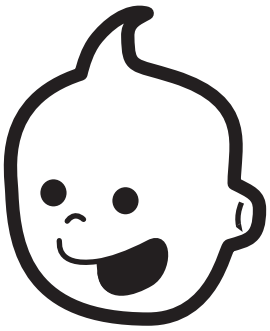
Mothers, grow your baby a bottle!

a toolkit to grow vegetables at home in the city of Hanoi.

Joep Deiman - Design for Interaction



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Master Design for Interaction
Delft University of Technology

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Get green Vietnam!

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switchasia TOWARDS SUSTAINABLE CONSUMPTION AND PRODUCTION

Executive summary

Vietnam has developed very fast over the past decades and is growing both in population and economic power rapidly. Especially the march of a middle-class is pushing the consumerism to a higher level; people have more money to spend on for example luxury items and food. Private food consumption is one of the most important areas with a big impact on the environmental sustainability. Sustainability is however still an unknown concept among the majority of Vietnamese consumers.

The main goal of the project developed in this thesis was to provoke behaviour change of Vietnamese middle-class households towards sustainable food consumption with the use of a physical tool.

Elaborate contextual research, conducted during a three month stay in Hanoi, was used to identify problematic behaviour wihin the area of food consumption. Throughout the project Vietnamese experts and organizations were consulted to ensure the concept would fit the Vietnamese context.

The topic of 'food safety' (often linked to the term 'sustainability') grabs everyone's attention in Vietnam.It is and has been a major problem, leaving consumers in despair. Especially young mothers are concerned about the health of their children and family. Although the government tries to improve the production of safe and organic vegetables with laws and regulations, a trustful system has not yet been established. The vast majority of the consumers still buy conventional vegetables that are produced with the use of chemical pesticides and fertilizers. Especially the intake of pesticide residues by young babies during their first two years can have a negative impact on the development of the baby's brain and immune system.

The final design proposed in this thesis is the 'Bottle Garden' toolkit **that empowers young mothers in Vietnamese middle-class households to start growing safe vegetables for their baby at home.** The toolkit emphasizes the importance of consuming safe/organic produced vegetables.

This graduation project was executed within the GetGreen Vietnam Project, which the TU Delft is part of. The overall aim of the GetGreen Vietnam project is promoting sustainable consumption among Vietnamese middle-class consumers in urban areas. The outcomes will be implemented in the designed methodology of GetGreen Vietnam.

Preface & acknowledgment

Throughout my Master Design for Interaction my focus has always been on simplicity; how to make our complex life easier to live by filtering out information or by bringing people together. Executed projects during my master had never a focus on sustainable consumption. I decided to take this final project as an opportunity to expand my horizon. It made me discover a world I was not familiar with, both in context (Vietnam) as in field of design (sustainable design).

'Think big' but 'start small'
Working on a global and complex problem made me learn to 'think big' but 'start small'. Solving a global problem within three months is a great vision, but a very overwhelming goal and impossible to achieve. So, one of the things that I learned was to narrow down a complex problem into something that is solvable within a short period of time taking one step at a time.

Working in another culture
One of the things I experienced was that being open to the culture and letting yourself be amazed without any judgment will earn you mutual respect. Being invited for dinner by my participants was very valuable for both building up trust and gaining insights from the real context. This is especially true in the field of Design for Interaction where immersion in the user context is invaluable. One of the lessons learned that apply to Asian cultures: first have dinner together, the next meeting we will talk about business.

A real adventure
I had never travelled outside of Europe before. Getting some kind of a culture shock was going to be inevitable. During my stay in Hanoi I was amazed about the spirit of hard work and the overwhelming amount of motorbikes. Although the contrast was big compared to the Netherlands, getting used to the busy lifestyle of Hanoi came natural. The real culture shock came when I arrived in Amsterdam again. At that moment I realized how chaotic Hanoi had been for me. It had made me stronger and taught me how to cope with complex problems and adversity; a lifetime experience I would never forget!

It was a great experience living in Hanoi for 3 months and I am thankful for all the citizens that were very helpful to me or served me delicious food. Some people I would like to mention who were of great support during the execution of my graduation project:

Netherlands:
My supervisors Floris, Jotte and Han.
Family: Lodi, Ruth, Frank & Diet
Friends: Paco, Sem.

Hanoi:
All colleagues at the Green Office.
All my participating mothers at AIT:
Ms. Hoai, Ms. Huong, Ms. Thao, Ms. Diep, Ms. Loan, Ms. Hoa.

Housemates Hanoi:
Guillaume, Linh, Sally, Chloe, Mathilde, Nikolai, Tim, Bertrand.

Joep

Hanoi: traffic

Hanoi is chaotic. Streets are flooded with motorbikes and traffic rules are not strictly observed. The most important rule is 'try not to hit someone else'. A cacophony of motorbikes and cars honking at each other fills the streets with their urgent sounds. Although the honking gives a feeling of rush and annoyance, all the drivers seem to be relaxed without any angry facial expression. It is the way they behave, warning other traffic members. And, if you decide to drive against the traffic? Just press and hold your horn to warn people and you are ok to go.

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1. Introduction

INTRO: This chapter will explain the problem statement and project scope.
CONCLUSION: This chapter will conclude with a general design approach.

The problem statement for this graduation project is:

How to **change the behaviour [D]** of **Vietnamese middle-class [A]** households towards **sustainable [B] food consumption [C]** with the use of a **physical tool [E]**?

1.1 Project Problem Definition and Goal

[A] Vietnamese Middle-class

Vietnam has developed very fast over the past decades and is growing both in population and economic power rapidly. Especially the march of a middle-class, rising from 24% of the population in 2010 to 65% in 2030 in South East Asia (Mumford, 2010), is pushing the consumerism to a higher level. Now that there is more money to spend, the consumer is shifting from having enough food and warm clothes, to having good food and fashionable clothes. Therefore it is interesting to focus on the consumers of the Vietnamese middle-class that is becoming more and more powerful.

[B] Sustainability

The demand for energy, food and luxury items is growing. It is pushing the economy and increasing life standards for many people living in urban areas. However, the increase and difference in consumption has a big impact on the environment that needs to be managed. To gain control over the environmental situation, sustainable behaviour in society is crucial and must be deeply embedded in the daily lives and behavioural patterns of its citizens. However, the topic of sustainable behaviour is still underexposed in Vietnam; the Vietnamese consumers do not see the necessity or feel the responsibility of it(GGVN, 2013). This attitude needs to be understand and changed towards a more sustainable lifestyle.

[C] Food consumption

Consumer research showed that Vietnamese people spent around half of their income on food (TNS, 2012). It can have a big negative impact on the environment if not controlled or regulated. With a higher income, households are spending more money on meat and diary products that have a big impact on the environment. Yet they do not spend more money on vegetables that are safe/organic produced. Elaborate information on this topic will be discussed in chapter 3.7.

Within the topic of food consumption three different stages can be distinguished: buying, using (cooking/preparing/eating) and disposing (leftovers/waste). It should be figured out in which stage of food consumption there is room for improvement towards a more sustainable lifestyle in Vietnamese households.

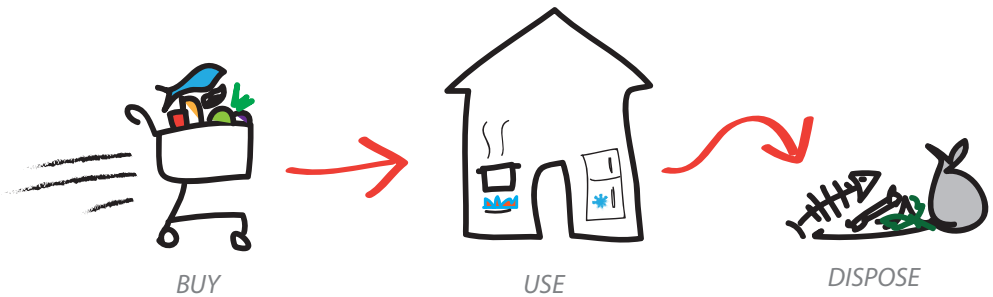


figure 1: stages of food consumption: buy, use, dispose.

[D] Behaviour Change
In order to improve the consumption pattern of Vietnamese middle-class households, unsustainable behaviour should be identified and tried to change. But what causes unsustainable behaviour? What are their motivations? And do people have the ability to change?

[E] Physical Tool
For this graduation I decided to design a physical tool in order to change behaviour. I see it as a challenge to find a simple hands-on solution to empower people to change their behaviour, rather than a (complex) digital solution that is in general focused on providing only information. Another reason is that I am more interested in physical rather than digital solutions.

1.2 Get Green Vietnam!

This graduation has been carried out within the project 'GetGreen Vietnam!' that has a focus on promoting sustainable consumption. During a three-month stay in Hanoi (where the office of GetGreen is situated), the goal was to identify a workable problem within the field of food consumption and design a physical product that empowers households to consume more sustainable.

figure 2: Logo GetGreen Vietnam.

GetGreen Vietnam! (GGVN) is a collaboration between the Delft University of Technology (TUD), Vietnam Cleaner Production Centre (VNCPC) and the Asian Institute of Technology in Vietnam (AIT-VN), funded by the European Union's program SWITCH Asia. The goal of the project is *"to promote sustainable consumption in Vietnam, focusing on sustainable living and working of middle-income consumers in urban areas."* (SCP, 2013). One of the unique project aims is the *"creation of a 'pool' of 1,000 individuals via 50 GetGreen consumer groups that will act as change agents to their direct living and/or working environment."*(SWITCH Asia, 2013) One of the phases of the GGVN project is aimed at creating the content of methods and training material for the 50 GetGreen consumer groups. The involvement and training of consumers throughout the whole project will increase the likelihood of adopting a sustainable way of living. The GetGreen Vietnam project runs from April 2012 to March 2015.

1.3 General Design Approach

1.3.1 Thesis Structure

This thesis is divided into three main parts; research, concept development and evaluation. The goal of the research part was to find valuable insights that led to the design brief (chapter 4). The requirements of the design brief served as input for the concept development.

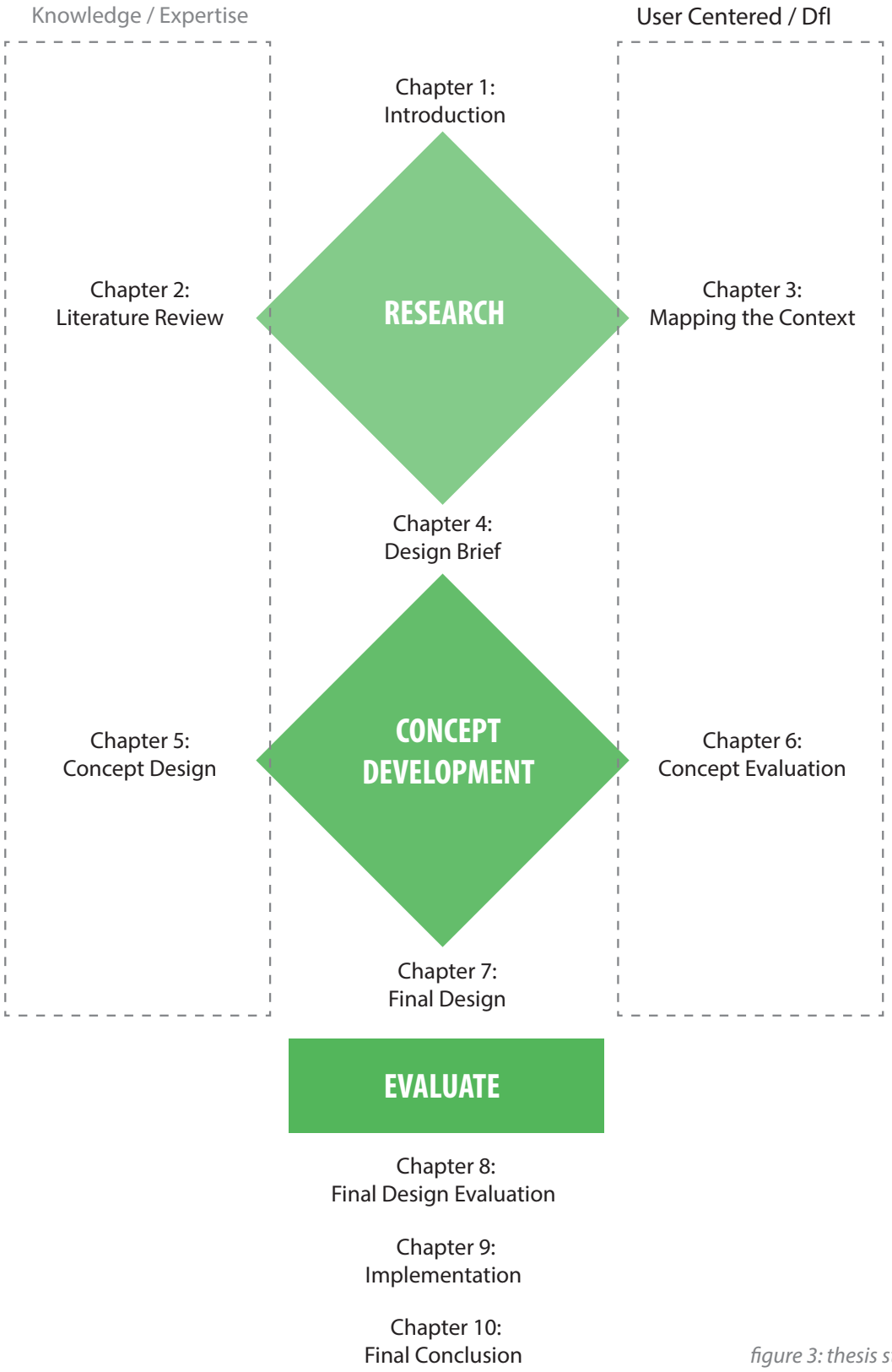


figure 3: thesis structure

Chapter 1. Introduction:
What is the scope, problem statement and design approach of the project?

Chapter 2. Literature Review:
Creating a base of common understanding from literature and finding interesting insights that contribute to the formulation of the design brief.

Chapter 3. Mapping the Context:
Doing (field) research in the context of Hanoi and finding opportunities.

Chapter 4. Design Brief:
Result of the whole research phase.

Chapter 5. Concept Design:
Giving shape to the proposed design brief.

Chapter 6. Concept Evaluation:
Test and evaluate final concept in Vietnam.

Chapter 7. Final Design:
Result of the whole concept development phases; showcase of final design.

Chapter 8. Final Design Evaluation:
Evaluation of motivation and target group.

Chapter 9. Implementation
How to implement the design in GG and future projects.

Chapter 10. Final Conclusion
Does the project contribute to behaviour change? What can people learn from this project?

1.3.2 Decision visuals

In chapter 3 (Mapping the context) and chapter 5 (Concept Development) the important decisions are depicted with figures as shown bellow to support the reader. Every dot represents a decision that has contributed to the development of the design brief or the development of the concept.

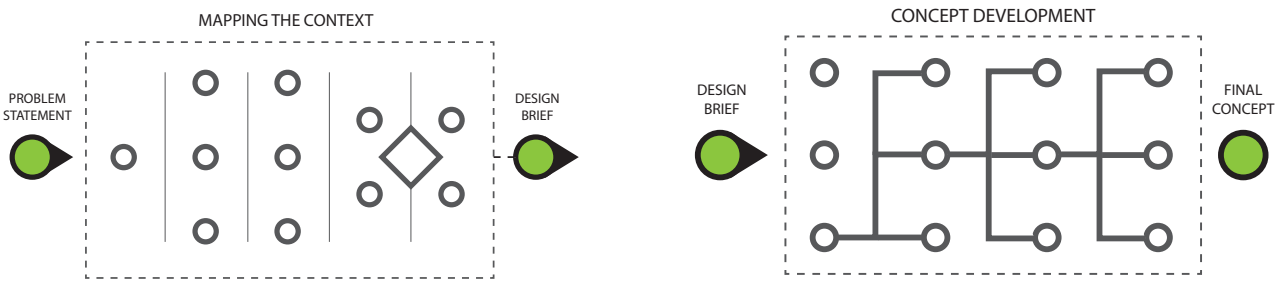


figure 4: decision visuals

1.3.3 Methods used.

First of all literature was consulted to gain general insights about the topic of sustainable food consumption in the context of Vietnam. The goal was to gain insights that could help to find focus during the first weeks in Vietnam and to formulate a concrete design brief.

Qualitative research methods

During the stay in Vietnam, qualitative research methods were used to gain rich insides from the actual context with the focus on the user. The process of this project was very explorative. Research was conducted as much as possible within the actual living context of the user. The use of Context Mapping in the first weeks made it possible to identify key motivations, workable problems and opportunities in a short amount of time. It was very important to be able to ask 'why' certain answers were given. Especially due to the fact that researcher and participant had different cultural backgrounds, answers could not be interpreted easily; behaviour that may seem obvious in Vietnam can be very unusual in a Western society (and visa versa).

Co-creation

In every phase of the project Vietnamese consumers and experts were involved to provide feedback and input. For example, creative sessions with Vietnamese students were held to co-create solutions. This was done to ensure that the project arose from the Vietnamese culture and user instead of a project that was forced upon them from a Western point of view only. The connections of GetGreen ensured that this was actually feasible.

"Co-creation is a form of collaborative creativity, that's initiated by firms to enable innovation with, rather than simply for their customers."

1.3.4 Relevance to Design for Interaction

The Master program Design for Interaction (DfI) of the TU Delft is focused on the way people and products interact. It investigates how users experience and use products and how product design can change certain behaviour. The needs and abilities of the user and their (social) context are key.
This graduation assignment has a strong focus on the actual user, trying to understand what (contextual) factors are of influence for a certain behaviour to occur.

1.3.5 Relevance to PhD Jotte de Koning

The outcome of this graduation project will be used as a case study for the PhD of Jotte de Koning at the TU Delft. Her research is titled *"Co-creation towards sustainable consumption"* with a focus on food consumption of the Vietnamese middle-class. She works on the methodology within the project of GetGreen Vietnam and tests whether co-creation can be used to change behaviour. At the end of this report (chapter 10) will be discussed to what extend my research can contribute to her PhD and to other research projects.

RESEARCH

2. Literature Review

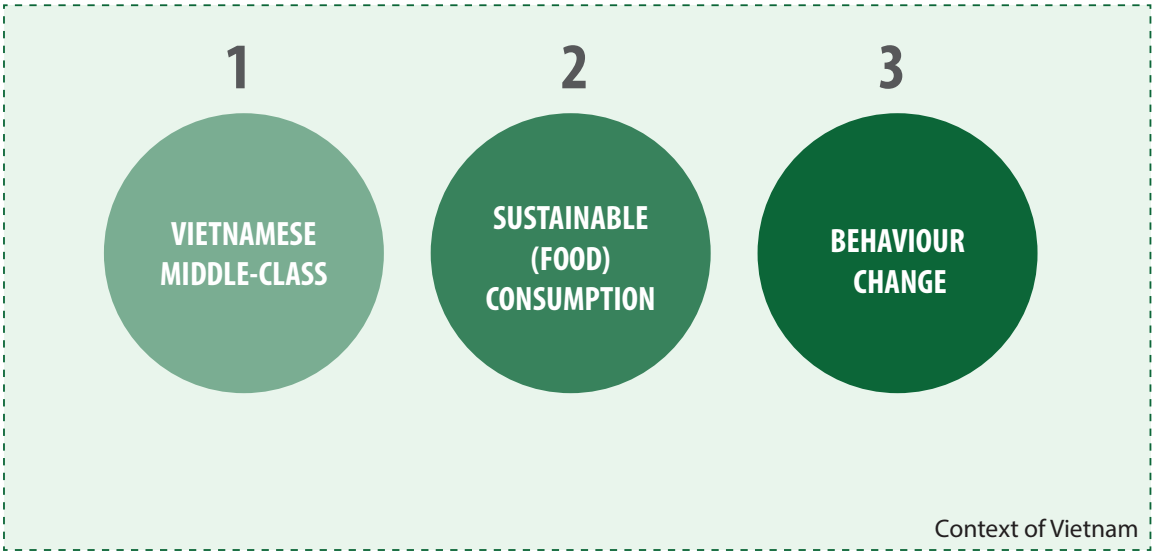
INTRO: This chapter will provide general understanding of behavior change and a cultural analysis based on literature.
CONCLUSION: This chapter will conclude with focus points for further research in the field.

2.1 Introduction

Literature is consulted on relevant topics to get an understanding of the subjects tackled in this project from a theoretical point of view. This information is used as basic knowledge during the research in the real context of Vietnam to be able to identify problems and opportunities in the field.

As a guide, the problem definition will be decomposed into smaller topics.

How to **change the behavior [3]** of **Vietnamese middle-class households [1]** towards **sustainable food consumption [2]**?



2.2 Findings

2.2.1 Vietnamese Middle-class households

With a fast growing middle-class, sustainable behaviour must be embedded within the Vietnamese lifestyle of every day. This paragraph will provide key insights about the middle-class in Vietnam and conclude with focus points for further research within this project.

Cultural dimensions by Hofstede (2001)

The 5-Dimension Model of Hofstede gives an impression of cultural dimensions that are typical for a country. The scores of Vietnam on the different cultural dimensions are depicted in figure 6. Vietnam scores high on the Power Distance Index (PDI); there is a strong sense of hierarchy, and one's places on the hierarchy ladder makes a difference in status. It also means that old people are highly respected. A high power distance has been part of traditional values in Vietnamese culture for centuries. In Vietnamese families the parents are very strict and children need to follow the rules of their parents.

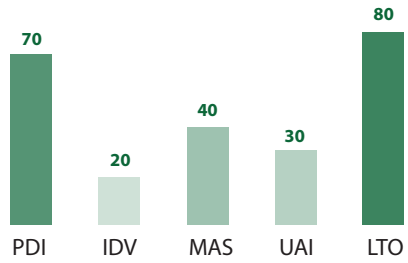


figure 6: cultural dimension Hofstede.

The score for Vietnam on the Individualism Index (IDV) is low (20) meaning that Vietnam is a collectivistic society. People show a strong long-term commitment to the group, especially to their (extended) family. Looking at the score (40) on the Masculinity index (MAS), Vietnam can be considered a slightly feminine society. People value equality and solidarity. Men were first seen as the provider of the family, but the division of labour in the family is becoming more equal; Vietnam has the third largest female working population in Asia with 77.3% [7](Survey, TNS).

Vietnam scores quite low (30) on the Uncertainty Avoidance Index (UAI): meaning that the society is not putting a lot of emphasis on controlling the future and avoiding uncertainty. The high score (80) for Vietnam on the Long Term orientation index (LOI) explains that it is a society that *"shows an ability to adapt traditions to a modern context."* (Hofstede, 2001)

Vietnamese middle-class: economic power

The entire population of Vietnam was estimated to be nearly 92 million people in 2013 (World Population Review, 2013). Vietnam has developed very fast the past decades and is growing both in population and economic power rapidly. A recent report of The Boston Consulting Group on consumer behaviour in Vietnam indicates that the middle and affluent class (MAC) is growing very fast, rising from 12 million in 2012 to 33 million in 2020. This report also shows that consumers in Vietnam are *"the most optimistic"* compared to other countries in Asia: 95% of the consumers in Vietnam believe that their children will have a better future than they have; and 69% of the Vietnamese consumers say *"they never spend money on themselves before the family's needs are met"* (BCG, 2013). It shows that family is more important than self-interest.

Vietnam has got a relatively young population with more than 70% being under 35 years old (Hansang, 2013). Upcoming years this will result in many new and young consumers entering the market, pushing the consumerism to a higher level.

One of the reasons why the Vietnamese middle-class is an interesting target group for this project is not only because the vast growth of this group results in a higher quantity of consumption (De Koning, 2013), reports also show that the middle-class is more open to change: *"In emerging economies such as Vietnam, the newly formed middle class is also considered the key cultural recipient of the changes"* (Nguyen, 2003, in De Koning, 2013). In other words, this group is not only a part of the problem, it is also the right group to start with.

However, on the topic of sustainable consumption (discussed in the next paragraph), there is little research to find about the Vietnamese middle-class (De Koning, 2013). This asks for a more hands-on approach in the actual context of Vietnam to gather information about the behaviour and awareness of sustainable food consumption in Vietnamese middle-class households. Health and family contribute to the motivation of sustainable consumption, since they are of high value in the Vietnamese culture (De Koning, 2013). Therefore it is necessary to look into the Vietnamese context to understand to which extent these factors can be of influence. With the growing number of studies in which health plays an increasing role in relation to food (Vindigni et al.,2002), it is interesting to examine the role of health from the consumer's perspective in Vietnam.

Therefore an elaborate context study needs to be executed. Not only to gain information about sustainable food consumption of the middle-class in Vietnam, but also to ensure that the concept will fit the context of Vietnam to increase the chance of succeeding. As explained by Vindigni:
"The compatibility of an innovation refers to the extent to which it fits with sociocultural values and beliefs, previously introduced ideas and needs for the innovation. The higher the compatibility of the innovation, the faster its diffusion will proceed" (Vindigni et al, 2002).

[Take aways]:
- Vietnam has a strong commitment to their family.
- There is little known about sustainable consumption and awareness of Vietnamese middle-class.
- To gain information: focus on contextual research in Vietnam.

2.2.2 Sustainable (food) consumption

A fast growing consumer group with economic power is likely to push the food consumption in Vietnam to a higher level the upcoming years. This paragraph will briefly explain what sustainable (food) consumption entails and ways how to make food consumption more sustainable in the context of Vietnam.

What is sustainable consumption?
"Sustainable consumption is giving consumers the opportunity to consume products and use services that meet their needs in an efficient way, while reducing negative impacts on the environment, society and economy. The ultimate goal of sustainable consumption is to improve the quality of life for consumers in both current and future generations; at the same time minimizing impacts on the environment". (UNEP, 2005).

What is food consumption?
For this research is decided to divide food consumption into three main categories: buying, using and disposing.

What is sustainable food consumption?
Food consumption is part of everyone's daily life. Research from the European Environment Agency (2005) indicates that private food consumption is one of the most important areas with a big impact on the environmental sustainability.
Thøgersen describes that *"extant research suggests that currently the most effective ways that affluent consumers can increase the sustainability of their food consumption are to (1) reduce the amount of meat, especially beef, in their diet, (2) buy organic instead of conventionally produced food products, and (3) avoid food products transported by airplane."* (Thøgersen, 2010)

Organic food is defined by Thøgersen as: *"Certified organic food products are produced with consideration for the environment and for animal welfare, controlled and certified by independent control organizations and usually labelled with an organic label to assist consumers in the supermarket."* (Thøgersen, 2010).

Another important area within sustainable food consumption is the excessive disposal of drinks and food. Food waste is one of the key elements in the development of a sustainable food system (Quested et al., 2011). Conducted research by the Waste and Resource Action Programme (WRAP) on food waste in the United Kingdom implies that the consumer should be guided to buy the right amount of food, store their food in the right conditions and use the food they buy. (Quested at al., 2011).

What is sustainable food consumption for the Vietnamese middle-class?

The consumers of the Vietnamese middle-class have little knowledge about sustainable consumption and its consequences and have low awareness of sustainable issues (De Koning, 2013). Conducted focus groups within GetGreen show that most of the Vietnamese consumers link sustainable consumption only to buying "greener" products; and sustainable food consumption in Vietnam is believed to be linked to the consumption of organic food that is safer for your health (GGVN, 2013).

Unfortunately there is little known about organic food consumption outside Europe (Thøgersen, 2010). Contextual research needs to be executed to find out what problems regarding to food consumption can be identified and solved within the scope of this graduation project.

Take away [BOX]
- Middle class has little knowledge about sustainable food consumption
- Middle class has low awareness about sustainable issues
- Context study: see which food category (meat, dairy, vegetables) should be the focus of this project.

2.2.3 Behaviour change

The goal of this graduation project is to influence the food consumption behaviour of Vietnamese middle-class households. Some behavioural models and behavioural change models are mentioned in this paragraph to better understand what behaviour is and how it can be changed. This paragraph concludes with focus points that are used within this project .

Behaviour models:

Behaviour is a complex phenomenon that is dependent on many contextual factors. Several psychological behavioural models in the past decennia are created for a better understanding of this concept. Designing for change can only be done when behaviour change is understood. Due to the complexity of behaviour there is not one overall explanation or model that can describe this phenomenon. Two behavioural models will be discussed: the Fogg Behavioural Model (2009) that is frequently used in the field of persuasive design and the Motivation-Opportunity-Ability model of Ölander and Thøgersen (1995) that can be used to analyse pro-environmental consumer behaviour.

Fogg Behaviour Model (FBM)

The Fogg Behaviour Model (Fogg, 2009) is presented in the light of persuasive design ("persuasive design is about understanding the emotions that influence people's behaviour and decision-making, and then acting on that information to design compelling user interactions" (Galdo, 2011, by Fogg, 2009)). The FBM *"provides designers and researchers with a systematic way to think about the factors underlying behaviour change"* (Fogg, 2009). The model consists of three principal factors: motivation, ability and triggers. An effective designed trigger can result in the occurrence of the desired behaviour, when both motivation (the reason to act in a certain way) and ability (the means or skill to do something) are high for a target behaviour.

The key element of raising the ability is simplicity; making the target behaviour as easy as possible to execute. When the behaviour does not occur, at least on of the elements is missing (see figure 7). As shown in the figure, to increase motivation and ability, there are several factors of influence. The model provides a clear framework to analyse existing behaviour. The designer can use this analysis to identify which factors impede the target behaviour from happening and try to influence them.

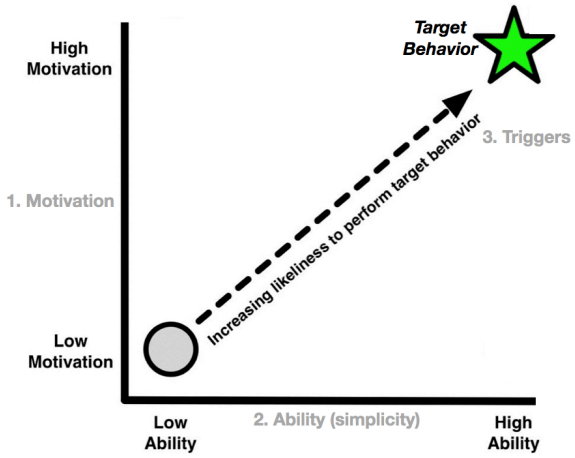


figure 7: Fogg's behavioural model has three factors: motivation, ability, trigger. (Fogg, 2009)

Motivation-Opportunity-Ability model (MOA-model)

The Motivation-Opportunity-Ability model (MOA-model) of Ölander and Thøgersen (1995) shows three factors that influence behaviour: motivation, ability and opportunity (see figure 8). The factor of motivation is divided into psychological elements (personal believes, attitude towards behaviour) and sociological elements (social norms or culture). All these elements lead to intentional behaviour. If the intention to behave in a certain way is present, the other two factors (ability, opportunity) influence whether the intention leads to behaviour. The ability entails the knowledge and habits people have. With opportunity is meant the situational conditions that people live in, like money and context.

