





# Climate change is a youth issue

Chapter 7



**C**limate change is one of the major dynamics of change affecting rural youth livelihoods. It is having significant effects on the countries in which the rural youth population is concentrated and on the sectors in which they will be looking for employment opportunities. The climate shocks underlying these effects are expected to become more frequent and intense unless measures are taken to incorporate climate change adaptation and mitigation into broad development policies and investments. At the same time, investments targeting rural youth need to incorporate a long-run climate lens approach for two simple reasons: today's youth will bear the brunt of a failure to adapt to climate change in the future; and the sustainability of any investment in the creation of youth opportunities will be determined by how the effects of climate change unfold (as well as myriad other uncertainties in the economic and policy environments).

**Climate change is a youth issue because most countries in which the youth population accounts for a sizeable share of the total population also depend heavily on agriculture – a sector that is highly exposed to climate change.** Although climate change affects everybody, certain sectors and parts of the population are more exposed to the livelihood risks that it poses. Investments in the agricultural sector in these countries need to ensure that adaptive technologies are developed and are accessible and that young people have the capacity to use these technologies as part of an inclusive and sustainable rural transformation process.

**Though most existing narratives on climate change and development focus on the agricultural sector, investments in every sector need to be cognizant of the need for adaptation to climate change.** The Intergovernmental Panel on Climate Change (IPCC) lists infrastructure, water management systems and agriculture as the main sectors that will be impacted and in which investments are needed (IPCC, 2014a). Many adaptive agricultural technologies exist, but adoption rates need to be improved to ensure that the agricultural sector can stay productive and absorb increasing numbers of rural youth in the labour market as the rural transformation process proceeds. As discussed in chapter 2, connectivity is one of the main challenges in the creation of rural youth opportunities; hence the importance of climate-resilient investments that will improve rural youth connectivity on a sustainable basis.

Vulnerability literature identifies exposure, sensitivity and adaptive capacity as the main components of vulnerability to climate change (Füssel, 2017; Füssel and Klein, 2006; IPCC, 2014a). **Rural youth are likely to be worse off than the rest of the population in terms of all components of vulnerability to climate change.** Countries with large youth populations depend heavily on agriculture and are projected to suffer significantly from extreme heat stress; this will disproportionately increase the *exposure* of rural youth who have limited options beyond agriculture. Rural youth are also likely to be more *sensitive* to climate shocks because of their lack or shortage of social capital and skills and their lower level of community participation (Brooks, 2003; Adger, 2003). Finally, the extent of *adaptive capacity* depends on access to resources such as land, credit

and insurance, from which young people tend to be excluded. This completes the circle of vulnerability (Gasparrri and Muñoz, 2018; Yeboah et al., 2018).

**Only by ensuring that young people develop the ability to process complex information, to adapt necessary technologies and to innovate can the rural transformation process be inclusive of rural youth on a sustainable basis and address their vulnerabilities.** One of the effects of climate change on the information environment is to decrease the capacity of traditional information systems to effectively deal with change (Lipper et al., 2016). Climate change has made it necessary to process increasingly complex information in a timely manner in order to develop adaptation strategies, and this capacity can only be achieved by improved education systems that can more effectively foster the development of cognitive and non-cognitive skills of future generations (Muttarak and Lutz, 2014).

