

POLITECNICO DI TORINO



**SYSTEMIC APPROACH  
in  
IRAN, PARS ABAD**

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di laurea magistrale in Ecodesign

Master Thesis

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# Contents

1	<b>Abstract</b>
3	<b>Introduction</b>
	<b>.Territory</b>
5	Parsabad
6	historical background
7	climate
9	conceptual Map
11	historical sites
13	Traditional Food
18	Traditions & Festivals
26	Nomads
33	Main Crops
36	Agricultural Plain
38	Historical Sit
33	<b>Critical Points</b>
35	problems analysis
38	Exportation
	<b>.LINEAR</b>
41	Utilized Agricultural Surface
42	Current Crops
46	Problems of Current Agriculture
55	Agricultural Production
59	Conservation & Problems
61	Consumption
	<b>.SYSTEMIC</b>
65	Systemic Approach Development of Agricultural Farming
68	Agricultural Surface
69	Production
70	Interchange

- 71 Local Consumption
- 73 Management and Energy consumption in Sustainable Farm
- 83 Local Conservation

## **.COMPARISON**

- 87 Consumption
- 88 Landuse
- 89 Production
- 91 Agriculture ,fruit & vegetable

## **94 .CONCLUSION**

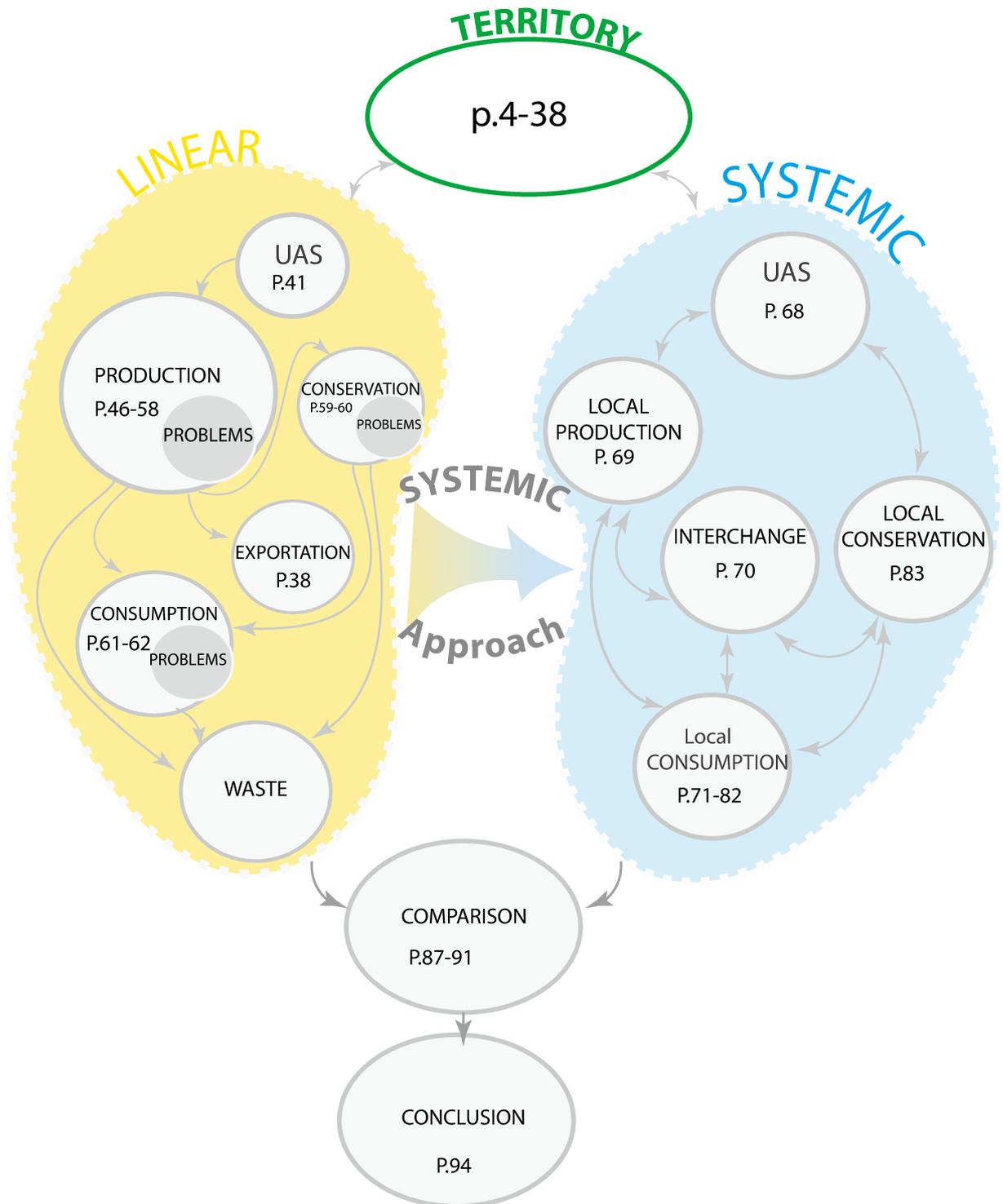
- 96 **References**

## **Acknowledgments**

Firstly, I would like to express my sincere gratitude to my advisor Prof. Luigi Bistagnino his patience, motivation, and immense knowledge. His guidance helped me in all the time...

Finally, I wish to thank my parents for their love and encouragement, without whom I would never have enjoyed so many opportunities.

# General Scheme



# ABSTRACT

Parsabad has the huge part of the agricultural area of Moghan plain, 80,000 hectares of land is used for agricultural activities, it is located around northern border of Iran and Azerbaijan; situated on the southern shore of Aras river.

This region is well known for its Agricultural plains. In this area, the farming plays an important role in the economy and the creation of the jobs. Also, agricultural production is more than 100% of the real need of population; unfortunately, the lack of management for exporting products has contributed to waste over 40% of the products.

The method used in this thesis is the Systemic Design approach, which is to study the flow of matter and energy to cut the waste and emissions by using the output of each system as an Input for another system or activity. The resulting output of the activities preoccupied in the system becomes a valuable resource for other activities, to produce new jobs and increasing the economic flow. The purpose of this project is to redesign the linear model of the agricultural production and remodel it, using the Systemic approach.

After the analysis of the territory, the agricultural techniques and the quality of the products and crops in the territory, a systemic

solution has been produced. The biggest expansion made in the production system of the cultivated plain of Parsabad and how it passed from a monocultural model into an intercropping model. The value of the system approach is found in the interaction of species in the territory.

