Recognizing the Potentials of Agroforestry in Climate Change Mitigation and Adaptation

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What is climate change?

Stronger and more frequent typhoons, warmer nights, and longer and hotter days are few of the most common evidences that climate change is real. These evidences, however, are often confused with weather changes.

From the popular phrase “climate is what you expect, while weather is what you get,” weather changes refer to the different conditions of temperature, rain, and wind from this day to the next. Climate change, meanwhile, refers to the differences in the average weather condition for a certain period—a month, 10 years to thousands or millions of years.

Today, climate change is a global concern especially in the agriculture sector. Evidences of climate change are limiting food supply, altering cropping seasons, increasing the incidence of pests and diseases, rationing water supply, and forcing farmers to adapt using meager resources.

How do we experience climate change?

Increase in temperature.
Studies have shown that climate change is due to the increasing emission and accumulation of greenhouse gasses, such as carbon dioxide, in the atmosphere. Greenhouse gasses are released from human activities such as deforestation, burning, chemical use, and many others. These gasses trap surface heat in the atmosphere and prevent them from being released into space. This condition, known as the greenhouse effect, increases global temperature which changes both weather and climate conditions.

More powerful typhoons.
Global warming increases ocean temperature and rate of evaporation. As water vapor increases, the more rains typhoons carry. Climate change, through global warming, has increased the number, frequency, and intensity of typhoons in the country over the years.

Extreme climate variability.
Climate variability refers to short-term changes in climate such as longer dry or rainy season, intense heat during summer, more rains during rainy months, and many more. This is caused by the El Niño Southern Oscillation or ENSO event. ENSO has two phases – the El Niño phase causes extensive drought while the La Niña phase causes more rains and longer rainy season.

Rise in sea levels.
Increasing global temperature causes glaciers and polar ice caps to melt thereby making sea levels rise. In the Philippines, experts identified a 15-centimeter increase in sea level from 1980 to 1989. If sea levels continue to increase, more land could be submerged under water permanently.

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http://www.boston.com/bigpicture/2009/09/typhoon_ketsana_ondoy.html

How does climate change affect the environment?

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Limited food supply.
Climate change can alter the schedule and duration of cropping seasons. It can extend El Niño or bring more rains than usual during La Niña. Farmers can become confused as to when they should plant crops, thereby affecting length of cropping season, time of harvest, and food supply. Water shortage during dry months can also affect crop growth and overall food production.

Increased occurrence of pests and diseases.
Climate change can vary the life cycle of pests—increasing their population at a different time. Farmers may be unaware of or caught unprepared for these changes. Diseases can also become prevalent based on the environmental conditions resulting from climate change. Floods due to the series of typhoons in October have increased the incidence of malaria, dengue, leptospirosis, and other water-borne diseases which normally occur during the months of June to August.

Ecological imbalance.
Climate change can make summer months warmer or cold months cooler than usual. These changes in temperature can cause animals to migrate to more suitable places, or force them to adapt with adverse effects on their physical conditions. Some may even die and become extinct because of their inability to adapt to extreme changes in environmental conditions. Biodiversity is thus at more risk now than ever because of climate change.

How can we help mitigate climate change?

As individuals, we can help mitigate climate change by performing simple tasks that reduce the release of greenhouse gasses, especially carbon dioxide.

At home, we can choose more energy-efficient appliances to minimize the electricity consumption; use less plastics and chemicals; and practice Reduce, Recycle, and Reuse. We can use public transportation more or maintain our cars properly to make them more energy-efficient.

As members of a community, we can plant trees and convince others to practice energy-saving tips.

As farmers, we can practice agroforestry—a type of land-use management system that grows trees on farms. Trees absorb carbon dioxide and other greenhouse gasses. Trees and other features make agroforestry a potential strategy in mitigating climate change.

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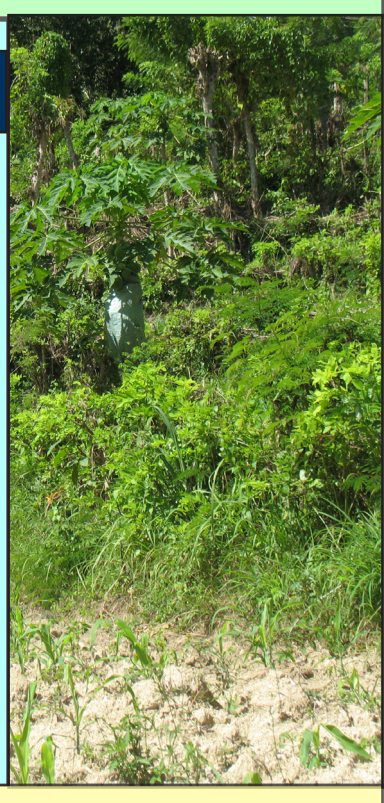
What is agroforestry?

