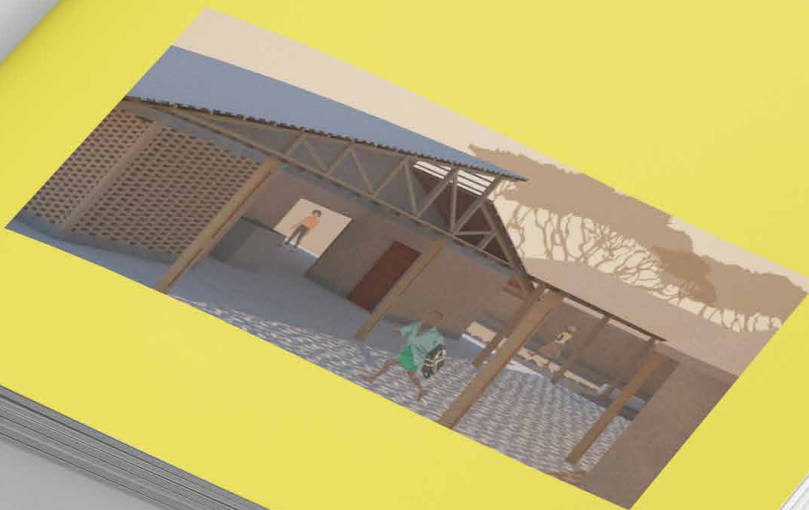


Nursery

VOCATIONAL LABS NELLY FARM
OMATAKO NAMIBIA



VOCATIONAL LABS NELLY FARM OMATAKO NAMIBIA
Dokumentation des Integrierten Projektes WiSe 2021/22

Nursery

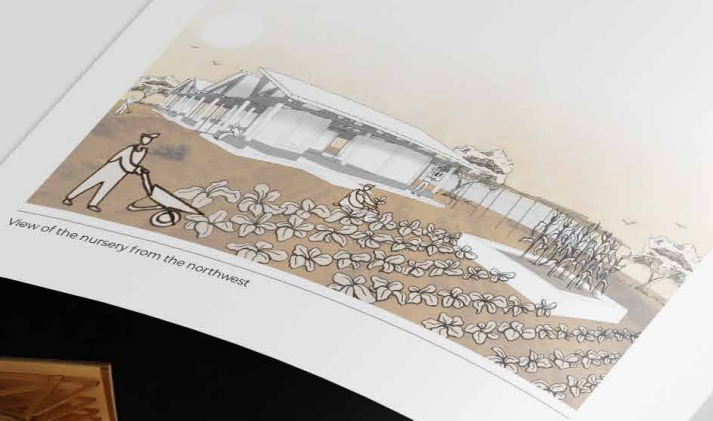
VIVIENNE POTTHOFF UND LEA TRAUE

Herausgeber

Fachhochschule Dortmund
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Lehrgebiet Entwerfen, V. Prof. Andrea Salgert

Konzeption und Realisierung

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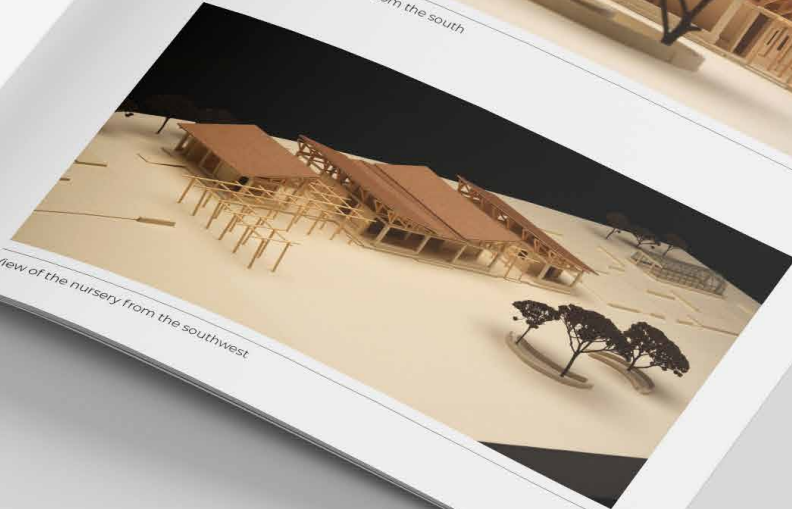
View of the nursery from the northwest



