Individual motivation for dairy products consumption in the city of leeuwarden

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ABSTRACT

Agriculture is often seen as the sector that is highly affected by the ongoing climate changes. But, rarely is there an emphasis on seeing the situation the other way around. Despite continuous research agriculture has never been in the spotlight as the major contributor to global warming as it is vital to support the daily nutrition needs of the population. However, the global trend over the years has shown an inclination to animal-based diet over plant-based diet. This has led to increased demand for animal-based food products and has further added immense strain on the depleted natural resources such as soil and water. The research aims to understand the key motivators of consumers towards their dietary choices and seeks to understand the factors that will aid in limiting the current dairy based dietary choices. The integration of planned behavior theory, norm activation theory and protection motivation theory will be used to analyze a paper – pencil-based questionnaire study filled by adult inhabitants in the city of Leeuwarden (The Netherlands). Understanding the key factors influencing consumer's dairy product consumption, their awareness of the environmental impact resulting and their willingness to make a shift from their existing consumption pattern is the key objective of this research. Desk research will highlight the idea of water food print in food consumption pattern and the resulting impact on the environment. Pencil – paper-based questionnaire will be used to gather the necessary data, frameworks shaped around the popular consumer behavior theories will aid in analyzing and identify the underlying reasons that prevent the transition. It will also seek to find the best fitting theory to explain the primary factor that has people inclined to a dairy intensive diet. Based on the overall outcome and similar studies held in the past changes that can be made at every possible level shall be proposed.

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1. INTRODUCTION

1.1. BACKGROUND

In the current world, sustainable living has gathered much attention amidst burning topics concerning the environment such as global warming, rapid depletion of resources, pollution, etc. Human activities time and again have been pointed out as the primary contributors of global warming which has further led to climate change. Environmental degradation has been accelerated which is visible through the extent of pollution of air, water and land. Although there has been a reduction in the day to day activities that contribute to the pollution, revising of food choice especially in key areas such as meat and dairy products which have shown to hold the key to lower the impact on the environment has seldom been considered (Zur & A. Klöckner, 2014).

With every attempt to reduce negative impact of human's day to day activities on the environment, the constantly increasing population is proving a challenge. This increase in population has led to the increasing demand for various food products with an estimated doubling of dairy production by the year 2050 (Ilea, 2009). Leading to greater impact on the environment resulting from high stocking rate, high use of chemical fertilizers and pesticides and mechanized methods. In turn resulting in problems in diffuse pollution, direct point source pollution and adding additional pressure on landscape features. Both groundwater and surface water are affected with the former being contaminated with nitrates and the latter being eutrophicated (CEAS Consultants, 2000). The report further states that the extent of pollution in surface water specifically by dairying is largely unquantified.

Numerous studies highlight that animal-based products were found to utilize more resource but also generated higher emission than plant-based foods. The Green House gas emission by the livestock and dairy sector was estimated at 18% which is way higher than the share of the whole global transport sector. Since water usage is extensive in dairy production, this has led to depletion of water and several problems such as dead zones in coastal areas, degradation of coral reefs mainly through animal waste, use of antibiotics, fertilizers and pesticides (Ilea, 2009; Röös et al., 2017; Zur & A. Klöckner, 2014;).

Hoekstra (2012), in his report states that the water footprint of any animal product is larger than the footprint of any wisely chosen food crop with the equivalent nutritional value. With water footprint being the volume of water used to produce the product, over different steps in the production chain, considering both consumed and polluted water. Lack of transparency of water impact of the

products to the consumers to make an informed choice. The author further stresses that by the mere action of industrialized countries adopting a vegetarian diet, a reduction in food related water footprint of 36% can be attained.

Overall, there has been continued focus and studies on various human activities apart from the consumption habits that has aided policy makers to incentivize favorable action amongst its residents to practice a sustainable approach. There is a slight increase in studies emphasizing the need to analyze the consumer perspective on the impact resulting from their consumption behavior and the need to understand the motivators that influence their day to day practices. An increased perception in consumers helps in motivating them to take a pro-environmental approach (Milfont, Wilson, & Diniz, 2012).

1.2. PROBLEM STATEMENT

Dairy farming is the largest production sector within the Dutch Agriculture complex both in number of holding and use of land (Agricultural Economics Research Institute, 2015). Extensive agriculture resulting from the production of dairy products has been increasing with the population so is its impact on the environment too. Raging from increased fossil fuel consumption to Greenhouse Gas emission, this resource intensive sector is of prime importance as it occupies a prime spot in the dietary consumption worldwide. In the Netherlands, consumption of dairy products is 50% more than the average in comparison to other European countries. It is evident from the observation that apart from vegetables, fruits and bread, dairy products which also are a part of the dietary pattern in the Netherlands (Geurts, van Bakel, van Rossim, de Boer, & Ocke, 2017), the demand is bound to increase with time.

Several policies and plans are centered around the production sector focusing on reducing the impact achieved through efficient practices. However, the demand side of the food production sector is seldom studied or regulated. Trying to understand consumer habits and influencing their food choice through raising awareness of the impact of their food choices has gained little importance so far. Understanding the level of public awareness and willingness to make a shift in their food choices can provide the ministries with relevant information based on which policies or regulations can be drafted in order to reduce the increasing demand and the negative impact resulting from it. With several studies emphasizing on the lack of study done in sector of consumption clearly highlights the need for acquisition of data and analyzing the reason behind the inclination towards dairy products.

1.3. RESEARCH OBJECTIVE

The objective of the research is to analyze the key motivators that lead to the choice of a dairy based diet, identify intention and factors those influence a consumer to make a transition towards a sustainable plant – based diet, in order to come up with suggestion that can enable a smooth but an assured shift for healthy and sustainable plant-based diet.

2. LITERATURE REVIEW

The following chapter seeks to explore the large-scale impact resulting from dairy consumption. In the sub chapters, a comparison of diary products is done with plant-based products. This is followed by an attempt to understand the consumer's perception of a products and it further highlights the relevance of the study of consumer behavior in light of influencing sustainable consumption practices. The last sub chapter discusses the critical issue of product transparency and its impact on consumers influencing their consumption behavior.

2.1. FARMING AND IT'S ENVIRONMENTAL IMPACT

For every country in the world, agriculture is a sector of primary importance as it provides for the sustenance of its residents. However, the agriculture land that we see today is mostly used to raise livestock over production of other food products such as vegetable, fruits, grains and pulses. 30% of the planet's land surface and 70% of all agriculture land being used by livestock (Hoekstra, 2014), this is further attested by the fact that 37% of cereals produced in the world were used for animal feed, in the period between 2001 – 2007 (Hoekstra, 2012). With the latest figure of roughly 815 million people being undernourished declared by the United Nations in the year 2017, One can safely say that the existing problem can be resolved by feeding the undernourished and revising unsustainable consumption habits. As the issue is likely to grow over the years with both increase in population and demand for food products.

The land for dairy farming in the Netherlands is evenly distributed throughout the country which remains unchanged from 1988-2013. There has been an ongoing issue of excess of nutrition in the soil which not only leads to degradation of the farm land but also of the surrounding lands and further affecting the quality of the forest adjacent to such lands. This large distribution of farm land for dairy farming not only brings about changes in the landscape but also influences the biodiversity and environment (Agricultural Economics Research Institute, 2015).

The intensive nature of dairy and livestock farming along with the use of fertilizer and presence of excess nutrition has further proved to be a challenge for the Netherlands to meet its targets set by the European Union Nitrates Directive. Furthermore, such areas are much more vulnerable for the depletion of air quality and tend to not comply with the Air quality directives too (Wiering, Liefferink, & Beijen, 2018; Van Grinsven, Tiktak, & Rougoor, 2016).

In the last few decades there has been a significant increase in the consumption of freshwater resources and a growing competition too, all of it to cater to the growth in population resulting in the growth of both industrial and economic sector as well.

With the increasing inclination towards animal-based products, this consumption pattern is expected to aggravate the situation further teamed with the increase in population.

Thus, forcing us to evaluate if current consumption patterns will be sustainable or not in the years to come (Ercin & Hoekstra, 2014). Household consumption pattern has a profound impact on water resource consumption not only at a regional level, but also at a worldwide level which rarely receives any emphasis. Thus, resulting in increased stress on those countries battling water deficiency (Tian, 2013).

Intensive dairy farming is accompanied with grazing on the farm lands which affect the soil property thus, impacting the sediment capture and water movement (Zur & A. Klöckner, 2014). Also, it is often associated with the eutrophication of both ground and surface water due the increased Nitrogen and Phosphorous concentration (Klootwijk, Van Middelaar, Berentsen, & de Boer, 2016). This is further seen in the OECD report with the Netherlands being listed as one of the countries with a high risk as measured by the country's soil nitrogen balance and the importance of dairy cow manure as a source of nitrogen (Organisation for Economic Co-operation and Development (OECD), n.d.).

Although such effects are evident at the location of the dairy farm, the impact does not limit itself to the area of operation but also on the global water chain. This impact is a cumulative result of majority of the feed, concentrates and Dry matter being utilized in these farms which originate from all over the globe, with a few from water deficient areas.

