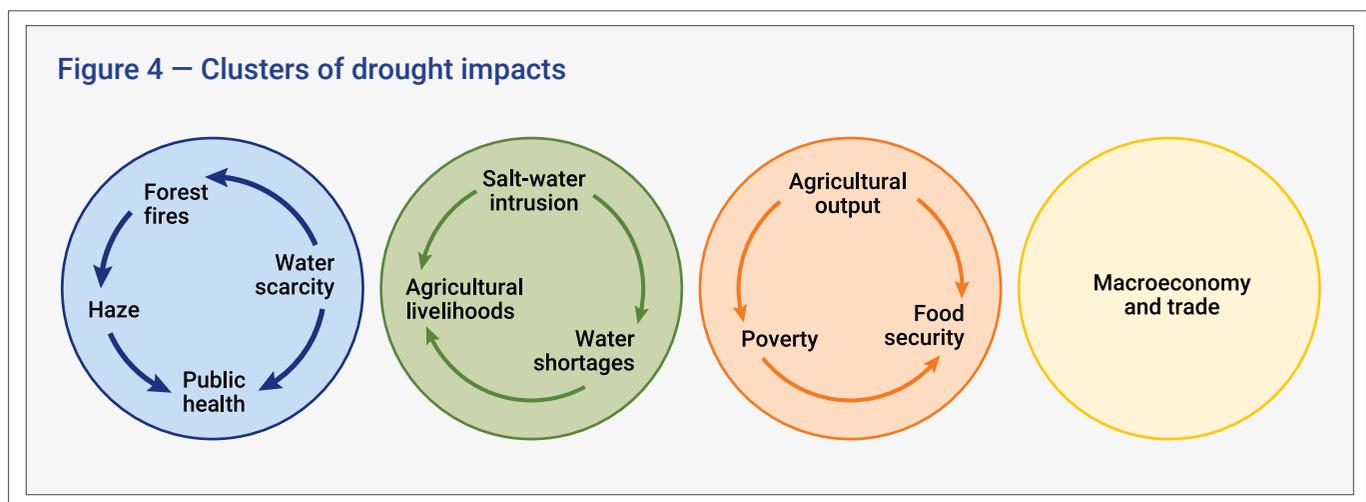
Note: Shading indicates the number of months a given location experienced at least moderate drought (SPI6 is less than -0.8) between January 2018 and February 2020. Time series show the SPI6 across countries. A value of zero indicates average conditions while increasingly negative values are indicative of increasingly dry conditions.

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## Drought impacts cluster around four identified nexuses

The Report uncovers impacts across the region that have persisted after drought conditions ceased and accumulated over time, including agricultural disruption and water shortages, environmental impacts, such as salt-water intrusion, and secondary hazards, such as forest fires and haze. It also identifies specific nexuses in which policy interventions will be most critical; forest fires, water scarcity, haze and public health; salt-water intrusion, water shortages and agricultural livelihoods; agricultural output, food security and poverty; and macroeconomy and trade (Figure 4).

The significance of each nexus varies between countries of different income levels, due to variations in the underlying socioeconomic vulnerability. For example, the countries included in the subnational analysis, such as Cambodia, Myanmar and Philippines which have high levels of poverty, malnutrition and agricultural vulnerability, as well as the Lao People’s Democratic Republic and Viet Nam, recorded impacts on agriculture, food insecurity, nutrition, and the need for humanitarian assistance. In contrast, the upper middle-income country of Malaysia and the high-income country of Singapore reported impacts on public health and water shortage.



Another critical finding is that disruptions to food security and livelihoods are cumulative, reinforcing each other and persisting even after drought events have ceased. Addressing the impacts of drought is therefore imperative for ASEAN countries in order to eradicate hunger to meet Sustainable Development Goal (SDG) 2. The *Asia and the Pacific SDG Progress Report 2020* highlights that in South-East Asia, whilst progress has been made towards Goal 2 since 2015, reaching the target by 2030 will require accelerated progress in key indicators, including 2.1 (undernourishment and food security) and 2.2 (malnutrition).<sup>1</sup> Furthermore, there is evidence that food security has actually worsened in recent years. Across South-East Asia, 31.8 million people, or 4.8 per

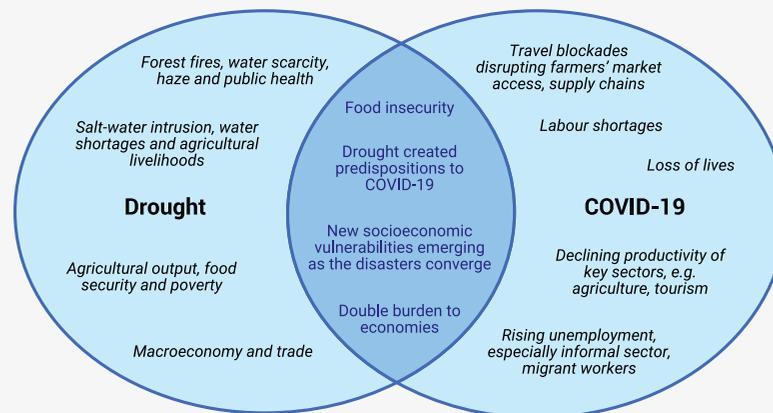
cent of the total population, were severely food insecure in 2019. When moderate food insecurity is included, the numbers are significantly higher, with 122.8 million people moderately or severely food insecure, or 18.6 per cent of the population.<sup>2</sup> The overall trend is that food insecurity has worsened in recent years, with the number of people who are severely food insecure increasing from 27.4 million, that is, 4.4 per cent of the total population, in 2014.<sup>3</sup> This could be due to the impact of adverse climate conditions on food availability and prices. Governments therefore need to be ready for long term interventions to prevent the insidious impacts of drought from further undermining efforts to eradicate hunger.

## The convergence of COVID-19 and drought has amplified impacts

The pandemic has made the socioeconomic impacts of drought even more severe. Understanding the interactions between the two disasters is essential for identifying the vulnerabilities that need to be addressed (Figure 5). Moving forward, effective drought risk management also provides an opportunity to mitigate the double burden of

these converging disasters. Drought can be predicted, and its onset is slow; Governments can therefore take risk-informed measures to strengthen societal resilience to drought, so that if a disaster of an unprecedented magnitude like COVID-19 occurs, key institutions, sectors and populations have a higher capacity to cope.

**Figure 5 – Convergence of drought and the COVID-19 pandemic**



The Report analyses how the double burden of the ongoing drought and the COVID-19 pandemic is playing out across different sectors and populations.

### Economies are facing an unprecedented threat to macroeconomic stability

The losses and damages from drought-induced agricultural disruption, salt intrusion and forest fires, are being compounded by the economic shock caused by the shutdown of entire sections of national economies. Economic disruption has exacerbated as the pandemic is hitting the same sectors that have already been identified as being heavily impacted by drought. Globally, food security is being undermined as the pandemic impacts agricultural output, food security and poverty. Within ASEAN countries, the ongoing drought means that these impacts are threatening food supply chains and households that are already under stress.

### New vulnerabilities are emerging, as the socioeconomic impacts of the two disasters converge

Households relying on incomes from migrant workers face a double exposure to loss of livelihoods. In many ASEAN countries, migrating to urban areas to work in the informal sector, such as in construction, is used as an important coping strategy during the dry season. Migrant workers will send remittances back to support their households and supplement their income from agriculture. This strategy is even more critical in this time of drought, as planting has been disrupted, crops have failed, and agricultural incomes have reduced. However, due to the travel restrictions that have been implemented in urban areas in order to prevent the transmission of COVID-19, the incomes of migrant workers have been severely curtailed. This means that one rural household may lose both incomes simultaneously.<sup>4</sup> The scale of this issue is significant, as an estimated 60 per cent of migrant workers in ASEAN countries fall within the informal sector with little or no social protection.<sup>5</sup>

## Droughts have heightened vulnerability to the COVID-19 pandemic

**Epidemiological** – By exacerbating food insecurity and malnourishment, droughts can compromise the immune system response to the virus.