View of the nursery from the south



View of the nursery from the south



View of the nursery from the southwest

Entwurfsbeschreibung

Das Ensemble der Gärtnerei teilt sich in drei miteinander verbundene Gebäude auf. Im zentralen und größten der drei befinden sich Arbeitsräume, Aufenthaltsflächen und als Forschungs- und Ausbildungsgegenstand eine Hydroponik-Anlage. Ein weiteres zentrales Element des Gebäudes ist der Wassertank, welcher das Regenwasser von den Dachflächen sammelt und dessen Außenwände gleichzeitig durch angebrachte Tafeln zum Ort der Information und des Austausches werden. Östlich und Westlich des zentralen Gebäudes sind die Nebengebäude mit dem Büro, den Lagern, den Humusbecken und jeweils einem weiteren Wassertank angeordnet. Diese orientieren sich zu den Feldern, welche sich weiter in östlicher und westlicher Richtung erstrecken. Durch diese Anordnung der Funktionen innerhalb des Gebäudes können Wege verkürzt und Arbeitsschritte getrennt voneinander ausgeführt werden. Untereinander sind die Baukörper über die durchlaufende Bodenplatte verbunden.

Der Entwurf ist geprägt von einer offenen Grundrissgestaltung mit raumbildenden Wandscheiben und Stützen, welche eine großzügige Belichtung und Belüftung zulassen. Die Öffnungen ermöglichen Blickbeziehungen und Durchgänge, auf diese Weise entsteht eine Verbindung mit der Umgebung und die Übergänge zwischen den Baukörpern ergeben sich fließend. In den Räumen zwischen den Baukörpern bewachsen einen weiteren Aufenthaltsort bietet, welche mit Rank-Pflanzen bewachsen einen weiteren Aufenthaltsort bietet. Weiterhin entsteht eine Verbindung mit den umliegenden Gebäuden, in welchen die Pergola als gestalterisches Element wieder aufgegriffen wird.

General plan



Floor plan

- 1 Entrance area
- 2 Workroom
- 3 Work area
- 4 Rainwater tank
- 5 Sinks
- 6 Humus tank
- 7 Camps
- 8 Office
- 9 Hydroponics
- 10 Outdoor area with pergola
- 11 Lounge area

EN Design Description

The ensemble of the nursery is divided into three interconnected buildings. The central and largest of the three parts houses workrooms, recreational areas and, as a research and training object, a hydroponics facility. Another central element of the building is the annex which collects the rainwater from the roof areas and simultaneously turns its outer walls into a place of information and exchange through attached blackboards. To the east and west of the central building are the buildings with the office, the storage facilities, the humus basins and another water tank each. These are oriented towards the fields, which extend further east and west. This arrangement of functions and separate work routines makes it possible to shorten distances and separate work routines. The buildings are connected to each other via the continuous floor slab.

