Best Practice 1

1. **Title of the Practice: Aquaculture Research & Training Unit**

2. **Objective of Aquaculture Research & Training Unit**

Our institute is located in the semi-urban area. Thus, the goal of our institute is to educate and train the surrounding rural, mostly first-generation learners as well as to serve the community for their welfare. Thus, the main objectives for establishing an Aquaculture Research and Training Unit within our institute campus are as follows:

Education and Research

This practice has been designed to promote or facilitate various types of research activities, related to aquatic ecology, aquatic toxicology, fish, biology, limnology, environmental pollution, aquatic microbiology, histology, sustainable development, chemical, biology, biochemical, interactions, etc.

Training Programme

Proper expertise and skills are required for any perfect education and research program. Launching some professional training programmes would help students, teachers as well and community people.

Entrepreneurship

Entrepreneurship would play a very crucial role in making our young generations financially self-sufficient with various new ideas, thoughts and expertise that could promote new businesses in rural and urban areas where there is a dearth of job opportunities. This aquatic research and training unit could be very helpful to our students and local community people in their journey of entrepreneurship.

3. **The Context: Establishment of Aquaculture Research & Training Unit**

The ‘Aquaculture Research & Training Unit’ was initially designed, developed and proposed by Department of Zoology in early 2022. Then, a formal proposal was carried forward from the Department of Zoology to the Governing Body of Gushkara Mahavidyalaya, for establishing an official aquaculture research and training unit under the Department of Zoology with the help of an existing water body within the campus. On 18.06.2022, the Governing Body of Gushkara Mahavidyalaya gladly approved this aquaculture research and training unit proposal and awarded a water body (including large pond wetland and marsh wetland) to the Department of Zoology for this purpose.

4. The Practice: Pisciculture

The pisciculture wetland is the largest part of the water body comprising nearly 500 m^2 located just in the backyard of our institution.

Pond preparation

We checked the character of the water body or wetland, their water level during various seasons, their aquatic animals, vegetation, and the ecosystem continuously from 2021. Pisciculture among all aquaculture would be the first choice and started following the institutional approval to utilize the water body scientifically and professionally for pisciculture from 2022 onwards. First of all different types of water, parameters like pH, salinity, order, colour, transparency, nitrate, phosphate, content, etc. have been measured through available standard protocols with the help of water testing instruments. Water has been also sent to the local water testing laboratory to re-check the physical parameters for proper aquaculture. Lime or calcium oxide (CaO) has been added adequately based on the estimated water for proper maintaining of pH for pisciculture.

Fish varieties

We have selected indigenous fish species like *Labeo rohita*, *Labeo bata*, *Labeo calbasu*, *Catla*, *Cirrhinus mrigala*, *Puntius ticto*, *Puntius sophore* etc available locally and exotic fish species like *Hypophthalmichthys molitrix*, *Ctenopharyngodon idella*, *Cyprinus carpio* etc to explore the potential of polyculture.



Variety of fish species used in polyculture.

Release of fingerling

Approximately 25 kgs of fingerling were released in the water body on 03.09.2022 and 05.09.2022.


Fingerlings of various fish species were released in the pond wetland.

Inspection and Sampling

All the released fishes have been carefully examined at regular intervals and closely monitored regarding their various bacterial, fungus, protozoan as well as other parasitic diseases.

Periodic inspection and sampling of fish in the pond wetland.