Although the degree of self-sufficiency is estimated to be 300% for animal-based products including dairy, it is noteworthy that it is done at the cost of depletion of water resources in countries facing water shortages (De Boer et al., 2013; LR - Veehouderij en omgeving, Yan, Buisonjé, & Melse, 2017; Tian, 2013). 31% of the livestock products account for external water footprint with dairy sector ranking second with 8.8% through the agriculture used to support it (van Oel, Mekonnen, & Hoekstra, 2009). There is also an increased concern with the over medication of cattle which when in contact with wastewater stream may carry nutrients, antibiotics and other pollutants which can result in the "dead" zones in costal areas, human health problems and emergence of antibiotic resistance pathogens, etc (Ilea, 2009; Miele, Veissier, Evans, & Botreau, 2011).

Global warming over the past few years has gained worldwide attention, and this has led to several plan and policies being put in place at both national and international level. International Agreements such as the Paris climate Accord was introduced by the UN and obliges the participating countries to reduce their co2 emissions, which has led to the increase in the global temperature ("United Nations Climate Change," 2018). Considering GHG emissions, at 18% the contribution of this sector is far higher than the global emissions resulting from the transport sector alone. Even when fossil fuels were held responsible for the Green House Gas (GHG) emissions, food consumption within Europe alone contributed approximately 30% towards it (Ilea, 2009; Petrovic, Djordjevic, Milicevic, Nastasijevic, & Parunovic, 2015). The dairy sector in the year of 2012 topped the list in consumption of fossil fuel and in the following year was named as the major contributor of increased methane emission due to the increasing cattle size (Agricultural Economics Research Institute, 2015; Klootwijk, Van Middelaar, Berentsen, & de Boer,

2016). These impacts are further acknowledged by organizations like United Nations, Global Climate Change, Pew center, etc.

With eradication of hunger being one of the sustainable development goals (SDG's), it would be more sustainable to produce food for human being rather than for livestock thus laying lower burden on the land and the ecosystem. An approach towards reduced dairy and animal-based food consumption can facilitate in attaining few of the SDG's such as halting and reverse land degradation and biodiversity loss, clean water, sustainability of marine resource, responsible production and consumption and climate action.

The increasing number of published papers on evaluation and comparison of various dietary practices, the findings of Hallström, Carlsson-Kanyama, & Börjesson (2015), suggests that change in diet can play an important role in realizing environmental goals and can even reduce up to 50% of GHG emissions and land demand compared to current diet. Such findings force us to revise our diet and consumption pattern rather than focusing on household utilization of resources in order to reduce the large-scale environmental impact (Hoekstra, 2012; Hoekstra, 2014; Swain et al., 2018; Zur & A. Klöckner, 2014). Shifting to a plant-based diet proves to be more efficient for the above-mentioned impact areas (Zur & A. Klöckner, 2014).

2.2. PLANT BASED VS ANIMAL BASED DIET

The measure of the use of water in consumer goods is analyzed by the concept of water footprint. Similar to ecological and carbon footprint, water footprint takes into account the net volume of water resources consumed or polluted. The water footprint of an animal product begins with assessing the water consumption starting from the cultivation to the harvesting of feed crop, this process takes into account water available on the soil either through rain or irrigation. It further includes the gray water resulting from the leaching of pollutants (fertilizers and pesticides) into the groundwater. This entire process of growing feed crops itself can contribute up to 98% of the total water footprint of the animal products (Hoekstra, 2012).

Studies have further gone to prove that water footprint of dairy products are much more than that of plant-based products. 1 L of soy milk produced in Belgium had a water footprint of approximately 300L, whereas the water footprint of milk from cows was more than 3 time larger. Butter is the only exception as it has relatively low water footprint per gram of fat in comparison to oilseed crops. Water footprint per gram of protein for milk is 1.5 time larger than pulses (Hoekstra, 2012).

With availability of various food products such as grains, pulses, cruciferous vegetables and plant based dairy alternates, the daily nutritional need of an individual can be met without being heavily dependent on the consumption of dairy products. However,

consumption patterns are bound to vary from country to country influenced by various factors such as culture, religion and customs (Drewnowski, 2018; Goodland, 1997).

In comparison to animal-based food products, plant-based products are less prone to microbial / parasitic contamination or infestation. The health benefits offered by plant-based diet is usually the prime motivation for vegans. (Dyett, Sabaté, Haddad, Rajaram, & Shavlik, 2013; McCarthy, Parker, Ameerally, Drake, & Drake, 2017).

The ever-expanding food sector today is constantly growing in the arena of plant-based alternative for dairy products and this area does hold a promise for a profitable market. Recent studies have found the demand for plant-based dairy alternatives is increasing to battle health issues such as food allergies, lactose intolerance, high cholesterol to name a few (Panghal et al., 2018).

2.3. CONSUMER BEHAVIOUR

The market of food supply chain is highly influenced by the dominating factor of food consumption (Verain, Dagevos, & Antonides, 2015). In order to combat the issues arising in the dairy sector, understanding both demand and supply is essential. Innovation in science and technology has benefited in maximization of production to meet the increasing demand. Studies time and again show that the current consumption pattern is not sustainable and there is certain downfall if the consumption patterns were to continue (Ilea, 2009; Röös et al., 2017; Tian, 2013; Zur & A. Klöckner, 2014).

Despite more research in improving production of dairy products and making the process much more efficient, less studies focused on understanding the demand sector has been carried out (Hoekstra, 2014). Given that a market is governed by the principle of demand and supply, when consumption is unsustainable it is a better solution to decrease the demand rather than supply which has already undergone more improvements (Ilea, 2009). The entire market food cycle has one essential dimension that is the human dimension, this dimension should always be considered as consumption is solely dependent on human beings who are the consumers of food.

Dietary choice of the consumers although under an individual's control is influenced by several factors ranging from social, personal and cultural norms, education, knowledge on food and sustainability, health and household sizes etc. (Geurts et al., 2017; Macdiarmid, Douglas, & Campbell, 2016; Röös et al., 2017; Verain et al., 2015; Zur & A. Klöckner, 2014).

One should be aware that the national dietary patterns does not solely rely on economic and ecological development context but is also heavily influenced by the regional and cultural context too (Drewnowski, 2018; Goodland, 1997; Petrovic et al., 2015).

Study by Hoek, Pearson, James, Lawrence, & Friel (2017) have gone to prove that personal motivators such as resulting health benefit from the consumption of certain food can be a dominating factor over the factor of environmentally friendliness, this is further facilitated

by the shopping environment designed for the customer. The study went further to state that a consumer's world of food is defined by the aisles in the supermarket and this can be narrowed down to the range of products provided by the store to its customers. Financial reasons could also play a major role in the process of moderation in consumption with one of the underlying problems being that animal-based products are cheaper, and the price of the resulting impact has not been included. Although a motivated effort to curtail certain consumption practice tend to differ in every individual, it is often seen that financial consideration is taken into account in lower income group and price was valued more than other segments (Verain et al., 2015; de Boer, Schösler, & Aiking, 2017).

Understanding a consumer's perspective on the consumption of dairy products can further aid in developing policies and other measures such as incentives to influence and support transition of consumption patterns. It can also help the government to shape campaigns to raise awareness amongst consumers where it is needed. This is necessary as dairy farmers are invisible since they are not big water users, but it is the feed that consumes a lot of water. This approach is necessary, since water policies seldom take measure to confine the growth in both dairy and meat production sectors despite the growing concerns of the depletion of water resources, (Hoekstra, 2014).

In an attempt to change dietary patterns, understanding the potential challenges that will be encountered is very important. Public reluctance needs to be integrated alongside environmental and health objectives for a sustainable pattern to emerge. Several countries associate food with important personal, social and cultural values and these should be addressed while attempting to change dietary patterns and consumption behavior (Macdiarmid et al, 2016).

2.4. PRODUCT TRANSPERANCY

Lack of information on environmental impact resulting from dietary choice / patterns can be termed as one of the factors that has led to the lack of awareness amongst consumers on the consequences of their food choices. Having access to information such as the water footprint in the food product, can influence the consumer to opt for a sustainable diet resulting in gradual transition of citizens towards a healthier and sustainable diet (Hoekstra, 2012; Röös et al., 2017; Verain et al., 2015). Studies have further proven that consumers preferences do not remain constant and choices tend to be made on limited information. Interestingly many of the choices tend to happen without any prior reflection (Vinnari & Tapio, 2012).

Hallström et al. (2015), further emphasized that there has to be improved knowledge about the substitutes and their impact on the environment and different groups of population based on geographical regions.

Change in consumption patterns and other driver changes supported with corrective policies both locally and globally can help with the sustainable approach along with the increasing population (Ercin & Hoekstra, 2014).

3. PSYCHOLOGICAL THEORIES AND ENVIRONMENTAL BEHAVIOR

Behavioral theories such as the Theory of Planned Behavior (TPB) by Ajzen (1991), The norm activation theory (Schwartz, 1977) are the most commonly used theories used in environmental psychology. Whereas the protection motivation theory (Rogers,1983) is commonly used to explain health related behavior. These theories have been extensively applied in research in the domain of pro environmental behavior, food choice, sustainable consumption (Verain et al., 2015; Zur & A. Klöckner, 2014).

The following section will elaborate on the above-mentioned theories. Each chapter will discuss the theories individually and will give an insight on how questions were formulated, and which aspect was assessed. Given the complex nature of human behavior there has been an attempt to view the theories as complementary to each other. With certain common aspects among the 3 theories taken into consideration, certain questions that were formulated would be encompassing the principal behind all the 3 theories.

