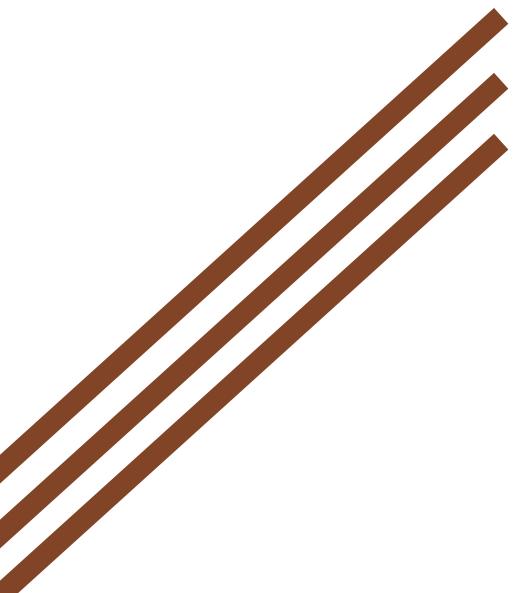


# ORGANIC BROWN RICE

THE INDUSTRIAL ANALYSIS REPORT

BY SEVENTH FLOOR



7th  
**FLOOR**





# ORGANIC BROWN RICE

SEVENTH FLOOR





---

## **ABOUT US**

---



### **Seetala Ummaralikit**

Nationality: Thai

Description: Completed bachelor in Industrial Engineering at Thammasat University (Thailand). Currently continuing studies in the same field.



### **Muanphet Charunratanavisan**

Nationality: Thai

Description: Completed bachelor in Mechanical Engineering at Thammasat University (Thailand). Currently continuing studies in Industrial Engineering at Tsinghua University.



### **Bobby Kurniawan**

Nationality: Indonesian

Description: Completed bachelor in Electrical Engineering at University of Gadjah Mada (Indonesia). Currently continuing studies in Industrial Engineering at Tsinghua University.

# TABLE OF CONTENTS



<b>LOGIC MODEL</b>	<b>1</b>
<b>1 HISTORY AND DEVELOPMENT</b>	<b>3</b>
ORGANIC PRODUCT	5
WHOLE GRAIN	7
GRAIN ANATOMY	9
INTRODUCTION TO BROWN RICE	11
<b>2 ORGANIC VS NONORGANIC BROWNRICE VS WHITERICE</b>	<b>13</b>
<b>3 POLICIES AND REGULATIONS</b>	<b>17</b>
<b>4 PROCESS AND TECHNOLOGY</b>	<b>21</b>
<b>5 MARKET ANALYSIS</b>	<b>23</b>
VARIABLES	25
CONSUMPTION	27
PRODUCTION TREND	29
INTERNATIONAL TRADING	31
<b>6 CONCLUSION AND DISCUSSION</b>	<b>33</b>
<b>REFERENCES</b>	<b>35</b>
<b>PROJECT ACTIVITIES</b>	<b>39</b>

# INPUT

- Research paper (from on-line sources) about health benefits of organic products and brown rice
- Regulations about organic farming
- Health facts about people who consume brown rice regularly
- Journal, article and reports regarding the growth of organic products, rice, white rice and brown rice
- Health facts about people who consume brown rice regularly

# PROCESS

- Comparing data relevant to health benefits of organic products and brown rice
- Indicating benefit of organic farming to environment
- Indicating benefit of organic products to health of the consumers
- Analyzing the consumption and market of both organic products and brown rice.

**T**HIS RESEARCH will use the framework which put in the logic model. Logic model is useful in many ways, actually logic model is a systematic design not only for visualizing the understanding of the research, but also representing the relation between any resource that we can find. The usage of logic model is to describe the planning work until the results is achieved to all stakeholders. Hence, we can translating the logic model into the action, by looking from the input until the outcomes. This logic model will describe research over the time from planning through results with a road map of related events.

The stakeholder of this Industrial Analysis Report are students, lecturer, assistant teaching, classmates, farming practitioner, and everyone who has interesting in organic product. Whereas the input for this logic model are the data on the interested areas such as, the market trend of organic products and brown rice,

the yearly consumption of rice, etc.

After attaining the target data they will be compared and analyze. For example in the marketing section, data about the yearly consumption of rice, brown rice and organic products are compared in attempt to find the trend of the "organic brown rice". On the other side of the logic model, there lies the output. In this output section the data processed earlier are presented to the readers. For example, judging from the statistics that indicates the growth of rice, brown rice and organic products consumption, one could conclude that organic brown rice has a potential to grow.

And ultimately, the outcomes of this industrial analysis report (IAR) is to convince readers to turn their appetite toward organic brown rice, or at least organic products; and to convince potential investors to invest in this market.

# OUTPUT

- Consuming organic brown rice will reduce risks of health problem
- Organic farming improves environment
  - Improvement on fertility soil
  - reduces pollution released during the farming process
  - reduces chemical residual in the environment
- People who consume organic brown regularly are healthier than those who consume white rice
- The global consumption of brown rice is increasing resulting in a larger market size

# OUTCOME

- Convince readers to eat more organic product
- Increase the people's awareness about environment
- People has the longer life expectancy
- Improve the quality life by consuming better food
- Convincing potential investors to invest in organic brown rice

# LOGIC MODEL

This research will use the framework which put in the logic model. Logic model is useful in many ways, actually logic model is a systematic design not only for visualizing the understanding of the research, but also representing the relation between any resource that we can find. The usage of logic model is to describe the planning work until the results is achieved to all stakeholders. Hence, we can translating the logic model into the action, by looking from the input until the outcomes. This logic model will describe research over the time from planning through results with a road map of related events.

# 1 HISTORY AND DEVELOPMENT

This chapter will be focusing on the history and development of organic industry. Because in order to understand more on one topic we should look deeper in to its background.

**B**EFORE the new modern era, particularly in early 20th Century, majority the food which grown across the world was still organic. At that time it was just food, it had not been called as organic food. Nobody had thought to use the chemicals substance into the soil in order to enhance the growth from the corps.

With the emerging of the petrochemical industries in early 1900s, agricultural try to find the way to optimize their result by doing research and focus on the chemicals that are required by plant and animal growth. Apparently, those chemicals is coming from finite resources, most of them are by-products of oil refining. This action actually could trigger another problems, and usually ignored until the problems became big.



## FOUNDATION OF ORGANIC

American and British publications form the foundation of organics. Writers in the United States and Great Britain - Sir Albert Howard, Rudolf Steiner, Lady Eve Balfour and J.I. Rodale to name a few - publish influential works introducing the basic idea of organics. They posit that the health of plants, soil, livestock, and people are interrelated. They advocate for an approach to farming based on working with natural systems rather than trying to control them.



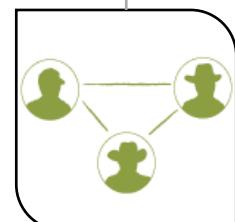
## FIRST USED OF DDT

**1939** - Paul Muller developed DDT, the first of a new class of insecticides - chlorinated hydrocarbons to counter the pest problems. Since then, a new way of farming emerged, where the use of chemicals was heavily promoted. This led to the outright dismissal of organic farming methods.



## CHEMICAL PESTICIDES AND HERBICIDES USED

Synthetic pesticides and herbicides are introduced to American agriculture as part of the Green Revolution.



## NATURAL FOOD ASSOCIATES (NFA)

Consumers gain increased access to organic food, with the forming of Natural Food Associates (NFA) in Atlanta, Texas, to help connect scattered organic growers with fledgling markets for organically grown foods.

1920s

1930s

1940s

## DEVELOP THE U.S. NATIONAL STANDARD

**1990** - Organic Foods Production Act (OFPA) developed a national standard for organic food and fiber production. OFPA mandated that USDA develop and write regulations to explain the law to producers, handlers and certifiers. OFPA also called for an advisory National Organic Standards Board to make recommendations regarding the substances that could be used in organic production and handling, and to help USDA write the regulations.



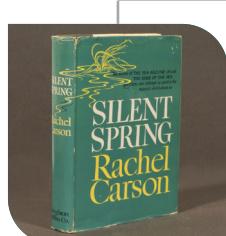
### GROWTH OF ORGANIC CROPLAND

**1998** - The USDA's Economic Research Service releases a major study on the status of organics in the United States showing that certified organic cropland more than doubled during the previous decade and that some organic livestock sectors - eggs and dairy - grew even faster.



## THE "BE NATURAL" APPROACH

**1980-1970** - The 'be natural' approach is growing as result of the growth of consumer interest in health and nutrition, the growth of the green movement, the focus on conservation and environmental issues stimulated the development of the organic market and encouraged farmers to adopt organic methods



## SILENT SPRING

**1962** - Rachel Carson's Silent Spring published. The book documents some of the negative consequences associated with chemical use in agriculture and gives rise to a new environmental consciousness and renewed focus on organic agriculture.



### OPPOSITION TO CHEMICAL PESTICIDES

**1973** - Consumer opposition to chemical pesticides grows. In United States started to bans the pesticide DDT, which some mark as the start of the modern environmental movement. The organics industry grows appreciably due to expanding consumer opposition to chemical pesticides coupled with a desire for food that is produced without harming the environment.



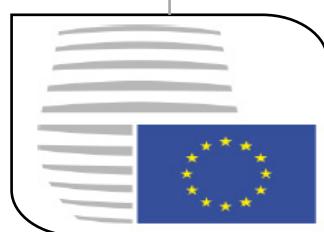
## IMPLEMENTATION OF U.S. STANDARD

**2002** - The Organic Standards arrive with the full implementation of the U.S. National Organic Standards takes place October 21st.



### MORE FUNDING ON ORGANIC RESEARCH

**2011** - US Government and non-government entities provide funding for research activities regarding to the sustainable agriculture including organic food and farming.



### REGULATIONS FOR RESIDUE LEVELS

**2015** - the European Union Council has decided about pesticide maximum residue levels and to oppose the adoption of a Commission regulation amending annexes II and III to regulation 396/20051 as regards maximum residue level for some chemical substances, such as Trichoderma polusporum, Trichoderma aperellum, etc.

1950s-1970s

1980s-1990s

2000s-2010s

# ORGANIC

**R**ECENTLY, people start to realize how health become more and more important. There is wise words says it better to prevent before something bad occurred. Many nations agreed to start with organic and creating the organic and healthier world. If organic food is able to change the people's habit, then a healthy life is no longer a dream to be reached.

In fact, according to National Organic Standards Board (NOSB) organic food is an ecological production management system that promotes and improve biodiversity, biological cycles and soil biological activity. It is based on minimal use of farm inputs and on management practices that restore, maintain ecological in harmony. This definition is similar with sustainable agriculture. Based on Lockeretz about organic farming and Drinkwater about cropping system, the characteristic of sustainable agriculture are reduce soil erosion, lower fossil fuel consumption, less leaching of nitrate, greater carbon sequestration and little or better no pesticide use.

Dr. Henry Chang, an international renowned organic researcher, said organic food means all farming products which free from chemical manure, pesticide and all other chemical substances since the beginning process of farming, it means all process should be conducted in natural way. The example for plowing soil using traditional way, using the natural manure or utilizing organism such as worm by inserting it into soil in order to increase soil fertility. This action will cause soil to be oxidized, therefore minimize land polluted, air, and water in area around farming. Even though chemical fertilizer will boost the growth, improve the productivity and give more harvest result, but actually it will only good in short time because not only the nutrient contain from food will be diminished, yet the soil fertility will decrease gradually.

The main characteristic of organic farming is using green manures such as animal dung and the plant's leaf. Organic farming also need the crop rotations to improve the fertility of the soil, enhance biological activity and maintain the long-term soil's health. However, organic farming also uses biological control, and crop rotations to



manage weeds, insects and crop diseases. the nutritional value and also taste which The main purpose of organic is try to lost in the process, enhancing the texture, reduce and eliminate the usage of synthetic extending its shelf life, preserving food pesticides and chemical fertilizers and from decaying, giving extra taste or other substance, such as antibiotics. Finally increasing appealing from the junk foods. organic is focus on renewable resources, The long term effect of the food additives water, soil conservation, and restore the are still questionable, particularly the ecological balance by management farming. combination of literally chemicals residual

Organic production is not simply found in the food. Many food have caused to avoid chemical inputs for the farming consumers into allergy, headaches, process, nor is it merely the substitution asthma, obesity, heart disease and the to natural inputs. Organic farmers applying worst case is cancer. How can we avoid methods used from thousands years ago, the harmful effects of food additives is such as crop rotations and the using of by educating ourselves and choose foods animal manures and green manure crops, to that give benefits for ours health. The gain the sustainability in nature. In organic usage of additives food is very restricted production, health is become the focus, and in organic food.

the management farming techniques is the primary concern. Organic producers are of organic product are biodiversity, implementing the strategies to develop and diversification and integration of maintain biological diversity and replenish enterprise, sustainability, natural plant soil fertility "Organic Agriculture Overview, nutrition, natural pest management. Finally USDA, Cooperative State Research, organic product should has the integrity Education, and Extension Service (CSREES), which refers to the systems in place 2007"

To summarize, the principal To summarize, the principal primary concern. Organic producers are of organic product are biodiversity, implementing the strategies to develop and diversification and integration of maintain biological diversity and replenish enterprise, sustainability, natural plant soil fertility "Organic Agriculture Overview, nutrition, natural pest management. Finally USDA, Cooperative State Research, organic product should has the integrity Education, and Extension Service (CSREES), which refers to the systems in place 2007"

Each countries has their own organic products get what they pay for. regulation about food additive, as example Consumers have a right to expect that the there are more than 300 substances in organic food they buy not only be raised Australia which are permitted to be used by organic methods but also be protected for food additives. Each of additive food is from the contamination from non-organic identified by its name and a number, and substances.

classified by the function it performs. The main purpose of food additives are replacing





**B**Y DEFINITION whole grain products are products that the whole kernels are intact, meaning that the three essential parts – namely the bran, endosperm, and the germs – are present. Else they would not be qualified as whole grain. A whole grain could be compared to eggs – the bran as the shell; endosperm as the egg white; and the germs as the yoke. Just like eggs' shell, bran protects the kernel from harm, be it by insects or environment. The germs are like yokes, they feed on the endosperms like how yokes feed on egg whites. However the difference between eggs and whole grains is that much of the essential vitamins of a whole grain lies in its bran, which is why it is so important that every part of a grain must be intact in order to be qualified as whole grain.