**Transmission** – The transmission rates will be higher where drought-induced water shortages restrict access to sanitation and make it more difficult to practice safe hygiene.

**Health system** – This includes the availability of intensive care. There are concerns in some countries that droughts could lead to reduced hydropower generation, which lead to power cuts thereby further reducing the capacity of the health system.

**Pandemic control** – The long-term, cumulative impacts of droughts erode livelihoods and incomes, reducing the capacities of households to cope with the socioeconomic impacts of public health measures, such as travel blockages and quarantines, which restrict the access of farmers to markets and processing plants.

## Targeted policy attention is needed to address the vulnerabilities of people in drought hotspots, that comprise 15 per cent to 25 per cent of the region's population

The impacts of drought in ASEAN countries are determined, not only by the physical hazard itself, but also by the exposure and vulnerability of the population and key climate-sensitive sectors. For Governments, this presents a no-regret strategy for reducing drought risk. Whilst the meteorological drought hazard may increase with climate change, steps can be taken now to change the underlying socioeconomic conditions and thereby strengthen the resilience of vulnerable population groups and of society, as a whole.

The Report therefore highlights the exposure and vulnerability across the region. Vulnerability refers to the characteristics that render the exposed people susceptible to the damaging effects of drought.<sup>6</sup> In this analysis, the Human Development Index (HDI) is used as a proxy for vulnerability, as it incorporates many dimensions of development, and is available for all ASEAN countries. Figure 6 shows that over the past five years, a large proportion of the total population exposed to drought also live in areas with low HDI scores. In 2015, people living in areas with low HDI and exposed to either severe, extreme or exceptional drought constituted 15.3 per cent of the population. The proportion was even higher in 2020, at 25 per cent.

## The geographic distribution of drought risk changes when population vulnerability is considered

Table 1 displays, for comparison, the hotspots of drought risk for each ASEAN country, categorised as high, medium and low risk. Targeted policy actions must recognize that when exposure and vulnerability are considered, the number of hotspots with high risk increases and the areas identified as hotspots change, for almost all countries.

## Interventions at the national level must be targeted to reach vulnerable population groups

To illustrate how policy interventions may be prioritized within countries, the *Report* analyses subnational Demographic and Health Survey (DHS) data for countries with available data, to identify hotspots at the scale of first level administrative divisions, in which exposure to recurring drought coincide with high levels of poverty, malnourishment and high dependence on agricultural employment.

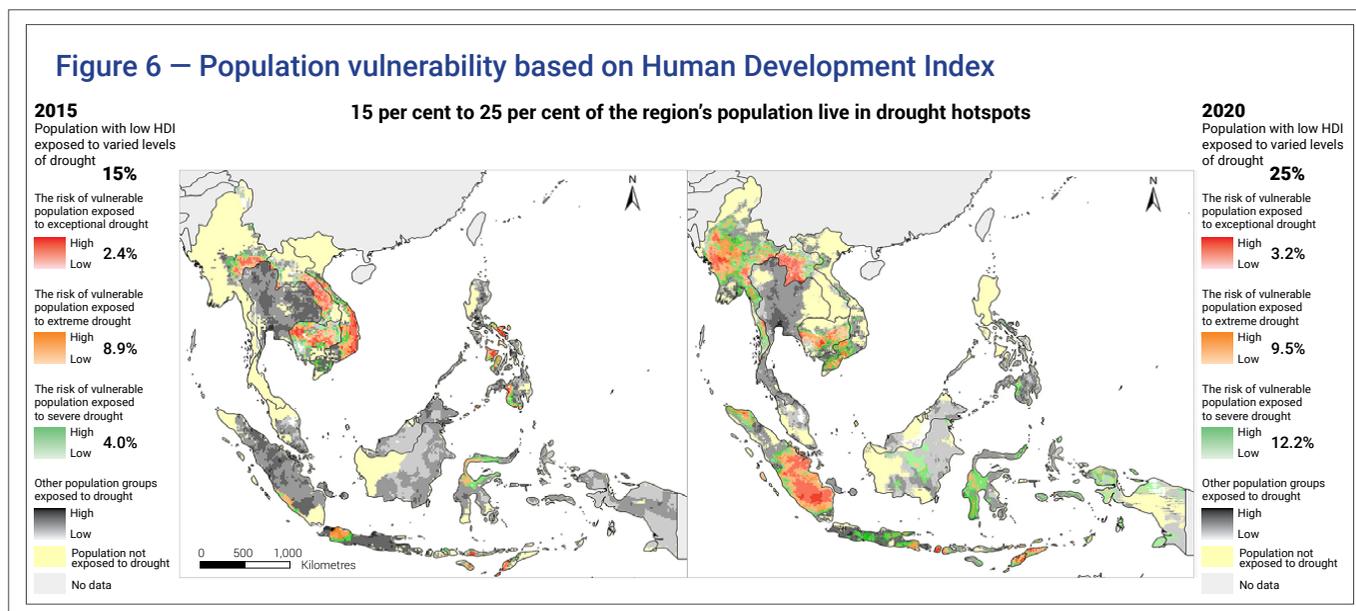
Based on this analysis, Table 2 presents these hotspots, highlighting in orange those that were evident during the drought peaks in both 2015 and 2020, and for each measure of vulnerability. It is within these hotspots that it is most urgent for Governments to implement a comprehensive package of humanitarian and development interventions to address intersecting vulnerabilities. Furthermore, they must prepare for the potential emergence of new hotspots as a result of climate change.

**Table 1 – Hotspots of drought risk for countries in South-East Asia**

Countries	Areas with high frequency of severe meteorological drought (over period 1981-2019, based on SPI6)	Hotspots of drought severity, exposure and vulnerability in 2015, (based on SPI6, population density and HDI)	Hotspots of drought severity, exposure and vulnerability in 2020 (based on SPI6, population density and HDI)
Brunei Darussalam	All parts	None	None
Cambodia	Central parts	Central and northern parts	Central and southern parts
Indonesia	Western, north-central and eastern parts	Western and southern parts	South-west and southern parts
Lao People's Democratic Republic	Northern parts	Central parts	Northern parts
Malaysia	South-western and north-western parts	South-western and north western parts	North-western parts
Myanmar	Northern and southern parts	Eastern parts	Central, northern and southern parts
Philippines	Southern parts	Central and southern parts	Southern parts
Singapore	All parts	Northern parts	None
Thailand	Central parts	Central and northern parts	Central and northern parts
Viet Nam	Central and southern parts	Central and southern parts	Southern parts

High Medium Low

Source: ESCAP calculations based on ratio of recurrence time for severe drought persisting at least 3 months (based on SPI6) to the minimum recurrence time identified across all of South-East Asia for the period of 1981-2019; six-month Standardized Precipitation Index (SPI6) in October 2015 and February 2020; Sub-National Human Development Index (SHDI) Version 1, 2018 and Version 4.0, 2020; and UN WPP-Adjusted Population Density 2015 and 2020, v4.11.



Sources: ESCAP calculations based on six-month Standardized Precipitation Index (SPI6) October 2015 and February 2020; Sub-National Human Development Index (SHDI) Version 1, 2018 and Version 4.0, 2020; and UN WPP-Adjusted Population Density 2015 and 2020, v4.11.