The respect it deserves is understanding the properties of each one of the species and how their interaction can support to amplify quantity and quality, therefore it will decrease the Demand for chemical products such as fertilizers and pesticides. on the other hand, the unbalanced diet system of the population and the relation between consumption and production has been studied in this thesis from different aspects such as health, environmental, and social point of view, Even though it is important to illuminate that the main objective of the project is not to gain income drastically and that in reality the major income of applying the systemic method to agricultural practices cannot be measured with economic measures but with a qualitative research of the territory and the product proceeding.

# INTRUDOCTION

In Iran as in many countries of Middleast, there is the absurd belief that to progress and achieve development, modern industrialization is needed.

there is a common belief, that in order to obtain economic growth it is necessary to abandon their traditions and embrace globalization. Currently, the country has more imports than exports, and foreign large chain stores are increasing, they offering products from all around the world at very low cost, affecting local craftsmen and traditional markets which are left alone to deal with the unfair competition. This situation is not exclusive to the consumers, also in the agriculture, which has been one of the hardest hit sectors.

Through Systemic Design it is possible to replace the linear approach, based on interconnections and relationships that permit the essential activities based on the real needs of the population in the territory. the current improvement is industrialization but without consciousness about input and output materials, wastes, emissions and productions processes. the politics rules, and economy is based on profit and big industries.

# Territory



IRAN is a country in southwestern Asia and in the Middle East, Iran is neighboring from the north with Azerbaijan , Armenia and Turkmenistan , from the east with Afghanistan and Pakistan, and from the west with Turkey and Iraq , and also from the north to the Caspian Sea (Caspian) and from the south to the Persian Gulf and the Oman Sea, two The first region is one of the major oil and gas extraction areas in the world.

Ardebil is an ancient city in Iranian Azerbaijan. The province is believed to be as old as the Achaemenid era (ca. 550–330 BCE). It is mentioned in the Avesta, where prophet Zoroaster was born by the river Aras and wrote his book in the Sabalan Mountains. is a city in and the capital of Parsabad County, in Ardabil Province, Iran. Parsabad is Iran's northernmost city. Its population is around 160,000, nowadays the economy of the city is based on agriculture and production a huge part of the fruit and vegetables and cereal in the territory.

