

Understanding **CLIMATE CHANGE**



A primer for local government officials in the Philippines

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The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), led by the International Center for Tropical Agriculture (CIAT), brings together the world's best researchers in agricultural science, development research, climate science and Earth System science, to identify and address the most important interactions, synergies and tradeoffs between climate change, agriculture and food security.

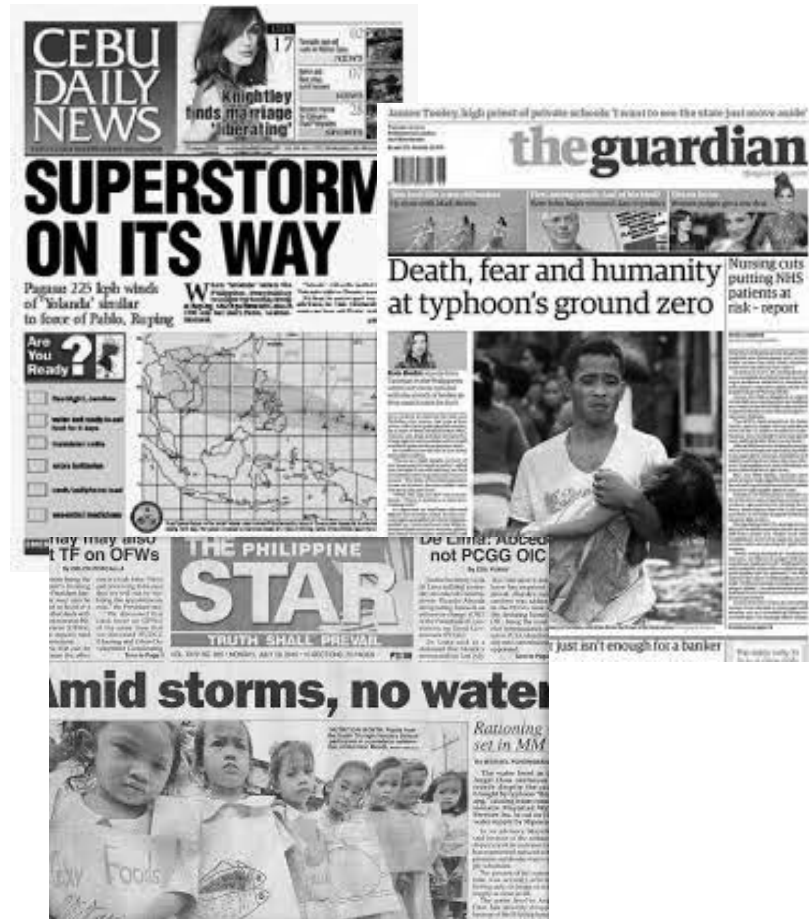
www.ccafs.cgiar.org.

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Climate Change has dominated discussions at different levels. Philippine newspapers frequently report about climate change, especially when typhoons enter or threaten to enter the country even when they are not expected (such as during summers).

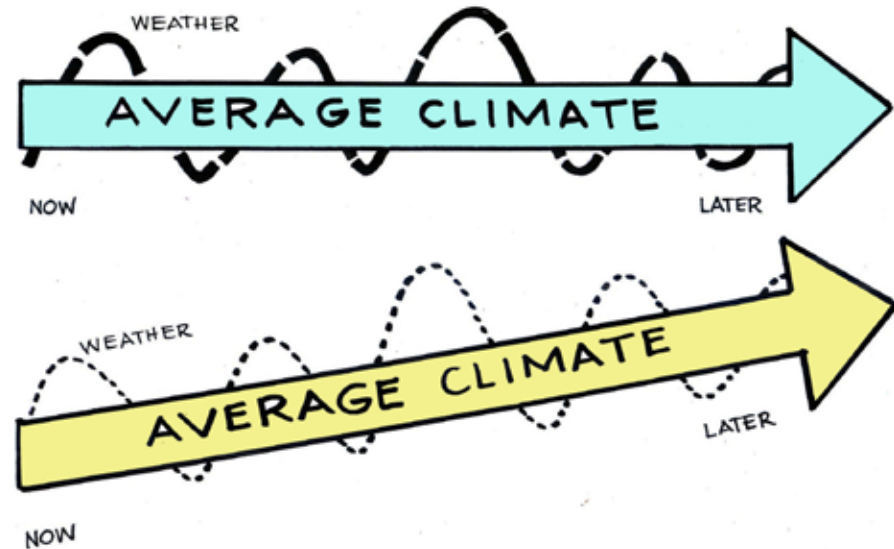


Weather is a specific event or condition that happens over a period of hours or days.

Climate refers to the average weather conditions in a place over many years (usually at least 30 years).

Climate change is defined by the observed change in the average climatic conditions over time.

VARIABILITY



Changes may be due to natural variability or the result of human activities.

The accumulation of Greenhouse Gases (GHGs) in the atmosphere is an important contributory factor.