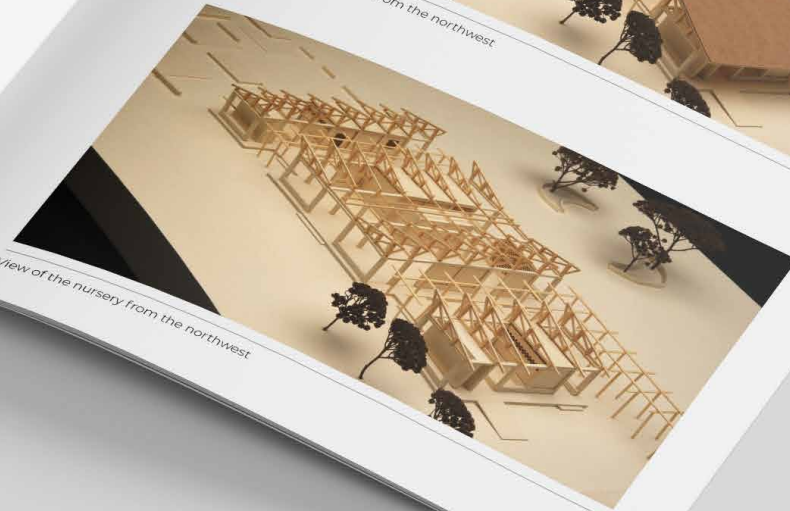
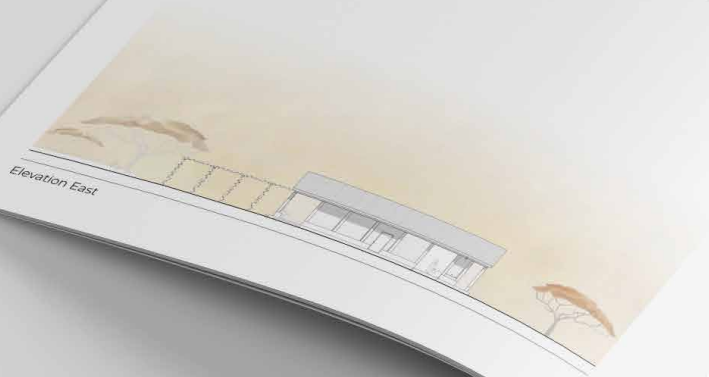
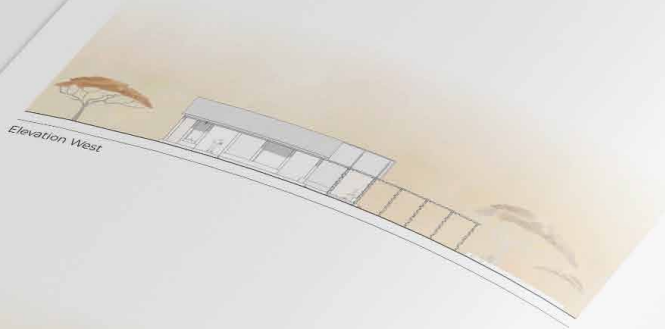
The design is characterised by an open floor plan with space-forming wall panels and pillars that allow generous lighting and ventilation. The openings provide visual connections and passages, thus creating a connection with the surroundings and making the transitions between outside and inside fluid. In the spaces between the buildings, there is room for a pergola, which is covered with climbing plants and offers another place to rest. Furthermore, a connection is created with the surrounding buildings, in which the pergola is taken up again as a design element.