### Whole wheat Vs Whole grain

A lot of people tend to confuse whole wheat with whole grain. Explaining this in a simple way would be to compare cabbages to vegetables. If asked that way people could come up with an

answer right away that cabbages are vegetables but not all vegetables are cabbage. This is also true for whole wheat and whole grains. Whole wheat is a type of whole grain just like cabbages are a type of vegetable.

### Example of whole grains

- Amaranth
- Barley
- Buckwheat
- Corn, including whole cornmeal and popcorn
- Millet
- Oats, including oatmeal
- Quinoa
- Rice, both brown rice and colored rice
- Rye
- Sorghum (also called milo)
- Teff
- Triticale
- Wild rice
- Wheat, including varieties such as spelt, emmer, farro, einkorn, Kamut®, durum and forms such as bulgur, cracked wheat and wheatberries

# WHOLE GRAIN

There are a lot of confusion going on when it comes to "whole grain", so the below section will be obliged to explain the definition of whole grain. There will be examples and an explicit explanation on the most frequently asked question that some people do not know up till now: what is the difference between "whole wheat" and "Whole grain".

## Health benefits of whole grains

According to the [wholegraincouncil.org](http://wholegraincouncil.org), there are research yielding an interesting result that the consumption of whole grain products could alleviate chronic diseases. Even though the benefits can be seen more vividly in those who consume more than three servings daily, the study also shows that those who consume even a small amount of whole grain will also benefit from its nutrients.

The benefits of whole grains most documented by repeated studies include:

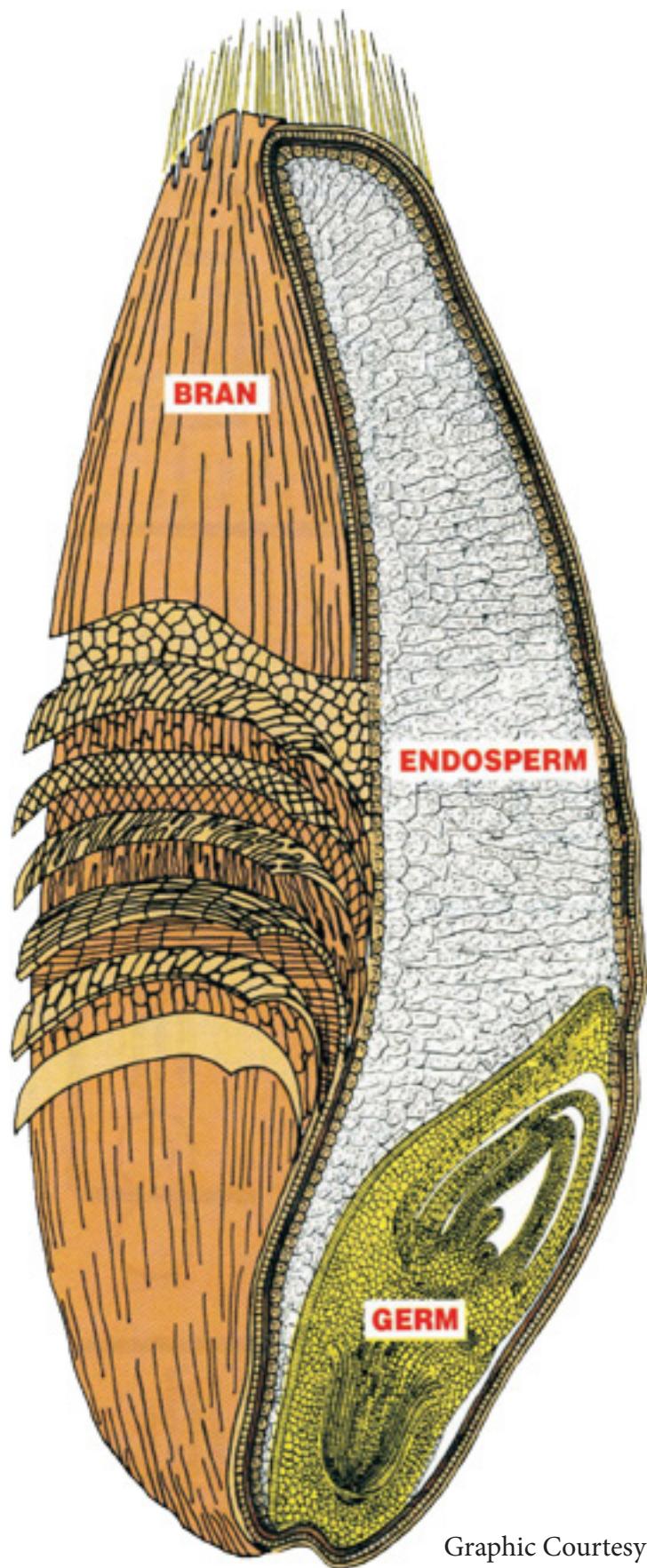
- *stroke risk reduced 30-36%*
- *type 2 diabetes risk reduced 21-30%*
- *heart disease risk reduced 25-28%*
- *better weight maintenance*

Other benefits indicated by recent studies include:

- *reduced risk of asthma*
- *healthier carotid arteries*
- *reduction of inflammatory disease risk*
- *lower risk of colorectal cancer*
- *healthier blood pressure levels*
- *less gum disease and tooth loss*



# GRAIN ANATOMY



Graphic Courtesy of the Wheat Foods Council

**K**ERNELS of wheat are small, so this picture is enlarged so it can be seen clearly. There are 50 kernels in one head of wheat and up to 17,000 kernels in just 1 pound! The kernel is the seed from which the wheat plant grows. It is also the part that humans and livestock eat. The kernel has 3 distinct parts: the bran, endosperm, and germ. These 3 parts are separated during the milling process to produce

## BARN

---

The bran contributes 14 1/2% of the kernel weight. It can also be purchased separately. It is the outer layer and contains the largest amount of insoluble fiber, B vitamins, trace minerals, and a small amount of protein.

## ENDOSPERM

---

The endosperm makes up 83% of the kernel weight. It is the middle layer and contains mostly protein and carbohydrates with small amounts of B vitamins, iron, and soluble fiber.

## GERM

---

The germ is only 2 1/2% of the kernel weight. The germ is the embryo, or the sprouting section of the seed. The germ is the inner part of the kernel and is a rich source of trace minerals, unsaturated fats, B vitamins, antioxidants, and a minimal amount of high quality protein.

# INTRODUCTION TO BROWN RICE

**H**OW MANY of you grew up eating rice? Did you know people have been eating rice for more than 5,000 years? Early Americans started growing rice more than 300 years ago in South Carolina. We still eat a lot of rice. Ninety percent of the rice we eat is grown right here in the United States. We can do a lot with rice and it's good for us! Both brown and white rice are healthy foods – both are low in fat and calories and supply no cholesterol. Both can be part of a healthy diet. However, I am going to try to convince you to go for the whole grain bonus with brown rice.

Can anyone name the three parts of a whole grain? Allow for answers. That's right, these are the bran, germ and endosperm (or starch) layers. Remember, the bran and germ layers are removed when grains are processed. Brown rice is a whole grain. White rice is milled to remove the bran and germ. This also removes some of the important nutrients. Some, but not all, of the nutrients are added back. This is why white rice is called enriched rice.

Brown rice is like Cinderella when compared to white rice. White rice is prepared at home more often than brown rice. White rice is offered on many more menus than brown rice. For instance, how many of you cooked brown rice in the past month? White rice? See what I mean? White rice is like the stepsisters, who get all the attention, even though brown rice has much more to offer like Cinderella.

*(July 2003, Department of Foods and Nutrition, The University of Georgia, Athens, GA 30602)*

*(Funding from UGA, the Northeast Georgia Area Agency on Aging and USDA)  
(UGA is an equal opportunity provider and employer)*



## Good to know

The Chinese word for rice is the same word used for food. Young girls are told that they must eat all of the rice in their plate because otherwise each grain of rice represents each pock mark on the face of their future husband. In Thailand, you call your family to a meal by saying, "eat rice." In Japan, the same word for cooked rice is for meal. The little rice grains are...



# 2 ORGANIC VS NONORGANIC

It is obvious to all that organic products contain more benefits than non-organic, which is probably why a lot of people are willing to spend more on them. In the following chapter we will be mentioning about the characteristic of organic products.

**F**OR HEALTH, There are three major benefits from organic food to our health. We want to show to the readers how organic food can really become a wonderful things to health. First is about the nutrient content from organic food, second about the toxic metal contain in the food and the last is about the pesticide residue amount exposure in the conventional food.

A study in United Kingdom, particularly in Newcastle University has figure out the evidence that the food made from organic, are nutritionally better to than conventional food products. The report was published in the prestigious British Journal of Nutrition. They are analyzing 343 studies and successfully found out that organic crops and organic crop-based foods are having more than 60 percent number of antioxidants compared to conventionally crops. This research also showed that organic is safer to consume, researcher's study found significantly lower amount of pesticide residues and lower levels of a toxic metal (Cadmium) in the organic food. From this study, we can know that conventional crops were four times to contain pesticide residues than the organic crops. The high exposure by pesticides will give bad affect to our body, particularly in brain development especially in young children, give risk for pregnant women.



▲ 62%

Organic milk has 62% more healthy omega-3 fatty acids than conventional milk

▲ 48%

Organic crops have 48% lowerlevwls of the toxic metal cadmium than conventional crops

▲ x4

Pesticides are found 4 times more frequently in conventional crops than organic crops

**F**OR ENVIRONMENT, There are six major benefit from organic crop to the environment, the first one is for the sustainability over the long term. Organic farming not only produce food to fulfil human needs, but also keep the balance in ecology and preserve soil fertility and prevent pesticide problems. Organic farming takes the proactive approach to oppose treating problems before they occurred.

Second is about soil, it building practices such as crop rotations, inter-cropping, symbiotic associations, cover crops, organic fertilizers and minimum tillage are central to organic practices. These encourage soil fauna and flora, improving soil formation and structure and creating more stable systems. In turn, nutrient and energy cycling is increased and the retentive abilities of the soil for nutrients and water are enhanced, compensating for the non-use of mineral fertilizers.

Third is groundwater. In agriculture areas, many pollution of groundwater, and the usage of improper dosage of chemical fertilizers and pesticides become serious problem. The usage of any chemical substance now prohibited in organic agriculture, they are replaced by organic fertilizers (for example compost, animal manure, green manure) and through the use of greater biodiversity (in terms of species cultivated and permanent vegetation) to enhance soil structure and water infiltration.

The fourth is about air and climate change. Organic agriculture reduces the usage of non-renewable energy by decreasing agrochemical needs which required a high amount of fossil fuel to be produced. Organic agriculture also mitigating and preventing the greenhouse effect through its ability to eliminate carbon in the soil.

The fifth is biodiversity. Organic farmers are custodians and users of biodiversity. Traditional and adapted seeds are more demanding because they possess more level of resistance to diseases and resilience to climatic stress. A recent study reporting on a meta-analysis of 766 scientific papers concluded that organic farming produces more biodiversity than other farming systems.

The last is about the ecological services. Ecological services is consist of soil forming and conditioning, soil stabilization, waste recycling, carbon sequestration, nutrients cycling, predation, pollination and habitats. The impact of organic agriculture will give interactions within the agro-ecosystem that are important to agricultural production and nature conservation. By choosing organic products, the consumer automatically promotes a less polluting agricultural system and more environmental friendly farming system.