Note: 1. The SPI6 value is categorized into moderate, severe, extreme and exceptional drought using CHIRPS rainfall data within the past 5 years. 2. SHDI Version 1, 2018 in South-East Asia is classified as high, medium and low. SHDI Version 4.0, 2020 in South-East Asia is classified as medium and low.

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Table 2 – Hotspots of drought vulnerability based on poverty, malnutrition, and agriculture, 2015 and 2020

Countries	Recurrent hotspots of drought and high poverty	Recurrent hotspots of drought and high malnutrition	Recurrent hotspots of drought and high proportion of men in agriculture	Recurrent hotspots of drought affecting a high proportion of agricultural land	Recurrent hotspots of drought and high proportion of farmland owned by smallholders
Cambodia	Battambang Province Pailin Province	Battambang Province Pailin Province	Battambang Province Pailin Province	Battambang Province Pailin Province	Battambang Province Pailin Province
				Kampong Cham Province	Kampong Cham Province
		Kampong Chhnang Province	Kampong Chhnang Province		Kampong Chhnang Province
		Kampong Thom Province	Kampong Thom Province		Kampong Thom Province
	Kratie Province	Kratie Province	Kratie Province	Kratie Province	Kratie Province
	Mondol Kiri Province	Mondol Kiri Province	Mondol Kiri Province	Mondol Kiri Province	
		Pursat Province	Pursat Province		Pursat Province
	Ratana Kiri Province	Ratana Kiri Province	Ratana Kiri Province	Ratana Kiri Province	
Myanmar					Chin State
					Kachin State
	Kayah State	Kayah State	Kayah State	Kayah State	*Kayah State in 2015
				Kayin State	
				Mon State	
		Nay Pyi Taw Union Territory	Nay Pyi Taw Union Territory		
		*Rakhine State in 2020	*Rakhine State in 2020		
					Sagaing Region
Kayah State	Kayah State	Kayah State	Kayah State	*Shan State in 2015	
Philippines	Zamboanga Peninsula Region	N/A	N/A	N/A	N/A
	Northern Mindanao Region				
	Caraga Region				
	Davao Region				

 Recurrent hotspots for all variables  Recurrent hotspots for certain variables

Sources: ESCAP calculations using GIS, based on the average value of six-month Standardized Precipitation Index (SPI6) in 2015 and 2020; and Demographic and Health Surveys (DHS) Programme for Cambodia 2014, Myanmar 2016, Philippines 2017.

Note: \*These hotspots occurred only in the years shown, not in both 2015 and 2020.

Examining Cambodia, Myanmar and the Philippines in more depth reveals the geographic distribution of drought risk which could be used to guide risk-informed

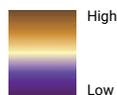
interventions in key sectors. Figure 7 presents a selection of such analyses from within the Report.

**Figure 7 – Maps of drought vulnerability hotspots in selected countries**

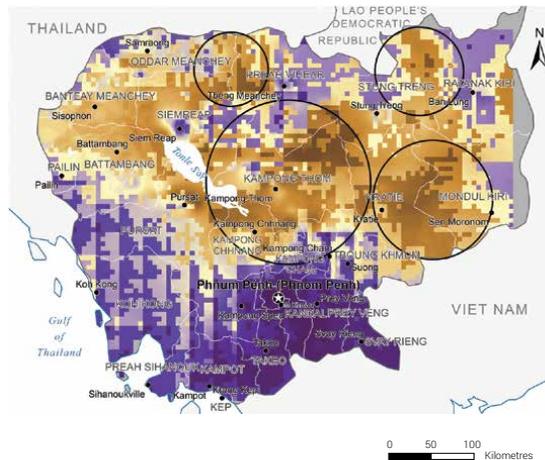
**2015 drought peak in areas with high levels of severely and moderately stunted children**

**CAMBODIA**

Hotspots of population with high percentage of severely and moderately stunted children during the most recent drought peak (October 2015).



- Areas with high concentration of risk
- National capital
- Administrative capital
- International boundary
- Administrative boundary



Sources: ESCAP calculations based on six-month Standardized Precipitation Index (SPI6) October 2015 and Demographic and Health Surveys (DHS) Programme for Cambodia 2014. Map source: UNmap 2020.

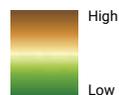
Note: 1. The SPI6 value is categorized into moderate, severe, extreme and exceptional drought using CHIRPS rainfall data within the past 5 years. 2. Moderately stunted children are those with height-for-age score below minus 2 standard deviations, or below the mean on the WHO Child Growth Standards (hc70 < -200).

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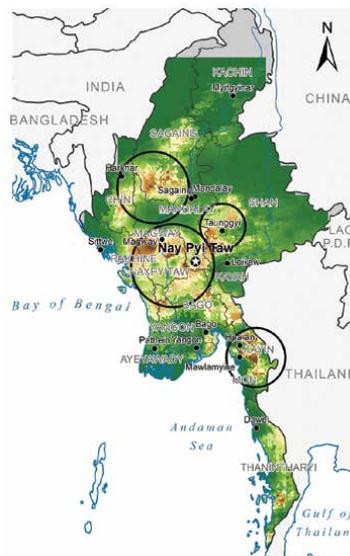
**2020 drought peak in areas with high levels of agricultural employment**

**MYANMAR**

Hotspots of population with high percentage of men working in agriculture sector during 5 year drought peak (October 2020).



- Areas with high concentration of risk
- National capital
- Administrative capital
- International boundary
- Administrative boundary