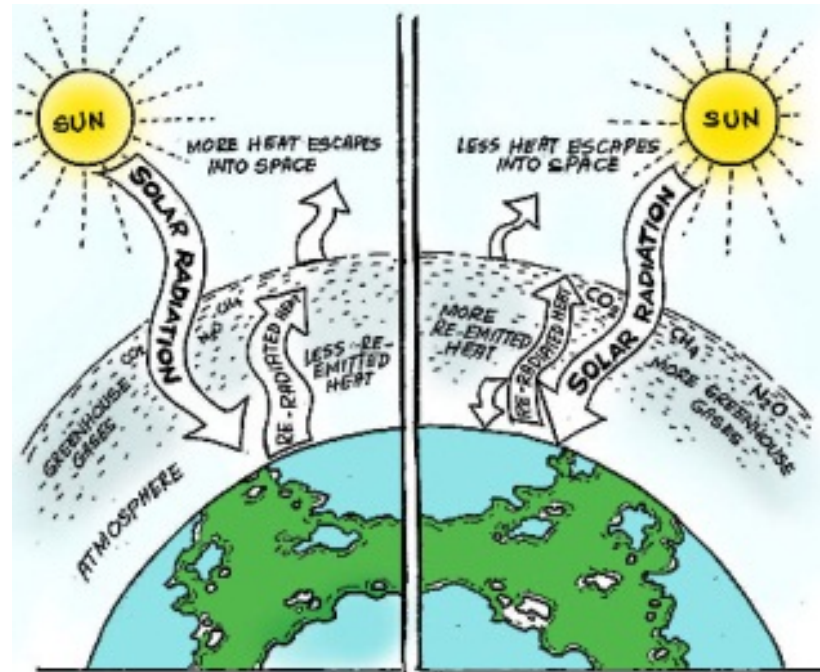
Greenhouse gases, found in the earth's atmosphere play a big role in regulating the earth's temperature.

The earth's atmosphere has a natural capacity to absorb solar radiation (solar energy or heat) from the sun and radiate (bounce) heat back to space.

So GHGs serve as a regulatory “blanket” that controls the entry of solar energy and the escape of excess heat back to space.

Natural Greenhouse Effect

Human Enhanced Greenhouse Effect

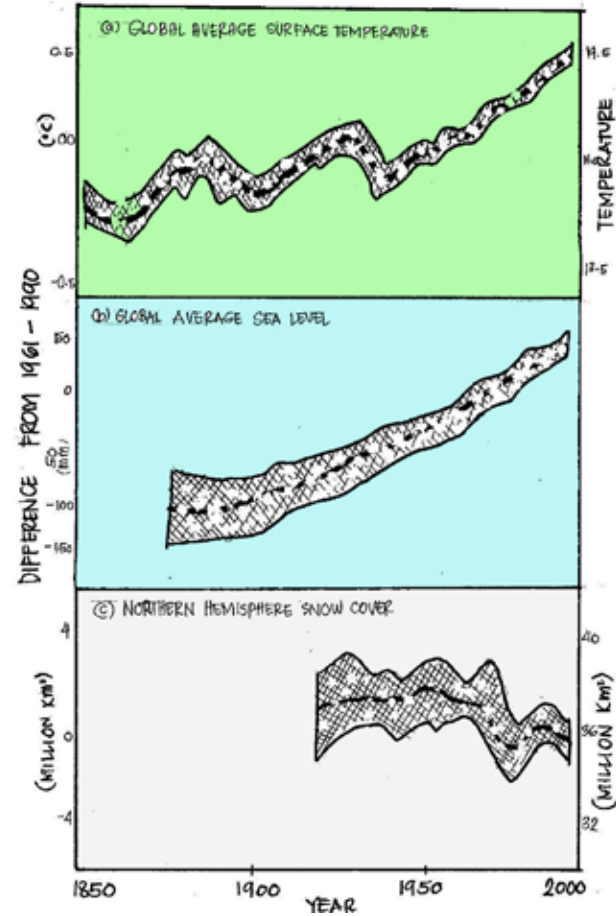


http://www.tokresource.org/tok_classes/biobiobio/biomenu/greenhouse_effect/index.htm

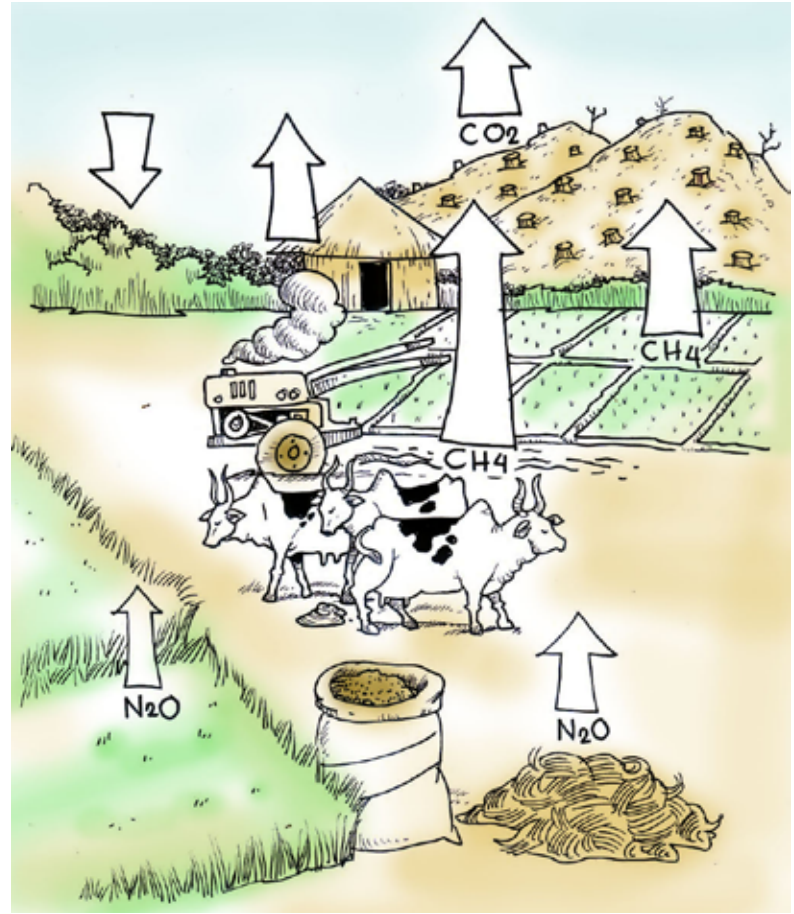
As the layer of GHG increases due to the release of more CO₂ into the air, the atmospheric blanket (that regulates the absorption and release of energy) traps more heat inside the earth. As a result of human activities the levels of GHG's are increasing and the earth's atmosphere is getting warmer.