### What makes climate change a youth issue?

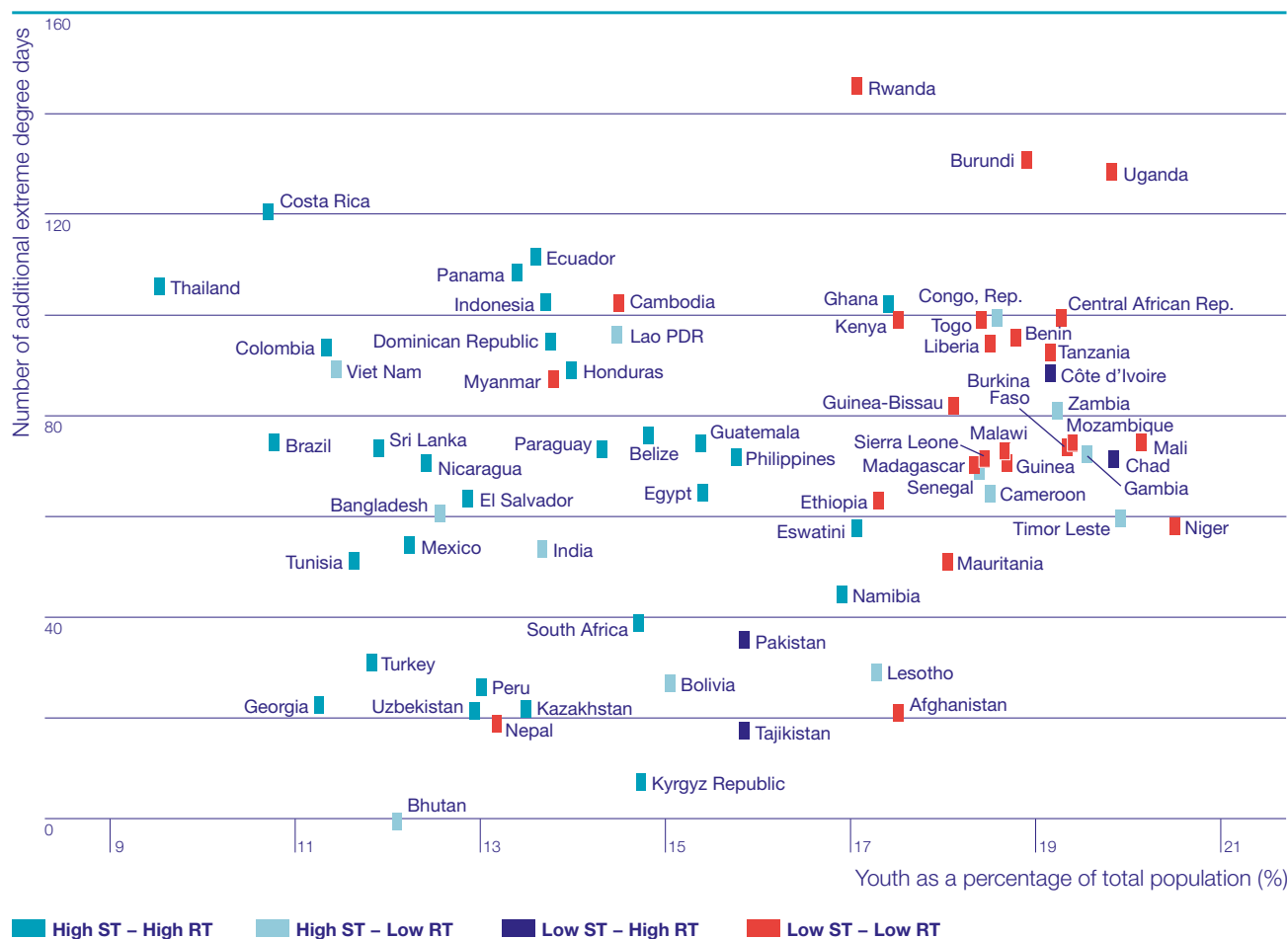
No country with a large youth population share is expected to be able to avoid significant impacts of climate change by 2050. Climate change manifests itself in many ways, but its effects are primarily measured in terms of changes in the distribution of rainfall and temperature; while both of these parameters are critically important for agriculture, temperature projections are more stable across a large set of climate models (Christensen et al., 2007). **FIGURE 7.1** shows that the majority of countries in which young people make up more than 17 per cent of the population are projected to have more than 60 additional days with heat stress (number of extreme degree days) in 2050. Increasing heat stress affects crop and livestock productivity and there is a significant variation in its effects across agroecological systems and regions, with substantial negative impacts being expected in temperate and subtropical areas (Teixeira et al., 2013; IPCC, 2014b). Moreover, most of these countries are among those that have the lowest structural and rural transformation levels (indicated by the red dots in **FIGURE 7.1**), and are mainly in Africa. These countries have the least capacity to deal with climate change challenges, and their youth populations are growing because of their lagging demographic transition, as discussed in chapter 5. This is one of the main reasons why climate change is considered to be one of the main dynamics of change affecting rural youth opportunities and livelihoods.

The majority of the world's rural youth live in countries with medium to high projected levels of exposure to extreme heat stress and in rural opportunity spaces that have a strong agricultural potential but limited market access (see **FIGURE 7.2**). Most of the young people living in an opportunity space composed of mixed challenges and opportunities are found in countries with a medium projected level of exposure to extreme heat days, whereas those residing in opportunity spaces with a strong agricultural potential but limited market access are mainly living in high-exposure countries. Although APR hosts the largest number of young people who will be exposed to medium and high levels of heat stress (mainly in India and China), SSA is the only region in which a majority of young people are living in high-exposure countries. Most of these youth live in places that currently have a strong agricultural potential (with limited markets), but that potential is threatened by climate change, so adaptive action will have to be taken in the agricultural sector if they are to find employment there. This call for action is also relevant for medium-exposure countries, where a majority of young people face mixed challenges and opportunities.



**FIGURE 7.1** Countries with large youth populations (and others) are projected to be exposed to an increased number of extreme heat days by 2050