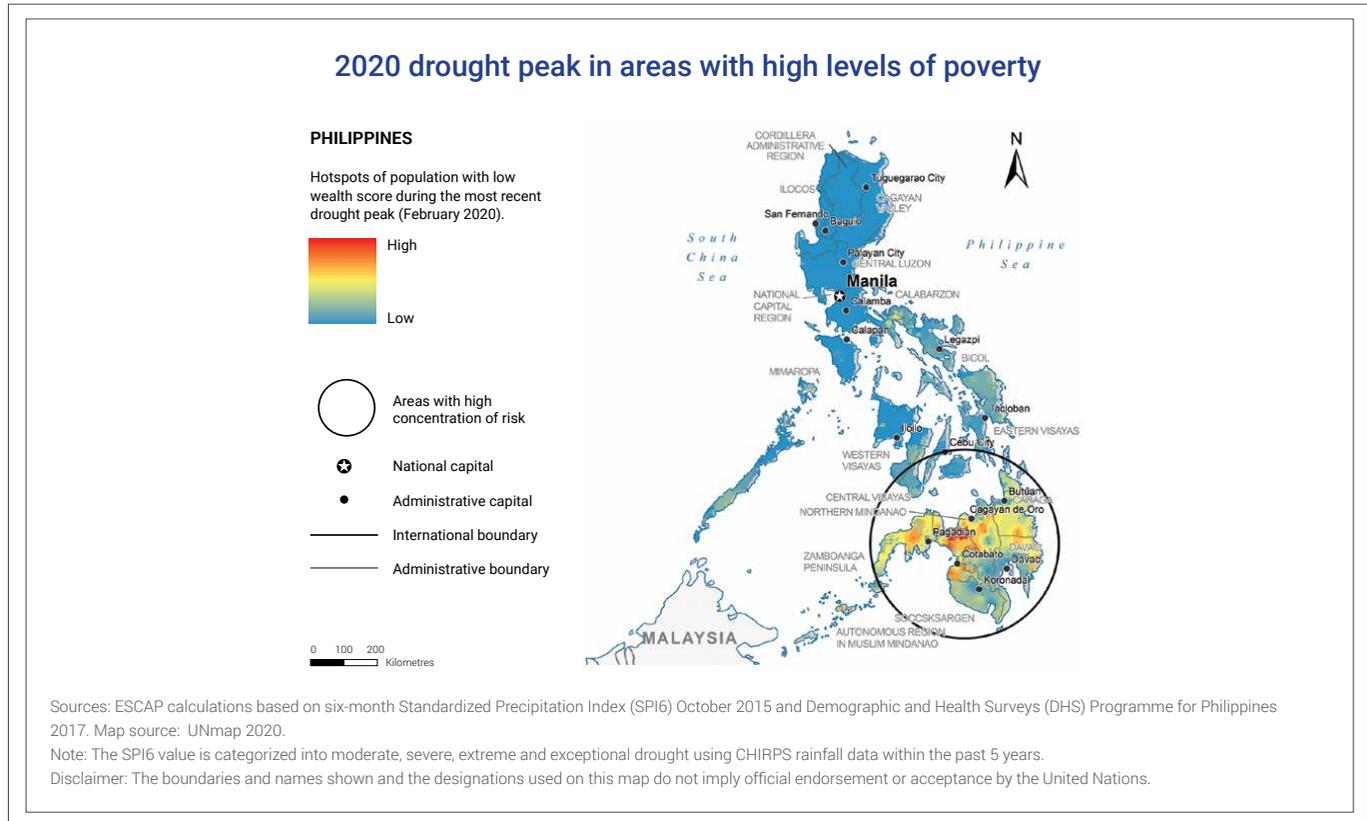


Sources: ESCAP calculations based on six-month Standardized Precipitation Index (SPI6) February 2020 and Demographic and Health Surveys (DHS) Programme for Myanmar 2016. Map source: UNmap 2020.

Note: The SPI6 value is categorized into moderate, severe, extreme and exceptional drought using CHIRPS rainfall data within the past 5 years.

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Figure 7 continued



Dry, cracked ground during a drought in South-East Asia.

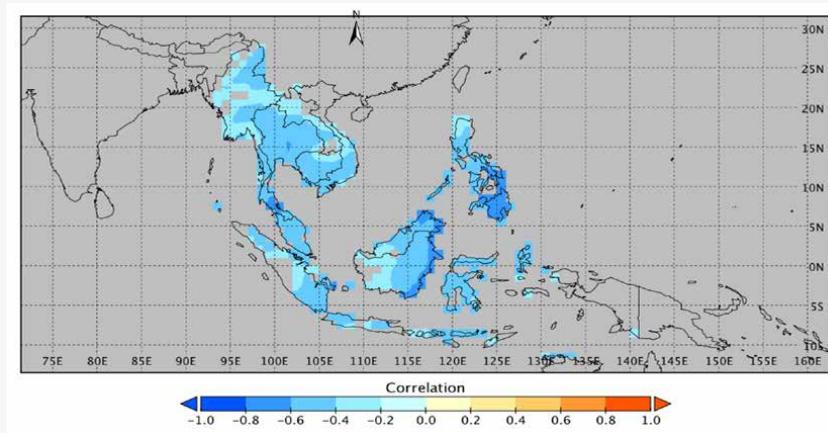
## Intensifying drought risk reinforces the urgency of developing a new regional drought agenda

### As the climate warms, drought severity is expected to increase

Droughts tend to be accompanied by higher temperatures (Figure 8). In both 2015 and 2019, the maximum temperatures were well above normal. Predicting future climates is inherently complex, but it can be confidently

projected that future droughts in the region will be generally associated with high temperatures. The region's climate has already warmed by 0.21°C per decade since 1981. Any continued increase in greenhouse gas emissions will mean that these changes will be even greater in magnitude, further exacerbating drought and attendant impacts.

Figure 8 – Correlation between droughts and higher temperatures, 1981-2019



Source: Rainfall data from CHIRPS, temperature data from Berkeley Earth.

## The changing climate demands a paradigm shift, towards more long-term and adaptive drought risk management

As drought severity is projected to increase, the existing policies relating to drought management across the region need to be upgraded. Drought risk management in ASEAN countries is currently governed by multiple, overlapping plans that remain generally fragmented and reactive, rather than adaptive. Table 3 displays an overview of the national policies in each country that address elements of drought management. It demonstrates that, whilst many countries incorporate drought management to varying extents within policies for adapting to climate change,

managing disaster risk, and developing specific sectors, such as agriculture and water resource management, almost all countries have no specific national drought plan. Policy coherence needs to be strengthened, as many of the sector plans contain overlapping tasks and responsibilities.

Most of the measures outlined in the existing plans are reactive, such as providing humanitarian assistance or issuing early warnings. Moving forward, Governments must design national drought plans, which identify all of the necessary actions to manage drought across different timescales, assign responsibilities for implementing them, and set out indicators for measuring their effectiveness. This will promote a more strategic approach, with one overview of all necessary measures across different policy domains, that is informed by long-term climate projections.

**Table 3 – National plans that incorporate elements of drought management**

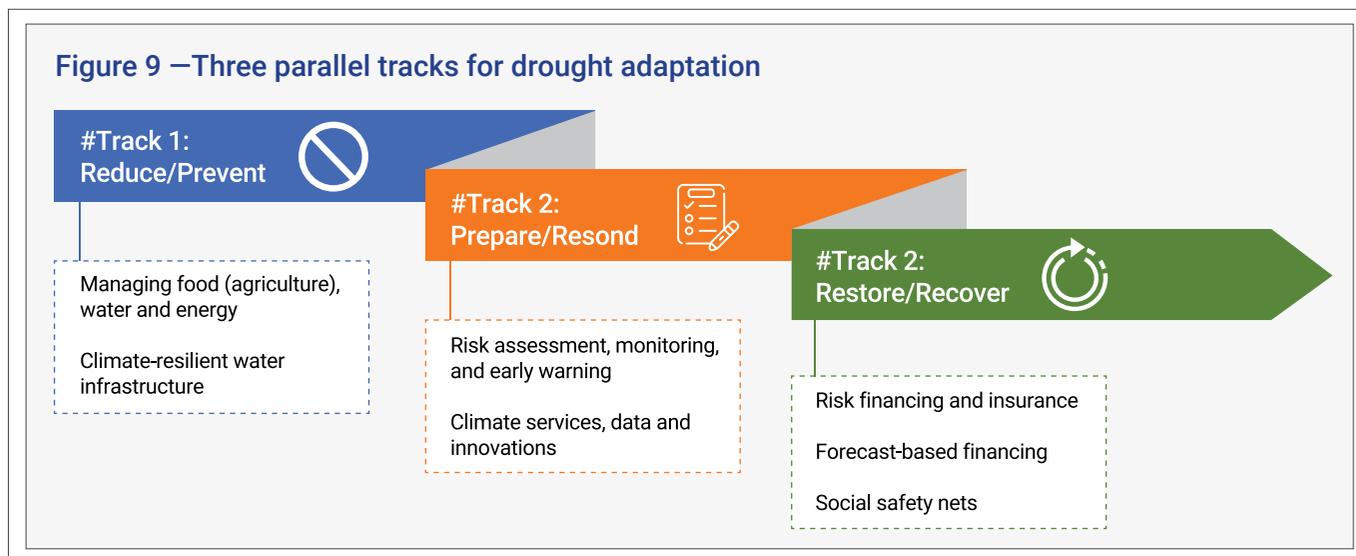
	Disaster Risk Management	Climate Change	National Development Plan	Agriculture	Water Resource Management	Haze	Land Degradation	Forest Fires
Brunei Darussalam	×					×		
Cambodia	×	×	×		×			
Indonesia	×							×
Lao PDR	×	×		×				
Malaysia		×	×	×				
Myanmar	×	×		×		×*		×*
Philippines	×	×	×	×			×	
Thailand	×	×		×	×	×		
Singapore		×						
Viet Nam	×	×	×	×	×			

Source: See Appendix 4 of the full report for a full list of references, available at <https://www.unescap.org/publications/ready-dry-years-building-resilience-drought-south-east-asia-0>  
 Note: \* Under development as of June 2020.