Unfortunately, the warming of global climate is unequivocal. We have to learn to adapt to climate change even as we attempt to reduce GHG emissions from factories, transportation, coal factories, agriculture, etc.



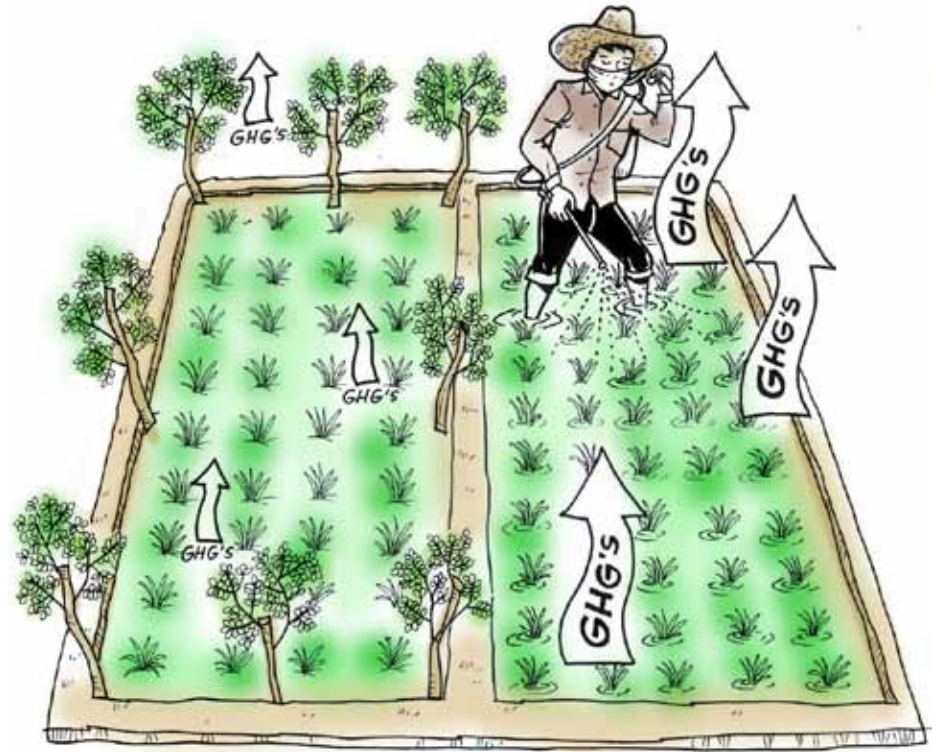
Agriculture is also a contributor of GHG's. Flooded rice paddies and livestock farmers produce methane gas. Excess and improper application of chemical fertilizers and over use of farm mechanization can also result in the release of GHGs (NO_2 , SO_2 , etc.)



When an agriculture or livestock production system relies heavily on external inputs (feeds, chemicals, antibiotics) they are considered to have a 'large carbon footprint'. Food produced with reduced external inputs and purchased from local markets, usually have smaller carbon footprints.



Carbon foot print is the total amount of GHG's produced to directly and indirectly support human activities, usually expressed in equivalent tons of CO².

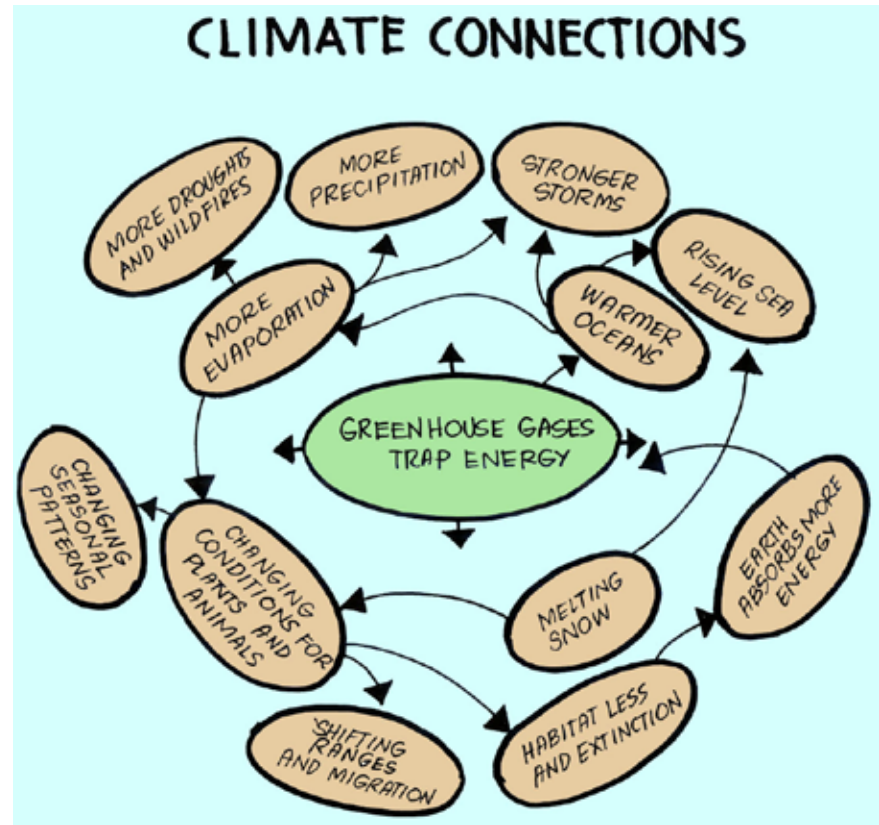


There is an agreement among scientists that warming (increases in temperature) must be kept below the critical 2 °C threshold (beyond this level crop production will be seriously affected). Unfortunately, greenhouse gas emissions are currently not being reduced and, in fact they continue to increase every year in spite of numerous global conferences.



