

KRISHIKOLPO

an IAAS Bangladesh Publication

4TH
ISSUE

Agrivoltaics:
The Interaction
of Food, Energy and
Water Ecosystem

Floating Agriculture:
Adapting with Climate
Change

Algae: The Food
of the Future

Psychology of Farmers:
A Field Story from
Southwest Bangladesh

a yearly magazine
December, 2022

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Welcome to



KIRILO

Since 2020

4th Issue

Way to Green Revolution

International Association of Students in
Agricultural and Related Sciences Bangladesh



#ThinkGloballyActLocally

1st Issue: August 2020
2nd Issue: November 2020
3rd Issue: August 2021
4th Issue: December 2022

LET'S LINK UP

Agriculture with Science

Editor in Chief



Dear IAASer!

KRISHIKOLPO comes from a combination of the Bengali words **KRISHI** (Agriculture) and **KOLPO** (Thought). Our dream is to actualize **DIGITAL BANGLADESH** through the agricultural revolution. we want to assemble a common understanding among farmers, scientists, and students of agriculture and allied sciences. Let's explore Bangladeshi Agriculture with **KRISHIKOLPO**.

Best regards,

Sujit Mondal

Vice Director of Communication
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KRISHIKOLPO 4TH EDITION

2022

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International Association of
students in Agricultural and
related Sciences Bangladesh

About IAAS Bangladesh

After the end of the Second World War, its terrible engulfed the entire world!! The world economy was stagnated. Malnutrition and famine occurred due to the underdevelopment of agriculture. At the same time, some students in Europe who studied agriculture and agriculture-related subjects took the initiative to form an organization of agricultural students worldwide which organization will bring about a radical change in the agriculture sector by helping students in agriculture, skill development, career development, research and higher education. Along with it will ensure safe and moderate food demand. Sustainable agriculture will drive the global economy through agricultural development. With these goals in mind, **IAAS (International Association of Students in Agricultural and Related Sciences)** was established in Tunisia in 1957. Initially, IAAS started its journey with **only 8 countries**. Slowly it began to expand. Currently, **more than 50 countries are members of IAAS**. Also, more than **10000 students from 140+ universities are affiliated with IAAS** who are studying agriculture and agriculture-related subjects. IAAS empowers its members in various ways through various pieces of training, seminars, symposiums, workshops, and meetings. Using these experiences, they will later contribute to the achievement of IAAS goals and the global economy.

Bangladesh is an agricultural country. Most of the people of the country depend on agriculture. In that respect, Bangladesh became a member of IAAS in 2017 and came to be known as IAAS Bangladesh. Although initially it was started at Khulna University, currently 12 universities are associated with IAAS Bangladesh. Each university is known as an individual local committee, which works under the guidance of the IAAS Bangladesh National Committee. IAAS Bangladesh is one of the most successful and powerful members of IAAS, despite Bangladesh becoming a member long after the establishment of IAAS. And this has been possible only because of the hard work, dedication and enthusiasm of the members of IAAS Bangladesh.



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AGRIVOLTAICS

THE INTERCONNECTION OF FOOD, ENERGY, AND WATER ECOSYSTEMS

AUTHOR

ABIDUR RAHMAN ABID & MD. TANGIMUL ISLAM



Agrophotovoltaics, also known as agrivoltaics, is the simultaneous utilization of land for both agriculture and solar photovoltaic power generation. The system has been suggested as an opportunity for the synergistic combination of renewable energy and food production. Agrivoltaic systems simultaneously address issues with energy and food security on the same piece of land, at the same time enhancing farmer livelihoods. Agriculture uses an enormous amount of water and energy to grow all our food. About 85% of global water consumption is used for irrigation, and over one-third of all greenhouse gasses are attributed to agriculture. We will need to nearly double our current food production to meet the future demand. This new technology promises to increase food output, decrease water use, and generate more energy and money.

In essence, growers can harness the power of the sun twice by installing solar panels in the same area where crops are cultivated. A recent Oregon state university study estimates that converting just 1% of American farmland to Agrivoltaics could meet our national renewable energy targets and save water and create a sustainable long-term food system.

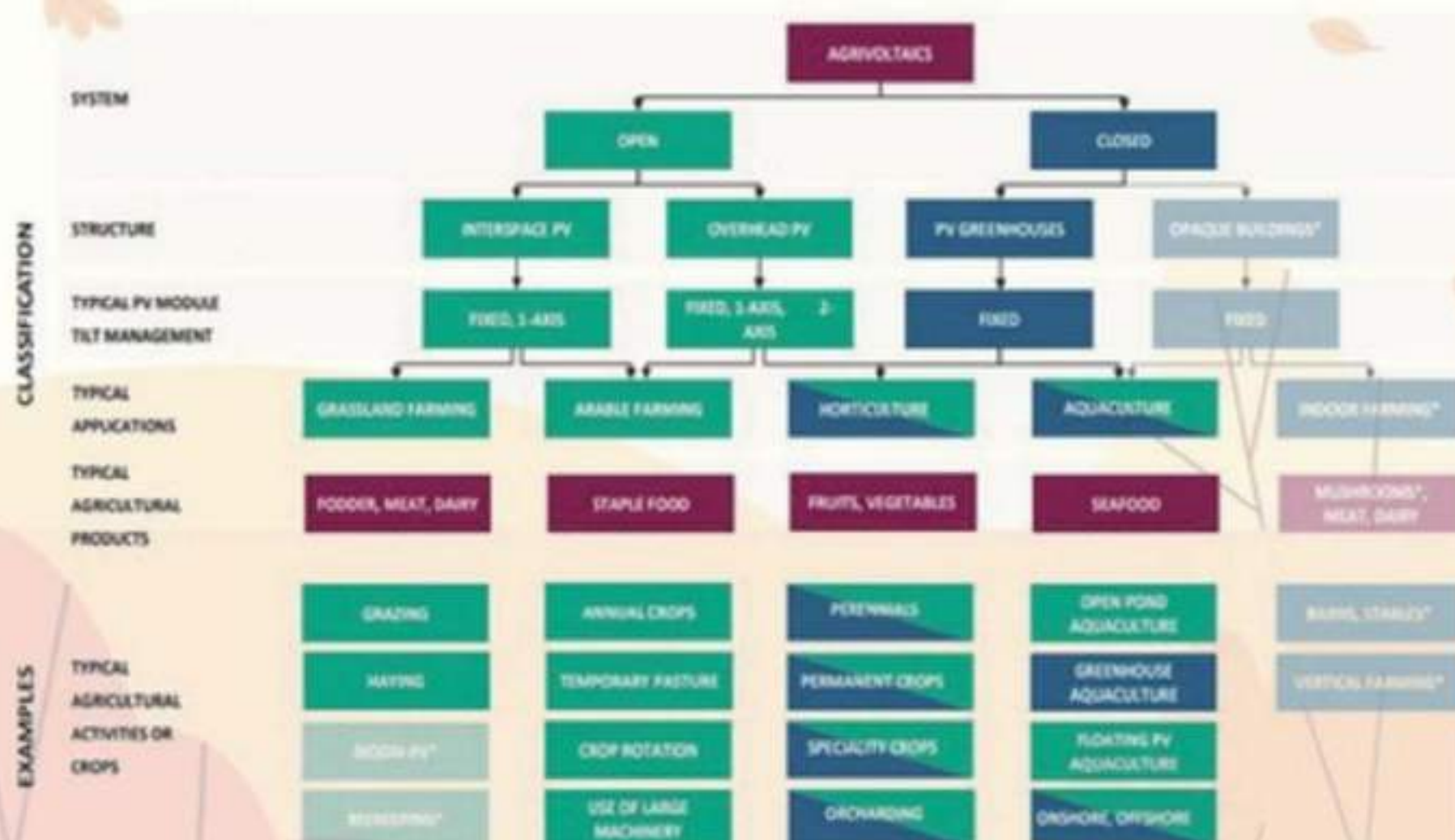


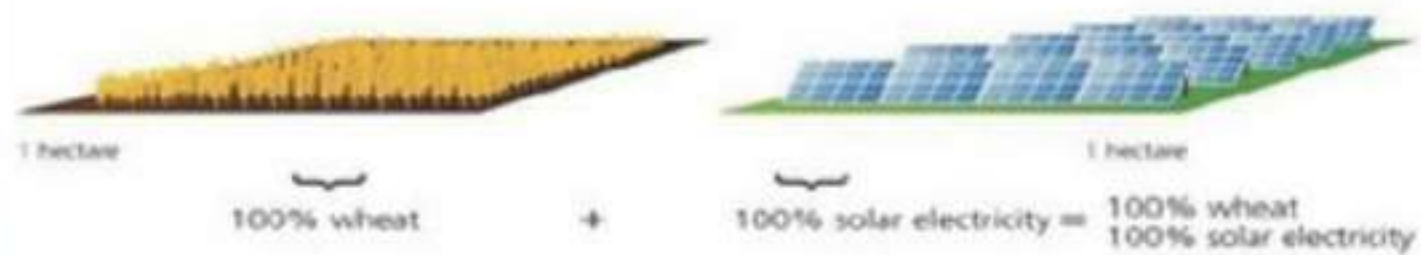
Fig 1. Agrivoltaic Systems Classification.

In the Pabna area of Bangladesh, on 12.5 acres of land, a 3.77 MW Solar PV Power Plant will be built by Saudia Agro. The project is expected to cost roughly USD 7 million. The local farming of chickens, ducks, goats, sheep, bees and other domestic animals will take place in the space underneath the solar panels. Additionally, vertical berry crops will be planted, and a greenhouse is anticipated to be built. Besides that Beximco Gets Approval to build the 'Largest' Solar PV Plant 280 MW DC Agrivoltaic Project in Bangladesh. Since 2014, around 2,800 Agri-PV systems have reportedly been deployed worldwide, with a total capacity of about 2.9 GWp. Countries like Japan, South Korea, China, France, and the US already have regulatory frameworks and assistance programs in place, while the Netherlands, Switzerland, Austria, Germany, India, and California in the US are said to be developing similar programs. The largest grid-connected concentrated solar installation in the world - with a capacity of 1,177 megawatts - is currently under construction in Abu Dhabi and rivals traditional fossil fuel plants in size. The constraint to such PV development is its extensive space requirements, complicated by increasing competition for land driven by population growth and rising food demand.

Solar energy is the main source of free energy in the modern world. We won't have to worry about energy in the future if we know how to use it effectively. The tight conflict between the production of food and energy for land resources can be overcome through agrivoltaic systems. This dual use of agricultural land can have a major impact on the nation's PV production, with little to no impact on food prices. Finally, viable recommendations for policymakers should be developed, so that appropriate incentives and regulatory initiatives can be used to enlarge agrivoltaic applications to increase farm income as well as lower the greenhouse gas emissions caused by the burning of fossil fuels. It is obvious that further research is required in this field and that the outputs for various crops and geographical regions should be investigated to determine the potential of agrivoltaic farming globally.



Separate Land Use on 2 Hectare Cropland



Combined Land Use on 2 Hectare Cropland: Efficiency increases over 60%

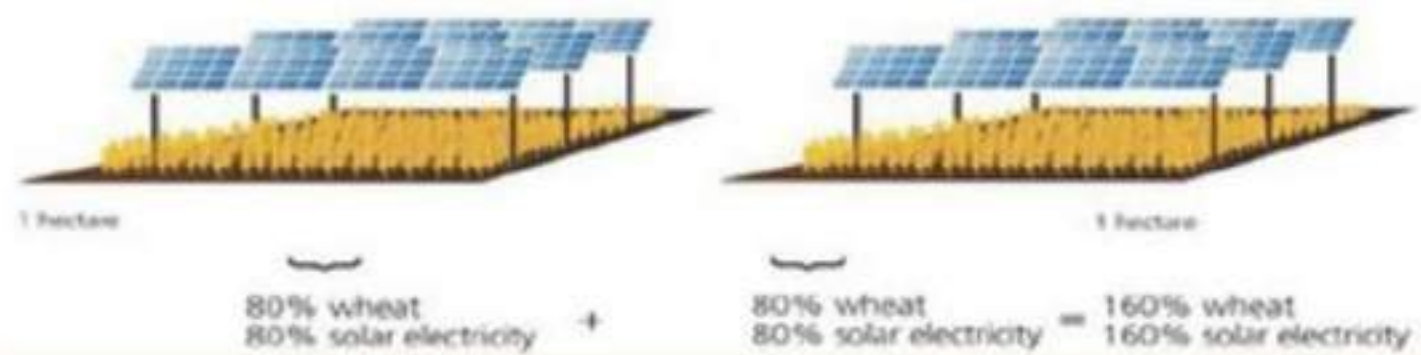


Fig 2. Model Agrivoltaics and Its Efficiency.

References :

1. [Solar Farming: Not a Good Use of Agricultural Land | Coastal AgroBusiness](#)
2. [Benefits of Agrivoltaics Across the Food-Energy-Water Nexus | News | NREL](#)
3. [Agrivoltaics: How Solar and Farmland can Fight Climate Change \(solarreviews.com\)](#)



PSYCHOLOGY OF FARMERS

A FIELD STORY FROM SOUTHWEST BANGLADESH

BY ABDULLAH AL MARUF AND UTHPAL KUMAR



PHOTO BY: SHEIKH MEHEDI MORSHED TAEF

The Bangladesh Delta is blessed with a lot of natural resources, fertile land, and suitable climatic conditions for farming.

The majority people of Bangladesh rely on agricultural operations, both directly and indirectly. Agriculture is one of the most important economic sectors that contribute about 13-17% of the national GDP and agricultural labourers make up 43% of the entire labour force (BBS, 2019, FAO).

Farming in Bangladesh is not an occupation people willingly choose. Some of them inherently choose to farm because their parents did so, otherwise, this is the easiest occupation they can be involved in with minimum or no academic education. In some cases, young and educated farmers are involved but the number is very less. By farmers' psychology, I meant to say their decision-making, their response to innovations, and technologies and attitude toward changes in their traditional farming systems and the reasons behind it.

Based on socioeconomic factors, **43.1% of farmers are in poor condition**, although 98% of farmers possess a home.

In terms of gender, **88.2% of peri-urban marginal farmers are male**, and the majority of farmers (86.2%) had 1 to 10 family members (Dipu et al., 2019). Most of the farmers' decisions are driven by fulfilling their basic needs for the family. Based on family needs, farmers set their farming goals.

For example, a smallholder or marginal farmer household's main goal is to secure food for their family. Also, most of the time they own a small piece of land (≤ 0.61 ha) that is combined with leased land. Among smallholders, vegetable farming in households is prominent. Field crop selection is completely based on their dietary needs. But among medium farmers ($>0.61 - <2.63$ ha), the selection of crops varies mainly rice, vegetables, pulses, livestock, and or poultry farming. The medium holders tend to become more open to new technologies and innovations. Large farmers cultivate high-value crops along with regular crops such as rice, pulses, and vegetables based on market value and higher returns than traditional practices.





The above sections provide a basic and broad comprehension of the farmers' decision-making based on family requirements. However, **the psychological aspects are not particularly obvious**. I'll talk about my working experience with farmers to help them with climate-smart agriculture practices.

During that time, I try to observe various farmers and their attitudes toward new techniques. I played a role as a research assistant in **RECSA** and **WATERAPPscale** project to improve farmers' decision-making using climate information services. In the beginning, when I used to go to the farmers' community, I tried to explain climate information services. Most of the farmers agreed that it is beneficial to their agricultural operations.

However, the majority believed that weather **information cannot be predicted by people**. When I started weekly training sessions at Farmers Weather Schools, they were eager to learn about it. However, their involvement was not always adequate. I try to explore why participation is not adequate. A few farmers replied that we are not providing financial compensation for their time. They further stated that farmers used to receive training money from NGOs and government projects. Therefore, they think that they are not receiving them because they lack negotiation with the project authorities.

After a few years, I began working on the **WATERAPPscale** project in the same location with the same goal as the prior one. Farmers received a little travel compensation for attending the Weather Schools. As I previously stated, the presence of farmers in the class was unsatisfactory, but after introducing a tiny compensation, the class was always full and farmers were very happy to learn how to access and interpreted climate information using a smartphone. A few other farmers were also extremely interested in joining our schools, not only because they wanted to learn, but also because there was financial compensation involved. The explanation for this tendency is that farmers' actions are always designed to meet their fundamental requirements. Taking training is helpful for farmers in the long run. However, having financial compensation for their working hours is also very important to farmers as the majority of them are day labourers. Most of the time, farmers' mentality is motivated by their wants rather than focused on the future benefits of training and education. It's simply human nature.

Source: Unsplash



Farmers are not any different from other people in that they are motivated by a desire for fulfilment in their lives.