When people show the intention to behave in a certain way it does not mean they will actually perform this behaviour. If they do not, there is a gap between intention and action. This phenomena is also called the intention-action gap or for sustainable consumption the 'green gap' (Bennett and Williams, 2011). The MOA-model explains that this gap can be caused by the ability and opportunity not being high enough for the intentional behaviour to result in actual behaviour. If people do have the intention to change, the model suggests that the ability and opportunity needs to be influenced to increase the chance of the desired behaviour to take place.

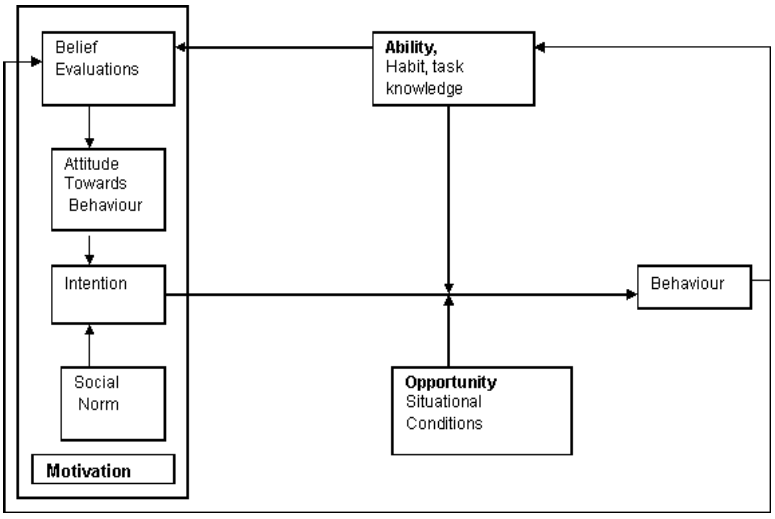


figure 8: MOA-model of Ölander and Thøgersen (1995).

Behaviour change models

The next question to be answered is how the intentional behaviour can be influenced. Behaviour that has become a habit can be hard to change, because there is a large aspect of unconscious decision-making involved; in order to change a habit the consumer needs to be made aware of its current behaviour (De Koning, 2013). In this paragraph two models on behaviour change will be discussed: Lewin's Three-Step Change model (1951) and the Stages of Change model by Prochaska and DiClemente's (1992).

Three-Step Change model.

The Three-Step Change model of Lewin (1951) divides behaviour change into three stages: 'unfreezing', 'change' and 'refreezing' (see figure 9). The first stage is to 'unfreeze' the existing situation; making people aware of their current behaviour and habits and motivating them to change. When people are conscious about their current behaviour they can move to the next stage of 'change'. In this stage adoption (being ready to adopt the change) will be followed by adaptation (trying to adapt to the change). The last steps in the model will lead to 'refreezing' the new behaviour; accepting the changed behaviour and incorporating it as a new habit.

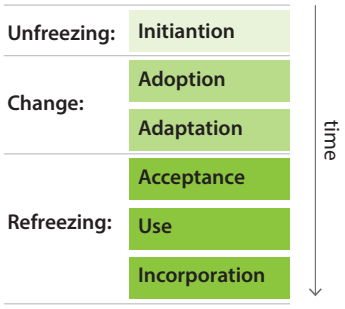


figure 9: Three-Step Change model by Lewin (1951)

The intention-action gap causes the behaviour of people not to get past the 'unfreezing' stage. In these cases a focus on motivation alone is not enough and other factors (ability, opportunity) could be of influence as explained with the MOA- model of Ölander and Thøgersen (De Koning, 2013).

Stages of Change model

The Stages of Change by DiClemente and Prochaska (1992) can be used to identify in which stage people are in relation to a certain behaviour (figure 10). Most people will go through several cycles before a certain behaviour is established.

People who are unaware or uninterested towards behaviour change are in the 'precontemplation' stage. To guide these people into the next stage, they can be educated on risks of their current behaviour and benefits of the new behaviour. When people are considering to make a change, they move to the 'contemplation' stage. To get people there, identifying (and overcoming) barriers and misconceptions can be a good strategy.

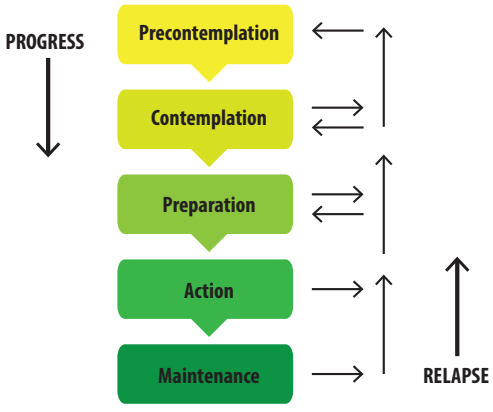


figure 10: Stages of Change by DiClemente and Prochaska (1992)

People who have decided and are preparing a behaviour change are in the 'preparation' stage. The strategy in this stage is to develop realistic goals. The last stages are to actually take action and maintaining the new behaviour in the future. Providing positive reinforcements during the action stage and positive feedback during the stage of maintenance will help to establish the new behaviour.

Use of models during contextual research

The behaviour of Vietnamese middle-class households need to be examined during the conducted context study on the factors (motivation, ability and opportunity) mentioned in the MOA-model to identify and improve behavioural problems to close the "green gap". Simplicity is a key element. Previous paragraphs showed that both awareness on sustainable issues (motivation factor) and knowledge about sustainable consumption (ability factor) are low in the Vietnamese middle-class. So, which factor should be improved? Is it, as de Koning (2013) says, in fact the lack of ability and opportunity that creates this gap?

Take away [BOX]:
- Try to identify motivation, opportunity, ability in the real context.
- The key element of raising the ability for a certain target behaviour is simplicity.

2.3 Conclusion

There is very little known and written in literature on the topic of sustainable food consumption of the Vietnamese middle-class. What we know is that the awareness of sustainable issues in Vietnam is low and needs to be raised. Raising only awareness on the area of sustainable consumption is not enough. During contextual research in Vietnam the moment of problematic behaviour within food consumption (buy, use, dispose) as well as the food area (meat, dairy, vegetables) needs to be found.

When the problematic behaviour is selected the relevant factors (motivation, opportunity and ability) need to be identified in order to change this behaviour.

3. Framing the Context

INTRO: This chapter will provide contextual insights to find a workable problem and opportunities for behavioural change.
CONCLUSION: This chapter will conclude with opportunities that lead to a design brief.

3.1 Introduction

Although the information and data about Vietnam found in literature provides insights in the Vietnamese culture, most of it is quantitative. It is interesting to gain a deeper understanding of the Vietnamese middle-class households by conducting qualitative research. In this chapter will be described: the target group, the main findings gained during the executed context mapping with the target group and insights from field research. A photo impression of food consumption

3.2 Target Group

The proposed assignment at the beginning of this graduation project was still very open. A specific target group within the Vietnamese Middle-class households was not yet defined. To bring more focus from the start 'young mothers' was defined as a target group on forehand. This made it possible to ask specific questions and gain richer insights. The reasons for choosing young mothers as a target group will be described below.

Young mothers

During conducted Focus Groups by GetGreen Vietnam (GGVN) with five Vietnamese consumer groups (Environmental Club University Students, Working Professionals, Mixed Group, Young mothers and Elderly People), several topics were addressed; food, waste & water, electricity & energy, transportation. The topic of food gathered every ones attention. Especially food safety is an issue that keeps the minds occupied in Vietnam and also the media frequently writes about it. The group of young mothers were especially concerned about food regarding to the health of their children.
One of the recommendations from the conducted focus groups by GGVN was that *"The project should give questions related to the kid, such as toys, food, clothes, because the kids will change the sustainable consumption behaviour of their family"* (GGVN, 2013).

Reasons for choosing young mothers as a target group are listed below.
Young mothers are an interesting target group because...

…they had a life changing event: the birth of a baby. It results in parents being more open to change their behaviour for the well being of their child;

...they are in the transition of a traditional lifestyle towards a more modern lifestyle; families are switching from 'Extended families' (more generations into one house) to 'Nuclear families' (only parents and children in one house).

...they are in control of the money that is spent on groceries bought for all family members.

...they cook for their family and nurture their children.

…they have a big influence on the buying, using and disposal of the food.

...they are becoming more employed and gaining economic power. Vietnam has got the third largest female working population in Asia with 77.3% (TNS, 2012).

... they teach their children how to live and behave; the norms and values of life.

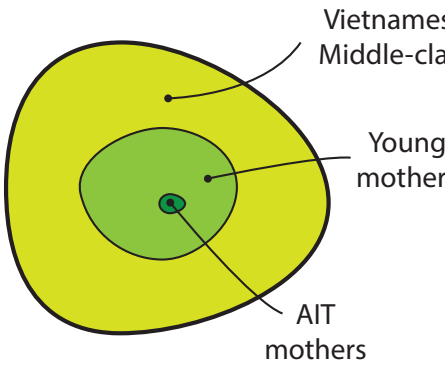


figure 11: focus of target group

Young mothers: AIT

Six young mothers between the age of 25 and 35 years old were selected to participate in the research. All participating young mothers are highly educated, working at the Asian Institute of Technology (AIT) and master the English language well. In this way they are easy to approach all at once. The English language enables communication without the intervention of a translator.

They all know about the existence of the GetGreen VN project. This makes them already more aware of the concept of sustainability. That is why, according to Rogers (1995), the participants can be classified as "innovators" or "early adopters"; consumers who are the first to adopt a new product or technology, before the mass..So, they might not be representative for all middle-class young mothers, but represent the right group that is open to change (see figure 12).

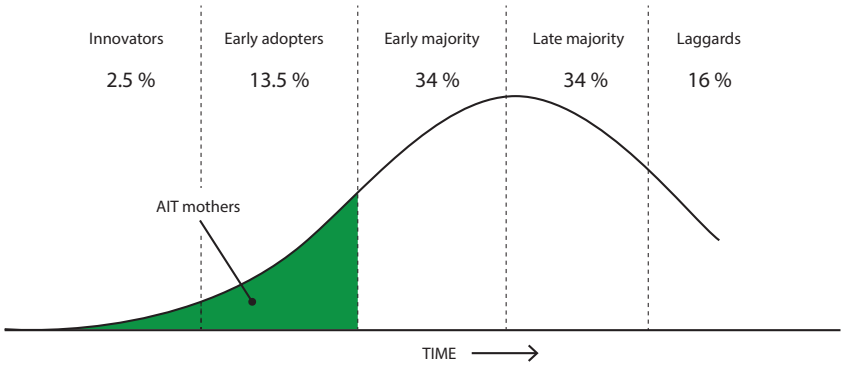
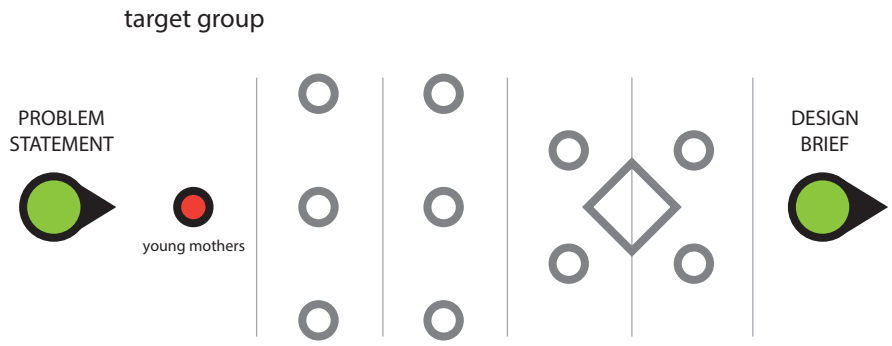


figure 12: Categories of Innovativeness by Rogers (1995).



3.3 Context Mapping

"Experience is a truer guide than the words of others."
LEONARDO DA VINCI, Thoughts on Art and Life

This paragraph will present and discuss the insights derived from the conducted context mapping sessions with the young mothers of AIT. The Context Mapping consisted of three parts: a sensitize phase with the use of a small booklet, an interview with every participant separately and a processing phase to analyse and conclude. The most important insights for further research will be presented.

3.3.1 Setup context mapping

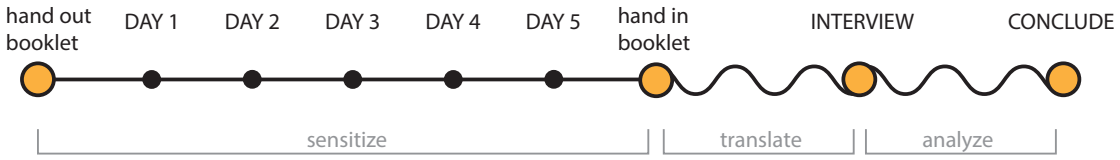


figure 14: Schematic overview of context mapping planning

Sensitize Booklets
One week before the visit at the family house, every participant got a sensitize booklet containing small questions and tasks divided over five days. The goal of the sensitize booklet was to map their daily (food consumption) pattern and getting a glimpse of their motivations in life. It would also serve as a conversation starter during the interview if necessary. Examples of tasks were: 'take a photo of your kitchen', 'describe your day and indicate what were your happy and unhappy moments' and 'write down which kitchen secrets you learned from your mother'. The booklet was written in Vietnamese to ensure the participants would understand the questions and enable them to answer and describe their feelings in their own words. The complete booklet can be found in appendix II.

Interviews
After the booklets were filled in and translated, all the participants were interviewed in their own living environment, their family house. The interview was semi-structured with a focus on food consumption and their living context. Three out of five families invited me for dinner. It was a nice introduction to start the conversation about food consumption and observe how the mothers cooked their meals. The interviews took place during dinner in presence of the whole family. Aditional insights that were not directly relevant for this report are presented in appendix III.

figure 15: family portret made during visit at home of Ms. Diep.

3.3.2 Findings

The insights from the sensitize booklets and interviews are combined into three categories: living context (how do they live?), food knowledge (what do they know?) and consumption behaviour (how do they behave?)

LIVING CONTEXT

Community

Every household in Vietnam belongs to a community group (figure 16). These groups provide information regarding nurturing, birth and death of community members, building plans or even environmental issues. Though once a powerful medium during war, loudspeakers that are still present in the streets are used to spread this information. The only thing is, nobody listens to the speakers anymore. Nowadays these community groups are more and more seen as too interferential and have little influence on young mothers.

Ms. Thao: "I don't listen to the loudspeakers anymore. They serve more as an alarm clock."

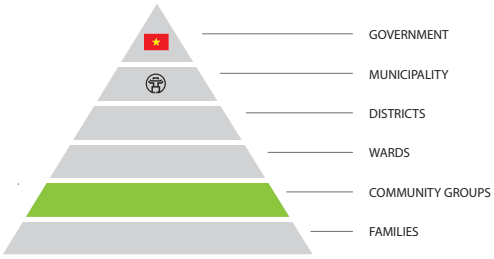


figure 16: Hierarchy of Vietnamese society in urban areas

Family

Most visited young mothers live with their parents-in-law. Some of the households have a maid that lives with them, who is responsible for babysitting and cleaning the house. All the visited families emphasized the importance of a close family relationship. Activities like eating, playing and sleeping with the whole family together are seen as very important. The young mothers try to spend as much time as possible with their children at home.

Ms. Huong: "I will teach my son how to live on its own".

All the interviewed young mothers had a clear opinion about the future of their children. They want their child to be able to solve their own problems and make their own decisions in the future. Being independent is considered to be important.

FOOD KNOWLEDGE

Food safety

Food safety is a topic of big concern among all the interviewed households. Twenty years ago there was no unsafe food, now there is. Especially the big cities are now faced with this problem. Rural areas can still grow their own vegetables and animals. One of the problems is that a lot of people have limited money to spend. They do not know what safe/clean food is or what the impact of unsafe food can have on their health.

Market sellers know that their food is or might be unsafe, but sell it anyway to earn their money. They do not know better. One of the market sellers was a student of the father-in-law of Ms. Huong. This fact makes him a trustful seller. Ms. Loan explains that there is no proper regulation or certification to know what is safe or not.

Ms. Loan: "People do not know what safe food is or do not care."

The best you can do is buying at the supermarket, but it is more expensive and less convenient. Although, Ms. Thao thinks that supermarkets are not honest about their food as well. A lot of people know that the food they buy is unsafe, but feel that do not have a choice.

All young mothers are concerned about unsafe food, in particular fruit and vegetables. Ms. Thao indicates that many people started growing vegetables for their own family. She grows vegetables herself on her rooftop for her baby. It allows her to control the safety of the food and it safes money as well. She calls it her "Babilon Garden" (see picture). Although the amount of food is only enough to feed her child, it is a conscious decision to take control over the production of a small amount of food in this way.

figure 17: Rooftop garden at home of Ms. Thao

Education

A lot of mothers who did not have proper education lack the knowledge about safe food. Nowadays, the children still do not get proper educated on this topic at school. They have to learn it from their parents. The participating mothers agree that it is the duty of every mother to teach her own children about food, nutrition and vitamins. Teaching children how to eat healthy and how to balance their meals is part of it.

Mother in law of Ms. Loan. "A lot of young people don't have the knowledge or proper education to know what safe food is about".

Ms. Hoai "It's all about inspiring new generations."

All this knowledge and traditions about food are passed down from generation to generation. Though, one thing is important: the information needs to be up-to-date. For this reason more and more young mothers become active on online forums to get information about food, nurturing, health and recipes. Still, Ms. Huong indicates that 'learning by doing' is one of the best ways to teach about food, rather than only reading about it.

CONSUMPTION BEHAVIOUR

Buy

Five out of six participants buy all their groceries in the early morning (6.30 - 8am) before having breakfast at the corner market near their house. Buying food at the corner market is the most convenient, although they know the food safety is not guaranteed. Some young mothers would like to go more often to the supermarket but either lack motivation or do not have time to do so. The amount of groceries is usually enough for 1 to 5 days. Especially vegetables need to be as fresh as possible and are preferable bought on the day of cooking, where meat is put into the freezer and consumed over multiple days.

Ms. Loan: "I only have time to do groceries in the early morning at the corner market. The supermarket is too far from my home".

Use: cooking / preparing / eating
The information of the consumed meals of the participants provides an indication of their food consumption pattern. Looking at the overall main ingredients that are part of the meals, pork meat is used the most next to fish and poultry. Beef is rarely part of the prepared meal. A reason for this could be the high price of beef compared to the other types of meat or fish. Boiled or stir fried vegetables are always served at dinner. Though, most of the time they are served as a side dish, not the main part of the meal.

The amount of meals eaten outside is very small compared to meals prepared at home. It indicates that the participants prefer a home cooked meal. The reason is twofold. Eating together with the whole family is seen as very important and by doing so the mother has control over the quality of the food she serves her family.

Ms. Hoai: "I always try to balance the meals I cook, bringing a lot of variety".

"I donate my leftover food to families who grow chicken or pigs."

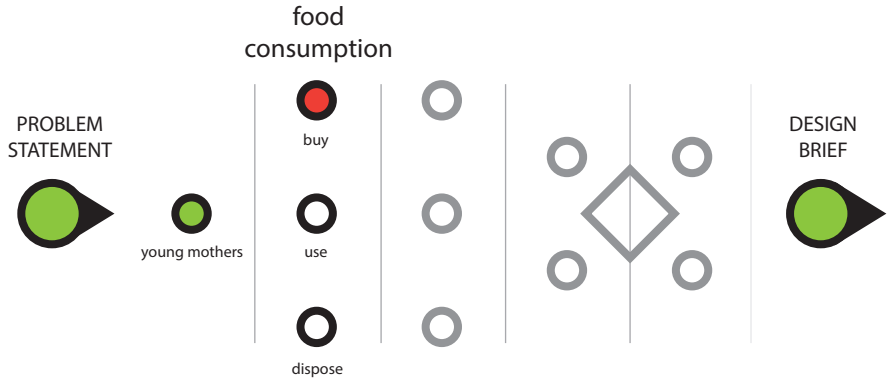
Dispose
The young mothers indicated that they are already cooking with the least amount of waste; e.g. turning leftovers from dinner into breakfast or lunch for the next day. Some even dispose leftovers into a community container where food is collected to feed farm animals. Glass and cans are separated and sold for a small amount of money to vendors that pass by the houses every day.

3.3.3 Conclusion

BUY, USE or DISPOSE?
When talking about sustainable food consumption the young mothers indicate that it is the duty of the parents to teach their children about this topic. On the other hand the participants indicate that a lot of mothers do not have the knowledge or proper education to know how to consume in a sustainable way. Especially the lack of knowledge about safe food is seen as a big problem.

But, how can we make young mothers buy in a more sustainable way? The answer does not lie in buying less, but in knowing what and how to buy. Some degree of knowledge is needed to make consumers aware of what sustainable products are.

The challenge is to find a good moment to raise awareness and empower young mothers to turn this knowledge into action. When looking at how young mothers buy, use and dispose, the real opportunity lies in trying to change the buying behaviour. Important motivations to change are food safety and the future of their children.



3.4 Visits to markets and supermarkets

To get an idea of the places where consumers buy their food, several open food markets and supermarkets were visited.

Open Markets

Food markets can be found all over Hanoi. There is a distinction in two types: markets controlled by authorities on designated locations and markets in front of people's houses. Selling food in front people's house is not legal but is tolerated on certain locations.

The biggest contrast with for example Western open markets is the absence of cooling for meat. Vietnamese consumers believe that the fresher the meat, the better it tastes and the better it is for your health. This is the reason why fish is kept alive in water bowls and chickens and ducks are kept in cages. The animal will be slaughtered when the consumer wants to buy it.

Freshness of food is very important and applies in high degree for fruits and vegetables. Every morning between 4-6am the open market sellers buy their fresh vegetables at wholesalers to sell them to consumers during the day.

figure 18: Open market, fish gets slaughtered (left), vegetable stall (right)

Supermarkets

The visited supermarkets in Hanoi have a large offer of fresh vegetables and fruits. The big difference between supermarkets and open markets is immediately visible; most of the fruit and vegetables in the supermarkets are packed in plastic and placed in a cooled section. This is in big contrast with the open markets where everything is stacked on large piles without any form of packaging material or cooling. The Big C (one of the biggest supermarkets in Hanoi) presents its fruit partially on large piles. However, it is compulsory to use a plastic bag that is sealed by an employee. The packaging material is used in this occasion to prevent fraud.
At the cash out of Big C every customer gets a pile of free plastic bags to pack all his groceries. It is interesting to see how trust and perceived control in the supermarket are expressed. After receiving your receipt at the cash out, a guard will check roughly if the receipt and the content in the bags match. If so, the receipt gets an approval stamp and the customer passes through security gates.

Insights:
- Vietnamese consumers prefer their food as fresh as possible.
- Supermakets put a lot of emphasis on (perceived) safety.

figure 19: fruit cooling in supermarket Hanoi.

3.5 Session: ranking the problem

The project team of GetGreen Vietnam made a list of sustainable tips they want households to implement in their daily life. For the topic of 'Food' there are 37 tips given: 13 about 'Buying', 14 about 'Using' and 10 about 'Disposing'. A session with the participating young mothers was held to get an indication of the tips that are already implemented in their (daily) lives or thought to be very important for future generations.

3.5.1 Setup

First all participant were asked to indicate whether a tip was already part of their (daily) life or not. In the next step every participant was asked to put a sticker behind three buying tips they thought were the most important. They were asked to think about the ideal future scenario; the world their children are going to live in.

3.5.2 Results

The top 5 of the most important tips is depicted bellow. The complete list of all tips can be found in the appendix IV.

	In the future everybody should…	# do it already
1	**…buy more diverse food**: more vegetables, less meat, less dairy. (4)	
2	**…list the required** product before shopping. (1)	
3	**…buy local food (2)**	
4	**…refuse plastic/shopping bags**, just carry it or use your own cloth shopping bag. (8)	
5	**…grow your own** vegetables instead of buying them. (9)	

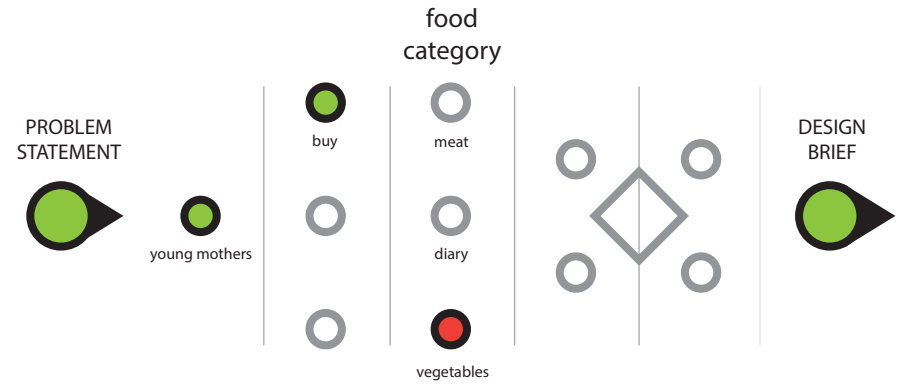
figure 20: top 5 of sustainable tips.

3.5.3 Conclusion

All participants agreed that the most important tip for a sustainable lifestyle in the future would be that people should buy more diverse food. This tip could be divided into three goals: empowering consumers to buy (1) more vegetables, (2) less meat or (3) less dairy.

The participating mothers indicated to be mainly concerned about the safety of fruit and vegetables. Highlighting the benefits of vegetables could show that meat and dairy products are not necessary to consume in high doses. Besides, people have a higher ability to grow their own vegetables at home, instead of producing dairy products or meat.

For people that are not able to maintain a vegetable garden at home, getting them to buy organic vegetables instead is also a step forward towards sustainable food consumption. Organic vegetables are grown without pesticides, chemical fertilizers and genetic manipulation. The used farming methods are safer for both the environment as well for human consumption. In both cases the young mothers should be empowered to buy (more) organic food or grow their own vegetables. To turn this tip into practice, knowledge is needed; if people are not aware of the consequences of their consumption pattern, they will never change it.



[BOX 1]: List your shopping!

As an experiment a shopping list booklet that could be put on a fridge was provided to the participating mothers. The booklet was made of a small notebook that had a new printed cover and a magnet glued on its back. The goal of the experiment was to see if such a physical tool would stimulate the participants to take action. Four out of six participants received a booklet, only one made use of it. She did not hang it on her fridge, but kept it in her purse; *"I always make a shopping list when I am at work or somewhere else, not when I am at home near my fridge."*

figure 21: Shopping list on refrigerator

3.6. Knowledge and motivation

The main reason why people are not consuming in a sustainable way is thought to be 'the lack of knowledge'; people do not know what sustainable behaviour entails or do not see the necessity of it. This paragraph will explain what motivates young mothers to take action and how knowledge can be transferred to consume more sustainable.

3.6.1 Motivation

Children as motivation

All mothers said to be concerned about the future of their children when talking about food consumption. During the executed interviews, the participants pointed out that parents have the responsibility to teach their children about food consumption. Here lies an important role and responsibility for the parents.

Next to that all parents want to spend as much time as possible with their children when they are at home. Targeting the whole family together to promote sustainable behaviour among households could be an effective way. By designing concepts that involve parents and their children at the same time, both will be part of the learning process.

Research of Unilever (2013) on how children inspire sustainable behaviour shows that "children are a prime motivation for adults to make major life adjustments" (p.7). Parents indicate that the birth of their first child has made them re-evaluate their behaviour to live a healthier lifestyle. (p.10)

Food Safety as motivation

The participating young mothers indicated that food safety (especially of vegetables and fruit) is a big concern for them and their family. Using food safety as a motivator to consume more sustainable could be an effective way (figure 22). Young mothers would like to know what to buy and how vegetables are grown and treated. Providing this knowledge can help consumers to make a deliberate choice.

Detailed information about food safety will be discussed in paragraph 3.7.

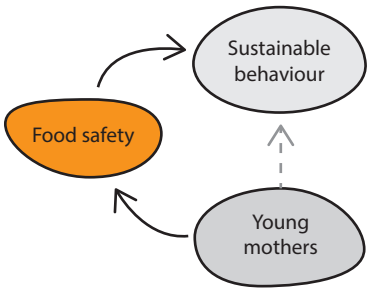


figure 22: Sustainable behaviour by using food safety

3.6.2 Knowledge

During executed Test Groups by GetGreen VN, participants went on a field trip to get familiarized with sustainable farming of food. It was indicated that the trip to the farm was very enlightening and helped to raise the awareness of its participants. The organic farmers have a lot of expertise in how to produce food without the use of chemicals and knowledge on why it is healthy to grow in an organic way. It would be interesting to transfer this expertise and knowledge about safe/organic food to the young mothers as well.

Basically there are two options to transfer this knowledge: bring mothers to the farm or bring the farm to mothers (figure 23). In both cases the young mothers should be empowered to consume more safe/organic vegetables by buying (more) organic vegetables or growing their own.