**“If you think organic food is expensive, have you priced cancer lately?”**

- Joel Salatin, Founder of Polyface Farms-

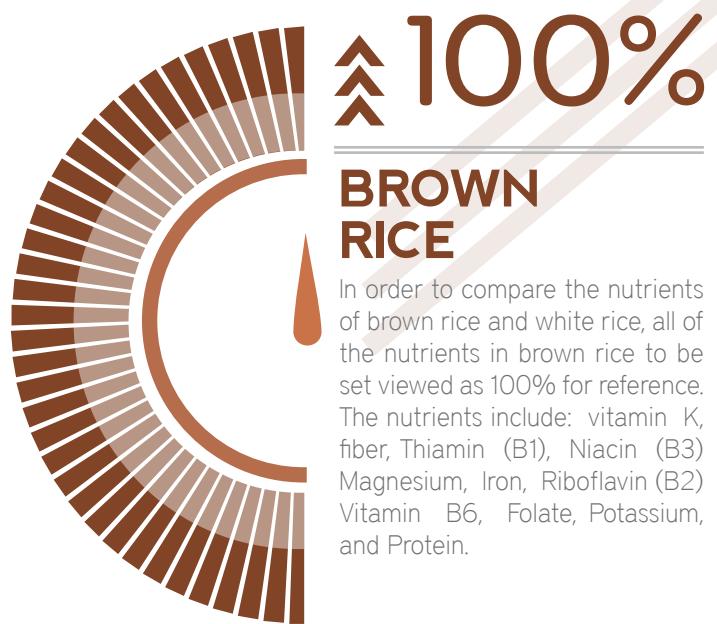


# BROWN RICE VS WHITE RICE

Most people have been eating white rice since they were young, and everyone knows that brown rice offers more health benefit. However only few have an idea regarding the magnitude of this difference. We will be comparing the difference in terms of nutrients between white and brown rice in this section.

**T**HE DIFFERENTS between white and brown rice lies in their aroma, taste and texture. While many claimed that brown rice smells different from the white rice they are used to they refuse to consume white rice, however the majority of people who have actually tried brown rice actually prefer its strangely appealing taste over white rice. Despite many reasons that turned people away from brown rice – be it the higher price or longer cooking time – brown rice holds many more essential nutrients to human body.

Brown rice contains 20 times more vitamin K than white rice, moreover white rice holds less than 55% of all nutrients present in brown rice except for protein content (compared to brown rice, white rice hold up to 90% protein present in brown rice). When comparing the two it should be obvious that brown rice is the better choice. There are even studies showing that the nutrients in brown rice can help in many chronic deceases.



By combining all of the nutrients content in white rice and dived by the number of candidates, we can see that white rice contains only 39% of the nutrients that brown rice holds.



## Good to know:

The reason that brown rice is more expensive is because in the brand, there contains some kind of oil along with the vitamins. That oil reduces the shelf-life of brown rice.



The support from government can be seen from the regulation. With support by awareness from the consumer about healthy life style, combine by the government regulation could make organic food developing into further level. Although the price is rather high than the conventional food, the national campaign for organic food also give significant effect to the development of organic food. The government also socializing eco farming to the farmer, ensuring and keeping the buying price for the farming product high.

**N**OWADAYS, the understanding of farming product is growth from knowledge increasing quantity production to fulfil the food needs into the increasing of quality and the safety of food itself. Quality that consist of taste, nutrient and vitamin contents. Food safety cover of the chemical residual contain in the food caused from the farming process, pesticide, herbicide which endanger human health.

Before starting business in organic product we need to pay more attention to the regulation that valid in the nation that we want to start business. We should concern about domestic

regulation, however as a developed country and reputed as modern agriculture industry, United States regulation usually seen as guideline by the other countries.

The United States organization who regulate the farming, particularly organic farming is known as United States Department of Agriculture (USDA). This organization recognize four categories of organic products, the first one is crops, means: food harvested from plant, livestock feed, fiber, or any used substances to add nutrients to the field. Second is livestock means food coming from animals or in the production of food. Third is processed products

# POLICIES AND REGULATIONS 3

which consist of all items that have been handled and packaged, processed, and packaged. The last is wild crops or plants from a growing site which not cultivated. For this regulation we are more focus on the crops regulation.

## Farming regulation

A description of the monitoring practices and procedures to be performed and maintained, including the frequency for what they will be performed. It also discussed how to implement cultivation practices which maintain the chemical, physical and biological condition of soil, and minimize soil erosion as well.

One important thing from farming regulation is about the crop rotation. The practice of alternating the annual crops grown on a specific field in a planned pattern or sequence in successive crop years so that crops of the same species or family are not grown repeatedly without interruption on the same field.

The producer must implement a crop rotation, green manure, improve soil organic matter content, then providing pest management in crops, finally managing the deficient or excess plant nutrients and provide erosion control. This regulation hope that having well defined boundaries to prevent the unintended application of a prohibited substance to the crop or contact with a prohibited substance that is not under organic management.

## Substance

The criteria in the evaluation of substances or ingredients for the organic production: Synthetic and non-synthetic substances considered for inclusion from the National List of allowed and prohibited substances.

The usage of synthetic substance used as a processing aid will consider these criteria: first is that this substance cannot be produced from a natural source and there are no organic substitutes. Then substance which is allowed if it don't have adverse effects on the environment and has compatible with organic handling, and also the nutritional quality of the food is still

maintained when the substance is used, and the substance itself doesn't have an adverse effect on human health as defined by applicable Federal regulations. The other condition that synthetic substance allowed is the primary use is not as preservative. Moreover the substance is listed as generally recognized as safe (GRAS) by Food and Drug Administration (FDA). Another requisite is the substance that essential for the handling of organically produced agricultural products. While Non-synthetics used in organic processing will be evaluated.

## Certification and labelling Process

### Cost for certification

The certification costs is depending on the certifying agent and the size, type and complexity from the farming operation. According to USDA website, the costs has range from few hundred to thousand dollars. Before applying they suggested to understand the fee structure and billing cycle. Generally, the fee is an application fee, annual renewal fee, assessment on annual production or sales, and inspection fees. The benefit of certification is after you are certified, the USDA Organic Certification gives Cost-Share Programs which farmer can reimburse operations up to 75 percent of their certification costs.

### Labelling

In United Stated if we want to seek for organic products in the marketplace, consumers should find for the USDA Organic Seal or a certifier name on the label. The U.S. Department of Agriculture categorized four kind of organic labels. This labelling based on the percentage of organic content in that product. This means that not only the organic ingredients in processed products certified, but also the facilities that handle and process the products are inspected and certified as well.

#### 1. 100 % ORGANIC

Products produced using exclusively organic methods, containing only organic ingredients, are allowed to carry a label declaring "100 percent organic" and may use the USDA Organic Seal.

#### 2. ORGANIC

Products produced using exclusively organic methods that contain at least 95% organic ingredients may use the USDA Organic Seal.

#### 3. MADE WITH ORGANIC

Products with 70% to 95% organic ingredients may display "Made with organic [with up to three specified ingredients or food groups]" on the front panel. The USDA Organic Seal may not be used, however products in this category MUST be certified through the same USDA organic certification process that is required for "100% Organic" and "Organic" label.

#### 4. INGREDIENT PANEL

Products with less than 70% organic ingredients can only list the organic items on the ingredient panel. The USDA Organic Seal must not be used. No organic claim is allowed on the front panel of the product.



**100%  
organic**



**organic**



**made with  
organic  
ingredients**



**less than  
70% organic  
ingredients**

## THAILAND REGULATIONS

The agricultural policy is formed from different countries. However there are many types policy that hold both positive and negative effects.

Rural areas and agriculture are characterized by heterogeneity and this requires different types of policies. Policies have to be tailored to correspond to the specific conditions and needs within the sector or group of people that constitute the target. Amongst the toughest policy dilemmas is balancing attention between different groups given specific resource constraints.

The types of agricultural policies that first come into mind are the different types of direct measures

available to governments that want to intervene in the agricultural sector.

Measures such as government procurement, export quotas and direct taxation of exports, which are all direct and sector-specific, have the effect that they keep the prices received by producers of agricultural output lower than they would have been in equilibrium without distortions and interventions. However, there are also different types of measures that aim at benefiting producers of agricultural products. Quantitative restrictions and import tariffs have been commonly used to protect the domestic production of import-competing commodities.

## INDONESIA REGULATIONS

Indonesian regulation about organic food production based on agriculture minister regulation number 64/Permentan/OT.140/2013. The purpose of these standards is first to protect consumers from manipulation and fraud on the market as well as incorrectly labelled products. Second, it protects producers and organic food from fraud through other agricultural products declared to be organic. Third, to guarantee that all production processes, supply, storage, transport and marketing can be reviewed in line with these standards. Then, to standardize the terms regarding the production processes, certification, identification and labelling of organic food. Fifth, providing national standards for organic food that are also recognized internationally for export and import purposes. Finally to develop and maintain organic agriculture further in Indonesia in order to help protect the environment both locally and globally.

In the first chapter of this regulation they state about the general rules in organic farm such as the definition of organic system which has function to develop ecosystem health, biology cycle and biological soil activity. While the organic food itself is the food produced from organic system farming, made by organic system standard, use only organic substance.

The government authority who monitoring the distribution organic food both from local production and international import in Indonesia market called OKPO stand for ("Otoritas Kompeten Pangan Organik" means Authority Competent of Organic Product). While

the standard should be applied in organic called SNI (Indonesian National Standard). For organic food the standard is SNI 6729:2010. The major substance to gain the organic label is using the proper manure and pesticide, manure used to keep the soil's fertile and to prevent or to drive out disturbing organism such as plant disease we are using the pesticide.

Genetic product modified is organism produce by manipulate the gen of the product. This manipulate can be recombination DNA, cell fusion, micro or macro injection, encapsulation, elimination and doubling gen. Anything done with this genetic modified is doesn't count as organic product. Organic manure is fertilizer which majority or completely part of it is from organic substance, for the example residue of plant, animal's dung. In Indonesia they called organic manure as "kompos".

For importing organic product into Indonesia market, each product should attach the transaction certificate, and health certificate. Transaction certificate issued by the origin country's organic institute. It is the same for the health care certificate. The minister of agriculture also have a role as founder and caretaker for the organic system that should be applied in Indonesia farming. The governor and all of the district head also have the role to ensure agriculture in theirs territorial can running smoothly.



# 4 PROCESS AND TECHNOLOGY

There are different steps in rice processing. In This section we will be talking how brown rice, white rice and enriched rice are made. However enriched rice may not sound familiar to a lot of people, so please refer to “Good to know: Enriched rice” section on this page.



## Good to know:

Along with the bran, the milling process removes over half of the essential vitamins from rice. And enriched rice are rice that have been processed in order to put the back the loss vitamin in to white rice, however they are still worse comparing to the original brown rice

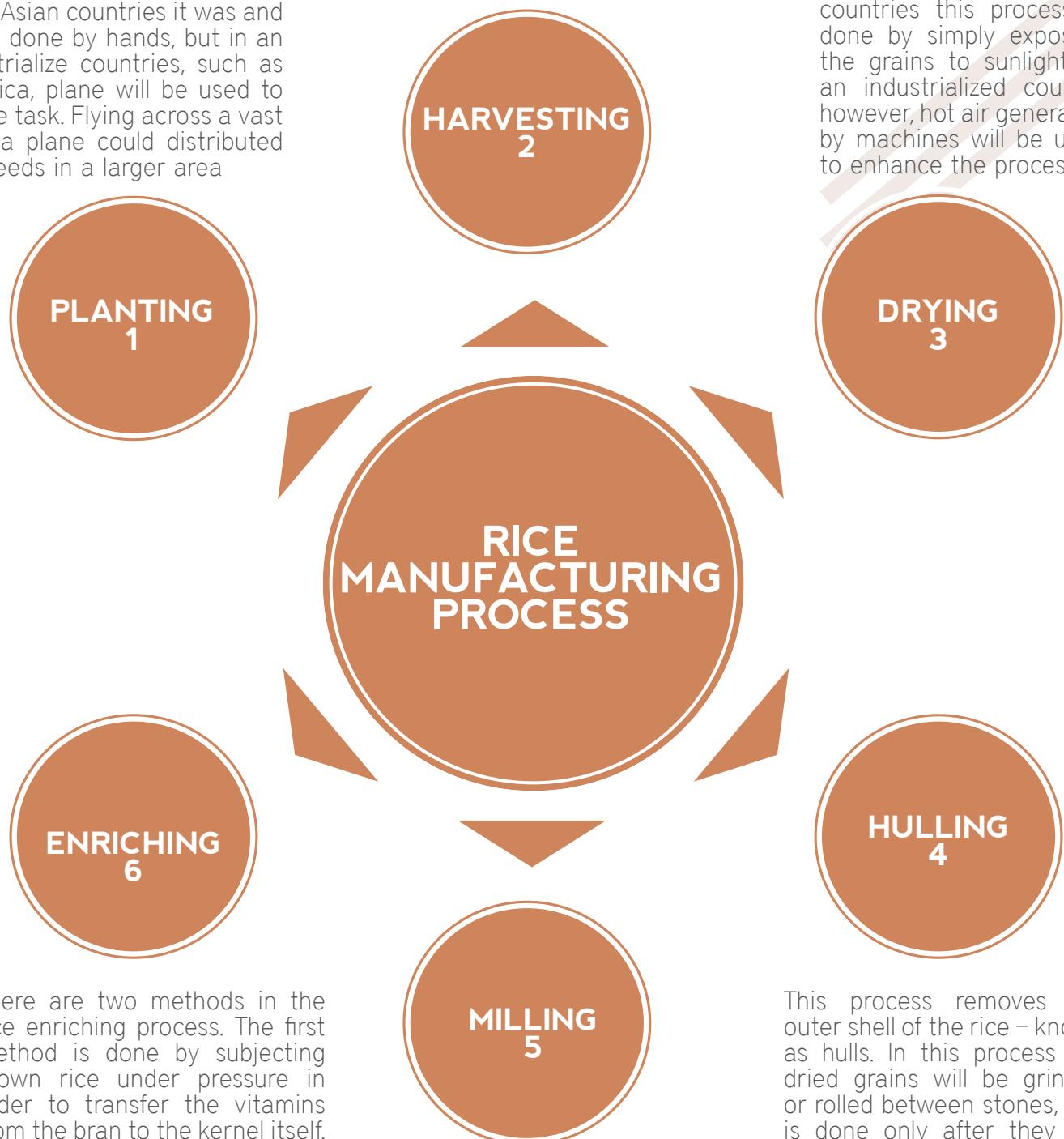


**BRIEF,** information prior the planting is that the land needs to be prepared before the seeding takes place. This is either done by machine or manually. In the early stage of rice cultivation, the land will be shaped into paddies. And the field will be flooded with water (around 20 Cm). The seeds will be soaked before planted in to the prepared bed. When it's time that the rice are ripe enough, the harvesting will commence. After being dried the rice will be hulled producing brown rice. And if either white or enriched rice are desired they will run the rough rice through 2 hullers.