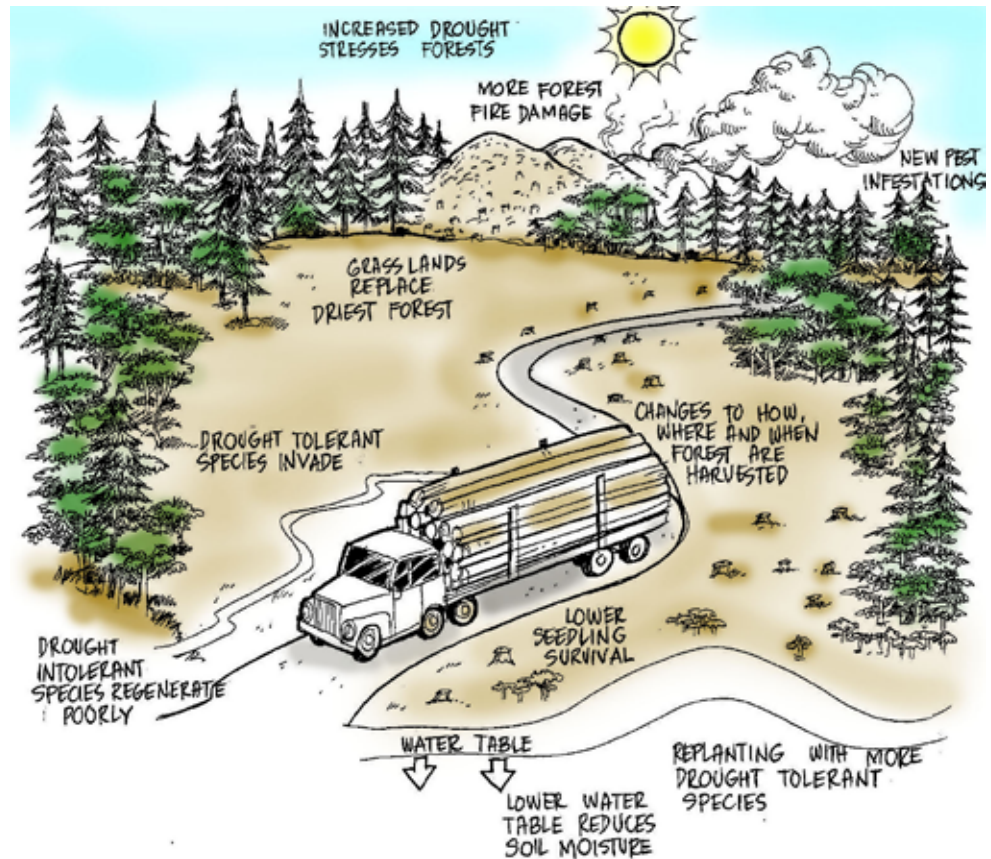
Rising global temperatures lead to other changes around the world (e.g., loss of wildlife habitats)

Evidence of climate-change impacts is the most comprehensive and strongest for natural systems.



Source: www.epa.gov/climate change

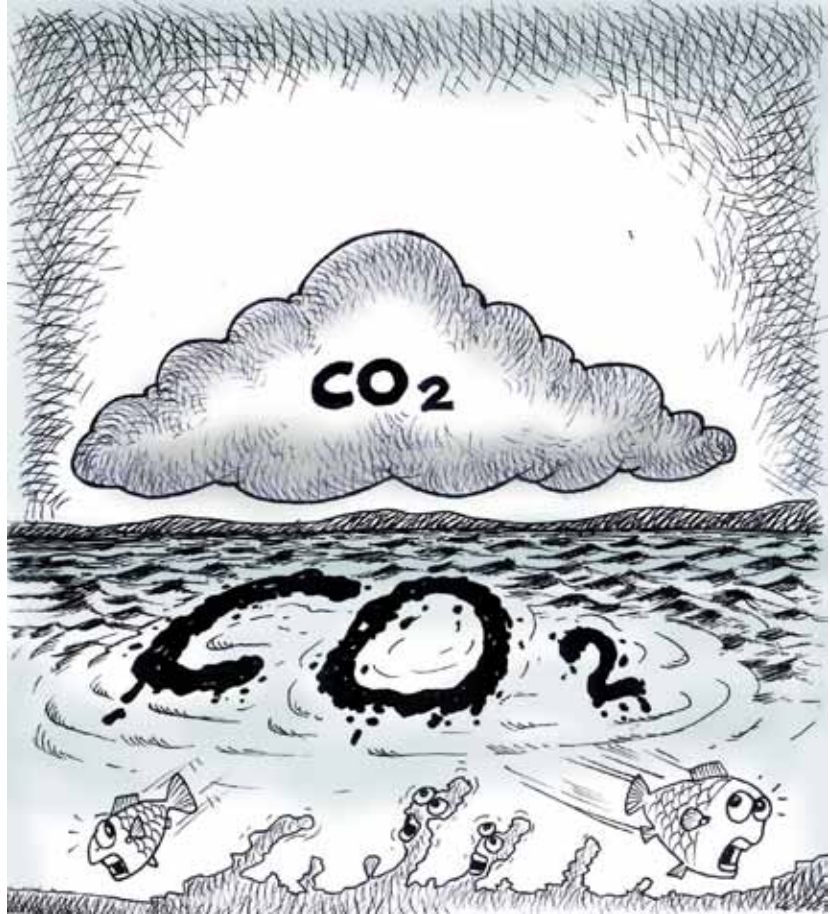
Forests are important resources in our fight against climate change and for conserving ecosystem services on which we depend on. Unknown to many, even our forests are affected by climate change.