# Parsabad

It is located in a border town located in the north of the province and neighboring on the Republic of Azerbaijan. It mainly consists of flatlands enjoying a mild climate.

This region, in which agriculture is a significant activity, is watered by the Araz River. Having fertile soil, favorable climate, and adequate precipitation, it has rich pasture and impressive natural beauty.

The establishment of “Kesht-o-San’at-e-Moghan”, including units for producing sugar, compotes, conserves and a unit for winnowing cotton, has flourished the economy of the town .



Parsabad agricultural plains and residential part

# **PARSABAD HISTORICAL BACKGROUND**

The geographic conditions of the Moghan and Aran plains, the two rivers of the great Aras and Khor(Kura) from the inside of this land, have traveled a long way and joined the Caspian Sea, have long since brought about the emergence of human life. The Clans, Meghan (Mikas) and Caspian and Albanians were ethnic Asians who had settled before entering Aryans and Turks.

The oldest civilization known as the Moghan plains is relevant to the clay that becomes visible on the shores of Aras (Araz ) with the creation of large cities and addressing agriculture, horticulture and animal husbandry as one of the glorious civilization on the surface of the day.

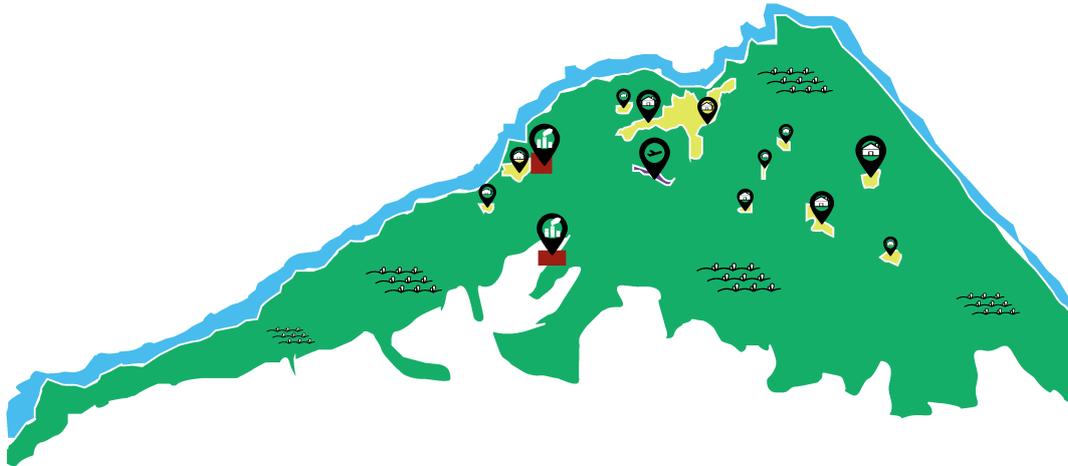
one of the tribes stationed along the Aras River in the first millennium BC was the Mik tribe, which later became Mogh and Moghan.

The Moghan plains, based on ancient geographic data, was once a prosperous city. but later it was lost due to unforeseen events.

The typical examples of the ancient and historic villages of Moghan are the populated village (Oltan), which has an important historical background, it has been said that in the old.

# CLIMATE

This area belongs to continental warm temperature zone, monsoon climate, the climate is characterized by the spring warm, dry, hot and rainy summer, the autumn weather is changeable, drought and flood, dry and windy in the winter, four distinctive seasons. The city has a moderate to warm climate. Its summers are hot and its winters have low temperature. The rainfall in Parsabad is affected by the flows of the Caspian Sea and the northern Siberian and cold air masses. The average rainfall is 768 mm, due to its low altitude, its winters are mild and its temperature reaches zero degrees. In spite of the fact that the cold and colds are less than 30 degrees Celsius, temperatures above 40 °C are also visible in some of the stations such as Parsabad, during the warmest hours of the summer in summer months. The temperature range fluctuates in the coldest and hottest months of the year, about 40°C. The average daily temperature is between 5.5 to 15°C.