3.1. The Theory of Planned Behavior (TPB)

The theory of planned behavior introduced and discussed by Ajzen, (1991) sets a framework for comprehending, predicting and transforming human social behavior. Although the theory states that actions can vary from situation to situation, personal considerations usually prevail when an intention proceeds to become an action. For a task such as making the transition to non-dairy alternatives the 2 primary factors i.e. social factor (subjective norm) and perception of the ease of task influences the action taken by consumer. If a person intends to make the shift then social factors such as support from friends, family and surrounding groups influence the outlook of the individual in either a positive or negative way. However, the perception of ease of approaching the task acts as a motivation factor for the individual and further supports the personal consideration thus facilitating the move from intention to action. The social factor is evaluated by assessing how an individual perceives the support of the surroundings for their intended behavior or action.

The questionnaire attempts to evaluate some of the factors that under the Planned Behavior Theory is considered essential for acting on the intended behavior. This is realized in the questionnaire by informing the participant about the large-scale impact on the environment influenced by their consumption pattern and asking if they are willing to make the transition. Further, to probe the factors that may have a positive effect on the intended behavior, with the help of literature review of consumer behavior factors such as price, range of alternatives, availability, etc. were listed down and participants were to choose from the list or could even state the otherwise.

The above pattern was followed for those who were practicing a vegetarian or an alternate diet. However, for those practicing a vegan diet, a question requesting for the

underlying motive to make the transition to a vegan diet was asked in addition to further enquiring the most difficult aspect / factor during the transition.

These factors also assess the ease of acting on the intended behavior, in the case of consumption patterns this can be assessed by the consumer's perception on the availability of the alternative plant-based products and the range available further adds to the consumers shopping experience as explained earlier in consumer behavior in Literature review. Taste can also play a moderate role but is still considered as a personal factor that has a significant effect on the choice of products.

Social Norm such as social perception towards animals and their treatment were included in the questionnaire to assess if it did play any role amongst individuals to make the shift from dairy products.

Since, every individual is raised in a family and is likely to share their housing space with other members either family or friends, these factors too were assessed in the questionnaire by enquiring if the perception of the social surrounding of the individual did have a significant impact on their consumption choices. Certain studies did find significant inclination in this area either based on gender or age group.

3.2. The Norm Activation Theory

The norm activation theory by Schwartz (1977) focuses on moral and normative dimensions of human behavior. It is based on the feeling of moral obligation to perform / inhibit a specific action, awareness of the consequences of one's action and the acceptance of one's responsibilities for the negative outcomes of their inaction. This theory is based on the idea of an individual's perception of right and wrong and not influenced by the social concept.

The theory lays weightage on empathy in an individual cognitive process. It speaks about how an individual processes information on the consequences resulting from their actions and this is shaped by the innate moral values which remain unaffected by the view of the people around. An individual's realization of the consequences of their past actions if positive can be viewed as a motivator and if negative could be associated with the factors that increases the resistance for the relevant norm to be further processed. In this manner any factor that is seen as a reason for resistance for the shift, is the very reason why the individual is motivated to continue with their existing dietary pattern.

Increased awareness of the consequences leads to activation of norm as per the theory, which in the case of our study can be translated into the decision an individual takes upon realizing the resulting damage to the environment from dairy consumption. The need for increased awareness about the consequences itself is an indicator of proceeding with the activation of the norm and this has been translated into the questionnaire by enquiring about the availability or lack of information on

environmental impact through food consumption patterns. Various factors listed in the questionnaire enquiring the obstacles towards change have been a cumulative selection from various studies held in analyzing food consumption behavior.

The question that enquires on an individual's consideration of their social circle's perception on their habit is the question that either tends to conform to the aspects taken into consideration in the planned behavior theory or the norm activation theory.

3.3. The Protection Motivation Theory

The protection motivation theory developed by Rogers (1975) links the effect of information of health threats resulting from consumption on attitude and behavior change. Based on the perceived vulnerability and seriousness of threat to the health of an individual, it can be applied to various types of threats and protective behavior (Zur & A. Klöckner, 2014).

Consumption patterns are usually influenced with the thought of individual wellbeing and with plan-based food known to contribute less towards cholesterol, fat and reduced parasitic or microbial condition, assessing this motive is easily done by assessing if the change or the intended change is done to improve health or avoid any allergies resulting from dairy consumption. In terms of allergies, there is a certain amount of compulsion to shift towards alternatives to avoid the side effects.

Any attempt to change dietary patterns in order to benefit from it in terms of health can be viewed under the protection motivation theory and as discussed earlier and further in the chapters, the protection motivation theory would be practiced more likely in those section of the population that is aware of their wellness and practice a health lifestyle, i.e. pursuing sports, being active, etc. in addition to their consumption practices. Once again, this theory does lay emphasis on awareness of an individual towards their very own well being and on the information that is made available to them in order to make the choice which suits them the best.

Awareness and information tend to be heavily influenced by social factors as the perception on a particular factor differs from one individual to another. Perception differs due to the experience of one individual varying from another while consuming or utilizing a product.

Overall, with the norm activation eliminating the influence of surrounding and situations on an individual's behavior teamed with the protection motivation theory does complement and support the in-depth assessment of the values and the underlying beliefs that play a pivotal role in motivating an individual to pursue their intention and in this case the shift to plant-based dairy alternatives.

The norm activation theory and protection motivation theory complement the idea introduced by Ajzen's Theory of planned behavior by considering essential factors that

concerns the individual intention. As mentioned earlier the theory of planned behavior does consider the external influence on an individual's behavior but still states clearly that the personal considerations tend to prevail over other factors while making a choice to pursue the intention and realize it into action.

The availability of different theoretical frameworks for pro-environmental behavior and the complex nature of human behavior, they should thus be viewed complementary (A.C. Hoek et al, 2017).

4. POTENTIAL MOTIVATION TO REDUCE DAIRY CONSUMPTION FROM CONSUMERS PERSPECTIVE.

Food consumption patterns have been associated with several factors, but the primary motivator has always personal considerations. However, an unprecedent shift is usually not the case especially with dietary patterns and is done gradually and the factors that heavily influence the transition which is further discussed below.

Vegans are individuals who practice dietary consumption of plant-based products only devoid of any food product that has been derived from animals including milk and various dairy products. The number of vegans has seen a global rise and there have been several factors that has caused the plant- based diet to be become a popular choice amongst people.

Health related reason have time and again topped as the primary motive for the transition from dairy to plant-based alternatives. While a minority of the crowd that faces food allergies such as lactose intolerance chose to change their dairy consumption pattern. A majority is seen to make the transition for health reasons, this is further explained due to the increased health consciousness and interest in healthy diets. With plant-based derivatives tending to contribute towards less fat, cholesterol and microbial contamination unlike the dairy counterparts, plant-based alternatives are viewed as a healthier alternative and then an environmentally friendly option (Dyett et al., 2013; McCarthy et al., 2017).

In McCarthy's (2017), detailed study about drivers of choice of milk over plant-based alternative, taste was shown to be the reason for an individual's inclination of consumers towards milk. It can be further validated by several studies that have ventured into the market of non-dairy alternatives, taste has played a vital role (Dyett et al., 2013; Panghal et al., 2018). Since dairy products is also perceived as an easily available and cheaper source of protein and calcium for consumers of all age groups (Drewnowski, 2018; Goodland, 1997; McCarthy et al., 2017), the cost factor does come into play for those is middle and low-income consumers.

5. RESEARCH APPROACH

This chapter will describe the approach that has be taken to answer the research question. It will investigate the activities that will help in gathering data to analyze consumer choices and patterns within the city of Leeuwarden.

5.1. RESEARCH FRAMEWORK

Research framework helps in formation of the general idea of the steps taken during course of the research project therefore realizing the research objective (Verschuren, Doorewaard, & Mellion, 2010).

The following text will highlight the step-by-step approach used for constructing the research framework

Characterizing briefly the objective of the research project

The aim of the research was to identify the key motivators of dairy consumption and the intention to reduce it. Since dairy consumption is one of the contributors to environmental degradation including climate change, pollution of land, water and air along with loss of biodiversity. As discussed in chapter 3, the questionnaire assesses this aspect by seeking for the reasons of resistance to make the shift to plant-based alternatives despite being aware of the large-scale impact from their consumption behavior.

Determining the research object

The research object will be the residents of the capital city of Friesland, Leeuwarden.

Establishing the nature of research perspective

The research will analyze and identify the predictors of dairy consumption through the perspective of Environmental Psychology which further investigates the personal, social, and economic variables influencing existing dietary patterns and willingness to shift. Further, it will explore the awareness amongst consumers on the consequences of their food choice and the availability of sustainable alternatives.

Determining the sources of the research perspective

The research utilizes theories commonly used in evaluation of consumer and pro-environmental behavior as discussed and elaborated in Chapter 3.

Key Concepts: Consumer habits and awareness linked with willingness to shift diet patterns.

Theories: The Theory of Planned Behavior, The Norm activation theory and protection motivation theory.