**The projected number of additional extreme degree days and youth as a percentage of total population**

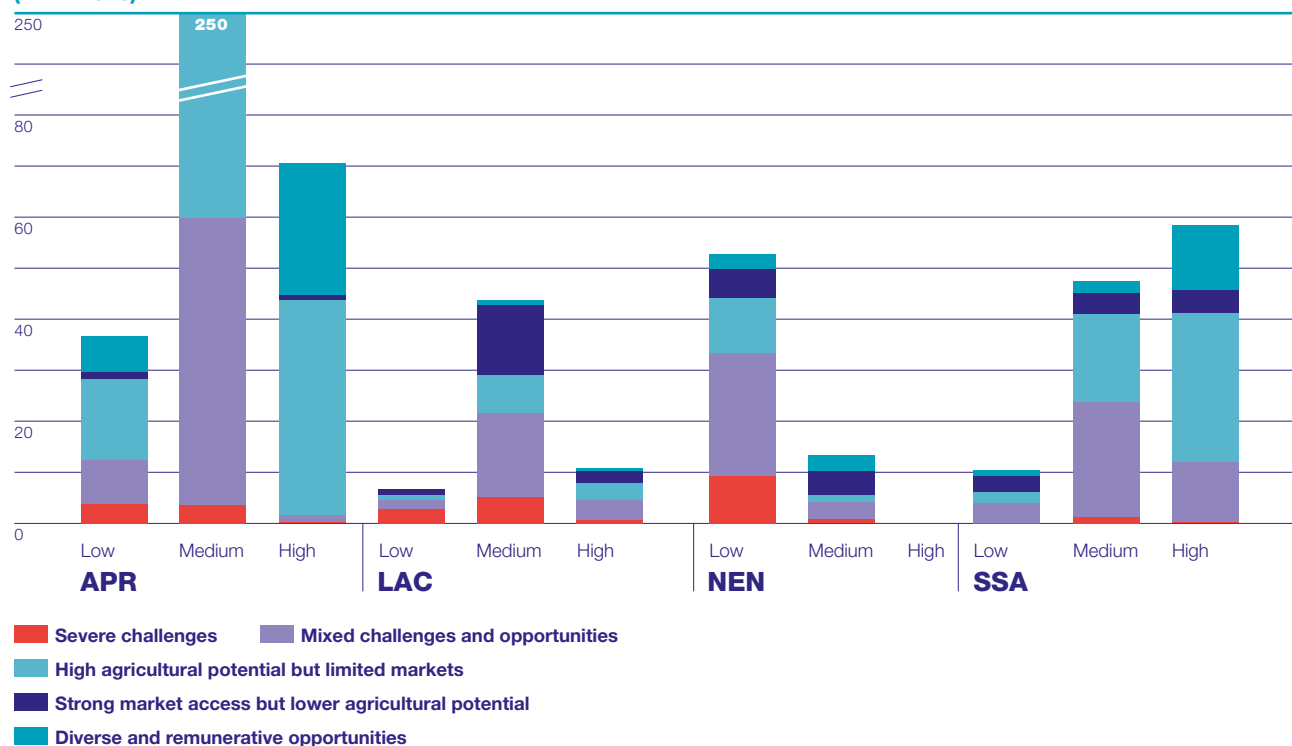


Many of the countries with large youth populations and a high degree of vulnerability to heat stress are also highly dependent on agriculture. **FIGURE 7.3** shows that the relative size of the youth population and dependence on the agricultural sector are strongly correlated. A high degree of dependence on agriculture makes countries vulnerable to the direct and indirect effects of climate change, which are likely to be felt more intensely in rural areas where young people will be looking at an opportunity space dominated by the agrifood sector (AFS).

To make matters worse, the majority of countries with the largest shares of young people in their populations are also those that are least likely to have the capacity to deal with the implications of climate change. More than 20 per cent of the GDP in countries with low levels of structural and rural transformation (represented by red dots in **FIGURE 7.3**) comes from agriculture, which remains a low-productivity sector (i.e. low agricultural value added). Rural youth in these countries will struggle to find employment in the agricultural sector if investments in adaptation are inadequate.

**FIGURE 7.2** The high agricultural potential existing in areas where a majority of global youth live today is threatened by extreme heat stress – especially in APR and SSA

**Number of youth by rural opportunity space, region and projected exposure to extreme heat days (in millions)**



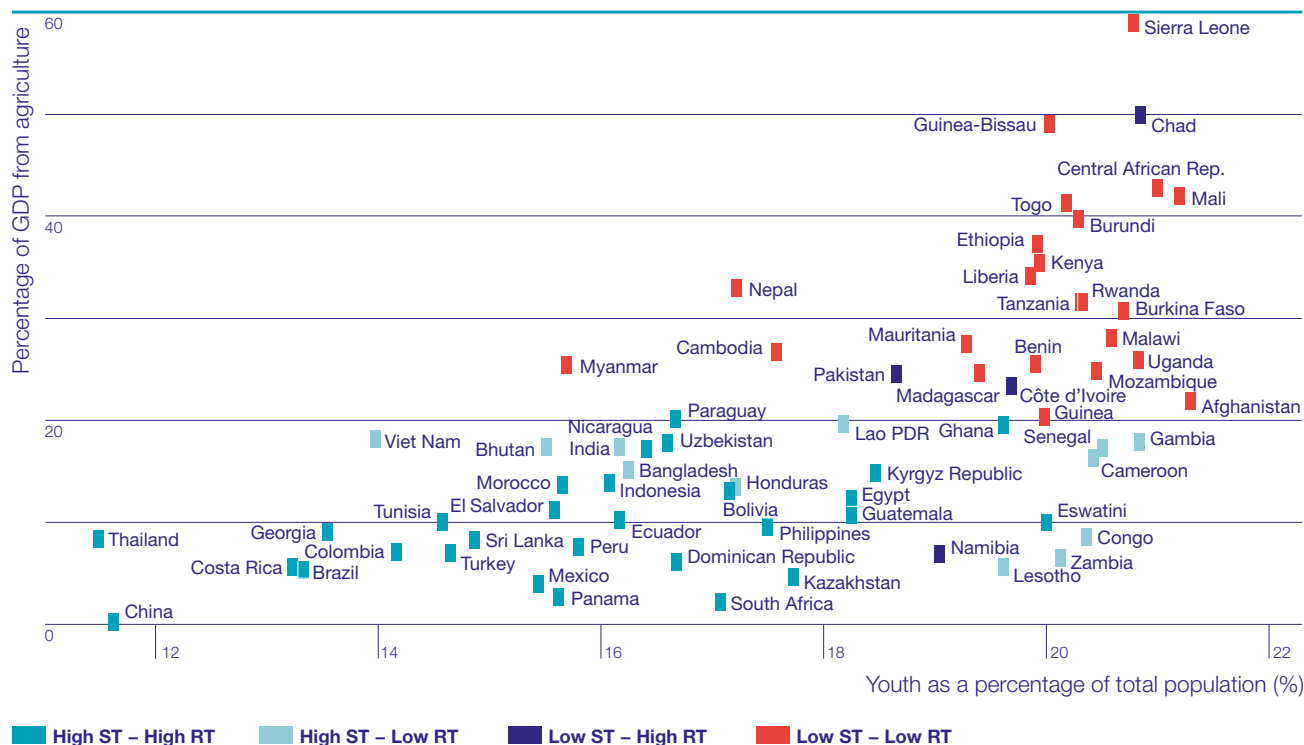
Notes: APR: Asia and the Pacific; LAC: Latin America and the Caribbean; NEN: Near East, North Africa, Europe and Central Asia; SSA: sub-Saharan Africa. "Low", "medium" and "high" indicate projected levels of exposure to less than 40, between 40 and 80, and more than 80 days of extreme heat by 2050, respectively. Source: Authors' own calculations using projections from Arndt et al. (2018) and spatial data on the rural opportunity space (see chapter 2).

