The Honduran Production Valleys

Finding Balance Between People and Environment

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Whilst agricultural landscapes are products of the local ecosystem, and community in which they are situated, they are increasingly becoming affected by the same global issues and converging under the dynamics of globalisation. The main global issues being the inevitable population growth and consequential worldwide food insecurity. How we spatially manage this growth in consideration of population and agricultural production is very prominent an issue faced by landscape architects and the future plans for land use; it is an issue which is uniting our landscapes globally. But intriguing to myself is the connection between the people who live in these landscapes and the global context to which they are being defined.

This curiosity has followed me through my studies. Starting in that of architecture it was always a question, to me, of our potential as architects and potential influence over problems socially, economically and environmentally. Curious to see the potential, I pursued a masters in urbanism, in effort to see the bigger role of the architect within the city. However this only questioned our being within the man-made world, and it was a question of our growth within the environment, and our cultural relation to nature which I was more fascinated. What is our position toward global issues such as resource management, social aspects in a country and economic stability of people, and how can we spatially design to influence this. Naturally, this led me into the study of Landscape Architecture, the field which has led me to writing this thesis.

It was such that the opportunity to work at the PBL was so intriguing, to learn more about other landscapes which are being pulled by agendas globally. This project has bought insight to myself of the role played by the profession of landscape architecture in such projects which question the globalising landscape and our influence over human growth and climate change. I hope the work produced can add to the dialogue of this topic.

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I would like to thank the PBL for the opportunity of an internship during the beginning of my thesis work. As well as being a great footing for my continued individual thesis work, it gave me great insight into the possibilities and applications of Landscape Architecture in the world outside of my studies. I would like to give thanks to Alexandra Tiemstra for her kindness and guidance during this period.

I would also like to give huge thanks to my mentors, firstly being Hugie Bobbink, whom guided me through the whole project. It was always a joy to talk with you and discuss the project, and your valuable advice constantly pushed my work to new levels. Secondly, my gratitude goes toward Luisa Galabrese whose optimism and energy always bought me back to excitement to this project and whose advice was always so helpful.

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How can the Landscape Approach provoke a spatial design in the Northern coastline of Honduras to create a future sustainable environment, accounting for the area’s landscape values?

This thesis initiated from a project worked on in conjunction with the PBL, the Environmental Agency of the Netherlands. The project, with PBL, follows three case studies of landscapes to research the implementation of the landscape approach for reaching the new framework of sustainable development goals, developed at the 2015 climate change talks. The landscape approach uses integrated landscape management (ILM) to attempt to achieve these SDG’s. This is with the integration of all the varying stakeholders on the landscape level to address global challenges. ILM addresses the planet and environment, economic stability and governmental agendas as well as social development. It addresses all the stakeholders in the scope of the place, for agreed management of future landscape development.

The landscapes researched were firstly the Northern Coastline of Honduras, secondly the Atewa Range in Ghana and thirdly the Ihelmi Cluster in Tanzania, all three with challenging land use issues by numerous actors, both locally and globally.

This thesis has come as follow up to the research, by choosing one of the landscapes; that being the Northern Coastline of Honduras. As addition to the research done on the landscape, the thesis will result in a spatial landscape design which hopes to bring the research learnt of Honduras, and knowledge gained from using the landscape approach as methodology, into a reality.

Abstract
Introduction to the Project
This project is worked on in conjunction with the PBL, the Environmental Agency of the Netherlands. The project researches a series of landscape case studies in three countries. The projects aims to research the implementation of the landscape approach in reaching the Sustainable Development Goals (SDGs); by minimising tradeoffs and maximising synergies between stakeholders in the differing landscapes. The project researches the potential use of spatially explicit modelling and scenario tools to help inform stakeholders in large landscape initiatives about the results of land-use management to achieve multiple SDGs.

Because landscapes are coupled socio-ecological systems, complexity and change are inherent properties that require management. A landscape approach is a long-term collaboration among different groups of land managers and stakeholders to achieve the multiple objectives required from the landscape. These typically include agricultural production, provision of ecosystem services (such as water flow regulation and quality, pollination, climate change mitigation and adaptation, cultural values); protection of biodiversity, landscape beauty, identity and recreation value; and local livelihoods, human health and well-being. Stakeholders seek to solve shared problems or capitalise on new opportunities that reduce trade-offs and strengthen synergies among different landscape objectives.

The case study of Honduras was the first case study of research as well as the project I researched the most. As such I decided to take this research for continuation into my thesis. The research conducted in the project looked at the larger scale potentials for land use in the area and stimulating discussion amongst stakeholders for possible synergies. However what was not addressed in the research was concrete ideas as to interventions to create the possible ideas for the future. As the research was conducted with many different inputs, I thought it interesting to continue as a project for potential realisation of the research.

Concepts for Spatial Design

What interventions should be made to achieve a more sustainable environment, and where?

How can these interventions be made and how should time be considered?

Introduction to Project and Problem Understanding

*What is the landscape approach?

Why the Northern coastline of Honduras?

Research : Global

Scenarios Methodology (Present Situation --> Trend Scenario --> ILM Scenario)

Who are the stakeholders and what and what main themes can be explored within the landscape?

Research : Local

Interviews with people and stakeholders

What are the social/ economical/ environmental problems in the location, and how can this influence the spatial future of the landscape?

What location should be chosen for in depth design study?

Spatial Design

What interventions should be made to achieve a more sustainable environment, and where?

How can these interventions be made and how should time be considered?
Since 2000, oil palm production in Honduras has more than tripled. Historically known as the banana republic, the landscape is again been historically monopolised by corporations for agricultural exports. The rich landscape of Honduras has consumption habits. It is a landscape which has been defined by the globalisation of landscape and spatially development; with huge consequences on the environment and our spatial landscape.

Honduras is prime example of a landscape largely affected by our consumption habits. It is a landscape which has been defined by the monoculture of agriculture. The rich landscape of Honduras has been historically monopolised by corporations for agricultural exports. Historically known as the banana republic, the landscape is again being transformed into a new monopoly, this time with the growth of Palm Oil.

Since 2000, oil palm production in Honduras has more than tripled, as has the area under cultivation and currently, Honduras is the largest palm oil producer in Central America and a player in the global market. Because palm oil production is an important source of economic development and income generation, many stakeholders in the landscape would like to see production increase sustainably. The rapid expansion of the crop has led to encroachment onto critical habitats and protected areas, as well as unsustainable terrain, such as steep slopes. This has led to soil degradation, deforestation, decrease in water quality and quantity, degradation of fragile ecosystems, and threats to biodiversity.

Sustainable management of watersheds to provide clean and sufficient water, prevent erosion and pollution, and support irrigation remains a challenge in the region. Expansion of oil palm onto slopes has degraded steep soil areas and sensitive recharge sites and water catchments and caused erosion and runoff into streams and rivers. Likewise, deforestation caused by over extraction of timber and agricultural expansion affects water quality and availability downstream. Water scarcity has been an issue that has affected the availability of water for irrigation and for the population in the Vale de Sula, particularly during drought conditions and dry months. While legislation exists to regulate the management of natural resources, such as preserving vegetative cover on riverbanks and point and non-point source pollution, government institutions lack the human and financial resources to effectively implement them. Improved management of hydrological resources will be necessary to ensure that the adequate quantity and quality of water is available both for human and agricultural needs.

As a coastal region, the landscape is vulnerable to hurricanes, flood, and drought. In recent years, the landscape has experienced lower rainfall levels and an extended dry season; but also extreme flooding in the valleys. These vulnerabilities particularly affect the agricultural sector, and farmers who rely primarily on agriculture for their livelihood.

As predicted by the UN, the world’s population by the year 2100 will be between 9.5 and 13.3 billion. In accordance to the average American consumption habits, which has led to soil degradation, deforestation, decrease in water quality and quantity, degradation of fragile ecosystems, and threats to biodiversity.

Many biodiversity rich ecosystems that provide a host of services are located in the Caribbean coast of Honduras. An important proportion of the landscape under cultivation by agro industrial actors and impoverished rural populations that are vulnerable to the effects of climate change. With added population a question of stopping the poverty is also at question.