After the fields are prepared, the soaked seeds will be deployed separately throughout the fields. This can be done by either hands or machines. In most Asian countries it was and still is done by hands, but in an industrialized countries, such as America, planes will be used to do the task. Flying across a vast field, a plane could distribute the seeds in a larger area.

After 12 to 13 months the ripe rice grains will be ready for harvesting. This again can be done by both manually and machines. By hand the stalks will be cut using sharp blades. This classical conduct still take place in most countries in Asia. In an industrialized country, automated mechanical harvesting machines will be used. By going through the machine the rice stalks will be harvested and staked in place before separating the grains from the stalks.

Before proceeding the rice grains need to be dried. In most developing countries this process is done by simply exposing the grains to sunlight. In an industrialized country however, hot air generated by machines will be used to enhance the process.



There are two methods in the rice enriching process. The first method is done by subjecting brown rice under pressure in order to transfer the vitamins from the bran to the kernel itself. The other way was to submerge the milled rice (white rice) in to vitamin bath.

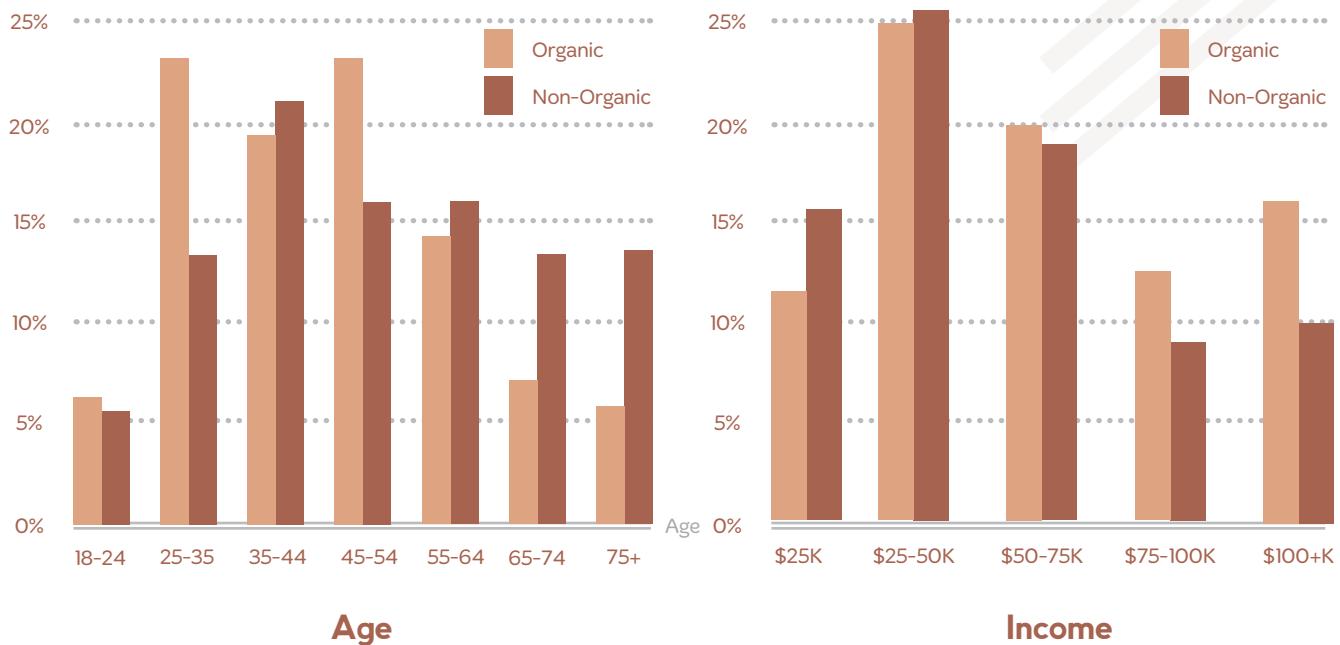
By running the brown rice in to another huller their brans will be removed resulting in white rice.

This process removes the outer shell of the rice – known as hulls. In this process the dried grains will be grinded or rolled between stones, this is done only after they are cleaned. Often this process is done by machines. The hulled rice are called brown rice.



# 5 MARKET ANALYSIS

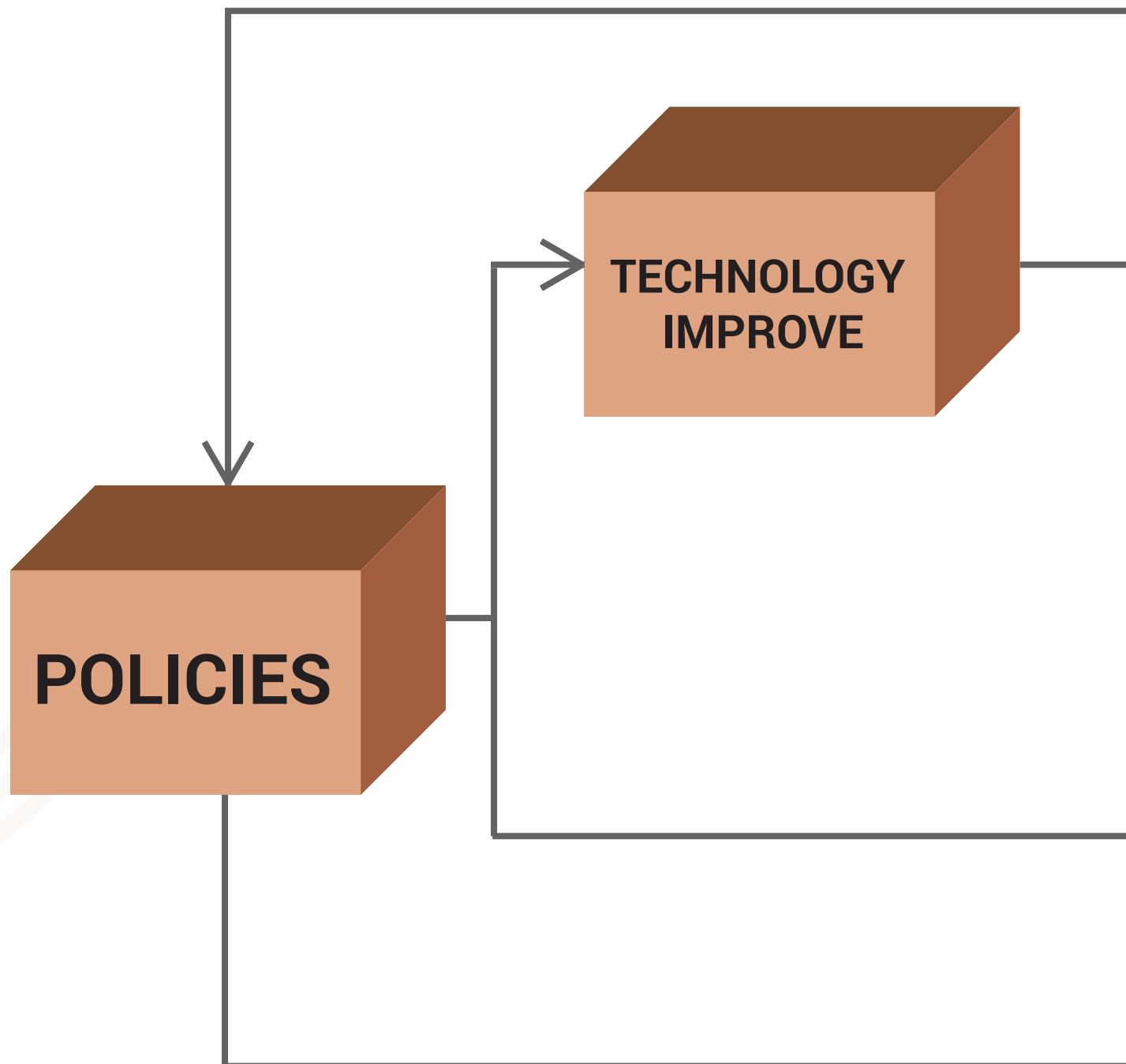
This market analysis section will be focusing on the food market, with the aim to identify trend of organic brown rice products from the available data.



*Noinaj, J. (2009, April 10). Organic Subculture.*

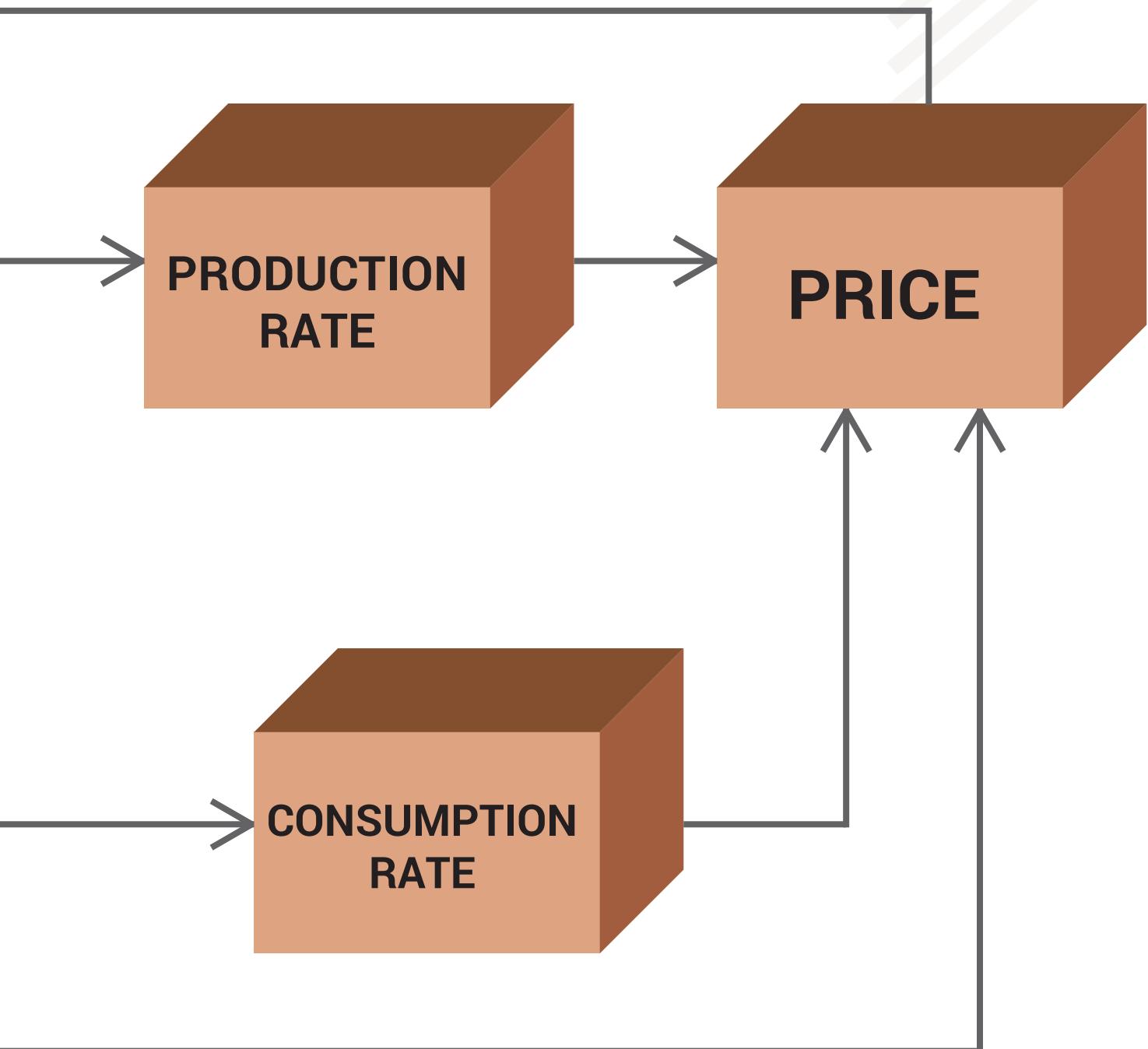
**T**HE FIRST data presented on this page is about organic food. From this graph displayed below, it is clear that the age of those customers who buy organic food seem to lie in between 24-34 and 45-54 years old. And according to this source (*Noinaj, 2009*) there is no significant difference in the gender of the customers who buy organic food. As for the income of those who will be more likely to make purchases in organic food lies between 25,000 – 75,000 USD per year.