Employment opportunities in other sectors are also limited, given the large share of GDP accounted for by agriculture and the fact that the structural transformation process is driven by productivity increases in the agricultural sector. As noted earlier, more than 50 per cent of rural youth in these countries live in opportunity spaces with a strong agricultural potential but with limited access to markets (see **FIGURE 2.5**). These countries need to invest in *agriculture-boosting* approaches to speed up their productivity growth (IFAD, 2016), with a specific focus on adaptation. Examples include youth-centred interventions to increase the adoption of stress-tolerant varieties (by improving access to finance, information and other inputs) and to improve irrigation infrastructure and water use efficiency.

Countries that have low levels of structural transformation and high levels of rural transformation also tend to have large proportions of young people in their populations (represented by yellow dots in the figure). Their agricultural sectors' productivity is higher by definition, and they can therefore focus more on *sustaining* their productivity through investments in the adaptation of all sectors to climate change shocks. Given the need to increase the share of GDP contributed by the non-farm sector in these economies, such interventions would include investments in green infrastructure, improved energy efficiency in the non-farm sector and risk management.

**FIGURE 7.3** Countries with the highest proportions of young people also depend heavily on agriculture and have the least capacity for coping with climate change

**Agriculture dependency and youth as a percentage of total population**



Notes: ST: structural transformation; RT: rural transformation.

Source: Adapted from Arndt et al. 2018. ST: Structural Transformation; RT: Rural Transformation

## How does climate change affect rural youth opportunities?

Climate change alters rural youth employment opportunities in all sectors – not just in agriculture. Some sectors are affected by climate change more directly, while others are affected indirectly through general equilibrium effects. Agriculture and other activities that draw on natural resources, such as livestock, forestry and fisheries, are among the sectors most directly affected by climate change. Climate change is projected to lower the productivity of major crops as compared to a baseline scenario without climate change in all regions, and this effect will cause prices to increase and will, to varying degrees (and with varying degrees of uncertainty), trigger more intensive management practices, area expansion, changes in international trade and reduced consumption across regions (Nelson et al., 2014; IPCC, 2014a, p. 632). The projected impacts of climate change include decreased livestock productivity due to heat stress and changing distributions of pests and diseases; a redistribution of the potential catch of marine fisheries away from tropical countries, which poses the risk of reduced production, income, employment and, hence, food security; and a loss of forest cover, which will both contribute to further climate change and threaten the livelihoods of communities dependent on forest resources (IPCC, 2014a).

In addition to affecting natural-resource-dependent sectors, climate change also has an impact on roads and other infrastructure which increases the exposure

of young people living in less connected areas to the ramifications of these kinds of changes. Both on-farm activities and the off-farm portions (e.g. processing, packaging and transportation) of the AFS, as well as non-AFS sectors, are vulnerable to the impacts of climate change on roads, water management systems and infrastructure. Given that both on-farm and off-farm activities are expected to become increasingly important sources of youth employment, the effects of climate change are likely to undermine the productivity and connectivity of rural youth (IPCC, 2014b).

**Economy-wide effects magnify the implications of climate shocks for job creation, poverty reduction and structural transformation.** The above summarized impacts will lead to increases in real food prices that will negatively affect real consumption, especially in poor net-buyer households. High food prices also increase wages that are closely tied to the cost of food in poor countries and decrease the demand for labour in labour-intensive non-agricultural sectors. Especially in countries with low levels of structural transformation, climate change is likely to lead to slower growth, shifts in trade balances and exchange rates, and reduced competitiveness for tradable goods and services. The combination of these effects will lead to slow job creation overall and will hamper the creation of employment opportunities for rural youth (Arndt et al., 2018).