Feeding and rearing

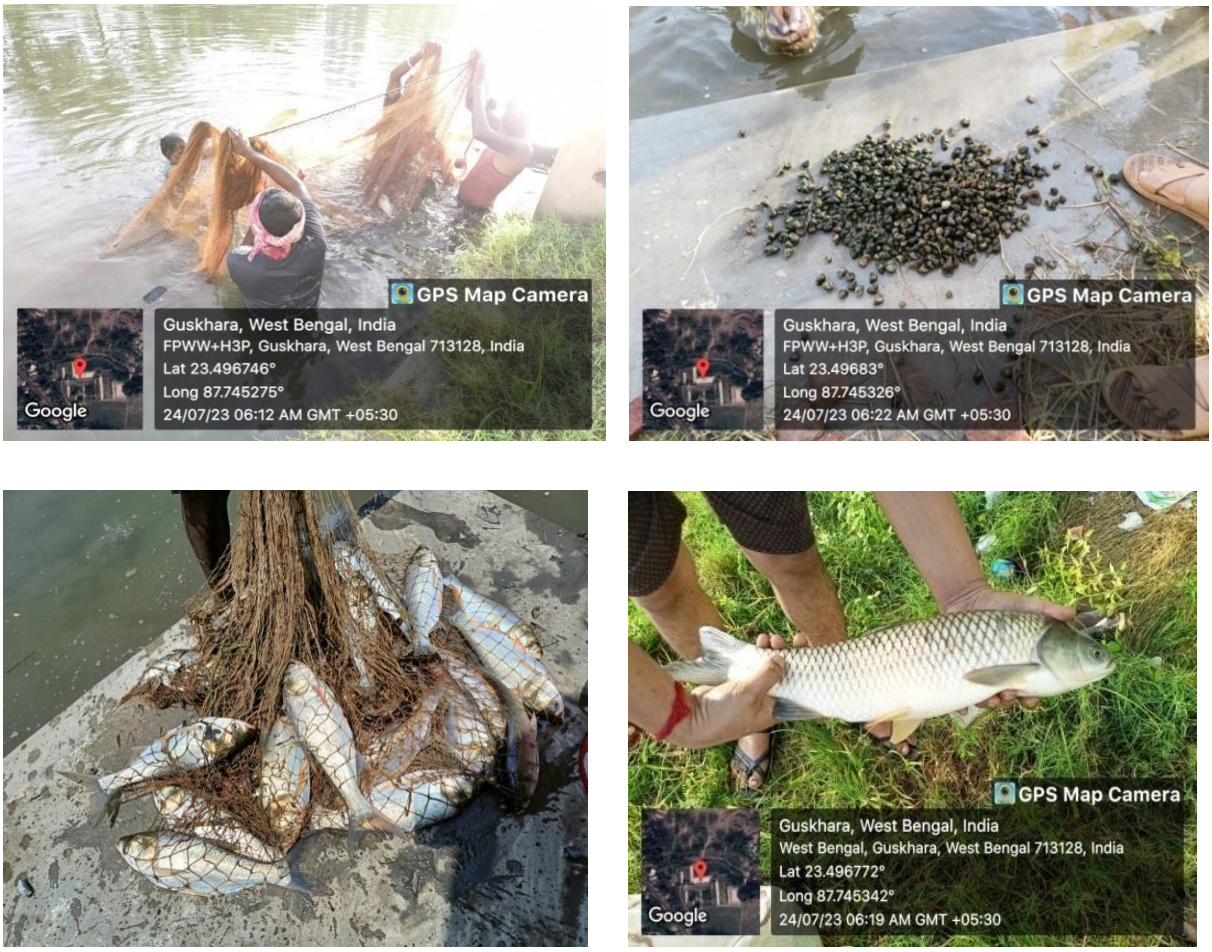
The water body is very rich in natural nutrients and vegetation as well as other food sources. There are green algae, some small water plants, and various zooplanktons that serve as a live food source for the fish. Supplementary food was also supplied to the water body at regular intervals. Mustard oil cake (bacteriologically safe) is one of the major agricultural byproducts that was supplied every alternate day to this water body. Fish meal and fish oil were also introduced to this water body once a week to supply essential amino acids and fatty acids. Our main objective is the feeding and development as well as rearing of the fishes in the utmost natural way. Use of any artificial hormones, medicines, or food supplements has been minimized.

Evidence of Success:

Capturing adult fishes and other aquatic animals

After attaining the desired size, the fish with the other aquatic animals like snails were collected from the water body. It has been estimated that approximately 25 kgs of fingerling were released in the water body on 03.09.2022 and 05.09.22 which gave us more than a hundred kgs of adult fish. Under the guidance of the Department of Zoology, along with the Research & Development Cell, Gushkara Mahavidhalaya, the first lot of approximately 20 kgs of various fish species had been captured on 16. 05. 2023. The second lot of approximately 50

kgs of different fish species and snails were captured on 24. 07. 2023 (Figure 8). It has been estimated more than 40% of fish (nearly 40 to 50 kgs) remain within the water body till now.