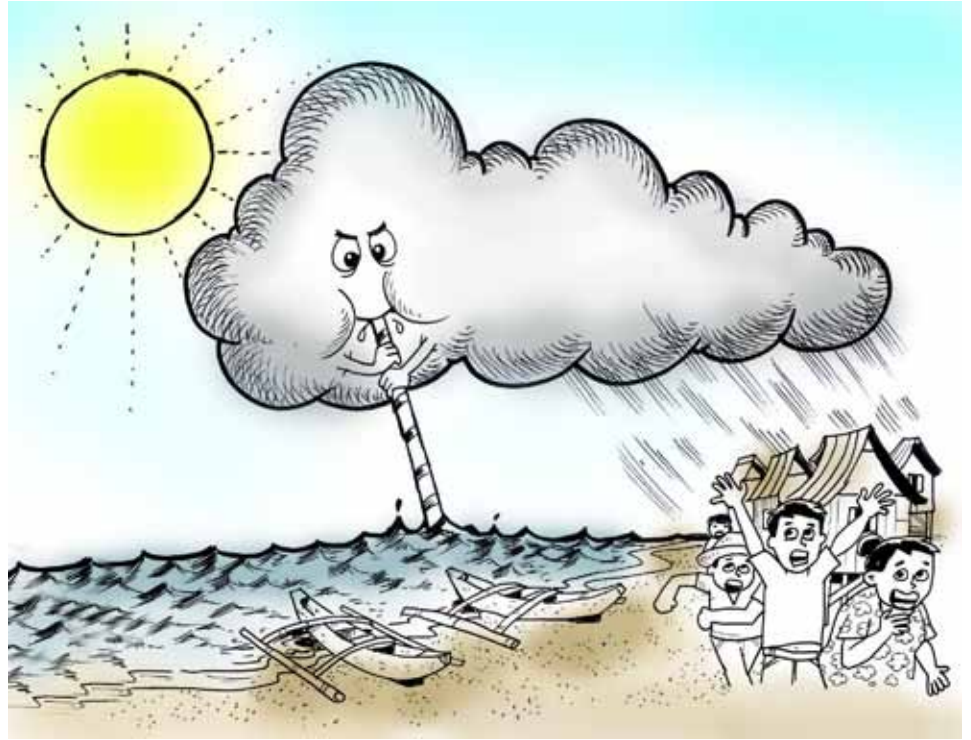
Due to sea level rise coastal systems and low-lying areas will increasingly experience adverse impacts such as coastal erosion, coastal flooding and submergence. The population and assets exposed to coastal risks as well as human pressures on coastal ecosystems will increase significantly in the coming decades due to population growth, economic development, inequities and urbanization.



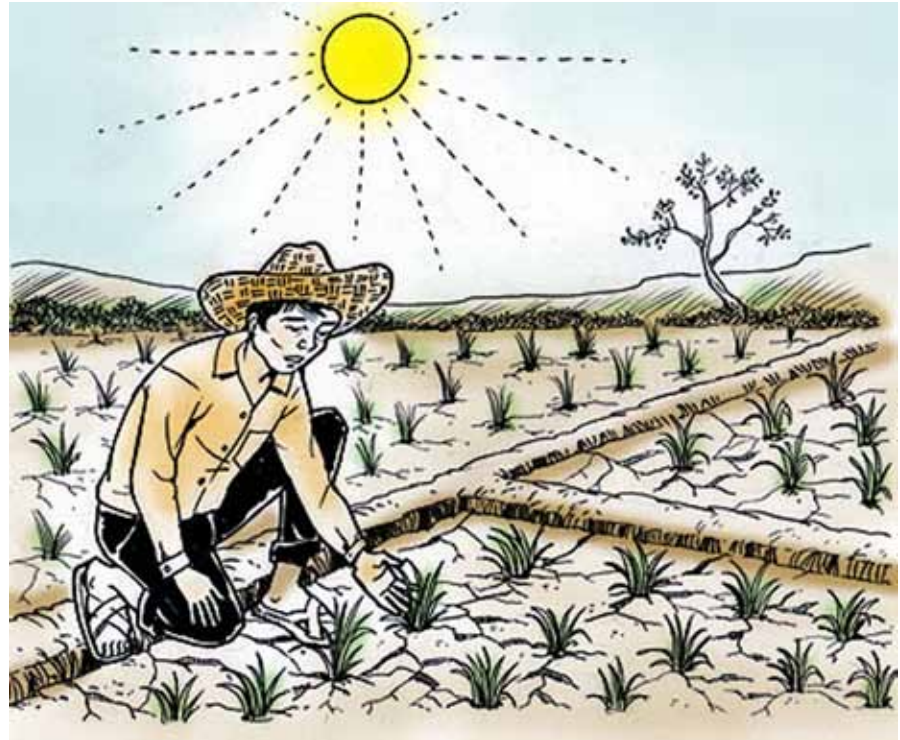
About a quarter of the emissions of carbon dioxide from human activities are soaked up by oceans each year. The extra CO_2 causes the chemical balance of seawater to shift to a more acidic state (lower pH). Some corals and shellfish have shells composed of calcium carbonate which dissolves more readily in acid.