**The impacts of climate change are likely to be distributed unevenly across the rural-urban gradient.** Major impacts of climate change in rural areas will be felt through changes in the water supply, food security and agriculture. The human costs in rural areas will be high because of rural residents' heavy dependence for their livelihoods on natural resources, high rural poverty rates, the low connectivity of rural areas and policy failures that prioritize urban demands (over rural ones) under extreme events (IPCC, 2014a). The livelihood impacts on rural youth will also depend on their rural opportunity space. Young people living in opportunity spaces marked by severe challenges will bear the brunt of the combined effects on their productivity and connectivity, while those in diverse opportunity spaces will have more options for coping with the impacts but will nonetheless need support in order to navigate the new and complex uncertainties that they will face.

**Country-specific detailed analyses are needed in order to gain an understanding of the spatial distribution of impacts and to identify adaptive investments that will be relevant for youth.** For example, Arndt and Thurlow (2015) identify four impact channels through which climate change affects the economy of Mozambique: agriculture, roads, hydropower and cyclonic sea level surges. Although the impacts may be modest in the aggregate, rural areas will bear the brunt of the downturn in agricultural yields and the deterioration of the road system, while urban areas will be more affected by the reduction in hydropower and storm surges in coastal cities. Similarly, Cullis et al. (2015) model the impacts of climate change on various sectors in South Africa and show that impacts are highly variable at the subnational level, especially in agriculture. Given how strongly the rural opportunity space influences youth livelihoods (see chapter 2), understanding how the different spaces they live in and sectors that can employ them will be affected is critical for sustainable youth inclusion.

**Youth-specific constraints – especially on access to land – may be exacerbated by climate change.** Land values are expected to change in response to climate-related factors in varying ways. In some cases, increasing competition for productive land may drive up agricultural land values (Smith et al., 2010), making it even harder for rural youth to access land (Arndt et al., 2018). In the absence of an agricultural sector that has adapted well to the impacts of climate change, however, agricultural land values may decline along



with productivity and employment opportunities in the sector (Mendelsohn et al., 2007; Mendelsohn, Christensen and Arellano-Gonzalez, 2010). The constraints that already exist in terms of rural young people's access to land need to be addressed by improving land rental markets and inheritance policies in order to minimize the impacts of climate change on young people's productive engagement in the economy.

### **Adaptation to climate change is essential to ensure sustainable livelihood opportunities for rural youth**

Agricultural sectors that are well prepared to meet the challenges of a changed agroecology can partially offset losses elsewhere in the economy. Countries with ample agricultural resources and labour that invest enough in agriculture to capture growing markets can benefit from the higher prices associated with climate change and can partially offset negative impacts in other sectors (Arndt et al., 2018). If countries with large youth populations fail to do so, however, productivity growth would fall behind rates observed recently and yield losses would be greater, thereby reducing agricultural revenues.

Agricultural sectors that have adapted to climate change can absorb increasing numbers of young people even while the importance of agriculture in the economy decreases as the structural transformation process proceeds. Though this may seem counterintuitive, evidence suggests that it is possible if certain conditions are met, especially in countries that are going through the structural transformation process and the demographic transition at the same time. Ahsan and Mitra (2016) argue that a labour-absorbing transformation was accomplished in Gujarat through investments in infrastructure, agricultural science and education, and water management and policy changes that improved access to land and markets. In India as a whole, the agricultural labour force expanded until 2005, even as the sector's share of the total labour force was decreasing, after which both numbers declined.

In Africa, although agriculture's share of the labour force in most countries is falling at varying rates, the absolute numbers of people employed and labour productivity in the sector have risen (IFAD, 2016, p. 139). The increase in labour productivity, however, has been sluggish compared to productivity gains in LAC and APR due in part to the slow adoption of improved agricultural technologies. Using panel data from six SSA countries, Yeboah and Jayne (2018) find that the numbers of people employed and the total amount of time that they work in agriculture are rising, although most of this increase comes from the off-farm portions of the AFS. These findings, taken together, underline the importance of adaptation in both on-farm and off-farm sectors for the creation of rural youth opportunities.

Adaptive investments in all sectors can also reduce the climate-related push factors of migration. Climate change and environmental factors are known to affect overall migration patterns in myriad ways (Martin and Herzberg, 2014; FAO, 2018). The World Bank recently projected that the slow-onset impacts of climate change (through warming and drought, rising sea levels, the increasing intensity and frequency of natural disasters and competition over natural resources) could act as push factors of internal migration for over 143 million people in SSA, South Asia, and Latin America by 2050 (Rigaud et al., 2018). Recent youth-specific evidence on these linkages shows that youth are more likely to migrate in response to droughts and hurricanes in LAC (Baez et al., 2017). Rural youth in SSA migrate to urban areas at higher rates in countries with larger

reductions in rainfall and increases in temperature (Weinreb, Stecklov and Arslan, 2018). Lack of access to natural resources, primarily land, has also been documented to increase incentives for rural youth migration (Headey and Jayne, 2014; Kosec et al., 2016). Climate change is likely to exacerbate this constraint, as discussed above, thereby adding to the urgency of incorporating a rural youth lens into climate change adaptation and land reform policies.