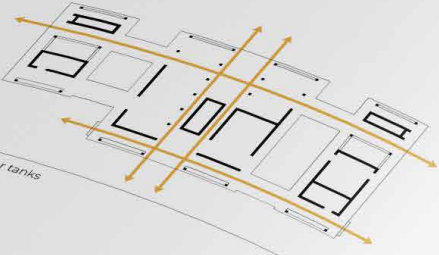
Elevation South

Section

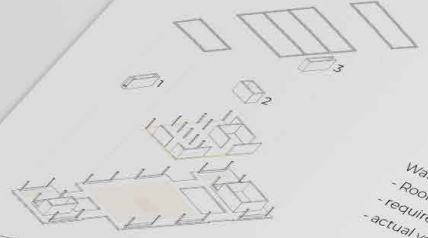
View of the nursery from the south





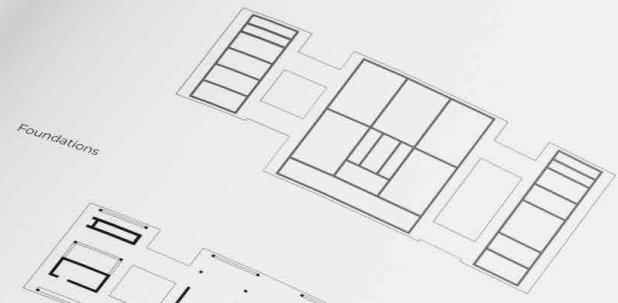


Dimensioning of the water tanks

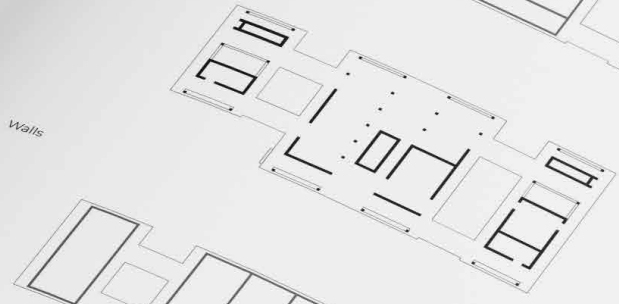


Dimensioning of the water tanks

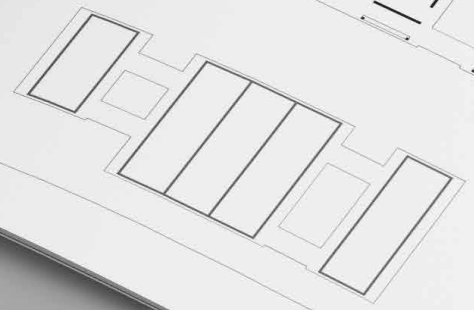
- Total rainfall per year: 124 litres/m²
- Water tank 1:
 - Roof surface: 100 m²
 - required volume: 12,4 m³
 - actual volume: 16,1 m³
- Water tank 2:
 - Roof surface: 300 m²
 - required volume: 30,5 m³
 - actual volume: 31,5 m³
- Water tank 3:
 - Roof surface: 130 m²
 - required volume: 16,1 m³
 - actual volume: 16,1 m³



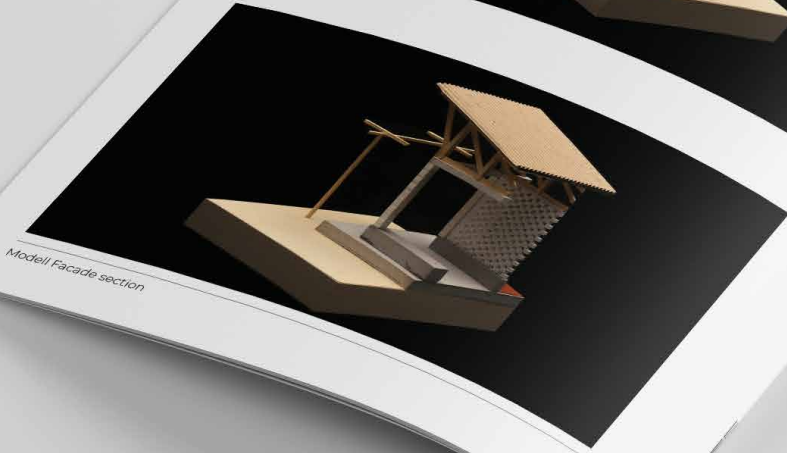
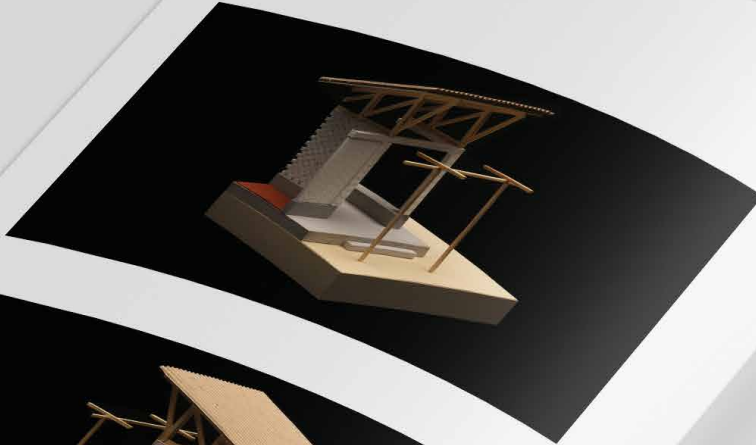
Foundations