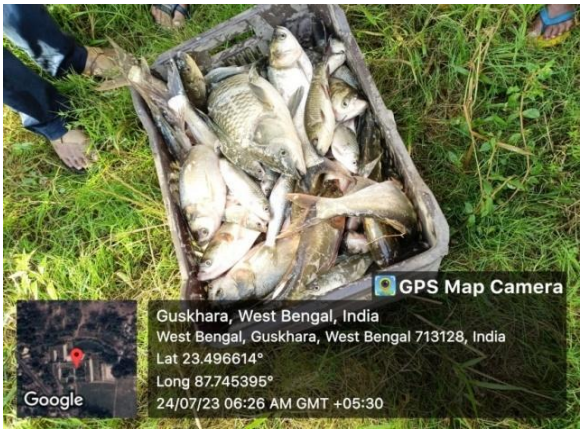


Periodical capturing of adult fishes and other aquatic animals with fishing nets.

Marketing

Our project on pisciculture has been initiated with the primary fund of approximately Rs. 8,000 including 25 kgs of fingerlings, their food, lime, very few medicines etc. Fish captured in the first lot of nearly 20 kgs had been sold within our institute to the different teaching and non-teaching staff at approximately the rate of Rs. 150 per kilogram. The second lot of more than 50 kgs was sent to the Gushkara fish market just after the fish capture and the approximate average selling price was at the rate of Rs.150 per kilogram (Figure 9). Thus, we have already received Rs.3000 from the first lot and nearly more than Rs.7000 from the second lot. The total invested

price of rupees Rs.8000 is less the total selling price of Rs.10,000 coming from this pisciculture of pond wetland. Moreover, 35% to 40% of approximately 40 to 50 kg of fish are still present in the water body. Their estimated price would be approximately Rs. 6000 to Rs. 7000. The calculated profit is nearly 80% of the invested amount excluding the expertise, labour, and management costs of our students, teachers, as well as non-teaching staff of the Department of Zoology. This expenditure includes the cost of professional and trained fisherman's fees for capturing and collecting of fishes with their fishing nets.



Selling captured fish and other aquatic animals in the Gushkara fish market.

Education & Training

We have already launched practical and field experience for zoology and other related students regarding pisciculture. Students could study the natural pond ecosystem, aquaculture, pisciculture, natural aquatic habitats as well as the ecology and environment of the water body

present in our institution. Initiation of this education and training in this water body gives the students more skills and expertise for their future entrepreneurship.

Various education and training programmes in the pond wetland.

Sustainable development

Sustainable development could be explained as a development that caters to human needs of the present without hampering nature and natural resources required for future generations. Sustainable development includes economic growth, social inclusion, and environmental protection. Sustainable development improves the quality of human life, minimizes the destruction of nature and natural resources, reduces pollution, uplifts all the life forms in the world as well as frames principles that enable and manage the need of future generations. The aquaculture research and training unit scientifically manages the wetland or water body within the campus. Thus we have to conserve ecology as well as the ecosystem including nature and natural habitats with organisms as well as preserve the water body for the use of future generations.

