Table 18-9 | Observed impacts of climate change reported since AR4 on human and managed systems, over the past several decades, across major world regions, with descriptors for (1) the confidence in detection of a climate change impact; (2) the relative contribution of climate change to the observed change, compared to that of non-climatic drivers; (3) the main climatic driver(s) causing the impacts; (4) the reference behavior of the system in the absence of climate change; and (5) the confidence in attribution of the impacts to climate change. References to related chapters in this report are given as well as key references to other IPCC reports and the scientific literature. Absence of climate change impacts from this table does not imply that such impacts have not occurred.

	Human and managed systems	References	Confidence in detection	Role of climate	Climate driver	Reference behavior	Confidence in attribution
Africa	Adaptative responses to changing rainfall by South African farmers	Section 13.2.1.2; Thomas et al. (2007)	*Low*	Major	Change in precipitation	Changes due to economic conditions	*Very low*
	Decline in fruit-bearing trees in Sahel	Wezel and Lykke (2006); Maranz (2009)	*Medium*	Major	Change in precipitation	No change	*Low*
	Malaria increases in Kenyan highlands	Section 11.5.1.1; O'Meara et al. (2010); Alonso et al. (2011); Stern et al. (2011)	*Low*	Minor	Warming	Changes due to vaccination, drug resistance, demography, and livelihoods	*Low*
	Reduced fisheries productivity of Great Lakes and Lake Kariba	Sections 7.2.1.2, 13.2.1.1, and 22.3.2.2; Descy and Sarmento (2008); Hecky et al. (2010); Ndebele-Murisa et al. (2011); Marshall (2012)	*Low*	Minor	Warming	Changes due to fisheries management and land use	*Low*
Europe	Shift from cold-related mortality to heat-related mortality in England and Wales	Sections 18.4.4 and 23.5.1; Christidis et al. (2010)	*Medium*	Major	Warming	Changes due to exposure and health care	*Low*
	Impacts on livelihoods of Sámi people in northern Europe	Eira (2012); Mathiesen et al. (2013)	*Medium*	Major	Warming	Economic and sociopolitical changes	*Medium*
	Stagnation of wheat yields in some countries in recent decades	Section 23.4.1; Brisson et al. (2010); Kristensen et al. (2011)	*High*	Minor	Warming	Increase due to improved technology	*Medium*
	Positive yield impacts for some crops, mainly in northern Europe	Figure 7-2; Section 23.4.1; Jaggard et al. (2007); Supit et al. (2010); Gregory and Marshall (2012)	*High*	Minor	Warming	Increase due to improved technology	*Medium*
	Spread of bluetongue virus in sheep, and of ticks across parts of Europe	Section 23.4.2; Arzt et al. (2010); Randolph and Rogers (2010); Van Dijk et al. (2010); Guis et al. (2012); Petney et al. (2012)	*High*	Minor	Warming	No change	*Medium*
Asia	Impacts on livelihoods of indigenous groups in Arctic Russia	Sections 13.2.1.2, 18.4.6, and 28.2.4.2; Table 18-4; Crate (2013)	*Medium*	Major	Warming; change in snow cover; change in sea ice	Economic and sociopolitical changes	*Low*
	Negative impacts on aggregate wheat yields in South Asia	Section 7.2.1; Figure 7-2; Pathak et al. (2003)	*Medium*	Minor	Warming; change in precipitation	Increase due to improved technology	*Medium*
	Negative impacts on aggregate wheat and maize yields in China	Section 7.2.1; Figure 7-2; Tao et al. (2006, 2008, 2012); You et al. (2009); Chen et al. (2010)	*Low*	Minor	Warming	Increase due to improved technology	*Low*
	Increases in a water-borne disease in Israel	Paz et al. (2007)	*Low*	Minor	Warming	No change	*Low*
Australasia	Advance timing of wine-grape maturation in recent decades	Table 25-3; Webb et al. (2012)	*High*	Major	Warming	Advance due to improved management	*Medium*
	Shift in winter versus summer human mortality in Australia	Sections 11.4.1, 18.4.4, and 25.8.1.1; Bennett et al. (2013)	*Medium*	Major	Warming	Changes due to exposure and health care	*Low*
	Relocation or diversification of agricultural activities in Australia	Section 25.7.2; Box 25-5; Gaydon et al. (2010); Howden et al. (2010); Park et al. (2012); Thorburn et al. (2012)	*Medium*	Minor	Warming	Changes due to policy, markets, and short-term climate variability	*Low*
Central and South America	More vulnerable livelihood trajectories for indigenous Aymara farmers in Bolivia, due to water shortage	Section 13.1.4; McDowell and Hess (2012)	*Medium*	Major	Warming	Increasing social and economic stress	*Medium*
	Increase in agricultural yields and expansion of agricultural areas in southeastern South America	Section 27.3.4.1; Magrin et al. (2007); Barros (2010); Hoyos et al. (2013)	*Medium*	Major	Precipitation increase	Increase due to improved technology	*Medium*

Table 18-9 (continued)

	Human and managed systems	References	Confidence in detection	Role of climate	Climate driver	Reference behavior	Confidence in attribution
North America	Impacts on livelihoods of indigenous groups in the Canadian Arctic	Sections 18.4.6 and 28.2.4.2; Table 18-4; Hovelsrud et al. (2008); Ford et al. (2009); Beaumier and Ford (2010); Pearce et al. (2010); Brubaker et al. (2011)	*Medium*	Major	Warming; change in snow cover; change in sea ice	Economic and sociopolitical changes	*Medium*
Polar regions	Impact on livelihoods of Arctic indigenous peoples	Sections 18.4.6 and 28.2.4.2; Table 18-4; Hovelsrud et al. (2008); Ford et al. (2009); Beaumier and Ford (2010); Pearce et al. (2010); Eira (2012); Crate (2013); Mathiesen et al. (2013)	*Medium*	Major	Warming; change in snow cover; change in sea ice	Economic and sociopolitical changes	*Medium*
	Increase of shipping traffic across the Bering Strait	Section 28.2.6.1.3; Figure 28-4; Robards (2013)	*Medium*	Major	Warming; change in sea ice	No change	*Medium*
Small islands	Increased degradation of coastal fisheries due to direct effects and effects of increased coral reef bleaching	Box CC-CR; Sections 18.3.3.3, 18.4.1.2, 29.3.1.2, and 30.6.2.1	*Low*	Minor	Ocean warming	Coastal fisheries degraded by overfishing and pollution	*Low*