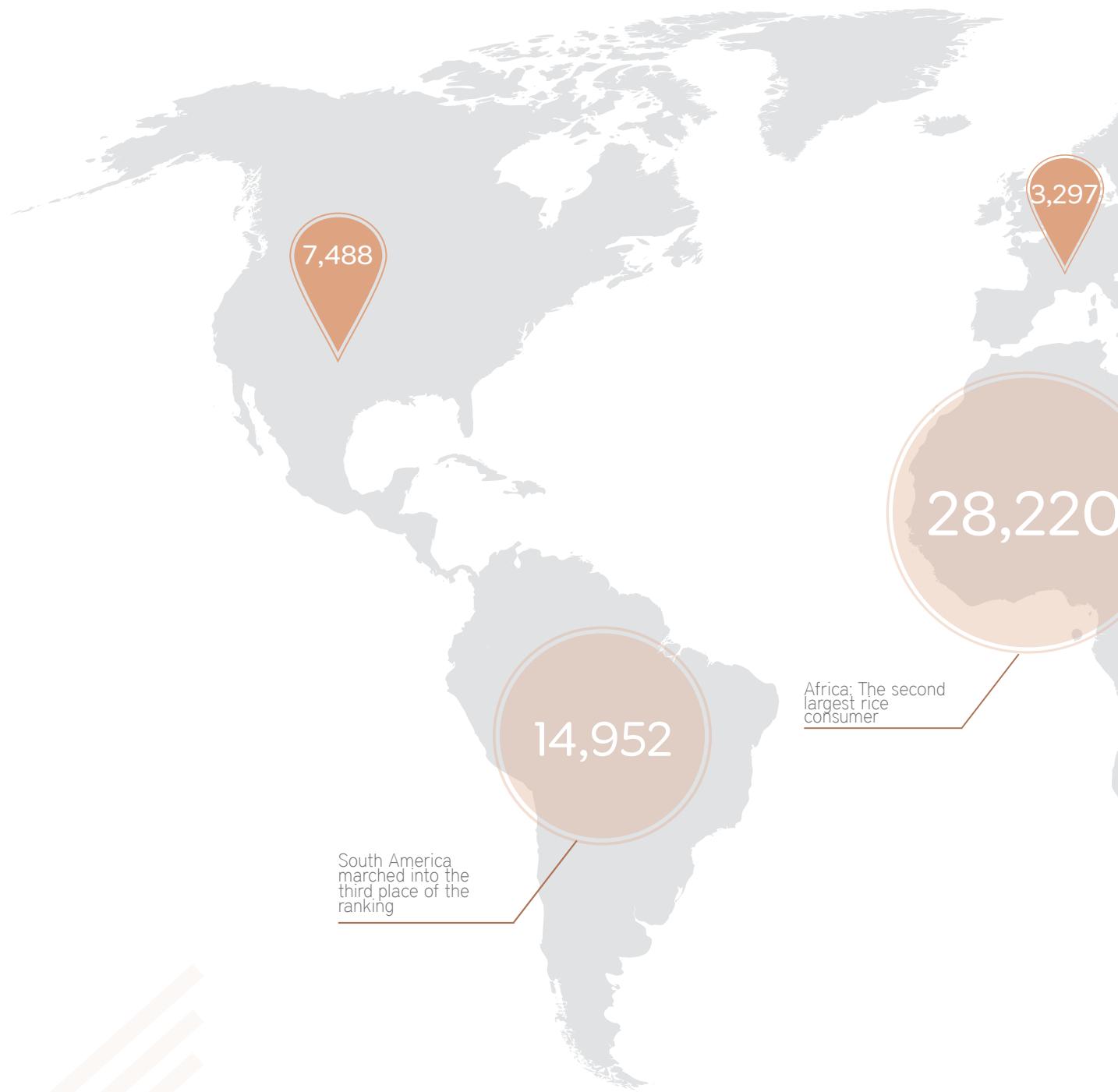
**T**HE **FIVE** variables defined are: policy, price, production rate, consumption rate, and technology. Because all of these variables will hold effects on others, it is essential understand how their relationships are. For example, if the policies regarding the production process change it may impact the cost of the whole production process, which will consequently vary the price. The same would occur should the consumption rate change it would hold impact on the production rate and price. The technologies involved in the production will also play a role on cost which will again influence the price, consumption rate and production rate.



# VARIABLES

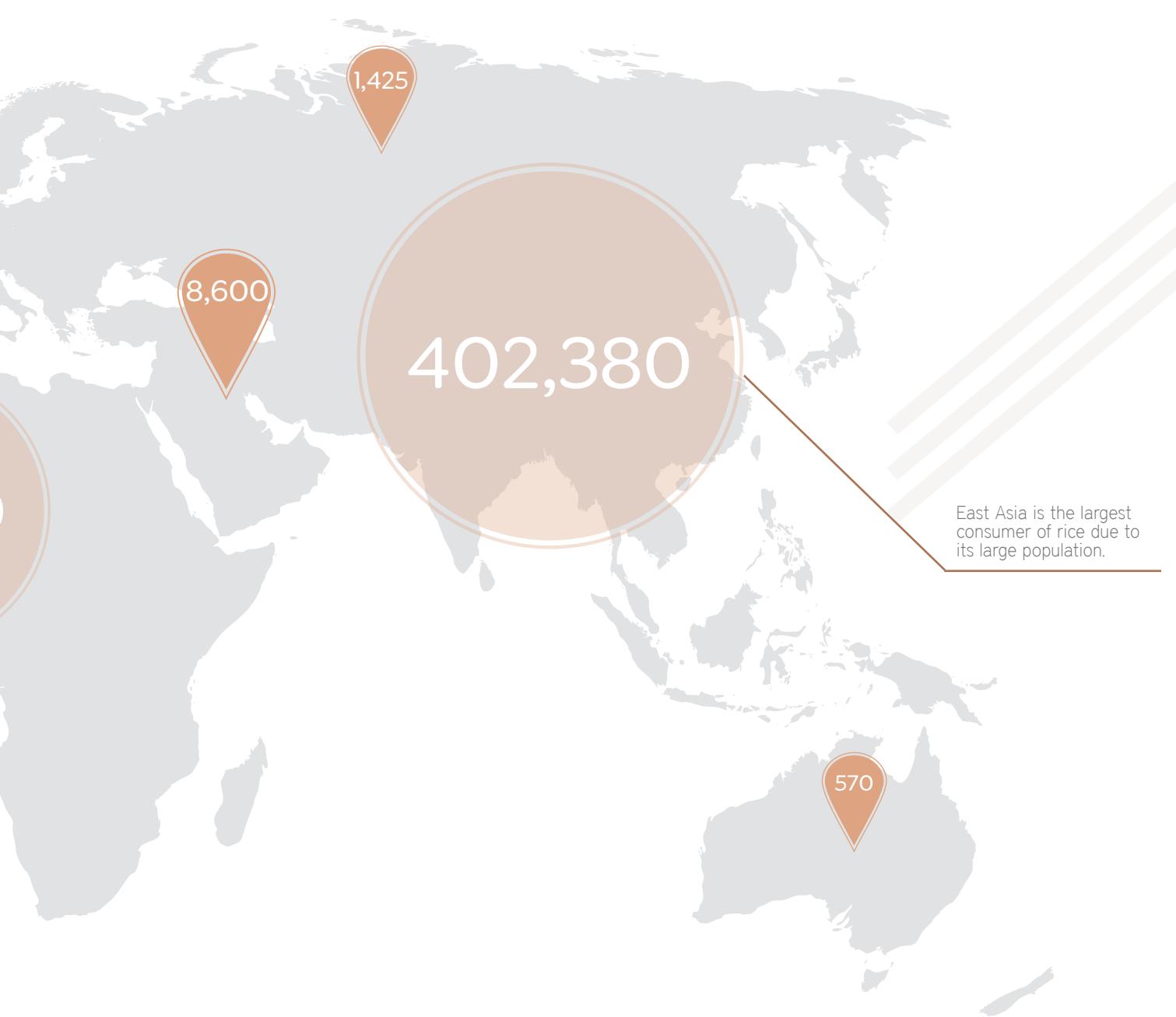
In order to understand the nature of this market, five variables were defined. These variables are essential; they narrowed down the scope of data needed to be searched. In addition by listing out the important factors, the reader will be able to quickly grasp the main idea of this report. So this section will present the variables and their relationships toward each other.





**T**HE FIGURE above displays the amount of rice consumed in each region in the year 2012. From the data it is clear that Asia was the largest consumer of rice, given that the amount of rice consumed by the rest of the world combine is significantly less than Asia. While the America consumed 22,440 thousands metric tons, and Africa consumed 28,220 thousands metric tons, combining with Europe, Australia and the middle will yield only 64,552 metric tons, Asia alone consumed 402,380 thousands metric tons. And due to the increasing population this number will be increasing.

The other statistics (on the lower right part of this page) shows the comparison of trading value between brown rice and white rice. Knowing that brown rice is more expensive one might argue that this comparison is not valid, however the focus of this statistic is that the trading value (in USD) of brown increased during the past years while the white rice tends to go on the opposite direction. From that data, one could say that the world is now concerning more on health issues.



# CONSUMPTION

**40%**

## BROWN RICE

The data suggested that the trading value of brown rice have been increasing for the past years. In spite of its higher cost when comparing to ordinary white rice, it managed to climb almost 40% in its value. This signals that people are becoming more aware of health issues. (Nielsen, 2015)

**8%**

## WHITE RICE

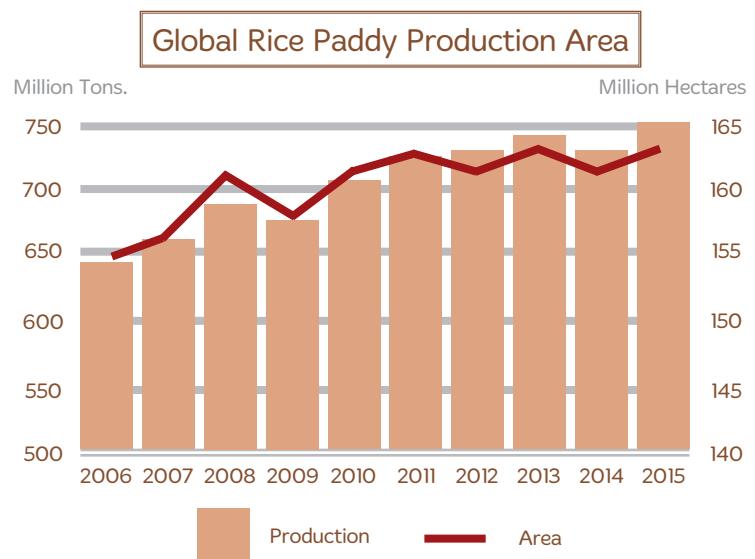
The transaction value in white rice trading have been decreasing by 8%. (Nielsen, 2015)

# PRODUCTION TREND

This section will discuss more about the rice production, how much rice is produced globally compared to the area is used for farming. After that we will talk about the region who gives the largest contribution to rice's availability in the world. Furthermore, how the development of organic food production in the world. More or less its development actually can be seen from how much area is used for organic agriculture land.

**T**HE EFFECT of inclement weather in 2014, particularly Asia is become one major challenge to the farming. The global production of rice is fallen slightly. At the country level, the largest downward is in Thailand because the disruption of water availability in irrigation caused by unseasonable dryness. In the other hand, the effect of monsoon make India rice production to deteriorate further.

Production rice globally is increase gradually from 2006 until 2014. At 2006 the production showed approximately 640 million ton with the farming land reach 155 million hectares, while in the closure of 2014 data recorded reach 740 million ton with the usage of land 163 million hectares. Since 2006 production rate and the farming land is increasing but in fluctuating pattern. The main reason for decreasing is inclement weather, although the number population who needs rice is increasing each



year. In the 2015 Food and Agriculture Organization (FAO) forecast the production will reach 750 million ton.

**O**RGANIC FOOD PRODUCTION, Healthy growth is continuing in the global market for organic product. Latest research showed the international sales of organic product approached US64 billion in 2012, experience positive growth in all region. While in 1999 the total market size is only US15.2 billion (source: Organic Monitor). The leading countires in organic market are US with EUR22.6 billion, Germany EUR7 billion and France with EUR4 billion.