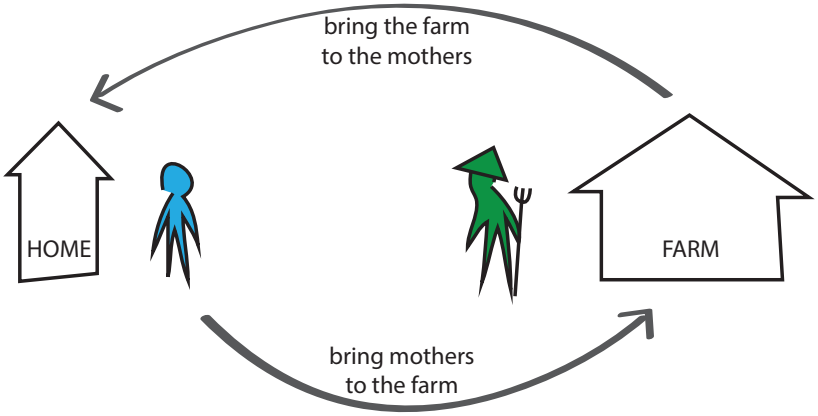


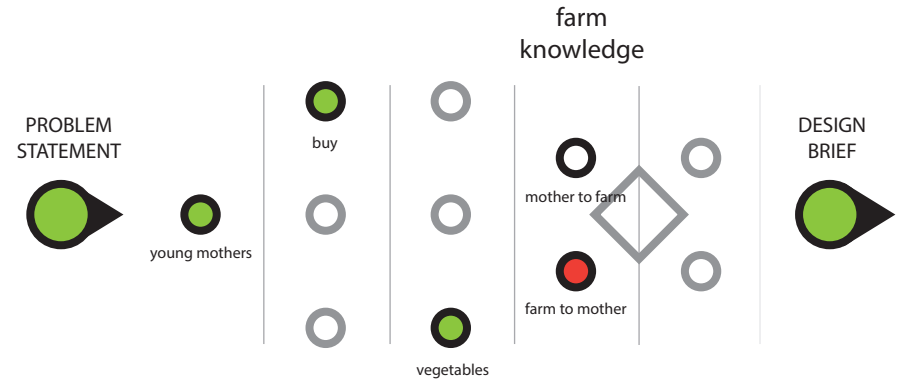
figure 23: Transfer of knowledge; mother < - > farm

Bring mothers to the farm

A field trip to a sustainable farm is going to be part of the training program of the GetGreen 'change agents'. The goal of this visit is to raise the awareness of safe and sustainable food production. To empower the participants to consume more organic food, the learned knowledge from the visit needs to be turned into action. The ability to take action will be raised by handing them at the farm a combination of information and tools to start growing. The downside is that if you want to raise the awareness of other consumers outside the project, they have to make a farm visit first. Besides, GetGreen is not able to guarantee quality of the trip by handing over control to the farmers

Bring farm to the mothers

Instead of bringing the mothers to the farm it is easier to bring the expertise of the farmers directly into the households. All relevant knowledge can be bundled into one product that is the same for every mother. In this way the quality of the information can be controlled and guaranteed. For these reasons further exploration will be focused on bringing the relevant knowledge from the farm to the mother.



3.7 Deeper Understanding

This paragraph will explain why food safety could be a good motivation to change behaviour towards more sustainable food consumption.

The participants indicated that food safety is a big issue in Vietnam, especially in the urban areas. They said that almost every day the news reports new food scandals caused by unsafe food, in some cases food poisoning with a lethal ending. This results in consumers' vigilance when buying food.

To better understand the system of food and to understand where the 'lack of trust' in safe vegetables comes from, deeper insights are presented bellow. To be able to put the situation in Vietnam/Hanoi in perspective, a comparison between the safety of food in the Netherlands and Vietnam is made.

3.7.1 Food Safety Netherlands

If we look at the Netherlands, there is a big concern about food safety as well among consumers and the government. Food scandals like imported unsafe cucumbers and tauge are just a few examples of the past years (Zom, 2011). People got sick or even died by consuming the contaminated food. (Dool, 2011) In the Netherlands there is a relatively good controlling mechanism that ensures the safety of food, compared to other countries. In September 2013 the discussion on pesticide use on vegetables and fruit was raised again. In a broadcast of 'Radar' (a Dutch consumer television program) was claimed that the list of recorded MRL (Maximum Residue Limit) of pesticides was outdated. There were batches of oranges tested that exceeded the legal health standard for babies by almost a 1000%. According to Hans Berkhuizen (director of Environmental Defence) *"Pesticides can cause skin irritation, disrupt the regulation of hormones and increase the chance of getting cancer."* Professor P. Sauer, emeritus professor of paediatrics, warns that especially for babies (till the age of 2), a high dose of pesticides can have a negative effect on the development of the brain and immune system. (Radar, 2013)

In response of this broadcast and a published report on pesticides by the National Institute for Public Health and the Environment, Dr. A.G. Schouw (member of parliament, D66) asked for clarification of the Second Board for these concerning insights (Schipper, 2013). This example shows that the concerns of consumers and institutes can result in a call for action from the government in Netherlands. Next to that, regulations and laws are recorded to protect the consumer from unsafe food. Multiple labels (e.g. 'Kiesbewust', 'ECO', 'Milieukeur') try to ensure the food quality and encourage consumers to make a sustainable choice.

3.7.2 Food safety: Vietnam.

In Vietnam, food safety is a major problem. All participants indicated to be concerned about the health of their family members because of the many cases of food poisoning reported in the media. These food scandals and food poisoning cause a raised apprehension among consumers. Especially the intensification of used chemical pesticides and fertilizers, that gained a boost during the economic liberation in the 1980s, increased the concerns and food risks caused by chemical residues for the Vietnamese consumer (Simmons & Scott, 2008). As a response to these risks the government issued the Ordinance of Food Safety and Hygiene in 2003, in which *"food business operators are legally responsible for the safety and hygiene of foods they produce and trade"* (Hoi et al., 2009a). Next to this ordinance the government came with regulations for the use of pesticides in the agricultural sector. The results of these regulations were modest at best (Hoi et all, 2009b).

In April 1998 the Ministry of Agriculture and Rural Development (MARD) issued the Temporary Regulations for the Production of Safe Vegetables. The regulations specified the required quality for safe vegetables, e.g. the allowed Maximum Residual Levels (MRLs) of permitted pesticides on harvested vegetables (Simmons & Scott, 2008). Although these efforts and regulations try to make

the vegetable sector safer, a national monitoring program for pesticide residues in crops is not yet established in Vietnam (Almvik et al., 2007). In 2008, the share of safe vegetables in Hanoi was approximately 5% of the total marketed vegetables (Hoi et al., 2009a). The small offer of safe vegetables in Hanoi seems not to correspond with the rising concern of food safety among consumers.

So, why do consumers stick to buying conventional vegetables instead of safe vegetables? One of the reasons is the conflicting information on vegetable safety provided by different regulatory agencies, i.e. the Ministry of Agriculture and Rural Development and the Ministry of Health (Hoi et al., 2009a). Another reason mentioned is the absence of food poisoning in the direct surrounding of the consumers; they don't see an immediate risk.

"In the absence of effective enforcement from the relevant governmental policies and of consumer pressure to respect environmental and human health interests, Vietnamese vegetable supply-chain actors are mostly oriented towards quick profit-yielding activities." (Hoi, 2010). Without substantial pressure of consumers to change government policies and vegetable supply-chain actors, it is hard to make a change in this complex and unreliable system. *"This poorly regulated chain has not been able to provide vegetables of good quality and safety to consumers, not even to those who are willing to pay extra for safe produce."* (Hoi, 2010).

The government keeps improving the agricultural sector though. For example, one of the set targets is that all vegetables consumed in Vietnam should be safe by 2015 (Vredeseilanden, 2013). The minister of Agriculture Cao Duc Phat established recently a new Law on Plant Protection and Quarantine, which should provide a tighter legal framework (Vietnam News, 2013). Although the agriculture sector has made certain changes, there is still a big concern and remaining risk for the consumers. It does not eliminate the public concern.

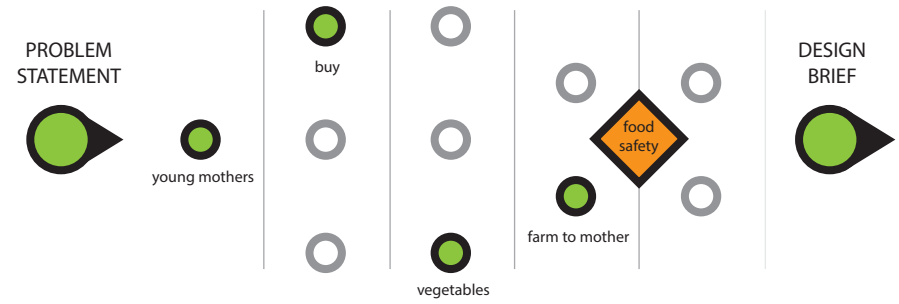
The lack of knowledge on the topic of safe food, next to contradicting information about food safety makes it very confusing for the consumer to make a healthy decision. Trying to change and improve the system around safe food is a very complex goal with many stakeholders involved. But, is there a way to raise the trust of the consumer in safe vegetables again? How can consumers gain control over the food they have bought? Households try by thorough cleaning to eliminate the risk of potentially unsafe food. This might increase the peace of mind of the consumer, but will not solve the problem or eliminate the risk.

If people could test their bought vegetables on harmful pesticides or fertilizers with a (physical) tool at home, one would give control to the household itself. There are several chemical test kits available to analyse fruit and vegetables on harmful pesticides and fertilizers (like the Rapid Pesticide Detection Kit of Renekabio). The process of testing is rather complex and takes a lot time to execute. Knowing whether fruit and vegetables are totally safe seems very hard to test. Encouraging people to grow their own vegetables could eliminate the uncertainty of not knowing whether vegetables are safe or not. Because of this reason, many consumers in Hanoi started to grow vegetables in boxes on the top floor of their house (Hoi et al., 2009a).

3.7.3 Conclusion

A lack of trust around vegetables that claim to be clean and safe causes consumers to be lost. As long as there are no immediate accidents among relatives or friends when consuming conventional vegetables, they keep buying vegetables that might not be safe to consume on the long term. Yet, the risk of pesticide intake for babies could be used as a motivation to change consumption behaviour. Another problem is the lack of policy and control by the government. They cannot guarantee controlled production and distribution of safe/organic vegetables yet. It is still in development. For this reason consumers stick to buying conventional vegetables. Although there is a shift in attitude towards buying safe and organic vegetables, consumers remain sceptical.

A lack of guidance and information underlies both problems that restrain consumers from sustainable food choices. In order to change the behaviour the consumer needs to be guided.



3.8 Opportunity Field

This paragraph will discuss an opportunity field for young mothers by looking at existing products that empower people to consume safe/ organic vegetables. Two ways of guiding the consumer to eliminate the risks of pesticide intake can be distinguished: 1) guiding the consumer with knowledge during shopping and 2) empowering consumers to produce their own vegetables at home.

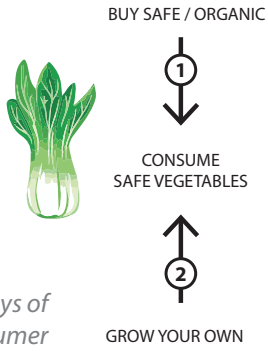


figure 24: two ways of guiding the consumer

3.8.1 Guiding the consumer with knowledge

Several guides are created that help consumers to make a healthy and sustainable product choice. Two examples of such guides are the 'Dirty Dozen, Clean 15' by the Environmental Working Group (EWG) and the 'What's on my food?'-app of the Pesticide Action Network of North America (PAN).

EWG - Dirty Dozen, Clean 15 (S)

The 'Dirty Dozen, Clean 15' (figure 25) lists fruits and vegetables that are high on pesticides (the dirty dozen) and vegetables that are low on pesticides (the clean 15). This printable small list encourages consumers to buy more organic vegetables and help them to make a healthier choice. Consumers are advised to buy organic types of the food that is listed as dirty dozen. The Clean 15 have the lowest amount of pesticide residues and are safe to consume even when grown in a conventional way.

NAME: Dirty Dozen, Clean 15
ORGANISATION: Environmental Working Group (EWG), US
PRICE: free download or donate $10 for hard copy.
POINT OF SALES: website

http://www.ewg.org

figure 25: EWG Shopper's Guide to Pesticide in Produce

PAN – What's on my food?

The Pesticide Action Network of North America (PAN) has made a smartphone app called 'What's on my food?'. The app links USDA food testing data to toxicology (i.e. health effects) data compiled from multiple authoritative sources. It shows in detail information about what types of pesticides are on specific vegetables and how it affects the consumer's health.

NAME: What's on my food?
ORGANISATION: The Pesticide Action Network of North America (PAN)
PRICE: Free to download
POINT OF SALES: Apple App Store

http://www.whatsonmyfood.org

figure 26: 'What's on my food' app by PAN.

DO IT YOURSELF

3.8.2 DIY: empowering consumers to produce their own.

If consumers grow their own food, they can eliminate the uncertainty of not knowing how and with what kind of chemicals their vegetables are grown.
In Vietnam many people in rural areas are growing vegetables for their own family or sell them to others. In urban areas where land is expensive and scarce, it is hard to have access to a piece of land to maintain a garden. Yet there are already a lot of people that grow vegetables on their rooftop in white Styrofoam boxes. Ready to use toolkits that combine all the ingredients you need to start growing vegetables at home are not common in Vietnam. In other countries there is a wide variety of products available to start to grow fruit and vegetables at home in the city. Some initiatives and products that fit the scope of this project are shown bellow.

HEMA "groeikratjes" (little growing crates)

These little garden crates can be bought at the Dutch discount retail chain 'HEMA'. All the ingredients to start growing herbs or salad can be found inside the package. It consists of a soil container, soil, seeds and information (see figures 27). It is an easy way to start growing different kinds of herbs and salad in a complete package that is very simple in its design. A downside is the limited offer of only herbs and salad.

NAME: "Groeikratjes"
COMPANY: HEMA, NL
PRICE: €9.50/$12.85 (dec 2013).
POINT OF SALES: Retail store + webstore

http://www.hema.nl

figure 27: 'Groeikratje' by HEMA, and content inside.

HEMA "groeizakjes" (little growing bags)

The same idea as the "groeikratjes", but in an even smaller version are the little growing bags of HEMA. The difference is that the bag of soil is the growing container as well. Just add the seeds and spray the soil with water to start growing one type of herb. A very easy way that takes up little space to grow herbs at home. A downside is that the bags cannot be reused.

NAME: "Groeizakjes"
COMPANY: HEMA, NL
PRICE: €1.95 / $2.64 (dec 2013).
POINT OF SALES: Retail store + webstore

http://www.hema.nl

Back to the roots – Mushroom starters-kit

figure 28: 'Groeizakjes' by HEMA

The Mushroom kit initiated by Back to the Roots is a small package that enables consumers to grow mushrooms at home. The only action it needs to start the growing process is cutting a cross in the pack with a knife and spraying a little water every day. In 10 days the mushrooms can be harvested and a new batch will grow. One package is able to produce at least 2 harvests. Unfortunately the user is not able to refill the package. Buying a new one is the only option. This concept has been copied by many others including Vietnamese companies. The original price for one mushroom kit of Back to the Roots is online $19.90 dollar (dec 2013). In Vietnam such a toolkit was available for approximately $4.00 dollar (dec 2013).

NAME: Mushroom Starters-kit
COMPANY: Back to the Roots, US
PRICE: $19.90 (dec 2013).
POINT OF SALES: Retail store + webstore

http://www.backtotheroots.com

Feedback that Back to the Roots got was that the mushrooms did not look the same; some of them had weird shapes and were unequal in size. Instead of making this fact into a weakness they asked their buyers to name their weird shaped mushrooms and share them on social media, which made it acceptable and exciting to grow for example a 'Pinocchio' (see picture).

figure 29: mushroom-kit by Back to the Roots (l), Vietnamese copy (m), 'Pinocchio-shaped mushroom (r).

Seed Pantry – Starters Packs

The British family business Seed Pantry specializes in offering starters-packs and garden equipment that can be ordered online. The website provides growing information, a community to ask questions and an online shop to buy products. One of the interesting packages that is offered is the 'Dad and Me Veg Seeds Starters Pack' (figure 30) for £48.75 (dec 2013). This package contains all ingredients and equipment needed to start growing a wide variety of vegetables in pots. The focus on both the child (small box with easy to grow vegetables) and the dad (large box with a wide variety of vegetables) makes it an interesting package that evokes interaction between the parent and the child. The very high price is the biggest disadvantage of these products.

NAME: Starters Packs
COMPANY: Seed Pantry, UK
PRICE: £12.99 - £48.75 (dec 2013).
POINT OF SALES: Webstore

http://www.seedpantry.co.uk

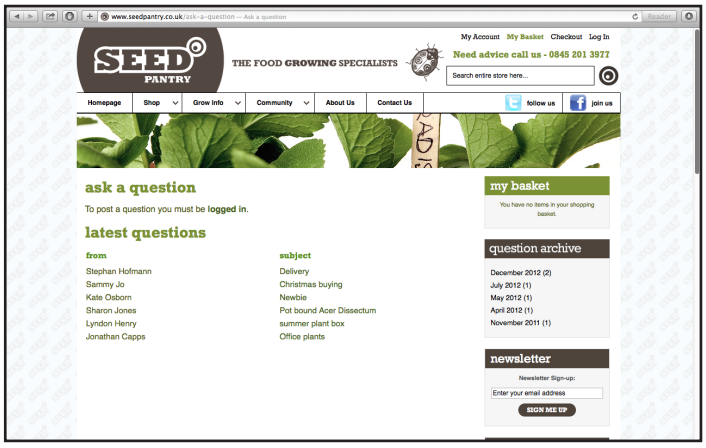


figure 30: 'Dad and Me Veg Seeds Starters Pack' by Seed Pantry (l), screenshot of Seed Pantry's website.

'Makkelijke Moestuin' (An Easy Kitchen Garden)

De 'Makkelijke Moestuin' is an initiative by Jelle Medema. He developed a website where he shared the idea of 'Square Foot Gardening' by Mel Bartholomew. The website consists of step-by-step instructions on how to build a square feet garden at home. People who like to get more information can order online the book of 'De Makkelijke Moestuin' or order carefully selected soil and soil containers. One page of the website provides the opportunity for followers/practitioners to 'show their MM'. It serves as (positive) feedback and inspiration for other people who like to start their own garden. Although the information and provided steps are very clear, people need to have the space and time to build their own garden from scratch.

NAME: "Makkelijke Moestuin"
INITIATOR: Jelle Medema
PRICE: book €20 - €25,-; soil €10,- (dec 2013).
POINT OF SALES: Webstore
http://www.seedpantry.co.uk

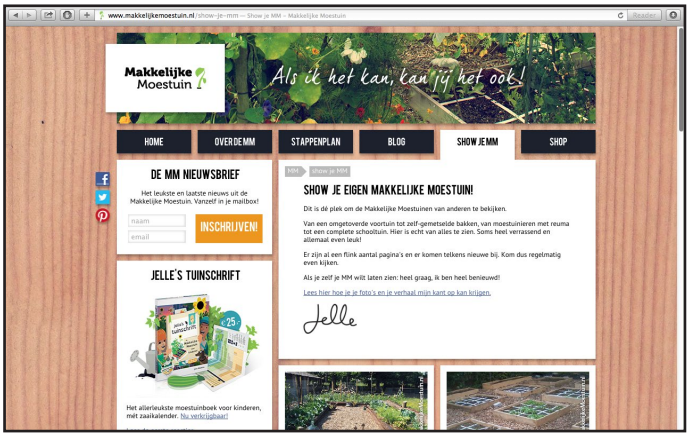


figure 31: 'Makkelijke Moestuin' illustrationby Jelle Medema (l), screenshot of website MM (r)

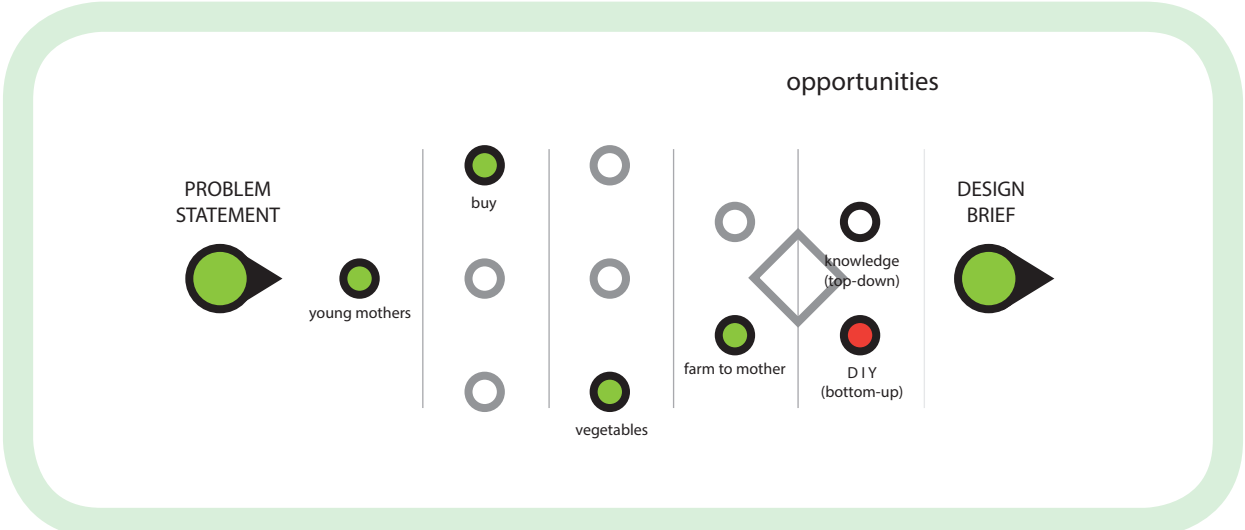
3.8.3 Conclusion

If we compare the two opportunities of guiding the user when buying vegetables or letting the user grow vegetables themselves, it shows that the latter opportunity has got the most change of succeeding in Vietnam. Both the guide 'Dirty Dozen, Clean 15' and the app 'What's on my food?' depend on reliable and objective information in order to be a successful tool. As explained in the chapter 3.7 a reliable system that guarantees safe vegetables in Vietnam is not yet established. Accurate information on the amount and types of pesticides used in Vietnam to grow vegetables and fruits are not (yet) available. Therefore creating a tool that guides young mothers during their daily grocery shopping is not possible within this graduation project.
Empowering young mothers to produce their own vegetables at home with an easy to use toolkit fits the scope of this project very well. In this way the young mother is in control of what food she will give to her baby and it takes away the uncertainty of who is and who is not be trusted when buying vegetables on the market.

In all the showed examples of existing solutions and products to grow vegetables at home the key is simplicity. The biggest differences between the products are the opportunity to reuse the products (HEMA groeikratje, Seed Pantry kits, MM) or not (HEMA groeizakje, Mushroom-kit) and provided online support/feedback (Mushroomkit, Seed Pantry kits). All the products are ready to use in just a few steps. Some provide more step-by-step guidance through the process of growing vegetables. In that case an online platform is provided that people can consult for more information and to ask for feedback. Showing real examples from other costumers/practitioners takes away uncertainty (like the weird shaped mushrooms) or serves as inspiration/motivation for people who are interested to start a kitchen garden (show your MM). Furthermore, an online platform that is open for everyone increases the opportunity to spread the knowledge among a wider audience.

Although the idea of the toolkits could work for young mothers in Vietnam as well, the examples showed are too expensive and not focused on the Vietnamese consumer. Therefore the strong aspects of the shown examples should be combined in a toolkit that fits the Vietnamese context of the young mother.

Guidelines derived from the existing solutions for the development of such a toolkit are:
• *Simplicity:* make it as simple as possible to start. Provide step-by-step information that is easy to understand by a novice.
• *Total package:* provide all the information, equipment or ingredients that are needed to start growing in one package.
• *Feedback:* provide a platform/website where users/consumers can consult for more information or ask for feedback. This can be in the form of e.g. a Facebook-page or a complete website.



[BOX 2]: Criticism on urban gardening

If everybody would grow his or her own food at home or inside their community, the impact on the environment would be decreased tremendously. Whether this vision could become reality depends on many factors. It takes a lot of effort to break habits and change behaviour in the world of today where time is rare and having a wide variety of food available from all over the world has become the norm.

However, there are many organizations and projects focusing on urban gardening as a future goal. For example the Victorian Eco Innovation Lab (VEIL) in Melbourne *"seeks to identify and promote emerging technical, social and organizational innovations that could form part of future sustainable systems."* (VEIL, 2013) One of their biggest and most recent projects is called 'Broadmeadows 2034'. The goal of the project is to *"transform the suburb and the community into one that is resilient and sustainable."* (Ryan et al., 2010). One of the themes within the project is 'Broady Food'. *"There is a clear and growing interest within the community for citizens to change their passive role as consumers to be actively connected with the production of vital resources."* (Ryan et al., 2010).

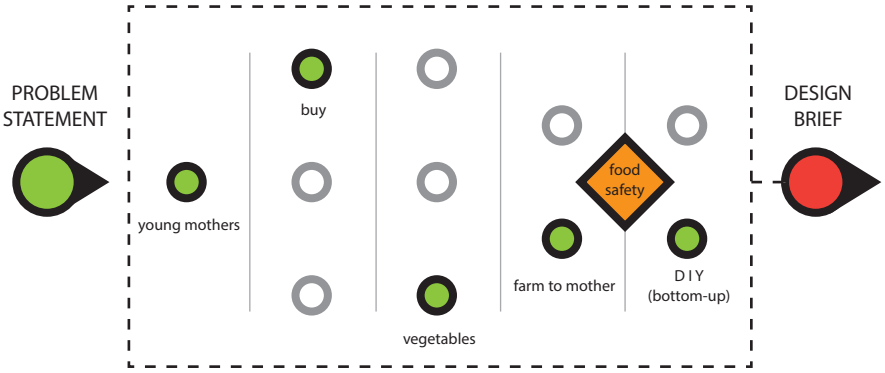
Another interesting example is the community of 'Transition Network'. *"Transition Network is a charitable organisation whose role is to inspire, encourage, connect, support and train communities as they self-organise around the Transition model, creating initiatives that rebuild resilience and reduce CO2 emissions."* (Transition Network, 2013). Most of the groups that join the Transition Network start growing their own food for their community.

Not everybody shares the opinion that communities only depending on local resources are the answer for a sustainable future. One of them is Louise Fresco, professor in sustainable development in international contexts at the University of Amsterdam. She argues that only focusing on local resources is not going to produce enough food for our fast growing world population. *"Local initiatives are fun and important because they lead to raised awareness, but it is not a sustainable solution for the entire population."* (Van Gelder, 2013) We should rather focus on the (technological) development of intensive agriculture, making it safer to produce large quantities of food.

If we look at the situation in Vietnam we see that there is an increasing demand for safe and organic produced vegetables. As long as there is no reliable control on the quality and safety of vegetables, local initiatives can help gaining trust again and give a clear signal to the authorities that change is needed.

3.9 Conclusion: research phase

This paragraph will summarize all insights that have led to the formulation of the design brief in chapter 4.



The goal of the research phase was to identify a behavioural problem within the food consumption of Vietnamese middle-class households and find to what extent the factors of motivation, ability and opportunity to change behaviour were present.
From the context mapping with the young mothers was derived that the buying behaviour of households was seen as the biggest problem, compared to the behaviour of use and disposal. Especially the concern about safe/organic vegetables that could be harmful for their family's health was seen as a motivation to change their buying behaviour. However, consumers still buy conventional vegetables that are produced with chemical pesticides and fertilizers. The lack of knowledge is mentioned to be the reason for this behaviour, although many mothers that are aware still do not take action (intention-action gap). Another reason is they do not have the opportunity to buy safe/organic vegetables; a system that ensures a safe vegetable market in Vietnam is not yet established (lack of opportunity). The mothers that have taken action, started to grow their own vegetables on their rooftop. Growing a small amount of controllable vegetables to secure the health of the baby should be made accessible for all young mothers. However, an easy to use toolkit that helps young mothers to start growing vegetables at home that is targeted on the Vietnamese market is not available (opportunity).

By empowering young mothers to grow their own food they could (a) get around the lack of trust in the seller and (b) control the safety of the food themselves and (c) consume vegetables that are as fresh as possible. A lack of ability seems the biggest problem for young mothers to start growing. The awareness of some young mothers is not high enough caused by a lack of knowledge. Others that have already a high awareness say they do not have time or space to grow their own vegetables at home. To overcome these barriers a DIY solution needs to be designed that: (1) raises awareness by highlighting the danger of pesticide residues for their baby, (2) provide a compact solution with all the needed ingredients to grow a small amount for their baby in the least amount of time, (3) provide feedback and additional information on an online platform. This online platform makes it possible to reach a wide audience and spread essential knowledge that is accessable to everyone.

An additional result of growing your own vegetables might be the fact that people are less willing to throw their own harvest away and change their attitude towards (excessive) food disposal in general.

All insights in brief:

- YOUNG MOTHERS:
o Young mothers are in control of buying behaviour of family
o Young mothers are concerned about health of child

- BUYING:
o Changing buying behaviour of households has big impact.
o What people buy is going to be used and disposed.

- VEGETABLES:
o Young mothers are especially concerned about food safety of fruit and vegetables.
o The majority of the consumers still buys conventional grown vegetables (grown without strict pesticide regulations) at the open market near their house.
o Young mothers have the possibility to grow their own vegetables at home.

- FARM TO MOTHER
o Safe/organic farmers have a lot of knowledge about food production of vegetables.
o Bringing knowledge of farm in the form of a physical product to the young mother to ensure consistent quality.

- FOOD SAFETY
o Food safety is a big problem and keeps many consumers concerned.
o A system that ensures a safe vegetable market in Vietnam is not yet established.
o There is no trust in vegetables that are claimed to be safe/organic.
o Although there are several labels (initiated by governmental institutions) that should provide the guarantee of safe vegetables, these labels are not trusted or cannot be traced by the consumer.
o The intake of pesticide residues by young babies during their first two years can have a negative impact on the development of the baby's brain and immune system.

- DO IT YOURSELF:
o Developing a tool to guide the consumer to buy safe/organic vegetables is not yet possible because of the lack of reliable information and policies.
o A toolkit that empowers consumers (young mothers) to start growing vegetables at home that targets the market of Vietnamese consumers is not available.
o An online platform makes the knowledge accessable for everyone.

4. Design brief

4.1 Problem definition

Nowadays, most young mothers still buy conventional vegetables that have a big impact on the environment compared to safe/organic vegetables. Conventional vegetables are grown with the use of chemical pesticides and fertilizers. These chemicals are harmful for the environment and the health of farmer and consumer. Pesticide residues are especially dangerous when consumed by babies between the ages of 0-2 years old. It affects the development of the brain and immune system.

Although the majority of young mothers see the importance of consuming safe food, no action is taken. One of the biggest reasons is the failing distribution of safe/organic vegetables; consumers are never sure whether bought vegetables are safe or not. Empowering young mothers to grow their own vegetables could eliminate this uncertainty. Because of the high risk for young children, consumption of safe or organic vegetables should be stimulated. The biggest barriers to start growing at home that need to be overcome are a lack of time and space.

4.2 Design goal

The goal is to translate the intention of young mothers to consume safer food into actual action. Therefore the goal becomes:

"Raise awareness and consumption of sustainable food in Vietnamese middle-class households by empowering/stimulating young mothers to grow safe/organic vegetables at home for their baby."

Every mother should grow vegetables for their young children, because it 1) creates a safe and healthy base for the child; 2) raises the importance of consuming safe food (among other household members as well); and 3) stimulates consumers to make a conscious decision in which food to choose (conventional vs. organic). Experiencing the amount of care it takes to grow vegetables will change the consumer's attitude towards food consumption and prevent excessive disposal as well. All of this will lead to sustainable behaviour change towards food consumption with less impact on the environment and the health of the consumers.