The northern coastline of Honduras is prime example of a landscape whose agriculture is being threatened by globalisation and subsequently the diminishing of natural resources, such as preserving vegetative cover on riverbanks and dry months. While legislation exists to regulate the management of natural resources, such as preserving vegetative cover on riverbanks and dry months. While legislation exists to regulate the management of natural resources, such as preserving vegetative cover on riverbanks and point and non-point source pollution, government institutions lack the human and financial resources to effectively implement them. Improved management of hydrological resources will be necessary to ensure that the adequate quantity and quality of water is available both for human and agricultural needs.

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Problem and Relevance

The northern coastline of Honduras is prime example of a landscape whose agriculture is being threatened by globalisation and subsequently the diminishing of natural resources, such as preserving vegetative cover on riverbanks and dry months. While legislation exists to regulate the management of natural resources, such as preserving vegetative cover on riverbanks and point and non-point source pollution, government institutions lack the human and financial resources to effectively implement them. Improved management of hydrological resources will be necessary to ensure that the adequate quantity and quality of water is available both for human and agricultural needs.

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Problem and Relevance

lower rainfall causes a strain on valuable water resources, whereas flooding can damage crops. Better management of natural resources, particularly water and vegetation cover, can help mitigate these risks. Likewise, extreme weather events, such as hurricanes, are a threat.

Honduras, Fishing balance between people and environment
Location

The project location is that of Honduras, this is a small country in Central America, bordering the Caribbean Sea and Pacific Oceans. In terms of scale, this country is about double the size of the Netherlands, but with about half of the population.

Looking at the country closer the capital is Tegucigalpa, in the south of the country. The city, among others surrounding, developed through mining in the mountainous landscape. The edges of the country were shaped by the rivers which run from the mountains to the surrounding seas. They are defined by large flat river plains of rich and fertile soils, and as such developed through a more agricultural industry. San Pedro Sula bring the largest city in this area, the industrial city of Honduras, which grew from the exporting of goods mainly north to the US.
History

Large companies have, through the 19th and 20th century, exploited the rich valley landscapes for agricultural goods. The rich soil and climate aiding growth of specific crops which were wanted for exportation.

The main crop which defined this era was the banana; Honduras was known as the first banana republic.

In the 21st century however, a new crop is defining the monopolised landscape; Palm Oil.

The Northern Valley plains have suffered this monopolisation of agriculture; and is the area for the research.

History

- 1899 First banana concession granted to the Vaccaro Brothers. Later to be the Standard Fruit Company (USA owned)
- 1912 Construction of Tela railroad by Standard Fruit Company. These "golden" exports were supported by more than US$40 million of specialised banana company investment in the Honduran infrastructure.
- 1917 Labour strike against Cuyamel fruit company.
- 1917-1929 Between 1913 and 1929, its agricultural exports rose from US$3 million (US$2 million from bananas) to US$25 million (US$21 million from bananas).
- 1927 African Oil Palm was first introduced to Honduras in 1927.
- 1960 Industrial growth was stimulated by the establishment of the Central American Common Market.
- 1960s The Northern Valley plains have suffered this monopolisation of agriculture; and is the area for the research.
- 1970s There were 11,000 hectares of Palm Oil planted throughout the northern part of the country.
- 2006 The Honduran government launched a five year program to promote the use of agrifuels with the aim of expanding the total cultivation area of Palm Oil from 100,000 hectares to 500,000 hectares.
Palm Oil Agriculture

50% of our supermarket products, processed foods, as well as beauty products, contain palm oil. It is an inherent product to our modern lives.

This crop is affecting many landscapes across the globe; as can be seen in the map to the right. The growth of the product is so influenced by the more western way of living where it is imported to.

Globally the industry employs about 6 million people, and makes tens of billions in revenue.

With such high need for the product, and its great impact in the economic market; growth of palm oil is only increasing.

This research concerns the landscapes which are impacted by this large scale problem.
Impact of Palm Oil

Environmentally, palm oil is destructing landscapes. Deforestation is wiping out land ready for agricultural use for more palm oil, and destructing the biodiversity which is lying in its path. This deforestation is not only a cause for present loss of biodiversity but in the larger context, a massive cause to global warming. There is a lot of carbon stored in these precious tropical forests that get released with deforestation.

As well as environmentally, it is causing a mass upheaval socially for the nationals, who are fighting over land rights and the right to their land. Corporations are moving indigenous people from their land to make room for more palm oil. Many local environmentalists have been killed in aid of this cause.

![Percentage Forest Loss, 1990-2005](https://earthobservatory.nasa.gov/Features/Deforestation/deforestation_update3.php)

Expansion of the crop is destroying environments and biodiversity.

Socially, the crop is causing upheaval to the indigenous people.

Two more Honduran land rights activists killed in ongoing violence.

Honduras: Finding balance between people and environment.

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The palm oil tree, African Palm, or Elaeis Guineensis. It is native to west and southwest Africa, specifically the area between Angola and the Gambia. Oil palms are able to produce fruit for harvest within 4 to 6 years of planting, if fertilised well. Life expectancy is 20 to 30 years on average, at which point they are usually 40 feet / 12 metres high.

It is their fruits that contain the oil kernel in which we so rely on. As shown in the right hand image. The rest of the fruit material can be used for biogas fuel.

In terms of trees, the palm oil is in fact one of the most productive, in comparison to other oil seed of soybean or canola, which is why it is becoming such a monopoly.

The northern coastline of Honduras is unique in tropical climate which is perfect for the growth of the crop.
Looking at land use maps from the 1960s, on the left, to the most recent recorded from 2014, on the right. The map from 1960, although in less detail shows the basic comparison of agricultural to natural landscape.

The land use map from 2014 has seen a dramatic change in land use. There has been huge increase in deforestation and for agricultural land, and much of which has been turned into palm oil agriculture.
The Landscape Approach

With a growing world population and a related growing demand for food and other resources, there is an ever increasing pressure on natural resources and climate. So the question is, what is the future landscape for Honduras. The landscape faces these common global problems as well as the undergoing rapid expansion of Palm Oil agriculture.

The landscape approach looks at competing claims from a large variety of stakeholders converging on a landscape level. When individually addressed, the approaches taken to reach these goals could have negative tradeoffs. The idea of landscape approaches is to find cross-sectoral solutions. The landscape approach aims to contribute to sustainable development by supporting economic and social development combined with local biodiversity conservation, in which biodiversity is regarded as a basic element for sustainable growth.

The right image illustrates the varying stakeholders whom were considered and used in discussions of the landscape.
Introduction to Project and Problem Understanding

1. Research: Location

2. Research: Global

   Scenario Methodology (Present Situation ---> Trend Scenario ---> ILM Scenario)

   Who are the stakeholders and what are the main themes?
   Can they be explored within the landscape?

3. Research: Local

   Interviews with people and stakeholders

   What are the social/ economical/ environmental problems in the location, and how can they influence the spatial future of the landscape?

   What location should be chosen for in depth design study?

Concepts for Spatial Design

Spatial Design

What interventions should be made to achieve a more sustainable environment, and where?

How can these interventions be made and how should time be considered?
The Landscape: Past and Present

To understand the future of the landscape, I looked at it in its past and present. Landscape paintings depict a traditional sense of the landscape, in its rich and diverse landscape centered around these rivers and rural agricultural life.

The present landscape however shows a different Honduras. Colonisations and exploitation has defined the recent history. All too often, the government’s main interest in the country’s economy leads them to allow corporations to take the land owned by indigenous peoples for their own financial benefit.

With plantations systematically destroying the rainforest land that the local people depend on, communities are continuously finding themselves with no choice but to become plantation workers. Faced with poor and degrading working conditions, some earn barely enough income to survive and support their families. Instead of being able to sustain themselves, indigenous communities become reliant on the palm oil industry for their income and survival, leaving these villagers incredibly vulnerable to the world market price of palm oil which they have no control over.

The traditional rural lifes in Honduras have severely changed from this idyllic paintings of the landscape.
There are three main landscape types which make up this area: being the mountainous landscape which is mainly forested, the large river plains where agriculture is very present, and the northern coastal landscape, bordering the Caribbean Sea.

