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Climate Change Changes the Landscape that our Lives and Livelihoods Depending on

Editorial

It is undeniable that the performance of a landscape is not only influenced by direct human activities. Climate change also contributes significantly to the sustainability of a landscape.

Our experience shows that the weather cycle nowadays has changed from a dozen years ago. Some areas have more frequent rainfalls while other areas face prolonged drought. Even with both changes only, there have been changes in farmers agriculture's common practices. Planting season has shifted, depending on availability of water, which is very crucial in agriculture.

Global warming, which has become another impact of the climate change, has also been observed in many areas in Central Java and in other areas in Indonesia. Mean increase of temperature has become a great pressure on plant productivity and in turn reduced crop productivity. In September 2018, the Food and Agriculture Organisation (FAO) identified some countries that would experience decrease in crop productivity in 2050, including Indonesia. Many crops that only grow in cooler climate like coffee and vegetables cannot produce optimally. As only the mountainous regions in Central Java have the suitable cool temperature, these crops can only grow in some altitudes.

Climate change will in the end have an impact on the services that the ecosystem provides to an area: commodities can no longer grow in some locations and further change livelihood options of the local community. Climate-smart agriculture can help farmers to adapt to climate change while at the same time reduce the severity and frequency of the impacts of climate change. Climate-smart agriculture is not a one-size approach of agriculture practices that fits everywhere; it is instead more of an approach that requires consideration of many local aspects.

In this edition, we would like to present some examples of climate-smart agriculture practices, which have been applied in Indonesia or in other parts of the world. These examples can become the lessons for farmers and community in Central Java to learn.

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Humans cannot take for granted the fact they are dependent in every aspects of their lives and livelihoods on nature, both directly or indirectly. Humans need the oxygen for breathing, water for drinking, animals and plants for eating just to survive. Beyond those aspects, they are dependent on energy to support economic and cultural activities.

The rapid growth of the world's population has led to an increase in the use of the natural resources, especially clean water and lands. As a result, the availability of water and lands have further decreased and indifferent attitudes towards environmental sustainability will inevitably affect the sustainability of humans' lives.

The advent of Industrial Revolution in the middle of the 17th century witnessed the dramatic increase in the use of coals, the fossil fuel first widely known to human. In addition to coals, the use of other sources of energy from fossil fuels had also started to develop during that time. This is how people nowadays come to know kerosene, gasoline, diesel oil and others. However, despite this progress, many researches have indicated that the consumption of fossil fuels has affected the environment adversely. When fossils fuels are burnt, they release carbon dioxide into the atmosphere and store heat. The concentration of carbon dioxide in the air has caused the increase of world temperature. This has resulted in an accumulation of carbon dioxide emission that causes the increase in the global temperature.

Other activities that exacerbates climate change is the increase use of urea and other chemical inputs for multiplying food production, increase of ruminant livestock farming businesses, and the opening of forest lands for agriculture and livestock farming. The drastic increase in the demand for food has pushed the agriculture sector to adopt more intensive and exploitative practices.

Climate change has further affected the lives of the people, including in economics and health affairs. Climate change has led to real changes to the environment. In some areas, these changes have forced community to change their livelihoods. Agriculture, which is highly dependent on the elements of nature like temperature, water and humidity, has become one of the sectors that is impacted severely by climate change.

Boosting National Food Production: World Food Day Momentum to Promote Farming on Swamp Lands

Attempts have been implemented by the Indonesian government to increase food production to anticipate increase spike in national food demand. In 2050, the Indonesian population is estimated to reach 330 million people, coupled with the increase growth of urbanisation and changes in consumer demand. To anticipate this, the food system in Indonesia has to be strengthened. Moreover, the government commits to make Indonesia as one of The World's Food Barns in 2045.

The theme for the commemoration of the World's Food Day at the national level was in line with the theme launched by FAO for celebrating the 38th World's Food Day. On the Day, FAO launched "Our Actions are Our Future" as the theme for the commemoration to show stronger commitment in achieving food security and the world that is free from hunger by 2030.