4.3 Design challenge

The biggest barrier for them is that they are not (yet) willing to put effort in growing vegetables for their child, because it is time consuming and they do not see the necessity yet. Using 'food safety' in combination with the health of their baby can increase the motivation to change. Next to that people indicate to have not enough space for a whole garden. Raising awareness and handing them the knowledge to grow vegetables needs to be combined in a simple, compact and easy to understand toolkit. Targeting the whole family (including father, child) would be preferable, but is not obliged. The design challenge:

"To design an engaging and easy-to-use toolkit for young mothers in Vietnamese middle-class households that empowers and motivates them to start growing safe vegetables for their baby at home and in this manner raises awareness of the importance of sustainable food consumption."

4.4 The basic concept of the toolkit

Figure 32 shows the basic idea of the empowering toolkit. Get Green will be the initiator/distributor of the kits to the young mothers. The toolkit consists of a box with all the necessities to start growing. For elaborate information and examples from other users, a digital platform is provided. The goal of the toolkit is to introduce and empower young mothers to grow safe vegetables for their baby at home. The step-by-step toolkit should raise the awareness that it is important to consume organic vegetables for better health of human and environment.
If the kit succeeds to raise awareness and the will to act, it could result in a deliberate choice of the consumer to 1) grow more vegetables at home; 2) buy more certified organic food/vegetables.

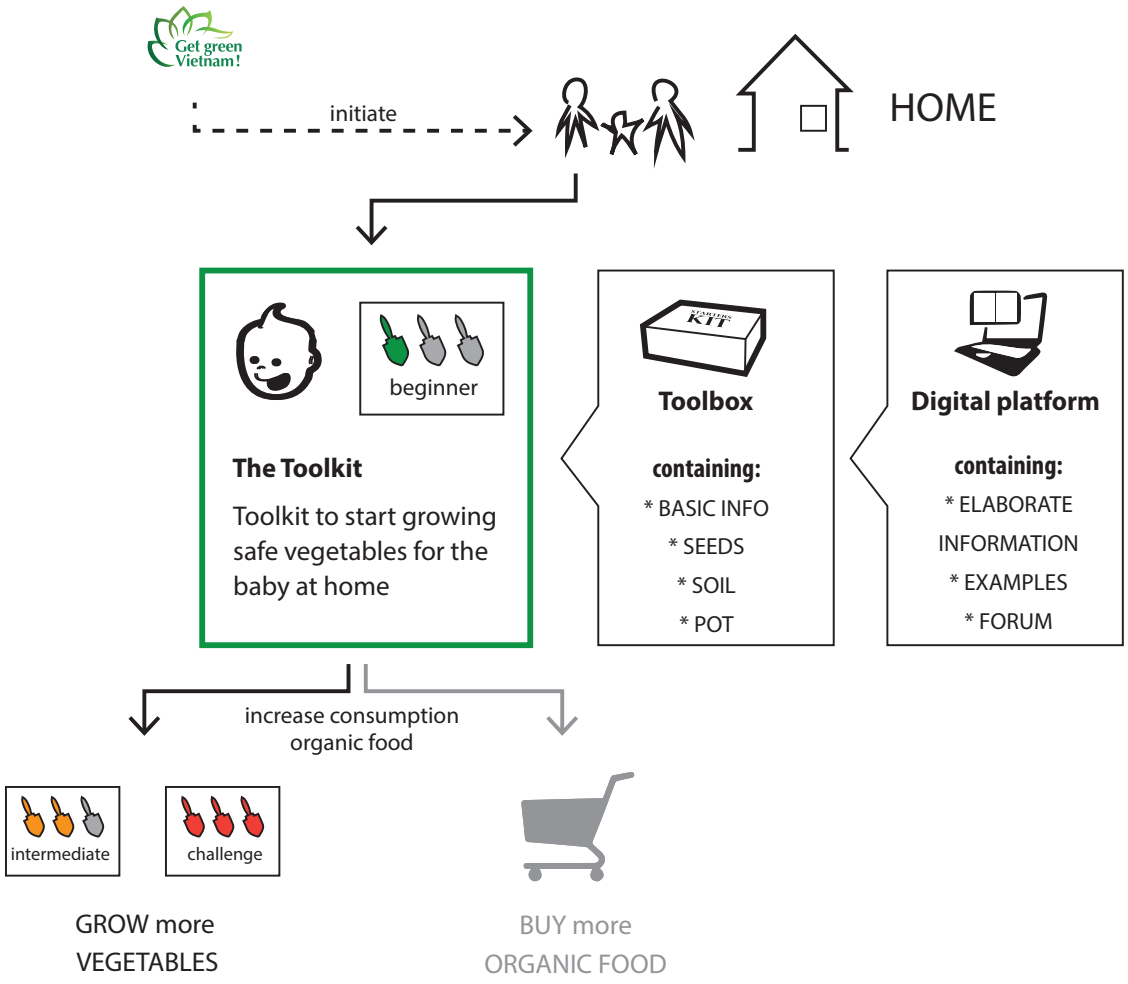


figure 32: the basic idea of the empowering toolkit.

List of requirements:
The toolkit should consist of two elements: [A] a physical toolbox and [B] an online platform. The emphasis of this graduation project will be on the development of the physical toolbox. The requirements are listed bellow:

[A] Toolbox:
information:
- Target young mothers with a baby between 0-2 years old; (chapter 3.7)
-Provide (in depth) information on the risks of pesticide residues for the young child to increase motivation of the user (young mother); (chapter 3.7)
- Easy to understand step-by-step manual on how-to-grow; (chapter 3.8)
- The communication of information needs to match with young mothers with a baby;
- The communication of information needs to be very visual. (chapter 3.3; *the participants were motivated to fill in the sensitize booklet because it was very visual)*

Physical content:
- Provide physical ingredients that enables the user to start growing their own vegetables: seeds, soil, growing container;
- The toolkit needs to be fast to setup to increase motivation;
- The toolkit needs to be of limited size;
- Transportable by 1 person;
- To increase motivation the toolkit should focus on vegetables that:
  - o ..are consumed (often) by babies in their first two years;
  - o ..are easy to grow with a minimum amount of care/effort;
  - o ..take a short amount of time to be ready to harvest;

[B] Online Platform
- Provide (elaborate) information in digital format on how-to-grow; (chapter 3.8)
- Provide a forum feedback where the user can ask for feedback and share photos of their garden with others; (chapter 3.8)

A wish would be that the end product is not only targeted at Vietnamese consumers, but could be used to change the food consumption behaviour within the context of Europe or other countries as well. This applies to both the toolbox and the online platform.

4.5 Interaction Vision
The envisioned interaction for the toolkit is twofold. First, the interaction for the toolkit itself that empowers people to start to grow vegetables. When receiving the toolkit it should provide the feeling of 'healthy' and 'being in control'. The benefit for the baby's health should be highlighted. Secondly, maintaining the activity of growing vegetables over a longer period of time should be 'simple' and 'time efficient'. If we put the interaction into an analogy and visual representation, we get the following interaction visions:

The toolkit that empowers people to start growing vegetables should be like:
"Being put on the shoulders of your parents when you were a child" (a helping hand from someone you trust and a change of perspective) (figure 33)

Maintaining the activity of growing vegetables should be like:
"taking an every day shower" (something that is part of a daily routine)

figure 33: interaction vision.

4.6 Interaction Story

GetGreen Vietnam will provide a physical toolbox to the families (1). The unboxing experience (2) should be engaging and easy to perform. The toolbox contains all the components/ingredients that enables the young mother to start growing vegetables for her baby (3). The young mother will take care of the garden (4) until the vegetables are ready to harvest (5). An online platform allows the young mothers to gain more information/inspiration and give feedback during the whole journey (6).

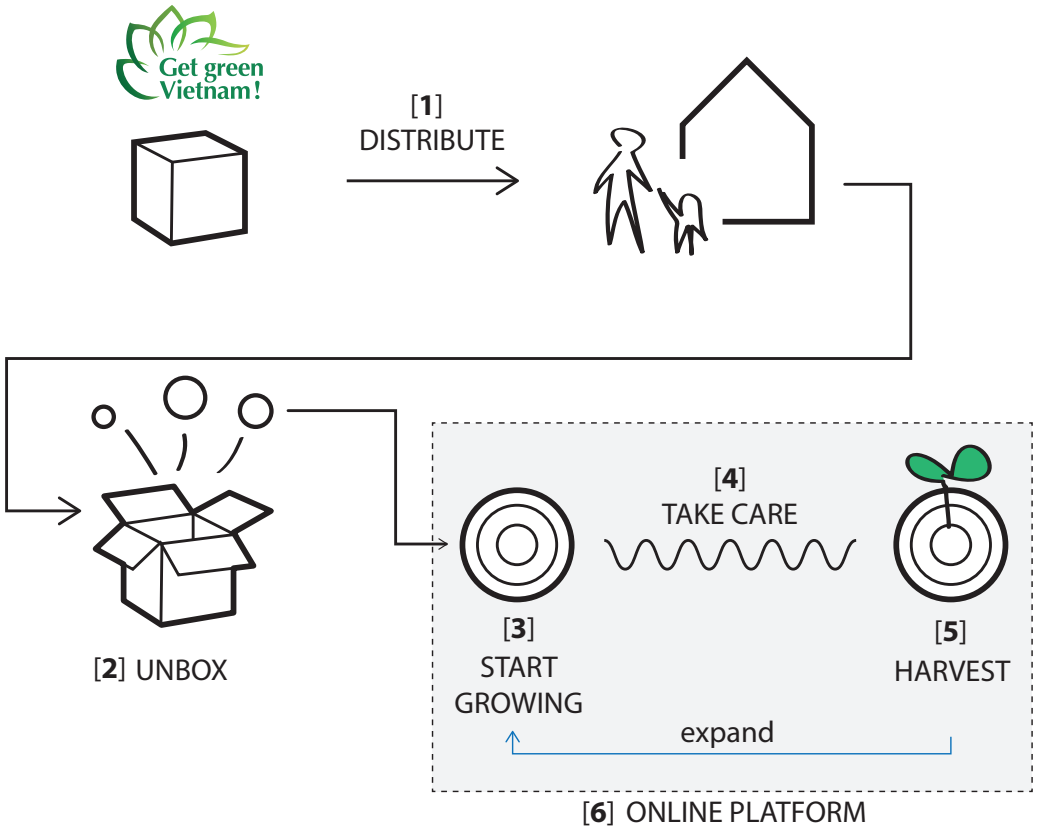


figure 34: interaction story of toolkit.

CONCEPT DEVELOPMENT

5. Concept Design

INTRO: This chapter will show the development of the concept.
CONCLUSION: This chapter will conclude with a testable prototype.

5.1 Introduction

With a clear design brief formulated the next step was combining all requirements into one testable concept. During the concept development several Vietnamese experts were closely involved in the decision process by sharing their opinion and expertise. This chapter will describe the important steps that have lead to the embodiment of the concept that resulted in a testable prototype.

5.2 First prototype

A paper prototype was made to make it possible to communicate a basic idea of the toolkit. Making the required elements tangible facilitated the discussion on size and content. All the basic necessities to start growing vegetables were put inside the box: soil, seeds, information and a watering can. It was left open whether the box itself or an external (foldable) pot was provided as a growing container.

figure 35: paper prototype of toolkit.

5.3 Session Agricultural Students: What to grow?

With a basic concept in mind the next step was making the essential elements of the toolkit more concrete. What to grow? Where to grow? How to grow? These questions needed to be answered for the specific context of Vietnam. A session with students of the University of Agriculture in Hanoi was arranged to provide the answers.

[BOX 3] Session: RMIT University Hanoi + University of Agriculture

A session was arranged with the intention to bring students together from the University of Agriculture and students from the environmental club of the RMIT
University Hanoi. The goal was to bring their expertise together in a creative session to come up with ideas for the toolkit. The session was combined with a field trip to the iNature farm 50km outside of Hanoi. First the students would get a tour around the farm provided by Ms. Trang who works for the iNature farm on behalf of AIT. After the tour the students would join a creative session.

On the day of the session the four RMIT students traveled by bus to the iNature farm. The agricultural students decided to travel on their own by motorbike, but never arrived. The police had stopped them en route and their motorbikes were confiscated. For this reason was decided to continue the tour, but shorten the session and only focus on how to motivate young mothers. One of the exercises they had to do was coming up with presents they would give to a young mother if they had $10, $100 and $1000 to spend. Most of the presents were focused on cooking/food (e.g. cupcakes, pots, apron, fridge), improving health (going to a spa, massage machine) or beautiful objects/ luxury trips (vase, golden ring, going on a trip to Thailand). From these insights can be derived that food, health and beauty could be a motivation for young mothers to use the toolkit.

The actual content of the toolkit (what and how to grow?) was derived from a new arranged session with only the agricultural students (see paragraph 5.3)

5.3.1 Setup

The participating young mothers were asked in advance of the session to list 5 vegetables they fed to their own baby when it was between 0 and 2 years old (see list bellow). The young mothers indicated that they started to feed their baby fresh vegetables at 6 months.

Tomato (2), Sweet Potato (2), Pumpkin (4), Carrot (1), Spring Union (1) Mushroom (2), Rau Cai (5), Rau Ngot (4), Rau Muong (3), Rau Xa Lach (1), Xu Hao (1)

This list of vegetables was used as input for the session with five agricultural students.
In the first part of the session the students were asked to indicate for all the vegetables that were mentioned by the young mothers how and where it is possible to grow these vegetables at home. With this knowledge in mind they were invited to rank the vegetables on three criteria:

1) Challenge to grow; is it easy to grow with low maintenance?
2) Time to harvest; how long does it take before it is ready for consumption?
3) Price; which vegetable is the least and the most expensive to buy?

In the second part of the session the students needed to come up with three basic ideas for a toolkit by using one or making a combination of vegetables. The session ended with a discussion that resulted in choosing the best basic idea and type of vegetable for the toolkit.

5.3.2 Results

The results from the ranking are depicted bellow.

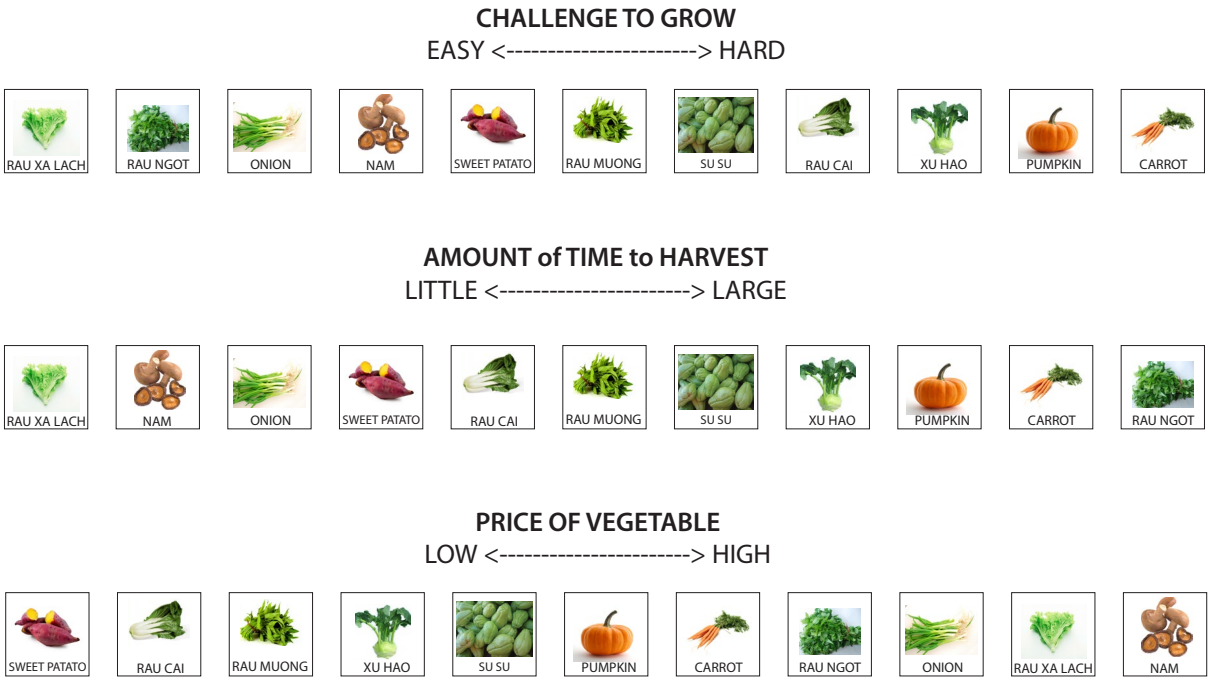


figure 36: results of ranked vegetables by agricultural students.

In the next step the paper prototype of the toolkit was shown to give them an idea of a possible direction. They were asked to generate three different ideas for a concept out of all the ranked vegetables and be inspired by the tools inside the paper prototype. The following three ideas were generated.

Toolkit nr1: Growing Steps

This toolkit is made out of multiple soil containers for growing 4 kinds of vegetables: rau ngot, pumpkin, sweet potato and carrot. The idea is to start growing when the child is 2 months old. All these vegetables are eaten a lot by babies but take a lot of time before they are ready to harvest.

Toolkit nr2: Auto watering vegetable-kit

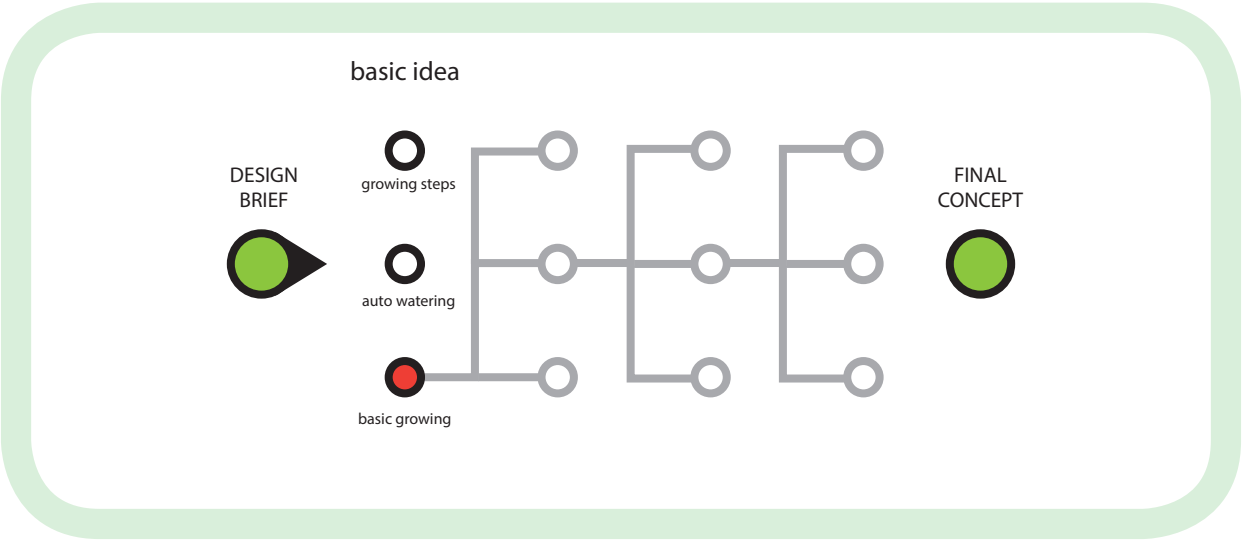
In this toolkit 2 soil containers and an automatic watering system are added to the soil and the seeds. One of the containers holds fast growing Xa Lach and one container grows Rau Cai that takes more time to grow. The watering system is added for people in the upper middle-class.

Toolkit nr3: Basic Growing

This is the smallest toolkit that focuses only on 1 vegetable, Rau Cai. Only the basic necessities are included into the toolkit (soil, seeds, container). A watering can or watering system is left out.

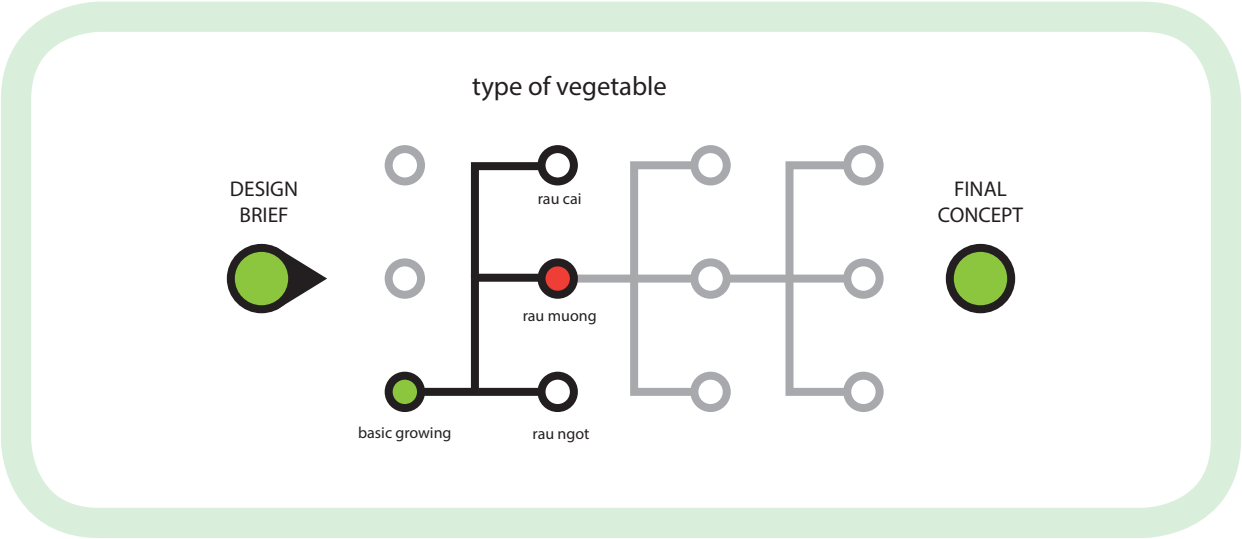
5.3.3 Discussion:

After the ideas were presented, the students were asked to discuss which concept they thought was most suitable for young mothers. During this discussion a bystander joined the conversation. His name was Mr. Long (44) from Ho Chi Min City, passing by for a business meeting. I introduced him the goal of my project and the session. He explained the students that Vietnamese people want to see result as soon as possible. This keeps them motivated. Since the goal of the toolkit is to introduce people to start gardening at home, it should be a small step. For this reason the toolkit should be focused on 1 easy to grow vegetable that shows result in a short amount of time. Expanding their garden with more vegetables could be a next step. The students agreed on this argumentation and chose the idea of Basic Growing.



5.3.4 Conclusion

The toolkit needs to focus on one vegetable that is often fed to babies, easy to grow at home and ready to harvest in a short amount of time. The indicated 3 most served Vietnamese vegetables by young mothers are: Rau Cai, Rau Ngot and Rau Muong. If we compare these vegetables with each other by looking at the ranking made by the students, Rau Muong and Rau Cai are both interesting. Pumpkin is indicated to be served a lot as well, but is hard to grow and takes a lot of time before ready for harvest. The same goes for Rau Ngot that takes too much time to grow. Although Rau Muong takes a bit longer to be ready to harvest, it is easier to grow. For this reason choosing Rau Muong as the toolkit vegetable is a legitimate choice.



[BOX 4] Rau Muong in Vietnam

Rau Muong (also known as 'water spinach' or 'morning glory') is a hollow green vegetable that is grown in tropical climates. Two types of rau muong can be distinguished. One grows on land and the other grows on swamp ground. Both kinds are very common in Vietnam. The Vietnamese climate creates favourable conditions to grow. It does not take a lot of care and can be used in many dishes. Especially stirred fried sautéed garlic spinach is consumed a lot. Rau muong is very nutritious and contains a lot of protein, calcium, iron, and vitamins (Survival Food Plants, 2013). *"For most Vietnamese, water spinach is considered as important as rice in their daily meals."* (Vietnam Online, 2013)

figure 37: rau muong

5.4 Finding the right shape

Now that the basic idea of growing one vegetable (rau muong) was fixed, the next step was defining the shape of the growing container. Three different kinds of growing containers were explored and evaluated against each other.

1) Standard pot (buy)

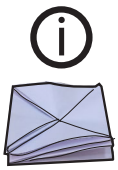
The standard pot (see picture) can be used for a wide variety of flowers and vegetables. It is a ready to use product that can be bought at many places for a low price and is available in all sorts of sizes and colours.

2) Wasted bottles (transform)

Empty bottles can be transformed into small growing containers, giving waste a second purpose. It takes manual labour to prepare the bottles for use.

3) New designed foldable box (create)

Designing a new and unique foldable box. All the information that is provided with the toolkit could be printed on the in- and outside of the box. The foldable box needs to be manufactured.



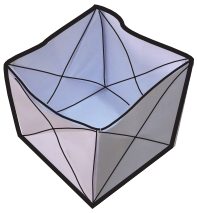


figure 38: standerd pot (1), wasted bottle (2), foldable box (3)

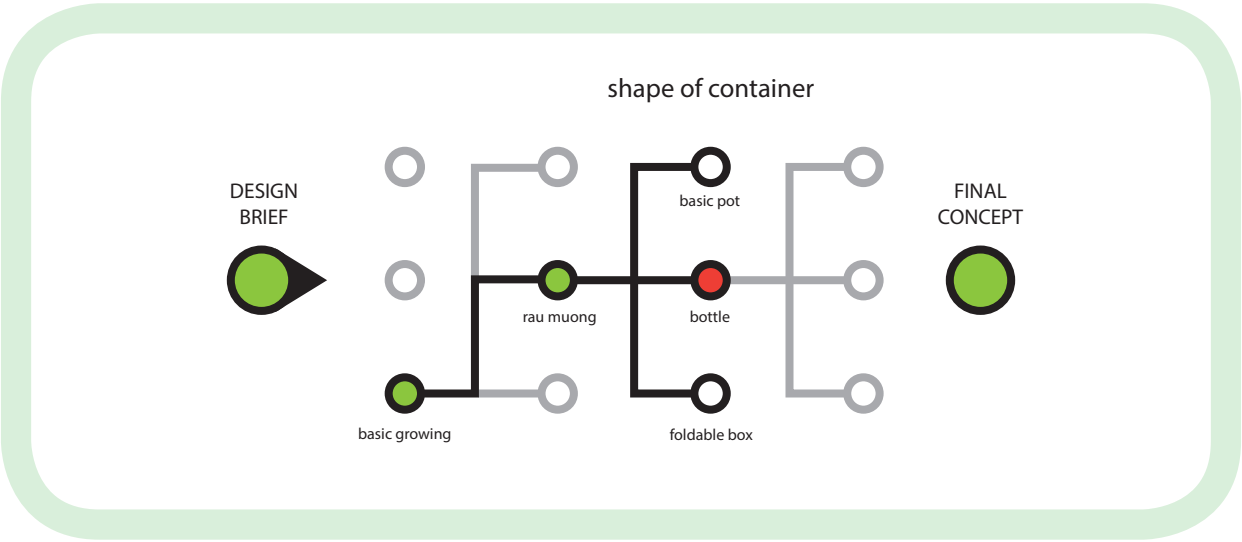
Evaluation GetGreen

Before elaborating on the concepts, GetGreen employees were asked to give their opinion on the three basic directions for the shape of the growing container. They thought that the standard pot was not distinctive enough (quote: "boring"), but is widely available if users want to expand their garden. The foldable box evoked the opposite reaction; a distinctive and innovative design, but cannot be bought everywhere. Another argument they put forward against the new designed foldable box was production costs and the complexity of the design.

The bottle garden came in between; low costs and a distinctive design. The use of a recycled bottle gave a sustainable look to the garden. If users want to expand their garden they could easily copy the design by themselves. The only downside of the bottle was the limited space that could be used for growing. Therefore GetGreen advised a minimum of three bottles for the toolkit.

Conclusion

The foldable box is an interesting concept but its production costs and complexity do not fit within the scope of this project. The downside of the standard pot is the lack of distinction; the pot does not have its own identity. The design is familiar to people and does not evoke curiosity or creativity. Since the goal of the toolkit is to stimulate and empower young mothers to start growing vegetables at home, the factor of distinction weighs heavily. The use of bottles is distinctive and allows people to expand their garden easily by copying the design. For these reasons the bottle garden is an interesting direction for this project and will be used in the further development of the toolkit.



5.5 Booklet Material

In this paragraph the content of the booklet and the way of presenting the information will be discussed.

5.5.1 Content Selection: what and how to grow?

Growing rau muong is said to be easy (it grows like a weed). Rau muong comes in two types: grown on land or grown on swamp ground. For the toolkit is chosen for the land grown rau muong, because it is easier to grow at home.

To ensure fast result the growing process needed to be as short as possible. The first and most difficult step of the growing process is germination. Doing it in the right way can have a big influence on the success rate and speed of the growing process. On the internet a wide variety of methods can be found that are posted on blogs and shared through YouTube. Many people have been experimenting with different germination methods, seeking for the best way to do it. I tried some of the methods myself to see whether their claims were true or false. Besides, I experimented if I could speed up the process even more. The method of distributing seeds on a wet paper towel and putting them inside a zip-bag was said to be the fastest. It claimed to have the highest germination rate. Little adjustments in the method could already have a big impact. For example closing the bag or putting the bag on a warm spot like the top of a fridge.

During the experiments the germination rate ranged from 35 to 70% depending of the conditions (soaking: yes/no; closing bag: yes/no; fridge: yes/no). In the end the following method was found to be the best:

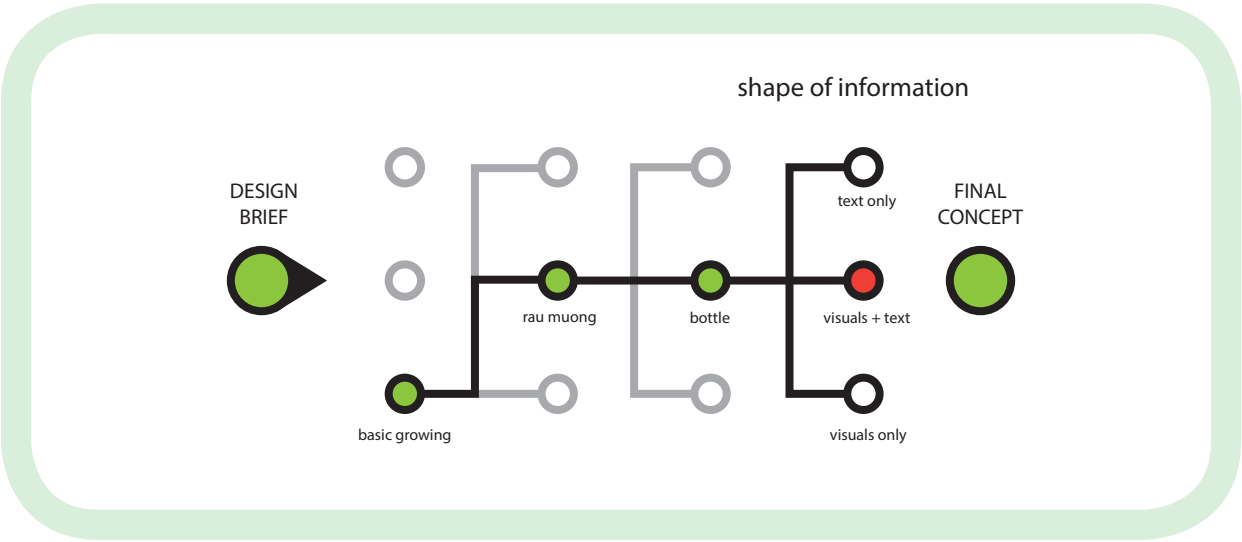
1) Soak an amount of seeds in water for 4 hours;
2) Wet two layers of kitchen towel and ring the excess water;
3) Distribute the seeds evenly on the towel and fold it;
4) Put the seeds in a fully closed zip bag and put them on the fridge (warm spot);
5) Look after 3 days if the seeds germinated successfully.