Herewith I would like to relate some success stories. Farmers who participated in the weather schools have a proclivity to use climate information services in their daily lives and farming practices - from daily chores to community events. Due to iterative training farmers have been habituated to using or thinking about weather situations for taking any agricultural decisions. As a result, they are more climate resilient than other farming groups. I observed these during my recent field visit after a year with the same farmers' groups.

There are substantial disparities between the lives of farmers and other individuals. There are several areas of farmer psychology that might be discussed. An in-depth social study will help to learn more about farmers' daily lives and their attitudes toward new technology acquisition. The involvement of social scientists is highly important to investigate the social and psychological elements of farmers alongside climate services technological advancements. Around the world, new inventions and advancements in agriculture are becoming available, therefore research on social and psychological topics is required for the application of technological innovations.

(Declaration: This article is based on my personal experiences and is not intended to be scientific research. The views expressed in this article are my own and do not necessarily reflect the views of any person or organization)

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BANGLADESH DELTA PLAN 2100 AND AGRICULTURE



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WHAT IS DELTA & GBM DELTA?

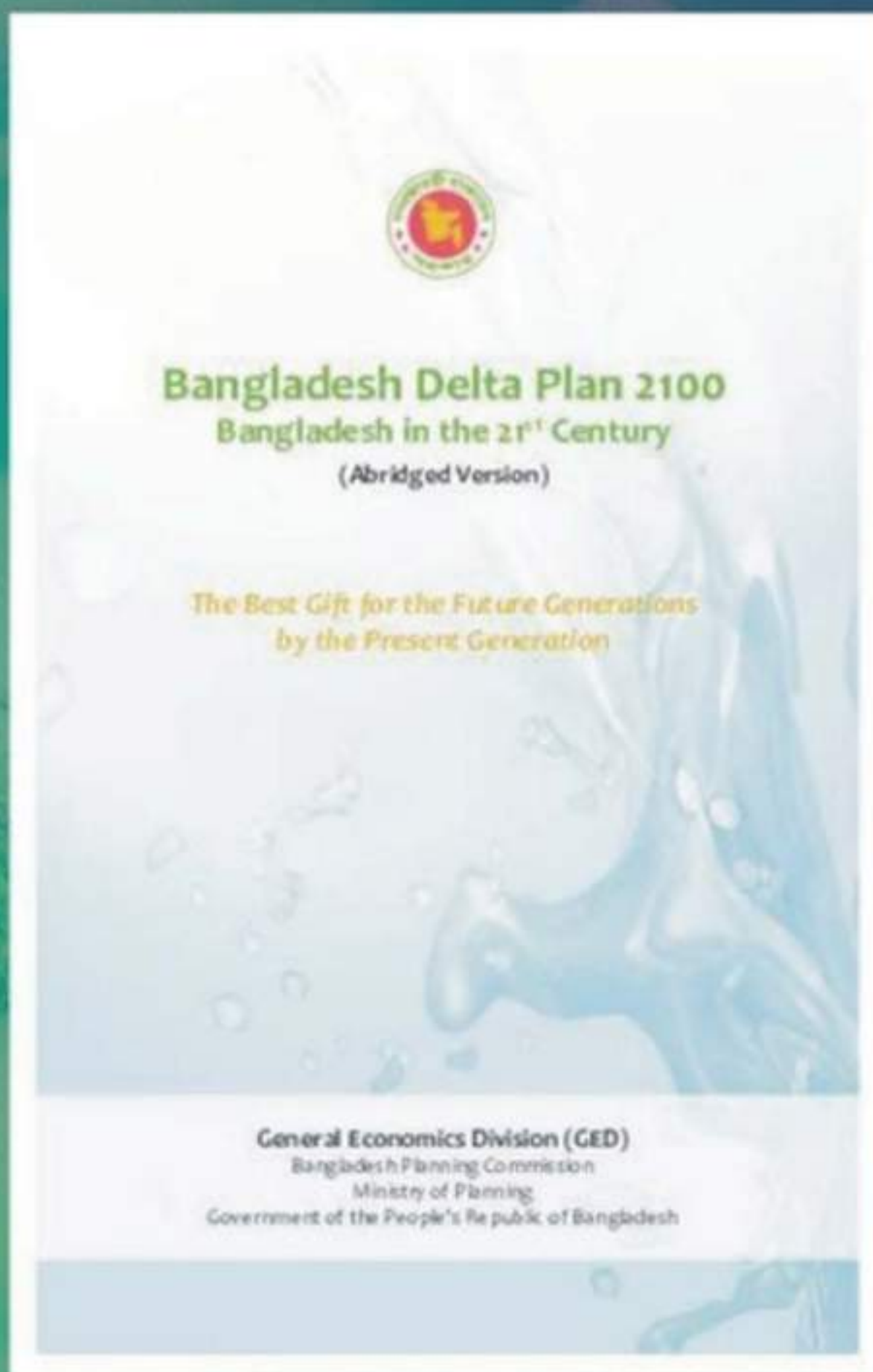
The term "delta" comes from the upper-case Greek letter delta (Δ), shaped like a triangle. Delta regions are wetlands that form as rivers empty their water and sediment into another body of water, such as an ocean, lake, or river. The world's largest dynamic delta is the Ganges-Brahmaputra delta in India and Bangladesh, it is a tide-dominated delta, shaped by the rise and fall of tides in the Bay of Bengal. Bangladesh sits almost entirely on this delta called GBM (Ganges-Brahmaputra-Meghna) delta.

BANGLADESH DELTA PLAN 2100

Due to the significant uncertainties concerning climate change and socio-economic development, planning is being enriched with adaptive strategy-making in several deltas in the world. Several sectoral initiatives and plans for water and agricultural development sectors have been adopted in Bangladesh since 1960.

A long-term integrated techno-economic mega plan that integrates all delta-related sector plans and policies, enveloping a Delta Vision and strategies that make it possible to integrate sector plans and policies for the long term and to present actionable interventions with a roadmap for realization.

General Economics Division, Planning Commission, and Ministry of Planning approved the Delta Plan 2100 on September 4, 2018.



DELTA OPPORTUNITIES & CHALLENGES RELATED TO AGRICULTURE

Opportunities:

Deltas have a rich accumulation of silt, so they are usually fertile agricultural areas. The soil and water combination of Bangladesh makes it a highly fertile land with multiple cropping opportunities.

The plentiful rivers, fresh wetlands, and lakes provide ample scope for fisheries resources. Apart from that marine fishing has now become a major source of fisheries resources.

Another large comparative advantage is that all districts are connected with the growth centres of Dhaka, Chattogram and Khulna through riverways. The inland waterways provide an environment-friendly and low-cost transport option for both passengers and cargo for the country as a whole but especially for the rural poor. The open access to the sea is a huge

advantage to Bangladesh. In addition to the port facilities that can become a regional hub for international sea transportation.

There is a growing demand for coastal tourism and alternative options to the traditional Cox's Bazar coastal resorts and Kuakata coastal tourism in the Patuakhali district.



Challenges:

Droughts Northwestern regions of Bangladesh are particularly exposed to droughts. A strong drought can cause greater than 40% damage to broadcast Aus. During the Kharif season, it causes significant destruction to the aman crop in approximately 2.32 million ha every year. In the rabi season, about 1.2 million ha of agricultural land face droughts of different magnitudes.

Apart from the agricultural loss, droughts have an important effect on livestock population, land degradation, health and employment.

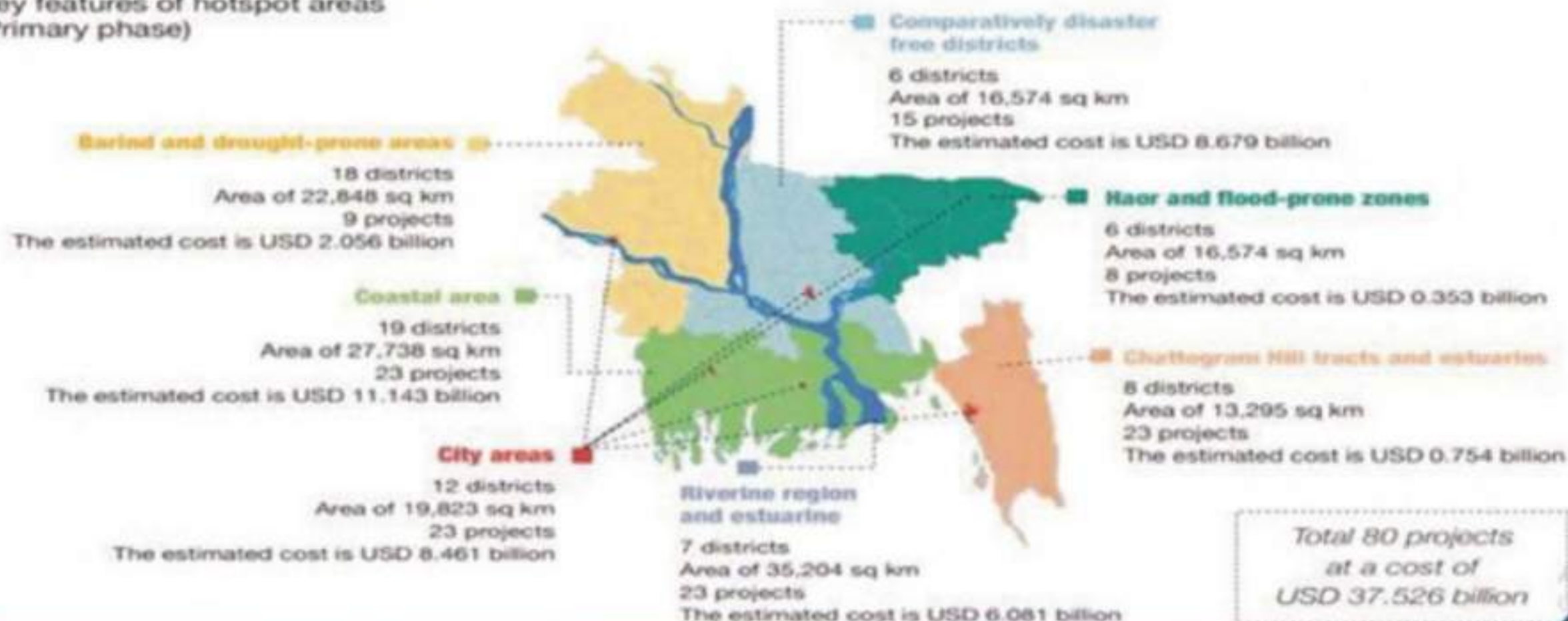
Sea Level Rise (SLR) and Salinity Intrusion: Salinity intrusion due to sea level rise will decrease agricultural production by the unavailability of fresh water and soil fertility. Salinity also decreases the terminative energy and germination rate of some plants (Rashid et al., 2004). Ali (2005) investigated the loss of rice production in a village in the Satkhira

district and found that rice production in 2003 was 1,151 metric tons less than the year 1985.

Waterlogging is a persistent problem resulting in damage to crops and therefore the livelihood of the coastal people in the southwestern region of Bangladesh. Furthermore, the majority of people living inside the polder (a low-lying tract of land enclosed by a built construction that forms an artificial hydrological unit)

Bangladesh Delta Plan 2100

Key features of hotspot areas
(Primary phase)



perceived that institutions and management were vitally important.

Riverbank Erosion has a great impact on agriculture; rice growing fertile cultivable land is becoming unsuitable for rice cultivation due to sand deposition. The fertility of the land is reduced as a result of erosion and sand deposition; the yield of the land is declined.

Floods: Not only can a flood make a field unsuitable for planting, but it can also ruin crops that have already been harvested.

Including the other damages, the farmers are generally identified as the most affected group due to the weak alarming system of flood and post-flood management strategies. The productivity of the land has decreased for nearly all kinds of crops in all these communities.

Flash floods caused enormous damage to agriculture such as rice especially Boro rice and fish production which the Haor dwellers rely on for their livelihood.



Sector-wise GDP growth rate (according to the BDP 2100)

Sectors	GDP growth rate				
	2016	2020	2021	2031	2041
Agricultural sector	2.37	2.66	2.66	2.77	2.77
Grain crops	0.50	0.54	0.54	0.56	0.56
Commercial crops	0.50	0.54	0.54	0.56	0.56
Livestock-poultry-fish farming	5.24	6.37	6.37	6.88	6.88
Forestry	5.13	5.31	5.31	5.31	5.31
Other agriculture	0.50	0.55	0.55	0.55	0.55

BDP 2100 STRATEGIES FOR THE AGRICULTURE SECTOR

For Addressing the Challenges in the crop sub-sector, GoB focused on promoting sustainable agriculture and green growth, rational use of quality inputs, and the promotion of measures to expand mechanization. BDP 2100 Strategies for Agriculture are below_

- Increasing resilience of agricultural production system;
- Diversification in agricultural output and livelihoods;
- Lower emissions (GHGs) from agricultural land;
- Encourage the establishment of commercial farms;
- Introduction of Aquaponics farming system to culture fish and plant together;
- Using Nanotechnology in agriculture for processing, distribution and packaging
- Introduce the precision agriculture model;
- Encouraging solar power in irrigation;
- Improved farm practices and technologies for mediating the negative impacts of climate Change;
- Preservation of ecosystems for plants, wild animals, fishes, birds, etc and encourage fruit tree plantation;
- Improve Wetland Management in Haor Areas for the Development of fisheries;
- Maintaining biodiversity to ensure long-term fish availability;
- Sustainable marine fisheries resources management; and
- Production of climate-resilient Livestock;

The Minister of Agriculture has initiated the Agriculture Transformation Programme (ATP) to address the changes in the agriculture and food system in a systematic and integrated way, also initiated and supported by FAO, and adopted by the government of Bangladesh, is naturally aligned with the Delta Plan because of the crucial importance of water to agriculture.

References:

Baseline Studies on Agriculture Food Security and Nutrition of BDP 2100
Coastal Zone Policy 2005; IPCC report (2022)
<https://education.nationalgeographic.org/resource/delta>
<https://www.fao.org/bangladesh/news/detail-events/ru/c/1529980/>
<https://bdp2100conference.org/wp-content/uploads/2022/05/BDP-2100-Conference-Paper.pdf>

70%
of all water
withdrawals
use for
Agriculture

BDP 2100
International Conference
was held on the
26-27th May, 2022

FAO Representative in Bangladesh Robert D. Simpson shared his views like "Agriculture cannot be transformed without an appreciation and respect for Water, the Delta Plan and the Country's Agricultural Transformation Plan need to be considered together."

AEROPONICS



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Aeroponics may be defined as the process of growing plants in an air or mist environment without the use of soil or an aggregate medium (known as geponics). It is a practice of growing plants without soil, with roots in mist environment. The word "aeroponic" comes from the Greek meanings of aer ("air") and ponos ("labor"). (How the Aeroponics Hydroponics System Works, 2022)

Objectives

1. Make farming easier to manage.
2. Eliminate waste of vegetables during harvest caused by pathogens (Algae and mold).
3. Increased profit allows for the re investment and expansion.
4. Substantial expansions create more job and raises the standard of living.
5. Aeroponics reduces cost of maintenance requirements such as fertilizer, chemicals, insect, fumigation, soil, staff and more.
6. Aeroponics drastically reduces the amount of water required due to the recycled water structure put in place.
7. Aeroponics can be applied on a small, medium and industrial large scale.