Within this landscape, are a hybrid of specific landscape types which house much biodiversity. Honduras is considered a hot spot of biodiversity. Due to its geographical location which converges on tropical and subtropical ecosystems, Honduras possesses a high degree of diversity of terrestrial, marine and coastal and freshwater biological resources.

The following pages research the two larger valleys in the project location: the Valley Sula and the Valley Aguan.

The vast majority of palm oil production is based in this ‘Zona Litoral del Norte’ or ‘Northern Littoral Zone,’ an area comprised of the Ulua, Chamelecon and Aguan river watersheds, which together compromise 135,000 ha and drain directly into the Caribbean Sea.
- Mountains of Bizinia are under threat to coffee plantations.
- Agriculture in bananas, plantain and palm oil
- Landscape toward the east is drier
- Palm oil is very high in this fertile region, many owned by Dinant company
- Important ecological areas are tropical forest, wetlands, lagoons, mangrove forests.

**Valley Sula**

- Pacific Coast
- Largest support in Cays
- Trenches
- San Pedro Sula
- Palomino Park
- Parque Nacional Cusuco
- Parque Nacional Mico Quemado
- Parque Nacional Pico Bonito
- Parque Nacional Botaderos

**Valley Aguan**

- Mountains of Bizinia are under threat to coffee plantations.
- Agriculture in bananas, plantain and palm oil
- Landscape toward the east is drier
- Palm oil is very high in this fertile region, many owned by Dinant company

- Extended dry season (irrigation systems in use)
- Oil palm from mid water shed to the river mouth
- Other agriculture in sugar cane, king grass, plantain and banana

**Honduras: Finding balance between people and environment**

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Honduras: Finding balance between people and environment

Research Lens: Global
Honduras: Finding balance between people and environment

This shift to a landscape which is the link between nature and culture - scales on which many different stakeholders, from global to local level, globalisation, technological development and the integration of peoples and boundaries of our physical landscapes. With increasing activities considered to be guided (and limited) by the natural conditions, the view on futures are becoming a part of a globalised landscape, no longer are our activities involved for more integrated approaches. As well as people becoming a defining part of their landscapes, we need to consider potential futures, which have been visualised as tools for the communication between stakeholders for discussions to take place, and influence on the successive design policies. In the study, we presented a mix of geographical information system (GIS)-based map making with more localised three-dimensional (3D) visualisations. In hand with more commonly developed GIS mapping and data is put upon themselves to understand potential consequences of tools. Rather than showing definitive end products of certain ideas, they instead showed tools which could be starting points to help sustain an environment, in which optimum integration occurs between parties. In allowing people to be involved in discussions on consequences, it was a good way to communicate potentials in the future understanding of each other. The method was more of a focus on the process and awareness of consequences to a shared optimum future, rather than toward set concrete futures which maybe did not represent everyone.

In a visualisation of process toward an optimum scenario for all the parties involved, everyone can be represented and the ideas can be more flexible. Exploring the consequences within the communication can allow everyone to evaluate them in consequences for themselves as well as for other parties for more of an integrated method toward a developed future.

The ILM scenario was not visualised, instead four main themes which could allow everyone to evaluate them in consequences for themselves. The ILM scenario was not visualised, instead four main themes which could allow everyone to evaluate them in consequences for themselves. The ILM scenario was not visualised, instead four main themes which could allow everyone to evaluate them in consequences for themselves. The ILM scenario was not visualised, instead four main themes which could allow everyone to evaluate them in consequences for themselves.
This map was developed by the team at the PBL. Using the program of CLIMondo, to develop maps of the existing land use in the project location. The maps looks at land uses in blocks of 250 by 250 metre frames. The data in this map was then used to think about the future land uses in the location.

The legend for the map is on the following page. The map on the right shows the present situation of the Northern Coastline of Honduras.
Each cell defines a space of 250m x 250m

0. **Urban**
Cells of urban development. Cells vary from small rural built areas, at a balance with landscape, medium urban spaces, with sharper lines against the landscape, and large urban hubs, with little interaction with the landscape.

1. **Intensive agriculture**
Intensive agriculture, for example: rice, sugarcane, pineapples.

2. **Palm Oil**
The cells sustainable palm oil production.

3. **Shrubland**
The cell is >20% shrubland and <40% forest.

4. **Mangrove**
The cell is >20% mangrove and <20% forest.

5. **Wetland**
The cell is >20% wetland and <20% forest.

6. **Forest Broadleaf**
The cell is >20% forest broadleaf and <40% forest.

7. **Forest Needleleaf**
The cell is >20% forest needleleaf and <40% forest.

8. **Bare**
Bare and sandy ground, normally adjacent to rivers and beaches.

9. **Water**
Water, lakes, rivers and lagoons.

10. **Extensive agriculture with spread**
The cell is >20% extensive agriculture and <15% forest.

11. **Mosaic extensive agriculture with spread**
The cell is >20% extensive agriculture and <40% forest.

12. **Forest with extensive agriculture**
The cell is >20% forest and <40% extensive agriculture.

13. **Cash tree crops, mixed with trees**
The cell is >20% cash tree crops and <40% forest.

14. **Forest mixed with cash tree crops**
The cell is >20% forest and <40% cash tree crops.
Challenges in the present landscape

From research the main challenges in the present landscape are as follows:

• More extreme flooding and drought through climate change
• Contaminated water from fertilisers
• Land-use conflicts between communities and corporations
• Unsafe image of Honduras
• Disconnection between urban and rural life
• Environmental destruction
• Food instability
• Less young involvement in agriculture.

With the team at the PBL, two follow up maps were made; illustrating the trend scenario of continued exploitation of the landscape, and the ILM scenario, designating land use to achieve the sustainable development goals. These are shown on following pages.
More severe flooding and drought events.

Mass deforestation to make room for palm oil.

The Trend Scenario Map

This map shows the trend scenario, where continued exploitation and use of resources was continued without consideration of people or planet.

The map is predicted for the year 2030, with a population increase of 1 million.

The trend scenario shows a Honduras of deforested mountains, to make room for the palm oil agriculture. Monoculture in the river plains with predominantly palm oil, and a flooded Honduras without protection to climate change.

Although many stakeholders will see the economic value as most important, it is an awareness of the biodiversity and landscape values which must be realised and focused on. That was the aim through these images.

Source: PBL

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The integrated landscape approach focuses on how to sustain the palm oil in the most sustainable way to ensure food security in the landscape as well. The maps look at blocks of 250 by 250 metre frames. The principles of creating the map were to continue palm oil on existing sites, but not to cause any more deforestation for increase of palm oil production. It also ensured the growth of palm oil was only done on suitable land, ensuring none was continued on hillsides. More space is accounted for food agriculture in prediction of the population increase, this is on new land and on existing palm oil land. It also considers potential areas for urban densification.

The map is predicted for the year 2030, with a population increase of 1 million.
As a landscape architect, I was more curious as to the consequences on the landscape in a spatial level, as well as how more localised landscape interventions can be implemented for solution.

Within this ILM overview, specific themes are looked into for intervention on a smaller scale. These were analysed further. The research conducted came from a report on the project, produced from discussions with stakeholders in the landscape.

EcoAgriculture Partners For the Solidaridad Network | Supporting Sustainable Landscapes in Northern Honduras; Landscape assessment (scoping) for the northern zone of Honduras: Recommendations for program design and implementation | December 14, 2016

From data and comments from the differing stakeholders, four main themes were deduced. To understand these themes more within the context and the impact they would have, they were analysed further, thinking in terms of the environment, social aspects, economic aspect and spatially.

### Scenarios of Integrated Landscape Management

**Food security**
- This is a focus on food security for the locals. Agriculture is focused onto food, and diversity of food for security. The power is with small holders. This is estimated in regard to the local population, which will increase by 1 million people towards 2030

**Water management**
- This theme focuses on water. Through reforestation, the watershed of the river is restored to tackle challenges of drought in the landscape. Flooding in the river plains is also tackled in this theme with river buffer zones. Also climate change affects water storage and rainfall.

**Sustainable palm oil**
- This theme focuses on the continued growth of sustainable palm oil. The agricultural growth is continued but in a sustainable way, increasing productivity from the same area, using new improved tree varieties.

**Eco tourism**
- This theme is a focus of the preservation of nature and biodiversity. This is a recreation of the environment, and true nature. The economy focused on natural beauty and tourism from it.