Once germinated, the rau muong germs can be planted into soil. It will grow very fast and is easy to maintain. Only watering the plants is enough to keep it growing.

5.5.2 Content Selection: how to present the information?

There a three ways in which the information could be presented to the user: text only, visuals only or a combination of both.
Feedback derived from the context mapping booklets was that the content was easy to understand because of the use of many illustrations and a little amount of text. It kept them motivated to fill in the booklet and do the small assignments. The instructions on how to grow rau muong should therefore be illustrative as well. Besides, the toolkit is targeting young mothers with a small baby; using simple to understand drawings with a friendly and childlike look will fit to the baby-period they are living in.

The instructions on how to grow need a certain amount of textual explanation. For this reason the information should be presented as a combination of visuals and text. However, the amount of text should be brought back to a minimum.



As an inspiration for the drawings was looked at the design of IKEA manuals (clear and illustrative), the simplicity of HEMA's corporate identity and the minimal and childlike illustrations of 'Nijntje' by Dick Bruna. 'Nijntje', better known as 'Miffy', is a big hype in China because of its simplicity and thoughtfulness (Pennarts, 2012).

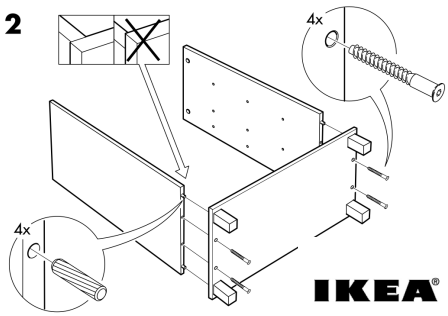


figure 39: IKEA manual

figure 40: impression of HEMA's corporate identity.

figure 41 illustration of Nijntje ('Miffy') by Dick Bruna.

5.6 Prototyping

With the type of vegetable, the shape of the container, the content and style of material set, it is time to put all these elements together in a testable prototype.

The possibility to copy the design and expand the garden is one of the strong aspects of the bottle garden mentioned by GetGreen. To ensure easy copying, only a small amount of kitchen tools was used during prototyping. The type of parts and tools used for assembling the prototype depended on the availability and price. For this reason many decisions for type and size of material were made on the go.

5.6.1 Bottle Search

The type of bottle used for the first prototype was a green Sprite bottle. The aim of the prototyping phase was making 3 bottle gardens that could be tested. At least 9 bottles needed to be collected since the feedback from GetGreen was that 3 bottles a kit was the minimum. The Sprite and Coca Cola bottle are almost similar in shape and have an elegant design. Which type of bottle to use depended on the availability. By asking street vendors and market stalls that collect recyclables, several bottles were acquired for a small amount of money (+/- 2.000 Dong per bottle = €0.07). Five out of six collected bottles were Coca Cola bottles, the other was Sprite. Three bottles brought by GetGreen employees were Coca Cola bottles too. I decided to use only Coca Cola bottles and drank one bottle of Coca Cola myself.

5.6.2 Hanging mechanism

Two wires serve as the backbone of the bottle garden. The wires hold the bottles together and are provided with loops on the top to be able to hang the bottle garden. An easy way to secure the bottles onto the wire is by using a knot. Though in this way it is not possible to adjust the position of the bottles afterwards. For this reason an adjustable solution needed to be found.

The parts used for prototyping that form the hanging mechanism are:

- PVC coated steel wire (3mm) – waterproof;
- small aluminium press clamps – to make a hanging loop;
- small wire clamps – to hold and adjust the position of the bottles;

5.6.3 Preparing the bottles

The strength of the bottle garden concept is that it is easy to (re)produce. To ensure that many people are actually able to reproduce the garden, a minimal amount of tools was used and making use of electric tools was avoided. During interim evaluation was mentioned that the edge of the cut hole in the bottle should not be able to injure the user. The final material used to prevent injury was the outer casing of two cored electrical wire. The steps taken to prepare the bottles are depicted on the right.

[BOX 5] Finding parts in Hanoi: the shattered hardware store

In Western countries we are used to go to the nearest hardware store in our city. A wide variety of tools and parts can be found in one store. In Hanoi however, there is not one store to buy parts and tools but several quarters full of individual shops. The two main areas are Chợ trời (with a focus on tools, electricity and audio) and Thuốc Bắc (with a focus on ironmongery, steel and aluminium). Both areas are located approximately 3.5km from each other. If you for example need screws and a screwdriver you will have to visit both areas.

Making the opening

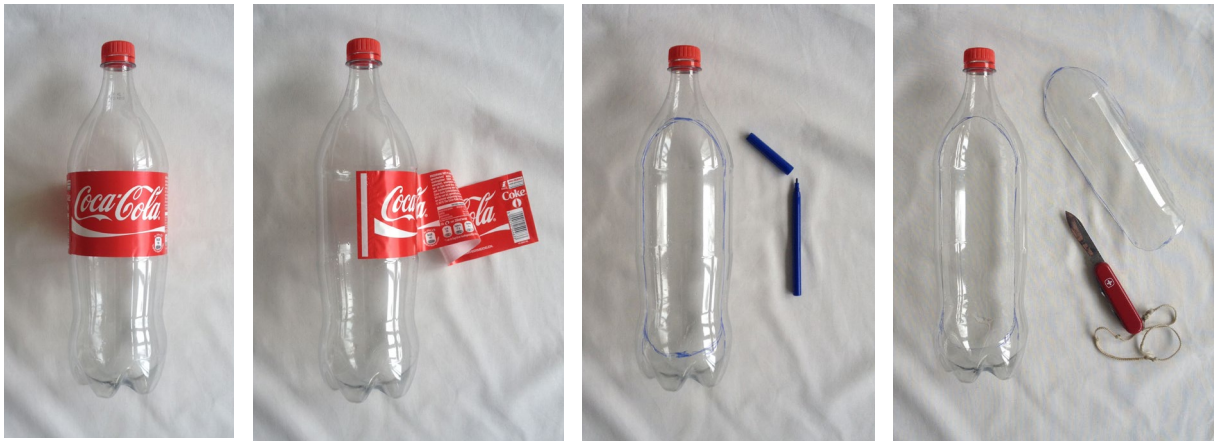


figure 42: making opening in bottle: remove label, draw cutting lines, use sharp knife to cut the hole.

Burning the holes

figure 43: buring holes: heat up iron nail, burn hole in bottle.

Applying rubber

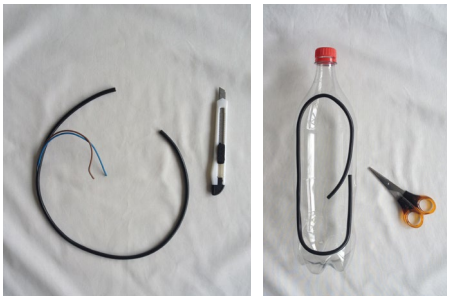


figure 44: strip the cable, attach strip.

5.6.4 Defining shape of presenting information

The information that is part of the toolkit entails: 1) information on the importance of organic vegetables/rau muong for their baby and the environment; 2) instructions on how-to-grow rau muong; 3) a manual to install the bottle garden.
Initially the toolkit was going to be packaged as an assembled and ready to use product. Since it turned out that it was hard to package the product while assembled, the information on how to install the bottle garden was added.

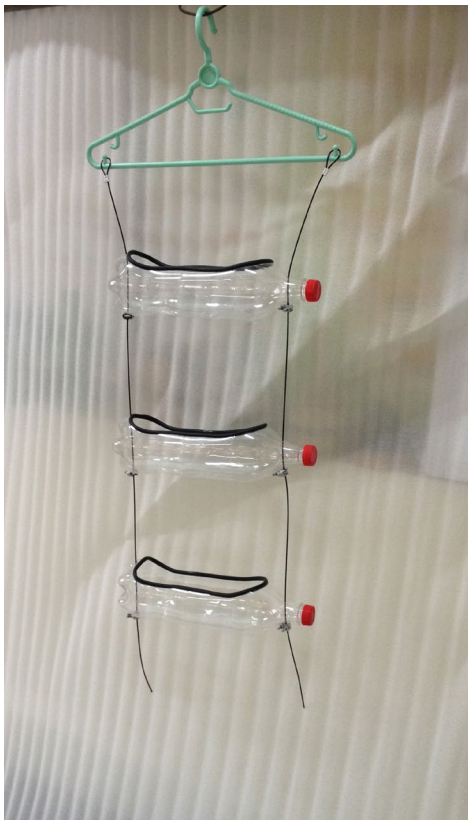
Different forms of booklet:

- All parts of information in 1 booklet;
- All information on 1 foldable leaflet;
- Every part of information in a separate booklet divided over the 3 bottles.

The division of the information over the three bottles was chosen to show in one glance the different types of information and tools needed for that step. The decision to create booklets instead of one big leaflet was to eliminate the risk of reading the provided information in the wrong order (which happened during interim evaluation).

5.6.5 Final Prototype:

All the different components were put into the bottles and wrapped together by a label made out of carton. A handle was added to make the toolkit easy to carry around. Bellow pictures are depicted of the final prototype.



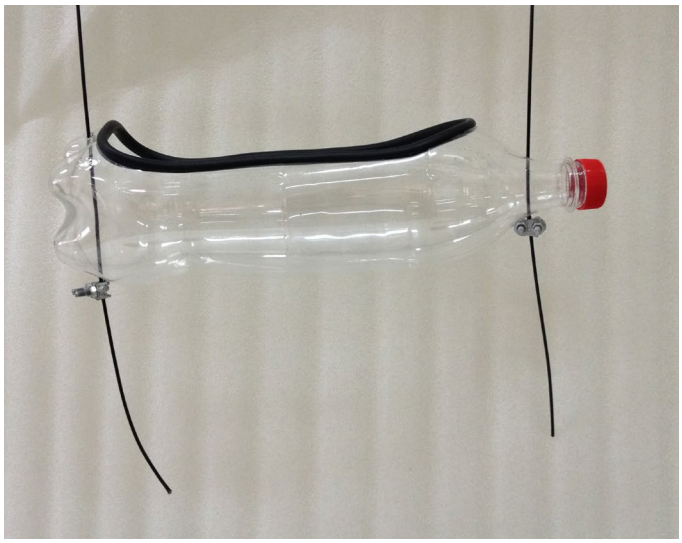


figure 45: collage of final prototype Bottle Garden.

6. Concept Evaluation

INTRO: This chapter will discuss the evaluation of the concept
CONCLUSION: This chapter will conclude with recommendations for the final design

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6.1 Introduction

The goal of this evaluation was to get feedback on the unboxing experience, the usability of the bottle garden, the content of the booklets and whether an online platform is needed or not. Three young mothers from AIT, five employees at Action for the City and the GetGreen staff were asked for their opinion. The results are described bellow.

6.2 Setup evaluations

AIT

Three participating young mothers from AIT were asked to evaluate the bottle garden toolkit. All participants were not informed about the interim progress of the concept; they had no idea what the final concept looked like. This made it possible to capture their first reactions and see whether the unboxing of the toolkit was positive and comprehensive. The participants were asked to evaluate the toolkit one by one to ensure everyone's personal opinion. After unboxing and exploring the toolkit, the participants were asked in a semi-structured interview to give their opinion of the product (shape, size, content).

Action for the City

The evaluation at Action for the City had a different setup. In an earlier visit to Action for the City was already spoken about the bottle garden concept. For this reason evaluating the unboxing experience was less important. The evaluation was meant to ask for their opinion and expertise in the field of sustainable behaviour education; is the content easy to understand? Five employees of AftC joined together the unveiling of the bottle garden toolkit. This in contrast with the evaluation of the young mothers apart from each other.

GetGreen staff

All GetGreen staff had seen the development of the bottle garden toolkit or knew what was going on. Therefore their feedback was targeted at the usability and overall content of the toolkit, not the unpacking experience.

[BOX 6]: Measuring emotions

In order to make the unboxing experience measurable the initial plan was to use the Pictorial Mood Description Instrument (Desmet 2012) where the participants could indicate how they felt about certain parts of the toolkit. Translating the emotions/expressions into Vietnamese was already hard, but I decided to give it a try. Unfortunately it turned out that the participants had indeed difficulties understanding the meaning of the expressions and explained that they did not know how to do it properly; *"We are normally not used to express our feelings."* For this reason was decided not to put emphasis on this evaluation method.

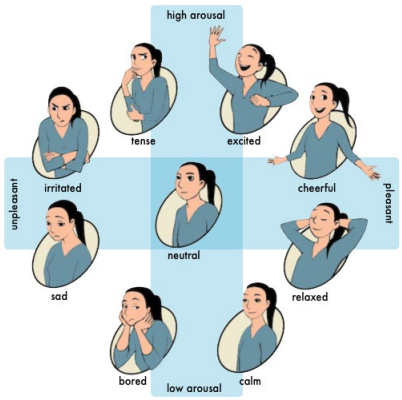


figure 46: Pictorial Mood Description Instrument by Desmet (2012).

6.3 Results

6.3.1 Unboxing experience

Young mothers AIT

The participants were told that GetGreen had sent them a package. They were asked to explore the content, look and feel of the product. Their first impression was of a positive nature: "*It is nice, I am very curious what is inside.*" And *"The package looks very attractive".* Ones opened the package, one of the participants was already wondering if the garden was too difficult to setup; *"I am asking myself how I could work with all the technical equipment [red. – wires, wrench, clamps] inside.*" After reading all the booklets inside the bottles it became clear to her that there was enough guidance to prepare the bottles herself.

[Recommendations to consider:]
• Make bottle garden easier to setup (without tools);

Although the booklets were numbered (1 to 3), all participants picked a random booklet and started reading it.
They mentioned afterwards that the order of reading the booklets does not matter. Dividing the information over three bottles makes it *"more attractive"* and *"the clear steps make it fascinating".* Besides, putting all the information together in one booklet would make it unattractive; "All information into one booklet might be too thick and they don't want to see it anymore."

The biggest problem they encountered during the test was that all the written information was in English. It was hard for them to understand. Especially the first impression of the amount of steps on 'how to grow' was for one of the participants overwhelming; *"Maybe because it is in English it is hard for me to understand".* When the toolkit is going to be implemented in the GetGreen methodology the booklets will be translated.

Action for the City

Evaluating the unpacking experience at Action for the City took place with five colleagues at the same time. This resulted in chaos where several people pulled the different booklets and content out of the bottles. Although they talked Vietnamese with each other, they gave some feedback; *"Very complicated."*
One of the employees began to put all the paper towels in the bottles as if it was soil. The towels were part of the germination package. Ones the booklets were read it became clear what they were supposed to do.

[Recommendations to consider:]
•Try to make the purpose of the toolkit (and its equipment) as clear as possible on the package label of the bottle garden to avoid confusion.

GetGreen staff

The GetGreen staff indicated that the label of the package did not communicate the content of the toolkit enough; "The package label is not clear enough. Should be clear in one glance." *The bottle garden itself conveyed the message of "very sustainable" because every material is reused and there is no need to buy anything."*

[Recommendations to consider:]
• Redesign package label to communicate the message and content clearer;

6.3.2 Usability of the Bottle Garden

Young mothers AIT

The participants were very positive about growing vegetables in a hanging garden. Most of the people who grow their own vegetables nowadays use disposed Styrofoam cooling boxes that are placed on the floor of the roof terrace or balcony. The disadvantage of these boxes is that they take up much space and rats can easily eat the vegetables; *"With this hanging garden we can keep rats away from it [red. Vegetables]."*

The fact that the bottles garden is relative small creates mixed feelings. On one hand it is easy to hang such a garden in small houses or flats because it does not take a lot of space. On the other hand they think it is too small and prefer bigger bottles to grow more. However, if the focus of the toolkit is only on growing vegetables for the baby they think it is enough; *"I think it is not too small, because my child is small. But I will ask my husband to find bigger bottles to grow for my whole family."*

To get rid of excess water, they indicate that the bottles should have holes in the bottom.

[Recommendations to consider:]
- Use bigger bottles, or make garden easier to expand;
- Make holes in bottle to drain excess water after watering the plants.

Action for the City

A bag of soil, normally part of the toolkit, was not provided during the evaluation. They mentioned that it is important to provide good soil with the toolkit or a clear description where to find it; "It is very difficult to find the right soil. " The size of the individual bottles was not a problem. It turned out that they experimented in the office to grow vegetables in bottles too, although they had not thought of hanging them. Especially linking multiple bottles underneath each other should be made convenient. In this way people can easily expand their garden to grow more vegetables for the whole family. The presence of the rubber edge was giving the product a "professional look". The reproducibility of the edge was their only concern. Providing an alternative with tape could be a solution. As a last comment the employees indicated that holes in the bottles were necessary; "So, if we put too much water, there need to be holes."

[Recommendations to consider:]
- Make bottle garden easier to expand;
- Provide alternative for rubber edge that is easier to make
- Put holes in the bottles to drain excess water.

6.3.3 Content of the booklets

Young mothers AIT

The participants were asked to indicate if there was information missing in the toolkit. They felt that there could be more information provided about for example storing the seeds in the right way and some information about the soil (type of soil to use and where to buy it).

[Recommendations to consider:]
- Provide information about seed storage and type of soil.

Action for the City

Despite of the confusion caused by the enthusiastic exploration, the content of the booklets was received as very clear; "The information is very good and illustrative. People have not to read much and that is good." "The guide books are very easy to read and it gives me motivation to try it for the first time." They thought information on where to buy safe seeds and soil should be added though.

[Recommendations to consider:]
• Add information about soil and seeds or make a link to the platform where detailed information is provided.

GetGreen staff
They indicated that the booklets did not provide information on how to copy the design of the bottle. It might be difficult for people to copy the way to cut the bottle and apply the rubber edge; "It would require some help."

[Recommendations to consider:]
•Give clear guidance on 'how to copy' in booklets or online platform.

6.3.4 Online Platform:
Young mothers AIT
The participants were asked if they felt an online platform was a necessary part of the toolkit. Especially the possibility to share insights and experiences was mentioned to be very useful; "Some people are very creative with making gardens who would like to share their insights." and "It is good to have a platform where people can share their experience".

[Recommendations to consider:]
• Highlight the possibility to share experience and insights through a forum.

6.4 Recommendations
The collected feedback will be used to improve the bottle garden concept towards a final design. Bellow is discussed to what extent the recommendations will be implemented in the final design or not.

MAKE PACKAGE LABEL CLEARER
•Try to make the purpose of the toolkit (and its equipment) as clear as possible on the package label of the bottle garden to avoid confusion.
•Redesign package label to communicate the message and content clearer.

If the bottle garden is distributed to people without any introduction, the label of the package should provide enough information to understand what the product is about. Redesigning the label to make design and goal of toolkit clear in one glance should be implemented in the final design.

SIMPLIFYING BOTTLE GARDEN
•Make bottle garden easier to setup (without tools);
•Use bigger bottles, or make garden easier to expand;
•Make bottle garden easier to expand;

The common criticism retrieved from the evaluations was that people could not grow a lot of vegetables inside the three provided bottles. They agreed that it would be enough for one baby, but would like to have the opportunity to expand their garden more easily by using more bottles. They thought the use of a wrench and buying specific clamps would discourage copying. For this reason the redesign should not make use of unnecessary parts and equipment.

• Provide alternative for rubber edge that is easier to make

The addition of the black rubber edge makes the disposed bottle look like a finished product. It makes the bottle garden more attractive. If people want to copy it, a clear guidance needs to be offered. Mentioning a cheap and easy alternative (like tape) could be implemented. It is up to the person whether they like to use the rubber edge or another alternative.

HOLES IN THE BOTTLE

• Make holes in bottle to drain excess water after watering the plants.

All groups indicated during the evaluation that there should be holes in the bottle to drain excess water. It would avoid rotting of the roots of the vegetable. The holes need to be implemented in the final design.

PROVIDE AN ONLINE PLATFORM

• Give clear guidance on 'how to copy' in booklets or online platform.
•Highlight the possibility to share experience and insights through a forum.

Providing a clear guide on 'how to copy the bottle' would empower more people to copy the design. Especially when the information is shared on the online platform, it becomes available for other people who are interested as well. In this way other people than young mothers can learn from each other too. It is essential to provide a forum where people can get more information and share their experiences.

• Add information about soil and seeds or make a link to the platform where detailed information is provided.

Good soil and seeds are the basic elements to grow vegetables. Providing information on where to buy the right type of soil and seeds is very important. Next to that it provides interesting possibilities to link certified soil and seed suppliers to the project from a business point of view. This information should be provided on the online platform.

All implementable recommendations mentioned above are included in the final design of the Bottle Garden toolkit. The final design will be presented in the next chapter. The online platform is limited to a visual impression and the design of the small bag of certified soil (3-5 litre) that will be provided with the toolkit is left out. Both because of the limited time available within this graduation project.

7. Final Design: Showcase – Bottle Garden

figure 46: final design of Bottle Garden toolkit.

7.1 Design

Bottle Garden toolkit

The Bottle Garden toolkit empowers young mothers in Vietnam to start growing safe vegetables for their baby at home. The young mother is in control of the growing process to ensure that chemical pesticides that are used to grow conventional vegetables will not harm her baby. The toolkit contains all ingredients needed to grow Rau Muong (water spinach), a powerful green vegetable full of essential minerals and vitamins. Rau Muong grows very fast and needs little attention and care. It is the ideal way to start growing safe vegetables at home and fits perfectly into the busy lifestyle of the young Vietnamese mother of today.

The toolkit includes certified seeds, a soil container, germination kit and step-by-step information. A small bag (3-5 litre) of certified soil that includes organic fertilizer will be provided next to the toolkit. Just all you need to start growing fresh rau muong right away!

figure 47: final design of Bottle Garden (content outside), on the right: two sets.

7.1.1 Bottles and booklets

The toolkit contains three bottles, each of them containing different content and information. Larger images of the booklets can be found in appendix V.

figure 48: bottles with content.

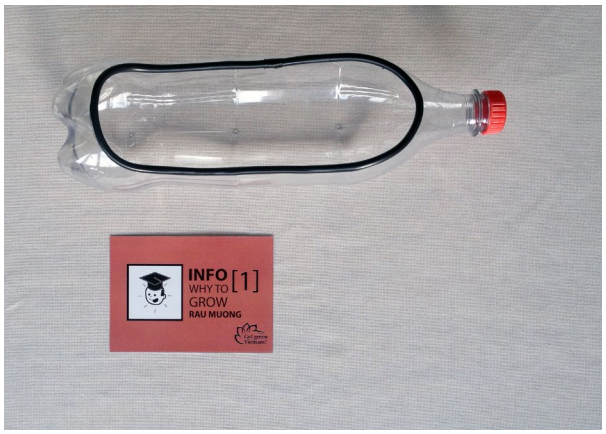


figure 49: content bottle [1].

Bottle 1: Why to grow?

Bottle 1 contains an information card to (a) raise the importance of consuming safe vegetables, (b) explain that chemical pesticide residues can have a negative effect on the development of brain and immune system of young babies, (c) list the powerful properties (vitamins/minerals) of rau muong. The general message: *"Give your baby your own grown safe/organic vegetables to stimulate your baby's brain development!"*

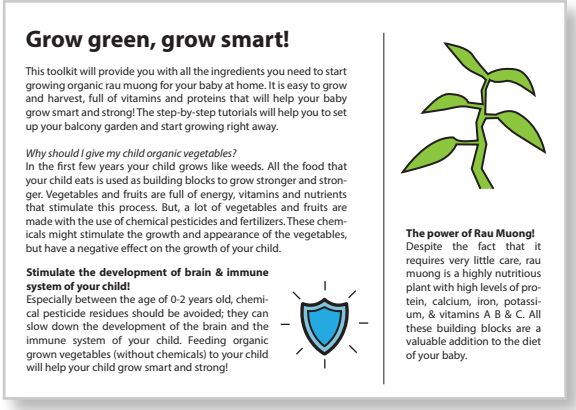
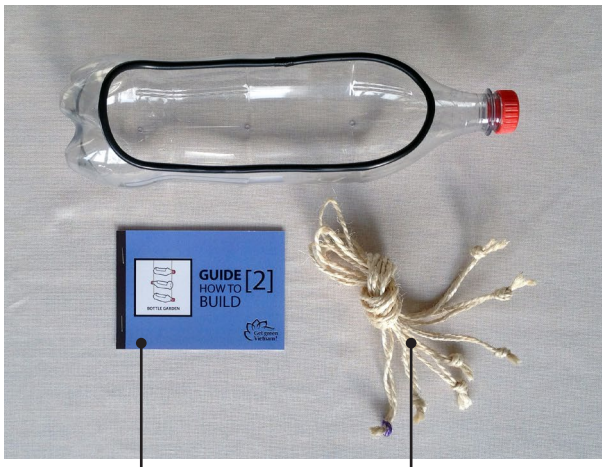


figure 50: information card: why to grow rau muong

figure 51: content bottle [2].



Bottle 2: How to build?

Bottle 2 provides information on how to setup the bottle garden with the enclosed ropes and how to create your own bottle.

Expanding the Bottle Garden is very easy. Step-by-step information on how to build your own bottle is provided within the toolkit and can be found on the online platform (paragraph 7.2).

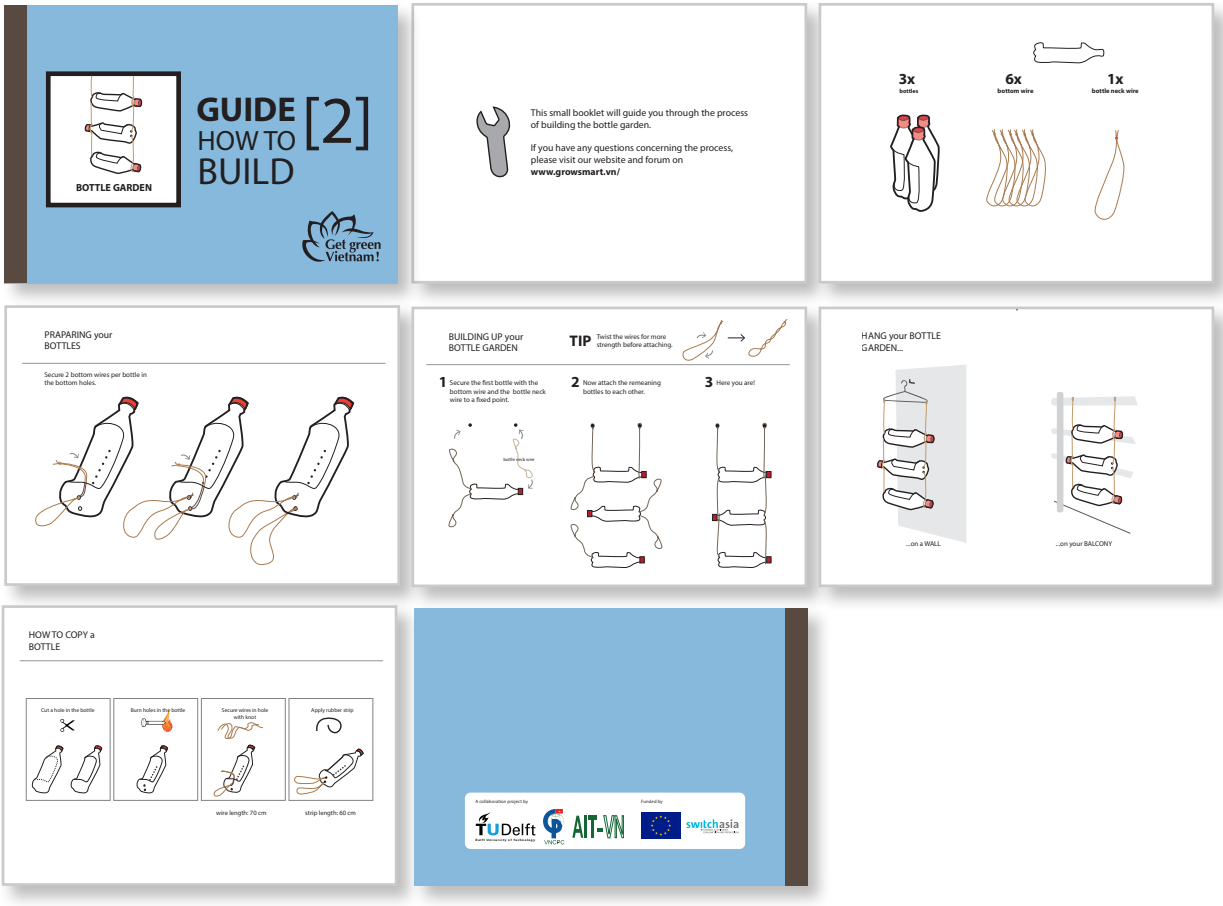
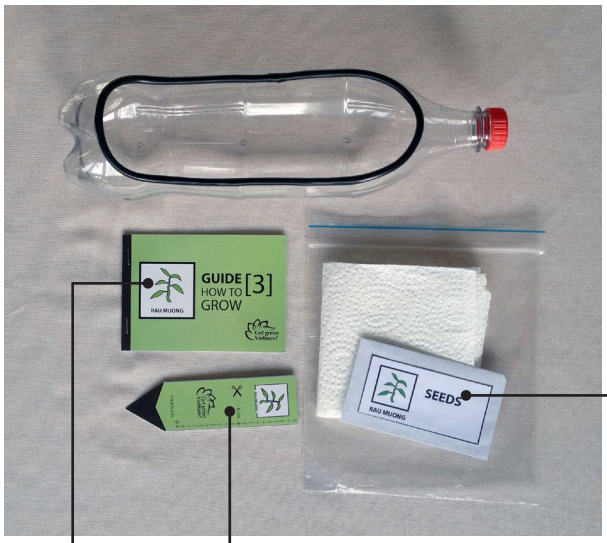


figure 52: content of guide: how to build.

figure 53: content bottle [3].