160 day/year



10 km/hour



768 mm/year



West to East



Pars abad city

# Conceptual Map





## Historical sites

Oltan Qalasi is located 12 km from Parsabad and on the edge of the border of the border of Aras (Araz). Oltan Qalasi is an ancient site on the southern shore of the Aras River, located less than five hundred meters west of the village of Oltan. This village is located in Ardebil province 12 km southwest of Parsabad, on the way to Pars Abad to Aslandoz. The historic site of Oltan Qalasi, number 2654, has been listed on the national monuments list. Indigenous people know the area (organ or barrow) called ((Oltan Qalasi)), the Oltan castle. . Oltan Qalyasi, in total and taking into account the citadel (about 33 hectares), and Rabaz, is probably more than 70 hectares.

500m from the village of Oltan, located along the Aras River, is located in a flat area of 800 x 400m. Around this castle is surrounded by a large wall of adobe with a diameter of 92.5 meters. And the effects of a large ditch, 30 meters wide, can be seen on three sides. The northern front of the Aras River and the village of Olhtan on the southern side of the castle are the apparent appearance of the building, like the military barracks, have been able to determine the wall diameter and the size of the bricks used on the slab previously constructed by bulldozers on the eastern wall of the castle. The founders were the first fortresses of the Parthians, due to the strength and proper position that had

been used until the 12th century AH. The varied clay obtained by this clay confirms this view. Unique and diverse pottery of various Islamic periods of Oltan castle is worth paying attention to. There are also hills inside the castle, which are small construction units with main buildings on the eastern side, which was washed and destroyed due to the displacement of the Aras River, although much of it still exists. Buried under the soil.



Naderi Hill



Oltan Castle

# TRADITIONAL FOOD

Definition of traditional food In a general look, traditional foods are those foods that have been consumed in a country since the old days and have been passed on to generations. In other words, these kinds of foods can be found in the diet of our very ancestors! These foods are simple and yet rich in nutrients and are often naturally thought-provoking. If we want to list the general characteristics of traditional foods, we can mention the following:

- \* Foods that were cooked with natural raw materials and not processed and packaged;
- \* Foods that have a long history of health care;
- \* Foods that were nutritionally rich and complete;
- \* Foods containing simple and basic ingredients in the diet include meat and poultry, eggs, whole grains, fish, legumes, vegetables, fruits, nuts, seeds and fats.

What does the traditional food mean?

- \* Animals like cows, goats, sheep and poultry fed on natural pastures.
- \* Fish that live in the open sea without contamination;
- \* Eggs that are naturally nourished;
- \* Raw dairy products that are not pasteurized or homogenized;
- \* Whole grains are soaked, germinated, or cooked by its method;

- \* Vegetables and organic fruits;
- \* Fats like butter, cow's milk and other animals, coconut oil and olive oil;
- \* Cereals and seeds;
- \* Natural sweeteners such as honey, herbal syrups, dry fruits;
- \* Unpolished sea salt is rich in minerals;
- \* Dried herbs and fresh and natural spices.

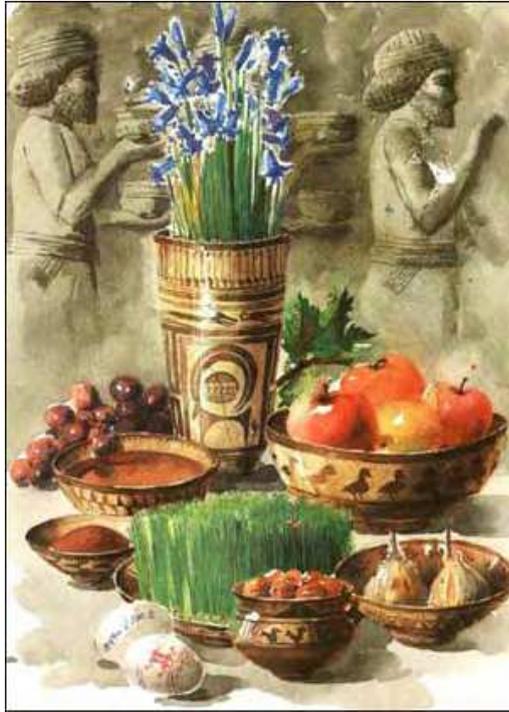
Looking at the current state of Iranian food habits, we find it very simple and quick. Traditional foods have no special place, as in the past, except in the villages and perhaps in small towns. Nutrition in Iran has undergone a transition from traditional and indigenous foods to western and western foods, and the same changes in eating habits have caused negative effects on their health status. One of the reasons for the prevalence of various diseases, such as obesity, cardiovascular disease, diabetes and cancer, which we call disease civilization, is the changes in the nutrition of communities. If we ask our children how to name a few types of food, it is very likely that the number of industrial and food products mentioned here is higher than traditional foods and this will remind us of this forgotten place of traditional food. In Iran, like any other country, there are a variety of traditional and indigenous dishes, each of which is very meaningful. The