Requirement for Aeroponic Set-Up



Capital



Location and Siting



Climatic conditions



Good quality
water



Choice of right
crop



Proximity to markets



Logistics involved



Good agronomists



Topography of
the land

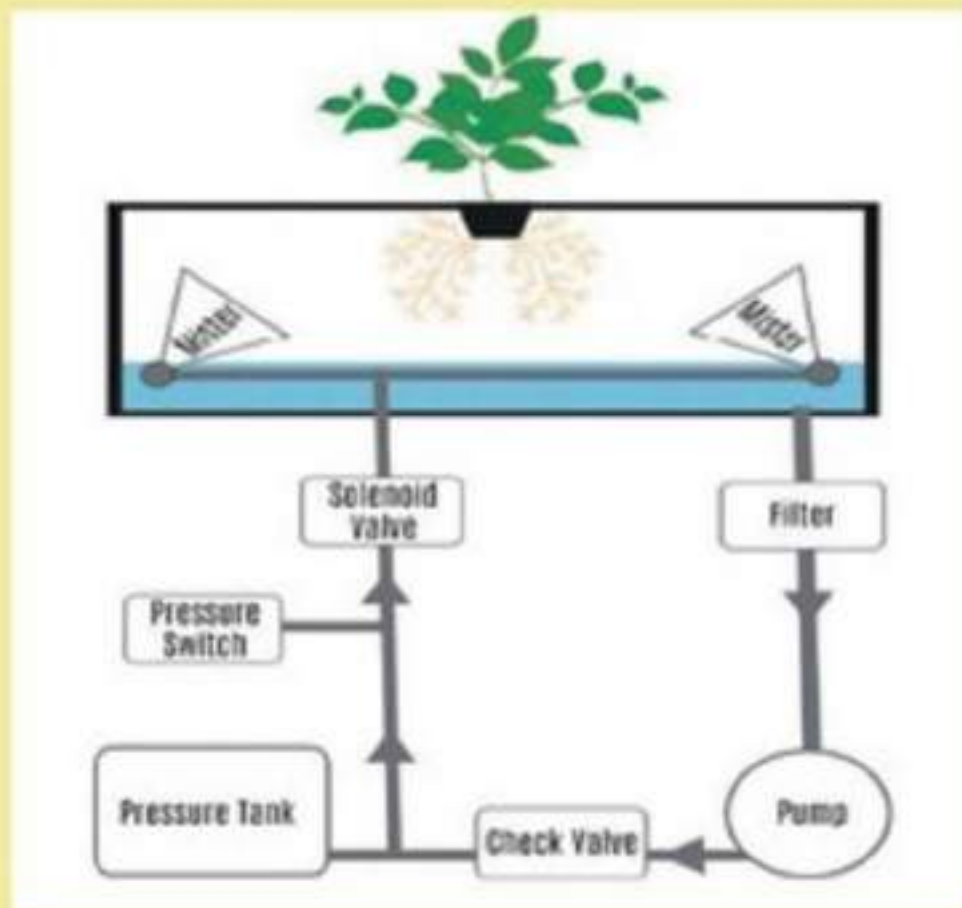
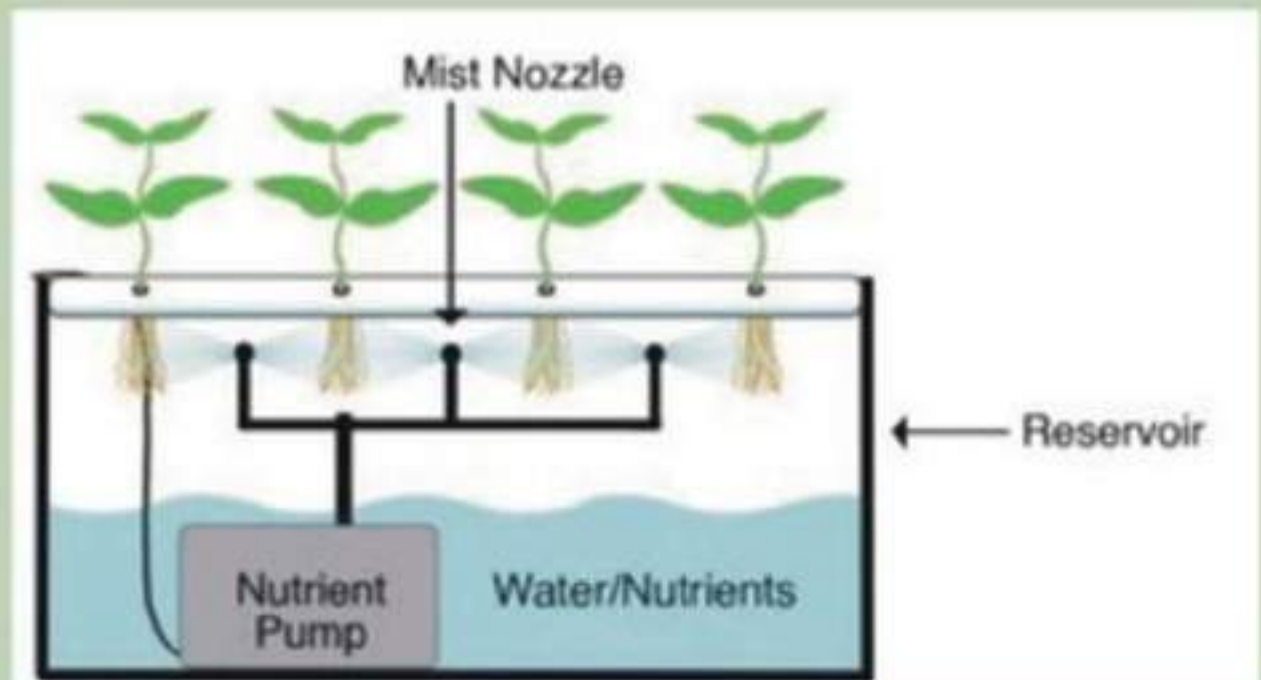


Climatic factors

TYPES OF AEROPONICS

Low-Pressure Aeroponics

Depression aeroponics (LPA) is a type of aeroponic growing system. In the aeroponic growing system, plants do not grow in the soil. Instead, they grow by hanging their roots in the air when a nutrient solution is supplied to the roots as fog. Low pressure aeroponic systems provide fog at low pressure tree roots with large droplets. In most low-pressure aeroponic gardens, plant roots hang over a reservoir of nutrient solution or inside a channel connected to the reservoir. A low-pressure pump delivers the nutrient solution through a jet or ultrasonic transducer, which then drips or drains into the reservoir.

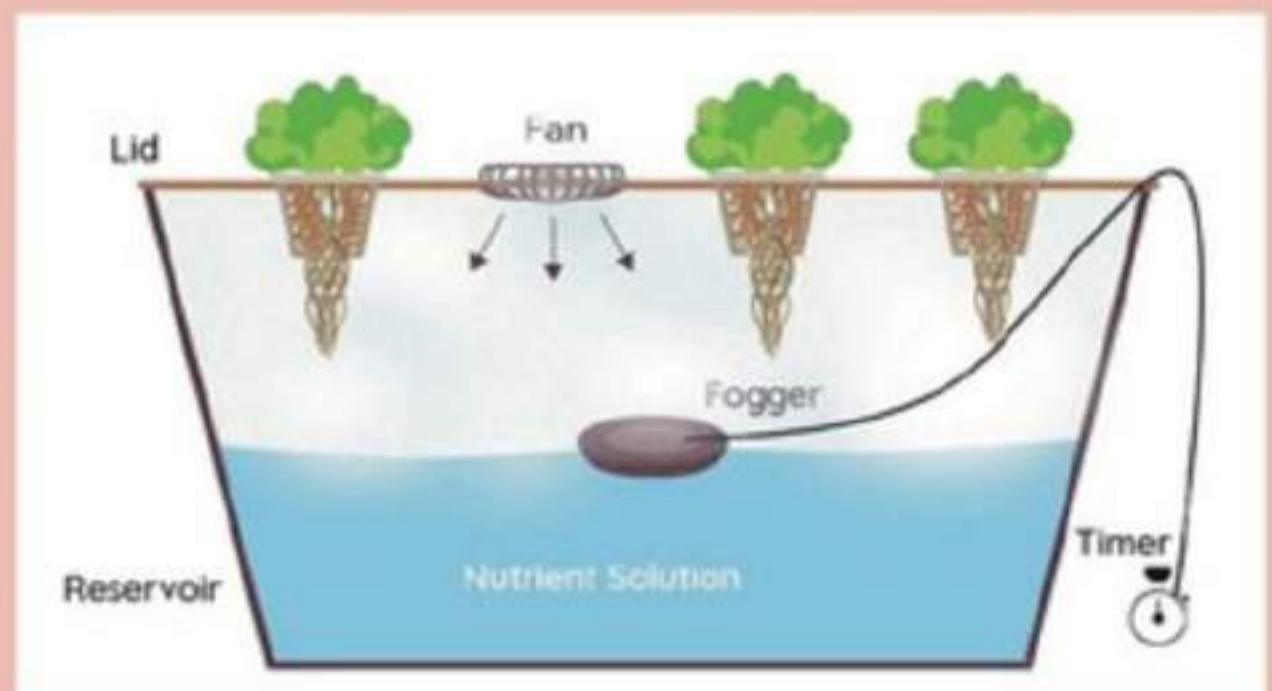


High-Pressure aeroponics

High-pressure aeroponic techniques, where fog is created by high-pressure pumps, are commonly used to cultivate high-value crops and plant samples that can offset the high setup costs associated with this method of horticulture. High-pressure aeroponics systems include low-mass polymer, air and water purification, nutrient disinfection and pressure-fed nutrient delivery systems. (Karak, 2018)

Ultrasonic Fogger aeroponics

Ultrasonic fogger aeroponics, or more commonly called fogponics, is another interesting type of aeroponic system. As the name implies, farmers can use ultrasonic foggers to turn water into tiny water droplets. These are very small and you will see it in the form of fog. Although tree roots may find it easier to absorb water in small amounts, fog creates little moisture and, over time, it can produce salts that can repel this fog compared to other aeroponic species. (A Deep Look At Aeroponics, 2022)



ADVANTAGES

- Crops are grown together, so more crops can be grown.
- Plants are not exposed to soil diseases or bacteria, so no pesticides are required, which means healthy crops.
- Crops mature faster, which means there will be more crops.
- High value crops because they are healthy and tasty.
- Low labor input for system owners.
- Long shelf life due to minimal impact of production.

DISADVANTAGES

- Large amount of money is needed to set up an aeroponics farm.
- Many consumers believe that aeroponically grown plants are not as nutritious as other growing plants.
- Maintenance of an aeroponics firm is extremely expensive.
- Pests & diseases can spread rapidly.
- Lack of experience and technical knowledge.

LIST OF CROPS CAN GROW IN AEROPONICS SYSTEM

•Spinach	•Eggplant	•Saint leaf	•Tomato	•Bitter leaf	•Pepper	•Pumpkin	•Lettuce
•Yam	•Bean	•Irish potato	•Rice	•Wheat	•Onions	•Maize	•Carrot
			•Ginger	•Garlic, etc.			

AEROPONICS IN SPACE

Space plants: In 1960, plants were first taken into Earth's orbit on two separate missions, Sputnik 4 and Discoverer 17 (for a review of the first 30 years of plant growth in space, see Halstead and Scott 1990). Pea, wheat, maize, spring onion, and *Nigella damascena* seeds were carried into space on the former mission and *Chlorella pyrenoidosa* cells were brought into orbit on the latter mission.

Bio controls in space: NASA sponsored Stoner's research for a natural liquid biocontrol, known then as ODC (organic disease control) in 1996, that activates plants to grow without the need for pesticides in order to control pathogens in a closed-loop culture system. This ODC is derived from natural aquatic materials.

AEROPONICS IS A SOIL LESS AGRICULTURE

- Aeroponic system is probably the most high-tech soilless farming system.
- In aeroponic system roots are hung in air and misted in nutrient solution.
- Usually misting is done every few minutes.
- Because if the roots come in contact with air, they will dry out quickly if the misting cycle is interrupted.
- Growing medium is primarily air in aeroponics. (Karak, 2018)

REFERENCES

1. A Deep Look At Aeroponics | Trees.com. (2022). <https://www.trees.com/gardening-and-landscaping/aeroponic>
2. How the Aeroponics Hydroponics System Works - The Hydroponics Guru. (2022). <https://thehydroponics-guru.com/how-the-aeroponics-hydroponics-system-works/>
3. Karak, S. (2018). Aerophonics. <https://www.slideshare.net/SOUMENKARAK/aerophonics-148534190>
4. <https://farmtrybe.com/how-does-aeroponics-work/>



IAAS BANGLADESH NATIONAL CONGRESS 2022



Emerging New Trends in Sustainable
Agricultural Practice and Food Security

▶▶ 18-19th November 2022

TSC, Sher-e-Bangla Agricultural University
Hosted by: IAAS Bangladesh SAU-Dhaka

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FLUTRICH
SYSTEMS
LIMITED



বাংলাদেশ প্রতিদিন

International Association of
Students in Agricultural and
Food Sciences Bangladesh

Innovative Idea Presentation Competition

Preliminary round(Online) : 12 November, 2022
Final round(Physically) : 18 November, 2022

All the Undergraduate Students and Ms
Students are allowed to participate

Registration Deadline: 10 November

Categories :
1.Challenges for safe agri-technology implementation
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Winged in future farming in BD
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Prizes:
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IAAS Bangladesh National Congress 2022

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Emerging
New Trends in
Sustainable Agricultural
Practice
and Food Security

Submission Deadline:
18th November, 2022

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Result Announcement:
18th November 2022

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CROPLAND MAPPING EXPANSION FOR PRODUCTION FORECAST

IN THE
MODERN ERA AGRICULTURE
DEVELOPMENT IS HIGHLY CONTRIBUTED
TO THE FIELD OF FOOD SECURITY. DATA
SCIENCE IS ONE OF THE TOP ANALYSIS EXPERIMENTAL
METHODS FOR FORECASTING AND MAPPING
SYNCHRONISATION. IN OUR STUDY, WE EXPERIMENT
WITH THREE MAJOR PARAMETERS (RAINFALL,
RELATIVE HUMIDITY AND TEMPERATURE) THAT
CAN BE AFFECTED CROP PRODUCTION RATE
AS WELL AS AREA-BASED MAPPING.

The potential future effect of global climate change is a major concern now.

The regions of Dhaka, Tangail, Comilla, Dinajpur, Jessore, Bogra, Rajshahi, Chittagong, Khulna, Sylhet, Mymensingh and Rangpur play a momentous role in the agricultural economy of Bangladesh for paddy and jute cultivation.

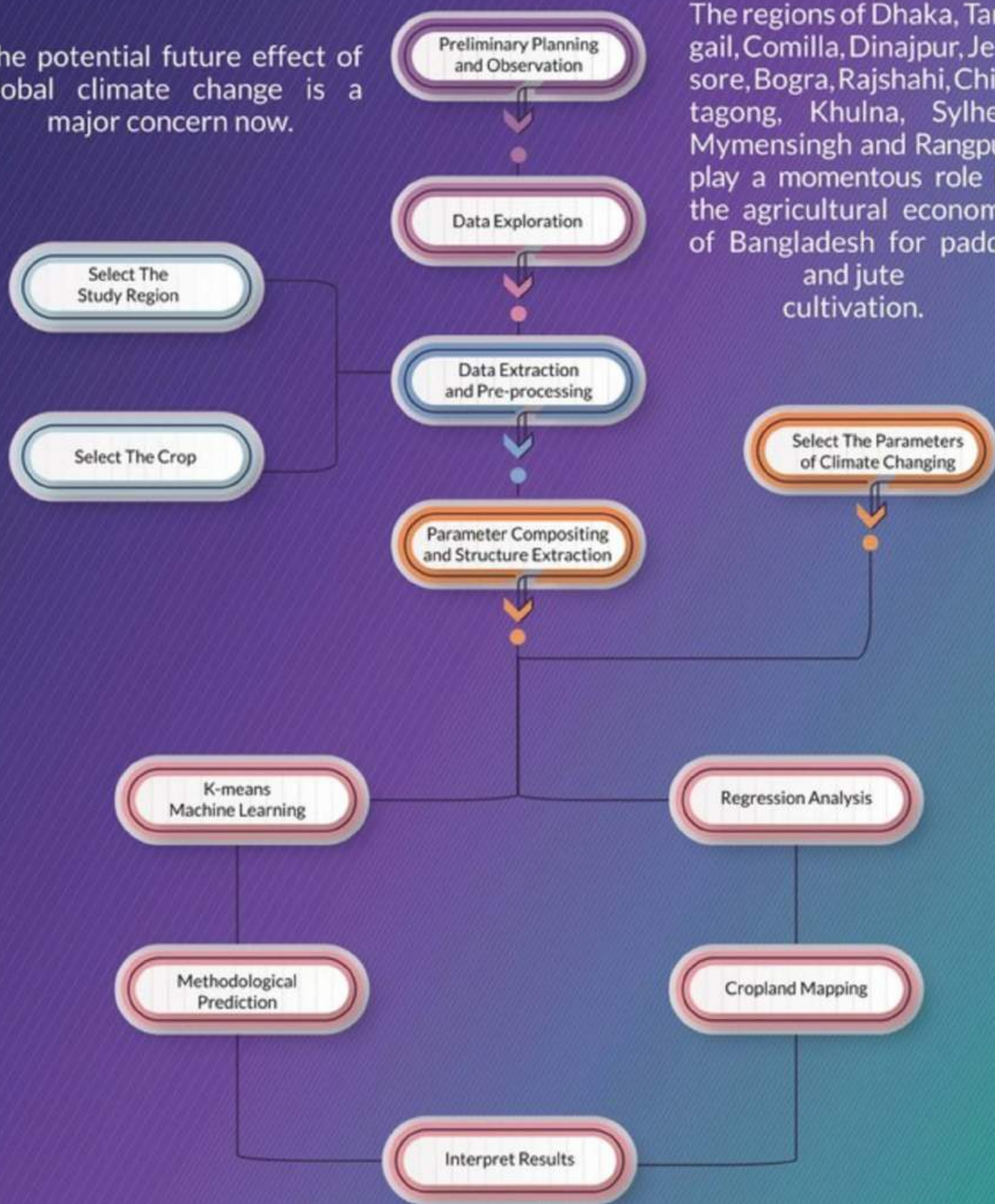


Fig: Systematic Flowchart based on EVPM (Environmental Variable Production Model) to analyze the significant change in agriculture production due to climatic stresses.