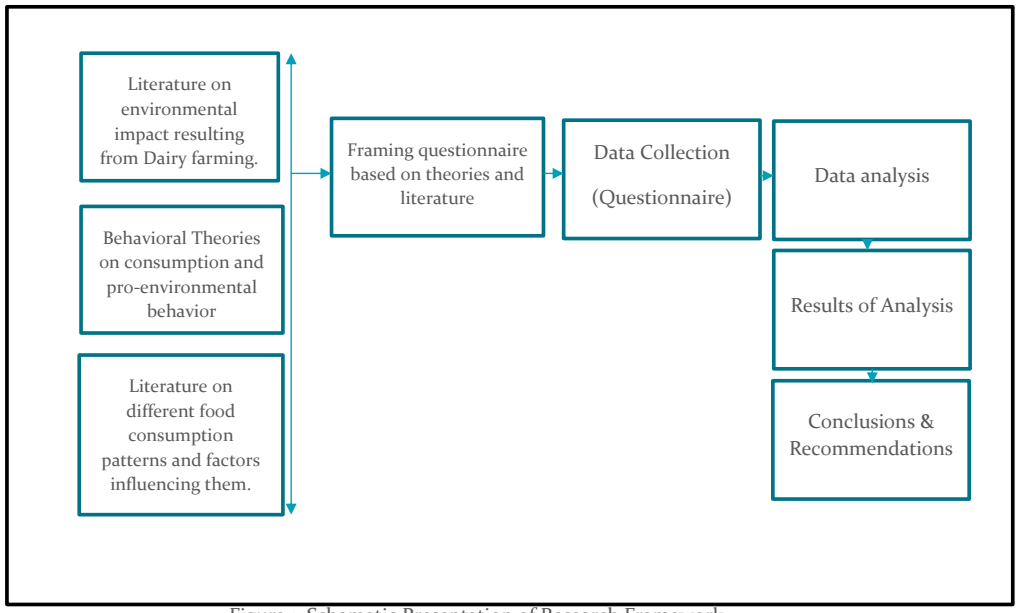

Figure 1: Schematic Presentation of Research Framework

Following is breakdown of the Research Framework that was put to practice, this is done with the aid of Fig 1. as shown above

1. An intensive literature review is done to analyze the extent of environmental impact with focus on the water chain resulting from the consumption of dairy products.
2. Selection of popular consumption and pro-environmental behavior theories are done in order to from the analysis framework. This will also aid in framing the questions on certain factors as highlighted in Chapter 3.
3. Research on different food consumption is utilized to identify significant factors that have played a larger role in influencing consumption patterns.
4. Along with the theories and the factors obtained from the literature, questionnaire as seen in Appendix 1 and 2, is formulated and the process of data collection was initiated through a voluntary participation.
5. The collected data from the questionnaire Appendix 4 had been tabulated as seen in Appendix 3 and based on the underlying theories that were used to frame the questionnaire the result is analyzed again with the help of analytical framework as seen in Fig 2.

6. The result of the analysis is summarized and presented in section 5.6.2 in form of a table as seen in table No 4.

5.2. RESEARCH QUESTION

The main research question:
Are consumers aware of the environmental impact resulting from their food choice and are they willing to shift to plant-based alternative on being aware of the consequences of their dietary habits. The main research question has been discussed with the help of the analytical framework in section 5.6.2

Sub- Research Question:

1. What are the primary motivators for the existing dairy consumption habits? Are consumers aware of the environmental impact resulting from this?
2. Are consumers willing to shift to plant-based alternative upon realizing the impact it has on water resources and environment.
3. What can further facilitate the shift? What are the factors that are currently missing to tackle the increasing demand?

These questions are further answered in section 5.6.2 and the overall observation and recommendations based on the analysis is given Chapter 6

5.3. DEFINING CONCEPTS

Residents: Dutch citizen residing in the city of Leeuwarden for a minimum of 1 (one) year.

Environmental Psychology: An interdisciplinary study focusing on interplay between individuals and their surroundings.

Plant-based alternatives: Alternate food product either in form or vegetable or fruits or products derived from grains or pulses with an equivalent nutritional value compared to that of dairy products.

5.4. RESEARCH STRATEGY

This research uses the randomized experiment approach through a pen & pencil-based questionnaire. Consumers theories as mentioned in Chapter 3 and the potential motivators as identified in Chapter 4 was be used to formulate the question as discussed in research framework in the previous chapter analyze the key predictors of consumer behavior.

5.4.1. RESEARCH UNIT

The research unit of this research is the residents of the city of Leeuwarden, particularly Dutch citizens residing for over 1 year in the city.

5.4.2. SELECTION OF RESEARCH UNIT

Data will be collected by approaching random individuals requesting for voluntary participation in the survey, a paper-pencil questionnaire in the city of Leeuwarden, within the province of Friesland in the Netherlands. The estimated population of Leeuwarden is 122,393 as of the year 2018. In a study concerning survey a sample size is determined in order to identify the relevance of the data collected and interpreted, however the sample size depends on different variable such as confidence interval and confidence level. The sample size varies with these two factors as the former indicates the assured percentage of the population to agree on a factor or provide the same answer whereas the later indicates how sure one can be of a particular factor prevailing as the most chosen one. In the section of data analysis in Chapter, further details on these variables will be provided in order to gain a better understanding of the data that has been collected.

In practice, data collection was done in public places such as university campus, city center, malls, train station and housing complexes. Individuals who volunteered filled out the forms after being informed about the intent of the questionnaire and the need for disclosing age and gender as mentioned in section 5.5.2. A total of 86 questionnaires were filled with 46 of them being male and 40 being female with age ranging from 19 – 78 years in male and 15 – 70 years in female participants. The breakdown of the data collected has been provided in Table no 3.

5.4.3. RESEARCH BOUNDARY

In order to achieve the goal of study within a specific duration, research boundaries are set to ensure consistency and determine the limit of study.

This research will be confined within the boundary of the following:

- The convenience sample will be confined with the city of Leeuwarden, The Netherlands.
- The research will not explore the extent of access / availability of plant-based alternative within the local market, only comparison in terms of nutritional value and water resource consumption will be done.

5.5. RESEARCH MATERIAL AND ACCESSING METHOD

Data and information required to carry out the study was done by extensive literature review, analysis of administrative reports and questionnaires.

Data analysis was done with the aid of the published scientific theories.

5.5.1. DATA COLLECTION

Since the nature of research is data intensive, Table 1. Highlights the approach of data collection with respect to the different sub-research questions.

Table 1. Data and Information Required for the Research and Accessing Method

Research Question	Data/ Information Required to Answer the Question	Sources of Data	Accessing Data
What are the primary motivators for the existing dairy consumption habits? Are consumers aware of the environmental impact resulting from this?	Motivators responsible for preferred dietary choices and the resulting impact from their consumption of dairy food products.	Primary Data: Questionnaire filled by the participants (Residents of Leeuwarden city)	Questioning: Voluntary participation in a pen-paper based questionnaire
Are consumers willing to shift to plant-based alternative upon realizing the impact it has on water resources and environment.	Willingness of consumer to opt for nutrition equivalent plant-based alternative.	Primary Data: Questionnaire filled by the participants	Questioning: Voluntary participation in a pen-paper based questionnaire
What can further facilitate the shift? What are the factors that are currently missing to tackle the increasing demand?	Provisions in policies drafted by the Food, water and health ministries concerning the increasing dairy demand and consumption.	Secondary Data: Literature	Content Analysis and search

5.5.2. ETHICAL DIMENSION

Considering all the ethical issues within a project is essential to ensure that the research done upholds to all the ethical principles. Since the project deals with the data collected from a large group of individuals about their personal choices for diet, the survey will be done only upon the consent of the participant. Any voluntary participant who agrees to take the survey will be notified about the need for disclosing their age, gender and duration of stay in the city prior to filling of the questionnaire.

This is done to ensure that any personal data provided by the individual will solely be used for statistical and behavioral analysis as a part of the project.

Also, information providing the insights into overall impact of consumption practices will be done in a neutral manner in order to avoid biasing of the choices for the questions provided further in the questionnaire.

Appendix 4 discloses the information provided by each participant with some of the participants not willing to state their identity in form of name, this has been

taken into consideration and has been carried forward while filling the information in Appendix 3.

5.6. DATA ANALYSIS

This section provides a breakdown on the data collected which has been further analyzed, utilizing the framework to assess the response of the participants and provide an insight on how the dairy industry is been perceived by the consumer and sheds light on few of the potential factors that although play a smaller role can significantly impact the behavior of individual.

5.6.1. METHOD OF DATA ANALYSIS

The research by nature is qualitative as it only involves understanding and analyzing the factors and does not include comparison of set targets with the results achieved, the analysis is done with the help of an integrated model of behavioral theories similar to the study carried out by Zur & A. Klöckner in their study of consumer behavior towards meat consumption. Although Chapter 4 provides an insight into the usual factors that play a role is sustained dairy consumption amongst consumers it need not be considered as a baseline for the following results to be compared.

In the following Table No 2. the specifics of the data and information required, and the method utilized for data analysis to answer the research questions is displayed.

Table 2. Data and Method of Data Analysis

Data/Information Required to Answer the Question	Method of Analysis
Overall Impact of Dairy production on the environment and specially in the water chain	Qualitative: As input for providing additional information in the questionnaire to raise awareness and analyze any changes in choice.
Available Policies or Plan focusing on reducing the extensive nature of dairy farming.	Qualitative: as input for analyzing the extent of initiatives taken by the government to battle the extensive nature of this sector.
Consumers existing mindset & factors influencing dairy consumption.	Qualitative: as input for comparison with that of choice made after being aware of the impact of dairy farming.
Consumers mindset & factors influencing dairy consumption after being informed about the environmental impact of	Qualitative: as input for comparison with that of choice made prior being aware of the environmental impact.

5.6.2. ANALYTICAL FRAMEWORK

The analytical framework provided below in Fig. 2 is a representation on how the data is interpreted. Although the questionnaire is formed by utilizing the underlying theories, keeping in mind the complimentary nature of the theories certain factors is seen under the combined lens of the 3 behavioral theories to identify those factors that play a pivotal role in making the shift to non-dairy alternatives successful and sustainable for a longer duration.