Using this framework, I analyse the four themes further in the following pages.
This is a focus on food security for the local people. Agriculture is focused onto food, and diversity of food for agriculture stability and resilience in food production. The power is with small holders, and improved land tenure security of small holder farmers.

Common crops seen in Honduras, which can be increased in production are highlighted below.
This theme focuses on the continued growth of sustainable palm oil. The agricultural growth is continued but in a sustainable way, increasing productivity from the same area, using new improved tree varieties. This is still aimed at the economic growth in one dominant industry, but done in a more sustainable way, under the RSPO. This ensures natural biodiversity is an important aspect in the continued production of palm oil, and work with the local communities. With this theme, there is a stability of jobs in this economy. Palm oil is also used as biofuel for energy in the area.

Hondupalma is a medium-sized palm oil cooperative located about an hour away from San Pedro Sula. This is a cooperative palm oil company that is already starting sustainable measures in its practice.
Water Management

This theme focuses on water. Through reforestation, the watershed of the rivers is restored to tackle challenges of drought in the landscape. Flooding in the river plains is also tackled in this theme. Agriculture will be out of flooding zones, and river buffers implemented for protection.

Water storage is important for use in rural communities and in agricultural production. Quality is also important to ensure environmental guarding of river eco systems and coral.
Water Management

Water is an important issue in the landscape at present, the map on the right indicating flooding threat. Flooding is a common issue in the landscape, affecting the production of many agricultural fields in the valleys.

The left indicates to practical solutions which can be implemented in landscapes to aid this issue.
Eco Tourism

At present a lot of space is still under threat of deforestation for agriculture and cattle. Biodiversity is extremely threatened. RPBR has noted more than two thousand species of endangered plants, with perhaps some yet to be discovered (UNESCO World Heritage Centre 2009).

This theme is a focus of the preservation of nature and biodiversity. This is a restoration of the environment, and true nature. The economy focused on natural beauty and tourism from it.
Eco Tourism

The map on the right indicates the areas in the location which are already protected. This themes looks to increase these areas, and buffer zones adjacent to them, as well as how they can be connected to one another.

Economy can develop thorough tourism of this unique and beautiful nature.

Red highlights the built urban environments, and the green highlighting protected areas. These would be extended to protect more space and re-store bio diversity.
In the design, a research into potential tools was undertaken. The table below illustrates potential interventions with the classification of each theme in which they would benefit.

Split into three groups: working with nature (river, room for the river projects, reforestation, and mangrove coastal protections); tools related to agricultural processes (ecological corridors, water storage, sustainable farm and palm oil practices); and architectonic developments (urban development, rural development, tourism development, and tourism parks).

<table>
<thead>
<tr>
<th>Tools in the Landscape</th>
<th>Food Security</th>
<th>Sustainable Palm Oil</th>
<th>Water Management</th>
<th>Eco Tourism</th>
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<tr>
<td>Working with nature</td>
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<td>Agricultural tools</td>
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<td>Architectonic developments</td>
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Honduras: Finding balance between people and environment

TU Delft Landscape Architecture
Stakeholder Discussions

The scenario themes were presented to the stakeholders of the project to create discussion on what could be the consequences of each theme for each stakeholder. Labels were made to prompt discussion.

Based on the feedback of this workshop, the team could feed back into the land-use models.

In general the exercise was extremely useful in creating awareness of the landscape as a system and the consequences of their actions on the landscape, as well as awareness of one another’s goals.
Conclusion from Research

The visualised models were vastly simplified models of the vast complexity of the landscape of the Northern coastline of Honduras. They are however successful in illustrating the potential scenarios for the future of Honduras, and the areas for interactions for future action.

The visualisations themselves were able to bring the global problems, which the landscape area faced, to practical solutions. In highlighting potentials in the landscape, they were able to show the landscape as a system for the needed awareness of consequences to the stakeholders individual decisions.

It was for me fascinating work done in conjunction with the PBL. But in continuation for my own thesis project I felt a lack of understanding the real culture of the place. So in hand with the research on the global level, I felt I needed more understanding with that on the local level. The following pages highlight the research done for more understanding of the area on the local landscape level.
Research Lens: Local
To Honduras

To acquire the research on a more local level, in hand with any previously conducted research done on the global scale with the PBL, I decided to go to Honduras. With the help and funding of TU DELFT Global Initiative, I was able to spend a month in Honduras in August of 2017.

In consideration of implementing a landscape design, I thought back to the main problem in the landscape; the expanding economy of palm oil agriculture. Looking at the northern coastline of Honduras, I looked at the areas with the most dense problem of Palm Oil agriculture. The valley of the river Ulua and the valley of the river Aguan, had the most palm oil agriculture.

I decided to zoom into the Valley of the River Ulua for the design as it is the most populated; many rural towns surround the palm oil fields as well as the industrial city of San Pedro Sula is situated here. In the design I am interested in the interaction between the environment, and productive identity of the valley, and the people whom live there.

So as such, it is to the valley of the river Ulua to which I went, and the city of San Pedro Sula.
The area of design research will be in the valley of the River Ulua, in the area of dense palm oil production. The specific location is very rural, there are many small rural towns situated here grown from the agricultural economy. In my research I hope to answer the following:

- How can the Rural towns develop?
- What specific habitats should be protected?
- What other types of agriculture can be used?
- What flooding protection can be implemented and where?
- How can the sustainable palm oil practice be implemented?
- How can power be brought back to small holders?
- What is the relation with the small holders and large corporations?
- What are the locals relation to the landscape?
Zoom in the the Valley of the River Ulua. This map illustrates the areas of ecological interest and areas of conservation.

Zoom in the the Valley of the River Ulua. This map illustrates land uses in the valley at present, as well as flood risk on the landscape.
A water system which could define areas for people and small holders to bring them power in the globalising landscape.

Initial design thoughts

Before I left for Honduras I was very keen to develop a new strategy to phase out the progress of palm oil and find new economies such as eco-tourism or other agriculture. I also considered creating a uniting water system for the people to define the areas of food agriculture away from the large corporations bringing in palm oil. In initial thought, this could define the limits of palm oil growth and more defined areas of ownership, to safeguard land for the people.

A small study of the town of Uracco looks into this idea in more detail.
Experience of the Landscape

Most notable to myself, whilst in Honduras was the separation between people and landscape. The people whom live in the rural towns of the valley, indigenous to their landscape, are now so disconnected from it. It is a loss of power, place and their presence. The landscape is no longer theirs, as it transforms around them, the towns seem disconnected from the production and business as well as the globalising technology.

The towns are left in under developed conditions, in comparison of that of the cities. There is little space of recreation, people gathering to local water holes to relax. The towns sit alone in their landscape; surrounded by agricultural production which is out of their power.

My ideas for landscape interventions separated the people and the corporations. However, it was through seeing the cooperative palm oil producer of Hondu palma, and talking with landscape initiatives such as WWF and Redmuch, in which I could see the need to work together as a whole, cooperatives working with people for job and food security because it is much easier to give them awareness of the landscape as a system and implement agricultural standards for them.

Many independent and smallholder producers are not involved in RSPO certification efforts, are not trained in sustainable practices, and do not have access to extension services. Meanwhile, yield remains low; the current average yield is 17 MT/ha of oil palm fruit, whereas the potential is 24 MT/ha or higher. Current extraction facilities are only operating at a portion of their capacity, creating a high demand for fruit and encouraging further expansion onto unsuitable areas (Sebastian and Lee 2016). To achieve this ambition will require a combination of increased productivity, increased adoption of sustainable agricultural practices, substitution of oil palm for more suitable crops such as cocoa on steep slopes, and improved land use planning and natural resource management.

Discussions I conducted whilst in Honduras, are expanded upon in the following pages.
We are a cooperative, the Honduras Foundation of Agricultural Research, which was established to develop an effective capacity for the generation and transfer of technology in Honduras. We help farmers understand their land and soil for the continued growth of food on the land. We test the soil and give advice on how to make sure it stays with nutrients.

Our landscape is part of a global food chain. Much of our food is exported, but a lot imported as well. Even the most basic food of rice and maize, is imported for four months a year. We help research and teach farmers what we know for continued process of agriculture and food stability.