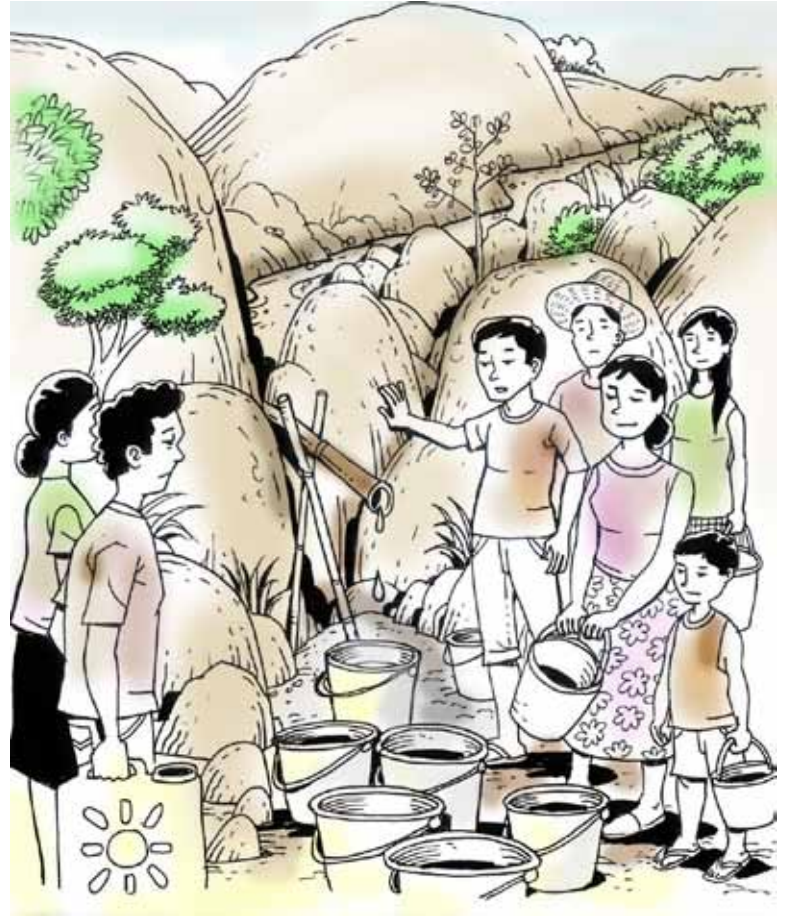
As the earth's lower atmosphere becomes warmer and moister more water is likely to be drawn into major rain storms, which could lead to more flooding events. Local communities will experience more extreme events such as typhoons, floods and drought.



Climate change is likely to increase the frequency of meteorological droughts (less rainfall) and agricultural droughts (less soil moisture) in presently dry regions. Even if the total annual rainfall might not decrease in some areas, farmers will experience longer dry periods.



As a result of climate change, rivers and streams could dry up sooner. Extensive extraction of ground water further results in water shortages. Moreover fresh water ecosystems will be adversely affected due to changing stream flows and reduced water quality because of drought and flooding.



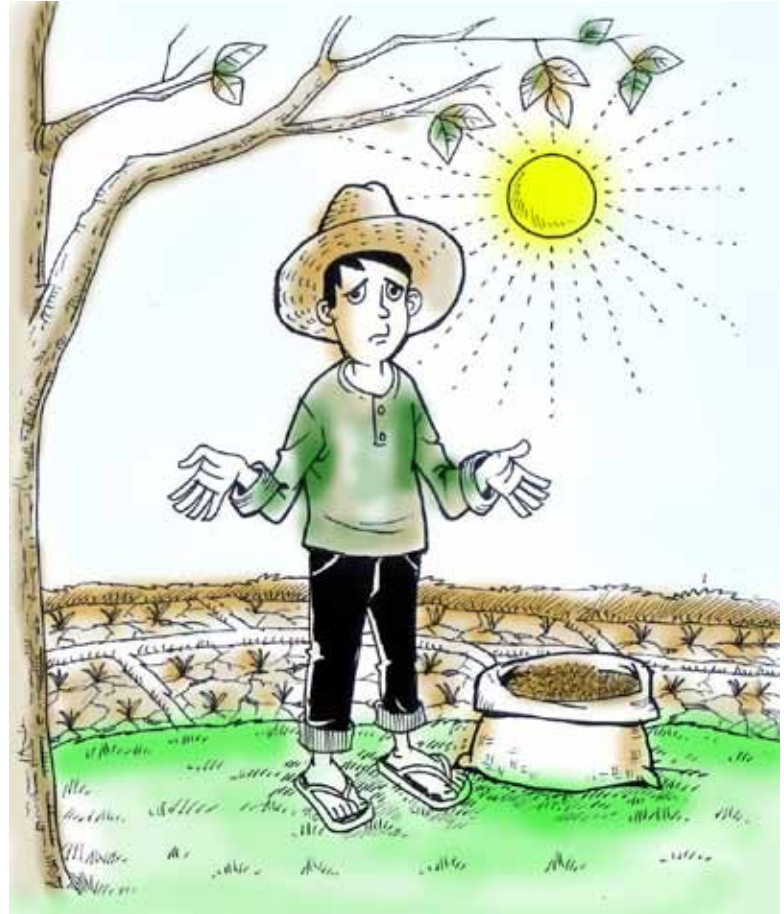
Climate change may affect food security systems in several ways, ranging from direct effects on crop production (such as changes in rainfall that cause drought or flooding, or warmer or cooler temperatures that results in changes in the length of the growing season) to changes in markets, food prices and impacts on supply chains.