Indonesia's support to any global initiative to improve food security and nutrition fulfilment has also been addressed in the 45th Session of the Committee on World Food Security (CFS) meeting in Rome, Italy. The meeting was held on the same day with the 2018 World Food Day celebration.

The celebration of World's Food Day at the national level was organised on 18-21 October 2018 in South Kalimantan. The celebration was opened by the Minister of Agriculture, Amran Sulaiman, and was also attended by the Coordinating Minister of Economic Affairs, FAO representatives in Indonesia, South Kalimantan Governor, the ambassadors of a number of countries, and other dignitary guests.

Farming technology on swamp lands has become an innovative farming method that provides new solutions for the government to improve food availability in Indonesia. Through the written keynote speech, the Minister of Agriculture said that the use of swamp lands in South Kalimantan can become the remedy in time of food shortages. Swamp lands have become the new solution to produce food – especially rice – that during food shortages during November and January in Java, the national rice stocks do not suffer from a drastic decline.

According to the mapping by the Research and Development Agency of the Ministry of Agriculture, the total swamp land areas in Indonesia are around 34.93 million hectares. From this acreage, more than 9 million hectares are tidal swamp zones with potential for agriculture production which are spread out in Sumatra, Papua and Kalimantan.

"We are very happy that the Ministry of Agriculture promotes the application of good agricultural practices referring to the models developed in FAO to intensify sustainable food production, including to reduce the use of pesticides through integrated pest management," said one of FAO representative Stephen Rudgard in his keynote opening speech.

Agroforestry Helps to Increase Agriculture Areas' Resistance to Extreme Weather

One of the causes of climate change is the concentration of carbon dioxide in the atmosphere. Carbon dioxide is an important element for plants as carbon is an important element for them to grow and form the food supply. This means that having more plants will make more carbon can be absorbed. On the other hand, the decrease of forest area means the decrease of the numbers of trees to absorb carbon in the atmosphere.

By choosing of trees that are good for shading and together with good plant management, the agroforestry system can give many benefits. The use of fruit trees in the agroforestry system helps to improve food security. Fruits and leaves can become nutritional food source. Some types of crops like lamtoro (Leucaena leucocephala) and calliandra can be used for feeding livestock. The planting of strongly rooted trees in the steep hills can help to support soil structure and to reduce erosion.

Fallen leaves around the trees can improve fertility and organic materials in the soil to improve food crop productivity. Some trees have the ability to hold nitrogen from the air and store it in the roots that help improve soil fertility. Nitrogen is one of the elements needed by plants to grow well. Additionally, with the good trimming, tree canopies can filter light and heat during daytime, and therefore reduce vaporisation and keep soil humidity.

The application of agroforestry in the wider area enables agriculture areas to face extreme hydrological and weather problems, like flood and drought. Moreover, the trees in the lands could help to maintain and improve biodiversity and conserve water sources.

Adaptation Started from Seeds

Climate change causes changes to the weather patterns and environmental characteristic in many regions. One of the most observed phenomena is the decrease or increase of rainfall intensity or duration in days. Changes in weather patterns have led to more frequent occurrences of hydrological hazards and disasters. Hydrological hazard is a natural hazard caused by the natural water cycle. Including in hydrological disasters are drought, flooding and rainfall-induced landslides.

Changes of rainfall intensity in one region area affect the ability of plants to grow. When talking about agriculture, climate is an indispensable element. To grow well, plants need tolerated humidity, optimal temperature and adequate water supply. Inability to meet one of those factors will cause plant retardation or worse growth failure.

For this reason, some researchers have developed crop varieties and clones that are more adaptive to climate change. The use of superior crop varieties or clones will help to improve plants' resistance to drought and flood. Superior clones are also developed to be more resistance to pests, which have increased due to climate change. The use of superior varieties and clones can reduce cultivation costs, for example through reduced costs for irrigation and pest control.