Opinions of Locals

Palm oil production is ruining our landscape, their roots are destroying the ground for other agriculture. It will ruin our environment. Maybe we should consider other economies such as bamboo production, which we can use to create houses. We need crops less harmful to the environment.

We want to work with corporations to help them meet sustainable standards of palm oil growth. Palm oil is good for stability in the economy, we don’t want to get rid of it, just make people aware of the affects and the standards we are trying to reach.

There is a lot of palm oil growth within national parks at the moment, which needs to be stopped. As well as on mountain sides and there is high soil erosions here already due to agriculture.

The corporations are good to help us reach the global agricultural standards we want. They just need to work more with local people, to help them stay aware of the standards of sustainability as well. Rural areas of Honduras are getting lazy, people are moving to cities and are no longer wanting to work in agriculture. Corporations will take over, we just need to ensure enough food is also available in the future plans. We work with these corporations to meet a sustainable future.

We want to empower women to lead their own careers and businesses as women are so underappreciated due to this country’s ancient traditions. We do this in hand with teaching them sustainable standards to ensure economic inclusion in the agricultural business. We also hope this can extend to future generations, who see an advantage to staying in this business at present.

The need to develop an effective capacity for the generation and transfer of technology in Honduras led to the establishment of the Honduras Foundation for Agricultural Research. We help farmers understand their land and soil for the continued growth of food on the land. We test the soil and give advice on how to make sure it stays with nutrients.

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We are an Agricultural Cooperative for Agrarian Reform, belonging to the Social Sector of the Economy, which has become an important source of development for the Valley of Sula and all Honduras. A reality that has forged thanks to the effort and dedication of its associates. A reality that is projected towards the future with only one idea: to improve the living conditions of our families and collaborators, as well as to seek the development of the country. We love the green of this country and the beautiful nature and we want to ensure that stays.
Visiting Honduras gave me new insights into how best to plan for this landscape, away from the computer and desk. Talking to the people and stakeholders here helped to see the reality of the problem and needs of the people, and the landscape where the environment and people are both considered. I was able to see the areas where people recreate and what their areas of beauty were, as well as the importance of job security in their productive landscape. It was also highlighting to me and un-awareness of the landscape as a system and its role in the global chain.

My time in Honduras was extremely impacting in what my perception was of the country, and completely changed my ideas for the project itself. It was incredible to see the spatial impact of palm oil in the landscape of Honduras. It only ignited the need for such a project as this to start discussions on the future of the landscape.

My drawing of Honduras, on the right, depicts the Honduras I saw. The rural towns sit separated from the productive value of their surroundings. The life in Honduras seemed very rural, and in poor conditions. There was a large separation between the people and their landscape.
Honduras: Finding balance between people and environment

Spatial Design
Two main concepts drive the spatial design thinking in the project, from my two lenses of research.

The first, from the global lens, being to create balance in the landscape in consideration of profit, planet and people. As consequence to the obviously unbalanced landscape in which this project sparked. Using the four main themes of research together to work toward the idea of a balanced landscape which considers people, profit and planet.

The second, from the local lens, being to reconnect the people back to their landscape. As history has depicted, the local people have steadily lost power over their landscape, mainly to actors outside of the landscape seeing the valley as site for valuable production. The people have constant limitations to their freedom within the landscape. Ownership becoming more and more to that of corporations and little public, natural and recreational space for the local people. This is for the empowerment of people within the landscape.

The research I conducted led me to certain key points to keep in mind during my design process, such as the following.

- Reduce pollution into water from agriculture.
- Promote income through food, sustainable palm oil products, and agrotourism.
- Watershed protection with vegetative cover near rivers all year around.
- With urban growth of 33%, limit urban sprawl and improve density in urban areas.
- Limit deforestation, and try to create reforestation wherever possible.
- Ensure habitat protection with areas for habitats and eco corridors.
- Minimise effects of drought and flooding, affects from natural occurrences.
- Improve productivity of palm oil through replacement of more resilient species and the limitation of expansion.
- Respect slopes with agroforestry to stop landslides.
- Improve food security with increased productivity of staple foods and promotion of mixed crops with livestock.

Conclusion from Research

How can the Landscape Approach provoke a spatial design in the Northern coastline of Honduras to create a future sustainable environment, accounting for the area’s landscape values?
Both lenses of my research led to a main idea integral to my design, being the idea of balance; in the planet, between production and nature, in people, between ownership by corporations and by locals; and in profit between monopolisation and diversity of economy.

The concept for the design is to connect the people of Honduras with their landscape. Bringing them together with the productive identity of the landscape into one system for water and food security as well as to meet global goals. The idea is to create a uniting system, which can unite people with the larger corporations.

In hand with a rethink of the land use of the specific area, two main systems are introduced as means of interventions as answer to the previous research and in target of the concepts to rebalance the landscape and reconnect people to their landscape. The two systems represent the two natural elements in the landscape; blue system to address water and green system to address the biotic environment. In terms of design I looked to these two natural systems already there and how I could make interventions and emphasise these more in meeting my concepts.

The blue system is a sequence of water collection and distribution. This not only manages the extreme seasonal weather conditions in the rainy season, but distributes water equally through the landscape to ensure better production of palm oil and food for efficiency of the productive landscape. The different landscape elements; the valley flat and the mountainous hills are considered separately in their collection of water.

The green system ensures a rebalancing of the abiotic and biotic system in consideration of this productive landscape. With introduction of different landscape conditions for creation for new habitats as well as connections to larger green corridors for the landscape. This also considers the changing of land uses for more environmentally friendly land use such as agroforestry or bamboo production, which can restore the soil, as well as eco tourism which can be introduced through the landscape. A main part of the project, and thought of in the proposed green system, is new types of economy, so that the area is less reliant on just one type of economy and production. These economies are as follows.

**Cocoa**

Stakeholders identified increased production of cocoa within diversified farming systems as a potential strategy to mitigate some of these risks for rural farmers. Cocoa is profitable and Honduras is competitive in the global market. Additionally, cocoa is suitable for agroforestry systems and can be grown alongside bananas, avocados, and other fruits, providing both additional nutrients for familial consumption and additional income if these products are sold.

**Tourism**

Tourism is growing in the Northern Coast of Honduras. Beach resorts and hotels exist on the coastline between Tela and La Ceiba. Eco-tourism is growing around Pico Bonito National Park and the Cangrejal River, and outfitters offer rafting, hiking, and horseback riding excursions. Stakeholders in the landscape would like to see eco-friendly and sustainable tourism grow, as it offers great potential to provide additional jobs and stimulate economic growth.

**Bamboo**

Increasing populations and the growth of a global middle class results in a rising demand for wood and fibre based products, placing further pressure on the planet’s remaining forests. Meanwhile, there are global commitments to restore 150 million hectares of degraded and deforested land by 2020. Furthermore, there are global commitments to restore 150 million hectares of degraded and deforested land by 2020.

Bamboo plantations can be grown on degraded land, providing positive restoration properties while at the same time reducing deforestation and degradation through the provision of a sustainable source of fibre. Grown on degraded land, EcoPlanet Bamboo’s plantations can provide a secure and sustainable raw resource for industries, companies and consumers.
### Interventions Table

<table>
<thead>
<tr>
<th>Food Security</th>
<th>Sustainable Palm Oil</th>
<th>Water Management</th>
<th>Eco Tourism</th>
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#### Blue System

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<tr>
<th>Interventions Table</th>
<th>Balancing the Landscape</th>
<th>Technical Landscape Interventions</th>
<th>Reconnecting People back to their landscape</th>
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<tbody>
<tr>
<td>Water management</td>
<td>River water collectors</td>
<td>Recreation and space in landscape</td>
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<tr>
<td>Soil erosion and food production on hills</td>
<td>Hill water collectors</td>
<td>Water and power access</td>
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<tr>
<td>Flooding prevention</td>
<td>Town water collectors</td>
<td>Water points through town</td>
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<tr>
<td>Food production on valley and more productive palm</td>
<td>Distributing water ways</td>
<td>Water access across landscape</td>
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#### Green System

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<td>Ectological diversity watershed restoration</td>
<td>Agroforestry and extensive agriculture</td>
<td>Food security/ power for people</td>
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<tr>
<td>Ectological diversity green movement</td>
<td>Green corridor</td>
<td>Natural route and connection through landscape</td>
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<tr>
<td>New economies</td>
<td>Community gardens and tourism activities</td>
<td>Food security/ new economy space and power for people</td>
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<td>Food security</td>
<td>River buffer and marshland</td>
<td>Reconnection to true nature</td>
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#### Ownership

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<tbody>
<tr>
<td>Diversity of economy</td>
<td>Ownership change</td>
<td>Diversity of power, back to people</td>
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</table>
Drawing the Landscape

In design of the project, many stakeholders were considered in the design for a united landscape system, in want of representation of everybody in the landscape. However, as landscapes are becoming globalised and their futures a matter of global decisions, uniformity threatens our places. Although place influenced my means of design, it is also carried through to the drawings in which I display the final project. Traditional paintings depicting the landscape have inspired my drawing of such. The compositions tell the landscape in a story capturing both tradition and invention, colloquial and academic, whilst showing link of the global to its local influence, my project tries to be the link between these scales.