5. Problems encountered and resources required

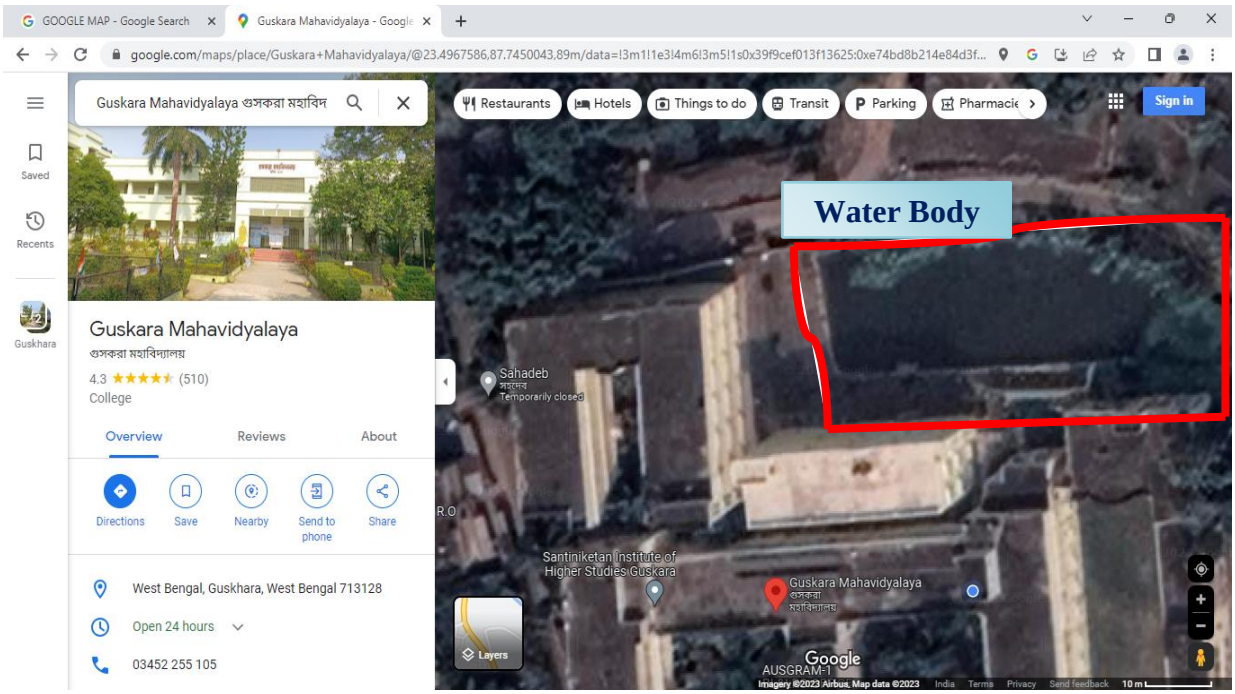
Lack of skilled workers is a problem that we have encountered. Another problem is the decreasing depth of the pond due to accumulation of mud at the bottom particularly in the rainy season. We will regularly increase the depth of the pond through dredging. The eco-system of the pond is constantly changing because of climatic changes. We are planning to utilize aeration instruments/ Motor to maintain the pond eco-system. Our objective is to increase the

funds available for this practice. Another challenge is to properly compete with the local fish sellers during marketing.

6. Notes (Optional)

We are planning to sign a MoU with Municipality for supply of larvicidal fish to Municipality for community dengue prevention.

Water body of our institution.



Location of our institute and the water body.

Best Practice 2

Title: PLANTATION FOR RESOURCE GENERATION AND ITS SUSTAINABLE DEVELOPMENT AS A PART OF CAMPUS ECOSYSTEM

OBJECTIVE OF PRACTICE:

One priority of our college is to maintain a green campus through regular plantation of tree saplings and a consistent policy of protecting the trees already existing in the campus. One objective is to promote environmental consciousness and to conserve biodiversity. To generate resource and to minimize expenditure the college has planted a large number of timber yielding trees. Timber collected from timber yielding trees is used to make furniture required for the college only after they are uprooted naturally.

THE CONTEXT:

Gushkara Mahavidyalaya is blessed with a geographical area of 7.3 Acres. The college has made good use of this space for plantations of trees, flowers and other medicinal plants. This serves three vital purposes:

1. Department of Botany needs varieties of plants for practical or lab-based experiments. In different Semesters of Botany varieties of herbs, shrubs, medicinal plants and timber yielding plants are required for practical classes.
2. Having most of these plants on the campus takes care not only of the time and effort needed to scout them from outside but also saves money.
3. When some of the timber yielding trees fall or become dry due to various natural factors, they are used for some of the needs of the college such as furniture.

THE PRACTICE:

Gushkara Mahavidyalaya has prioritized planting flowers, medicinal plants and varieties of trees. Flowers are not only appreciated for their beautiful radiance; they also keep the environmental equilibrium in place as bees feed on them.