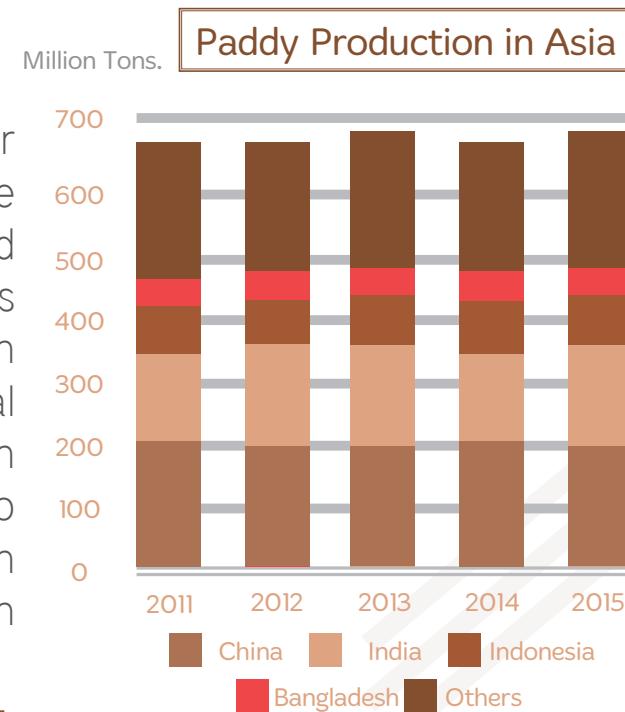
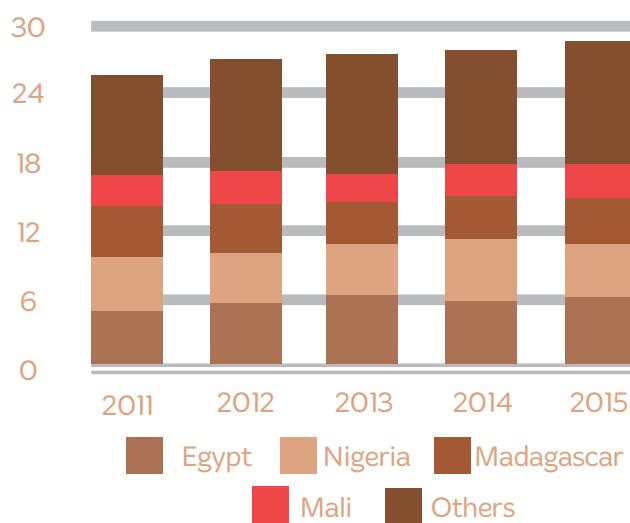
According to the latest FIBL-IFOAM survey on certified organic agriculture worldwide, which available from 164 countries in 2012, it has increased from 162 countries in 2011. There were 37.5 million hectare of organic agricultural land in 2012. While if we see the data in 1999, the organic agricultural land only 11 milion hectare. The largest area of organic agricultural are Oceania with 12.2 milion hectares or almost 32% of world's organic agricultural land. Then followed by Argentina with 3.6 million hectare and United States with 2.2 million hectare. In 2012, the organic agricultural land increased by almost 0.2 million hectares or about 0.5 percent.

The growth of rice production means that the demand or people who consuming rice is increasing, moreover the organic agricultural land always steps up gradually too, hence the organic rice is the great opportunity with a high project of market.

# ASIA

More specific to Asia as the bigger rice production, the highest rice producer is China then followed by India. Those two countries can produce almost 350 million ton. It is almost half of global production. The total production for Asia is steady from 2011 to 2014, averagely their production capacity is around 780 million ton rice.

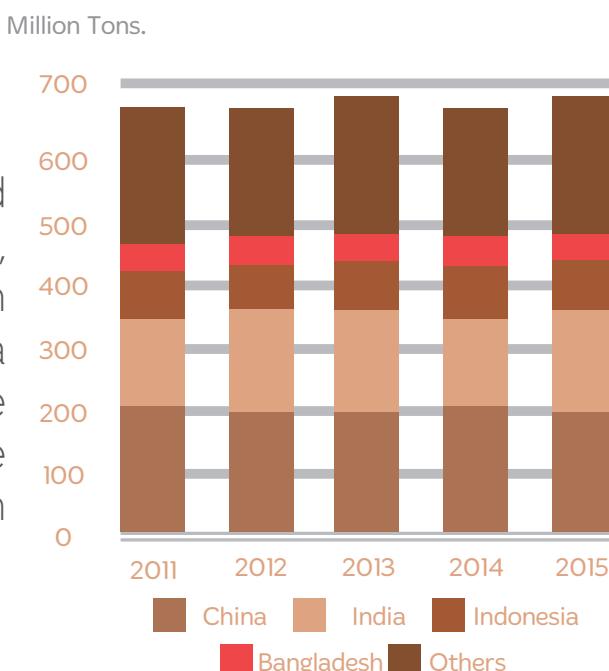
Million Tons. **Paddy Production in Africa**



# Africa

The total production for Africa continent is almost 30 million ton, which half of them are produced in Egypt, Nigeria and Madagascar.

Million Tons. **Paddy Production in Latin America**



# Latin America

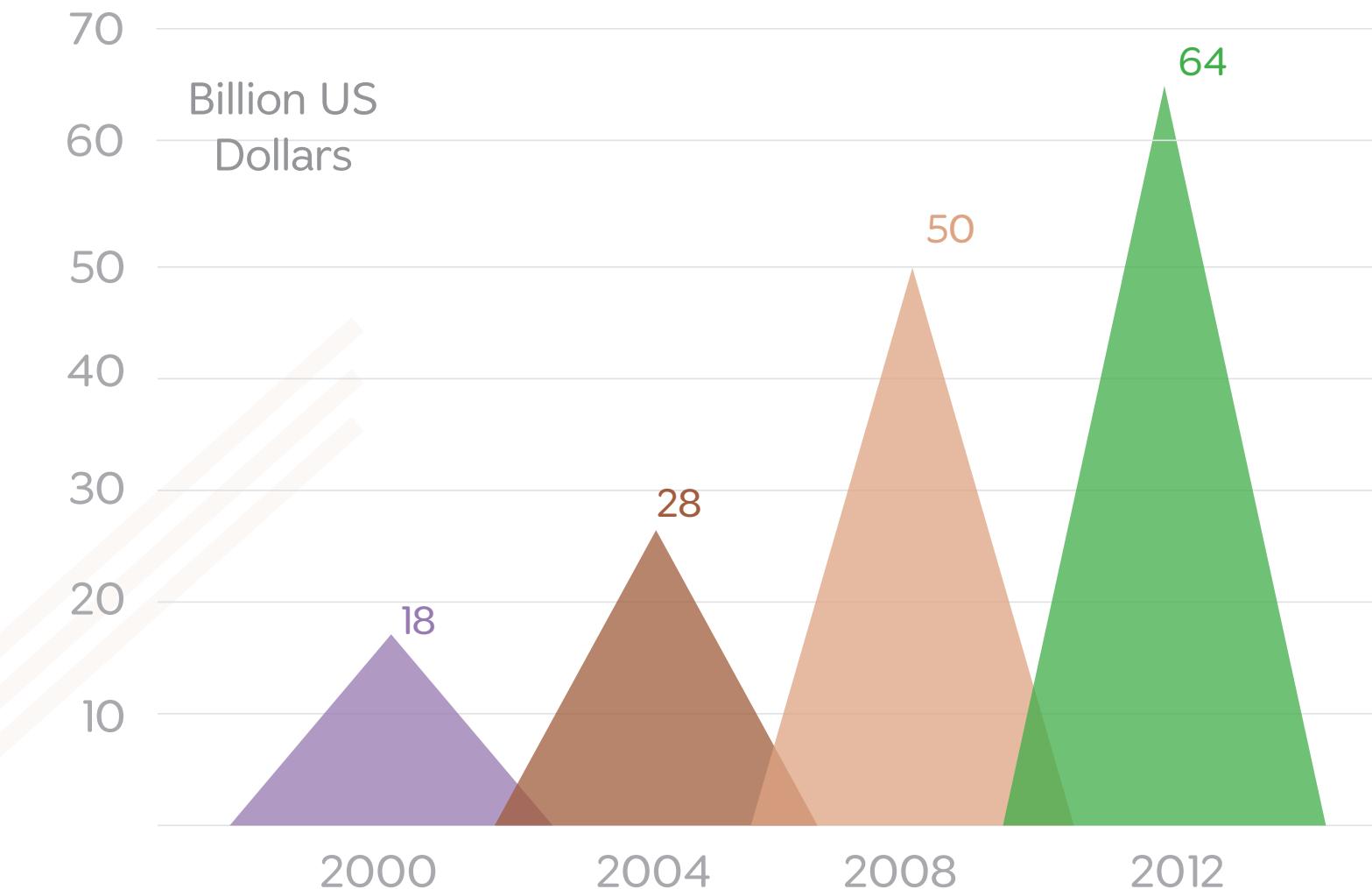
The South America produced almost the same with Africa, almost reach 30 million ton rice. However, in South America is dominated by Brazil as the highest rice producer which the production around 12 million ton of rice.

# INTERNATIONAL TRADING

This section will talk about money, particularly money that involved in organic product. The market trend of the organic product is become more important, moreover if we want to stand in this business and want to get more understanding about the prospect of organic product industry globally. In the other hand international trading related to the rice, from import to export commodity, and which country has become the most dominant in this industry will be discussed.

**B**ASE ON market data at 2012, although organic products are now produced in the four corner of the world, the number of demand still concentrate in two regions, Europe and United States. In 2012 Europe and US has entered a historic trade arrangement for organic food. Changing consumer demands is another challenge. International trading of organic food has grown from almost nothing into over US60 billion over 30 years. Economic stability also another

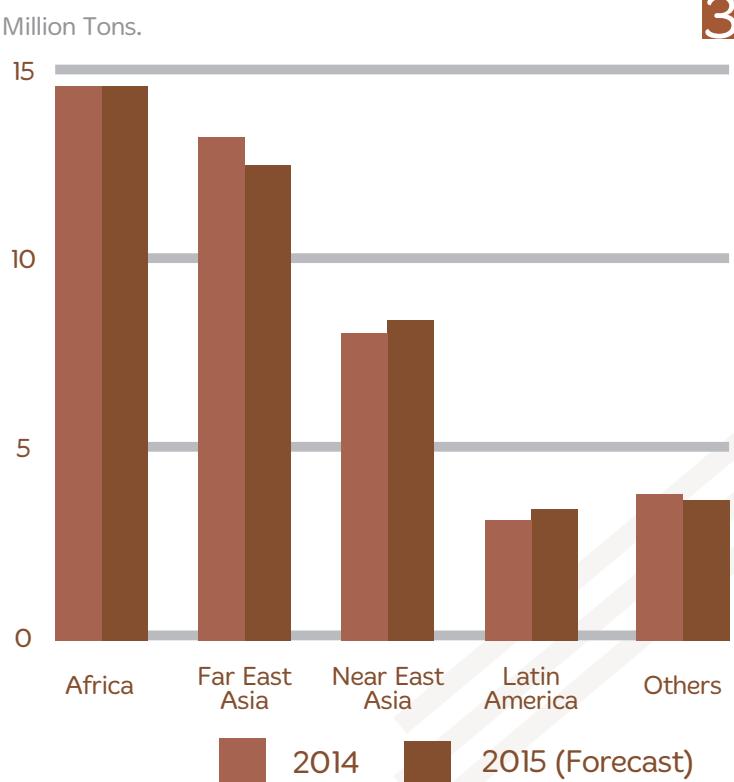
major challenge. The financial crisis in 2008 also give impact to the slow market of organic product. Although global economy still has strengthened, many country markets experience sluggish growth because of falling income level caused by the global crisis. The global market of organic product was increasing almost US15 billion within 4 years from 2008 to 2012.



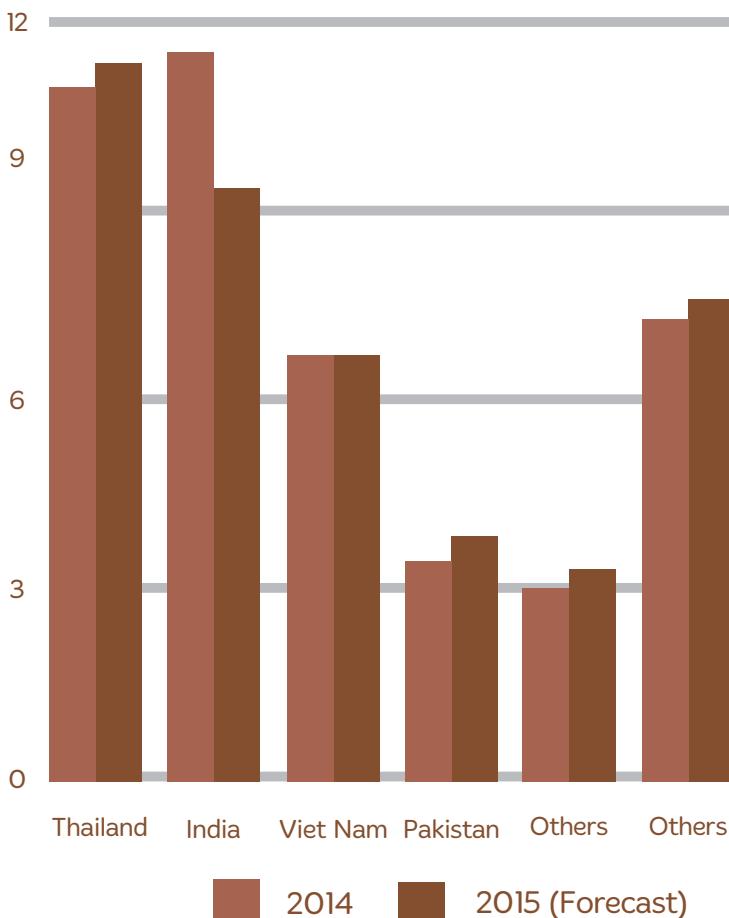
# IMPORTS

On the demand side, a higher import is concerned in the countries which consume rice a primary food, which are Bangladesh, China, Malaysia, Philippines and Sri Lanka. Those countries are all gauge to have larger numbers of trading. In other hand, some African countries namely for Angola, Guinea, Kenya, Mozambique, Nigeria and Senegal estimate to show higher in import

In Far East Asia estimated to be dropped because at both Indonesia and Philippines will cut the import because of good prospect for ongoing harvest, while Sri Lanka is predicted to slash its purchases from 600 000 ton in 2014 to a more normal level of 150 000 ton, this reduction is also facilitated by reinstatement of import duties. Timor Leste who raise the purchase in 2014 will also cut their import too in result of the local supply have been improved. In contrary, import in China expected to remain strong, as high local quotations continue to encourage traders to rely on cheaper of rice from abroad. Official flows to the country are currently seen rising to a total 2.7 million ton in 2015.



