RESEARCH THE PROPERTIES OF SALTWATER PLANTS FOR USE AS MATERIALS IN SUSTAINABLE DESIGN

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ABSTRACT

Research the properties of saltwater plants for use as materials in sustainable design. The objective was to explore the diversity and potential of saltwater plants in Yisan Subdistrict, Amphawa District, Samut Songkhram Province, and evaluate the feasibility of utilizing them as environmentally conscious design materials. The study found that:

Saltwater plants found in Yisan Subdistrict, Amphawa District, Samut Songkhram Province are Rhizophora apiculata, Rhizophora mucronata, Avicennia marina, Sonneratia alba, Sonneratia ovata, Xylocarpus moluccensis, Acanthus ilicifolius, Nypa Palm, Seablite, and Sea Purslane. Each type has been used for both consumer and industrial purposes, such as making charcoal and supporting pillars. Consumption includes cooking sweet and savory food, including all saltwater plants that have medicinal properties and herbs that can be used to treat various diseases as well.

A plant suitable for design application is Rhizophora because it is grown in concession areas. Utilization of charcoal by people in the community. Rhizophora is characterized by a straight stem that is hardwood, orange in color. When dried, there will be a unique crack in the wood. It is resistant to insects, so it has suitable properties for application in furniture design, home decoration, and souvenirs. Nypa palm is also suitable, as it is a plant that has been cut down to reduce coastal ground erosion caused by the weight of the nypa palm. Due to their fibrous nature, the leaves are tough when dried, making them suitable for both basketry and woven designs.

According to the research results, this is the use of indigenous plants to develop materials that are applied in various aspects of design, which is considered to be the use of natural resource capital combined with creativity as a way to create value to promote the community economy. This will have a positive effect on creating additional benefits for saltwater plants. It also results in replanting, conservation, and resource circulation.

Keywords: Saltwater plants, materials, sustainable design

INTRODUCTION

Yisan Subdistrict, Amphawa District, Samut Songkhram Province has an area of 60.90 square kilometers. (38,062.5 Rai) The area is generally composed of coastal plains and mangrove forests. The soil is moderately to very salty. There are many canals through it. The water is brackish to salty (Department of Local Administration, 2023) From the spatial survey conducted by people in the community, it was found that there are various plants that are interesting resources to be used as materials for designing community products, especially saltwater plants. Another natural resource that is interesting and can be developed as a design material. Because most saltwater plants have strong and tough properties, Dense wood texture It is resistant to destruction only in seawater and resistant to termites and insects. When utilized on land (Sarayut Bunyavejchiwin, Rungsuriya Bua Sali, 2011)

Materials can be considered one of the key elements in design that play an increasingly important role. Nowadays, designers often use material properties as the main factor in their

design (Form Follow Material) (Nantanee Niamsap, 2023) Each material has a story behind it. Thailand is another source of material that conveys material stories through the abundance of nature. It is transformed into a modern form of product. The combination of materials and design has demonstrated creativity and produced new works that are unusual and beyond expectations, while conservation and eco-conscious trends have inspired designers to use materials. Therefore, new materials are invented or created.

Based on the above information, the researcher had the idea to explore saltwater plants in Yisan Subdistrict. Amphawa District, Samut Songkhram Province, serves as an example to study and develop materials that are applied in various aspects of design. It is considered to combine natural resource capital with creativity as a way to create value for the local economy as well as design that takes into account the environment by using resources cost-effectively and for maximum benefit. This will have a positive effect on creating additional benefits for saltwater plants. It also results in replanting, conservation, and resource circulation.

OJECTIVES

1. To explore the diversity of saltwater plants in Yisan Subdistrict, Amphawa District, Samut Songkhram Province.
2. To study the potential of saltwater plants and evaluate the feasibility of their use.

RESEARCH SCOPES

Content Scope

1. Study the area, properties, features, and benefits of saltwater plants from research and related documents.
2. Study the data from the survey site. Use in-depth interviews and observations. Note-taking and recording
3. Evaluate the feasibility of using it as a design material.