Agroforestry combines the production of trees, food crops, and animals on the same land. It can even integrate mini-forests, orchards, and aquaculture systems. The interactions among these different components make agroforestry unique from agriculture and forestry.

Agroforesry systems produce multiple benefits—increased income from diverse sources; increased food production; improved supply of fodder for fish and livestock; increased supply of fuelwood; improved soil fertility and water supply; improved habitats; and many more. The diverse components also provide multiple harvests at different times of the year thereby ensuring income and reducing the risk of crop loss. Because of these benefits, agroforestry can improve the lives of farmers, help reduce poverty, and maintain ecological stability.

What types of agroforestry systems can we implement?



You can choose from various agroforestry systems according to available resources and environmental conditions of your farm.

Agrisilvicultural Systems produce agricultural crops and trees at the same time. You can choose from:

- **Alley Cropping System** where trees act as hedges and agricultural crops are planted on alleys
- **Multistorey System** where trees and crops of different heights are planted
- **Improved Fallow System** where some land areas are planted while others are left to "rest"

Silvipastoral System combines the planting of trees and the production of livestock. Livestock may include cattle, carabaos, goats and sheep. You can choose from:

- Tree-Crop Grazing System where animals are allowed to graze freely between trees
- Protein Bank System where leguminous trees provide supplementary protein for livestock
- Live Fence System where fodder trees are used as fences

Agrisilvipatoral System produces agricultural crops, trees, and livestock in the same area.

Integrated System combines the different systems from the previous categories.

How can we mitigate climate change through agroforestry?

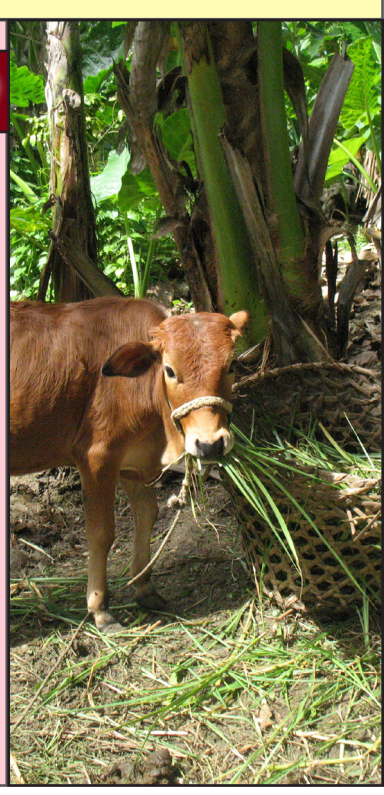
The interactions of the different components of agroforestry systems can help absorb and sequester carbon dioxide and other greenhouse gasses from the atmosphere. Studies have shown that about 5.7 million hectares of agroforestry systems in the Philippines can sequester around 1.37 to 26.0 million tons of carbon per year. Imagine how much more carbon can be absorbed if more farmers practice agroforestry?

If agroforestry systems are properly planned and implemented, more carbon dioxide and other greenhouse gasses can be sequestered every year. However, a poorly designed agroforestry system can enhance global warming and further contribute to climate change.

Undertaking agroforestry systems involves proper implementation of soil and water conservation measures, particularly along steep slopes. Putting these measures in place enable agroforestry systems to efficiently minimize erosion, floods, and landslides. The canopy of trees, tree litter, and humus also filter sunlight thereby maintaining soil moisture.

An efficient agroforestry system not only maximizes the benefits it provides but also ensures the link to climate change mitigation.

How can we adapt to climate change through agroforestry?



Researches revealed that the agricultural sector would be most vulnerable to the impacts of climate change. Agricultural production is most affected by temperature and rainfall—two factors that are easily altered because of climate change. Because of its potentials, agroforestry is not only unique from agriculture and forestry, it may also be a key strategy in mitigating and adapting to climate change.

Agroforestry ensures food security by generating direct benefits to farmers such as food, fodder, feed for fish and livestock, fuelwood, live fences, and other products. The diversity of crops provides multiple harvests at different times of the year, thereby reducing the risk of crop loss and food shortage.

Agroforestry helps maintain ecological balance by providing indirect benefits such as soil and water conservation, improved soil fertility, and improved microclimate conditions.

Agroforestry improves quality of life of farmers by increasing income due to multiple harvests and sale of products from the systems' different components, thereby providing regular income throughout the year.

For more information, please contact:

THE PAFERN SECRETARIAT
c/o Institute of Agroforestry
2nd Floor Tamesis Hall
College of Forestry and Natural Resources
University of the Philippines Los Baños
College, Laguna, Philipppines.

Telefax: +63 49 536 3809
Email: agro_cfnr@yahoo.com
secretariat@pafern.org.ph
Website: www.pafern.org.ph

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