Among them, Dhaka is situated in tropical climatic conditions. More rainfall occurs in summer than in winter. The annual mean temperature in Dhaka is 25.3°C | 77.5°F, yearly precipitation is 2055 mm | 80.9 inches, and relative humidity is 75%. Chittagong also has a tropical climate. Most of the months have adequate rainfall. The annual mean temperature in Chittagong is 25.3°C | 77.5°F, yearly rainfall is 2777 mm | 109.3 inches and yearly mean humidity is 73.7%.

The weather in Khulna is cloudy and troublesome. Mostly clear and hot conditions are seen in the dry season. The annual mean temperature in Khulna is 27°C | 80.6°F. Total precipitation is 1290.5 mm | 50.8 inches and annual mean humidity is 75%. Rajshahi has periodic moist and arid weather. There is reasonable precipitation, considerable humidity, and aerial temperature.

The highest average temperature is 36°C | 97°F. Yearly total precipitation is about 1448 mm | 57.0 inches and yearly mean humidity is 77%.

Mymensingh is situated in average climatic conditions. The arid season is usually thermal and the moist season is overcast. The highest mean temperature is 32.1°C | 89.8°F. Yearly total rainfall is 2249 mm | 88.54 inches and yearly mean humidity is 76%.

Sylhet has a moderate and hot climate. In summer more rainfall occurs than in winter in Dhaka. The yearly mean temperature is 23.6°C | 74.5°F in Sylhet. Total Rainfall is 5048 mm | 198.7 inches and annual mean humidity is 77%. The climatic condition of Rangpur is also moderate and warm. Rainfall is more organized in summer than in winter. The annual average temperature in Rangpur is 24.3°C | 75.7°F. Total rainfall is 2497 mm | 98.3 inches and yearly mean humidity is 79%.

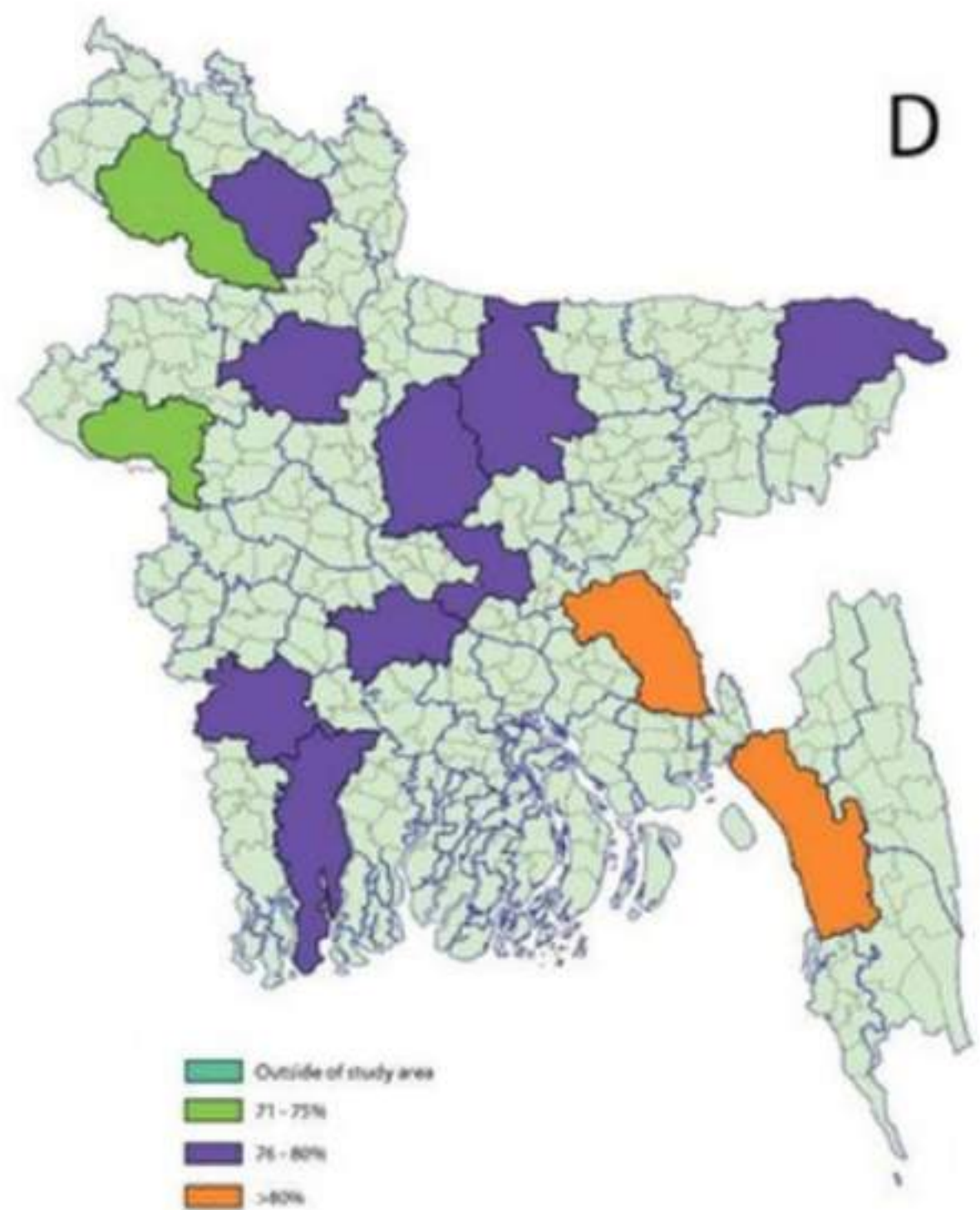
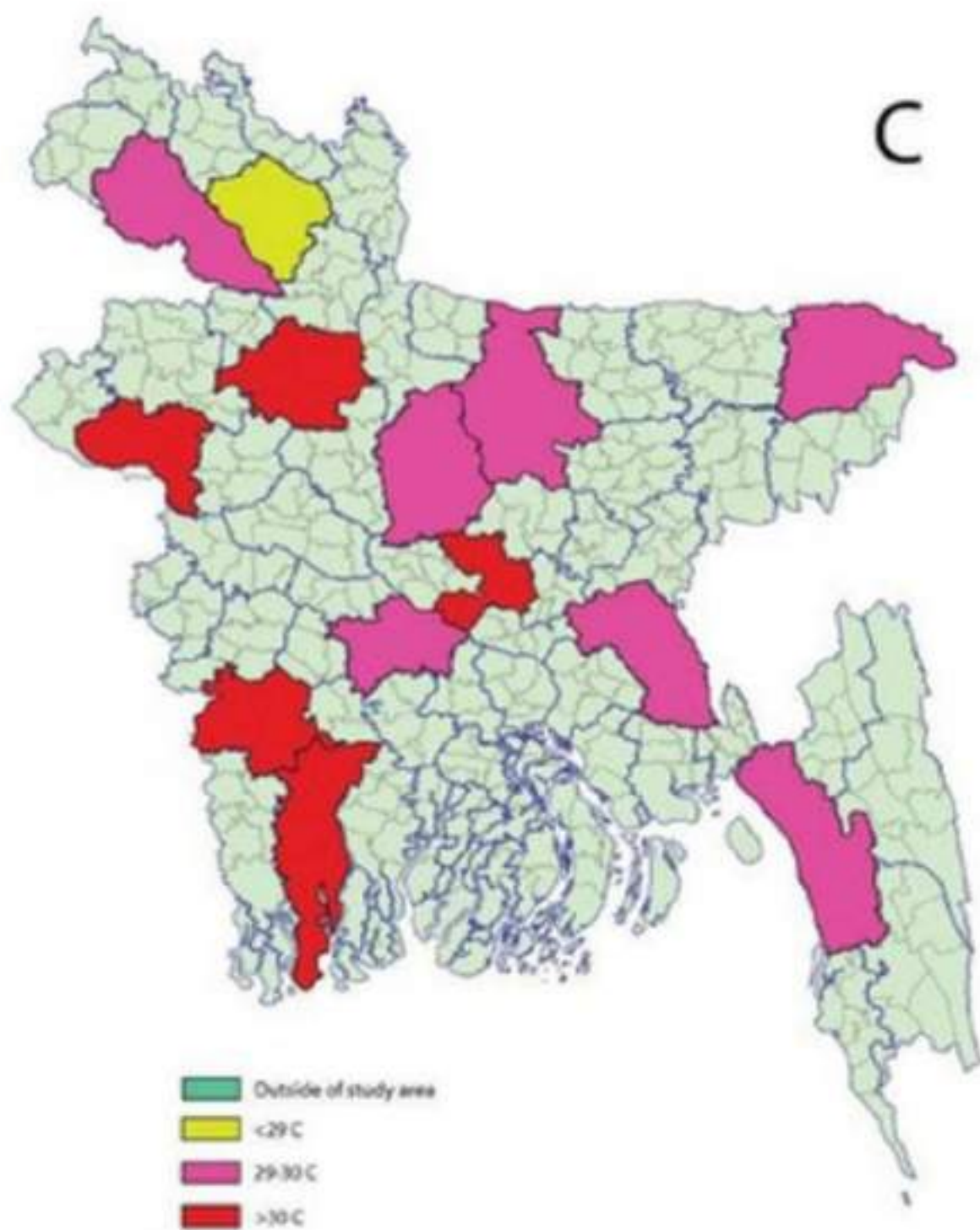
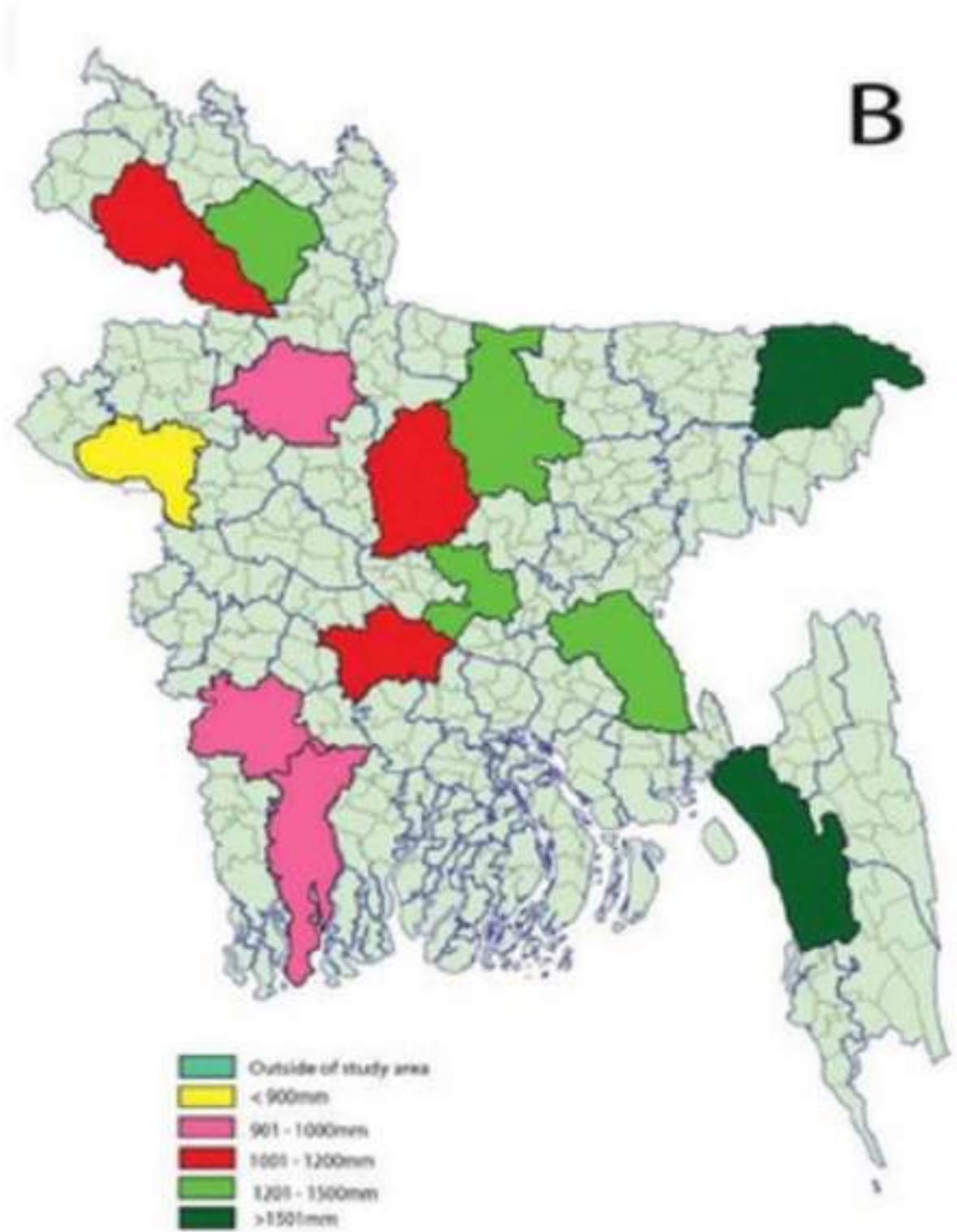
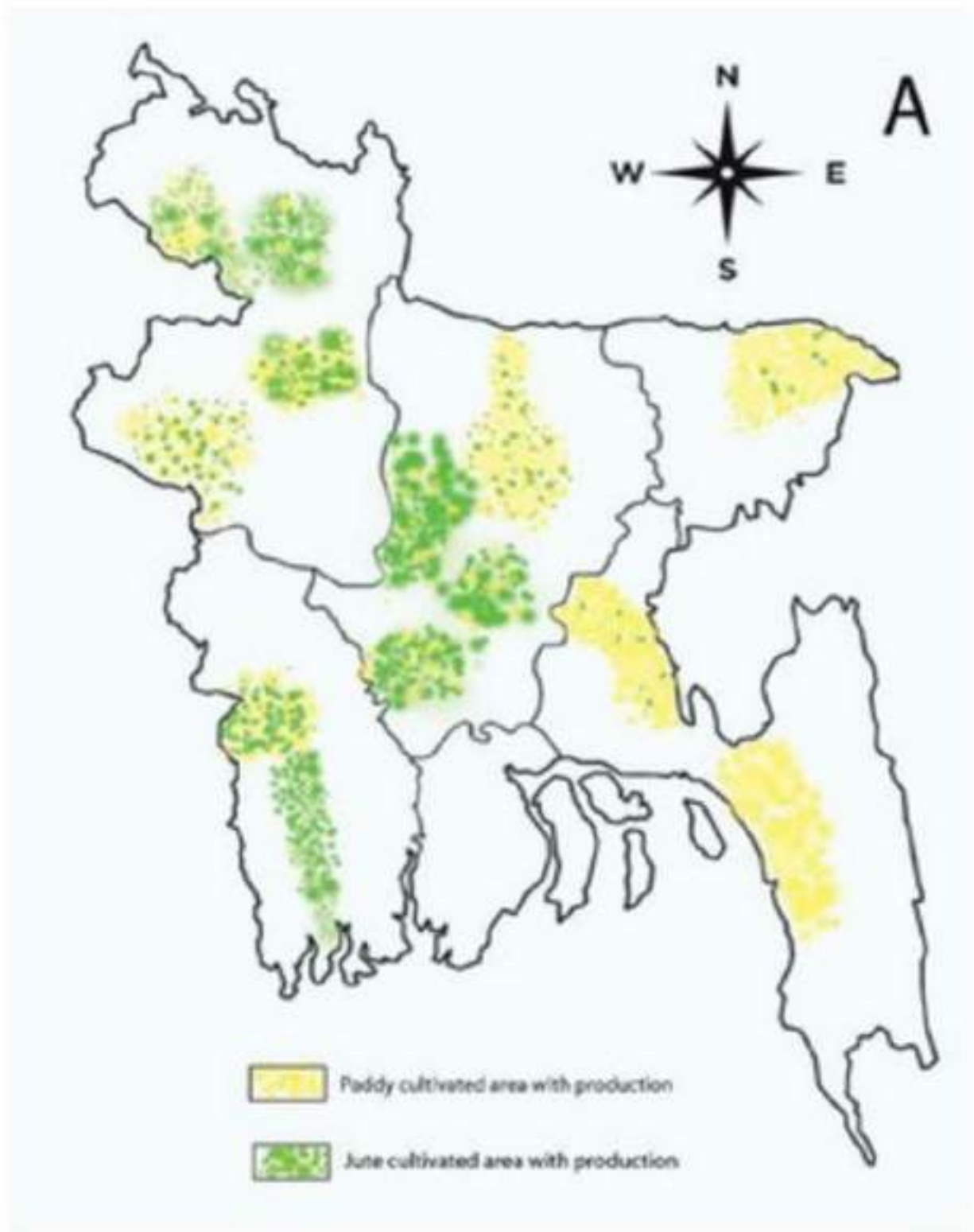
Cropland Mapping

The cropland mapping of Bangladesh is designed based on 2 important models. At first, diagrams have been made on each year's crop production data in each district. With the help of the diagram, the map design was easily found.