**Increased adoption of adaptive agricultural technologies combined with increased investment in R&D has the potential to decrease the negative effects of climate change on agriculture.** New research shows that existing heat- and drought-tolerant agricultural technologies have the potential to counteract the decline in yields associated with climate change for some of the main staple crops (Robinson et. al., 2015; Islam et. al 2016). The applicability of these technologies is limited to a small number of crops and threats, however, and their adoption levels remain lower than the model assumptions. Consequently, they are unlikely to be sufficient to build resilient rural livelihoods for large numbers of rural youth. Increased investment in adaptive agricultural research for a wide variety of crops and farming systems, combined with the youth-inclusive promotion of existing proven technologies, is needed to address this challenge.

Most adaptive agricultural technologies have improved water management at their heart, as they are directed at trying to address the challenges caused by altered and heightened variability in rainfall patterns combined with the increased evapotranspiration associated with higher temperatures. These technologies include innovations and practices in integrated soil fertility management to improve water retention capacity and drainage; water harvesting in landscapes and complementary irrigation systems with high water-use efficiency; improved groundwater management; adjustments in crop varieties and in planting and harvest times; and innovations in cultivation systems to improve water use efficiency (FAO, 2017). Livelihood diversification is also an integral part of adaptation in the light of increasing uncertainty regarding climate change impacts. By making agricultural production more resilient, such technologies are expected to create more stable employment opportunities in both the on- and off-farm portions of the AFS and are especially relevant for rural youth in countries that will be going through structural and rural transformations while their youth populations continue to expand.

**Some technologies that are focused on climate change adaptation also have mitigation co-benefits that can be harnessed as part of a climate-resilient rural transformation process.** These technologies include improved soil and fertilizer management to reduce resource-use intensity, improved livestock diet and supply chain management, and reduced resource-use intensity in aquaculture and fisheries (FAO, 2016, ch. 4). Investments in renewable energy sources to power the rural transformation process have the potential to provide leap-frogging opportunities in some areas that can also provide youth employment (EDC, 2002).

As discussed above, most impacts of climate change are highly localized. Site-specific responses are consequently required for both adaptation and mitigation, a fact which negates the possibility of one-size-fits-all solutions. Therefore, more investment in agricultural R&D is essential in order to develop localized adaptation options that can be widely promoted and adopted. **Most countries underinvest in agricultural R&D, however, and countries with large youth populations are no different.** Current investments in agricultural R&D fall short of what is needed to drive a dynamic AFS that can create sustainable employment opportunities (Arndt et al., 2018).

## **A programmatic approach to climate change adaptation is needed that goes beyond agriculture to ensure productivity, connectivity and agency for rural youth**

Programmatic approaches, by definition, cut across sectors and require both overall adaptation interventions to ensure that rural development is sustainable and youth-centred measures to ensure their active inclusion.

**A comprehensive investment package is needed to address general challenges posed by climate change.** Rosegrant et al. (2017), in collaboration with the 15 research centres belonging to the Consortium of International Agricultural Research Centers (CGIAR), have examined four alternative scenarios for investment in agricultural research, water management and marketing infrastructure as part of a strategy for addressing climate change. The most comprehensive investment scenario that combines elements from all three of these areas delivers the highest gains in agricultural supply, economic growth, welfare and environmental indicators. Infrastructure investments bring benefits in the shorter term (by 2030) but make up the most expensive component, whereas investments in irrigation and water-use management, improved soil management and agricultural research deliver benefits over a longer time period (by 2050) and are relatively less costly. Countries need to balance politically more appealing adaptation investments that are more visible in the short term with those that take a longer time to pay off but are essential for adapting the whole economy in order to create opportunities for today's and tomorrow's rural youth.

**Given the wide variation of impacts within countries, there is an acute need for localized adaptive innovation in countries where agriculture will have to absorb very large cohorts of rural youth.** In order to gain an understanding of how to invest in locally relevant adaptive agriculture, projections that combine multiple dynamics of change are needed. Models for projecting localized impacts of climate change in the agricultural sector are particularly complicated because they have to be based on a combination of climate, agroecological and human-environment interactions. Adaptive innovation in this sector, therefore, is more critical than in other sectors, such as infrastructure. This observation is not intended to minimize the significance of resilient infrastructure, which is becoming more important as agrifood systems increasingly employ rural youth; instead, it simply emphasizes the fact that large-scale campaigns to expand infrastructure and irrigation will have limited impacts on rural youth opportunities unless they are combined with investments in improved agricultural technology (Arndt et al., 2018).

**Youth-centred adaptation actions are needed to address the constraints that are having the most acute effects on young people.** Even the best programme of public investment in agricultural research and rural infrastructure will benefit rural youth only to the extent that they: (i) can access factors of production; (ii) are an integral part of the technology development and promotion effort; and (iii) have the necessary skills to guide complex decision-making in the new environment that is being framed by climate change.