## Adaptive drought risk management must incorporate three policy tracks

Making the paradigm shift towards a proactive approach to drought risk management will require greater coherence, urgency, innovation, and scale in every country. This can be achieved by leveraging the opportunities provided by new technologies and innovative financing through

regional policy cooperation. The Report proposes a three-track framework, which integrates the measures that need to be taken across the various timescales of drought management (Figure 9).

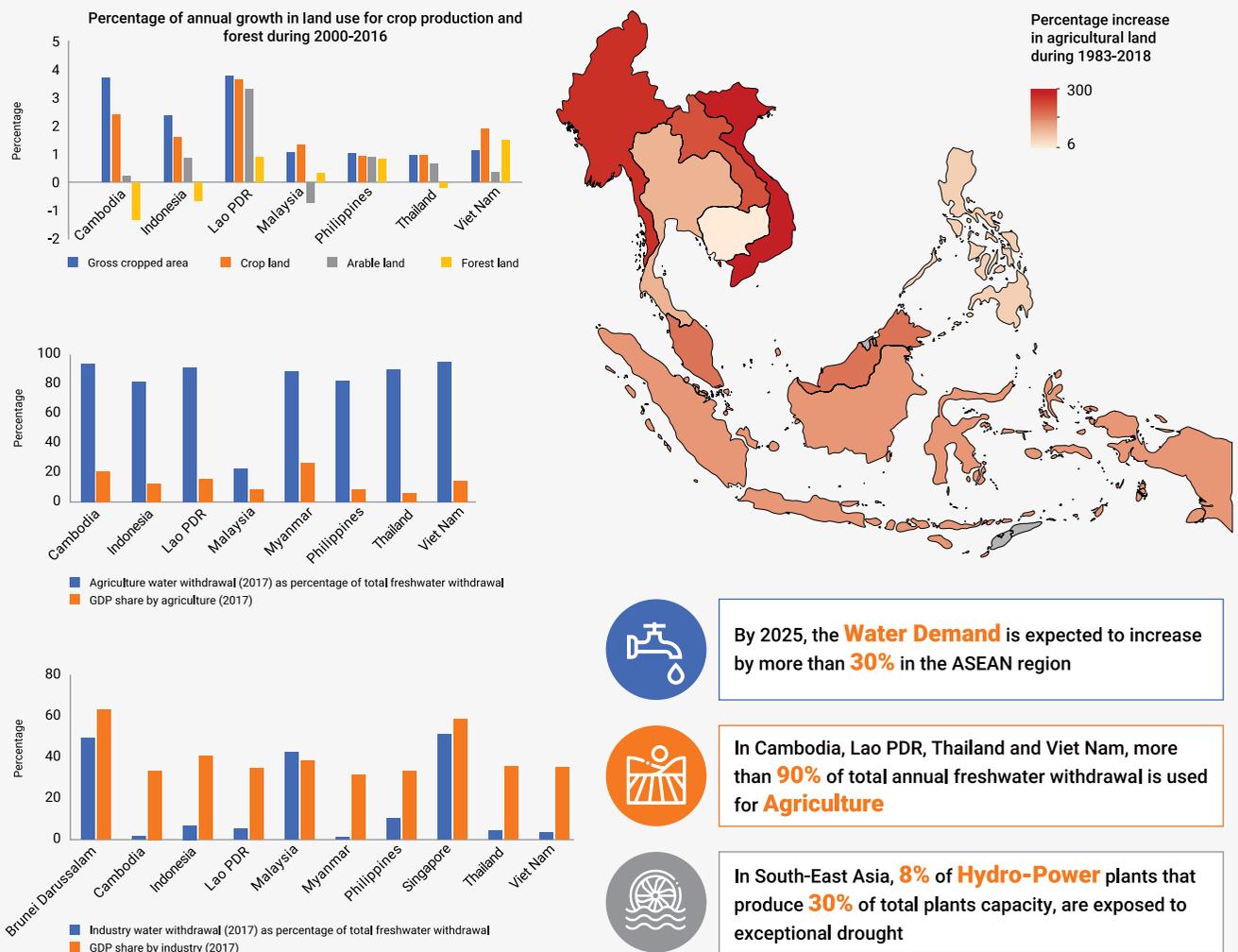


Source: Modified from the Global Commission on Adaptation Report 2019.

## Track 1 – Reduce and prevent

The primary task must be to reduce risk of drought while also minimizing the impact. If countries are to follow this track, they need a coherent approach to systems for food, water and energy (Figure 10).

**Figure 10 – Drought risk in South-East Asia is systemic in nature, and closely linked with food, water and energy systems**



Source: ASEAN Food Security Information System; Birthal and others, 2019; Food and Agriculture Organization Corporate Statistical Database (FAOSTAT) and ASEAN Statistical Yearbook, 2018.

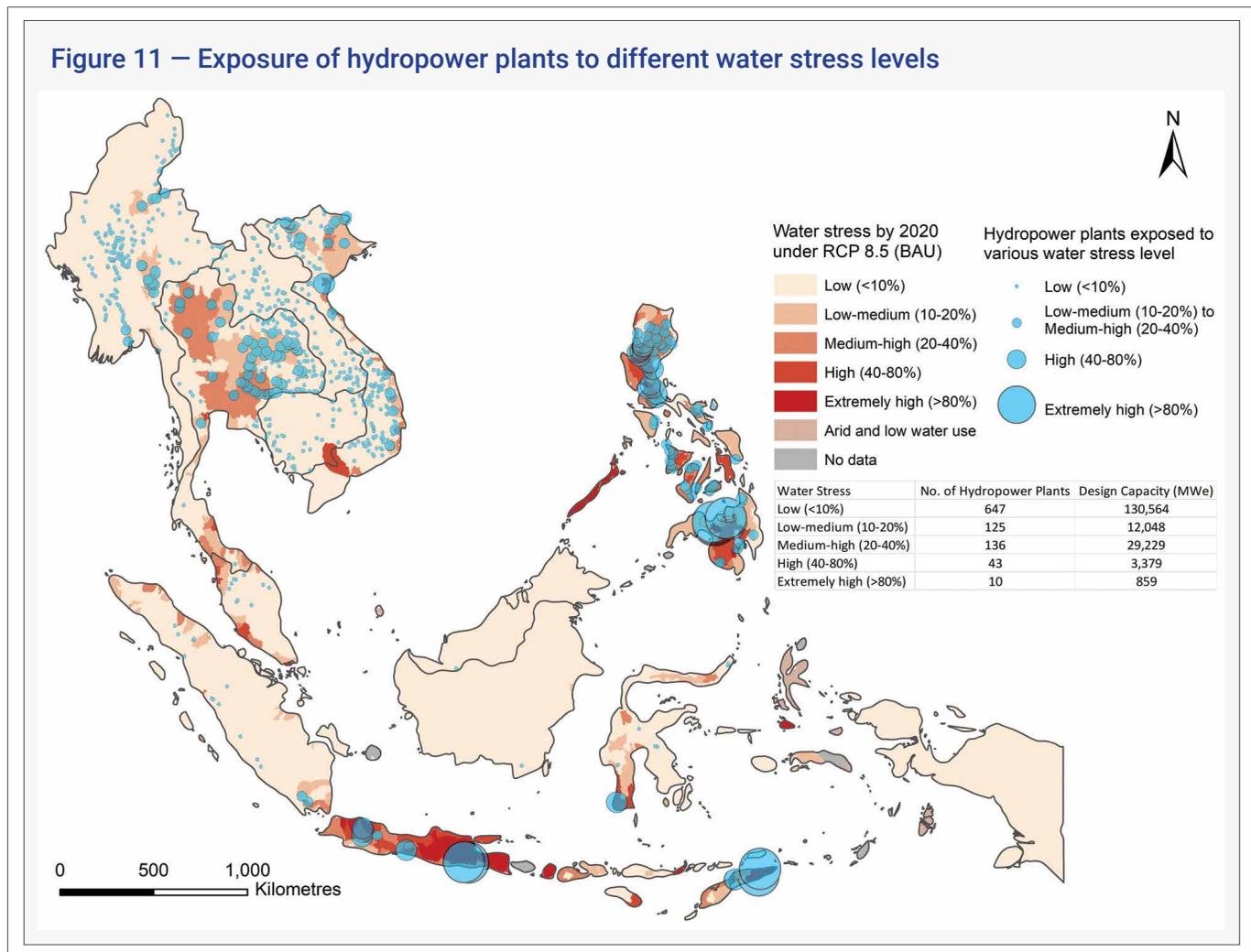
Disclaimer: The boundaries and names shown, and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