Again using the key technique of the Multiple Linear Regression model has been used to make a complete cropland mapping from the obtained data. This model is applied to explain the correlation among the variables. The model shows how much the dependent variable changes for the independent variable.

Here rainfall, relative humidity, and temperature all are independent variables, and crop production is a dependent variable. By using the relationship between parameters and crop production, cropland mapping has been done. The value of R^2 is used to design the land mapping. Which is sowed the dimensions of the relationship between the variables.



Specific 13 regions' crop production, rainfall, temperature, and relative humidity have been analyzed by this land mapping. The above figure, i.e. (A, B, C, and D) shows the annual amount of crop production, rainfall, temperature, and humidity respectively in the different areas in Bangladesh.

In Map A, the cultivated area and production amount of paddy and jute obtained in 13 designated regions are shown. The yellow colour indicates the cultivated area and production of paddy. On the other hand, the green color indicates the cultivated area and the production of jute. The map shows that Chittagong, Comilla, Mymensingh, and Sylhet regions have the highest cultivated area and production of paddy, but these regions have the lowest cultivated area and production of jute. Although paddy is cultivated jointly with jute in Dhaka, Faridpur, Khulna, Tangail, and Rangpur regions, the cultivated area and production of paddy are comparatively low. In addition, Dhaka, Faridpur, Khulna, Tangail, and Rangpur regions have the highest cultivated area and production of jute. Chittagong, Comilla, Mymensingh, and Sylhet regions have the lowest cultivated area and production of jute. Cultivated areas and production of paddy and jute in the Rajshahi, Bogra, Dinajpur, and Jessore regions are almost equal. The map shows that the Jessore region has a more cultivated area and production of jute than the Rajshahi, Dinajpur and the Bogra region. Conversely, the cultivated area and production of paddy in the Rajshahi region are more than in the Jessore region.

In Map B, the annual total rainfall of different regions is shown. The vivid cyan colour indicates outside of the study area. The colours: yellow, bright red, red, light green, and dark green, show the amount of rainfall in different ranges (<900 mm), (901-1000 mm), (1001-1200 mm), (1201-1500 mm), (> 1501 mm) respectively. The rainfall in Chittagong and Sylhet is more than 1501 mm which indicates the highest rainfall. Precipitation in Dhaka, Mymensingh, Comilla, and Rangpur is 1201-1500 mm. The amount of rainfall in Faridpur, Tangail, and Dinajpur is 1001-1200 mm. The rainfall in Khulna, Jessore, and Bogra is 901-1000 mm. In Faridpur, Tangail, and Dinajpur

occurs less rainfall than in Dhaka, Mymensingh, Comilla, and Rangpur. On the other hand, Faridpur, Tangail, and Dinajpur obtained more rainfall than Khulna, Jessore, and the Bogra regions. The Rajshahi region obtained less than 900 mm of rainfall, which is the lowest rainfall in the country.

In Map C, the average temperature of different regions is indicated. Yellow, vivid pink, and red indicate the amount of temperature in different ranges (<29 ° C), (29-30 ° C), and (> 30 ° C), respectively. The Rangpur region recorded the lowest average temperature in Bangladesh which is below 29°C. The average temperature in Chittagong, Comilla, Faridpur, Tangail, Mymensingh, Sylhet, and Dinajpur is 29-30°C. The average temperature in Dhaka, Khulna, Jessore, Rajshahi, and Bogra is above 30°C. In other words, the highest temperature of the country is recorded in these regions. The average temperature in Chittagong, Comilla, Faridpur, Tangail, Mymensingh, Sylhet, and Dinajpur is lower than in Dhaka, Khulna, Jessore, Rajshahi, and the Bogra regions.

In Map D, the amount of relative humidity of different regions is indicated. The bright green, vivid purple, and bright orange colours show the amount of humidity in different ranges (71-75%), (76-80%), and (> 80%) respectively. The humidity of Chittagong and Comilla is more than 80%, which means that the highest humidity of Bangladesh is recorded in these two regions. Humidity varies from 76% to 80% in Dhaka, Faridpur, Khulna, Jessore, Tangail, Mymensingh, Sylhet, Bogra, and the Rangpur regions. The humidity of these regions indicates that humidity is in the range of 76-80% in most parts of the country. The humidity of Rajshahi and Dinajpur is 71-745%. That means the lowest humidity in the country is observed in these two regions.

Results and Discussion

This section implies that the impact on crop production (Jute, Paddy) which is dependent on the rainfall, humidity, temperature.

Secondly, we examine the dependency and independence variable for impact on Agri production and forecasting in the next years. Table 1, is a sample of the random pickup year report.

Year	Jute Production (Avg)	Paddy Production (Avg)	Rainfall (Avg)	Temperature (Avg)	Humidity (Avg)	R ² Value	Climate Model	P. Variation	Relationship
2001	16.3	25.96	1331	33°C	74.8	0.59	Good	Yes	Strong
2002	15.26	40.56	1409	34°C	73.6	0.67	Good	Yes	Strong
2003	10.26	21.6	1705	33°C	73.6	0.40	Moderate	No	Moderate
2004	14.25	30.25	1209	30°C	73.69	.60	Good	Yes	Strong
2005	18.37	29.36	1560	33°C	71.02	0.56	Good	Yes	Strong
2006	7.26	20.36	1370	34°C	69.41	0.63	Good	Yes	Strong
2007	10.33	23.58	1409	33°C	66.9	0.76	High	Yes	Strong
2008	11.09	29.25	1705	34°C	86.25	0.66	Moderate	Yes	Moderate
2009	9.5	29.69	2275	34°C	90.25	0.39	Good	No	Moderate
2010	17.09	38.25	1702	34°C	85.56	0.58	Good	Yes	Strong
2011	10.26	21.6	1705	33°C	73.6	0.40	Moderate	No	Moderate

Table 1. Randomly Pickup relation and model accuracy

From the table, after the data analysis, we can see some different results that affect the production system.

As expected, extreme rainfall and high temperature strongly affect agricultural productivity. An untactful environmental change on parameters (Rainfall, Humidity and Temperature) reduces agricultural productivity by 32-38%. Where the co-efficient, Correlation(R^2) is good or strong that year production increases but if any parameter is not acting suitable or friendly the production is decreased as well. P. Variation is indicative of all parameters like rainfall, relative humidity and temperature relation based on an unsupervised clustering algorithm.

According to Agro scientific report, for the best production (Jute) and cultivation need Temperature, Humidity and Rainfall (18-35°C, Humidity above 80% and 1000-1500mm). Because of the smooth processing and data analysis in the future production forecasting system, we combined a supervised and unsupervised bot method. We applied more regression and clustering algorithms. In Table 4, shows the model accuracy for the forecasting system. After analyzing and discussing all the data, we can see that some elements of our environment are closely associated with the productivity of the crop. If any of these elements are affected, the system of production can undergo major changes.

These excessive rains and droughts have a big impact, while excessive humidity is responsible for this rain control. In this study, multivariate algorithms and methods create a hypothesis of the production system that can change our agriculture crop production system. We can easily find next year's production system if we use this model. If we take some necessary steps about these parameters we can easily change our production system.

Predication, gives an idea of which crop will be better in a specific weather combination. This results in no loss of money by cultivating the wrong crop. This will strengthen the economy of Bangladesh. Wrong crop cultivation will prevent the wastage of money. As a result of the cropland mapping, farmers will be able to know which crops are grown and yielded the most in their area. They will be motivated to cultivate that crop.

Algorithm	Clustering	Regression	Model Accuracy	Remark
Supervised	-	MLR	0.89%	High
Unsupervised	K-Means	-	0.91%	High
Unsupervised	Hidden Markov	-	0.68%	Moderate
Supervised	-	Decision Tree	0.79%	Moderate
Supervised	-	LR	0.68%	Moderate

Table: Algorithms model accuracy and remark

Conclusion

Since man has no control over nature, he has to work in agriculture in harmony with nature. Improvements in this agriculture field can be achieved only if changes in crop production can be brought about in conjunction with natural climate change. All types of crops don't grow well in all environments, so it is impossible to get good yields every time. The goal of this paper is to improve the living standards of farmers by solving all these problems. This paper tries to explain the relationship between rainfall, temperature, and humidity with jute and paddy production. We applied two methods (Regression analysis and K-Means Clustering) to measure the depth of these relationships using its dataset which comes from the Bangladesh Bureau of Statistics (BBS) and The Data World. From the first data obtained, rainfall, temperature, and humidity of each month have been.

analyzed separately. Secondly, how much land and how much jute and paddy is cultivated in different parts of the country have been collected. Thirdly, a final result brings out obtained by analyzing all the data. By analyzing those data Changes in crop cultivation are observed in a given area over the last 46 years. The results are shown in the precipitation, temperature, and humidity review of crop productivity in a certain field. For example, rainfall is good for jute production, but due to excess rainfall, jute production in Sylhet is not much. A cropland mapping of Bangladesh has been made through the collection of data analysis. Through which a person can easily understand in which region the selected crop grows well and will get a detailed idea about that. A prediction has been given as to which weather combination will give a better yield in the future. Through this paper, a farmer in a village will be able to select the right crop for his cultivation and have an idea about the yield of that crop. These results will have a meaningful impression on Bangladesh's agricultural infrastructure and development policies.

To Read The Full Article:

I. J. Engineering and Manufacturing, 2021, 5, 25-40

Published Online October 2021 in MECS (<http://www.mecs-press.org/>)

DOI: 10.5815/ijem.2021.05.03

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International Association of Students in Agricultural and Related Sciences

Exchange Program

IAAS Bangladesh presents

EXCHANGE WEEK 2022

(28.05.22-03.06.22)

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International Association of Students in Agricultural and Related Sciences

Exchange Program

EXCHANGE WEEK 2022

DAY 1: 28 May, 2022

WELCOME SPEECH
Festus Septian Yosafat
President of IAAS World

INTRODUCTION TO EXCHANGE PROGRAM
SPEAKER
Andrea Calderon
VPE of IAAS World

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EXCHANGE WEEK 2022

DAY 2: 29 May, 2022

Knowing Exchange opportunities within Asia & around the world
SPEAKER
Bimal Koirala
RExCo of IAAS Asia Pacific

Why should you take part for internship in Bangladesh?
SPEAKER
Md. Atique Ashab
NExCo IAAS Bangladesh

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EXCHANGE WEEK 2022

DAY 3: 30 May, 2022

SHARING KNOWLEDGE ON EXPRO WITH LEXCOS & LDs.

SPEAKER
Md. Atique Ashab
NExCo IAAS Bangladesh

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EXCHANGE WEEK 2022

DAY 4: 2 June, 2022

SOFT SKILL TRAINING SESSION ON "LEADERSHIP STYLES"

SPEAKER
Md. Tangimul Islam
Former National Director
IAAS Bangladesh 2019-2020

SPEAKER
Abdur Rahman
Former VP of Exchange
IAAS Bangladesh 2019-2020

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Programme Schedule

Day 1: 28 May, 2022
Welcome speech:
Festus Septian Yosafat
President, IAAS World
Introduction to Exchange program
Speaker: Andrea Calderon
VPE, IAAS

Day 2: 29 May, 2022
Knowing Exchange opportunities within Asia & around the world
Speaker: Bimal Koirala
RExCo, IAAS Asia Pacific
Why should you take part for internship in Bangladesh?
Speaker: Md. Atique Ashab
NExCo, IAAS Bangladesh

Day 3: 30 May, 2022
Sharing knowledge on ExPre with LEXCOS & LDs.
Speaker: Md. Atique Ashab
NExCo, IAAS Bangladesh.

DAY 4: 2 June, 2022
Soft skill training session on "Leadership Styles"
Trainers:
Md. Tangimul Islam
Former National Director
IAAS Bangladesh
Abdur Rahman
Former Vice President of Exchange
IAAS Bangladesh

DAY 5: 3 June, 2022
Cultural Exchange

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FLOATING AGRICULTURE: ADAPTING WITH CLIMATE CHANGE



Md. Arifur Rahaman
Faculty of Agriculture
Patuakhali Science and Technology University

‘To plant a garden is to believe in tomorrow’
~Audrey Hepburn~

One of the major effects of climate change is losing cultivable lands due to rise of water & sea-levels, specially in the low-lying countries like Bangladesh. Besides, excessive rainfall & floods often submerge the lands. By 2050, with a projected 50 cm rise in sea level, Bangladesh may lose approximately 11% of its land, affecting an estimated 15 million people living in its low-lying coastal region.[1]



SO, HOW WILL THEY SURVIVE & ADOPT AMONG THIS WATER AND FACE THE SITUATION?

To face the challenge, the local's of those area turned towards an alternate practice that represents a traditional/indigenous agriculture system for the waterlogged or submerged area in Bangladesh.[2] Let's get introduced to this innovative method of cultivation.

HAVE YOU EVER HEARD OF CULTIVATING CROPS, VEGETABLES & FRUITS ON STANDING WATER?

WHICH IS ALSO IN A TOTALLY ORGANIC & ECO-FRIENDLY WAY?

Well, it's not any complex research product or superior technology. It is Floating Agriculture, an innovative method of cultivation in Bangladesh, which is being used for utilizing the low lying lands that are waterlogged for a long period of time throughout the year.[3] In this method, rafts are made by gathering a large number of invasive weeds (like: water hyacinth), duckweed, straw or other residues and then, they are given the shape of floating beds by beating. During the monsoon, water submerges the land and the raft starts floating due to the buoyancy nature of the weeds. Direct seeds or transplanted seedlings are then planted in those organic beds. Farmers grow various vegetables, fruits & spices like brinjal, chili, cucumber, bitter gourd, squash, amaranths, leafy vegetables, okra, lemon, ginger, turmeric and many others. Sometimes, the seedlings of rice, paddy are also raised on those floating garden beds. During the monsoon, farmers use boats to surf through the gardens and look after their crops.





The lands stays under water for 6/7 months in a year and those rafts also lasts throughout this period. After the end of autumn, the water level goes down and so the beds, then they are broken up and mixed with soil; leaving the land fertile for growing winter crops.[4] As the rafts/beds were made up of weeds and other plant materials, they easily degrade in the soil increasing the fertility and causing no harm to the nature or biodiversity.

First of all, this unique system ensures food security by producing a huge amount of food for the nation. Secondly, It provides livelihood security to all the farmers of low-lying & flood-prone area for at least 6 months in a year.

Moreover, it also empowers the women. They play a big role in floating gardens by working with men throughout this months. Both men & women work together from making the rafts to getting the harvest done.[4] Studies

shows that, the floating agricultural gardens has more higher production than the land-based gardens. The productivity of floating vegetable cultivation is estimated ten times higher than on a similar sized land-based cultivation.[2]



The cost for production is also very low and that makes this system more realistic for farmers. Pro-

duction cost of this system estimated to be 30-50% lower compared to traditional land-based system.[5] Besides, because of being

planted in organic debris, they almost grows without any fertilizer and the infestation of insects is also very less as they floats on water. Furthermore, the production gets a special market value from the buyers because of totally organic & safe cultivation.

As we cannot change what is happening, we have to find innovative ways to get adapted & live with the nature. From this point of view -

Floating Agriculture is obviously a great step. It proved itself as a sustainable solution for climate change. It stood as the buoyancy of the submerging farmers of the low-lying lands in Bangladesh.



Besides, it maintains the agricultural & aquatic biodiversity, controls invasive weeds, serves the eco-system. And, all the raw materials used in this cultivation were from natural sources & degraded in the nature after a period of time, causing no harms. So, based on its contributions to nature, biodiversity, and human society by tackling societal challenges, Floating Agriculture is indeed a nature-based solution.[6] It is tackling the nature with nature!