Million Tons.



# EXPORTS

FAO made forecast about the world rice trade in 2015 will fall around 2%. The highest drop prediction is coming from India, especially demand from the main consumer is projected to shrink. This because most countries in Asia expected to have promising harvest result in the next year, hence the export number will slightly decrease.

The high amount of money associated with the organic product, and its number always increase significantly each year even though the world suffered economic crisis in 2008. Moreover the global rice trading for export and import is quite steady. So we can conclude that rice has a great market, in addition the enthusiasm of organic product is growing, as the result organic brown rice possess a promising market.

# 6 DISCUSSION AND CONCLUSION

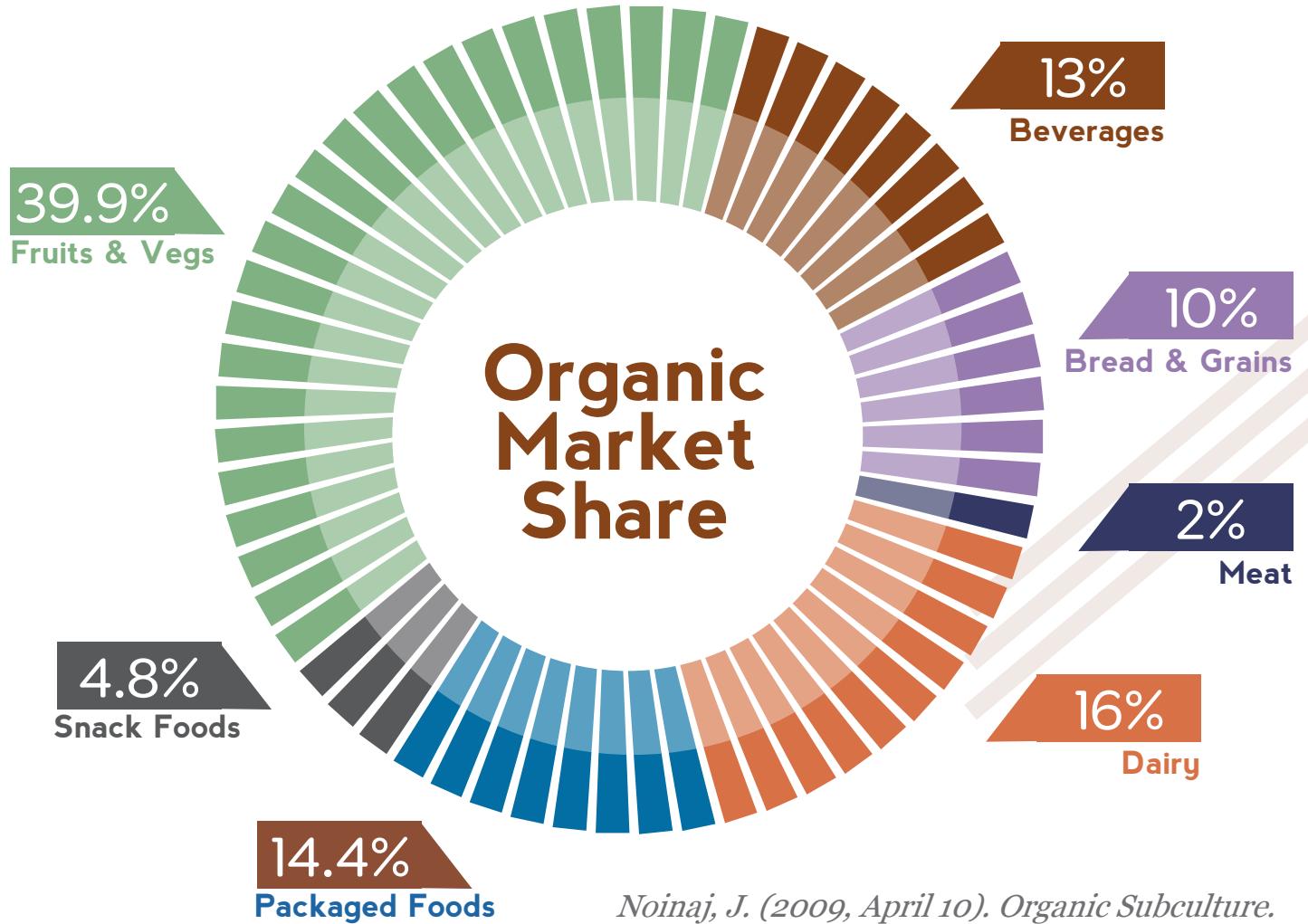
The section below will be given to conclusion and discussion. Most of the content in here will be from the authors' opinion regarding the organic brown rice market - based on the data found from online sources.

**T**HE AIM of this industrial analysis report is to see the market trend for organic brown rice, as well as to describe the benefits of brown rice over white rice, and to convince the reader that there are still clear and far future for this product. However with no specific data regarding this topic, other sets of relevant data are used for analysis. ALL OF THE DATA/STATISTICS DISPLAYED IN THIS REPORT ARE TAKEN FROM OTHER SOURCES LISTED IN THE REFERENCE SECTION.

As far as statistic shows, the consumption of rice has been gradually climbing. Throughout the years its pace may be hindered by the economic crisis, but the fact remains that it is making its way up in the food industry. Seeing how much rice is consumed comparing to the increased in the treading value of brown rice in addition to the decrease in white rice (please refer to Consumption trend on Pg.27-28), one could say that the future of brown rice in the market is still bright. For the organic market, there are also data indicating the growth in this field, be it the growth in investment or land used for organic farming. As mentioned in

the Variables section (on Pg.25-26), there are many factors in play when it comes to marketing. So even if there are no data specifically gathered for "organic brown rice" it is possible to see the trend of this market.

As one country develops further its concern for health increased proportionally. This can be proven by the increasing sells on organic foods. Price may be the only factor hindering the growth of organic product. But this hindrance could be overcame by the economy of scale, if more people choose to consume organic product, the price will surely be reduced. However every factors are related to each other. For example if the consumption rate of the customers increase the price will increase. Then seeing that there are more consumers the manufacturers will likely to invest more to produce more; this will cause the price to drop due to more competitors and lower cost. The improvement in technology will also the manufacturers to produce rice at a quicker pace, and sometimes lower cost. Moreover the regulations regarding the manufacturing procedures of the product itself may influence the cost, which will consequently effect the vending price.



Noinaj, J. (2009, April 10). *Organic Subculture*.

The pie chart above expresses the different types of organic food in the organic market in percentage. While organic fruits and vegetables seem to dominate the market with over 39% of the organic product, bread and grains made up to only 10%. Knowing that the volume of rice consumption is increasing, and the organic market is growing in parallel to it, is a signal that was hinting the direction of this market. However this data is a snap shot of the organic market in 2007, so the value may be different now.

It is difficult to distinguish organic food with conventional food especially when consumer want to purchase it from the shop or grocery. Although a lot of study about organic food state that consuming organic food will give a better nutrient content, less heavy metal residual, and certainly a better taste than conventional food, the only way to differentiate it is by looking for the labels which gave by the organic authorized assessor. Therefore, organizations who gives the labels should be able to gain trust from consumers. In the era of technology information, we think the use of block chain technology will give a lot of benefits. The principal of openness and transparency from block chain will attract public, so they can personally check the certification process. This will highly boost the consumer's trustworthiness. In addition the utilizing of information technology, such as "layar" application can facilitate consumers to verify the organic logo that given by authorized organization.

# REFERENCES

## BIBLIOGRAPHY

---

- Agriculture, I. D. (2010). Standard For Organic Food. Office for National Standardization BSNI.
- Batcha, L. (2014). Study: Significant nutritional benefits for organic. Organc Report : Summer 2014, 20.
- Commission, E. (2010). An Analysis of the EU Organic Sector. European Commission Directorate-General for Agriculture and Rural Development.
- Drinkwater, L.E., P. Wagoner, and M. Sarrantonio. (1998). Legume-based cropping systems have reduced carbon and nitrogen losses. Nature. Vol. 396, 262–264.
- Electronic Code of Federal Regulations. Retrieved from US Government Publishing Office: [http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=3f34f4c22f9aa8e6d9864cc2683cea02&t=pl=/ecfrbrowse/Title07/7cfr205\\_main\\_02.tpl](http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=3f34f4c22f9aa8e6d9864cc2683cea02&t=pl=/ecfrbrowse/Title07/7cfr205_main_02.tpl)
- Growth of the Organics Industry. Retrieved from Whole Foods Market: <http://www.wholefoodsmarket.com/mission-values/organic/growth-organics-industry>
- Health Benefits of Organic Food. Retrieved from Organic Facts : <https://www.organicfacts.net/organic-products/organic-food/health-benefits-of-organic-food.html>
- History of Organic Farming in United States. Retrieved from Sustainable Agriculture Research and Education: <http://www.sare.org/Learning-Center/Bulletins/Transitioning-to-Organic-Production/Text-Version/History-of-Organic-Farming-in-the-United-States>
- History Of The Organic Movement. Retrieved from The Organic Institute: <http://theorganicsinstitute.com/organic/history-of-the-organic-movement/>
- Indonesia, C. (2009). Value Chain Analysis Report of Organic Rice in Indonesia. AsiaDHRRA and The ASEAN Foundation.
- Lemoud, H. a. (2014). The World of Organic Agriculture, Statistic and Emerging Trends 2014.. FiBL and IFOAM.
- Lockeretz, W. G. (2007). Organic farming an International History. CAB International.
- Lockeretz, W. G. (1981). Organic farming in the Corn Belt. Science. Vol. 211, 540–547.
- Nation, F. a. (2014). Rice Market Monitor. Food and Agricultural Organization (FAO).
- National Organic Program. Retrieved from United Stated Department of Agriculture: <http://www.ams.usda.gov/AMSV1.0/NOPFAQsHowCertified>
- Organic Agriculture. Retrieved from Food and Agricultural Organization of The Uniten

---

## BIBLIOGRAPHY

---

- Nation: <http://www.fao.org/organicag/oa-faq/oa-faq6/en/>
- Organic Food. Retrieved from The Organic Institute: <http://theorganicsinstitute.com/organic/organic-food/>
- Organic Trade Association. Retrieved from <http://www.ota.com/learn-about-organic/labeling>
- Poritosh Roy, T. O. (2011). Processing Conditions, Rice Properties, Health and Environment. International Journal of Environmental Research and Public Health.
- Retrieved from Council of European Union: <http://data.consilium.europa.eu/doc/document/ST-8319-2015-INIT/en/pdf>
- Publication. (n.d.). Retrieved from United States Department of Agriculture: <http://www.nal.usda.gov/afsic/pubs/agnic/susagfunding.shtml>
- United States Environmental Protection Agency. (n.d.). Retrieved from United States Environmental Protection Agency: <http://www.epa.gov/agriculture/tlan.html>
- University of California Santa Cruz. Retrieved from University Library: <http://library.ucsc.edu/reg-hist/cultiv/timeline>
- What is organic food? A brief history of organic food. Retrieved from World.Edu: <http://world.edu/organic-food-history-organic-food/>
- What is Organic Production? Retrieved from United Stated Department of Agriculture: <http://www.nal.usda.gov/afsic/pubs/ofp/ofp.shtml>