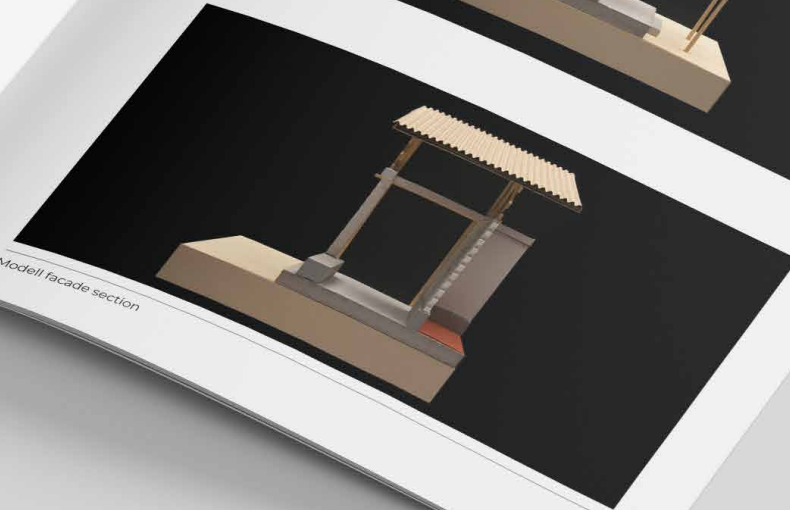
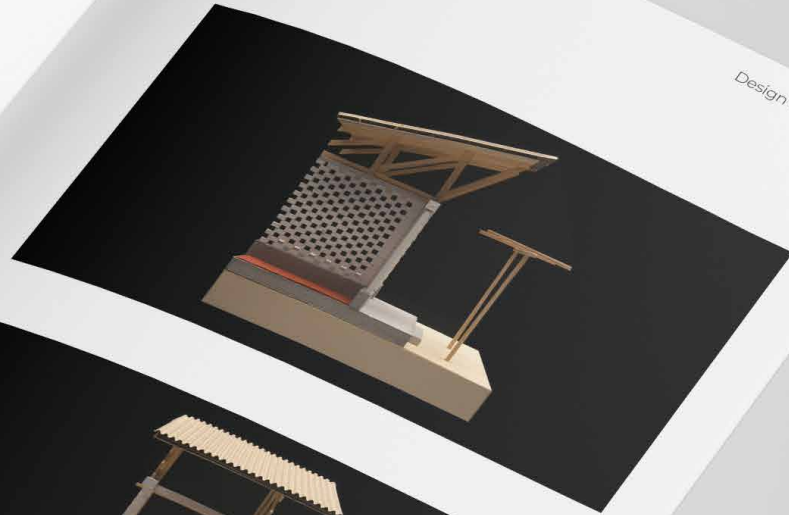
Walls



Ring beams



Modell facade section



Modell facade section

Pflanzzyklen

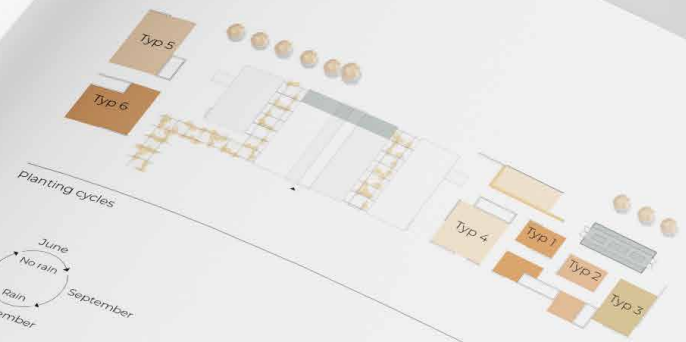
Die Pflanzzyklen stellen Fruchtfolgen dar, die für den Anbau von Gemüse auf den Feldern der Gärtnerei genutzt werden können. Es wird gezeigt, welche Pflanzen im trockenen Winter und welche im regnerischen Sommer am besten wachsen und in welcher Reihenfolge die Pflanzen voneinander profitieren, in dem sie unter Anderem Insekten anziehen, Schädlinge abstoßen oder Nährstoffe dem Boden hinzufügen, beziehungsweise entziehen.