Floating Agriculture of Bangladesh has already become a climate celebrity.[7] It has earned recognitions from **FAO, UNFCCC, IUCN** and many other organizations around the world. The UN's **Food and Agricultural Organization(FAO)** declared Bangladesh's floating gardens to be a Globally Important Agricultural Heritage System in December, 2015.[4] In Bangladesh, the government has taken it under good consideration. They had launched many projects to spread this method all over the country. Several international & national NGO's like **FAO, IPCC, IUCN, PKSF, BRAC**, Care Bangladesh etc. are also working inside & outside Bangladesh to spread this eco-friendly agricultural system. Outside Bangladesh, this soil-free method is also introduced in Dal Lake in Kashmir and Inle Lake in Myanmar, where people have adapted to living on the water.[4] It is high time for other affected countries like Bangladesh to start practicing Floating Agriculture and other adaptive measures to face climate change.

References:

1. Climate Displacement in Bangladesh. (<https://ejfoundation.org/reports/climate-displacement-in-bangladesh>)
2. Floating Garden Agricultural Practices in Bangladesh. (<http://www.fao.org/3/a-bp777e.pdf>)
3. Scope and specialty of floating agriculture in Bangladesh. (<https://dailyasianage.com/news/195656/scope-and-specialty-of-floating-agriculture-in-bangladesh>)
4. Kalpana Sunder, The remarkable floating gardens of Bangladesh. Future Planet, BBC. 11th September 2020. (<https://www.bbc.com/future/article/20200910-the-remarkable-floating-gardens-of-bangladesh>)
5. Proposal for GIAHS: Floating Agriculture practices in Bangladesh. Ministry Of Agriculture, People's Republic of Bangladesh.
6. Haseeb Md Irfanullah, Is floating agriculture a nature-based solution? The Daily Star; Thu Feb 18, 2021 12:00 AM. (<https://www.thedailystar.net/opinion/news/floating-agriculture-nature-based-solution-2046729>)
7. Irfanullah, Haseeb. (2018). Floating Gardening: Bangladesh Story. 10.13140/RG.2.2.22227.43040. (https://www.researchgate.net/publication/327890574_Floating_Gardening_Bangladesh_Story)

BOK CHOY

A New Source of Healthy Food

Bok choy, Pak choi, or pok choi (*Brassica rapa* subsp. *Chinensis*) is a vegetable of the Cruciferae family and a member of the genus *Brassica* which means a vegetable like broccoli, cauliflower, cabbage, etc. It is a subspecies of *Brassica rapa* and it is *Chinensis*, which is closely associated with broccoli, napa cabbage, and turnips.



The main branch of the Bok choy plant is the same as the mustard plant, the leaves look like celery, and all are associated with the bulbous middle stems. The stems are either white or light green and the leaves are dark green in the marginal region.



Varieties:

There are many varieties of Bok choy, all of them 2 varieties used most: Shanghai and regular Bok choy. Shanghai Bok choy leaves are smoother and oval-shaped on the margin with light green stalks, on the other hand, regular Bok choy has white stalks along with darker and crinkly leaves.

What does it tastes like?

Bok choy is like other cabbages which means crispy and crunchy texture, slightly bitter with mineral flavor. Also, a somewhat garlicky flavor found in Bok choy may result from minerals.

Nutritional Value:

The nutritional content of Bok choy, the raw vegetable is 95% water, 2% carbohydrates, 1% protein, and less than 1% fat. In a 100-gram (3+1/2-ounce) reference serving, raw Bok choy provides 54 kilojoules (13 food calories) of food energy and is a rich source



(20% or more of the Daily Value, DV) of vitamin A (30% DV), vitamin C (54% DV) and vitamin K (44% DV), while providing folate, vitamin B6 and calcium in moderate amounts (10–17% DV).

Toxic effects:

Bok choy contains glucosinolates. These compounds have been reported to prevent cancer[citation needed] in small doses, but, like many substances, can be toxic to humans in large doses, particularly to people who are already seriously ill. In 2009, an elderly diabetic woman who had been consuming 1 to 1.5 kilograms (2 lb. 3 oz to 3 lb. 5 oz) of raw Bok choy per day in an attempt to treat her diabetes developed hypothyroidism for reasons relating to her diabetes,[citation needed] resulting in myxedema coma. According to the case study published by her treating physicians, raw Bok choy releases an enzyme that can inhibit the uptake of iodine when eaten in large amounts over extended periods.

How to cook Bok choy?

There are many ways of cooking Bok choy, the Bok choy is mostly consumed by stir fry in a hot pan with a small amount of oil for a few minutes. The leafy portion cooks faster than the stalks.



Braising and roasting are other ways of cooking Bok choy. Braising means cooking Bok choy in a flavorful liquid, or added to a braised meat, as the long, slow, moist heat helps to tenderize the crunchy stalks.



Roasting is yet another popular cooking method. You can roast either whole or chopped stalks, or halve the entire Bok choy and roast it that way.

Storage:



Like most vegetables, Bok choy should be prepared and eaten as soon as possible after purchasing, at its most fresh and crisp. We can store Bok choy in the drawer of the refrigerator, loosely wrapped in plastic, for a few days. After that, the leaves may start to wilt and the stalks lose their crunch. If it was directly stored up from the field as fresh, we can keep it for up

Self-experience:

In the winter of November of 2021 in the university dormitory corridor, me and one of my friends cultivated a few Bok choy plants in a 12x9 inch square area containing a plastic pot. The potting soil contains soil, sand, small stone, cow dung, etc. We spread the seed all over the pot, and after a few days nearly all the seeds become germinated and seedlings come out. After a few days of seedling germination, we thin the pot and let the few seedlings into the pot, and give them space to grow up.



After 2 months, without any treatment just by using only watering our Bok choy plant become an adult for cooking. We harvest most of the plants and few are left for seed production.



We cook the Bok choy as patty fried in deep soybean oil. The vegetable tastes like garlicky flavor and a sharp flavor like ginger. Overall, it tastes good.

After producing seeds we harvest the seeds and store the seeds in a plastic bag covered in aluminum foil to check the 2nd generation of the plants.

References:

1. <https://www.diversivore.com/ingredient-pages/bok-choy/#:~:text=are%20commonly%20used.,Varieties,marketed%20using%20size%2Dspecific%20names.>
2. https://en.wikipedia.org/wiki/Bok_choy



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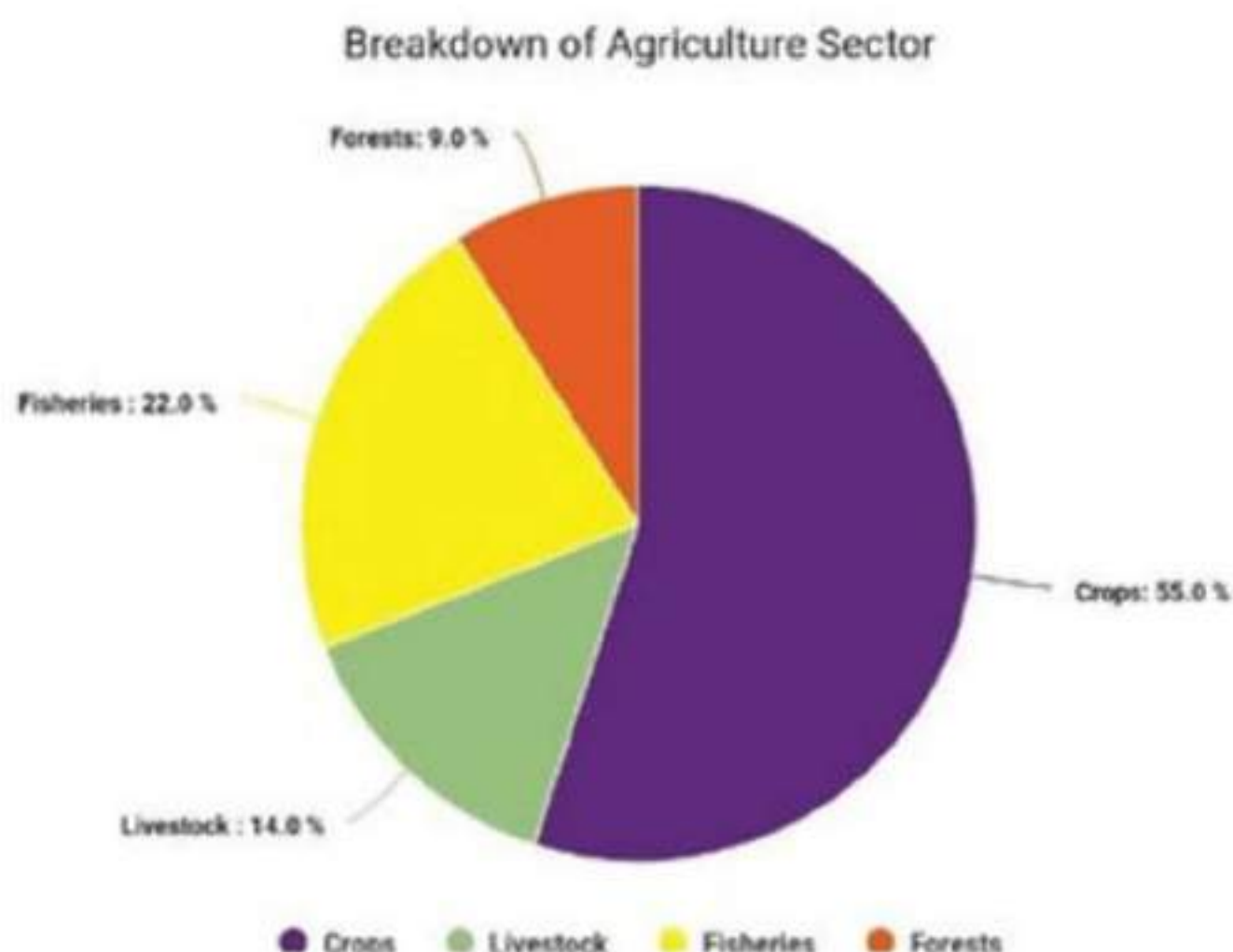
INCLINATION OF OUR AGRICULTURE - HOW COVID-19 SHAPES AGRICULTURAL SECTORS OF BANGLADESH

Agriculture is the largest employment sector in Bangladesh. As of 2018, it employs 47% of the total labor forces are employed in agriculture & nearly 18% of the country's GDP comes from this. Agriculture has an overwhelming influence on socioeconomic development objectives like employment generation, poverty alleviation, human resources development and food & nutrition security that sustain other economic activities (Tchuda Na Blaga). The COVID-19 pandemic is the greatest global humanitarian challenge the world has faced since World War II (WHO). Safety measures have added some new challenges to our agriculture's recurring vulnerabilities and brought ample suggestions for sustenance of it. [1]

Findings from secondary data show that the protective measures resulted in a significant adverse impact on agricultural & agro-business activities, Financial Institutions and NGO or Government services.

The agriculture faced large-scale disruption which had a serious detrimental effect on farming, horticulture, dairy, poultry, NFS and various other allied sectors of the economy (FAO). During pandemic farmers found it difficult to cope with the unexpected challenges. Overall, 88% of all farmers reported problems they faced, which resulted in economic losses. The main causes are not getting fair prices (66%), limited operation of markets (52%), higher prices of inputs (45%) and unavailability of labor (28%). [2]

Numerous concerns associated with COVID-19 consequences were identified including loss of labor mobility, rising labor costs, restricted transportation, loss of food security and dietary diversity, decreased incomes, and increased consumer uncertainty. [3] Triennial review of Instability of agricultural production (score) increased from 3.09 in 2018 to 3.1 in 2021. [4]



Breakdown of agricultural sectors in Bangladesh (Source: Bangladesh Bureau of Statistics)

How COVID-19 Affects Our Agriculture

Covid-19 protecting measures that have significantly affected agricultural production, food supply demand and local agro-businesses. [5] An upsurge in the purchase of essential goods, and food products were the main target for people that results in the price hikes and out of stock of essential food products [6]. Blockages to transport routes, transport restrictions including export bans and quarantine measures, shortages of labor, perishable nature of their products, and spikes in product's prices are obstructive for fresh food supply chains result in increased levels of food loss and waste (Food waste:68.3%) [7] which has led to the deterioration of farm products and unexpected price down at the producer level. The largest decline in income has seen in the agricultural by 16.5 per cent. [8] [9] This limited access to agricultural inputs, distress selling of machinery, lack of cash and increased debt reduce cultivated areas and agricultural activities resulting in falling yields, less crop diversity, and soil infertility in the long term. [10] Also various research projects of BARI could not be conducted because of covid-19. [11]



How we try to fight back

To cope with COVID-19 impacts, Government and NGOs have taken different initiatives and strategies. The Prime Minister of Bangladesh has approved 5,000 crore (at 4% interest) in soft loans to farmers, encouraged cultivation and to safeguard other value-chain actors so that no land and resources should be left unused in protecting agricultural production (Prothom Alo).



Government also facilitated machinery & helped mobilization of farm labour, launched online based marketing app "Sodai" for better yields and fair prices, developed community-based marketing, fostered public-private linkages to protect supply chains, improved information systems and asked NGO & microcredit managers to suspend loan collection during lockdown.[3]

What we have learned from the COVID-19 pandemic



Achieving higher growth in agricultural production has significantly influenced the growth of the economy (Oyakhilomen & Zibah, 2014)

Lorem ipsum dolor sit amet, Pandemic exposes the flawed system of government-society and changes the context of structural adjustment of economic attention and provides policymakers with valuable insight on the importance of agriculture.

Loss of arable land, population growth, climate changes, inadequate management, lack of quality seeds, and inadequate credit support to farmers, unfair price of produces, and insufficient investment in research have been the other challenges that hurt the agricultural crop production of Bangladesh over the years. [12]

All the four pillars (RMG industry, Remittance, Agriculture and NGOs) of the country's economy except agricultural production have been adversely affected and are reported to be under significant stress due to the COVID outbreak.

PPRC-BGID survey indicates an estimated 24.5 million people have become 'new poor' because of COVID-19. But economic recovery of the poor living in rural areas has been much faster than that of their urban counterparts. [13] While people lost their jobs due to COVID-19, the majority were able to be reemployed. [14] Many had to shift from services sectors to agricultural jobs & employment in the agricultural sector increased by 18.2 per cent on average. [15]

In the national budgets, subsidies (Agricultural subsidy- 19 billion BDT) [16] and incentives are offered to agriculture to boost production but only production based policies resulted in the vicious cycle of the economy. Fair price, socio-economical safety net, proper banking knowledge, sustainable supply chain, responsible consumption, uniform income distribution, global connectivity & digitalization of complete production & marketing system need sharp focus of the policymakers.

Strategies should be on focus

Steps should be taken to intensify production and coordinate efforts to ensure availability of inputs, extension support, less labor-intensive crop, access to cold storage, digitalization of rural sectors, farmer-friendly credit disbursement and middlemen free fully functioning value chain can rectify the falling prices. Budgetary allocations, the inclusion of farmers in social safety net programmes might contribute to the sustainable growth of the sector. The government should prioritize agricultural marketing to lead a comprehensive recovery.

Times of crisis is a great teacher as along with the inherent challenges it opens many new opportunities to start over in building a sustainable agricultural system. Online marketing, rooftop agriculture, youths' interest, public awareness and shock absorbability of this sector make it more reliable to achieve SDGs. We hope, the faults and lacking that have come up from this pandemic lead Bangladesh towards a new era of agriculture.