Germination kit:
- zip-bag;
- rau muong seeds;
- paper towels.

Harvest measuring card.

How to grow - information booklet

Bottle 3: How to grow?

Bottle 3 contains a step-by-step guide on how to grow and harvest rau muong, a germination kit (zip-bag, seeds, paper towels), measuring card to see when and how to harvast.

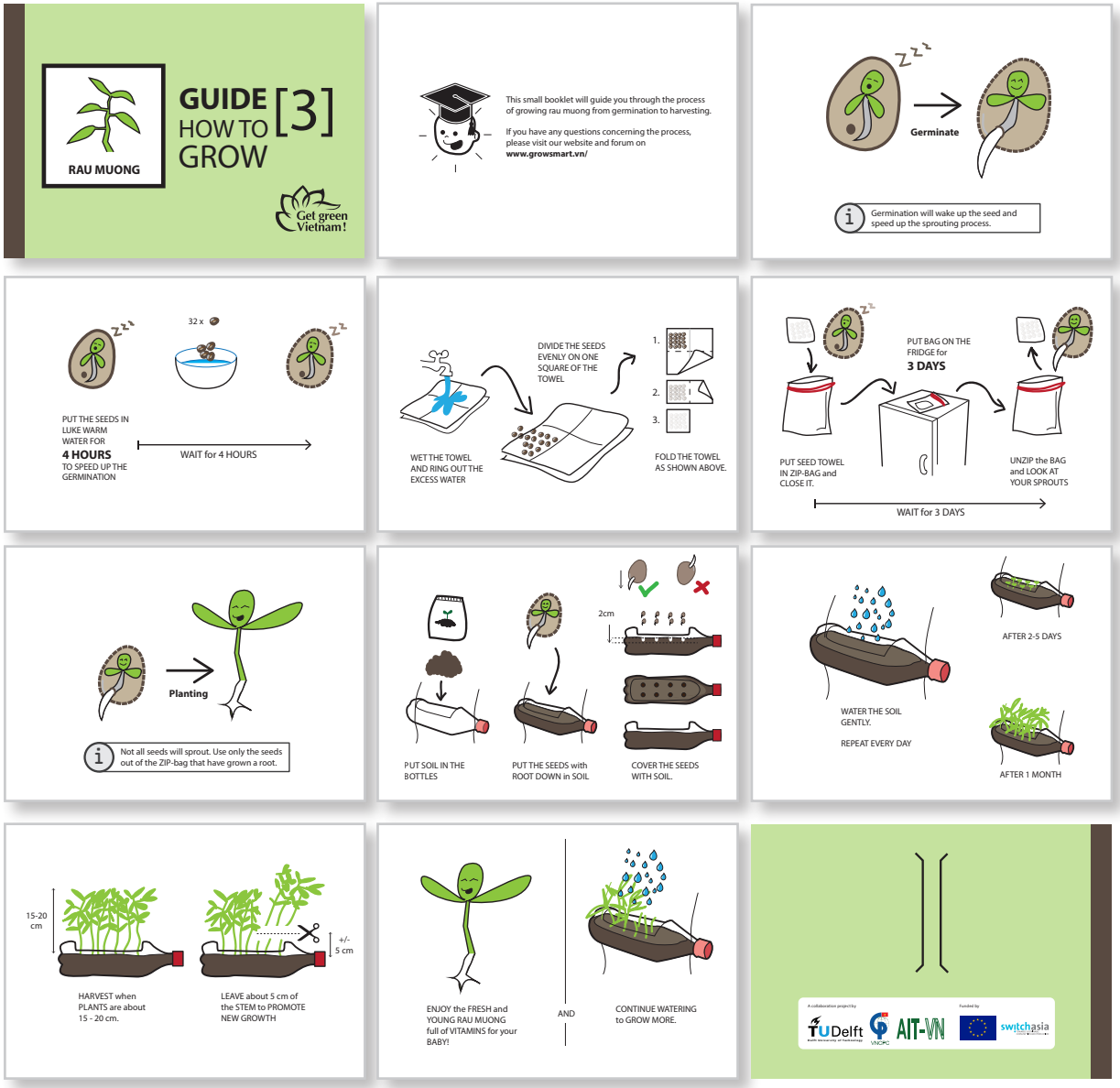


figure 54: content of guide: how to grow.

7.1.2 Hanging ropes

The bottles can be attachted to each other by linking the ropes at the bottom of the bottle. It is easy to add another bottle if the user wants to expand his/her Bottle Garden. Twisting the ropes adds more strength.

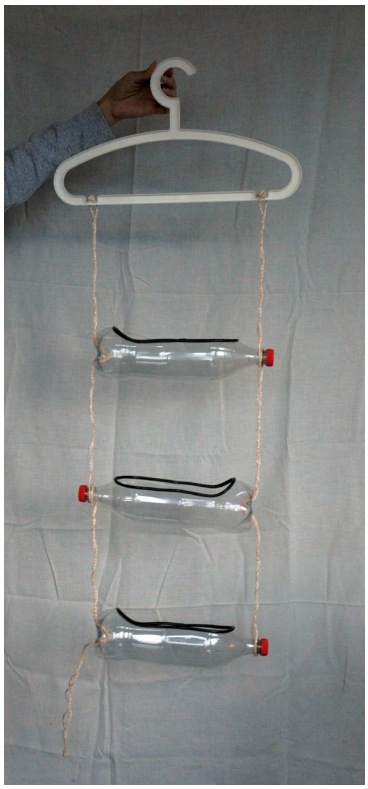


figure 55: hanging ropes, hanging bottles.

7.1.3 Package

The bottle garden with all its content will be hold together by a carton wrapping that makes it easy to carry. There are no extra materials needed, like glue or stapples, to close the package.

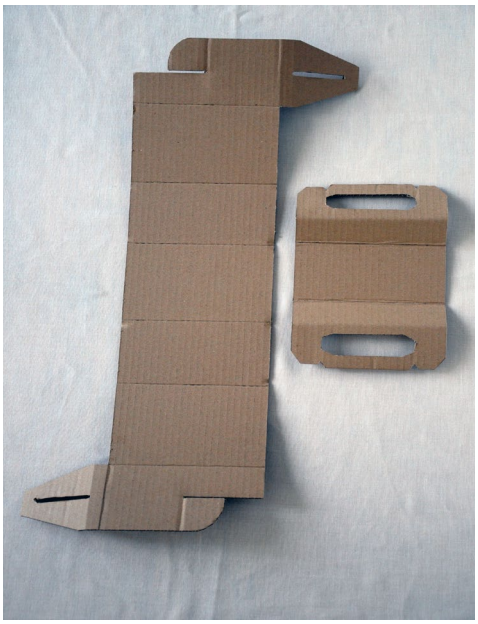


figure 56: package of Bottle Garden.

7.2 Online Platform

The online platform is a website where people can gain more information about:
1) Growing different kinds of vegetables; 2) learning how to build their own bottle garden; 3) finding out how and where to buy certified seeds and soil; 4) providing a forum to share gardening experience and pictures of their own garden.

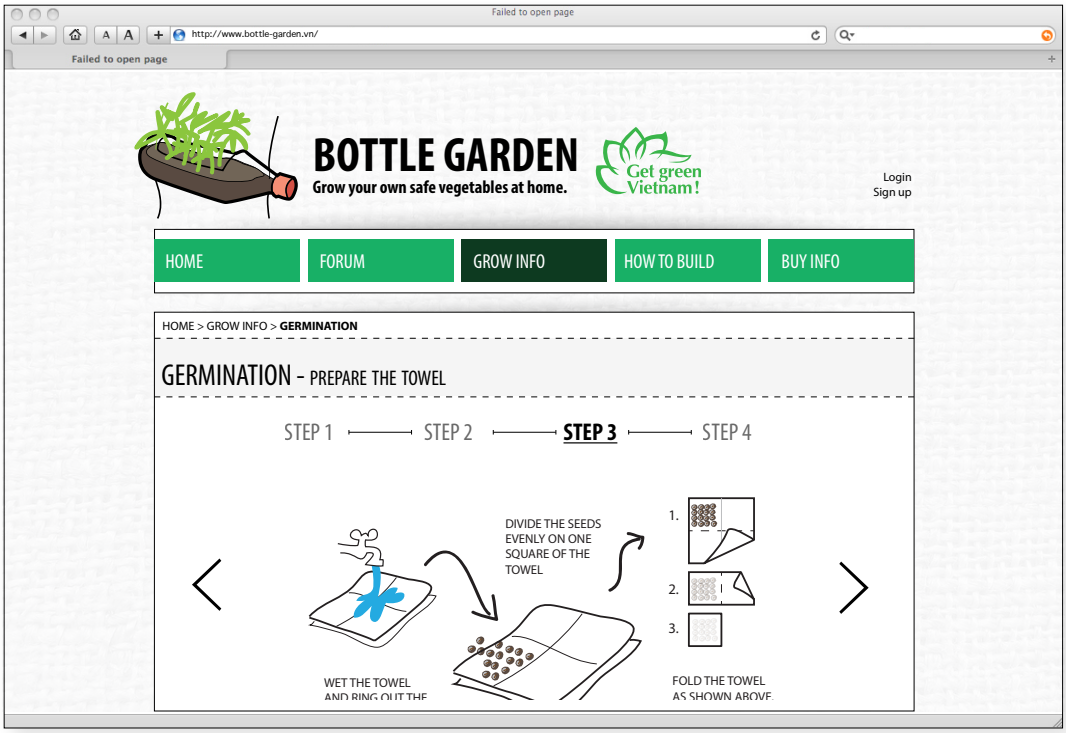


figure 57: impression online platform, grow info.

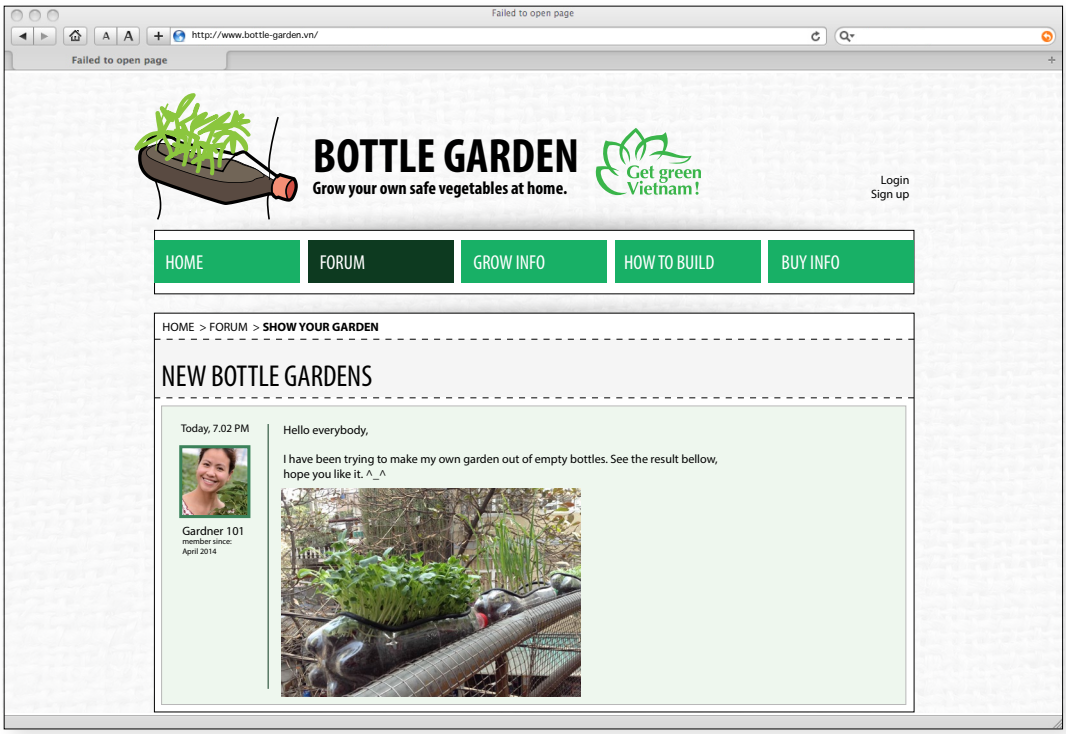


figure 58: impression online platform, forum.

EVALUATE

8. Evaluation: final design

INTRO: This chapter will discuss the evaluation of the final design
CONCLUSION: This chapter will conclude with recommendations for the future

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The evaluation of the final design was focused on the overall opinion of the toolkit; does it motivate to start? Is focusing on only young mothers not too narrow? The young mothers from AIT, Action for the City and GetGreen staff were asked to reflect on the goal of the Bottle Garden Toolkit; empowering young mothers to start growing safe vegetables for their baby at home. At the end of this chapter will be evaluated whether the requirements formulated in the design brief are met.

8.1 Bottle Garden: does it motivate?

All participants were asked whether they thought the bottle garden was able to motivate young mothers to start growing rau muong for their babies or not. They indicated that it really depends on the mindset people are in. There should already be some kind of passion or interest in gardening in order to start growing vegetables. Some mothers already grow vegetables for their child at home. For the mothers that don't grow vegetables, the following distinction in mindset was found:

1) People who are ready for it: they are motivated to consume safe vegetables and have an interest in gardening, but are missing the ability to start.

"I wanted to start growing vegetables for a long time, but could not find a method to avoid rats eating my vegetables." "And, now I have a reason more to climb up to the rooftop so I can have gym and water my plants!"

2) People who are willing to try: they are motivated to consume safe vegetables, but don't see the ability to grow at home.

"Especially for my baby I use organic vegetables. If I get the opportunity to do something at home, I would try to find out if it is good or not."

3) People who are not ready for it: they are not motivated enough to consume safe vegetables, with or without the ability to grow.

"I am a relaxed mum who is not so scared of vegetables bought outside. Now with two children I am too busy. I think this package will be more attractive to me in the next two years when my child is older."

The will and ability to spend time on gardening is one of the most important factors to start growing vegetables at home or not. All the mothers indicate that the bottle garden toolkit seems very easy to use and does not take a lot of time to grow or maintain; "I think it looks practical, eco-friendly and convenient."

The employees of Action for the City were also positive about the bottle garden toolkit focused on young mothers; "I have a baby and I think that it is a beautiful package when seeing it for the first time."

8.2 Bottle Garden: only for young mothers?

Action for the City said that the idea of targeting only young mothers is understandable and a good starting point that is worth a try. Although, they think it is an interesting concept for other target groups too; "If people don't have a baby they can use the toolkit to grow other things they like."

According to GetGreen, the toolkit could be implemented and distributed during the training sessions of the change agents. These training sessions involve a wide variety of people with different age,

gender and profession. Focusing the toolkit only on young mothers is understandable, but would exclude many people; "We cannot give it to all participants." GetGreen could decide to distribute the Bottle Garden to other people who are interested as well. It would raise awareness and empower even more people to start growing safe vegetables at home. However, it should be kept in mind that the amount of rau muong that could be harvested with the toolkit is just enough for one baby. If the toolkit will be distributed to other people as well, the childlike style of the booklets and the size/ amount of the bottles should be reconsidered.

8.3 Bottle Garden: only growing rau muong?

Both the mothers from AIT and employees from Action for the City agree to focus on only one vegetable (rau muong) in the toolkit to start with. The user is of course free to grow other vegetables as well if they want to. For example one of the mothers would like to grow not only rau muong, but experiment with other vegetables as well; "I would not only grow rau muong with it, because my child also likes xa lach and tomato." The bottles can be used for a wide variety of vegetables and herbs, like: tomato, salad, chili peppers, basil, union, and sprouts. A redesign of the bottles is not needed.

8.4 Bottle Garden: are the requirements met?

Bellow is indicated to what extent the formulated requirements of the design brief are met and where future activities are recommended.

✓ *: requirement met* ✓ *: requirement not (yet) met or unclear*

[A] Toolbox:

information:

- Target young mothers with a baby between 0-2 years old; ✓

(also interesting for other target groups in the future.)

-Provide (in depth) information on the risks of pesticide residues for the young child (✓) to increase motivation of the user (young mother) to consume safe/organic vegetables (✓);

(whether this motivational factor will increase the consumption of safe/organic vegetables with the use of the Bottle Garden needs to be evaluated after people have started to use this product.)

- Easy to understand step-by-step manual on how-to-grow; ✓

(but booklets/information should be translated into Vietnamese)

- The communication of information needs to match with young mothers with a baby; ✓

("I have a baby and I think that it is a beautiful package when seeing it for the first time.")

- The communication of information needs to be very visual. ✓

("The information is very good and illustrative. People have not to read much and that is good.")

Physical content:

- Provide physical ingredients that enables the user to start growing their own vegetables: seeds (✓), soil *(✓ ,future activity)*, growing container (✓);
- The toolkit needs to be fast to setup (✓)to increase motivation; *(✓ ,they are willing to try)*
- The toolkit needs to be of limited size; ✓
- Transportable by 1 person; ✓
- To increase motivation the toolkit should focus on vegetables that:
  - o ..are consumed (often) by babies in their first two years; ✓

  (other vegetables could be considered)
  - o ..are easy to grow with a minimum amount of care/effort; ✓
  - o ..take a short amount of time to be ready to harvest; ✓

[B] Online Platform

- Provide (elaborate) information in digital format on how-to-grow; ✓

(designing content of platform is a future activity)

- Provide a forum feedback where the user can ask for feedback and share photos of their garden with others; ✓

(designing content of platform is a future activity)

- *Wish:* toolkit could be used to change the food consumption behaviour within the context of Europe or other countries as well. This applies to both the toolbox and the online platform.

(evaluation of GetGreen Vietnam test groups should provide insights in the efficacy of the toolkit. All materials used to build the toolkit (PET bottles, rope and carton) are available worldwide. Only the type of plants to start growing with the toolkit should be matched with the climate and availability of local seeds in the targeted country.)

8.5 Conclusion

From the evaluation of the toolkit with AIT, Action for the City and GetGreen staff can be derived that people already need to have a positive attitude towards gardening in order for the toolkit to succeed. As mentioned in the Stages of Change model (paragraph 2.2.3), people need to be in the right mind-set to change their behaviour as well. The Bottle Garden is targeted at people who are in the stage of contemplation (being ambivalent to change their behaviour) and preparation (taking small steps towards changing their behaviour). For those people the toolkit can be empowering. As a pilot, focusing the toolkit only on young mothers and one type of vegetable (rau muong) is a good start; change comes with little (baby) steps.

However, the bottle garden would be interesting for other target groups as well. It can be an introduction to the concept of sustainability. For example people can be triggered to recycle materials and give waste another purpose. That is why targeting a broader audience with the toolkit is an interesting option in the future as well.

Most of the set requirements in the design brief are met. Future activities should be focused on the development of the online platform. Evaluation of the GetGreen test groups should reveal whether the toolkit proved to change the attitude and behaviour of the user's food consumption. A next step could be be searching for an organization who would like to pick up the idea of spreading the idea of the Bottle Garden toolkit in other countries as well. In that case the toolkit should be matched to the conditions of the targeted country (type of vegetable, indoor-version).

Overall, the bottle garden toolkit is well received by the Vietnamese participants and provides a small first step towards more sustainable food consumption.

"The toolkit is very convenient and easy. It is worth a try!"

9. Implementation

Now that a final design is presented it is interesting to look how the product can be implemented in the GetGreen methodology and what happens with the concept (product, platform) after the GetGreen project ends in April 2015. For both scenarios a Product Service System will be presented.

9.1 GetGreen Vietnam training sessions

During the GetGreen training program of the change agents several clusters will be presented and discussed. Some examples are: 'Live like a farmer in the city' or 'In and around the supermarket'. Each cluster will discuss useful tips and tricks to live in a more sustainable way. For example in the cluster of 'Live like a farmer in the city' the tips 'reuse leftovers' and 'eat organic food' will be discussed. Introducing the bottle garden during the topic of 'eat organic food' seems the best moment.
During the training sessions of each cluster the change agents will get several 'challenges' they need to do at home, 'easy' and 'difficult' ones. Installing the bottle garden at home and start to grow rau muong can be a good 'easy challenge'. Expanding the garden and growing different kinds of vegetables could be the 'difficult challenge'.

GetGreen Vietnam will create a website for communicating their information on all the clusters. The website will be provided with a forum where the change agents can give their feedback on the methodology or share insights among each other. This forum can also be used for the change agents to share insights and pictures of their bottle garden, as proposed in the online platform of the final design (see paragraph 7.2). Therefore developing a separate platform is not necessary.

9.2 Producing Bottle Gardens

The Bottle garden toolkit is easy to produce. It contains a minimum of material and a small amount of labour to prepare the bottles (see figure 59). Students could be asked to prepare the bottles for the change agents and put all material (bottles, booklets, germination kit and label) together.

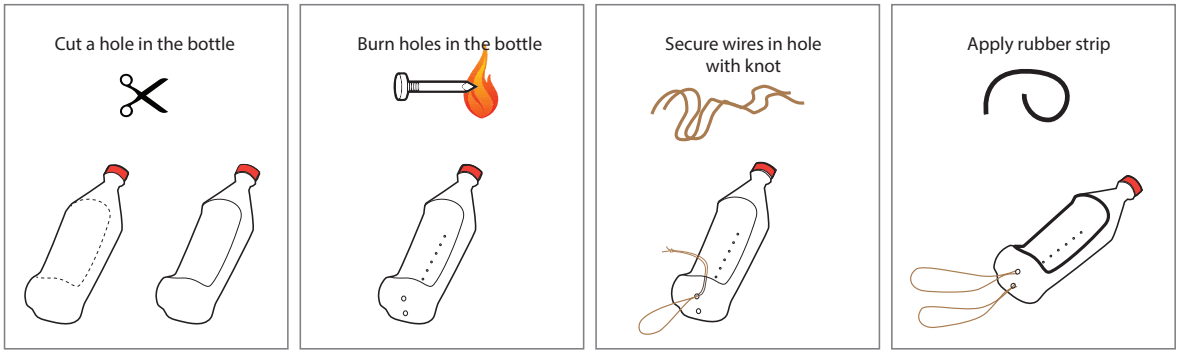


figure 59: steps on how to prepare the bottles.

9.3 Product Service System (PSS)

There are two Product Service Systems (PSS) that apply to the concept of the bottle garden; one during the execution in the GetGreen training program and one that could apply when the project of GetGreen Vietnam ends.

In short, a PSS is *"a marketable set of products and services capable of jointly fulfilling a user's needs."* (Halen et al., 2005)

PSS – During the execution of GetGreen Vietnam

Figures bellow shows how the change agent (young mother) interacts with GetGreen Vietnam during the training. The service is divided into two phases: 1) signing up to GetGreen and receiving the Bottle Garden toolkit. 2) Installing the Bottle Garden at home. The figures show the steps the change agent take, how GetGreen interacts (visible/invisible) on them and what (physical) evidence is needed.

GG Training

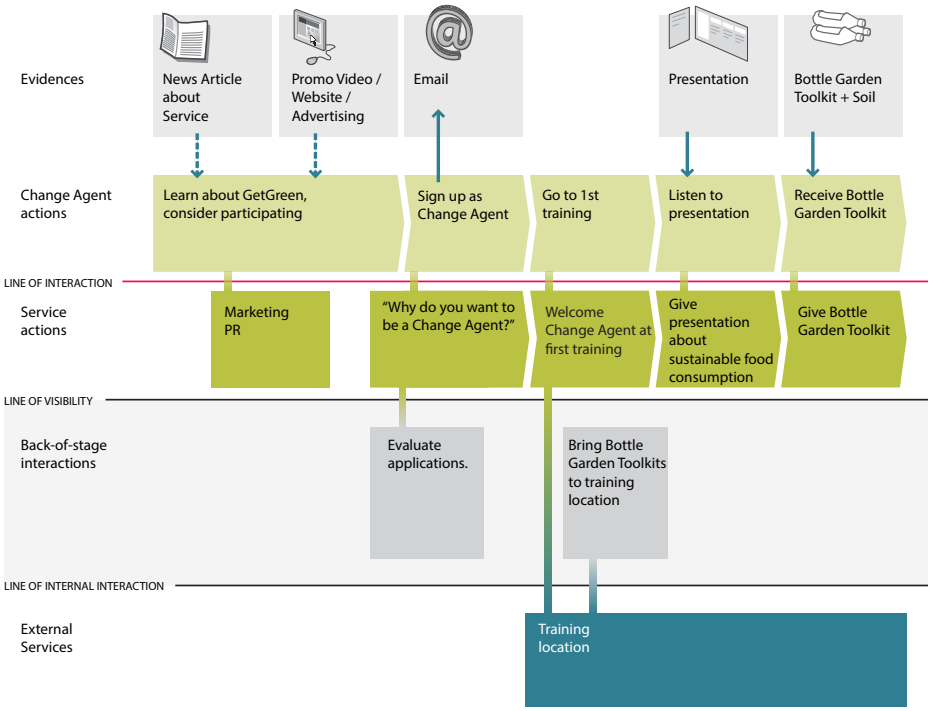
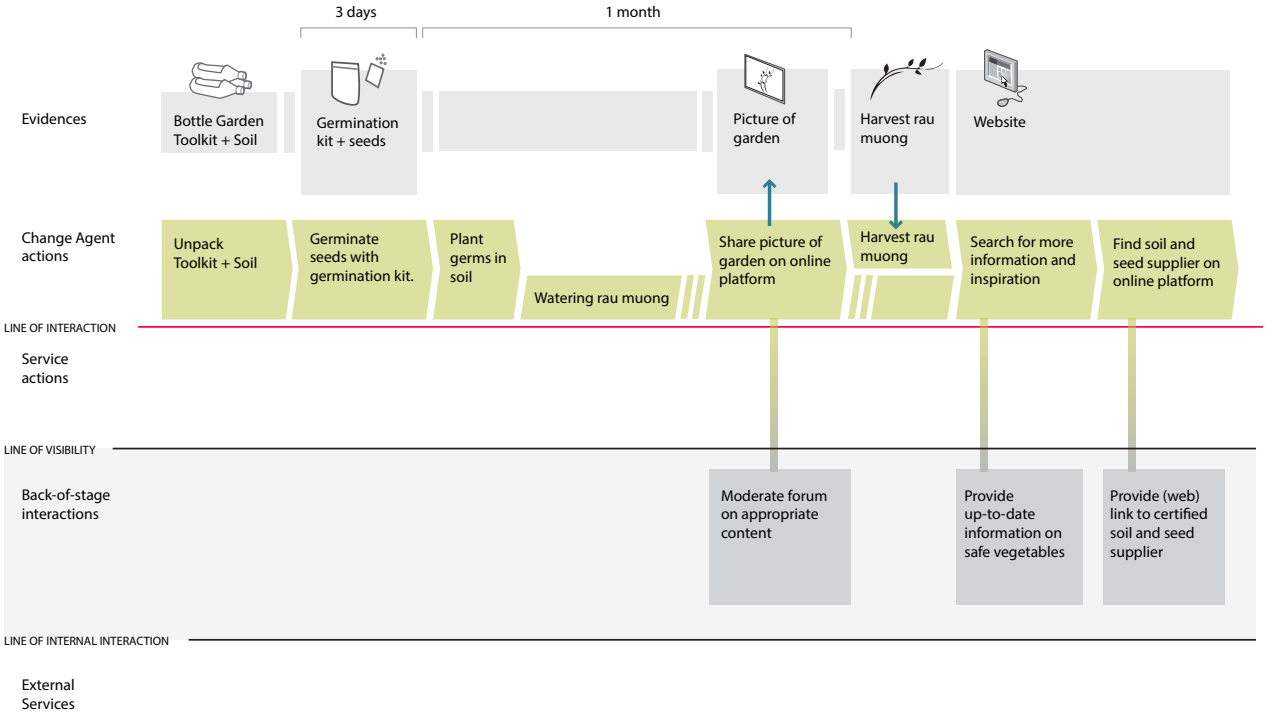


figure 60:
above: Product Service System (PSS) of sign up phase during GG training.
bellow: PSS of use of toolkit at home.

Use of toolkit at home



PSS – After GetGreen Vietnam ends

When GetGreen ends in April 2015 the question will be if it interesting for other projects or local companies to continue to production and distribution of the bottle garden toolkit. The online platform will be key in the whole concept, giving the opportunity for local suppliers of safe soil and seeds that are selected by GetGreen or other trusted organizations to sell their products. If there is an organization that wants to continue spreading the message through distribution of the toolkit, they become responsible for the production of the toolkit.

Another way suggested by the GG staff to promote or distribute the bottle garden toolkit could be asking the Women Union to pick up the idea. They have a strong voice and a big network. Especially when the GetGreen project ends April 2015, they could continue to spread the message and the promotion of the toolkits in Vietnam.

If the toolkit during the execution of the GetGreen training proves to have a (significant) possitve effect on awareness and behaviour, it would be interesting to continue the project in an European or global context as well.

10. Final conclusion

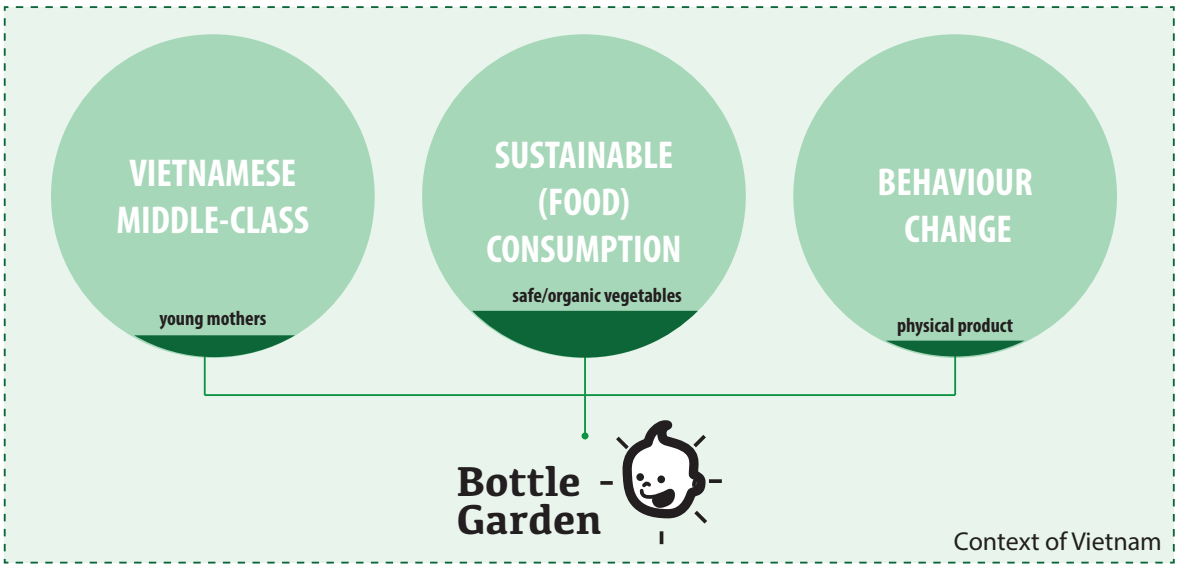


figure 61: visual representation of spectrum tackled within graduation project.