Beispielsweise werden beim zweiten Zyklus im September, also im Frühling Curken gepflanzt. Darauf folgen nach der Ernte im Dezember Bohnenkraut, im März Borretsch und im Juni Zwiebelpflanzen.

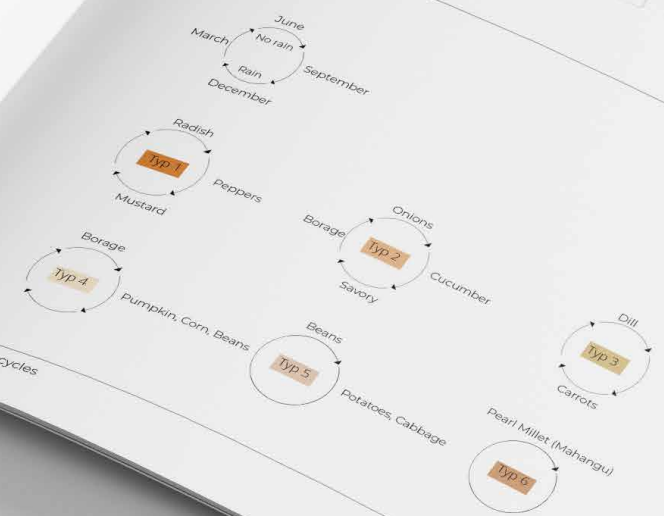
EN Planting cycles

The planting cycles represent fruit cycles that can be used for growing vegetables in the nursery's fields. It shows which plants grow best in the dry winter and which in the rainy summer, and in which order the plants benefit from each other by attracting insects, repelling pests or adding or removing nutrients from the soil, among other things.

For example, in the second cycle, cucumbers are planted in September, i.e. in spring, followed by savory after the harvest in December, borage in March and onion plants in June.



planting cycles



planting cycles

EN Hydroponics, Nutrient film technique (NFT)

Hydroponics is a system for cultivating plants in which the roots of a plant are placed in a mixture of water and nutrients. The aim of hydroponics is to provide the plant with optimal growing conditions in order to achieve the highest possible harvest. Advantages compared to conventional planting in soil include lower water consumption, which can be reduced by up to 90%, and the smaller space required, which increases yields per square metre by up to five times. Different systems are possible in hydroponics, these vary in complexity of construction and use, suitability for beginners, for the growing possibilities. For the design of the nursery, the following two systems have been selected, which are suitable for beginners, for the purpose of teaching and basic understanding of plants.

The NFT system consists of a water reservoir with a water pump, PVC pipes and net pots with substrate. The water runs as a thin film through the pipes in which the net pots with the plants are inserted. The roots of the plants lie permanently in the water film and can absorb the nutrients it contains. The length of the channel should be 10 to 15 metres. Possible plants that can be grown are basil, coriander, mint, dill, lettuce, nasturtium, chives, sorrel.