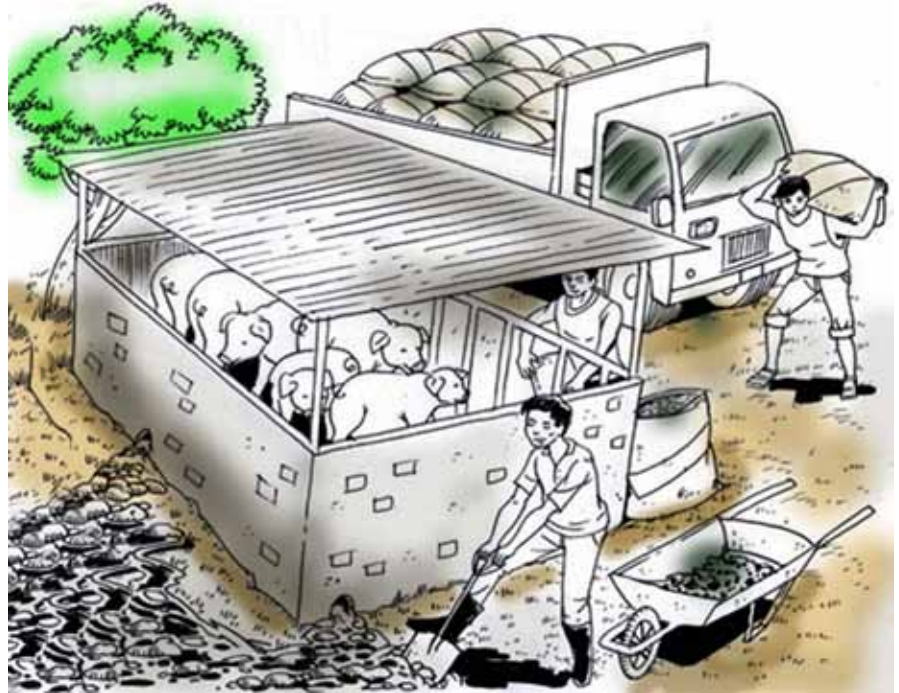
Agriculture sector will suffer the most serious impacts of climate change. Food security, nutrition and livelihoods will be affected if we don't act soon.



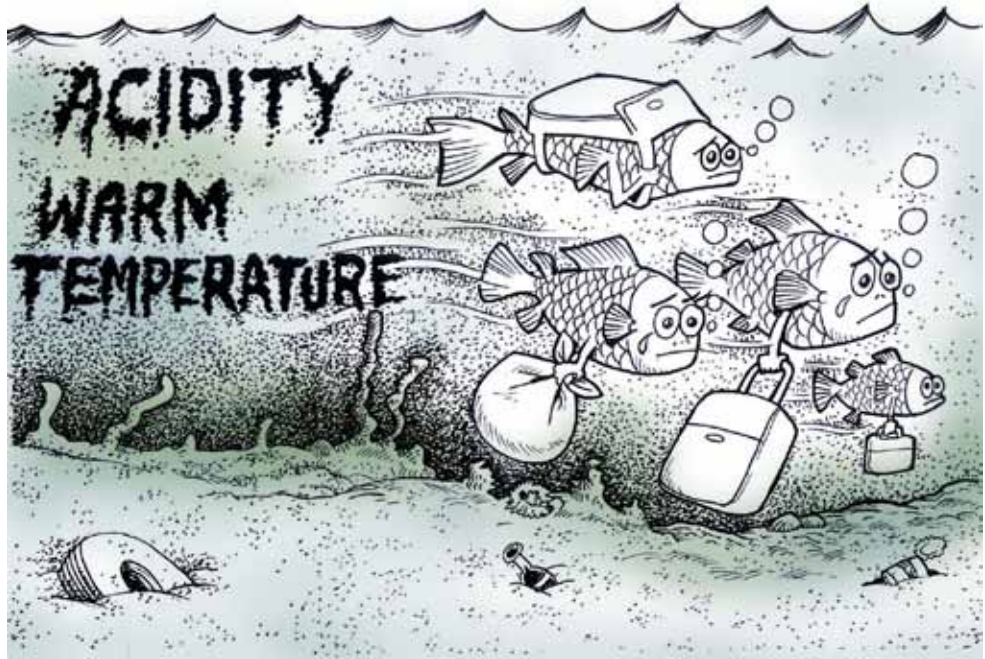
The impacts of climate change on agriculture can include such impacts as the following: the loss of agro-biodiversity, increased floods and droughts, soil degradation, reduction in crop, fish and livestock productivity, water shortages and possible increases in destructive pests and diseases.