---

## IMAGES REFERENCES

---

- Adam, E. (2008, October 14). flickr. Retrieved from <https://www.flickr.com/photos/etaiadam/2980409165/>
  - Admin. (2015, February 18). Retrieved from Green Tribunal: <http://www.greentribunal.in>
  - Allchin, D. (2006, November 15). Retrieved from Advisory Committee on Pesticides: <http://www1.umn.edu/ships/pesticides/background.htm>
  - bragg, S. f. (2013, June 12). Sustainable fort bragg. Retrieved from <http://sustainablefortbragg.com/2013/06/12/fresh-fruits-and-vegetables-should-you-buy-organic/>
  - Branchflower, D. (2012). Photo Contest 2012. Retrieved from National Geography: <http://travel.nationalgeographic.com/travel/traveler-magazine/photo-contest/2012/entries/129414/view/>
  - Breen, N. Dreamstime. Retrieved from <http://www.dreamstime.com/stock-photo-brown-rice-uncooked-aluminium-plate-aluminium-spoon-over-metal-surface-top-view-image51448452>
  - CEphoto, U. A. (2014, January 10). Wikimedia. Retrieved from [http://commons.wikimedia.org/wiki/File:Langkawi\\_Malaysia\\_Rice-Harvesting-03.jpg](http://commons.wikimedia.org/wiki/File:Langkawi_Malaysia_Rice-Harvesting-03.jpg)
  - Challenge, W. L. (2014, April 29). Fit one Boise. Retrieved from <http://www.fitoneboise.org/befit365/blog/entry/go-with-the-grain>
  - Council, W. F. A Kernel of Wheat. 1.
  - Doe, V. (2014, June 30). Vicki Doe. Retrieved from <http://www.vickidoefitness.com/organic-natural-hormone-free-whats-buzz/>
  - guru, R. J. Raw Juice guru. Retrieved from <http://rawjuiceguru.com/our-raw-juice/>
  - Kaminska, I. (2013, July 23). Retrieved from FT Alphaville: <http://ftalphaville.ft.com/2013/07/23/1578802/explaining-the-commodity-warehouse-trade-with-scripture/wheat/>
  - Kyoto, G. F. (2006, June 12). Wikimedia. Retrieved from [http://commons.wikimedia.org/wiki/File:Rice\\_milling.JPG](http://commons.wikimedia.org/wiki/File:Rice_milling.JPG)
  - L.P., W. F. Whole foods market. Retrieved from <http://www.wholefoodsmarket.com/mission-values/organic/growth-organics-industry>
  - Littletaibua. (2015, March 26). Dreamstime. Retrieved from <http://www.dreamstime.com/stock-photo-rice-s-grains-isolate-white-background-ear-image52757367>
-

# REFERENCES

## IMAGES REFERENCES

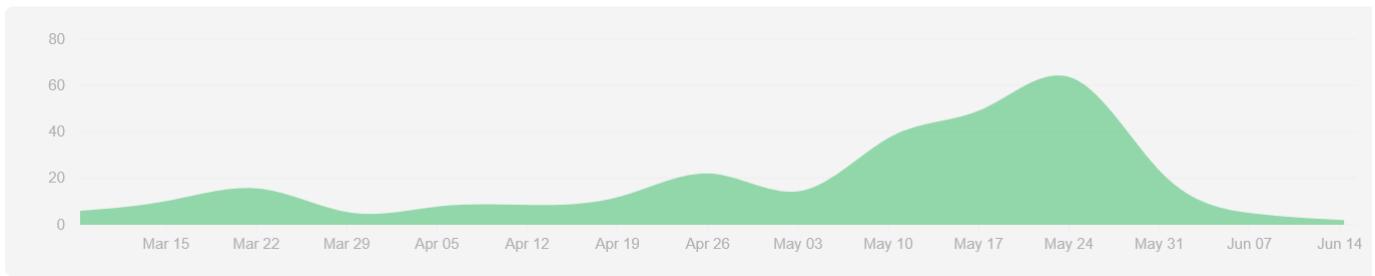
---

- Penny Lane DNP, C. I. (2013, November 10). Retrieved from Believe Midwifery Services: <http://believemidwiferyservices.com/broth-brown-rice/>
- Ron. (2015, April 16). Retrieved from Organic Food: <http://www.organicfoodadvisors.com/>
- Sirijinda, W. (2010, November 05). dreamstime. Retrieved from <http://www.dreamstime.com/stock-photos-rice-paddy-drying-image16854253>
- The Nettleton Hollow Group, L.. Retrieved from Nettleton Hollow: <http://www.nettletonhollow.com/v/vspfiles/photos/511400-2.gif>
- Unknow. galleria25. Retrieved from <http://galleria25.com/brown-rice-are-more-nutritious-than-white-rice/>
- Unknown( Retrieved from Croplands Anthromes: [http://upload.wikimedia.org/wikipedia/commons/7/72/Fields\\_of\\_gold.jpg](http://upload.wikimedia.org/wikipedia/commons/7/72/Fields_of_gold.jpg)
- Unknown. (1970, January 01). CS Signs. Retrieved from <http://customisedsigns.co.uk/wag23-warning-pesticides-p-1520.html>
- Unknown. mgkid. Retrieved from <http://imgkid.com/rachel-carson-ddt.shtml>
- Unknown. Patel Brothers. Retrieved from <http://store.patelbros.com/rice/>
- Unknown. Thinkstock. Retrieved from <http://www.thinkstockphotos.com/>
- USDA. Retrieved from Agricultural Marketing Service: <http://www.ams.usda.gov>
- USDA. Retrieved from <http://www.usda.gov/wps/portal/usda/usdahome>
- USDA. (2015, May 12). National Agricultural Library. Retrieved from <http://www.nal.usda.gov/afsic/pubs/agnic/susagfunding.shtml>
- USDA. imgbuddy. Retrieved from <http://imgbuddy.com/usda-organic-food-label.asp>
- Victoria. (2015, February 1). Retrieved from Vhealthybyv: <http://static1.squarespace.com/static/5463a2a4e4b0b157260007fd/5463a91de4b0fef8eaee167f/54c6c640e4b0e6c0ab4d8866/1424282638436/?format=1000w>
- Yogurt, P. Peachwave. Retrieved from <http://www.peachwaveyogurt.com/nutrition/ingredients/>

# PROJECT ACTIVITIES

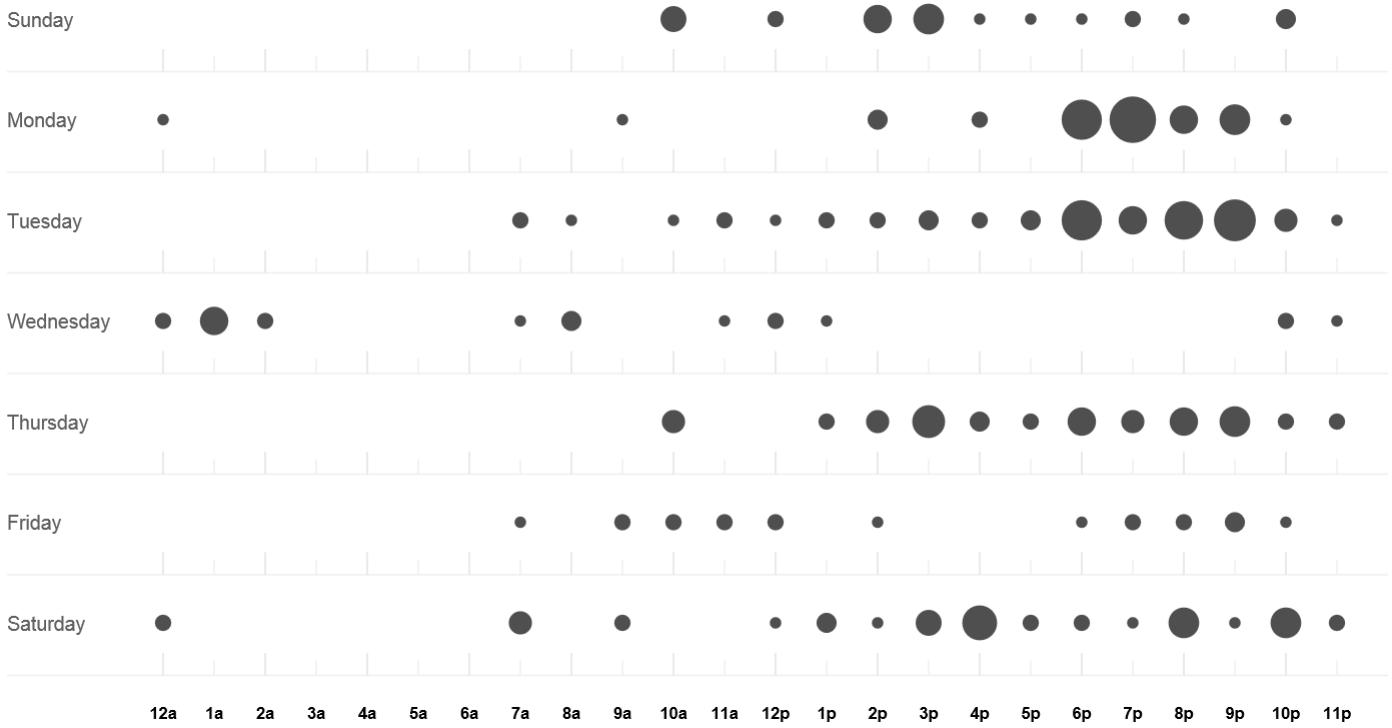
This session explains the overview of project activities. In this report, our group use the github as the platform. The following graphs show the group's activities on github - from the beginning to the end.

- 1<sup>ST PHASE:</sup>** At the early phase of this project, vague information about many topics in various industries were searched. After pondering about which topic we want to go in to deeper details we decided to go with "organic brown rice" as we deemed it a topic that is closely related to the Asian life style.
- 2<sup>ND PHASE:</sup>** After deciding on the topic we started to find many journal and articles relevant to the organic brown rice, such as information about whole grain, regulations of organic food products, etc.
- 3<sup>RD PHASE:</sup>** Before commencing to the IAR we revised all of our articles and highlighted few that we could use.
- 4<sup>TH PHASE:</sup>** And lastly we write the IAR according to the data we could find

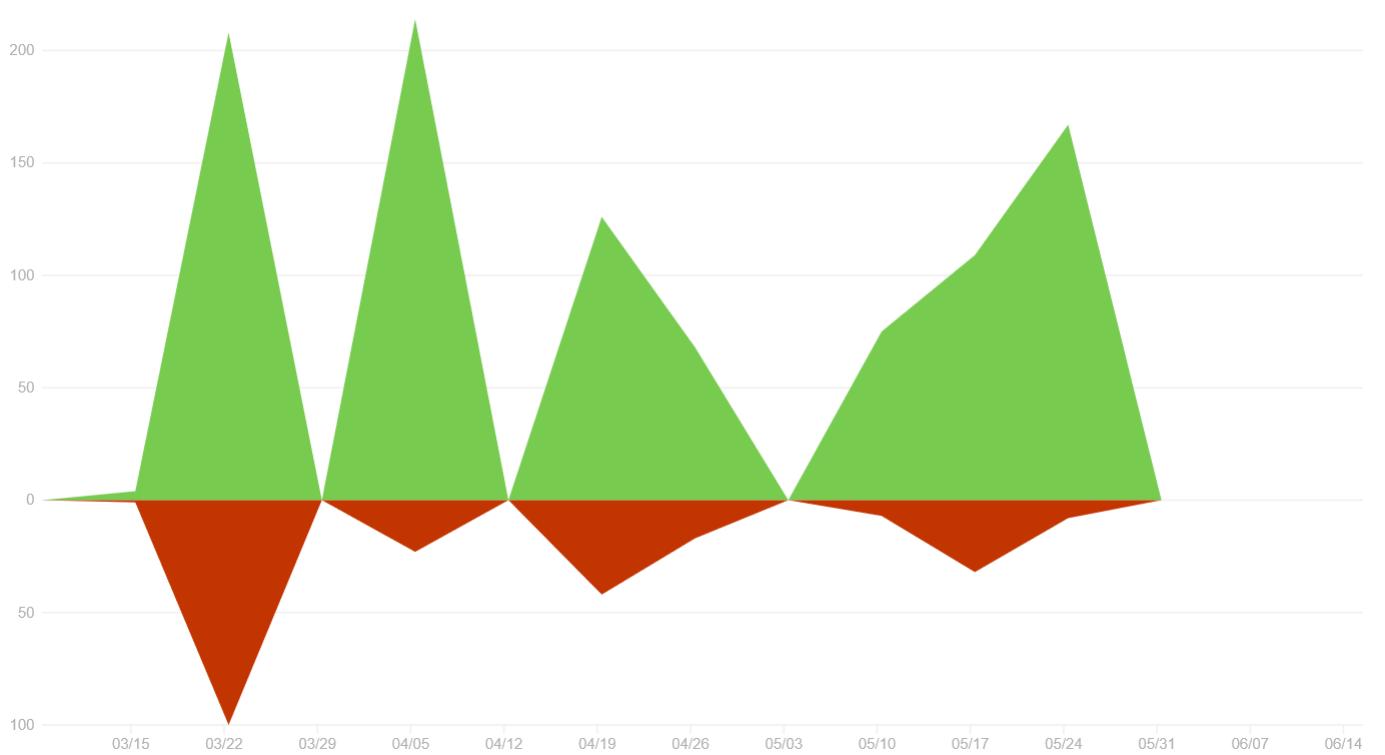


**Contribution graph:** The repository for seventh floor was started in the early of March since the beginning of Global Manufacturing Strategy course. Our contributors consist of three people @Seetala, @MuanphetCharunratanavisan, and @kurniawanbobby. At the beginning, we did the research by collecting all possible related data. Each person needs to read the journal or article related to the product then submit the material into Github, hence at that time the graph looked steady yet not in a high level of activities. This collecting data phase was occurred until April.

Afterwards, started from the middle of April we did lot activities, such as writing the content and commit it into Github, so that the contributor's graph showed increasing in activities. Our collaboration then reached its peak at the middle of May, when we tried to finish our content in Industrial Analysis Report. Therefore our activities experienced fall down after this period.



**Punch Card:** This graph depicted the commit activities from all contributors to the Github repository based on the distribution of the days. We can see that the commit have done almost every day evenly. The bigger the dot means we did more commit to Github.



**Code frequency:** Almost the same with the other graph, it showed our activities in Github, but according to the commit and delete activities in Github, The green chart represents the commit while the red chart explain the number of deletion in Github.