Area Scope

Yisan Subdistrict, Amphawa District, Samut Songkhram Province

METHODOLOGY

This research There is a combination of qualitative research and quantitative research, with details as follows:

1. Data study
   1.1 The study was compiled from documents, books, textbooks, and related research.
   1.2 Study information from community areas and various connections. Community context, the use of capital, resources, and livelihoods to create guidelines.
2. The collection of information is as follows:
   2.1 Interview Method: In-Depth Interview and Group Interview Community philosopher Community leaders and experts provide information.
   2.2 Observation Method: Observation in community areas
   2.3 Study and analyze conceptual data. Theory, strategy, participation, and relevant design principles

Tools for collecting information

Questionnaire to assess satisfaction which has a 5-level estimation scales; 5 means the most appropriate, 4 means very appropriate, 3 means moderately appropriate, 2 means less appropriate, 1 means the least appropriate

Data Analysis

The satisfaction questionnaire used the mean and the standard deviation of the satisfaction level that can be divided as follows; 4.50-5.00 means most appropriate, 3.50-4.49 means very appropriate, 2.50-3.49 means moderately appropriate, 1.50-2.49 means less appropriate, 1.00-1.49 means least appropriate

Statistics used for data analysis

The data were analyzed by the researcher using a software package to analyze statistical data and present the analysis results as follows; Percentage and Mean

RESULT

From studying the data and going to the survey area. With in-depth interviews from local sages. Community leaders and community members in Yisan Subdistrict, Amphawa District, Samut Songkhram Province about the types, characteristics, and benefits of saltwater plants that exist in the area found that:

In Yisan Subdistrict, Amphawa District, Samut Songkhram Province The saltwater plants explored include Rhizophora apiculata, Rhizophora mucronata, Avicennia marina, Sonneratia alba, Sonneratia ovata, Xylocarpus moluccensis, Acanthus ilicifolius, Nypa palm, seablite, and sea purslane.Each type has characteristics and benefits, as shown in Table 1.

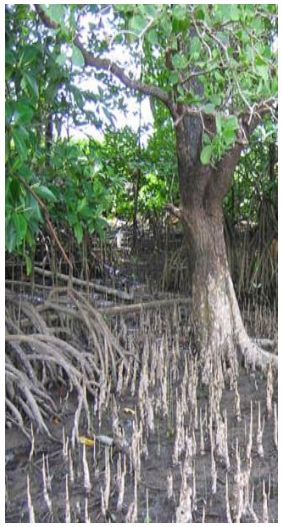
Table 1 Type, features and benefits of saltwater plants

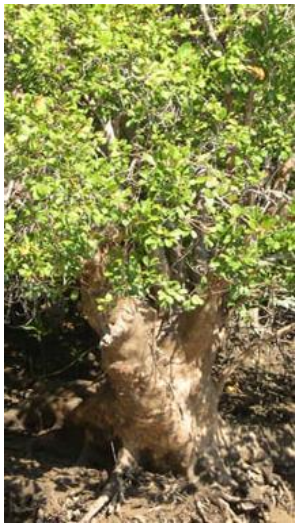
Type	appearance			Utilized parts						Utilization	
	Perennial plants	herbaceous plant	weed	tree	leaf	flower	fruit	root	bark	use	food
Rhizophora apiculata	✓			✓				✓	✓	✓	✓
Rhizophora mucronata	✓			✓				✓	✓	✓	✓
Avicennia marina	✓				✓			✓	✓	✓	✓
Sonneratia alba	✓						✓	✓	✓		✓
Sonneratia ovata	✓			✓	✓	✓	✓			✓	✓
Xylocarpus moluccensis	✓			✓			✓	✓	✓	✓	✓
Acanthus ilicifolius		✓		✓	✓		✓	✓			✓
Nypa Palm			✓	✓	✓					✓	✓
Seablite			✓		✓						✓
Sea Purslane			✓	✓	✓						✓

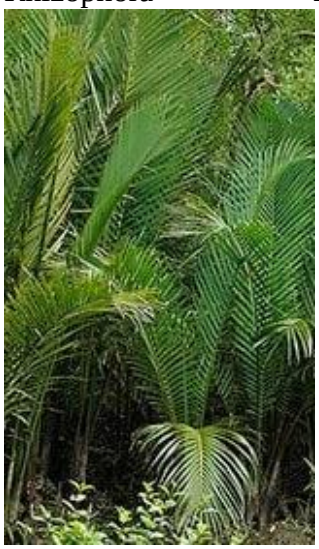
Table 1 shows that saltwater plants are utilized for making charcoal, poles, and cooking. Studies have also shown that all plants have medicinal properties.