Greenhouse

Gewächshaus, Tiefwasserkultur

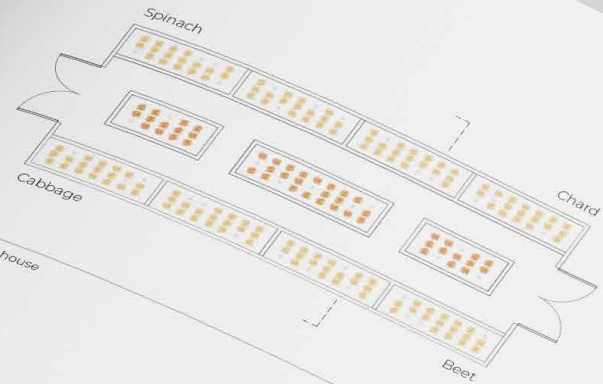
Das System der Tiefwasserkultur ist grundlegend weniger komplex als das NFT-System, da es simpler im Aufbau und der Nutzung ist, außerdem ist es weniger anfällig für Fehler und Ausfälle. Das NFT-System benötigt und durch die vertikale Anordnung auch platzsparender ist. Weiterhin kann die Gesundheit der Pflanzen schneller überprüft werden und das Wasser ist weniger anfällig für Ablagerungen und Schädlinge, da es ständig in Bewegung ist.

Um eine größere Variation in der Lehre bieten zu können, werden im Entwurf beide Hydroponik-Systeme, wie auch der konventionelle Anbau von Obst und Gemüse in Erde vorgeschlagen.

EN Greenhouse, Deep water culture

The deep water culture system is fundamentally less complex than the NFT system because it is easier to set up and use, and it is less prone to errors and failures. However, the NFT system offers the advantages of requiring even less water and nutrients and is also more space saving due to the vertical arrangement. Furthermore, the health of the plants can be checked more quickly and the water is less susceptible to sediment and pests as it is constantly in motion.

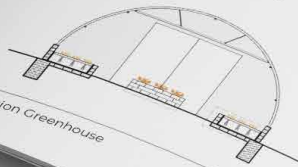
In order to offer a greater variation in teaching, both hydroponic systems, as well as conventional cultivation of fruits and vegetables in soil, are proposed in the design.



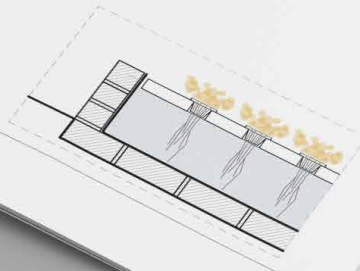
Floorplan Greenhouse

Construction:

- water reservoir
- Construction brick
- Pond liner as a seal
- Styrofoam as platform/lid
- Net pots with substrate



Section Greenhouse



Pflanzenbuch

Das Pflanzenbuch zeigt mögliche Gemüse- und Obstpflanzen, sowie Bäume, Küchen- und Heilkräuter, welche auf dem Grundstück angepflanzt werden können. Bei der Auswahl wurde besonders auf die klimatischen Besonderheiten und die Bodenverhältnisse des Ortes geachtet. Die dargestellten Pflanzen kommen gut mit Hitze und wenig Wasser, sowie nährstoffarmen bis sandigen Böden aus und können auch in den Hydroponik-Systemen angepflanzt werden. Außerdem sind sie einfach zu pflegen und somit gut für den Zweck der Lehre geeignet, bei der es darum geht, ein grundsätzliches Wissen und Verständnis des Gärtnerns zu vermitteln. Weiterhin sollen die kulinarischen und medizinischen Möglichkeiten aufgezeigt werden und zur gesundheitlichen Aufklärung beitragen.

EN Plant book

The plant book shows possible vegetable and fruit plants, as well as trees, culinary and medicinal herbs, which can be planted on the plot. In the selection, special attention was paid to the climatic characteristics and soil conditions of the location as well that the plants can be used in the hydroponic systems. The illustrated plants do well with heat and little water, as well as nutrient-poor to sandy soil. They are also easy to care for and are therefore well suited to the purpose of teaching, which is to impart a basic knowledge and understanding of gardening. Furthermore, the culinary and medicinal possibilities can be demonstrated and contribute to health education.



Welwitschie

Welwitschia (*Welwitschia mirabilis*) is a desert plant and the only species out of the genus *Welwitschia*. It has only two deciduous leaves that grow back from a woody shoot axis. It can grow over 1 meter tall and reach several meters in diameter. Since its taproot, which is only a few meters long, usually cannot reach groundwater, it has a whole range of special features for obtaining water and against desiccation.