As illustrated in above (figure 61), this graduation project focused only on small parts of the whole spectrum on behaviour change of sustainable food consumption in the Vietnamese middle-class. It is a first step to introduce sustainable consumption in Vietnamese households. The question is: is the Bottle Garden toolkit able to "raise awareness and consumption of sustainable food in Vietnamese middle-class households by empowering young mothers to grow safe/organic vegetables at home for their baby"?

Introducing the importance of sustainable consumption with a hands-on solution does not only raise awareness, but also empowers them to act immediately. By increasing the ability (providing easy to understand knowledge on how to grow) and the opportunity (providing a small all-in-one toolkit to start growing vegetables that fits the context of Vietnamese households) is tried to bridge the 'green gap' between intention and action towards sustainable consumption. The online platform provides a place to evaluate and stimulate the maintenance of the sustainable behaviour of the user and others.

"One of the problems in current strategies is that they create a higher awareness on sustainability or intention to act more sustainable but fail to actually establish a change in behaviour." (De Koning, 2013)

Using food safety to increase motivation worked out well. Targeting young mothers that are concerned about the health of their baby and family has proven to be a legitimate choice. Whether the Bottle Garden toolkit is able to evoke an actual behaviour change on the long term is hard to measure. Evaluations of the pilot version of the toolkit during the GetGreen test groups should find out to what extent the toolkit was able to change behaviour.

As discussed in the evaluation of the final design, the Bottle Garden could be interesting for other target groups as well. It can contribute to sustainable consumption, raise awareness and evoke behaviour change for other people too. The look and feeling of the bottle garden conveys the message of sustainability very well with the use of recycled materials. Experiencing the amount of care it takes to grow vegetables might change the consumer's attitude towards food consumption and prevent excessive disposal as well. By making the design and needed information of the Bottle Garden accessible for everyone it becomes a product of the community instead of a product an individual should buy.

Especially in collectivistic societies like Vietnam behaviour change through a community can have a bigger impact than targeting only the individual. Worth of mouth (on- and offline) has got a strong impact in these societies. Designing a product that is easy to copy will reach and stimulate many people. Future projects on behaviour change in Vietnam should take this into account.

There is still a lot to do towards sustainable food consumption in Vietnam. Especially a reliable food system that can assure safe food for consumers is necessary. These systems are generally in control of governmental organizations that are not able to guarantee a safe food supply. As long as these systems are not reliable enough, consumers need to take action themselves.

Among the Vietnamese consumers there is rising an urge to change and people are stepping up for the future of their family and fellow citizens. Projects that focus on sustainable consumption from a consumer perspective should be stimulated and carried out more in the future. The Vietnamese consumer should be empowered to get and stay green!

What could others learn?

Faculty of Industrial Design Engineering (IDE)

Designing for behaviour change is dependent on many factors that differ from culture to culture. Doing research in the real context you are designing for is a necessity. The use of qualitative techniques (like Context Mapping) is very helpful to identify behavioural factors within the context of the user.

This graduation project shows sustainable food consumption is a very interesting field for designers. The Wageningen University & Research centre (with a focus on "healthy food and living conditions") could join forces with IDE in the future. Both faculties could exchange knowledge and intensify collaboration in future projects with a focus on sustainable food consumption.

Design for Sustainable Behaviour (DfSB)

"Design for sustainable behaviour (DfSB) aims to reduce the negative environmental and social impacts of products by moderating users' interaction with them"(Wever, 2012 by Lilley, 2013). This field of research, that bundles project where (product) design evokes sustainable behaviour, is still quite new. Most of the recent documented projects are aimed at lowering energy and water usage. Stimulating sustainable food consumption could be an interesting focus in the future as well (e.g. decreasing the consumption of animal based products). Next to that it could be an interesting challenge for designers to look more into simple solutions that make use of waste or depreciated (elements of) products as a resource for new design to increase awareness on sustainable consumption.

PhD of de Koning

The research of this graduation project shows that 'health of family' and 'food safety' are important motivational factors to empower Vietnamese consumers to act. Consumers are open to change their consumption behaviour of safe/organic food. One of the barriers for consumers to change their behaviour is the lack of opportunity (there is no place where safe food can be guaranteed). The concept of the Bottle Garden toolkit tries to increase this opportunity by empowering them with a hands-on solution to grow their own vegetables. The involvement of trusted producers (like the soil and seed suppliers) are key in products like the Bottle Garden.

The participatory design approach used in of this graduation project has proved to be very effective. Involving experts (agricultural students, Action for the City) and target consumers (young mothers) during the development and evaluation of the design ensured that the Bottle Garden fits the user and its context very well. It implies that (future) projects and producers in Vietnam should embrace their target users and start to co-create towards more sustainable consumption.

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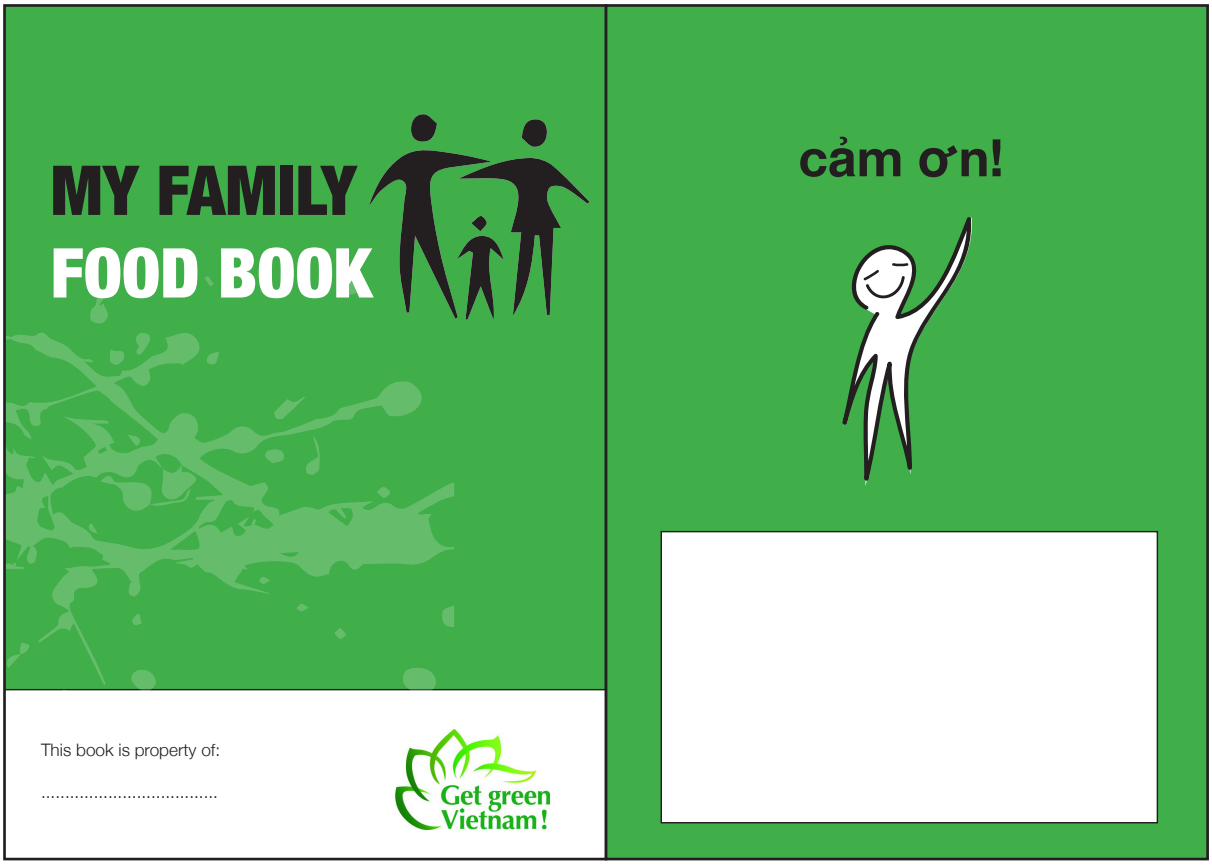
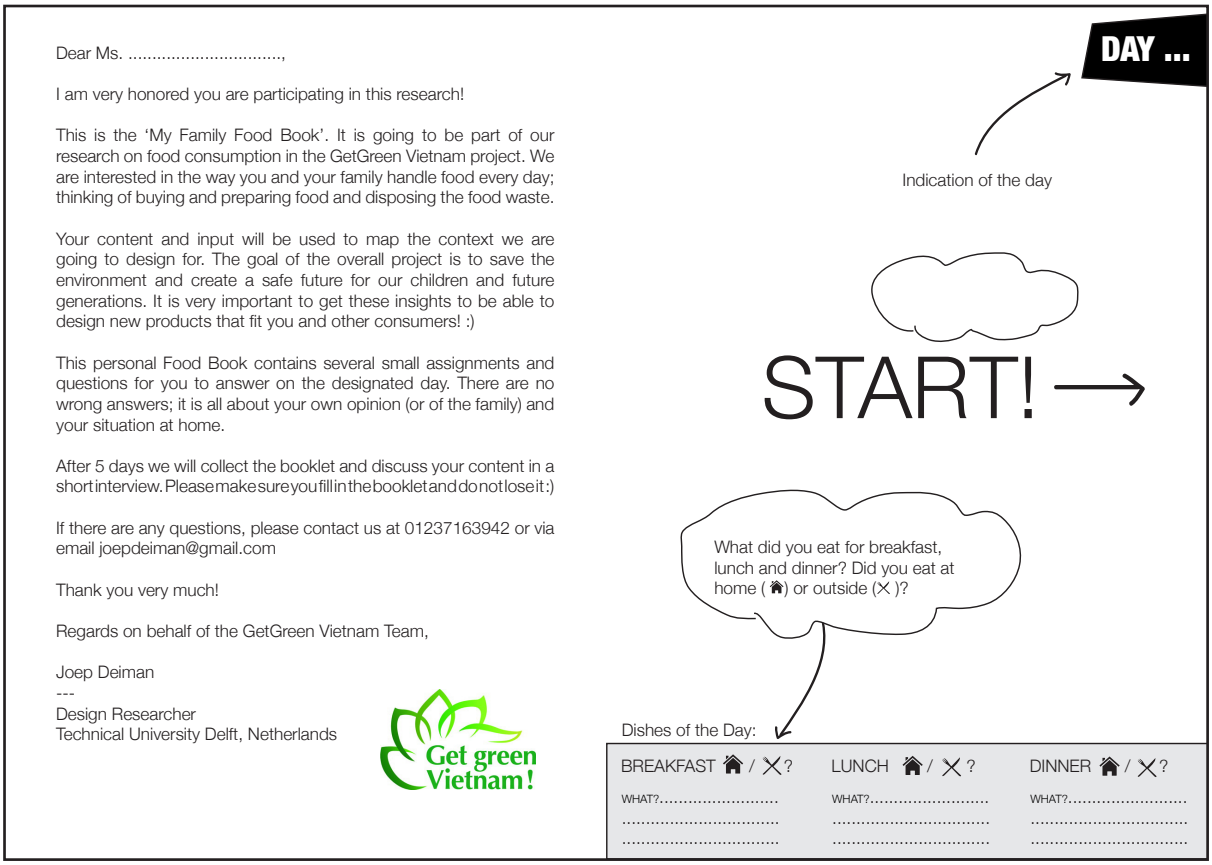
Appendix I: Photo impression food VN


BÁNH BAO - BÁNH GIÒ
BÁNH MÌ
Sốt vang - Patê

Appendix II: Sensitize booklet





DAY 1 My Family

Please complete the story below:

Hi, my name is ..... (name + age),

I live in ..... (district) together with .....

..... (family members).

I work at ..... (which office?) from ..... to ..... (time).

When I travel to work I go by ..... (motorbike/car/bus/walking/?)

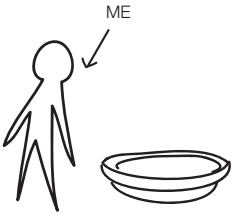
Please try to draw yourself. Give yourself a face and clothes.

TIP! You can always ask your child to do it for you :)

Dishes of the Day:

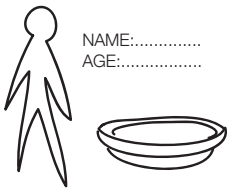
BREAKFAST 🏠 / ✕?	LUNCH 🏠 / ✕?	DINNER 🏠 / ✕?
WHAT?.....	WHAT?.....	WHAT?.....
.....	.....	.....
.....	.....	.....

DAY 1



Favourite dish: ....

Favourite ingredient(s): ....



NAME:.....
AGE:.....

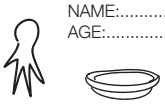
Favourite dish: ....

Favourite ingredient(s): ....

NAME:.....
AGE:.....

Favourite dish: ....

Favourite ingredient(s): ....



NAME:.....
AGE:.....

Favourite dish: ....

Favourite ingredient(s): ....

DAY 2 Groceries

How do you carry your groceries?
.....
.....

Complete the story bellow:

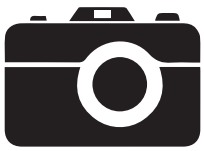
"When I go shopping for food, I most of the time go to .....
..... ((super)market/around the corner). I usually do it at .....
o'clock (time). If I go shopping I go ..... (alone/with friends).
Most of the time I buy food for ..... day(s)."

On what kind of food do you spend most of your money when buying groceries? .....
(for example: fish/meat/vegetables/soja/beer/....?)

Dishes of the Day:

BREAKFAST 🏠 / ✕?	LUNCH 🏠 / ✕?	DINNER 🏠 / ✕?
WHAT?.....	WHAT?.....	WHAT?.....
.....	.....	.....
.....	.....	.....

DAY 2



Please take pictures of:

1. Overall picture of your kitchen.

2. The inside of your fridge.

3. The place where you store food (not cooled).

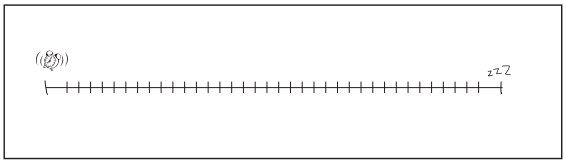
4. The place where you put waste.

Please email the photos **today (as soon as possible)** to joepdeiman@gmail.com.

DAY 3 What does your day look like?

DAY 3

EXAMPLE:



WAKE UP!

GO TO SLEEP

zzz

time?

Dishes of the Day:

BREAKFAST / ?	LUNCH / ?	DINNER / ?
WHAT?.....	WHAT?.....	WHAT?.....
.....	.....	.....
.....	.....	.....

Next page as well!

DAY 3

DAY 3 What do you think about your day?

DAY 3

Please place a HAPPY smiley on the timeline you made at the activity you really enjoyed.
And, explain in 1 sentence why this made you happy.

"*This is a happy moment because,*
.....
....."

Please place the second HAPPY smiley on the timeline at the activity you really enjoyed as well.
And, explain in 1 sentence why this made you happy.

"*This is a happy moment because,*
.....
....."

Please place the SAD smiley on the timeline at the activity you did not enjoy.
Explain in 1 sentence why this made you unhappy.

"*This is a unhappy moment because,*
.....
....."

Please place also the second SAD smiley on the timeline at the activity you did not enjoy as well.
Explain in 1 sentence why this made you unhappy.

"*This is a unhappy moment because,*
.....
....."

Dishes of the Day:

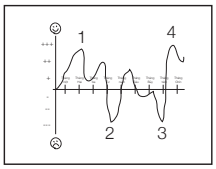
BREAKFAST / ?	LUNCH / ?	DINNER / ?
WHAT?.....	WHAT?.....	WHAT?.....
.....	.....	.....
.....	.....	.....

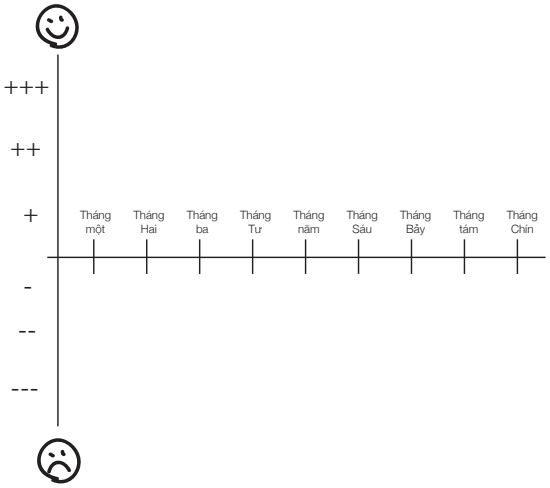
DAY 4 Moments of the year 2013

DAY 4

Please draw a line on the graph below that shows your mood during the past months.

EXAMPLE





Please explain the 2 happy moments for you of the past year!

"One of the happiest moments of the year was when .....
1 .....
....."

"Another happy moment of this year was when .....
2 .....
....."

Please explain 2 unhappy moments for you of the past year..

"One of the moments I felt unhappy was when .....
3 .....
....."

"Another moment I felt unhappy was when .....
4 .....
....."

Dishes of the Day:

BREAKFAST / ?	LUNCH / ?	DINNER / ?
WHAT?.....	WHAT?.....	WHAT?.....
.....	.....	.....
.....	.....	.....

DAY 5 Lessons from life

DAY 5

What lessons have you learned from your mother (or other family member) that you are (still) using in your kitchen?
(for example: "Always wash your hands before cooking!")
.....
.....
.....

What would you teach your own children about food?
.....
.....

Do you have a **'secret' tip or smart trick** you are proud of and the world should know when thinking about? Write and draw :)

Preparing food:
.....
.....

Storing food:
.....
.....

Cleaning food
.....
.....

Disposing food
.....
.....

Dishes of the Day:

BREAKFAST / ?	LUNCH / ?	DINNER / ?
WHAT?.....	WHAT?.....	WHAT?.....
.....	.....	.....
.....	.....	.....

Appendix III: Insights Context Mapping

To be able to compare the differences in family into more detail the information per participant is depicted in table X. Unfortunately not every participant filled in the meals they consumed for every day. The gathered information will serve as an indication.

Base of meal	P1	P2	P3	P4	P5	P6	TOTAL (75)
Rice	7	10	13	10	12	9	61
Noodle (rice)	2	-	2	3	3	4	14
Home made	11	-	16	11	17	5	60
Eating out	1	-	2	3	-	9	15
Dishes							
Vegetables	7	10	13	8	12	5	55
Pork	**4**	**-**	**4**	**4**	**9**	**5**	**26**
Fish	5	2	2	3	2	-	14
Poultry	3	1	2	2	1	-	9
Egg	1	-	4	2	1	-	8
Shrimp	1	1	4	-	1	-	7
Tofu	1	2	-	1	1	1	6
Beef	1	-	1	-	-	4	6

Most meals are prepared and consumed at home. Only one participant ate out twice a day. There is a lot of diversity in used ingredients over 5 days per family in most cases.

Buying food:
Five out of six participants buy all their groceries in the early morning (6.30 - 8am) at the corner market near their house. Only one participant goes to the supermarket in the evening (8pm) to buy products only for her son. This because her mother in law does the groceries for the whole family during the day. For how many days they buy their groceries varies from 1 to 5 days. If they buy groceries, they always go alone. Five out of six people use plastic bags they get from the seller to carry their groceries. One participant uses her own plastic basket to carry her groceries.

Motivations:
All participants were asked to indicate the best moments of their daily routine during the day. 3 out of 6 participant indicated that they liked the moment to play with their children the most. The participants were asked to indicate 2 positive and 2 negative moments in the past 8 months. When asked about 2 of their most positive moments, all participants indicated an event related to the family; e.g. "*I went on new year holiday with the whole family*" or the birthday of their child. The 2 most negative moments were or related to work (e.g. "*I worked very hard at my work, but it was not acknowledged*") or one of the children got sick.

2. Context Mapping: Booklets

During the conducted Context Mapping every participant was interviewed in her own context; the house of the family. One week before the visit at the family house every participant got a sensitize booklet containing small questions and tasks. The goal of the sensitize booklet was to map their daily (food consumption) pattern and their motivations in life. It would also serve as a conversation starter during the interview if necessary.

The booklet was written in Vietnamese to ensure they would understand the questions and it would enable them to answer in their own words.

Sensitize Booklet: insights
The booklet contains small tasks and questions that are divided over 5 days. Every day the participating young mother was asked to write down what she had eaten for breakfast, lunch and dinner. Next to that they were asked to indicate whether they ate at home or had been eating out. Below the results per category are given and compared.

Meal composition:
The participants were asked to write down the meals they consumed during five days. Table X depicts the meal composition per meal of all participants together. It shows that dinner brings the most variety in ingredients of the day. Every meal is eaten with rice or rice noodles. Pork meat is relatively the most consumed meat compared to poultry and beef.

	Breakfast	Lunch	Dinner	TOTAL (75)
Rice	11	21	29	61
Noodle (rice)	9	5	-	14
Vegetables	10	18	27	55
Pork	**6**	**7**	**13**	**26**
Fish	-	4	10	14
Poultry	2	3	4	9
Egg				8
Shrimp	-	4	3	7
Tofu	-	4	2	6
Beef	4	-	2	6

Conclusions
Although the information of the consumed meals of the participants is not always filled in properly or is incomplete (e.g. forgetting to indicate if the meal is prepared at home or eaten outside), it provides a rough indication of their food consumption pattern. For example the amount of meals eaten outside is very small compared to meals prepared at home. It indicates that the participants prefer a home cooked meal. Looking at the overall main ingredients that are part of the meals, pork meat is used the most next to fish and poultry. Beef is rarely part of the prepared meal. A reason for this could be the high price of beef compared to the other types of meat or fish.

Five out of six of the participants buy their fresh food in the early morning before having breakfast at the corner market near their house. None of the participants goes to the market with other people or family members. Buying groceries seems not a family occasion in the households of the participating young mothers, although taking your child to the market could be an informative and interesting event for both the mother (spending more time with her child) as for the child (learning about food).

Context Mapping: Interviews

After all participants had completed filling in the sensitize booklet, they were visited at their family home. Through a semi structured interview the participants were asked about their family. The topics discussed included: family composition, neighbourhood involvement, the future of their children, the role and importance of food in the family.

General insights:
There is a lot of difference in the way the families of the young mothers are composed (see figure X). Only one of the 6 participants lives in a nuclear family. The rest of the young mothers lives either with their parents in law or with their own parents. Some of the households have a maid that lives with them, who is responsible for babysitting and cleaning the house. Eating together with the whole family is seen as a very important.

There is a lot of variation in the way the houses are built and divided. Though, every house has got is a rooftop for their laundry and a room dedicated for the family altar where they remember their ancestors. An interesting observation is that in all the visited houses the father, mother and child sleep in the same room and the same bed. The reason is not a lack of space, because every house has got (some) spare or empty rooms available. Even the son of one of the participants with the age of six sleeps still with his parents.

Community
Every household is obligated to be part of their neighbourhood group (figure). These groups are run by retired people (especially women), who will get elected and get in some cases a small amount of money for their effort. The activities of the group are mostly targeted at providing information to their habitants, like: informing young mothers how to nurture their children, announcements of people who passed away in the community or new building plans. Once in a while (monthly/quarterly) the neighbourhood group organizes a meeting. During these meetings they will discuss topics like new building plans inside the community. Sometimes the community group will invite a guest speaker to inform the people about a concerning topic, like 'the consequences of littering to the environment'. None of the participating young mothers attend these events. Their reason is the lack of time and interest. Their opinion is that the community group interferes too much with their family what is 'good' and what is 'wrong'.

Good Family Award
A good example of interference of the community group with the families is the existence of 'Good Family Awards'. When a family has been living in a 'good' way they will get a certificate award for it (see picture). The award is given to the family when they have been living in a traditional Vietnamese way for two years in a row; not having more than 2 children per couple and showing an active attitude in the community group. Every two years the head of the community will judge again if the family has been living according the rules. Some of the visited families possess the award, but the young mothers do not attach a lot of meaning to it, "*It's just an award*."

Community Loudspeaker
All the neighbourhood community groups make use of loudspeakers that are put on every street corner to inform their habitants. One of the mothers tells that the speakers were meant in the past to spread propaganda or warn people for upcoming helicopters or soldiers during the Vietnam War. Nowadays they are used to pronounce government policies or e.g. the request to donate blood, or occurrences in the community itself (birth or death). The only thing is, nobody listens to the speakers anymore. Most of the people find it very disturbing. For some people the only useful incidental is that is serves like an alarm clock; every day around 7-8am the announcements begin. In the afternoon between 4-5pm there will be another announcement.

Children's future
All the interviewed young mothers had a clear opinion about the future of their children. "I want my children to be independent" indicates Ms. Hoai, mother of a 6-year-old son and a daughter of 9 months old. She thinks it is important for her children to be able to solve their own problems in the future. Eating healthy and balancing their meals are very important and they should be proper educated to do so. She does not allow her children to eat at fast food restaurants like Kentucky Fried Chicken (KFC), although she thinks a lot of children are nowadays.

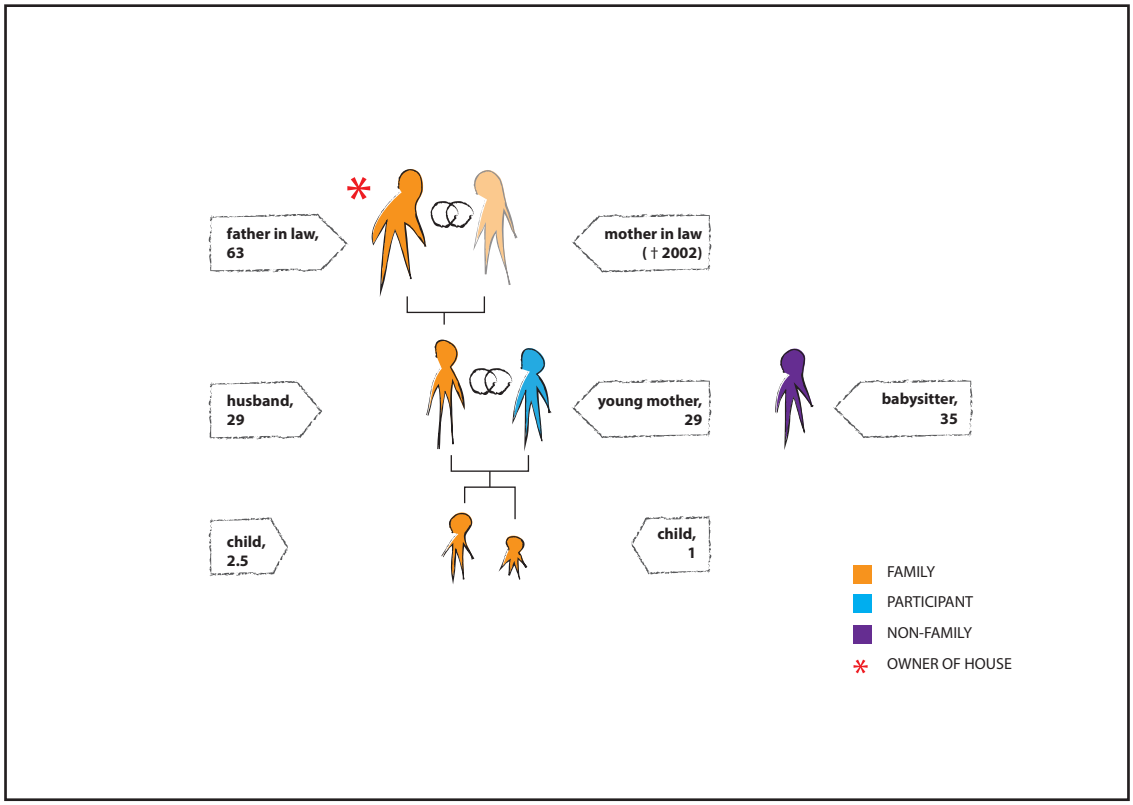
Ms. Huong, mother of an 8-month-old son, wants her child to be independent as well. She has lived for 7 years in Germany with her husband and is a proponent for having a nuclear family. Her child should be able to make its own decisions in the future, "*I will teach him how to live on its own*". When talking about food, she indicates that it is duty of every mother to teach her own children about food, nutrition and vitamins.