When some of the trees fall due to natural factors, they also become an useful source of timber for some of the furniture needs of the college saving the college funds for other needs.

We particularly use the timber from the trees situated along the boundary walls to protect the timber from being used by local people without permission.

EVIDENCE OF SUCCESS:

There are varieties of plants within the area of our campus. The students of Botany require different genera and species of plants for theoretical and practical purposes. It is not an easy task to provide such diverse samples. Moreover, procuring from outside often involves having

to buy or cut an entire plant when just a small portion is needed. Thus, to meet these needs, our college garden provides all the plants. The fresh parts of the plants such as the leaves, flowers, fruits bark seeds and roots are taken and worked out as per requirement. Usually, these are used in the form of paste, powder, pulp, juice etc. Some of the important medicinal plants on our campus include *Canna indica L.*, *Rauvolfia serpentina*(L.)Benth. Ex Kurz., *Centella asiatica*(L.) Urban., *Ocimum sanctum*(L.), *Aloevera*(L.)Burn.f., *Curcuma longa*(L.),etc. The timber-yielding trees include *Dalbergia sissoo*(Roxb.), *Polyalthialogifolia*(Sonn.), *Swieteneamacrophylla* (King) and *Tectona Grandis*(L.f.).

While their main purpose remains to strengthen the ecological balance, the timber-yielding trees are regularly utilized for diverse furniture needs of the college saving a handsome amount.

PROBLEMS ENCOUNTERED AND RESOURCES REQUIRED

One problem is to protect the trees from natural calamities such as storms. To address this problem, we regularly plant new saplings. We are planning to create a Digital Plant Data library. Some of the plants develop plant diseases which are caused by varying abiotic factors like the mineral content of the soil and weather. Biotic factors are also responsible, such as insects, mites, bacteria, fungi, viruses, etc. The disease and mineral deficiency in medicinal plants can be countered by the application of various measures. Nutrient uptake of the soil can be maintained by adjusting the soil PH level and providing nutrient supplements biologically by the implementation of beneficial microbes.

Tree plantation and conservation in our college campus: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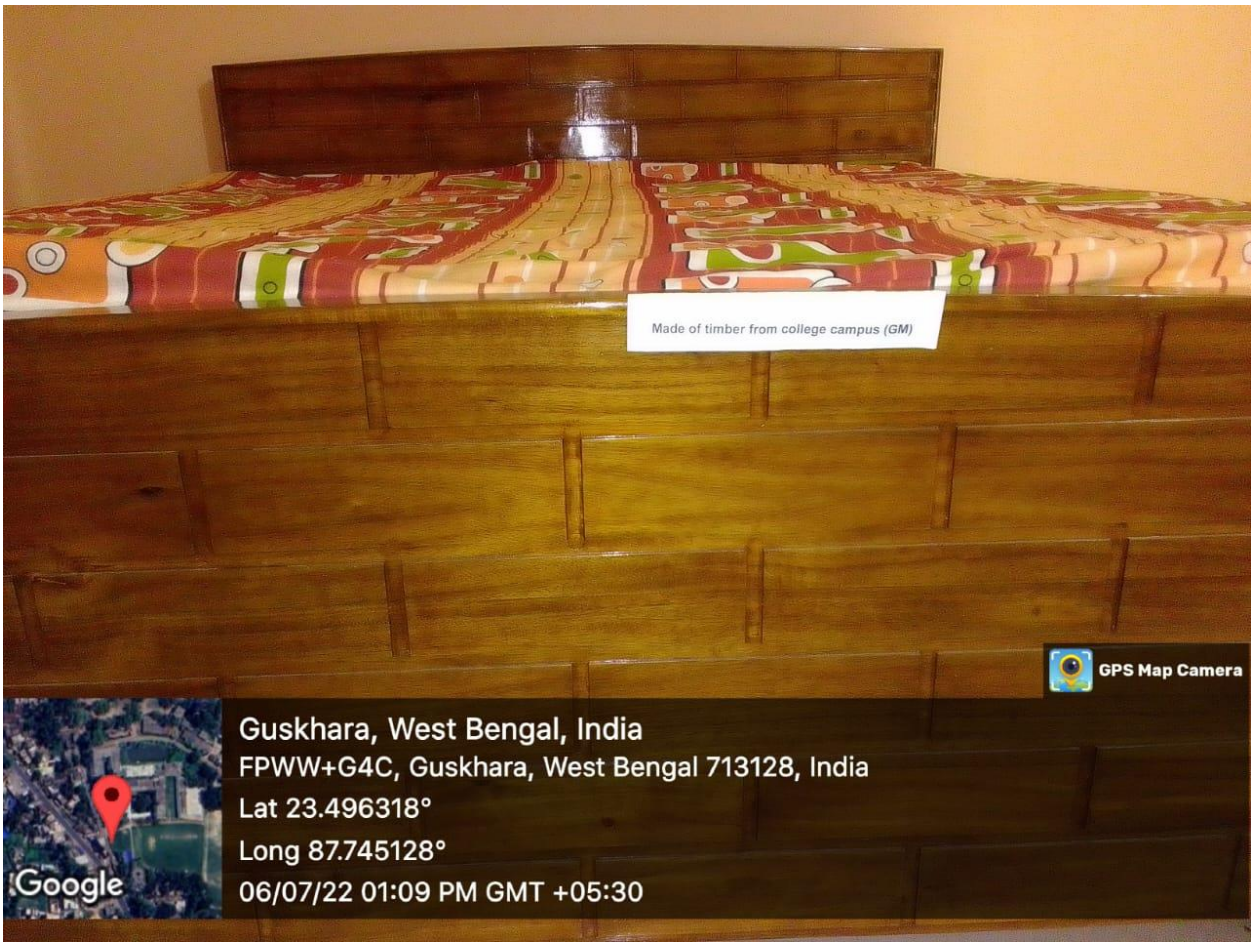
Plant diversity in college campus:

Name of the plant	***Number***	***Documentation***
Dalbergia sisso	*54*	
Polyalthia longifolia	*48*	

Swietenia macrophylla	*38*	
Tectona grandis	*41*	

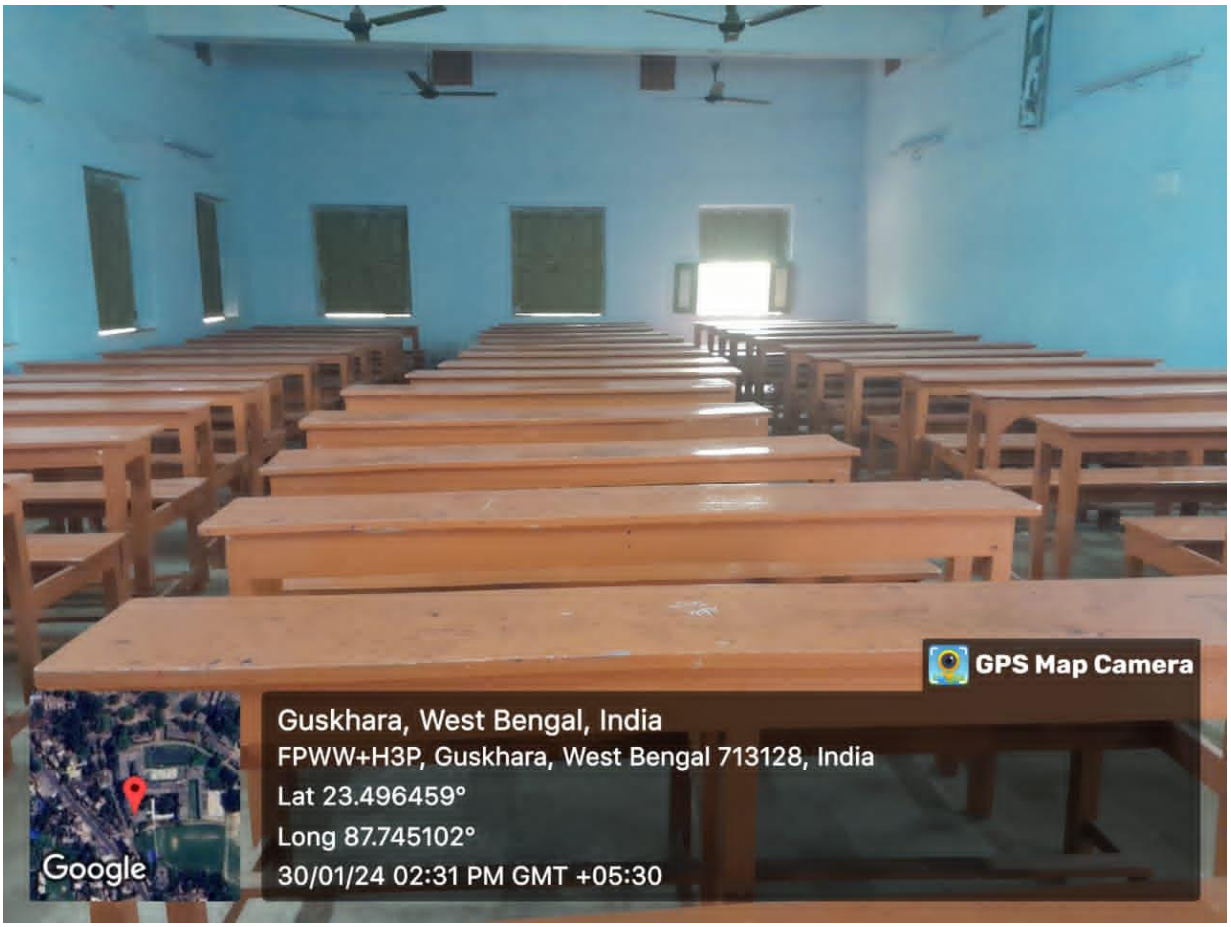
Furniture made of timber collected from college campus:



Furniture in our Guest House

Furniture in our Library

Wooden structure in our Library



Furniture in our Class Room

GUSHKARA MAHAVIDYALAYA

[An ISO 9001:2015 & 14001:2015 Quality Research Organization]
P.O.: Gushkara, Dist.: Purba Bardhaman, West Bengal - 713128
Phone : 03452 - 255105, Website : gushkaramahavidyalaya.ac.in
E-mail : guskaramahavidyalaya@gmail.com, office@gushkaramahavidyalaya.ac.in

Furniture made from wood sourced from timber-yielding trees grown in college campus

Ref. No. ..... *Date* .....

2021-2022

Sl. No.	Item	Estimated Expenditure			Wood from College and Actual Expenditure incurred			Saved Amount (Rs.)
		Wood (Rs.)	Labour Charge (Rs.)	Fitting materials and contingency (Rs.)	Wood From College (Rs.)	Labour (Rs.)	Fitting materials and contingency (Rs.)	
1	Table 10Pc	24000/-	7500/-	4000/-	24000/-	7486/-	3865/-	24000/-
2	Chair 15Pc	30000/-	10000/-	5000/-	30000/-	9600/-	4800/-	30000/-
3	Bench 10Pc	37500/-	11000/-	3500/-	37500/-	10700/-	3350/-	37500/-

2022-2023

Sl. No.	Item	Estimated Expenditure			Wood from College and Actual Expenditure incurred			Saved Amount (Rs.)
		Wood (Rs.)	Labour Charge (Rs.)	Fitting materials and contingency (Rs.)	Wood From College (Rs.)	Labour (Rs.)	Fitting materials and contingency (Rs.)	
1	Wooden Divan 1Pc	25000/-	6000/-	2000/-	25000/-	5800/-	2050/-	25000/-
2	Table 10Pc	25500/-	8000/-	4500/-	25500/-	7300/-	5200/-	25500/-

Principal
Gushkara Mahavidyalaya
Principal
Gushkara Mahavidyalaya

Bursar
Gushkara Mahavidyalaya
BURSAR
Gushkara Mahavidyalaya

Accountant
Gushkara Mahavidyalaya
Head Clerk
Gushkara Mahavidyalaya

Jagad Ray & Co. BURDWAN 53111

ATTESTED
31/01/2024
Principal
Gushkara Mahavidyalaya

Jan 31, 2024, 11:05 AM