Effects of global climate changes on the ecosystem and agriculture

By: Dr. Adel Al-Weshali

Climate is the average of weather conditions for long periods of not less than 30 years. It depends upon temperature, absolute and relative humidity, atmospheric pressure, precipitation rates and wind speed and direction. Simply, climate determines the ecosystem and agro-economic activities for a specific area.

The responsibility of dramatic changes in global climate conditions rests upon humans, especially after the industrial revolution. Over the last 100 years, the massive deforestation and excessive burning of fossil fuels for energy needs has resulted in enormous amounts of carbon dioxide (CO2) emitted into the atmosphere.

The increase of CO2 in the atmosphere caused the 'greenhouse effect' marked with annual temperature rises. As a consequence of the CO2 concentration reaching 385 parts per million (ppm), our plant temperatures increased 0.74o C in the last 100 years. If the CO2 concentration continues to increase at its present rate of 3 ppm, average global temperatures will rise by 0.7o C in the next 30 years, and could increase by as much as 6.4o C by the year 2100. This could put tens of millions of people at risk of flooding and landslides driven by projected increases in rainfall intensity, rising sea levels and river currents affected by rapidly melting glaciers and ice, especially during spring.

Effect of climate change on agriculture and the ecosystem is global, and Yemen, as well as other countries, will be influenced by one or more of the following:

-earlier spring seasons, causing plants to bloom earlier

-migration changes of birds and many species

-change in rain patterns and intensity with high variability on horizontal vision level

-plant migrations toward cooler and more humid areas

-farmer difficulties in planting and cultivating crops

-regions affected by higher temperatures and greater precipitation, likely to result in the spread of agricultural pests and diseases.

In brief, scientists estimate an overall decrease in agricultural productivity (600 million people facing malnutrition), and severe water shortages in the arid and semi-arid land areas in southern Africa, the Middle East and southern Europe (1,8 billion

people facing water shortage by 2080). These major losses in productivity (25% by 2060) and changes in critical ecological systems will lead to higher worldwide food prices as food and water supplies diminish. In addition, there will be a displacement of up to 332 million people in coastal and low-lying areas through flooding and tropical storm activity. Over 70 million Bangladeshis, 22 million Vietnamese, and six million Egyptians could be affected by global warming-related flooding.

Eliminating the dangerous effects of climate change on agriculture and the ecosystem is linked with adapting to changes in climate conditions:

-Reforming the agricultural map using available water resources, considering changes in rain patterns and season timings

-Selecting crops which don't require much water and are highly resistant to diseases

-Approving an integrated water resources management policy, especially in elevated regions

-Increasing productivity quantity and quality by applying modern irrigation techniques and introducing mechanization into all cultivation processes

-Improving harvesting, storing, food technology and marketing processes

The total annual amount of carbon dioxide emitted into the atmosphere is estimated at 24,215,376 thousand metric tons. The amount of CO2 Yemen produces is estimated at 14,158 thousand metric tons, divided as follows:

٤٨% -from transportation

٢٠% -from electricity and heat production

٢٠% -from residences

٧% -from manufacturing and construction

٥% -from other energy industries

The main goal of any environmental policy must reduce the annual amount of CO2 emitted. Scientists and responsible public and private establishments and organizations must work together on the following:

-Prevent the burning of agriculture and garbage, and develop a recycling program for waste

-Conserve greenery and restrict deforestation

-Require industries to limit CO2 output

-Use renewable energy resources such as wind and solar energy

-Control CO_2 produced by transportation vehicles and improve traffic systems

-Increase community awareness about environmentally-friendly lifestyles

-Prevent armed conflicts and wars that destroy nature and produce CO_2 and other deadly gases

Within the actual concentration of carbon dioxide (385ppm) in the atmosphere, any process could succeed in reducing the annual temperature increases. However, if CO_2 concentration levels reach 450 ppm, it will be the point of no return, where global warming and all its dramatic effects will be out of control .

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