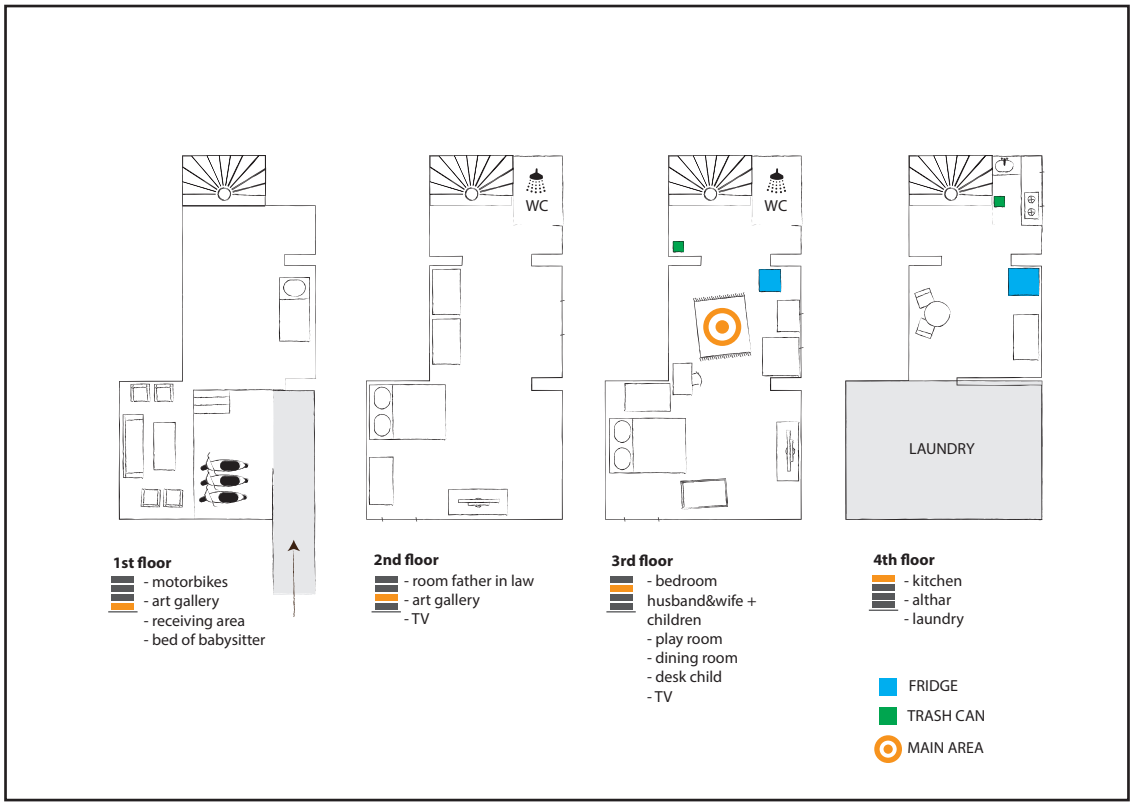
"A lot of young people don't have the knowledge or proper education to know what safe food is about", says the mother in law of Ms. Loan. Her opinion is that a lot of people who did not have a proper education lack knowledge about safe food and children do not get taught on school properly about the this topic as well. They have to learn it from their parents. She thinks that young people believe more in advertising these days, "*They think that advertising is 'scientific'"*. Both Ms. Thao and the mother in law of Ms. Loan gave the example of breast milk. People believe that powdered milk is safer and better for their children than giving breast milk. *"They don't know better."*

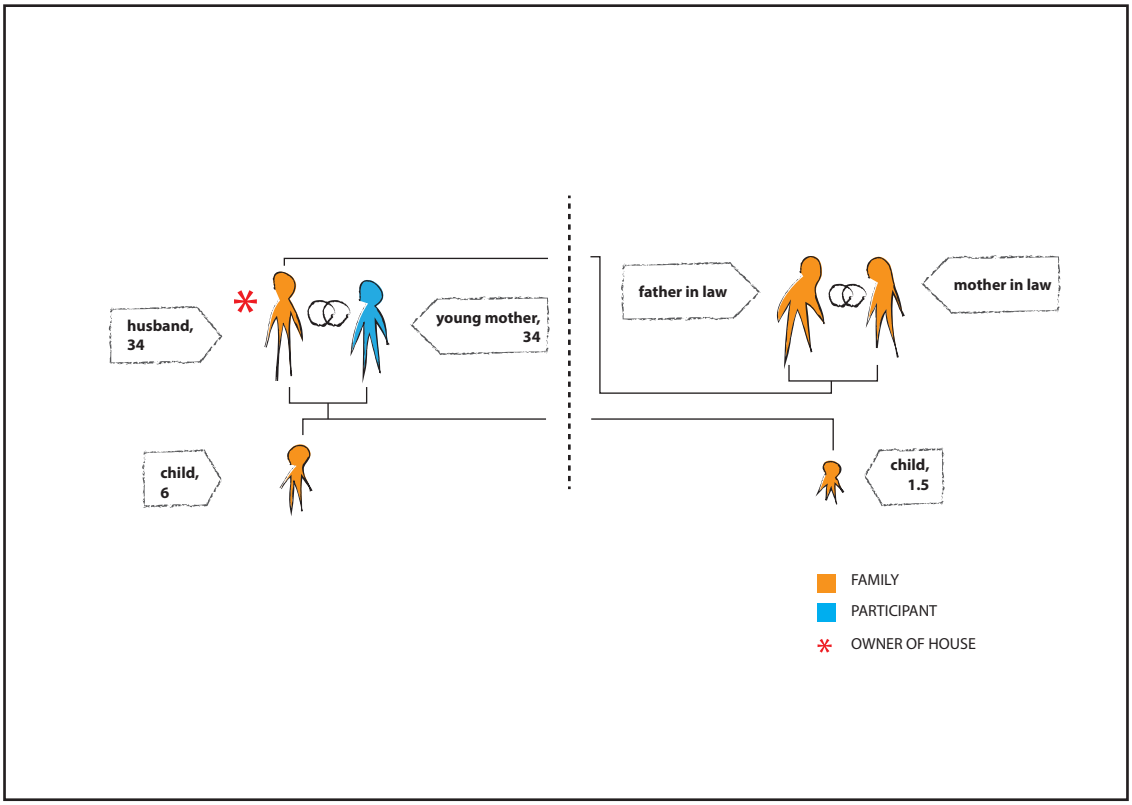
Food safety is a big topic among all the interviewed households. For this reason Ms. Thao grows vegetables on her rooftop for her baby. It allows her to control the safety of the food and it safes money as well. She calls it her "Babilon Garden" (see picture X). Although the amount of food is only enough to feed her child, it is a conscious decision to be more sustainable in this way.

Conclusions

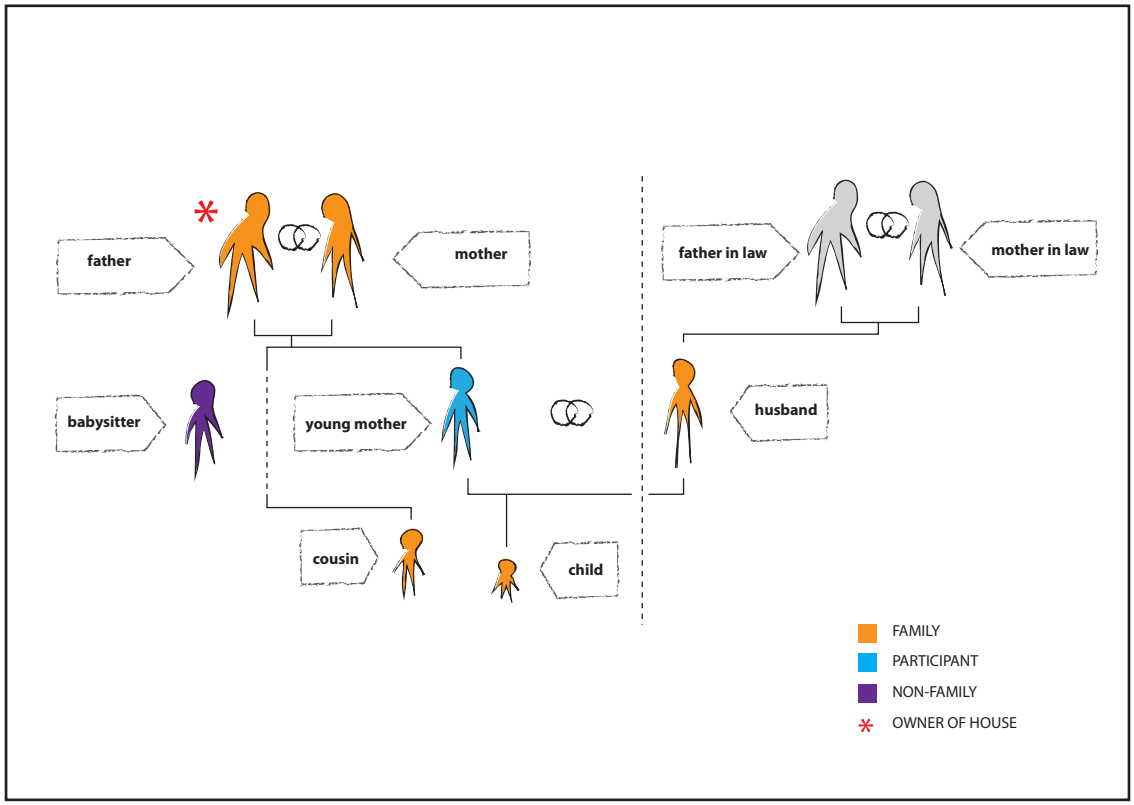
All the visited families emphasized the importance of a close family relationship. Activities like eating, playing and sleeping with the whole family together are seen as very important. When talking about sustainable food consumption the young mothers indicate that it is the duty of the parents to teach their children about this topic. On the other hand the participants indicate that a lot of people do not have the knowledge or proper education to know how consume in a sustainable way. Community groups are trying to inform their habitants about topics these topics, but they fail to reach their audience; families don't listen to the community speakers and do not attend community meetings. They rather believe in advertising.

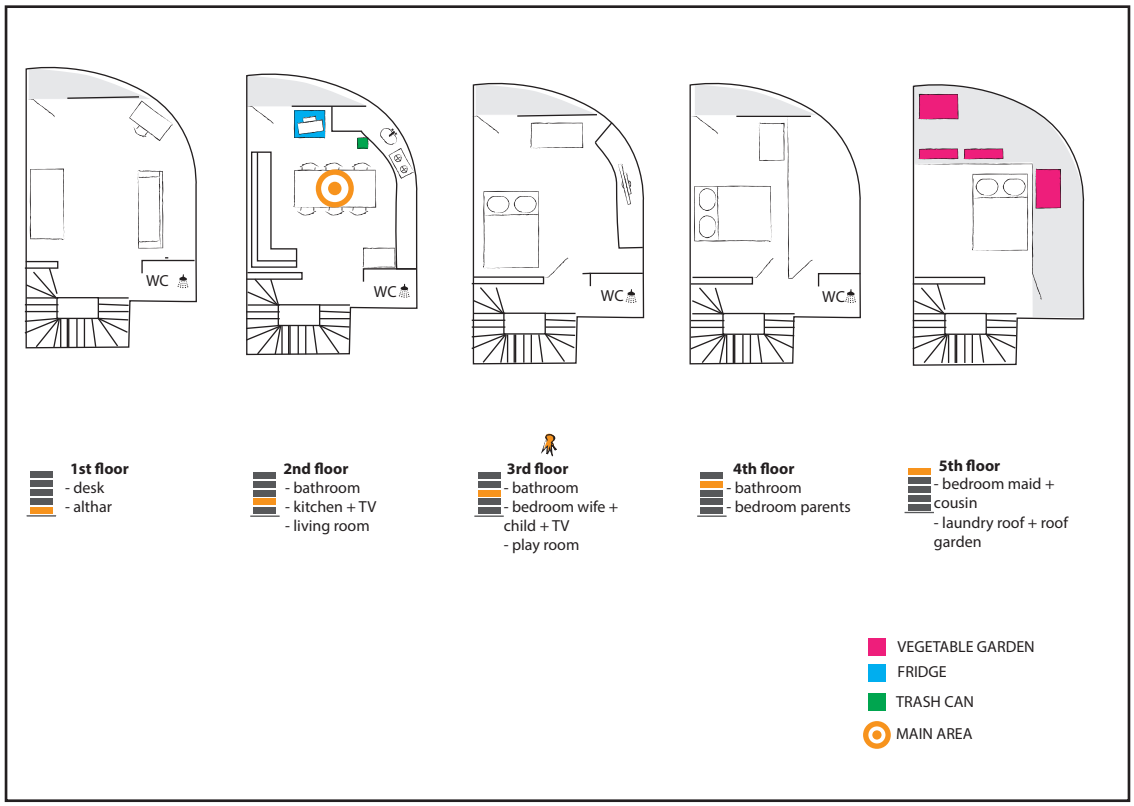

father in law, 63
mother in law († 2002)
husband, 29
young mother, 29
babysitter, 35
child, 2.5
child, 1
FAMILY
PARTICIPANT
NON-FAMILY
OWNER OF HOUSE

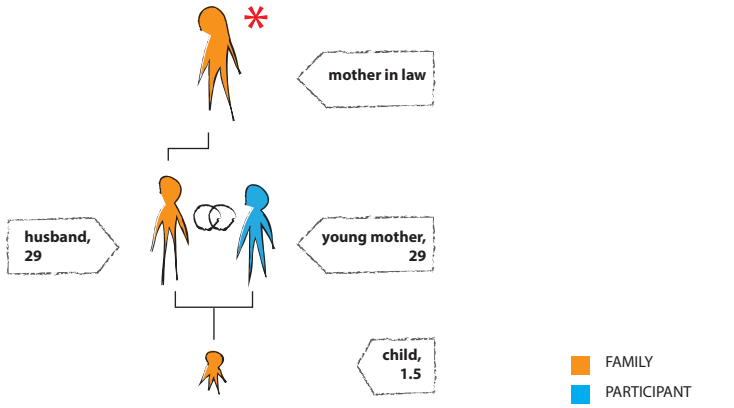

WC
WC
LAUNDRY
1st floor
- motorbikes
- art gallery
- receiving area
- bed of babysitter
2nd floor
- room father in law
- art gallery
- TV
3rd floor
- bedroom husband&wife + children
- play room
- dining room
- desk child
- TV
4th floor
- kitchen
- althar
- laundry
FRIDGE
TRASH CAN
MAIN AREA


husband, 34
young mother, 34
child, 6
father in law
mother in law
child, 1.5
FAMILY
PARTICIPANT
OWNER OF HOUSE


WC
WC
WC
1st floor
- motorbikes
- kitchen
2nd floor
- bathroom
- living room
3rd floor
- bathroom
- bedroom husband&wife + child
- desk child
4th floor
- bathroom
- bedroom
5th floor
- althar
- guest room
6th floor
- laundry
- roof terrace
FRIDGE
TRASH CAN
MAIN AREA


father
mother
babysitter
young mother
cousin
child
father in law
mother in law
husband
FAMILY
PARTICIPANT
NON-FAMILY
OWNER OF HOUSE


WC
WC
WC
WC
1st floor
- desk
- althar
2nd floor
- bathroom
- kitchen + TV
- living room
3rd floor
- bathroom
- bedroom wife + child + TV
- play room
4th floor
- bathroom
- bedroom parents
5th floor
- bedroom maid + cousin
- laundry roof + roof garden
VEGETABLE GARDEN
FRIDGE
TRASH CAN
MAIN AREA



1st floor
- motorbikes
- kitchen + TV
- bathroom

2nd floor
front:
- althar
- couch

back:
- bathroom
- bedroom mother in law + TV

3rd floor
front:
- play room child

back:
- bathroom
- bedroom husband&wife + child + TV

4th floor
front:
- empty/storage room

back:
- roof terrace for laundry
- water tank

Appendix IV: List of tips

dots	In the future everybody should…	# Do it already
•••••	**…store food in right condition** to prolong the shelf life (14),	They don't know
	…apply FIFO (first in, first out) (15)	
••••	**…list the required** product before shopping. (1)	
	…buy more diverse food: more veggies, less meat, less dairy. (4)	
	….**give away any food** they can to friends, relatives, or beggars. (28)	
	…**dispose of cooking oils** and fats by collecting them in a jar. (30)	
	…**separate organic food wastes and inorganic food wastes** (bags, jars, etc.) (33)	
•••	**…buy local food (2)**	
	…defrost your freezer twice a year	
	…**reuse, give away or sell** (to waste collectors) **food packaging bags, bottles, jars, etc.**	
••	**…refuse plastic/shopping bags**, just carry it or use your own cloth shopping bag. (8)	
	…grow your own vegetables instead of buying them. (9)	
	…buy food that is in season. (10)	
	…buy a modern cooker/stove (maximise energy efficiency)	
	…take stock: note upcoming expiration dates on foods you already have at home (20)	
	…**load up to 70%-80% of refrigerator (25)**	
	…**select right cooking method for different foods (27)**	
•	**…buy certified food** (3)	
	…buy refill product with recycled packaging. (7)	
	…set your fridge/freezer to the highest allowed temperature. (24a)	
	…**use appropriate cooker**; sizes, pot wall thickness, saving energy equipment. (26)	
	…**compost food** that can be organically disposed of. (29)	
	…**turn packaging material into material for crafting for the kids. (37)**	

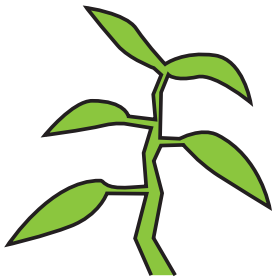
Appendix V: Bottle booklets

Grow green, grow smart!

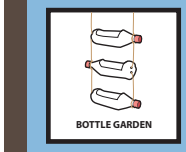
This toolkit will provide you with all the ingredients you need to start growing organic rau muong for your baby at home. It is easy to grow and harvest, full of vitamins and proteins that will help your baby grow smart and strong! The step-by-step tutorials will help you to set up your balcony garden and start growing right away.

Why should I give my child organic vegetables?
In the first few years your child grows like weeds. All the food that your child eats is used as building blocks to grow stronger and stronger. Vegetables and fruits are full of energy, vitamins and nutrients that stimulate this process. But, a lot of vegetables and fruits are made with the use of chemical pesticides and fertilizers. These chemicals might stimulate the growth and appearance of the vegetables, but have a negative effect on the growth of your child.

Stimulate the development of brain & immune system of your child!
Especially between the age of 0-2 years old, chemical pesticide residues should be avoided; they can slow down the development of the brain and the immune system of your child. Feeding organic grown vegetables (without chemicals) to your child will help your child grow smart and strong!



The power of Rau Muong!
Despite the fact that it requires very little care, rau muong is a highly nutritious plant with high levels of protein, calcium, iron, potassium, & vitamins A B & C. All these building blocks are a valuable addition to the diet of your baby.



GUIDE [2]
HOW TO BUILD

Get green Vietnam!

This small booklet will guide you through the process of building the bottle garden.

If you have any questions concerning the process, please visit our website and forum on **www.growsmart.vn/**

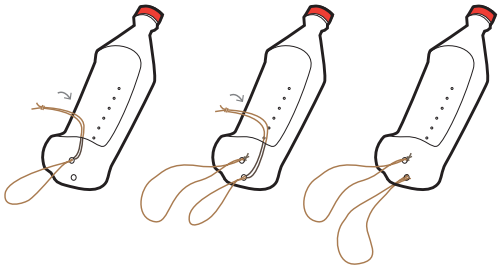
3x
bottles

6x
bottom wire

1x
bottle neck wire

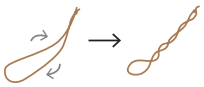
PRAPARING your
BOTTLES

Secure 2 bottom wires per bottle in the bottom holes.

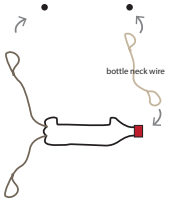


BUILDING UP your BOTTLE GARDEN

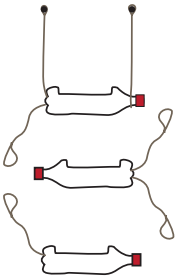
TIP Twist the wires for more strength before attaching.



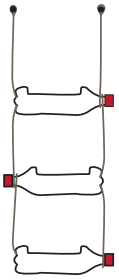
1 Secure the first bottle with the bottom wire and the bottle neck wire to a fixed point.



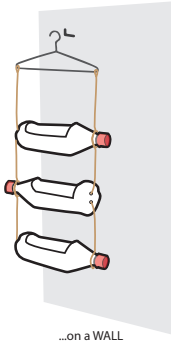
2 Now attach the remeaning bottles to each other.



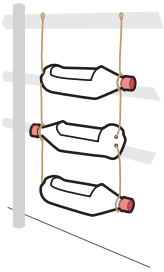
3 Here you are!



HANG your BOTTLE GARDEN...

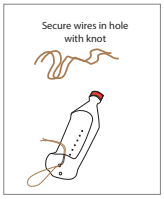


...on a WALL

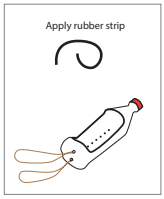


...on your BALCONY

HOW TO COPY a BOTTLE



wire length: 70 cm



strip length: 60 cm

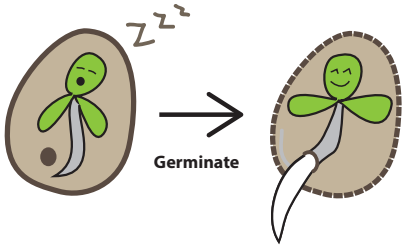
RAU MUONG

GUIDE HOW TO GROW [3]

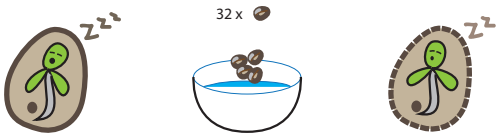
Get green Vietnam!

This small booklet will guide you through the process of growing rau muong from germination to harvesting.

If you have any questions concerning the process, please visit our website and forum on **www.growsmart.vn/**

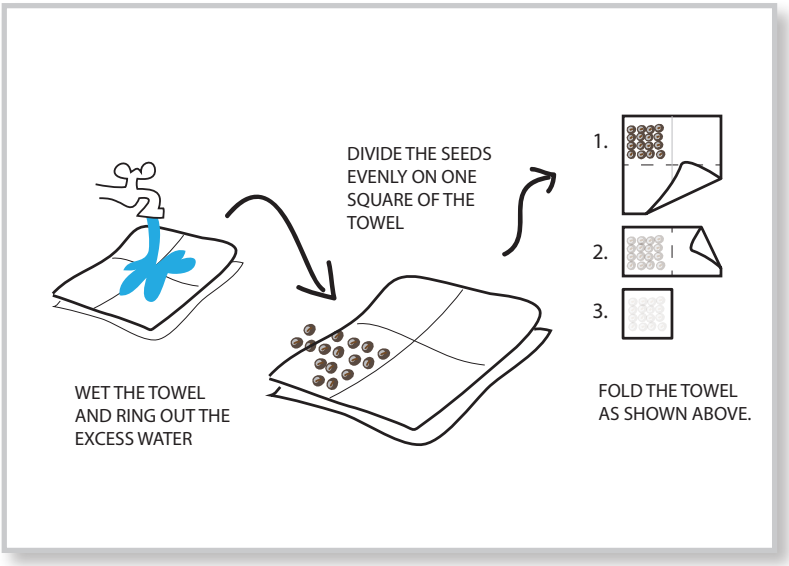


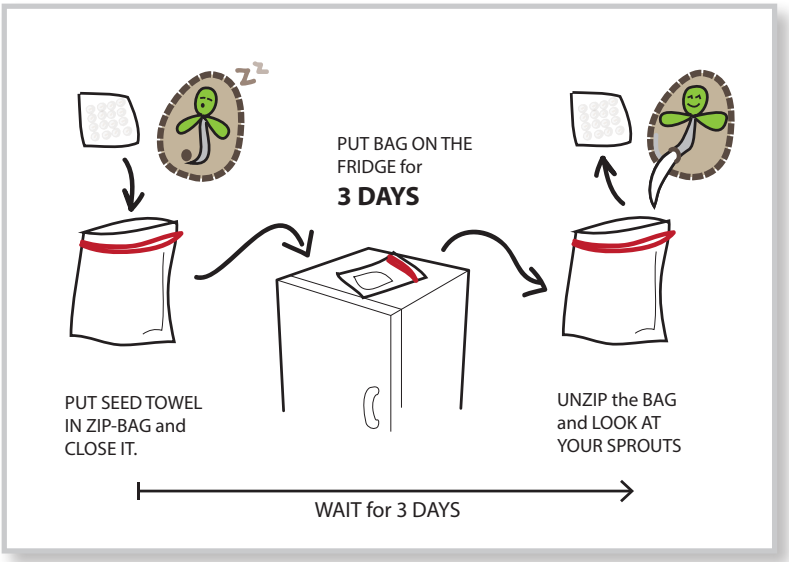
Germination will wake up the seed and speed up the sprouting process.

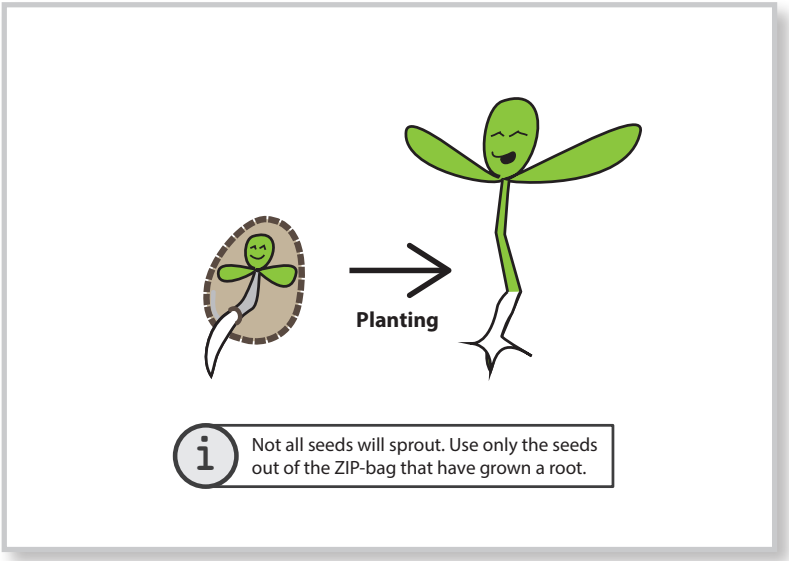


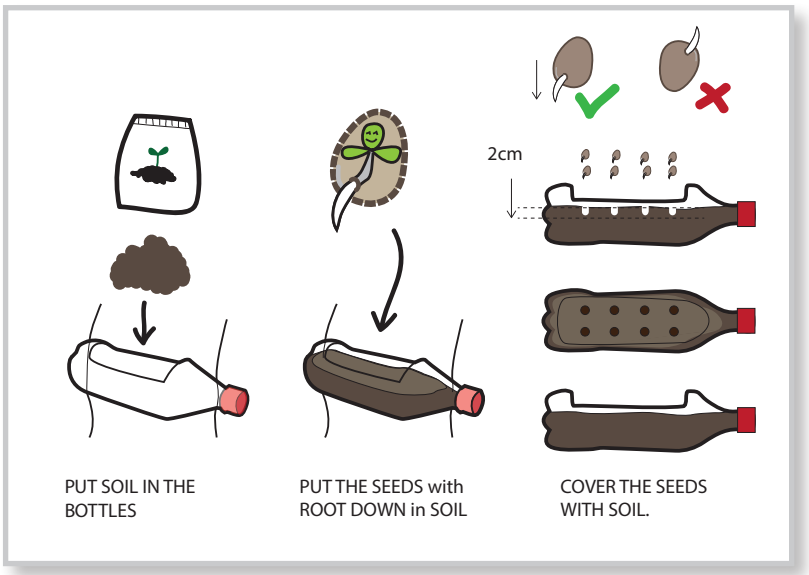
PUT THE SEEDS IN LUKE WARM WATER FOR **4 HOURS** TO SPEED UP THE GERMINATION

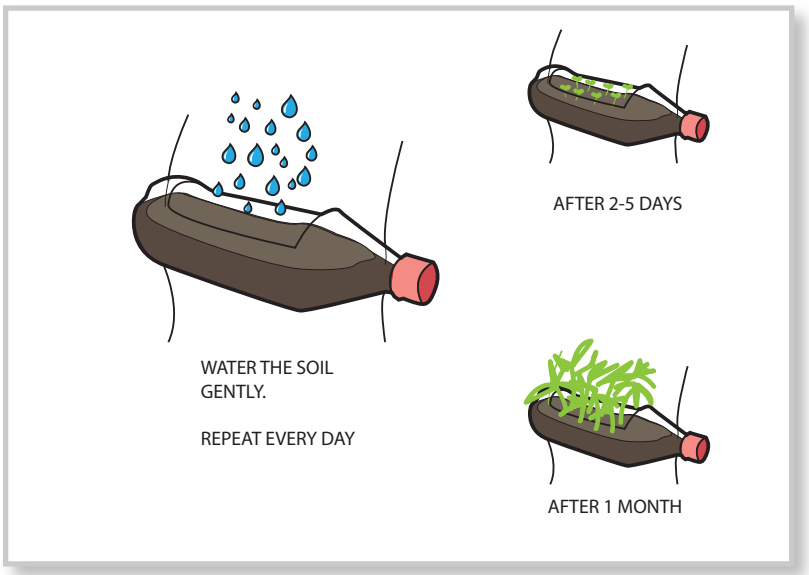
WAIT for 4 HOURS

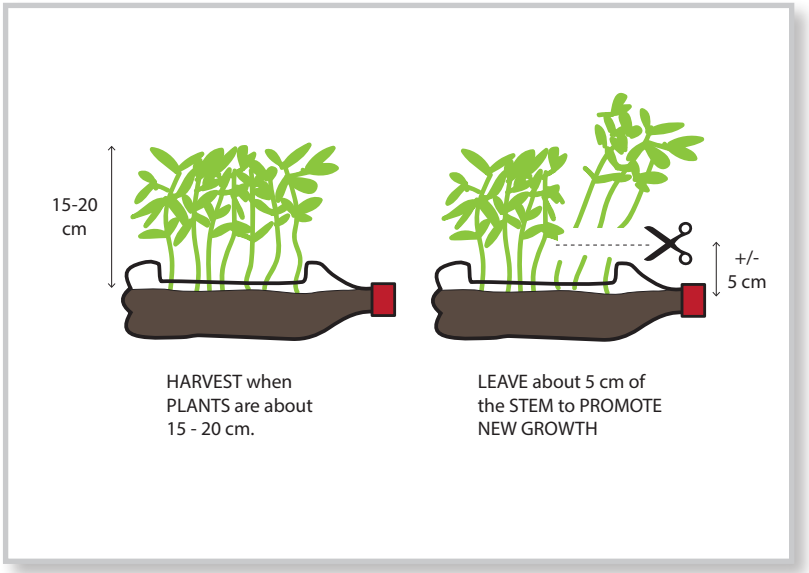

DIVIDE THE SEEDS
EVENLY ON ONE
SQUARE OF THE
TOWEL
1.
2.
3.
WET THE TOWEL
AND RING OUT THE
EXCESS WATER
FOLD THE TOWEL
AS SHOWN ABOVE.

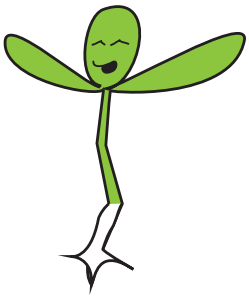

PUT BAG ON THE
FRIDGE for
3 DAYS
PUT SEED TOWEL
IN ZIP-BAG and
CLOSE IT.
UNZIP the BAG
and LOOK AT
YOUR SPROUTS
WAIT for 3 DAYS


Planting
Not all seeds will sprout. Use only the seeds
out of the ZIP-bag that have grown a root.


2cm
PUT SOIL IN THE BOTTLES
PUT THE SEEDS with ROOT DOWN in SOIL
COVER THE SEEDS WITH SOIL.


WATER THE SOIL GENTLY.
REPEAT EVERY DAY
AFTER 2-5 DAYS
AFTER 1 MONTH


15-20 cm
+/- 5 cm
HARVEST when PLANTS are about 15 - 20 cm.
LEAVE about 5 cm of the STEM to PROMOTE NEW GROWTH



ENJOY the FRESH and YOUNG RAU MUONG full of VITAMINS for your BABY!

AND

CONTINUE WATERING to GROW MORE.

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