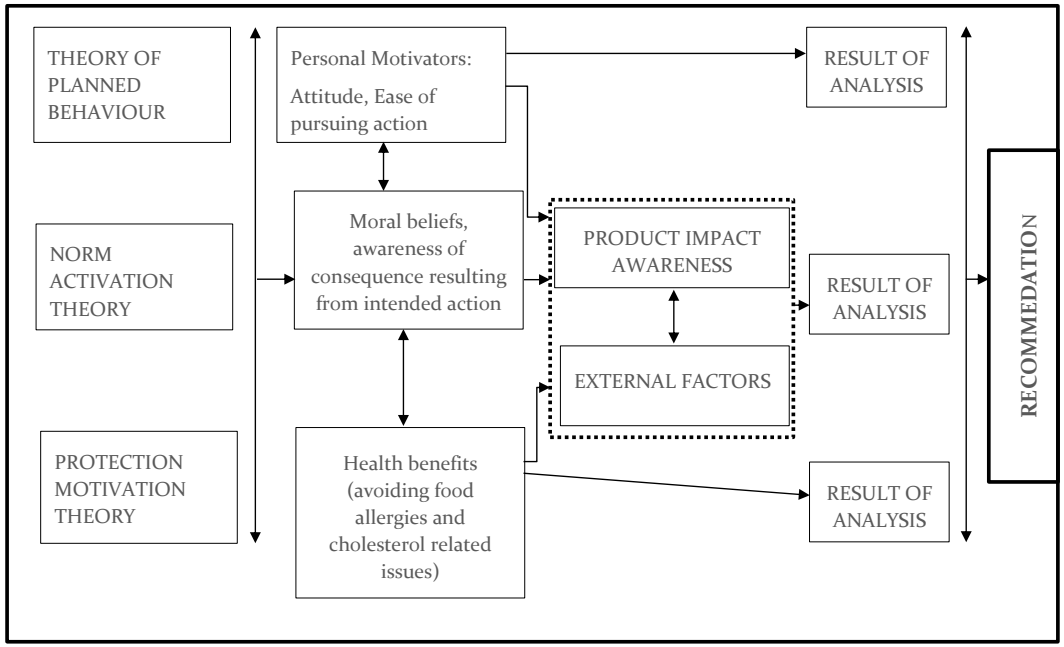

Figure2. A Schematic presentation of Analytical Framework

Table No 4. below summarizes the information gathered in the questionnaire as provided in the appendix 4. A breakdown based on number of participants per gender and their dietary habits is provided. The corresponding question numbers have been mentioned, since the actual questions are not repeated. However, the result for the frequency of consumption of dairy products is a cumulative result of both men and

women as this question was asked to evaluate the popularity and the extent of consumption of dairy products amongst the residents.

Question 2 as seen in appendix 1 and 2 evaluates the awareness of the consequences of the dietary pattern of the individual. As seen in Chapter 3, this question analyzes the factors that play a crucial role in predicting an individual's consideration for making a transition towards an environmentally friendly alternative. As per norm activation theory, an individual aware of the consequence if against their value would have a tendency to reconsider the pattern of their diet with an intention to protect the environment. The choices made by such individuals will tend be more mindful and thought out rather than an impulsive one.

Question 4 informs the participant about the general impact resulting from the consumption of dairy products this is also done to test the public awareness of the country's largest sector's.

Question 5 analyzes the intended behavior in question around which the research is centered, the willingness to shift to a plant-based alternative after being made aware of the impact of dairy consumption. It will also give an insight on the attitude and the moral values of the individual. A yes to this question does solely not confirm to the behavior since a set of other factors come into play, this is further enquired in question 6.

The options provided in Question 6 is presented in Table No 3, the factors with the corresponding aspects listed. This question helps in gaining insight on both the motivators of an individual to retain their habit of dairy consumption and also highlight the factors that in addition to the underlying attitude and beliefs can play a very important role in helping the individual make the transition without having to compromise on any aspect, therefore increasing the possibility of the transition to be one that can be sustained for a longer duration.

Table 3. Factors & their corresponding aspects

Factor	Corresponding Aspect
Availability – Lack of Alternatives	Personal Motivator: Ease of Action
Range – Lack of variety/ option in shops and restaurants	Personal Motivator: Ease of Action
Cost – Expensive	Personal Motivator: Economic / Financial Factor
Lack of knowledge about equivalent alternatives	Product Transparency: Ease of Action
Taste	Personal Motivators: Likes and Dislikes
Health Benefits	Personal Motivators: Health and Well-being

Ethical Treatment of animals	Moral values and Social Factor
Dietary habits while living with other members in the house	Social Factors

Question 7 is to assess the information available to the consumers in comparison to other pro-environmental behavior such as reduced/ efficient fuel consumption. As discussed in Chapter 2, product transparency can reduce the burden on the consumer in terms of cognitive assessment of the impact resulting from the consumption, in turn increasing the ease of pursing an action which acts as a personal motivator.

Question 8 evaluates the perception of the individual of the social factors surrounding them. The transition here being in question, the awareness of social perception can influence an individual as per the planned behavior theory towards taking up the transition. If not felt encouraged by their social circle, this factor can maybe cause the individual to reconsider their intentions.

Question 9 puts the two theories, the Planned Behavior Theory and the Norm Activation Theory to the test, with both of them stating that personal consideration tend to dominate over all factors, this question gives an insight on how vulnerable an individual is to views of their social circle. Like general social perception, this factor can also lead to the individual reconsidering their actions.

As mentioned in the earlier chapter, given that the basic dietary pattern in the Netherlands being dairy intensive, the confidence level taken into consideration was 95%, i.e. the certainty of presented factors would more likely be the motivators to dairy consumption. The confidence level taken into consideration was 9 and the preferred sample size was 118, due to the voluntary nature of the interview and abiding by the ethical norms, interviews held around different areas were limited due to refusal in participation from approached persons. Only 86 participant's inputs were collected.

However, with the 86 being the sample size in practice and the frequency of response being mostly a balanced one, the Confidence Interval of 10.56 implies that the study can be relevant for 39(50-10.56) to 60(50-10.56) % of the population.

Table 4. Summarized Participant Statistics

Description	Frequency
Participant Statistics	
Total No of Participants	86
Female	40
Male	46
Based on Diet Practiced	
Vegan	Female:1 Male:2

Vegetarian	Female:23 Male:28
Others	Female:16 Male:16
Based on Consumption of Dairy	
Daily	62
Weekly	10
Occasionally	11
Q3 - Awareness of the impact of dairy consumption Vs fossil fuels (General Awareness)	
Yes	Female:28 Male:41
No	Female:11 Male:3
Q4 -Awareness of water consumption in the production of dairy products (Information provided intentionally to analyze intention in Q5)	
Yes	Female:19 Male:12
No	Female:20 Male:32
Q5-Willingness to make the shift (Intended Behavior on awareness, moral values)	
Yes	Female:21 Male:20
No	Female:18 Male:24
Q7- The need for more awareness on environmental impact resulting from food consumption habits (Availability of information & product transparency)	
Yes	Female:33 Male:36
No	Female:6 Male:8
Q8 - Awareness on the support from social circle (Family members or friends) towards behavior (awareness of social / external perception)	
Yes	Female:26 Male:29
No	Female:13 Male:15
Q9 - Consideration towards the view of social circle towards behavior (consideration of social / external perception)	
Yes	Female:33 Male:12
No	Female:14 Male:32
Q5 & Q10 - Factors impacting the behavior (External Factors)	

Availability- Lack of Alternatives	13
Cost – Expensive	21
Lack of knowledge about equivalent alternatives	23
Range - Lack Of variety / options	At Shops:16 At Restaurants:5
Taste	23
Health Benefits	Known:4 Unknown:3
Ethical Treatment of animals	2
Dietary habits while living with other members in the house	8

From the above table the residents are very much aware about the large-scale impact of their consumption pattern in comparison to the use of fossil fuel. However, the same does not stand true when informed about the resource extensive nature of dairy farming, less participants were aware about the difference between dairy products and their plant-based alternatives.

It is noteworthy to state that along with a good understanding of the perception of social surrounding on the intended behavior, Female participants were far more likely to take into consideration these views, thus making them the gender that is more vulnerable group to social influence. One can assume that this may be a result of women having to assume the role of a mother and keeping the consideration of their children in mind. An increased sensitivity to social factor can definitely make theories like the norm activation theory susceptible to being not a relevant one as it never lays importance on the aspect of social factors.

Having been informed of the impact, there are several people who intend to continue with their usual consumption pattern. The factors that were more popular among such consumers was taste and price this can be viewed in Table 5 as shown below. Even for those intending to / having made the change these factors also played an important role or were even viewed as difficulties encountered during the transition period.

Table5. Frequency distribution of prevailing factors amongst based on participants intention.

DESCRIPTION	FREQUENCY	
	WHEN INTENDING TO MAKE THE TRANSITION	WHEN REFRAINING FROM THE INTENTION OF TRANSITION
Availability	10	8
Cost	8	12
Lack of knowledge of Alternatives	9	11
Taste	8	14

Dietary of family members living in the same house	4	2

Factors such as Lack of knowledge of about equivalent alternative, lack of availability of alternatives and option in shops and restaurants. Such aspects make it hard for a consumer to make an informed choice with limited alternative catering to their likings and daily nutritional needs.

The lack of information available to consumers can be viewed as an issue with product transparency, as information provided to the consumer can influence the customer to comprehend the extent of their impact on the environment through the purchase of a particular product.