References:

1. Covid-19 and agriculture: A story of resilience, Financial Express
2. Vulnerabilities of Agricultural producers during COVID-19 pandemic, BRAC
3. Shoaib, J. U. M, & Arafat, M. F. (2020). IMPACTS OF COVID-19 ON AGRICULTURE IN BANGLADESH. Covid-19 - Dispatches from the Ground, WOCAT
4. CPD Working Paper -101
5. COVID-19 Impact of food and agriculture FAO
6. COVID-19 and food security in Bangladesh: A chance to look back at what is done and what can be done, Debashish Sarker Dev Khondokar H. Kabir (<https://doi.org/10.5304/jafscd.2020.094.008>)

7. Ananno, A.A., Masud, M.H., Chowdhury, S.A., Dabnichki, P., Ahmed, N., Arefin, A.M.E., 2020. Sustainable food waste management model for Bangladesh. *Sustain. Product. Consump.* 27, 35–51. (<https://doi.org/10.1016/j.spc.2020.10.022>)
8. Ranjan Roy, Mitigating Covid-19 impacts on food and agriculture, 2020 (Financial Express)
9. Effect of COVID-19 on the livestock sector in Bangladesh and recommendations Md. Sahidur Rahman, Goutam Chandra Das. (<https://doi.org/10.1016/j.jafr.2021.100128>)
10. Needs Assessment Working Group Bangladesh, 2020
11. BARRI annual report 2019-20
12. Mondal, M. H. (2010). Crop Agriculture of Bangladesh: Challenges and Opportunities. *Bangladesh Journal of Agricultural Research*, XXXV (2), 235-245. (doi:10.3329/bjar.v35i2.5886)
13. Agriculture proves its worth again Shamsul Huq Zahid | Thursday, 22 April 2021, Financial Express
14. Rahman, M., Khan, T.I., Kamal, M., Nawar, N., Alam, M., & Hossain. S. (2021) <https://cpd.org.bd/wp-content/uploads/2021/05/Presentation-on-Income-and-Employment-Situation-in-COVID-Times.pdf>
15. Employment & income generations should define- FE Covid-19 recovery
16. Fahmida Khatun, Syed Yusuf Saadat; Distribution of new additions to safety net budget in FY2020-21, based on the data from Ministry of Finance (MoF)



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POLYHOUSE FARMING



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Polyhouse means a tunnel made by polythene with the help of bamboo or iron metals or other sticks. It is basically a large framework of semi-hoops covered in polythene plastic. It is the special structure which is used for fruits and vegetables to protect them in adverse climatic condition. A polyhouse can also be called a plastic or polythene tunnel or greenhouse or polytunnel. The crops that are cultivated in the polyhouse is called poly-house farming. (*Growing a Vegetable Garden in a Polytunnel, 2022*)

Objectives -

- It is made to protect the young seedlings from adverse climatic condition such as light, rainfall.
- Polythene traps the sun energy creating an increase in temperature.
- It is also used in case of early planting. (*Polytunnel, 2021*)

Crops grown in poly-house -

Fruits - Papaya, Strawberry etc.

Vegetables - Cabbage, Bitter Gourd, Capsicum, Coriander, Onion, Spinach, Tomato

Flowers - Carnation, Gerbera, Marigold, Orchid and Rose. (*Toppo, 2021*)

Advantages -

- It retains additional heat to facilitate plant growth.
- Gives protection from cold or frost.
- Provides a warm place to garden in diverse weather.
- Protects plants from heavy rainfall.
- It can be used as seed production support.
- It can be used for raising seedlings. (*Femi, 2021*)



**“POLYHOUSE FARMING
is a more affordable
solution of Greenhouse farming
ensuring desired growth and
YIELD!!!”**

Disadvantages -

- High initial investment is required.
- Pest and disease problem can build up quickly in the enclosed space.
- Requires skilled person, technical knowledge for preparation.
- It may be time consuming.
- Management may be difficult to some extent. (*Polyhouse Farming, 2020*)

Site selection for poly-house construction -

- A minimum of 1000 square meters is required for one. The availability of a continuous source of

quality water in the area is essential to grow a commercially efficient polyhouse.

- Selected sites must be pollution free.

POLYHOUSE FARMING

3. The construction site should be higher than the surrounding land.
4. Polyhouse products need to have good road arrangements for transportation to nearby markets. (Polyhouse Farming, 2020)

Polyhouse Structure -

Typical Size:

Length: 3-20m but optimum 10m

Width: 2.3/3/4.2/5.5m

Materials Required: Wooden frame, Plastic film

Polyhouse Construction -

Use local fabricators and locally available ingredients. The polyhouse is basically a ware-house like structure. Roofs are usually arched to provide good ventilation. Use bamboo or galvanized steel support beams. For easy access, the polyhouse should have a door. The span can be on the roof of the entire structure and on both sides and the roof is covered with transparent polythene material film. Inside the structure are your rows of flower or vegetable beds. High tech polyhouse consists of temperature control, humidity control, sprinkler system, irrigation system. (Femi, 2021)

Maintenance of Polyhouse -

i. **Polyhouse Ventilation:** A thermometer should be used to check the temperature of the polytunnel. Doors, windows and vents should be kept open in the hotter weather to avoid interior over heating.

ii. **Polyhouse Irrigation:** Micro irrigation system such as fdripping system should be used to conserve the moisture. Mist sytem or irrigation would be used to control humidity and adjust inside temperature.

iii. **Pest and Disease Management:** Well venttilation and air flow restrict fungal growth. Practicing crop rotation to avoid soil getting tired, depletion of nutrient and vulnerable to disease and pests. Overcroding of plants should be avoided that would encourage disease development inside polytunnel.

iv. **Miscellanous:** Polytunnel should be washed inside and out anually, so maximum sunlight gets in. Holes should be covered with transparent repair tape before they get bigger. Polythene cover should be replaced after 3-5years. (Grrowing a Vegetable Garden in a Polytunnel, 2022)



References -

Femi. (2021). Poly House: How to construct polyhouse. <https://agricfarming.com/how-to-construct-poly-house/>

Growing a Vegetable Garden in a Polytunnel. (2022) <https://www.growingraw.com/growing-a-vegetable-garden-in-a-polytunnel.html>

Poluhouse Farming: High Tech Farming in India. Polyhouse Agriculture. Polyhouse Construction. (2020) <https://www.ugao.com/knowledge-centre/high-tech-farming-in-india-polyhouse-technology/>

Polytunnel. (2021). In Wikipedia. <https://en.wikipedia.org/wiki/polytunnel>

Toppo, A. (2021). What are the Benefits of Polyhouse Cultivation. <https://krishijagran.com/agripedia/what-are-the-benefits-of-polyhouse-cultivation/>

ALGAE

THE FOOD OF THE FUTURE



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The amount of agricultural land has been steadily decreasing as the world's population has grown over time. The greenhouse effect, on the other hand, has caused the sea level to rise. Food and fuel will be the world's greatest challenge. Year after year, various scientists have been looking for alternative food and fuel sources. The study of algae as a source of food and biofuel is not new. The research started in 1942. Microalgae are single-celled organisms that thrive in salty or clear water and store energy by converting sunlight into chemical energy. There are many different types of microalgae and aquatic plants found all over the world. Algae in water Bangladesh has around 300 species and kinds of freshwater algae reported. Freshwater blue greens, euglenoids, Volvocales, Chlorococcales, oedogoniales, Zygnematales, desmids, chaetophoralean algae, chralean members, and red algae have all been studied extensively. In addition, research on the freshwater diatoms Xanthophyceae, Chrysophyceae, and Chloromonadinae has been conducted. However, chlorella and spirulina are currently grown and also are being consumed all over the world. Spirulina, on the other hand, became a social media craze a few years ago. The 'Mermaid Smoothie' & 'Ocean Bowls' photos were shared by millions of people.

In the Yaletown Kitchen near Paddington & London, spirulina and chlorella are very significant ingredients in the process for cooking. Green Spirulina Paleo Cookies, Dairy-Free Ice Cream, Green Spirulina Energy Balls, and Blue Spirulina Cheesecake may all be found there.

ALGAE IS THE PERFECT FOOD PLANT. IT DOUBLES CELL MASS EVERY TWELVE HOURS, DEPENDING ON THE STRAIN.

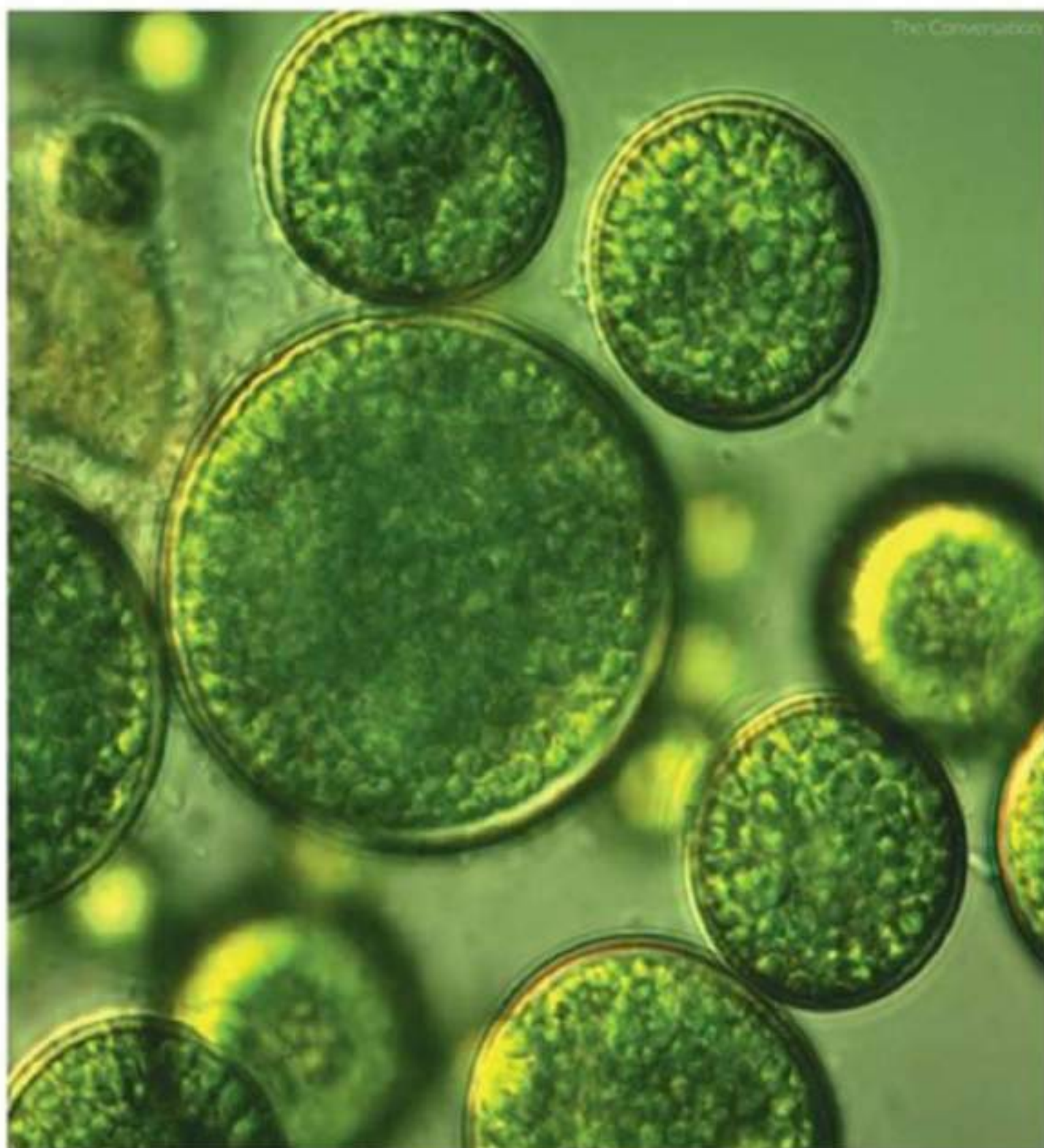
However, they are merely the suggestions. Ryanon Lambert, a dietitian, believes that "Protein makes up 55 to 60% of spirulina. Its amino acid composition is superior to that of plant-based diets." Omega-3 is found in aquatic plants. This is a lot more accessible source than fish. It contains vitamin B12, which is essential for our nervous system and energy metabolism. And Chlorella, on the other hand, is high in nutrients. Microalgae, according to Becker et al., are high in vitamins A, B1, B2, B6, B12, C, and E, as well as minerals including potassium, iron, magnesium, calcium and iodine.

Protein content varies greatly amongst algal types. The filamentous cyanobacterium *Arthrospira platensis* ("spirulina") and various commercial species of unicellular green alga *Chlorella* contain up to 70% dry weight protein; these microalgae also have an amino acid profile that compares favorably to egg, particularly in terms of containing all of the essential amino acids (EAA) that humans cannot synthesize and must obtain from foods.

ALGAE IS BEING UTILIZED AS A DIRECT SOURCE OF FOOD. IT IS RICH IN PROTEIN, CARBOHYDRATES, VIT A, VIT B, VIT C AND VIT E ALONG WITH VARIOUS MINERALS.

Outside of Europe and North America, spirulina was used to be harvested traditionally as a protein rich whole meal (Gantar and Svircev 2008). Several significant producers now have "GRAS" (Generally Recognized As Safe) classifications for domesticated spirulina and Chlorella.

New paths for increasing production must be explored as the population expands and agricultural land shrinks. Aquatic plants, like all other sources of protein, will require little agricultural land. "It merely came to our attention at the time." Anywhere there is water, sea, ponds, or lakes. These can be found in cities as well as ports. It may even be in space, and humans on long-term Mars expeditions could eat it. Pond algae can be tasty food, but ingenuity is working to solve various challenges so that the food is made from algae or aquatic plants, which are very beautiful in color and flavor. It's time to look at new food opportunities. In Bangladesh, algae are already being used for fish feeding. Bringing it into the human diet would be a huge accomplishment.



Reference:

Wells, Mark L et al. "Algae as nutritional and functional food sources: revisiting our understanding." *Journal of applied phycology* vol. 29,2(2017):949-982. doi:10.1007/s10811-016-0974-5

Gurney, Tom, and Owen Spendiff. "Algae Supplementation for Exercise Performance: Current Perspectives and Future Directions for Spirulina and Chlorella." *Frontiers in nutrition* vol. 9 865741. 7 Mar. 2022, doi:10.3389/f-nut.2022.865741

Udayan, Aswathy, et al. "Production of microalgae with high lipid content and their potential as sources of nutraceuticals." *Phytochemistry reviews: proceedings of the Phytochemical Society of Europe*, 1-28. 23 Jan. 2022, doi:10.1007/s11101-021-09784-y

Gantar M, Svircev Z. Microalgae and cyanobacteria: food for thought. *J Phycol.* 2008 ;44: 260 -268. DOI: 10.1111/j.1529-8817.2008 .00469.x.[PubMed] [CrossRef] [Google Scholar]

CULTURED MEAT

The Easiest Way to Eliminate Food Shortages in the World



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We all seem to know where the meat comes from, but if we say it is not from animals, then we would be surprised.

The human population has been exploding year after year and at the moment there are many small and big problems due to lack of resources to accommodate the growing population. In a world of 6.3 billion people, the food crisis will be more than double by 2050. Cultured meat, therefore, can alleviate the worries and conditions of food production by thinking of future generations.

Cultured meat is produced by cell culture in a lab, not in the traditional way of killing animals. The technology of producing meat in any shape or size according to the choice of the buyer without any harm to the animal is very good for us. But now the question is how is it possible?

Cultured meat is made by cell multiplication by painlessly collecting muscle cells from healthy animals. Scientists nurture cells by applying growth hormone to cultured media so that muscle tissue grows without any complications. It looks like a sack that is enclosed with a drawstring. The strands of the growing cells come together to form a simple sized hamburger-like structure.

Why Do We Need Cultured Meat In The Modern World?

Less Infection: Proponents of Cultured Meat say they are less likely to be infected by *E. Coli* bacteria (which are found in animals) & other kinds of contaminants you may find in a meat processing plant.

Fewer Antibiotics: Cattles are often given antibiotics to keep them healthy. This can later lead to antibiotic resistance, where the drugs do not work at all against the infection.

Less environmental impact: As the global demand for meat increases, more and more forests are being converted into farms and crop fields. Cultured Meat requires less land, less water and relatively less pollution.

Kindness to animals: Although cultured meat requires a small sample of tissue, it does not require the killing of any animal. The cells can be easily removed from living organisms without any pain.