**The constraints that rural youth face in gaining access to land need to be addressed, especially in the countries that are more exposed to the impacts of climate change.** By decreasing the productivity of land that is not adapted to the new climate realities and by increasing the competition for and the value of land that *is* adapted to climate shocks, climate change exacerbates the constraints on access to land faced by rural youth. Revising land inheritance rules in order to facilitate early access to land for rural



youth would enable young people who want to engage in agriculture to be able to do so, especially as the demographic transition decreases mortality rates further. Improving how land rental markets function is also essential, as they benefit marginalized groups more than mainstream groups by reducing existing inequalities in access to land (Deininger, Savastano and Xia, 2018). Recent evidence shows that young people participate more in rural land rental markets than other age groups, suggesting that investments to improve land rental markets would disproportionately benefit young people (Ricker-Gilbert and Chamberlin, 2018; Yeboah et al. 2018).

**Access to land can facilitate productive employment in agriculture for rural youth only if the promotion of adaptive agricultural technologies is youth-centred.** Many such technologies for crop production already exist (though mostly for cereals and a small number of other crops), but adoption levels remain low in general, which underlines the importance of the role of information in fostering adoption in a changing environment (Mullins et al., 2018). Systematic studies on barriers to the adoption of such technologies do not show a clear youth advantage or disadvantage, but do demonstrate that tenure security and access to information are major enablers of adoption (Arslan et al., 2018). Given that rural youth are at a disadvantage in terms of both of these dimensions, addressing these constraints is likely to increase the adoption of new technologies that are climate-resilient to some extent.

A lack of access to credit is also an important barrier to the adoption of new technologies and, as discussed in detail in chapter 8, young people are usually at a greater disadvantage in accessing credit given the life-cycle effect associated with the fact that they have not yet had time to accumulate enough assets to use as collateral. Although this issue is not related to climate change per se, it should be borne in mind that rural youth can benefit more from improved access to land and to information on adaptive technologies if they have the necessary financial resources (see chapter 8). A number of projects in IFAD's Adaptation for Smallholder Agriculture Programme (ASAP) set a good example of approaches for promoting youth-centred adaptation that involve methods for addressing cognitive and non-cognitive skill gaps, for disseminating climate-related information and for addressing finance constraints faced by rural youth (see **BOX 7.1**).

**ICTs are increasingly being used in technology promotion and information dissemination efforts because they have the potential to reach rural youth more effectively than traditional systems.** Investments in adaptive technologies in agriculture and other sectors traditionally do not have an explicit youth focus and do not put enough emphasis on the agroecological changes that are likely to occur as a result of climate change. Traditional extension programmes are generally not suited to the informational needs of young people, but alternative approaches that make use of social networks and ICT-based outreach efforts hold promise for increasing adoption rates (see chapter 8). While the first generation of ICT-based extension services relied on SMS messages and reminders, interactive voice response systems, purpose-built smartphone apps, picture-based pest and disease surveillance, other hardware and software solutions, and video-mediated extension support services are gaining momentum. Recent evaluations of such programmes show promising results in terms of technology adoption and productivity outcomes (Spielman, 2018). One such study, which dealt with a particularly innovative programme in Peru that integrated high school children into video-based extension services, found that the programme was effective in increasing the children's parents' knowledge of agricultural technologies and adoption rates (Nakasone and Torero, 2016). Such innovative approaches are needed not only in agricultural extension initiatives but

**BOX 7.1** Youth-centred approaches to adaptation: Examples from IFAD's Adaptation for Smallholder Agriculture Programme (ASAP)

IFAD's Adaptation for Smallholder Agriculture Programme (ASAP) is the most extensive adaptation programme for smallholder farmers globally. The programme aims to improve the livelihoods of rural people by financing projects that focus on food security and nutrition, increasing rural incomes and strengthening climate change resilience. It places rural youth and women at the forefront of adaptation interventions to address their particular vulnerabilities.

ASAP investments are facilitating youth-inclusive rural transformation efforts focusing on increased agricultural productivity, enhanced entrepreneurial opportunities, improved infrastructure and diversified livelihoods. As climate change threatens the productivity of agriculture, programmes such as ASAP play a critical role in repositioning agriculture and making it a sector that can create sustainable economic opportunities for rural youth.

The programme has helped to improve the livelihoods of youth in rural areas by addressing some of the main challenges that they face. These include unemployment and underemployment, insufficient access to information and education, and a lack of access to productive assets. While these challenges are also faced by adult farmers, the evidence suggests that rural youth, and particularly young women in rural areas, will not benefit from overall rural development as much as adults or young males will (Bennell, 2007). ASAP-supported projects address these constraints by specifically targeting rural youth through interventions that focus on skills development in entrepreneurial activities, financial management and sustainable agricultural practices. They are also designed to leverage the adaptability and innovation-savvy nature of many young people (Makiwane and Kwizera, 2009) in order to augment the adoption of climate-resilient agricultural technologies and strengthen the cognitive skills of rural

youth so that they will be in a better position to address climate risks in agricultural production and to innovate.

Vocational training, the provision of grants to support the establishment of small businesses that promote diversification, mechanization and financial literacy classes are some of the fundamental mechanisms used as incentives for the participation of rural youth in project activities. For example, an ASAP-supported project in Egypt is exploring opportunities for creating new employment opportunities for rural youth in such areas as the maintenance of drip irrigation systems or solar pumps and waste recycling. As part of this initiative, private sector suppliers of irrigation systems and solar panels will be invited to participate in the training of rural youth in new agricultural technologies. **TABLE 7.1** highlights examples of youth-centred adaptation interventions undertaken by ASAP-supported projects.