In the case of food, countries in South-East Asia have already been adapting agricultural systems. Measures include crop diversification, upland cropping, rice intensification, integrated farming, planting short-maturing and stress-tolerant varieties, integrated pest management, soil conservation, and crop watches for early warning.

There has also been progress for water systems. Measures include integrated water resources management, water

accounting, managed aquifer recharge, alternative wet and dry irrigation technology, reuse of wastewater, rainwater harvesting, and traditional water management.

In the case of energy, South-East Asia gets nearly 1.5 per cent of total supplies from hydropower, a proportion that is likely to increase in the near future. Hydropower generation is, however, vulnerable to drought and to future climate change. Currently 53 hydropower plants are exposed to extremely high water stress (Figure 11).



Source: ESCAP calculations, based on data from WRI Aqueduct Water Stress Projection Data, 2015.

Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Communities can better protect themselves against natural hazards by promoting robust ecosystems that require little capital or maintenance. They can do so through 'ecosystem-based adaptation', which involves nature-based solutions for building resilience by ensuring human-ecosystem integrity.

Dealing with these and other issues in an integrated way entails following the principles of sustainable land management (SLM). An extension of this is drought-smart land management (D-SLM), which involves improving the terrestrial ecosystem services that are affected by changes in precipitation and soil moisture. D-SLM can also include changes in tillage practices.

D-SLM should also involve sustainable forest management. This will improve the water cycle and conservation in the forest ecosystem, making it more resistant to drought and reducing the probability of forest fires. South-East Asia has already piloted many innovations in adaptation. These bright spots now need to be scaled up urgently in the following key systems:

**Food** – Countries should plan for future food security. In many cases this will mean scaling up climate-resilient production by vulnerable small-scale farming households.

**Water** – Successful adaptation will require scaled-up investments in healthy watersheds and water infrastructure, along with dramatic improvements in the efficiency of water use.

**Energy** – Owners need to climate-proof existing hydro-electric plants, and investors should plan new energy infrastructure that is more climate resilient.

**Land** – Decisions on land use, public and private, should aim to safeguard nature. This should include integrated approaches for land use planning, and drought-smart land management.

## Track 2 – Prepare and respond

Governments can take steps to reduce drought risk. They must also anticipate the arrival of droughts and take steps to reduce their impact. The key to this is effective early warning, which is now much more possible as a result of technological advances in the collection and processing of data. National hydrometeorological services now have at their disposal tools and models that

can inform decision-making by everyone concerned, be it government officials, asset managers, and farmers or individual households.

For early warnings, there are often seasonal forecasts, which can provide predictions on rainfall three to six months in advance. In addition, for hazards, such as dry spells and heatwaves, it might also be possible to provide sub-seasonal predictions, for two weeks to one month ahead. Seamlessly combining predictions for different timescales can now enable decision makers to assess risks more dynamically.

An important resource for countries looking to improve their systems is the South-East Asia Regional Climate Centre network, through which national hydrometeorological services can cooperate and help each other to assess, predict, and monitor climate risk.

Countries must start monitoring drought indicators that correspond most closely to the priorities of policymakers. These should include data on precipitation, temperature, streamflow, groundwater and reservoir levels, and soil moisture. These indicators, and any indices derived from them, need to be linked with drought/disaster contingency plans, drought policies, and adaptation plans. Governments should adopt pre-agreed plans and procedures and know what steps to take once certain thresholds are crossed. They should also have predictable sources of funds to finance these actions.

## Track 3 – Restore and recover

Rapid-onset disasters, such as typhoons, usually trigger increases in local social protection. This shock-responsiveness now needs to be extended for slower-onset events, such as drought. This will require significant investment. Even so, the additional requirements for sectors like infrastructure and social protection are much lower than the likely losses from drought damage.

ASEAN Governments typically retain most of their country's disaster risk; they largely finance disaster response from current contingency budgets. Drought risk is thus a hidden public debt that becomes a realized fiscal liability when disasters occur.

Some of this should be offset by insurance. At the national level, Governments can learn lessons from the ASEAN Disaster Risk Finance and Insurance Programme.

Mechanisms like this can help Member States identify potential risks, design innovative risk transfer tools and solutions, and introduce specific aspects of disaster risk financing and transfer.

At the same time, there should be better insurance for enterprises and households. In agriculture, relatively few farmers take out insurance, partly because the current mechanisms for validating claims and making payout can be slow and time-consuming. The alternative is forecast-based financing, which uses a rainfall-based index to determine if a payout is warranted. For the insurer, this is more efficient and reduces the risk of fraud. For farmers, this means faster payouts, so they no longer need to sell their assets to survive.

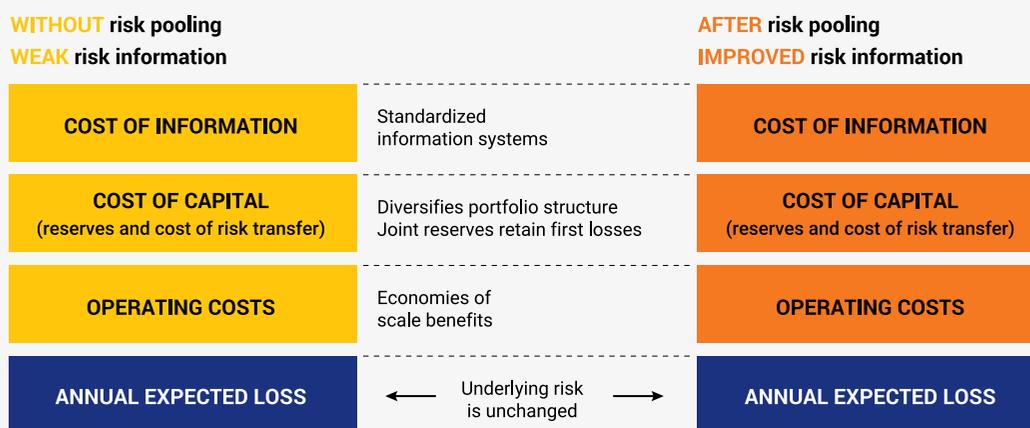
Governments can also adopt policies to enable farming communities to benefit, directly and indirectly, from information and communications technology. They can, for example, take advantage of mobile broadband access devices and the internet of things, backed up by systems that use smart networks, big data analytics, and artificial intelligence. In the future, crop health and soil conditions can also be monitored precisely and accurately using autonomous drones and sensors.