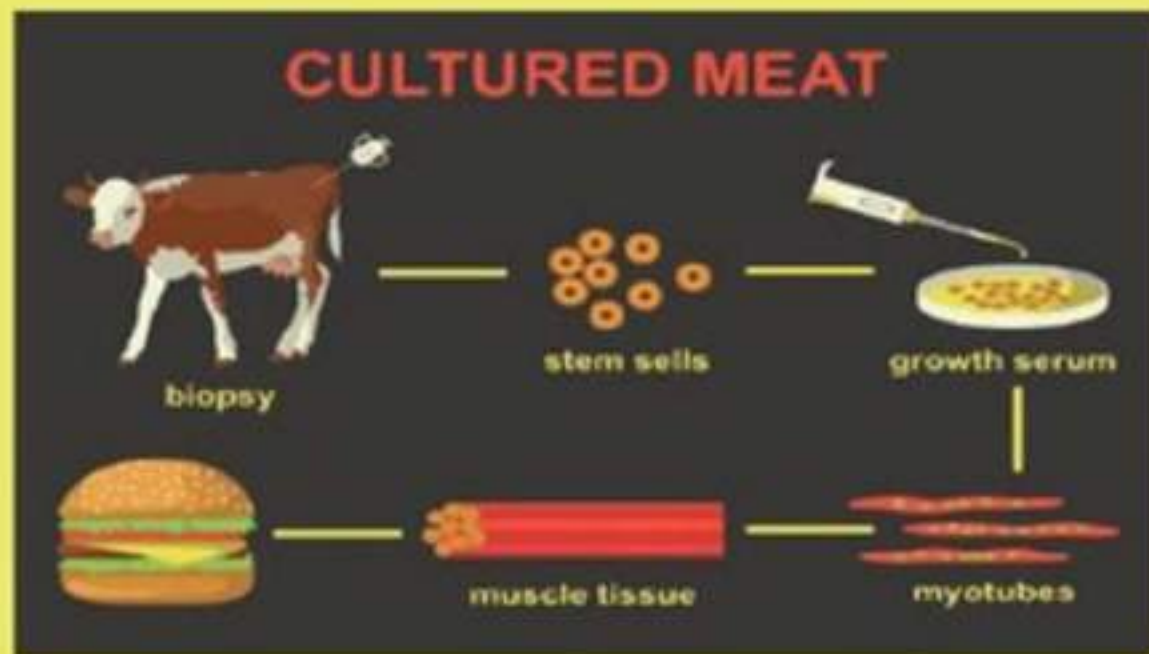
Also the threat of food chain being contaminated can be prevented in this manner as every single stage of meat production can be controlled.



Is Cultured Meat as Safe and Delicious as Animal Meat?

Cultured meat is much safer than the traditional meat since it needs fewer antibiotics & minimizes food-borne diseases. It seems there is no evidence of human concern in the short term, but the safety question remains for the long term. And according to Memphis Meat, the taste of cultured meat is not much different from the taste of the conventional meat. They commented that "the same great taste, good for the planet."

Cultured meat is the main driving force in meeting the food needs of the future. This newly invented product is getting more and more standardized and recognized by the people day by day, but there is still a long way to go to get acceptance from everyone. Of course, in order to pull this exploding population to the top, people will have to face cultured meat one day, whether it is today or tomorrow.



As the population arise, scarcity of protein worsens. Solution lies with the adaption of new food technology and culture technology for protein source

Reference(s):

<https://www.frontiersin.org/articles/10.3389/fnut.2020.00007/full>

<https://mycorena.com/myco-talks/what-lies-beyond-cultured-meat-the-delicacy-of-lab-grown-meat>

<https://sitn.hms.harvard.edu/flash/2022/meat-pie-in-the-sky-when-will-our-appetite-for-lab-grown-meat-be-satisfied/>

BIODEGRADABLE PLASTIC: AN UNPARALLELED WAY TOWARDS ENVIRONMENTAL SUSTAINABILITY

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Faculty of Agriculture

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The Mariana Trench is the world's deepest ocean trench. Only three people have ever reached the bottom of the trench, from the surface to 36,000 feet deep. But in 2018, it was discovered that a disposable plastic bag made of microplastic is in the deepest trench of the earth. Even the highest peaks in the most remote places of the world are not safe from plastic pollution.



Plastic, in any situation, is not naturally biodegradable. However, there is always an exception when it comes to **biodegradable plastic**. It is one of the greatest inventions that mankind has ever seen. It utilizes a process called biodegradation, which impedes a natural recycling system where microorganisms eat waste and convert it into a nutrient. Biodegradable plastics are those that can be broken down by living organisms. Most of the microbes in water release carbon dioxide and biomass by degrading it.

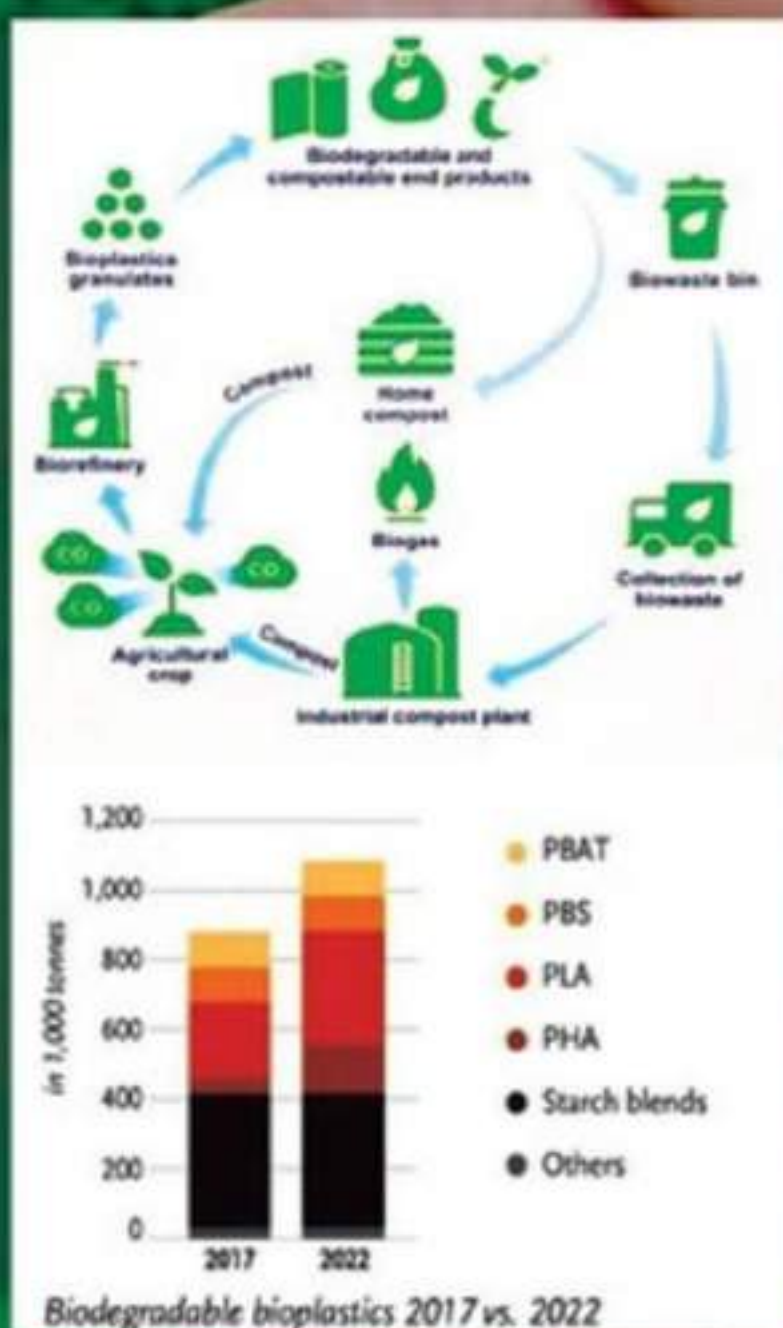
PROCEDURE OF BIOPLASTIC MAKING

The easiest way to create your biodegradable plastic bags is just to follow these steps:

- I. Take a container
- II. Add 1 tablespoon of **cornstarch**
- III. Add 4 tbsp. water, stirred in with cornstarch until it dissolves
- IV. Add 1 tablespoon of **glycerin**, and 1 tablespoon of **vinegar** and mix well
- V. With the mixture ready, heat over low heat while stirring
- VI. Remove the mass from the fire once it has thickened and become lump-free.
- VII. To dry the dough, place it on a non-stick surface or cling film.
- VIII. Once the dough is dry, all you have to do now is, shape it to make the bag – don't wait until it's completely cold because you won't be able to change its shape.
- IX. Allow 2-3 days for the bag to dry after it has been shaped.

This is how the biodegradable plastic bag manufacturing process works.

Some biodegradable plastics available on the market are starch-based, bacteria-soy-based plastics, cellulose-based plastics, ICS-based plastic, D-lignin, natural fibers plastics, etc. Reinforcement Biodegradable plastic can decompose in **one year**, which means it outperforms traditional plastics in terms of reducing waste sent to landfills or incinerators, requiring less energy to manufacture, and releasing



fewer harmful substances when decomposed. Biodegradable plastics are typically green bioplastics that emit significantly fewer greenhouse gases over their lifetime than conventional plastics. There is no net increase in carbon dioxide when they break down because the plants that bioplastics are made of have absorbed the same amount of carbon dioxide if they are grown.

Now the decision is yours whether you accept it or not?

Reference(s):

<https://www.explainthatstuff.com/bioplastics.html>

<https://connectusfund.org/7-advantages-and-disadvantages-of-biodegradable-plastics>

INGENIOUS HUNTING: AN AGRICULTURAL PHOTOGRAPHY EXHIBITION & COMPETITION AND GMO POSTER PRESENTATION COMPETITION

1. GMO Poster Presentation Competition



1st - K. M. Salim Andalib



2nd - Plabon Saha



3rd - S. M. Riaz-us Saleheen

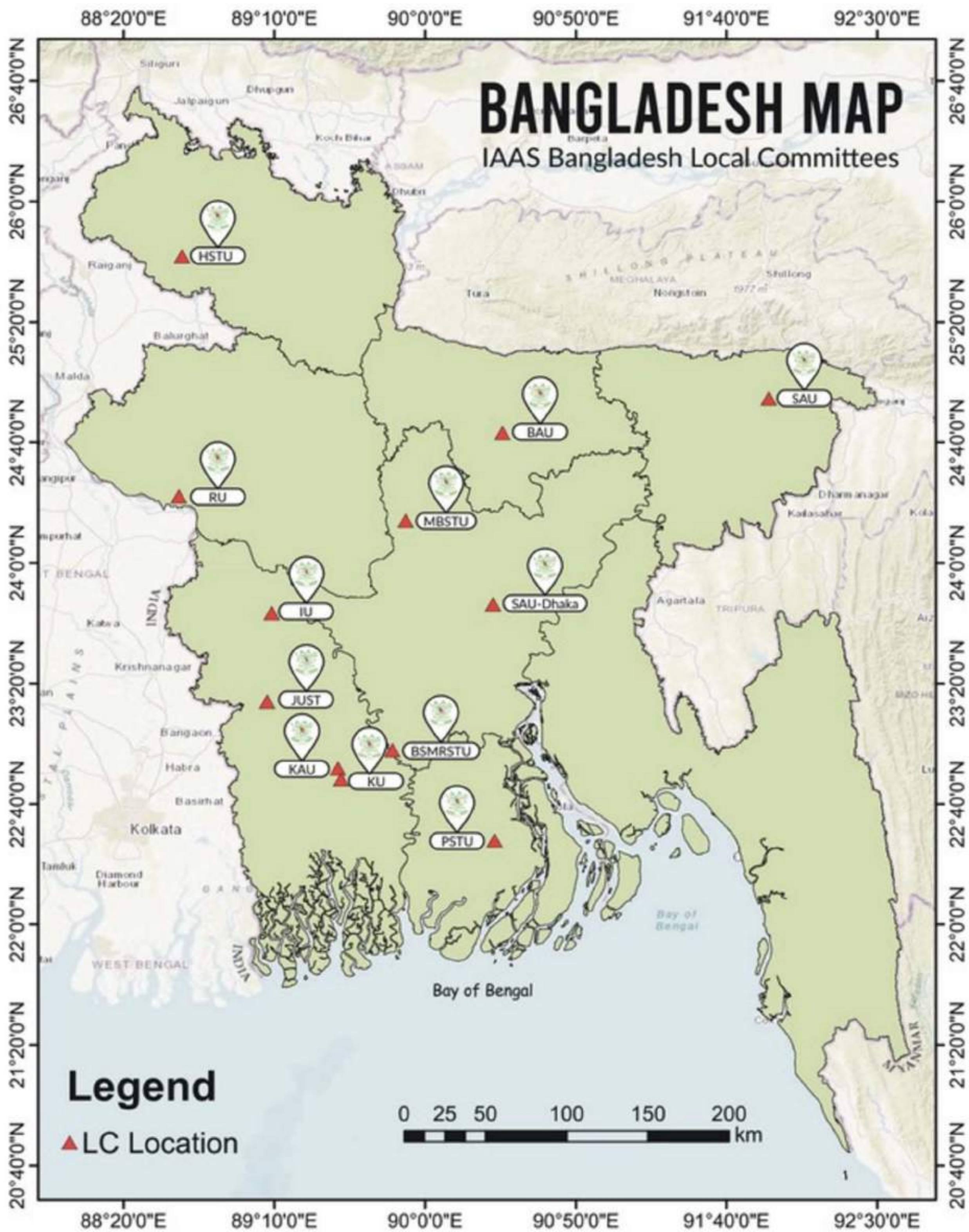
2. Agricultural Photography Exhibition and Competition

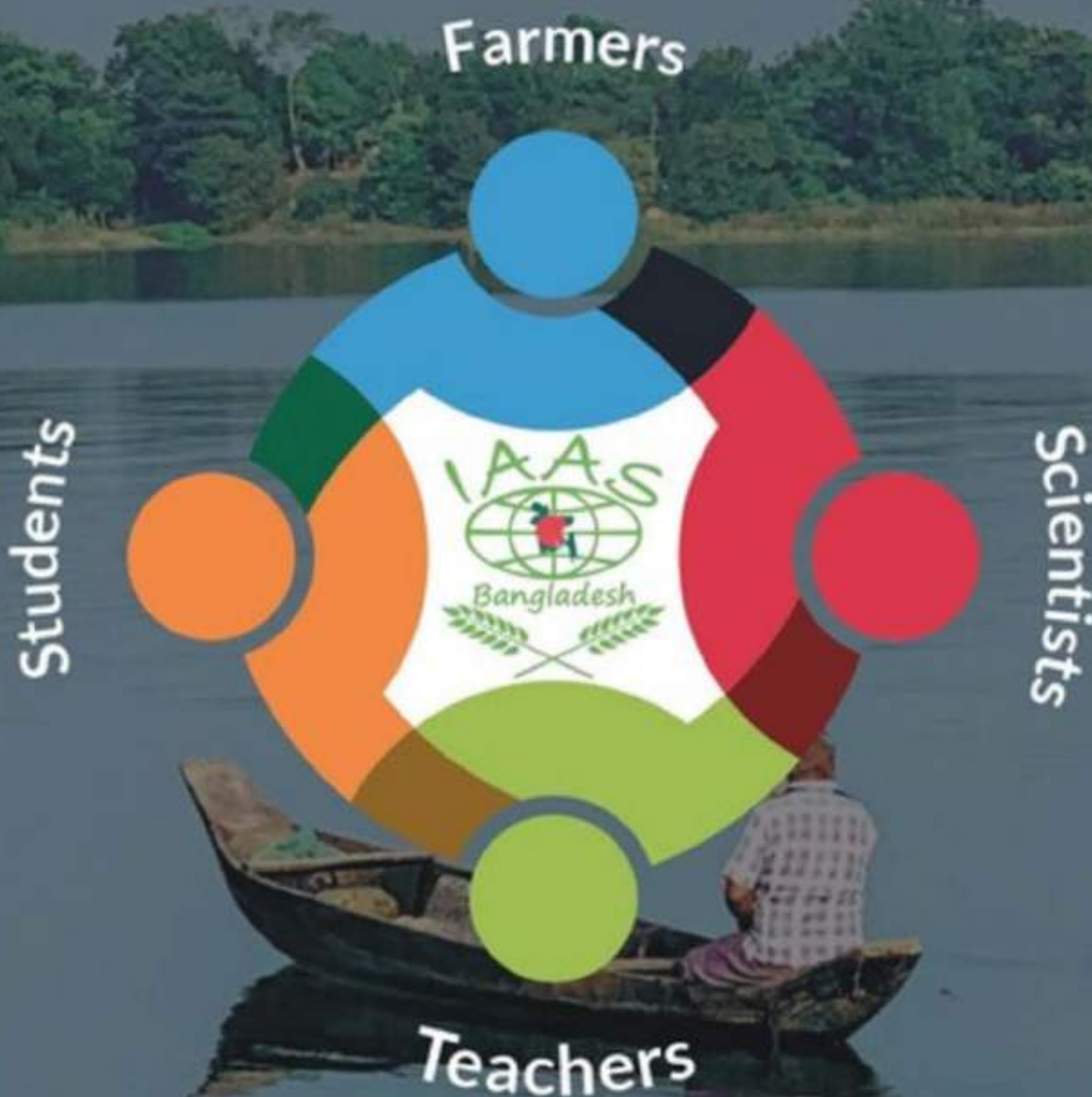


1st - Iftakharul Munna



2nd - Md. Mostafijur Rahman





IAAS BANGLADESH

IAAS Bangladesh is a National network of young, motivated people like students, farmers, teachers, and scientists who are interested in solving the issues that are affecting agriculture, society, and the world today and shaping it for a better tomorrow.