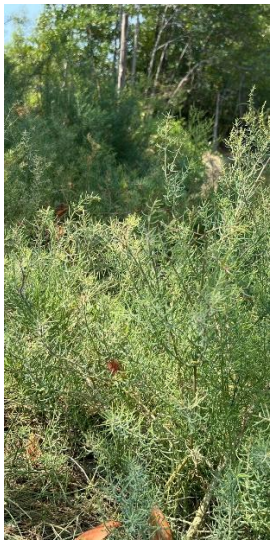

Rhizophora


Avicennia


Sonneratia alba


Xylocarpus moluccensis


Nypa Palm


Seablite Sea


Purslane


Acanthus ilicifolius

Figure 1 Types of saltwater plants

Table 2 Material utilization in design

type	Material utilization	Design-oriented applications
Rhizophora apiculata	Charcoal, support poles, fabric dyes	Furniture, Home Decoration, Textiles
Rhizophora mucronata	Charcoal, support poles, fabric dyes	Furniture, Home Decoration, Textiles
Avicennia marina	Charcoal, support poles	Furniture, Home Decoration
Sonneratia alba	-	-
Sonneratia ovata	-	-
Xylocarpus moluccensis	Charcoal, support poles	Furniture, Home Decoration
Acanthus ilicifolius	-	-
Nypa Palm	roofing material, food wrapping	Basketry, Packaging
Seablite	-	-
Sea Purslane	-	-

Table 2 shows that there are plants that can be applied to design. There are 5 types, as follows: Rhizophora apiculata and Rhizophora mucronata have properties that can be used as materials for furniture and home decoration and to make dyes in textiles. Avicennia marina and Xylocarpus moluccensis can be used as a material for making furniture and home decoration and Nypa palmcan be used as a material in basketry and packaging.

Table 3 Possibility of utilization in design

type	Mean	Standard Deviation (S.D.)	Satisfaction Level	note
Rhizophora apiculata	4.90	0.316	The most	It is a plant that is used to make charcoal. In the concession zone
Rhizophora mucronata	4.90	0.316	The most	It is a plant that is used to make charcoal. In the concession zone
Avicennia marina	4.70	0.483	The most	-
Xylocarpus moluccensis	4.60	0.516	The most	-
Nypa Palm	4.80	0.422	The most	weed.

Table 3 shows that based on the analysis of properties and community context, Rhizophora and Nypa Palm have the possibility of being processed into design materials. Since Rhizophora is a plant grown for use in concession zones, it can be utilized. Nypa palm is a weed that is cut down when there are many of them, so it is a suitable plant to use as well.

CONCLUSIONS AND DISCUSSIONS

Based on the results of the study, field survey, and feasibility assessment of the utilization of saltwater plants, the research results can be summarized as follows:

Saltwater plants found in Yisan Subdistrict, Amphawa District, Samut Songkhram Province are Rhizophora apiculata, Rhizophora mucronata, Avicennia marina, Sonneratia alba, Sonneratia ovata, Xylocarpus moluccensis, Acanthus ilicifolius, Nypa Palm, Seablite, and Sea Purslane. Each type has been utilized for making charcoal, supporting poles, etc. All saltwater plants have medicinal properties, including herbs that can be used to treat various diseases as well.

A plant suitable for design application is Rhizophora because it is grown in concession areas. Rhizophora also has outstanding properties such as straight stems, hardwood, and orange color. When dried, there will be a unique crack in the wood. It is resistant to insects, so it has suitable properties for application in furniture design, home decoration, and souvenirs.

Nypa palm is also suitable, as it is a plant that has been cut down to reduce coastal ground erosion caused by the weight of the nypa palm. Due to their fibrous nature, the leaves are tough when dried, making them suitable for both basketry and woven designs.

Based on the research results, which created guidelines and an assessment of the potential of saltwater plants, For the application of materials in various aspects of design, it is the use of natural resource capital combined with creativity as a way to create value. In line with Kanin Privanrat (2020) That has created a way to develop communities towards creative cities that should be created through environmental development. This will help create a sustainable environment for businesses or creative industries. In addition, the best use of natural resources

is considered environmentally conscious design. This will have a positive effect on creating additional benefits for saltwater plants. This results in the replanting, conservation, and sustainable circulation of resources.

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