Viewing these factors through the framework helps us in arriving at the understanding that despite a strong intention, several factors do play a crucial role in the cognitive process of a consumer. When assured that the transition will be beneficial to the health of the individual we see that the theory of protection motivation comes into play and with an intention to pursue a healthy lifestyle we can see that the norm activation theory also comes into action.

As the act of consumption and the pattern is heavily influenced by the criteria of availability, the ease of transition is often seen as a big influencer on the decision-making process of a consumer. A general thumb rule, surplus of any goods is a result of efficient production methods are often cheap than those goods that are rare and have a lower production rate. The easy and cost-efficient access to dairy product can easily be preferred over alternative given the stark contrast in price. This aspect teamed with lack of knowledge on alternatives can often discourage the consumer by making such transition a harder one.

6. CONCLUSIONS AND DISCUSSIONS

The following chapter will seek to elaborate of the analyzed data and provide answers to the research questions as mentioned in section 5.6.2.

As discussed in Chapter 7, the frequency of personal factors prevailed over social factors. Issues like Taste, cost and a general idea of the product happened to be the primary motivator in the consumption of dairy products. A well-informed customer when offered with several products in different price range will have a tendency to gravitate towards the product that satisfy these basic criteria's, thus also contributing to the overall shopping experience of the consumer.

Except for vegan participants, almost every participant both vegetarian and those on an omnivorous diet, consumed milk regularly and this is in line with the findings done in the literature review in Chapter 2. With a higher rate of general awareness of environmental impacts resulting from food consumption, an approximate of 60% of the participants were seemingly unaware of the impact that resulted from dairy consumption. Therefore, highlighting the extent of product transparency and the general awareness amongst the crowd on the sector of dairy farming.

As viewed in Table 4, despite being aware of the impact resulting from the consumption of dairy product, several participants refrained from even the intention of making a shift and as discussed in the previous chapter, a lot of these external factors tend to impact the intention of making the transition.

Personal motivation factors such as taste and cost of available alternatives were seen as a make or break point for consumers. Given the balanced number of people intending to make the shift and refrain from it, the popular factors are aligned to the findings by McCarthy et al. (2017) as discussed in chapter 4. An approximate of 27% of the participants felt that taste played a pivotal role in their transition and it remained as their reason to continue with the practice of dairy consumption.

With the vegans stating the most common reason for their intention to make the shift was from the increased awareness of the negative consequences resulting from increased dairy use. They too have faced certain obstacles and a few of them being personal motivating factors such as price and availability of plant-based alternates during the transition process. Moreover, the process of transition would also involve increasing one's self awareness on the products consumed in order to assure that the approach adopted is beneficial to them as per every single theory highlighted in the study.

However, for those willing to make a shift, the product range for dairy alternatives and its availability both in shops and restaurants along with the higher cost of alternative was the top reasons to hold them back from putting their intentions into action. This highlights the factor of ease of intended action as indicated in Ajzen's theory. It is when situations surrounding the individual makes it difficult for them to pursue the intended action, it

often leads to the individual reconsidering the realization of their intentions at a much favorable situation that is more likely to support their actions.

With personal motivators being the prevailing motivators and potential restrainers, it is very evident that the statement Ajzen made in his theory stands true, personal intention plays a pivotal role and dominates over all other factors. Social factors such as support from friends and family did not seem to cause any hinderance to the intention of making a shift amongst the participants.

The norm activation also stands true with the underlying belief guiding an individual's intention to pursue a behavior. However, it is notable to state that women were more likely than men to consider the views of their family when intending to make the transition and this can be due to various factors such as being a house wife, nursing mother, etc. Having to refrain from the intended transition is a manifestation of the norm activation theory in opposite direction, this can be viewed as avoiding any inconvenience to the other members in the household, a consequence resulting from the transition to a plant- based alternative which may or may not be favored by the rest.

From the above results the planned behavior theory by Ajzen seems to be the best match amongst the 3 theories considered, since it is considering both internal and external motivators and even facilitates in the understanding of how an intended behavior such as shift towards dairy alternative can be influence by external factors such as availability and price of dairy alternatives in the market.

Having discussed in chapter 1, in the section of problem statement, the large-scale impact resulting from dairy consumption, in a country like Netherlands where the consumption is 50% higher than other European countries, it can be easily said that this sector is of great significance when it is focusing on the environmental impact. Since, dairy farming happens to have a widespread presence over the Netherlands given its size, a gradual reduction in consumption would come a long way to reducing the size of this sector and thus enabling the Netherlands to meet the several directives that it has been battling to meet in all these years. With a good percentage of the population being highly aware of their actions, motivating them by making the transition easier can eventually lead to the transition. However, these all depends on policies and initiatives taken by the government to bring to light the impact of consumption habits to the consumers in a similar way to that of the use of fossil fuels.

Overall, several approaches can be taken to tackle the issue of consumption. Instead of focusing on improving on already updated and improved technology time and again, a change of focus on to reduction of demand can be more helpful and sustainable over the long term.

By focusing on the primary motivators and external factors of consumers, various initiatives at different level can aid in the process of transition towards a sustainable dietary consumption practice.

Several researches highlight that motivation of pro-environmental behavior and healthiness operate on different level and vary with individual but is accompanied with a general distinction between the two.

Lack of general awareness amongst individual about the resulting impact of the consumption patterns is a clear indicator that in order to direct and incentivize the shift towards non-dairy products, ample information of plant-based dairy alternative should be made available to consumer. This not only helps in encouraging each of them in making a healthier choice but also makes the transition easier and more sustainable both environmentally and practically. A.C.Hoek (2017), goes on to suggest the reduction of the effort put in decision making by the consumer by providing ample information of alternate products and avoiding any compromise on important attributes such as taste, price and convenience.

For a public policy to influence consumption patterns amongst its resident, understanding the habits in domains concerned with everyday action, healthy lifestyles and product purchase is very much important. Policies tailored around the habit strength of the target behavior are more likely to be successful ((de Boer et al., 2017; Verplanken & Wood, 2006). Targeting multiple component of behavioral change will help in advancing towards healthier and more environmentally friendly diets.

For the given research it must be brought to the reader's attention, there are several limitations to the study as it highlights the various factors that play an essential role to facilitate the move towards plant-based dairy alternatives and that it does not guarantee actual behavioral change. There has been an attempt to avoid self-biasing responses, by providing the opportunity to the participants to state any additional factor other than those mentioned. Also, given that random people were approached in different locations for participating in the questionnaire, this eliminates any inclination towards one dietary consumption pattern. Thus, providing certain level of diverse outcome of this study. Given the limited number of participants this study cannot be considered as a representation of the remaining resident in the city of Leeuwarden.

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APPENDIX – 1
Questionnaire (Medium - Dutch)

VRAGENLIJST

Algemene informatie

De volgende vragenlijst is opgesteld om gegevens te verkrijgen voor de studie van "de motivatiefactoren van de zuivelconsumptie in de stad Leeuwarden" voor het masterproject om te voldoen aan de vereisten van het MEEM-programma door de Universiteit Twente. De studie gebruikt gegevens zoals geslacht en leeftijd voor classificatie en uw keuzes in de onderstaande vragen.

NAAM:
GESLACHT:
LEEFTIJD:
DUUR VAN DE WOONPLAATS IN LEEUWARDEN:
NEDERLANDSE BURGER □ JA of □ NEE

1.Type dieet dat wordt toegepast ?
□ Veganistisch (graag overslaan en vraag 10 beantwoorden)
□ Vegatarisch
□ Anders
2. Hoe vaak consumeer je zuivelproducten (melk, yoghurt, boter, karnemelk, kaas, etc.)?
□ Dagelijks
□ Wekelijks
□ Af en toe
3. Ik weet dat de consumptie van zuivel product belangrijke gevolgen heeft voor het milieu en veel meer bijdraagt aan het broeikaseffect in vergelijking tot het gebruik van fossiele brandstoffen.
□ Ja
□ Nee
4. Weet je dat 1L-melk (op basis van dieren) 3 keer meer water verbruikt dan 1L-sojamelk (op basis van planten)? Met sojamelk met een geschatte hoeveelheid van 300 liter water. Ook hebben verschillende op planten gebaseerde alternatieven een langere houdbaarheid waardoor verspilling wordt verminderd.
□ Ja
□ Nee
5. Als u zich bewust bent van de milieu-impact van uw voedingsgewoonten, heeft u invloed door over te stappen naar een op planten gebaseerd alternatief.
□ Ja, ga door naar vraag zeven.