## Regional risk pools offer untapped potential for protection

The Report also highlights the potential for regional risk pooling, which makes risk transfer among countries more cost-effective by helping to (i) diversify risk across multiple countries with different disaster risk profiles, including drought; (ii) establish joint reserves to self-insure a part of the risk managed by the pool; (iii) facilitate access to international reinsurance and capital markets; (iv) share operational costs, such as programme development and day-to-day back office operations; and (v) build a better foundation of risk information.

This is of particular value in transboundary areas, such as the Mekong River Basin. Risk pools offer larger and more attractive transaction sizes and can cut premiums by reducing the cost of capital and risk information as well as operating costs (Figure 12). Risk pools can be linked to pre-agreed post-disaster programmes. For example, payouts could support existing national safety net programmes to poor and vulnerable households.

Figure 12 – Financial benefits of risk pooling



| Source: Adapted from ESCAP (2018).

## COVID-19 stimulus packages must be amplified with investments in climate action and adaptation

A second recent opportunity for financing long-term adaptation is presented by the continuing COVID-19 stimulus packages. In response to the pandemic, ASEAN Governments quickly introduced emergency fiscal measures, supported small businesses, expanded unemployment benefits, provided additional social assistance, and supported vulnerable households with cash transfers. They also established the COVID-19 ASEAN Response Fund.

These investments can now be amplified with much-needed investments in climate action and adaptation, in order to support vulnerable populations exposed both to pandemics and slow-onset disasters. This could happen quickly through investments in nature-based solutions and by strengthening social protection mechanisms to make them responsive to recurring droughts.

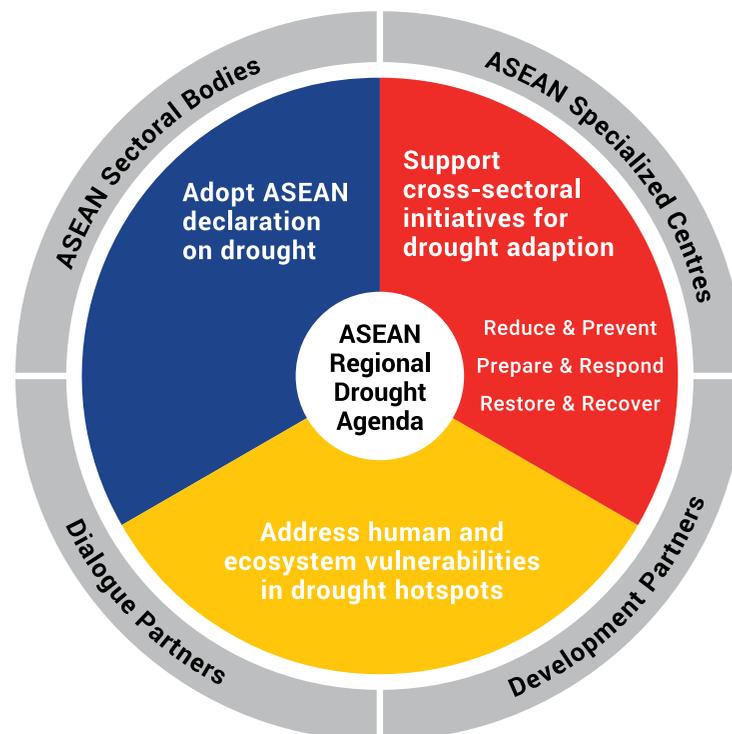
## The best way to upgrade drought risk management is through a whole-of-ASEAN-response

The primary responsibility for dealing with drought lies with national Governments. But drought poses many complex problems that are best tackled through regional cooperation, which will enable all countries to benefit from peer learning and support and from sharing of expertise and resources.

Such cooperation is already underway. In May 2016, at the informal ASEAN Ministerial Meeting on Disaster Management, ASEAN Ministers resolved to build the region's capacity to address drought. Between 2019 and 2020, the focal points of the ASEAN Committee on Disaster Management convened national drought policy dialogues to sustain the political momentum of addressing drought within broader climate resilience efforts.

The Report proposes three further priority actions at the ASEAN level. The aim is to establish a regional drought agenda for adapting to risk in a changing climate (Figure 13).

Figure 13 – Priority actions and actors for an ASEAN regional drought agenda



## Priority 1 – An ASEAN drought agenda

There are already various regional discussions on disasters that include drought, but the policy landscape is overlapping and disjointed. Drought is addressed directly or indirectly, for example, in several ASEAN frameworks and agreements. ASEAN Member States are also signatories to relevant international conventions and agreements.

These agreements represent commendable progress, but the result is rather fragmented. The time has come for a coordinated ASEAN response that aligns with existing commitments, but also ensures coherence across the various plans and initiatives, and across ASEAN's three pillars. This could be achieved through a legal instrument, such as a declaration, that would mandate cross-sectoral collaboration and initiatives.

## Priority 2 – Cross-sectoral initiatives

Most of the actions for the three-track approach need to be taken by national authorities. But, they should also be able to rely on regional cooperation that offers support, expertise and resources, along with opportunities for peer learning, within and across countries. For this purpose, Member States can harness the collective resources and expertise of the ASEAN bodies and technical working groups and specialized centres.

These regional resources for multiple sectors can be used to support drought adaptation actions in key systems of food, water, energy, land and environment. They can also help with drought monitoring and early warning services for both short-and long-term drought response. In addition, they can advise Governments to enable risk-informed social protection, insurance solutions, as well as economic and investment planning.

## Priority Action 3 – Address drought hotspots

The region has many hotspots where high drought exposure overlaps with human vulnerability and land degradation. ASEAN countries need to address the underlying factors that expose people in these perilous places to climate-related disasters. This would be consistent with the *United Nations 2030 Agenda for Sustainable Development*, which declares that no one should be left behind, and also with the commitments made at the informal 2016 ASEAN Ministerial Meeting on Disaster Management, which aimed for prevention, protection and assistance for all, especially the most vulnerable.

There will be an opportunity to carry this agenda forward through the *ASEAN Framework Action Plan on Rural Development and Poverty Eradication*. The next iteration of the plan should address drought risk hotspots and include an integrated package of actions for adaptation. This would not only reduce drought risk but also bring about many other economic, social and environmental benefits.

The stimulus packages being rolled out by Governments to revive their economies amid the COVID-19 fall-out also present opportunities for investment in drought preparedness. These packages should also be designed to build resilience of ASEAN peoples to future disaster risk, including drought.

## Ready for the dry years – one ASEAN, one response

2020 saw an extraordinary display of energy and cooperation across ASEAN to deal with the COVID-19 pandemic and its socioeconomic impacts. This included large-scale collaboration that established the COVID-19 regional response fund. The region has also taken a major step forward with the landmark *ASEAN Agreement on Disaster Management and Emergency Response*.

The same spirit of cooperation now needs to be extended to protect the most vulnerable, through effective drought management. The regional initiatives suggested in this Report should serve as the basis for a united effort – one ASEAN, one response.

## Endnotes

- <sup>1</sup> ESCAP (2020a).
- <sup>2</sup> FAO, IFAD, UNICEF, WFP and WHO (2020).
- <sup>3</sup> Ibid.
- <sup>4</sup> ILO (2020).
- <sup>5</sup> ILO (2018).
- <sup>6</sup> UNDRR (2009).