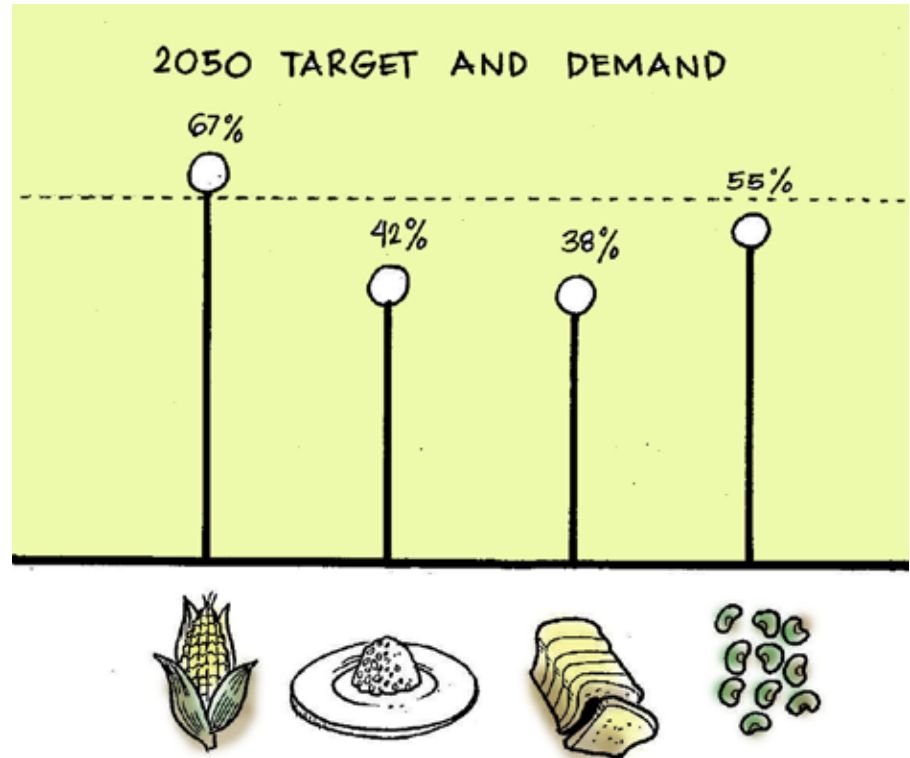
Climate change will affect livestock production by altering the quantity and quality of feed available for animals. Reproduction and growth rates of livestock could also be affected.



Climate change can directly impact fish growth, feeding patterns, migration, breeding behaviour and geographic distribution due to changes in the physical environment (e.g. acidity, salinity levels, temperature, etc).



Climate change is a potential risk multiplier in agriculture: by 2050 in the tropics and subtropics, yields can drop 10-20 percent because of climate change thus threatening food security and nutrition.



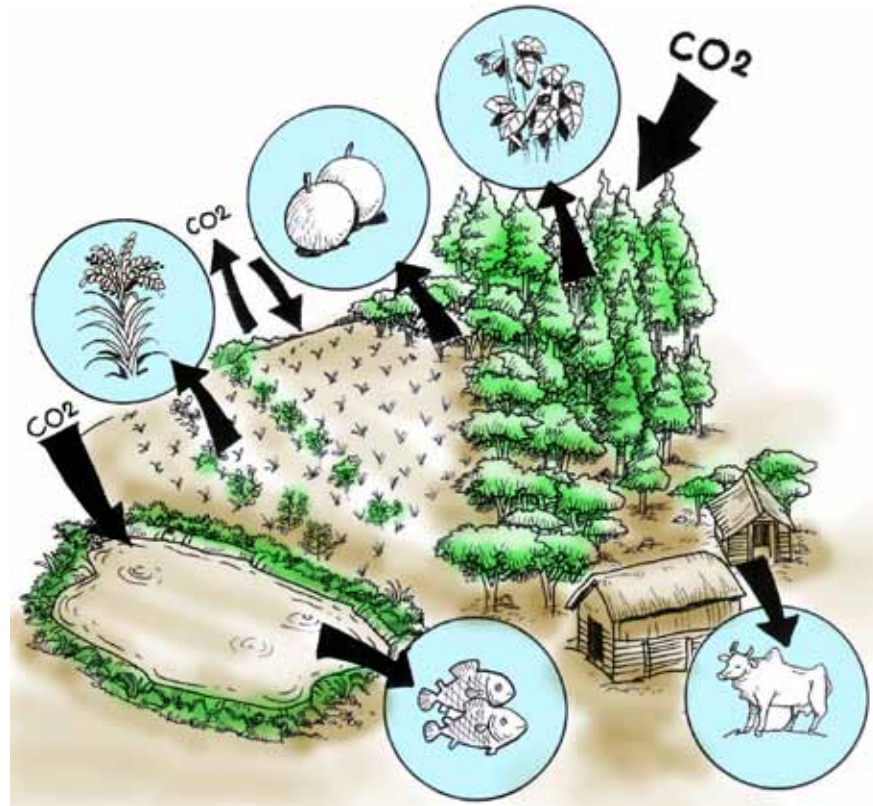
We must remember that farmers and local communities have in the past found a way to respond to climate variability and changes in weather.

Many traditional and research derived solutions to address the impacts of climate change already exist and could be used.



“Multiple benefit” approaches to small holder agriculture can help improve production while reducing and managing climate related risks.

(Low external input production systems increases production, decrease reliance on commercial inputs. –CO₂ reduction)



Targeting of the poorest and the most vulnerable groups should receive special attention. The poorest are usually the most affected by the impacts of climate change.

Attention needs to be devoted to those most at risk, to enhance the resilience of livelihoods.



Climate change can only be addressed through collective efforts.

Local action through community-based adaptation can go a long way to reduce the impacts of climate change.

Local governments can do a lot to include climate change considerations into their policies, plans and programs.

Partnership with other stakeholders are important in achieving these goals.





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