Welwitschie

Camelthorn tree

The wood of the camel thorn (*acacia erioloba*) is so hard that it is avoided by termites. Depending on the water supply, it develops into a 2 m high bush or a tree that grows to about 7 m high. The plant has thorns up to 6 cm long, which protects it from animal predation. The powder of the legumes is used in traditional medicine against ear infections, while the decoction from the root is used for toothache and tuberculosis.



Camelthorn tree

Nara

The nara (*Acanthosicyos horridus*) belongs to the pumpkin family, and its roots, up to 70 m long, dig through the sand hills on which it grows to reach groundwater. The plant, which is endemic to Namibia, is found in a strip 40 to 60 km wide along the coastline, which is about 1,000 km long. The nara fruit is used as food by many animals and is also sought after by the locals because of its high water content.



Potato

Potato plants prefer loose, well-drained and nutrient-rich soils on fully sunny sites. Sandy soils and sandy loam soils are ideal for this. But potatoes also thrive in peaty and very loamy soils, as long as water can drain away well. Potatoes are a good precrop. They improve the soil in which they are planted.

Potato



Pumpkin

Pumpkins prefer sunny to semi-shady conditions. They need a lot of water and a lot of nutrients, especially nitrogen. The soil should therefore be as moist and nutrient-rich as possible. A place by the compost is ideal. In addition to vitamins A, C and E, pumpkins also contain valuable magnesium and a large amount of fiber.

Pumpkin



Carrots

Carrots contain provitamin A, folic acid, potassium, iron, magnesium, manganese, copper, sulfur and pectin. That is why they are among the most valuable vegetables. Carrots grow best in a loose, sandy-loamy soil, which should not contain stones. If the soil is very heavy and loosening is very laborious, carrots can be grown on dams.

Carrots



Corn

Corn (*Zea mays*) requires a well-moistened soil only directly at germination. Once a stately young plant has formed, there is little need for watering. In most cases, summer rainfall is sufficient. Popcorn corn requires even smaller amounts of water than sweetcorn.

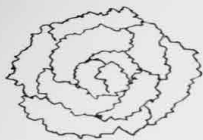
Corn



Pearl Millet

Pearl millet is called „mahango“, a traditional and indigenous grain known in Africa for thousands of years. The long, round seed heads are harvested in the Namibian winter, dried and threshed to obtain the small pearl shaped millet seeds. This is used to make a porridge (oshifima), which is the most important staple food for the Namibian population.

Pearl Millet



Cabbage

Cabbage contains many vitamins and minerals, such as vitamin C or B vitamins, beta-carotene, folic acid, potassium, calcium and iron, kale also vitamin K and provitamin A. Basically, sunny to semi-shady locations are ideal. Head cabbage requires particularly deep, nutrient-rich and humus-rich soil with good water storage capacity.

Cabbage



Ausstellung im Fachbereich Architektur im Sommersemester 2022
Foto: Vincent Mel Heinrich

Impressum/Imprint

Imprint

Die Dokumentation zeigt ausgewählte Entwurfsarbeiten des Integrierten Projektes. Die Gärtnerei von Lea Traue und Vivienne Pottthoff, die Werkstatt für Handwerkskunst von Zahra Moradi und Jannis Holzbrink und die Lapa von Thomas Sauer. Die Entwürfe entstanden im Wintersemester 2021/22 am Fachbereich Architektur, der Fachhochschule Dortmund.

EN The documentation shows selected design works of the Integrated Project. The Nursery by Lea Traue and Vivienne Pottthoff, the Handicraft lab by Zahra Moradi and Jannis Holzbrink and the Lapa by Thomas Sauer. The designs were created in the winter semester 2021/22 in the architectural faculty of the University of Dortmund.

Lehrgebiet Entwerfen / Architectural design: V.-Prof. Andrea Salgert

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Modellfotos / Photographs: Gabriele Marl

Grafiken und Abbildungen / Graphics and diagrams:

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