Each intervention which makes up the new story of the landscape is shown in two drawings, linking the scales of project. The first, showing the intervention linking the global and local, and the second showing its working on a technical and detail scale.
Blue System

TU Delft Landscape Architecture
**The blue system**

The blue system is a sequence of water collection and distribution. This not only manages the extreme seasonal weather conditions in the rainy season, but distributes water equally through the landscape to ensure better production of palm oil and food for efficiency of the productive landscape. The different landscape elements, the valley flat and the mountainous hills are considered separately in their collection of water.
Hillside Water Collection

Global - There is extreme soil erosion, from an over intensification of intensive agriculture and palm oil agriculture.

Intervention - Flexible water collection systems implemented by farmers into the landscape. These sit on hillside farms to collect water, to stop the soil erosion in the landscape.

Local - Water systems collect water in which cattle can drink from or farmers can use for irrigation. The systems can be added to with roofs, and places making for the people to enjoy.
**Hillside Water Collection**

From study of precedents of collecting water on hill landscapes, the design has taken the main concept and been adapted for this specific context. This intervention concerns the landscape on the sloped edges surrounding the valleys.

These water collectors are situated following the natural slope of the hill.Built into the landscape, they collect excess water flowing down the hill. This not only stops soil erosion in the areas of agriculture, but also collects water for use on the farms in the drier months. Built in conjunction with trenches in the hill, access water can be directed into the systems.

Built with local materials; earth blocks for the main structure, with compacted clay on the inner walls to contain the water. I look into a specific farm on the hill bordering the town of Mezap a for design. Looking at amount of water flowing on each 50 by 50m area, interventions are placed to capture all falling water. The system at the top of the hill is roofed as viewing point over the farm and valley.
River Water Collection

Global - The designed reservoirs collect water from the rivers, at the points that the valley flat starts. Adjacent to areas of water overflow, they capture water during the rainy seasons, from storm surges in the river, to protect farmland from floods, and to better distribute the water.

Intervention - The long pools of water link altogether and push water into the agricultural lands for peoples individual access to water. With trees between to create shade, they can hold water for use in drier months. These sit at the edges of the valley side.

Local - The water plaza not only helps in the balance of landscape, but on a local level connects to the local people. Recreational pools are created at the side which vary in depth for people to relax in. Weekends see many people head to the rivers for recreation with friends, as well as where locals go to wash their clothes and as places to cool down from the heat. These areas sit close to towns in the valley. This pools mark the start of the system, the recognisable orange tiles on the water houses mark the system throughout the landscape.
River Water Collection

There already exists several water collection points in the valley area, (marked in circles on the left). The design introduces more interventions to collect water at the base of the mountains to the valley. These are the start of the water system. They sit on the edges of the rivers, in the areas of ‘natural overflow points’ which have marked the landscape. Following the shape of these, the new reservoirs are formed. Highlighted in red is the reservoir designed in detail.

The reservoirs are long and thin pools sitting horizontally to the north direction. They are only 6m in width, with 10m to separate them, as space for vegetation and trees. This has been decided in a way to create shade over the pools in aid of stopping evaporation. During heavy rainfall or storms, when the river naturally overflows, the water will be captured within these pools and saved for utilisation in the water system during drier months of the year.

The design is strict in form, and the pools are made from in-situ concrete following this formal design thought. These start the balancing of the landscape system by helping distribute the water during the extreme seasonal variations. They also help protect the landscape from flooding in the areas where there is extreme threat.
**Urban Water Collection**

Global - The towns suffer from extreme flooding during rain season, the threat increasing with climate change. Situated on the valley flats, they are prone to the overflows of the rivers during storms.

Meso - As such, water systems are also designed for the towns. These interventions can easily be built by the people themselves. They are designed to collect water overflow from the streets, and through a gutter system in the streets, can connect back to the water systems of whole. Towns and landscape are united and no longer separated. The water flows into new waterways bordering the urban land, which in hand limit town growth into the natural landscape but also designate areas for future housing development for the soon population increase.

Local - Many of the rural towns in Honduras lack constant access to water supply. These points in the street hold the water and linked to a hand pump, these points can be used by the people as water for washing and cleaning clothes.
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111 The idea for these water collectors is similar to that of the collection points on the hills. They are situated at the sides of the road, for excess water on the streets to flow into. The water is held in these systems, the ground being compacted clay to prevent erosion and provide potential for plant growth. These are attached to manual pumping taps, as the water can then be used by town residents for washing clothes or washing up. They can become communal points in towns for daily activities. The overflow of water from these points connect to one another and form the water system of the valley.
Honduras: Finding balance between people and environment

Distributing Water Ways

Global - Honduras does not lack water, but fails in distribution of this water. With better distribution, the agricultural production in the valley will be better, and individual farmers will have more security. The production will be more efficient and less space will be needed to this use.

Intervention - A system of waterways connect throughout the landscape, distributing the water from collection points, to the individual farms. The main large waterways work from the south valley edge down toward the north low valley. These connect to smaller waterways which take the water to individual farms. The system follows the existing lines of infrastructure, turning this colonised grided road system into a system which empowers the local people again.

Local - Farmers can take water from these trenches at their own need for irrigation of their farms and better productivity of their business. Simple hand pumps can be attached at the sides of the waterways for easy access to the system by not only large businesses but the small holders. Canal houses sit along the water system, controlling the flow of water, and highlighting infrastructure crossings. These houses, tiled in iconic red clay tiles, create a new language of the system over the valley, tying into the industrial city of San Pedro Sula. These can incorporate solar panels on the southern side as energy generation to control the water as well as local access to electricity by local people.
Distributing Water Ways

Following these set interventions in the landscape, in order of collecting water, it is then all bought into the system of waterways for distribution of the water. This water system has two main principles; the primary water way system and the secondary waterway system. The primary system is a larger waterway design, as the main channels for distributing the water in the landscape. These follow the natural topography of the landscape, using the natural slope for distribution. These lines follow the main infrastructure pattern along the landscape.

The secondary water network is linked to the primary system, these are smaller channels which run horizontal to the main and connect to the individual farms. They connect from the primary system through small pipes. These are powered by small units to enable water to flow into these trenches. Farmers can connect to them in their individual farms through hand pumps which can connect into the water.

Canal houses define this water system. They intersect at infrastructure crossings. At certain points they also act as gate houses to control the flow of water. These are also adaptable to solar panels on the roofs for the generation of energy to the local people. The climate is perfect for solar panels, and it can also bring individual power supply to the people; connecting to plug points in the canal house and to main infrastructure energy system. Much like the pavilion in the main city squares - these can become social hubs for local people, shaded places to relax from working in the farms.

These will stand iconic in the landscape, with the honduran red tiles on the roof, they will be seen across the valley as points emphasising the water system.
Green System
The green system ensures a rebalancing of the abiotic and biotic system in consideration of this productive landscape. With introduction of different landscape conditions for creation for new habitats as well as connections to larger green corridors for the ensured able movement of wildlife. This also considers the changing of land uses for more environmentally friendly land use such as agroforestry or bamboo production, which can restore the soil, as well as eco tourism which can be introduced through the landscape. A main part of the project, and thought of in the proposed green system, is new types of economy, so that the area is less reliant on just one type of economy and production. These economies are as follows.