□ Nee, antwoord vraag zes.
6. Waarom niet?
□ Beschikbaarheid door bijv. gebrek aan alternatieven
□ Kosten - duur
□ Gebrek aan kennis over gelijkwaardige alternatieven.
□ Bereik - Gebrek aan verscheidenheid / opties
• Bij winkels
• In restaurants
□ Smaak
□ Onbekende gezondheidsvoordelen (verminderd risico op coronaire aandoeningen, hartaandoeningen, cholesterolniveaus, lactose-intolerantie, voedselallergieën, enz.)
□ Ethische behandeling van dieren
□ Dieetgewoonten tijdens het leven met andere leden in het huis
7. Vindt u dat er een gebrek aan informatie is over de milieu-impact van voedselconsumptiegewoonten in vergelijking met andere milieuvriendelijke benaderingen zoals energiebesparing en verminderde consumptie van fossiele brandstoffen?
□ Ja
□ Nee
8. Denk je dat de overgang naar een plantaardig alternateief wordt ondersteund door familieleden?
□ Ja
□ Nee
9. Zijn de opvattingen van familie en vrienden over uw eetgewoonten belangrijk voor u?
□ Ja
□ Nee
10. Wat was het moeilijkste aspect van uw overgang naar plantaardig alternatief voor zuivelproducten?
□ Beschikbaarheid - Gebrek aan alternatieven
□ Kosten - duur
□ Gebrek aan kennis over gelijkwaardige alternatieven.
□ Gebrek aan variatie / opties
• □ Bij winkels
• □ in restaurants
□ Smaak
□ Onbekende gezondheidsvoordelen (verminderd risico op coronaire aandoeningen, hartaandoeningen, cholesterolniveaus, lactose-intolerantie, voedselallergieën, enz.)
□ Ondersteuning van familie, vrienden, etc.
Vermeld ook vriendelijk de reden voor uw overgang:

De vee- en zuivelsector draagt bij aan de uitstoot van broeikasgassen
DANKJEWEL

APPENDIX – 2

Questionnaire (Medium - English)

QUESTIONNAIRE

General Information

The following questionnaire has been drafted to obtain data for the study of "the motivation factors of Dairy consumption in the city of Leeuwarden" for the master's project in order to meet the requirements of the MEEM programme by the University of Twente. The study will be utilizing data such as Gender and age for classification purposes and your choices in the questions given below.

NAME:

GENDER:

AGE:

DURATION OF RESIDENCE IN LEEUWARDEN:

DUTCH CITIZEN □ YES or □ NO

1. Type of Diet practiced
   □Vegan (Kindly skip and answer question 10)
   □Vegetarian
   □Others
2. How often do you consume dairy products (Milk, yoghurt, butter, buttermilk, cheese, etc.)?
   □Daily
   □Weekly
   □Occasionally
3. Are you aware that dairy consumption has a significant impact on the environment and contributes far much more towards global warming in comparison to use of fossil fuels.
   □Yes
   □No
4. Are you aware 1L milk (animal based) utilizes 3 times more water than that of 1L soy milk (plant based)? With soy milk utilizing an approximate of 300 Liters of water. Also, several plant-based alternatives have larger shelf life reducing wastage.
   □Yes
   □No
5. Does being aware of the environmental impact of your food habits, influence you to make a shift to the Plant-based alternatives.
   □Yes

   □No, Kindly answer Question6.
6. Why Not?
   □Availability - Lack of Alternatives
   □Cost - Expensive
   □ Lack of Knowledge about equivalent alternatives.
   □Range – Lack of Variety / Options
   - At shops
   - At restaurants

   □ Taste
   □ Unknown Health Benefits (reduced risk of coronary diseases, heart diseases, cholesterol levels, lactose intolerance, food allergies, etc.)
   □ Ethical Treatment of Animals
   □ Dietary Habits in while living with other members in the house
7. Do you feel there is a lack of information about the environmental impact of food consumption habits in comparison to other environmental friendly approach such as saving of energy and reduced consumption of Fossil Fuels?
   □Yes
   □No
8. Do you think the transition will be supported by family members?
   □Yes
   □No
9. Does the view of family and friends on your eating habits matter to you?
   □Yes
   □No
10. What was the most difficult aspect of your transition toward plant-based alternative for dairy products?
    □Availability - Lack of Alternatives
    □Cost - Expensive
    □Lack of Knowledge about equivalent alternatives.
    □Lack of Variety / Options
    - □At shops
    - □At restaurants

    □ Taste
    □Unknown Health Benefits (reduced risk of coronary diseases, heart diseases, cholesterol levels, lactose intolerance, food allergies, etc.)
    □Support of family, friends, etc.
    Also, Kindly state the reason for your transition:_____

The Livestock and Dairy sector contribute towards Green House emission more than the global transportation sector.

Thank You for sparing your time

APPENDIX 3
LIST OF PARTICIPANTS AND THEIR RESPONSE ON THE QUESTIONNAIRE

No.	1 Name	2 Gender	3 Age	3 Duration of Residence in Leeuwarden	4 Dutch Citizen	5 Type of diet practiced	6 Frequency of dairy product consumption	7 Awareness of impact resulting from dairy consumption being much higher than that of Fossil Fuels	8 Awareness of the extent of resource consumption by dairy products in comparison to a plant based alternative	9 Intention to make a shift to Plant-based alternative (desired behaviour)	10 Factors causing resistance or Factors that motivate the retention of dairy consumption	11 Lack of information on the environmental impact resulting from food consumption in comparison to fossil fuels	12 Will the transition be supported by family members	13 Does the view of family member/friends matter?	14 The most difficult factor of transition	15 Reason for transition
1	Anonymous	Man	19	3	Yes	Other	Occassionally	Yes	No	Yes		Yes	Yes	Yes	Availability - Lack of Alternatives Lack of Knowledge about equivalent alternatives.	Climate
2	Anonymous	Female	29	10	Yes	Vegetarian	Daily	Yes	No	No	Cost-Expensive	Yes	Yes	No		
3	Anonymous	Female	31	2	Yes	Vegetarian	Daily	Yes	No	Yes		Yes	Yes	Yes	Lack of Knowledge about equivalent alternatives. Cost- Expensive Range – Lack of Variety / Options at shops Unknown health benefits	
4	Anonymous	Female	30	20	Yes	Others	Daily	Yes	Yes	No	Dietary Habits influenced while living with other members in the house.	Yes	Yes	No		
5	Anonymous	Female	21	3	Yes	Vegetarian	Weekly	No	No	No	Lack of Knowledge about equivalent alternatives.	Yes	No	No	Nut allergies	
6	Anonymous	Female	25	4	Yes	Vegetarian	Occassionally	Yes	No	No	Cost- Expensive Lack of Knowledge about equivalent alternatives.	Yes	Yes	No		
7	Anonymous	Male	24	4	Yes	Vegetarian	Daily	Yes	Yes	No	Taste	Yes	Yes	No		
8	Anonymous	Male	23	2	Yes	Vegetarian	Daily	Yes	No	No	Availability - Lack of Alternatives	Yes	Yes	No		
9	Anonymous	Male	20	4		Vegetarian	Occassionally	Yes	No	No	Taste Dietary Habits in while living with other members in the house	Yes	Yes	No		
10	Anonymous	Female	63	40	Yes	Vegetarian	Daily	Yes	No	Yes		Yes	Yes	No		
11	Anonymous	Female	70	50	Yes	Other	Daily	Yes	No	No	Availability - Lack of Alternatives	No	Yes	No		
12	Anonymous	Male	20	2	Yes	Vegetarian	Daily	Yes	No	No	Availability - Lack of Alternatives Cost- Expensive Range – Lack of Variety / Options at shops Taste	Yes	No	No		
13	Anonymous	Female	14	14	Yes	Vegetarian	Weekly	Yes	No	Yes	Lack of Knowledge about equivalent alternatives.	Yes	Yes	No		
14	Anonymous	Male	28	2	No	Other	Occassionally	Yes	Yes	No	Taste	Yes	Yes	No		
15	Anonymous	Male	42	13	Yes	Other	Weekly	Yes	Yes	Yes		No	No	Yes		
16	Anonymous	Female	21	12	Yes	Vegan									Dietary Habits influenced while living with other members in the house.	Well- Being Environmental Change
17	Anonymous	Female	18	18	Yes	Other	Daily	Yes	No	No	Range – Lack of Variety / Options at restaurants Dietary Habits in while living with other members in the house	Yes	Yes	Yes		
18	Anonymous	Female	18	18	Yes	Other	Daily	No	No	No	Taste	No	Yes	No		
19	Anonymous	Female	26	6	Yes	Vegetarian	Weekly	No	No	Yes		Yes	No	Yes	Lack of Know ledge about equivalent alternatives. Dietary Habits influenced while living with other members in the house.	
20	Anonymous	Female	15	15	Yes	Vegetarian	Daily	Yes	No	No	Availability - Lack of Alternatives	Yes	Yes	Yes		
21	Anonymous	Female	54	19	Yes	Others	Daily	Yes	No	Yes		Yes	Yes	Yes	Availability - Lack of Alternatives Taste	
22	Anonymous	Female	40	4	No	Others	Daily	Yes	No	No	Taste	Yes	No	No		
23	Anonymous	Female	62	54	Yes	Vegetarian	Daily	Yes	Yes	Yes		Yes	Yes	Yes		
24	Anonymous	Female	53	2	Yes	Vegetarian	Daily	Yes	Yes	Yes		Yes	No	No		
25	Anonymous	Female	38	38	Yes	Vegetarian	Daily	No	No	No	Lack of Knowledge about equivalent alternatives. Range – Lack of Variety / Options at restaurants/ shops Taste Unknown health benefits Dietary Habits in while living with other members in the house	Yes	Yes	No		
26	Anonymous	Female	50	10	Yes	Vegetarian	Daily	Yes	Yes	Yes		No	No	Yes		
27	Anonymous	Female	34	10	Yes	Vegetarian	Occassionally	Yes	Yes	No	Lack of Knowledge about equivalent alternatives	Yes	No	No		

