

Salad Greenhouse at Samart Farm Location: Association of the Physically Handicapped Pathumthani (APHP)

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Introduction

Since the Association of the Physically Handicapped Pathumthani (APHP) was established, one main mission of this organization is an income generation to the members. It encourages members to do vegetable farming by focusing on local products, such as morning glory and lettuce. However, with physical limitations, disabled people confront with many difficulties to take care of vegetables every day. Moreover, they cannot earn enough income to meet expenses because prices of local vegetables are relatively low, and they can only be sold in the community. The members' incentives to grow vegetables are decreased.

The School of Architecture, Bangkok University was asked by the APHP's president to find any solution to improve a quality of life of the disabled members. After intensive discussion with many the association's members, therefore, a project for constructing salad greenhouse and conducting workshops for growing vegetable were proposed. This project will lead to sustainable income for all members.

Within a year of conducting the project, accessible facilities were developed according to Universal Design principles. The existing vegetable plots were modified. The automation water system was attached. Furthermore, the greenhouse was constructed. Many salad vegetables are selected to grow because of

higher value. People with disabilities can access and take care of the vegetable plots easier than before. The building is lesser barriers and able to solve many physical limitations. This will lead to a more stable income.



Picture1: the APHP's president is cutting the salad vegetable which is the first round production.

Project's objectives

- 1. Design and construction of salad greenhouses for increasing agricultural productivity within the Association of the Physically Handicapped Pathumthani (APHP)**
- 2. Applying the Universal Design principles and assistive technology to facilitate the disabled people to access to the vegetable plots and salad greenhouse**

Design Concept

The salad greenhouse is design and built based on Universal Design principles. Assistive technologies are installed, such as automation watering system which is controlled by an application in

mobile phone. This greenhouse prototype can extend to other communities.

Process of working

Since the project aimed to decrease both financial and environmental barriers that the people with disability are confronted, participatory design is mentioned. This concept can help the design team to learn more about disability. Action research is also the vital idea to conduct this project. This methodology focuses on studying a real environments or situations in a community in order to understand the problem which leads to development of that community. This consist of four stages; plan, observation, action and evaluation.

1. Plan: survey the disabled people requirements



Picture2: the Bangkok University students are interviewing the APHP staffs.

The design team has created the process of data collection with the APHP's representatives. At the research stage, students from the school of Architecture, Bangkok University were asked to collaborate. They visited the project's site and arrange a focused group interview with association's members. All requirements were

collected. Issues of both occupational and environmental improvements were key information.

Many physical limitation and environmental barriers were raised during survey. Problems in vegetable quality control and distribution were also mentioned. Therefore, at this planning stage, experts from various disciplines were invited to give consults such as instructors from the School of Engineering, the School of Economics, and the School of Communication Arts. Ideas were exchanged among them and some of them were implemented. From participatory meetings among every stakeholder, salad vegetables are proposed to grow instead of local vegetables due to higher value. The salad greenhouse is also a solution.

2.Observation: physical and economic challenges

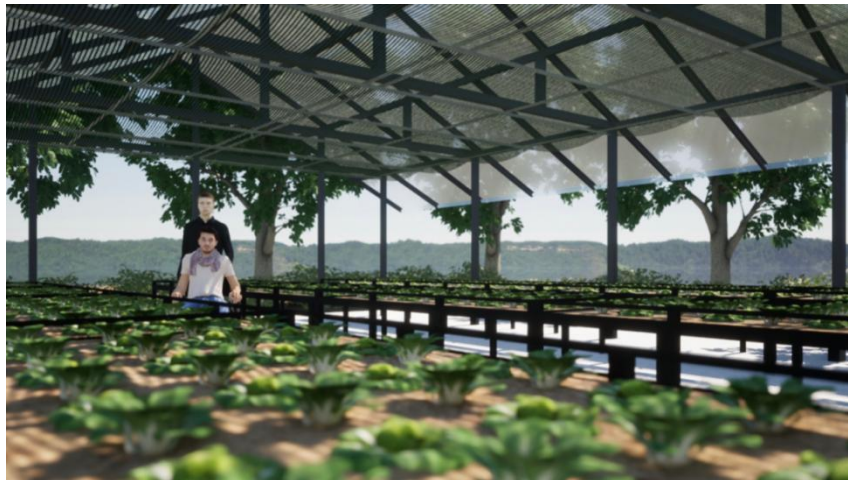
The significant problems that the people with disability encountered are physical obstructs in the environment. The design team therefore uses two methods to observe such barriers. Firstly, the team observes one wheelchair user's activities and behavior. He is the real staff of the APHP. Secondly, students in the design team simulated the use of space by spending half day on a wheelchair and do all farming activities to understand more on accessing the vegetable plots and its obstacles. These can help the team learn about the user's limitations.



Picture3: the Bangkok University students are experimentally doing farm activities on wheelchair in order to understand the wheelchair user.

2. Action by design

The accessible facilities within the greenhouse and vegetable table plots were designed according to the Universal Design principles and the accessible environment standard. To make sure that these designs can solve every physical need of disabled people especially a wheelchair user, staffs of APHP were invited to participate with every design stages. The table planting plot is an example idea deriving from this participation process. It was proposed to replace an on-ground plot by the wheelchair staffs, who want to take care of salad by themselves.



Picture4: the design of salad greenhouse

Apart from such physical concern, the design is also dealing with economic dimensions such as size of construction area, budget, and possible income from salad in each planting cycle. Form such issues, we summarized that 12 planting table plots were built. Each table plot can grow 100 salad vegetables which all 12 plots will lead to an initial income about 144,000 Thai baht per year. This project can increase annual income about 10 times.

4. Evaluation



Picture5: the salad greenhouse

After the design of the salad green house and planting table plots were completed and agreed, they were constructed. All these constructions were fully finished on December 2020 and the first fully income obtained on March 2021. An assessment focuses on evaluating many aspects both physical and financial challenges as following,

-The greenhouses can lead to certain productivity, which give rise to certain income.

-The greenhouses can be controlled and maintained by people with disabilities themselves.

-The use of technology is appropriate for the limitations of people with disabilities. The automation system of watering can

facilitate the maintenance of vegetables. However, trainings of such technology using must be arranged.



Picture 6: the automation watering system controlled by mobile application

When asking further the APHP's members, they suggest a future development as following,

-The APHP should increase productivity options, for example, other higher value vegetables or processed products derived from vegetables. These can expand new marketing channels.

-The APHP should create brand and packaging of this community product in order to add value to the production.

-The APHP should bring the products into digital marketing. Training of this issue could be arranged.

-Profits from the products should be used to build new greenhouses in order to providing product .