In order to be successful in promoting adaptation in agriculture, such initiatives need to be scaled up, and the possibility of doing so depends, to a critical extent, on the evidence that can be shown of the impact that such initiatives have. In order to assess the impact on rural youth, in general, and on young women, in particular, such programmes need to incorporate a set of age- and sex-disaggregated indicators into their monitoring and evaluation (M&E) systems. The consistency of M&E systems across youth-centred projects to date has been limited. This situation underlines the need to step up efforts to achieve the SDG targets that call for age- and sex-disaggregated documentation across all indicators. Incorporating such efforts into the design of future youth-centred projects will also contribute to the evidence base regarding what types of interventions improve rural youth opportunities in a sustainable way and how. This information is sorely needed in order to enhance investment and policy design.

also in other sectors where youth productivity and connectivity need to be improved in order to further an inclusive rural transformation process.

**Investments in young people's development of cognitive and non-cognitive skills will equip them with the tools to understand and adapt to climate change and to innovate**

Climate change is continuously altering the information environment because of the great uncertainties that exist in terms of our understanding of localized impacts and the required adaptation actions. Young people who lack certain basic skills will be hard pressed to process the information they will need in order to decide how best to react to climate change, which may include, for example, adjusting the range of activities undertaken on their farms, switching to new agronomic practices, seeking out alternative marketing channels and buying insurance or other instruments that will help them to manage the risks that they face. Educational reform in rural areas is a core element of adaptation to climate change, since the education system must ensure that youth have both the cognitive and non-cognitive skills needed to navigate today's complex information environment (Arndt et al., 2018).

**TABLE 7.1** Examples of ASAP approach for promoting youth-centred adaptation

Adaptation intervention	Country	ASAP-supported project	Interventions
<b>On- and off-farm livelihood strategies</b>	Bhutan	Commercial Agriculture and Resilient Livelihoods Enhancement Programme (CARLEP)	Rural youth groups were supported in the intensification of dairy production through construction of dairy sheds, provision of fodder seedlings, chuff cutters and electric milling equipment.
	Egypt	Sustainable Agriculture Investments and Livelihoods Project (SAIL)	Two youth community development associations (CDAs) have been established. CDAs have received training in managerial skills of leadership, good governance, strategic planning and management of social infrastructure. 60 women received vocational training in sewing and carpet weaving.
	Nigeria	Climate Change Adaptation and Agribusiness Support Programme (CASP)	390 rural youth were selected to benefit from a five-day enterprise development training which provided business support with mentorship and coaching.
<b>Skills to address climate risks in agricultural production</b>	Gambia	National Agricultural Land and Water Management Development (NEMA-CHOSSO)	5,322 farmers including rural young people and women in the Gambia were trained on integrated pest management, the use of improved seeds and the implications of climate change. The programme is also running farmer field schools. <sup>43</sup>
<b>Provision of financial services that enable climate risk management</b>	Viet Nam	Adaptation to Climate Change in the Mekong Delta (AMD)	The project is providing financial resources and facilities to scale up adaptation investments to build resilience. The project has resulted in a women's support fund that has established 384 new women's savings and credit groups in Tra Vinh with 2,490 members. The fund has provided loans to 2,355 members.

Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC) calls for action for climate empowerment in order to ensure that all countries develop and implement educational and public awareness programmes, train scientific, technical and managerial personnel, foster access to information and promote public participation in addressing climate change (UNESCO and UNFCCC, 2016). To achieve these goals, a number of countries have successfully prepared national climate change learning strategies, but they are the exceptions rather than the rule, and the strategies are mainly focused on formal education systems.

Recognizing the importance of developing youth-centred climate change policies to equip youth with the tools they need to understand and adapt to climate change, UNFCCC extended its constituency to include non-governmental youth organizations in 2009. This has allowed youth-led and youth-focused NGOs to actively shape intergovernmental climate change policies. Their representatives receive official information, participate in UNFCCC meetings, provide technical and policy inputs to negotiation groups and engage in intergenerational dialogue with decision makers through high-level briefings.

<sup>44</sup> The Farmer Field School is a methodology developed by the Food and Agriculture Organization (FAO) to equip farmers with skills and the ability to analyse and observe the ecology of their fields. The schools provide a platform for experimentation with different agricultural management practices in a setting where farmers hold the decisive role in what could be considered as 'best practices.'



The United Nations Joint Framework Initiative on Children, Youth and Climate Change has been coordinating the efforts of 16 intergovernmental entities and numerous youth organizations. The overall objective of this cooperation is to enable young people from around the world to take action on climate change mitigation and adaptation at the local and national levels. The diverse range of initiatives includes educational, awareness-raising and behavioural-change campaigns. Young people are also engaged in climate change projects within the framework of different national and international organizations. These initiatives are more likely to reach urban youth than rural youth, however. The specific challenges that climate change poses to rural youth in terms of their productivity, connectivity and agency need to be taken into consideration so that they can be included in and contribute to adaptive rural transformation efforts.

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