28	Anorymous	Female	56	3	Yes	Others	Daily	Yes	Yes	No	Taste	Yes	Yes	Yes		
29	Anorymous	Female	63	38	Yes	Vegeterian	Daily	Yes	Yes	No	Availability - Lack of Alternatives	Yes	No	Yes		
30	Anorymous	Male	26	3	Yes	Vegan									Cost-Expensive	Known health benefits
31	Anorymous	Male	51	31	Yes	Others	Weekly	Yes	No	Yes		Yes	Yes	No		
32	Anorymous	Male	54	54	Yes	Others	Daily	No	No	No	Lack of Knowledge about equivalent alternatives. Unknown health benefits	Yes	No	No		
33	Anorymous	Male	36	2	No	Others	Weekly	Yes	No	Yes	Cost - Expensive Range – Lack of Variety / Options at restaurants/ shops Taste	Yes	Yes	Yes		
34	Anorymous	Male	70	50	Yes	Vegeterian	Occassionally	Yes	Yes	Sometime	Range – Lack of Variety / Options at restaurants/ shops Taste Unknown health benefit Ethical Treatment of Animals	Yes	Yes	No		
35	Anorymous	Male	41	20	Yes	Vegeterian	Daily	Yes	Yes	No	Availability - Lack of Alternatives	Yes	Yes	No	Range – Lack of Variety / Options at restaurants/ shops	
36	Anorymous	Male	36	2	Yes	Vegeterian	Daily	Yes	Yes	No	Taste	No	No	Yes		
37	Anorymous	Male	32	2	Yes	Vegeterian	Occassionally	Yes	Yes	Yes		Yes	Yes	No	Range – Lack of Variety / Options at restaurants/ shops	
38	Anorymous	Male	32	1	Yes	Vegeterian	Daily	No	No	Yes		Yes	No	No		
39	Anorymous	Male	31	10	Yes	Vegeterian	Daily	Yes	No	Yes		Yes	Yes	No	Lack of Knowledge about equivalent alternatives.	
40	Anorymous	Male	28	3	Yes	Vegeterian	Weekly	Yes	Yes	No	Cost-Expensive	Yes	Yes	No		
41	Anorymous	Male	26	10	Yes	Vegeterian	Weekly	Yes	No	Yes		Yes	Yes	Yes	Cost-Expensive	
42	Anorymous	Male	25	4	Yes	Vegeterian	Daily	Yes	No	Yes		Yes	No	No		

43	Anorymous	Male	25	2	No	Vegeterian	Occassionally	Yes	Yes	Yes		Yes	Yes	No	Availability - Lack of Alternatives Cost-Expensive	To support animal cruelty and lessen impact on environment
44	Anorymous	Male	25	25	Yes	Vegeterian	Daily	Yes	No	No	Lack of Knowledge about equivalent alternatives.	Yes	Yes	No		
45	Anorymous	Male	24	24	Yes	Vegeterian	Daily	Yes	No	No	Lack of Knowledge about equivalent alternatives.	Yes	Yes	Yes		
46	Anorymous	Male	23	2	No	Vegeterian	Daily	Yes	Yes	No	Cost-Expensive	Yes	Yes	No	Cost-Expensive Range – Lack of Variety / Options at restaurants	
47	Anorymous	Male	20	3	Yes	Vegeterian	Daily	Yes	No	Yes		Yes	No			Environment
48	Anorymous	Female	61	10	Yes	Others	Daily	No	No	Yes	Taste	Yes	Yes	No		
49	Anorymous	Male	22	5	Yes	Vegeterian	Daily	No	No	Yes		Yes	Yes	No		
50	Anorymous	Female	22	2	No	Vegeterian	Daily	No	No	Yes	Taste	No	No	Yes		
51	Anorymous	Male	23	23	Yes	Vegan									Lack of Knowledge about equivalent alternatives. Range – Lack of Variety / Options at restaurants	Earth, Animal and Health
52	Anorymous	Male	20	3	Yes	Others	Weekly	Yes	No	No	Cost-Expensive Dietary Habits in while living with other members in the house	No	Yes	No		
53	Anorymous	Male	25	7	Yes	Others	Daily	Yes	No	No	Taste	No	No	No	Availability - Lack of Alternatives Lack of Knowledge about equivalent alternatives.	
54	Anorymous	Male	24	24	Yes	Others	Daily	Yes	No	No	Cost-Expensive Range – Lack of Variety / Options at restaurants/ shops Taste Dietary Habits in while living with other members in the house	Yes	Yes	No		
55	Anorymous	Female	27	27	Yes	Others	Occassionally	Yes	No	Yes		Yes	No	No		
56	Anorymous	Female	34	1	Yes	Others	Daily	Yes	Yes	Yes	Taste	Yes	Yes	No		
57	Anorymous	Female	19	2	Yes	Others	Daily	No	No	No	Cost-Expensive	Yes	Yes	No		

58	Anorymous	Female	37	4	Yes	Vegeterian	Daily	Yes	No	No	Lack of Knowledge about equivalent alternatives.	Yes	Yes	Yes		
59	Anorymous	Female	24	24	Yes	Vegeterian	Daily	Yes	No	Yes		Yes	Yes	No	Range – Lack of Variety / Options at restaurants	
60	Anorymous	Female	21	2	Yes	Vegeterian	Daily	No	No	Yes		Yes	Yes	No		
61	Anorymous	Female	17	17	Yes	Vegeterian	Daily	Yes	No	No	Lack of Knowledge about equivalent alternatives. Unknown health benefits Dietary Habits in while living with other members in the house	Yes	No	Yes		
62	Anorymous	Female	57	3	Yes	Vegeterian	Occassionally	Yes	Yes	Yes	Availability - Lack of Alternatives Taste Ethical Treatment of Animals	No	Yes	No		
63	Anorymous	Female	18	3	Yes	Vegeterian	Daily	Yes	Yes	Yes		Yes	No	No		
64	Anorymous	Male	23	1	Yes	Vegeterian	Daily	Yes	No	No	Taste	Yes	Yes	No		
65	Anorymous	Male	21	2	Yes	Other	Weekly	Yes	No	Yes		Yes	Yes	No		
66	Anorymous	Female	22	22	Yes	Other	Daily	Yes	No	No	Taste	Yes	Yes	No		
67	Anorymous	Female	18	18	yes	Other	Daily	No	No	No	Lack of Knowledge about equivalent alternatives.	Yes	Yes	Yes		
68	Anorymous	Female	55	55	Yes	Other	Daily	Yes	Yes	Yes		Yes	No	No	Cost-Expensive Lack of Knowledge about equivalent alternatives. Unknown health benefits	Health
69	Anorymous	Female	58	58	Yes	Other	Daily	Yes	Yes	Yes		Yes	Yes	No		
70	Anorymous	Female	17	8	Yes	Vegeterian	Daily	Yes	No	Yes		Yes	No	Yes		
71	Anorymous	Female	14	14	Yes	Vegeterian	Daily	No	No	No	Availability - Lack of Alternatives	No	Yes	Yes		
72	Anorymous	Female	25	2	No	Vegeterian	Occassionally	Yes	Yes	Yes		Yes	Yes	No	Availability - Lack of Alternatives Cost-Expensive	Health - Lactose Intolerance

73	Anorymous	Male	59	59	Yes	Other	Daily	Yes	No	No	Cost- Expensive Lack of Knowledge about equivalent alternatives. Range – Lack of Variety / Options at shops Taste	Yes	No	No	Availability - Lack of Alternatives Cost-Expensive Range – Lack of Variety / Options at shops Taste Lack of Knowledge about equivalent alternatives. Unknown health benefits	
74	Anorymous	Male	45	45	Yes	Other	Occassionally	Yes	No	No		Yes	No	No		
75	Anorymous	Male	30	5	Yes	Other	Daily	Yes	No	No	Cost- Expensive Lack of Knowledge about equivalent alternatives. Range – Lack of Variety / Options at shops	Yes	Yes	No		
76	Anorymous	Male	22	22	Yes	Other	Daily	Yes	No	No	Lack of Knowledge about equivalent alternatives.	No	Yes	No		
77	Anorymous	Male	33	5	Yes	Other	Daily	Yes	No	Yes		Yes	No	Yes	Availability - Lack of Alternatives taste	Will change production method
78	Anorymous	Male	78	73	Yes	Vegeterian	Daily	Yes	Yes	Yes		Yes	No	No	Availability - Lack of Alternatives Lack of Knowledge about equivalent alternatives. Unknown health benefits	
79	Anorymous	Male	47	30	Yes	Vegeterian	Daily	Yes	No	No	Cost-Expensive	Yes	Yes	Yes		
80	Anorymous	Female	62	12	Yes	Vegeterian	Daily	Yes	No	Yes		Yes	Yes	Yes	Lack of Knowledge about equivalent alternatives.	
81	Anorymous	Male	68	40	Yes	Vegeterian	Daily	Yes	No	Yes		Yes	No	Yes	Range – Lack of Variety / Options at shops / restaurants	
82	Anorymous	Male	35	1	Yes	Vegeterian	Daily	Yes	Yes	No	Cost-Expensive	No	No	Yes		
83	Anorymous	Male	32	20	Yes	Vegeterian	Daily	Yes	No	Yes		No	Yes	No		
84	Anorymous	Male	27	37	Yes	Vegeterian	Daily	Yes	No	Yes	Unknown health benefits	No	No	Yes		
85	Anorymous	Male	25	3	Yes	Vegeterian	Daily	No	No	No	Cost-Expensive Range – Lack of Variety / Options at shops	Yes	Yes	No		
86	Anorymous	Male	24	6	Yes	Vegeterian	Daily	Yes	No	Yes	Cost-Expensive Taste Dietary Habits in while living with other members in the house	Yes	No	Yes	Cost-Expensive Taste Dietary Habits in while living with other members in the house	Bothered if they meet nutritional need due to active lifestyle