## References

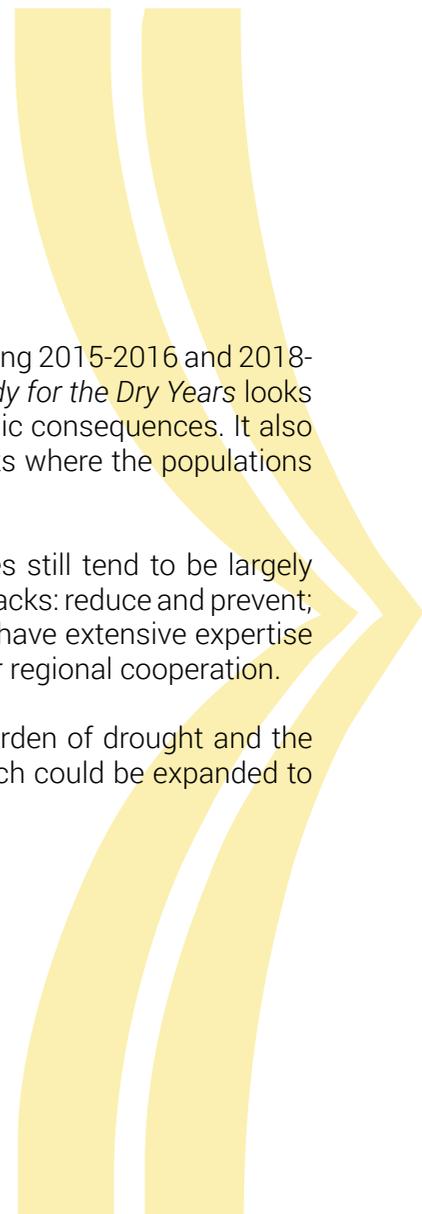
- ASEAN Food Security Information System. Statistics. Available at <http://www.apfssis.org/statistics>
- ASEAN Secretariat (2018). ASEAN Statistical Yearbook, 2018. Available at <https://asean.org/storage/2018/12/asyb-2018.pdf>.
- Birthal, Pratap S., and others (2019). Transformation and Sources of Growth in Southeast Asian Agriculture. IFPRI Discussion Paper, No. 01834. Washington, D. C.: International Food Policy Research Institute.
- Center for International Earth Science Information Network (CIESIN) Columbia University. 2018. Gridded Population of the World, Version 4 (GPWv4): Administrative Unit Center Points with Population Estimates, Revision 11. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). Available at <https://doi.org/10.7927/H4BC3WMT> and at <https://sedac.ciesin.columbia.edu/data/set/gpw-v4-admin-unitcenter-points-population-estimates-rev11>. Accessed in May 2020.
- Food and Agriculture Organization (FAO) (2019). FAOSTAT Statistical Database. Rome, Italy: FAO. Retrieved 5 May 2020, from <http://www.fao.org/faostat/en/#data/>
- FAO, IFAD, UNICEF, WFP and WHO (2020). The State of Food Security and Nutrition in the World 2020. Transforming Food Systems for Affordable Healthy Diets. Rome. Available at <http://www.fao.org/3/ca9692en/CA9692EN.pdf>
- Funk, Chris C., and others (2014). A quasi-global precipitation time series for drought monitoring: U. S. Geological Survey Data Series 832, pp. 4. Available at <https://dx.doi.org/10.3133/ds832>.
- Global Commission on Adaptation (2019). Adapt now: A global call for leadership on climate resilience. Available at [https://cdn.gca.org/assets/2019-09/GlobalCommission\\_Report\\_FINAL.pdf](https://cdn.gca.org/assets/2019-09/GlobalCommission_Report_FINAL.pdf)
- Global Data Lab (2018). Subnational Human Development Index (HDI) Version 1. Available at [https://globaldatalab.org/shdi/download\\_fles/](https://globaldatalab.org/shdi/download_fles/). Accessed in May 2020.
- Global Data Lab (2020). Subnational Human Development Index (HDI) Version 4.0-2020. Available at [https://globaldatalab.org/shdi/download\\_fles/](https://globaldatalab.org/shdi/download_fles/). Accessed in May 2020.
- International Labour Organization (ILO) (2018). Social protection for migrant workers in ASEAN: Developments, challenges, and prospects. Available at <https://www.social-protection.org/gimi/RessourcePDF.action?id=55654>
- (2020). ILO Monitor: COVID-19 and the world of work. Second edition: updated estimates and analysis. Available at [https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/documents/briefingnote/wcms\\_740877.pdf](https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/documents/briefingnote/wcms_740877.pdf)
- Schneider, Udo and others (2008). Global precipitation analysis products of the GPCP. Global Precipitation Climatology Centre (GPCC), DWD, pp. 12.
- Taylor, Karl., Stouffer, Ronald., and Meehl, Gerald (2012). An overview of CMIP5 and the experiment design. Bulletin of the American Meteorological Society, vol. 93, pp. 485–98
- United Nations, Economic and Social Commission for Asia and the Pacific (ESCAP). Asia-Pacific Energy Portal. Available at [https://asiapacificenergy.org/#main/lang/en/graph/1/type/0/sort/0/time/\[1990,2015\]/indicator/\[2948:2810\]/geo/\[SOEA\]/legend/1/inspect/0](https://asiapacificenergy.org/#main/lang/en/graph/1/type/0/sort/0/time/[1990,2015]/indicator/[2948:2810]/geo/[SOEA]/legend/1/inspect/0)
- (2018). Opportunities for regional cooperation in disaster risk financing. Available at <https://www.unescap.org/resources/disasterrisk-financing-opportunities-regional-cooperation-asia-and-pacific>
- (2020a). Asia and the Pacific SDG Progress Report 2020. Available at [https://www.unescap.org/sites/default/files/publications/ESCAP\\_Asia\\_and\\_the\\_Pacific\\_SDG\\_Progress\\_Report\\_2020.pdf#page=100](https://www.unescap.org/sites/default/files/publications/ESCAP_Asia_and_the_Pacific_SDG_Progress_Report_2020.pdf#page=100)
- (2020b). The Disaster Riskscape across South-East Asia: Key Takeaways for Stakeholders. ST/ESCAP/2885.
- United Nations Office for Disaster Risk Reduction (UNDRR) (2009). UNISDR Terminology on Disaster Risk Reduction. Available at [https://www.unisdr.org/files/7817\\_UNISDRTerminologyEnglish.pdf](https://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf)
- United States Agency for International Development (USAID) (2014). Demographic and Health Surveys (DHS) Programme for Cambodia. Available at <https://dhsprogram.com/data/>. Accessed in May 2020.
- (2016a). Demographic and Health Surveys (DHS) Programme for Myanmar. Available at: <https://dhsprogram.com/data/>. Accessed in May 2020.
- (2017). Demographic and Health Surveys (DHS) Programme for Philippines. Available at <https://dhsprogram.com/data/>. Accessed in May 2020.
- World Resource Institute (WRI) (2015). Aqueduct Water Stress Projections Data. Available at <https://www.wri.org/resources/data-sets/aqueduct-water-stress-projections-data>. Accessed on 24 May 2020.



South-East Asia has long experienced droughts. However, the two drought events during 2015-2016 and 2018-2020 exceed anything recorded in the past two decades. This second edition of *Ready for the Dry Years* looks at their severity and impacts, as well as their climatic drivers and their socioeconomic consequences. It also combines data on rainfall with other socioeconomic indicators to reveal the hotspots where the populations are most vulnerable to drought.

Compared with other disasters, droughts are fairly predictable, yet policy responses still tend to be largely reactive. This Report argues instead for a more proactive approach along three clear tracks: reduce and prevent; prepare and respond; and restore and recover. Many institutions in South-East Asia have extensive expertise in the relevant scientific disciplines which countries can capitalize on through greater regional cooperation.

This Report comes at a critical time, as ASEAN Member States face the double burden of drought and the COVID-19 pandemic. Governments have responded rapidly with stimulus plans, which could be expanded to accommodate measures for drought resilience.



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