The Green System

Hill land use changes
Green Route
Valley land use changes
Storm Water Landscape

Honduras: Finding balance between people and environment
Global - The increased intensity of palm oil agriculture has started to encroach upon the hills surrounding the landscape. The new design encourages the loss of all palm oil agriculture on the hills, over time, because of the caused soil erosion and loss of watersheds.

Intervention - Instead encouragement of agroforestry and extensive agriculture such as cattle is introduced. Agroforestry such as cocoa and coffee production is introduced which can be a large economy for the area and business for local people, and sustain the environment.

Local - Cattle will still be grazed but in combination with a small amount of bamboo production. Controlled by the cattle the bamboo can be grown small at first, the materials for use in the irrigation system and housing development.
Hill Landscape Land Use

A main objective within the design is to restrict palm oil growth on the hillsides as this cause lots of soil erosion and loss of watersheds. As such, a change of palm oil agriculture to mostly food production happens on the hill sides, as well as reforestation to restore watersheds. In terms of this new type of land use, agroforestry is mainly introduced for crops such as coffee and cocoa. The production of these crops is mixed amongst trees and shrubs for the insurance of continued habitats and reduced soil erosion. There is also introduction of more extensive agriculture such as cattle, which after palm oil can bring nutrients back into the soil. Also as an alternate economy, bamboo agriculture will be introduced into the landscape. Initially as an experiment to see its usefulness in the market. The species is native to central america. The bamboo has restoration properties which could help restore the land after palm oil agriculture, whose roots can be very extensive within the ground. Mixed with cattle, the bamboo itself can be controlled.

Introduction of this crop has been considered because it is also a useful material for the system as well. It can be used in hand with irrigation, as well as building material for new homes within the valley.
Valley Green Route

Global - The new green route connects the main communities of the valley, bringing space and nature back to the people, whom have been so disconnected to their landscape and other communities over past centuries.

Intervention - The previously agricultural plots will be left to ‘wild’ growth of nature. In initial stages of design, endangered trees can be bought here and planted by the community to bring back the beautiful diversity of nature which used to flourish in the valley.

Local - Creation of the paths and routes through can be built up over time by the people who live here. Using local materials to create the paths so people can walk or cycle through the natural valley. Houses similar to the canal houses are also implemented with solar energy generation which people can use to sell fruits under. This type of hut is very common on the roads through the valley to sell fruits.
Valley Green Route

As existing there is very little natural areas in the valley flats, there is a large disconnection between the town and people and the landscape. The landscape is restricted, the ownership of the valley being strongly taken away from the people. As such, a large green route is added to the valley which connects the different towns together. Running horizontally to connect all the towns, it is also connecting of different landscape elements, from the main River Ulua through the valley flats and to the side of the hill. Not only is this for the restoration of natural habitats in the valley area, but as a way to bring nature back to the people whom inhabitant this place. Sectioned from existing plots which will be left to grow as true nature, The people can help encourage the growth one day with addition of fruit trees. Although this acts as the main green corridor, it connects to many smaller ones which will be implemented along river banks and the new water ways, both for wildlife movement and movement of people. This main corridor connects to the marsh landscape as well as larger eco corridors on the top of the hill side.
Valley Plains Land Use

Global - The valley has become monopolised by palm oil agriculture, the area’s economy becoming reliant on this industry, controlled in the hands of a few. The people are losing space to this economy and power in their landscape.

Meso - A new economy in the form of activism tourism is introduced, working with palm oil agriculture. This starts from the town of Mezapa to join through to the factory of HonduPalma. In addition, local gardens are introduced as space for the local people to grow their own food.

Local - Local communities utilise the new gardens, which surround their towns, to grow their own food. These areas are designated just for the local people to transform into their own garden space. Amidst the green route which connects these communities and the new gardens is introduced a new road for encouragement of tourism. This road connects the town of Mezapa through to the cooperative factory of HonduPalma. This ‘activism tourism’ not only generates new economy in the area, but brings a new image to the valley; from ‘dangerous area’ to holiday destination. This activism tourism encourages the idea of this project as well as support to sustainable thinking cooperatives.
Valley Plains Land Use

On the valley flats there is also a large change in land use. Much of the palm oil agriculture will be changed into food agriculture, both of intensive and extensive use. The palm oil agriculture which through the help of cooperatives will follow the rules of RSVPO to be more productive in production. Pointed out already, much of the land in the valley will be restored to natural areas.

Introduced as a new land use through the proposed natural corridor are community gardens for the added food security for local people. In addition, tourism through the palm oil fields is introduced as a tourism aimed at activism which encourages the management of the land use of palm oil and the work done with the local people in the area. This is centred around the palm oil factory of Hondupalma in the valley. A path leads from the town of Mezapa to the factory to encourage the start of this economy.
Global - The intense variation in seasons in this climate results in a huge amount of water in the rainy season, increasing due to climate change.

Meso - At the end of the designed system is a new wetlands landscape. The large space sits at the end of the system, at the meeting point of the rivers that flow through the valley and ends of the water ways.

Local - Canal houses at the end of water ways can also control water into here. This area has been converted from agricultural land into space for excess storm water, through the digging of ground to make new paths in the landscape over time. This is an area for nature to flourish, a nature which has been condensed in the agricultural expansion. Birds and amphibians can flourish here in their habitats.
Storm Protection Wetlands Landscape

Overlapping with the blue system is the introduced marsh landscape. This natural element in the production landscape is introduced as a tool for storm water holding. The large space offers a large buffer for the channeled water to distribute into, to protect the towns and farms from impact of water during the rainy season, especially in the outlook to a future of severe climate change which will affect the rural people most. This sits at the lowest topographical point of the landscape area.

This area, which at present is farmland, will through the digging of trenches, diagonally to the flow of the adjacent rivers, transform into the marshland over time. It sits at the end of the water system, at the end of the waterways which can let water into the marsh. This natural landscape will also be a renewed landscape to the area which has long been lost to the productive function for the simulation of more habitats for wildlife.
Ownership

Taking reference of the land use maps, carefully created by the PBL, of future land use in the year of 2030, I zoom into my area of research.

The final outcome of the project utilises the suggestion of land use change, in addition to the interventions I design.

The maps on the right show the schematic drawings of land use changes in the area, and the area with addition of the interventions.

In addition to this design, is thought about the ownership of the project. At present, the landscape is becoming more privately owned and as such is the people of the landscape are being forced off of their land and losing power in their landscape. The idea is of the landscape changes as suggested here also goes in hand with more democratic ownership of the landscape; as explained on the following pages.
The design connects the landscape in a united system. The design itself tackles global goals of the landscape in a more balanced system, but in hand connects the people back to their landscape.

The design as explained above, shows the balancing of the landscape in terms of planet; production vs environmental stability, of profit; diversity and stability of economy, and people; reconnecting people to their natural landscape. In addition the project aims to empower the local people in their landscape. This empowerment of the local people has been thought about in terms of ownership and through the construction of the project itself.
The landscape project in vision is one of a united landscape, and this also concerns the ownership. With farmers put at an equal landscape within the system. The new system is about equalising the landscape in a shared vision, and with the cooperative hondu palma at the front of its making, it will be one which the people both help to make and can own.

The first elements of the project to be constructed are the most important to the project. In the blue system, this is initially the waterways, and following their construction, the water collection points adjacent to the rivers. The thought is to have these main waterways, and following their construction, the water collection is initially the blue system, this is initially the first tasks as mentioned are to be completed within the first five years of the project.

As new land uses come into place within the landscape, in time with the gradual decline of palm oil trees, new types of agriculture and land use are bought into the landscape. This includes more diverse food agriculture, such as bananas, sugar cane, pine-apples, and cattle; as well as agros forestry with the production of coffee and cocoa.

In hand with these new land uses and the introduced diversity in economy, local people are able to buy into the landscape. They can purchase plots of land for business with these new production uses. The aim is for more balance in ownership over the productivity of their own business, as well as help them to become certified with the RSPO, incentives for their time within the system. Along with initiation of the blue system, the green system will become certified with the RSPO, incentives for their time within the system.

Alongside developments in the productive agenda of the system, is the green spaces for people. As the green route and storm water landscape grow into more natural areas, the local people can interpret the tools in their own farms or in the urban areas. The materiality of these come from local materials which can be easily adapted by the people. Alongside developments in the productive agenda of the system, is the green spaces for people. As the green route and storm water landscape grow into more natural areas, the local people can interpret the tools in their own farms or in the urban areas. The materiality of these come from local materials which can be easily adapted by the people.

The storm water landscape is to be constructed following this, and post the construction of the waterways. This is also a task to be headed by the palm oil industries in the area, helping connect the system as one. The first above tasks as mentioned are to be completed within the first five years of the project.

With these new land uses coming into action, and more diverse productions taking place, farmers can start implementing some of the tools in the design. Landscape initiatives can help aid farmer and local people in this. These tools include the water pumps to have access to the water from the waterways, and access to local construction materials to build the water collectors on the hills and in the towns. These sets of tools, the water collectors on the hills and in the towns, do not follow the strict design principles of the initial elements built. The design suggests how they can be made, but the design is not implied to be a strict set of rules for their construction. The local people can interpret the tools in their own farms or in the urban areas. The materiality of these come from local materials which can be easily adapted by the people.

The construction starts with the most formal elements, that being the river water collection and the water ways along the existing strict lines of infrastructure. Through the timeline, the whole system will start to come together, in hand with the palm oil fields becoming more sustainable to RPSO standards, as well as increase in amount of agro forstry. From this a new economy will form through tourism. This tourism is to be aimed at activism tourism, based around walking tours of the palm oil farms and eco agriculture. This business will start to grow in the area.

By the year 2030, the plan would be to have all the new land uses in place as well as the water system, and both green and blue systems unite as one in the area. In hope of the projects success, the general principles in the design can expand through the valley.

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Digging of the waterways through the landscape, during the Dry months.

Green links surround waterways join, riparian zones encouraged to grow at 50m bordering rivers.

Areas in landscape designated their new land use.

Construction of main water collectors at the points adjacent to the river. Constructed in dry season.

STORMWATER LANDSCAPE

NEW LAND USES

People able to buy into landscape, in coherence with the new land uses, to start their own businesses or have their own land.

The aim is for a 50/50 in ownership, between co-ops/ corporations to people.

The cooperative of HonduPalma and the corporation of Palcasa hold land in the area and will help initiate the proposed design.

Water pumps in secondary waterways, connecting water to individual farms.

Water pumps to access water, such as water pumps. Funding of local initiatives.

Landscape initiatives help people start business and join common market, such as WWF and REDMUCH.
System is united in identity. System can be expanded in area across whole valley.

Farmers can construct their own water systems on farms in hills. Water system in farms build up over time, according to their own needs.

Recreational areas, paths through green route, and community gardens start taking place, constructed by local people.

Water system becomes one of the more flexible ‘tools’ for water collection can be used by local material. Farmers can buy locally or receive from the palm oil corporations. The construction is open to interpretation and how local builders can create these tools. The suggested tools use earth bricks covered with compacted clay for water retention. This is a construction method used a lot currently in the area.

Towns adapt water collection in urban areas over time to connect to larger water system over time. Continuous process with urban expansion.

From Palm Oil Agriculture to Cattle agriculture and Bamboo

Activism tourism starts as a prominent business in the area.

On the hills surrounding the valley - From Palm Oil to Agroforestry

Present
Palm oil fields
+10 years
Old palm oil trees remain
Surrounding land left to recover
+12 years
Community help in planting new trees (endangered species)
+30 years
Forest landscape connecting valley floor

On the hills surrounding the valley - From Palm Oil to Agroforestry

Present
Palm oil fields
+10 years
Old palm oil trees remain
Surrounding land left to recover
+12 years
Agroforestry planted with acacia
+30 years
Biodiverse landscape connecting valley floor

From Palm Oil Agriculture into natural areas on the valley floor.

New land uses in place

2030
In reflection to the wider context

Whilst agricultural landscapes are products of the local ecosystem, and in community in which they are situated, they are increasingly becoming affected by the same global issues and converging under the dynamics of globalisation. The main global issues being the inevitable population growth and consequential worldwide food insecurity. As predicted by the UN, the world’s population by the year 2100 will be between 9.5 and 13.3 billion. In accordance to the average American with a food footprint of 1.4 hectares, 93% of the world’s surface would be needed for a ‘2100 middle class world’. I think this project is extremely relevant on a spatial level, I think it very relevant as well to address the people of whom make up the landscape. My work at the PBL allowed me to explore three case studies of agricultural landscapes and their possible futures; in all three it was a multitude of actors contributing to the discussion, especially from an outsider perspective. It was the ambition of my project to bring this large global issue to the context, I conducted interviews to various landscape initiatives as well as living with an architect whom works in San Pedro Sula and could really bring me insight to the context, I conducted interviews to various landscape initiatives as well as at a palm oil company.

In reflection to the method and ethical dilemmas

I was very fortunate to work with the PBL during the initial stages of this project which could really support the research being conducted. Through my work at the PBL, I had access to a great amount of information in regard to the problem in the specific area of Honduras, and from interviews with various actors within the landscape such as NGOs, Palm Oil companies as well as banks and donors of the project. This was extremely useful in seeing the project from a very real perspective and for a more realistic approach of implementation, especially from an outsider perspective. The interviews conducted were able to lead to scenarios which, through research in more depth and through illustration, were able to be brought back to the actors for real discussions on the varying scenarios. This was a great moment to make actors in the landscape aware of another one and their needs, as well as how the landscape works as a system and the consequences of their decisions.

It is as such that I think what this project really compels in is its social aspect; throughout the project actors of the landscape have been in discussion a large range of people have been talked to. As a landscape architect, I think it essential to bring these global problems into technical solutions in the landscape but always in consideration of the people and place. I think this especially relevant in my more western perspectives and design approaches to global contexts.

Again, in my own visit to Honduras, I set about to really talk to people there to fully understand the landscape. As well as living with an architect whom works in San Pedro Sula and could really bring me insight to the context, I conducted interviews to various landscape initiatives as well as at a palm oil company.

In reflection of design and ethical implementation

It was the ambition of my project to bring this large global issue to a realised design of site specificity. Although I think the concept and spatial design as whole works very well as solution to the problem, both balancing landscape and reconnecting people to their landscape, I think there are many aspects which still require much more research by in depth design. For the further in detail design, I think the project requires more knowledge on the landscape such as predicted rain falls and specialists on water management to realistically implement the project. However I think the design is successful in its spatial quality it brings to the landscape, taking elements specific to the landscape itself and working with the natural form of the landscape itself. The design in places is not only about the technical solutions but subtle characteristics which fits together the valley of the Sula for interactions on an individual level.

I think the design in materiality successfully offers a realistic way of implementation. There are a few formal and set interventions in design, but much of the project is flexibly designed for interpretation by the locals themselves. As a project, I wanted to offer a unified system but ensure enough freedom for the open interpretation by the people, so it is not too controlled, but even in implementation can empower the people of the landscape for their own control of their landscape. Eeva in thinking of the construction of the project, I bought people at the forefront of its implementation. Using the cooperative of HonduPalma as the starting point, which ensures the fair working with local people, people in the landscape will be involved in the construction and able to interpret it throughout. Through land use changes and ownership change, this part of the pro...
Reflection

Through land use changes and ownership change, this part of the project may take a long time to ensure, which can only come with cooperation of many actors within the landscape. I hope through the story I tell, which highlights the project to global issues and brings awareness of the whole system, that this can be influenced. This story is carried through to the drawings in which I display the final project. The compositions tell the landscape in a story capturing the link of the global to its local influence.

In conclusion

The project highlights as to a possible future, of a united landscape, envisioned in a new story of the landscape. The project offers ideas of the landscape at whole, linking the global issues to the local situation. As well as real ways of construction and how the project may be implemented. With more focus on technical aspects of the project, I think the project could in reality be successful and a starting point to the entire northern coastline of Honduras.

The project in whole is display of possibility for the future of this landscape, and in though can start discussion to the future. It is also display of landscape architects influence on large global issues such as food production, and the technical solutions we can offer.

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