foods that were cooked and consumed according to the natural, geographical and cultural characteristics of the area. The typical characteristics of traditional Iranian foods are the consumption of various foods from different food groups, and this is exactly the same as the current recommendations for diverse and balanced consumption. Food comes from pyramid food groups. Particularly the vegetable and fruit group, as a source of vitamins and minerals and antioxidants, has been used extensively in the traditional Iranian diet.

In this area, the diet of more people is based on bread and cereals and rice; the supply of cereal grains from agricultural products in the Moghan plain is provided and rice supply from a nearby territory. Also, a large part of the dairy needs of chicken and sheep's meat and chicken is provided by Shahsavan nomads in the territory.



# Traditions & Festivals



# NOWROZ

Nowruz is a festival that has been celebrated for thousands of years. It is a secular holiday that is enjoyed by people of several different faiths and as such can take on additional interpretations through the lens of religion. Nowruz is partly rooted in the religious tradition of Zoroastrianism. Among other ideas, Zoroastrianism emphasizes broad concepts such as the corresponding work of good and evil in the world, and the connection of humans to nature. Zoroastrian practices were dominant for much of the history of ancient Persia (centered in what is now Iran). Today there are a few Zoroastrian communities throughout the world, and the largest are in southern Iran and India.

Nowruz (pronounced no-rooz) is a combination of two Persian words. The exact beginning of the New Year occurs when the season changes from winter to spring on the vernal equinox, which usually happens on 20 or 21 March each year.



Nowroz Tradition

## **Haft-Seen Table: The Table of Seven S's**

The most important activity in the celebration of Nowruz is making the haft-seen table. Haft is the Persian word for the number seven and seen is the Persian word for the letter S. Literally, the haft-seen table means a "table of seven things that start with the letter S". Creating the haft-seen table is a family activity that begins by spreading a special family cloth on the table. Next the table is set with the seven S items. Here are some of the items and what they symbolize:

Sumac (crushed spice of berries): For the sunrise and the spice of life.

Senjed (sweet dry fruit of the lotus tree): For love and affection

Serkeh (vinegar): For patience and age  
Seeb (apples): For health and beauty

Sir (garlic): For good health

Samanu (wheat pudding): For fertility and the sweetness of life

Sabzeh (sprouted wheat grass): For rebirth and renewal of nature

In addition to these S items, there are other symbolic items that go on the haft-seen table, depending on the tradition of each family. It is customary to place a mirror

on the table to symbolize reflection on the past year, an orange in a bowl of water to symbolize the Earth, a bowl of real goldfish to symbolize new life, colored eggs to represent fertility, coins for prosperity in the New Year, special flowers called hyacinths to symbolize spring and candles to radiate light and happiness. Each family places other items on the table that are special, for example the Qur'an, the holy book of Islam, or the Shahnameh, an epic Persian story of colorful kings and princes written around the year 1000 CE.



Haft Sin table

# Chahar Shanbe Suri: The Fire Jumping traditions

On the night of the last Wednesday of the old year Chahar Shanbe Suri, in Persian, is celebrated. During the night of Chahar Shanbe Suri people traditionally gather and light small bonfires in the streets and jump over the flames shouting: “Zardie man az to, sorkhie to az man” in Persian, which means, “May my sickly pallor be yours and your red glow be mine.” With this phrase, the flames symbolically take away all of the unpleasant things that happened in the past year. Because jumping over a fire is dangerous, many people today simply light the bonfire and shout the special phrase without getting too close to the flames.



Chaharshanbe sori

## **Yalda Night; Iranians celebrate longest night**

Every year, on December 21st, Iranians celebrate the arrival of winter, the renewal of the sun and the victory of light over darkness on Yalda Night.

Family members get together (most often in the house of the eldest member) and stay awake all night long in Yalda.

Watermelon, pomegranate and dried nuts are served as a tradition and classic poetry and old mythologies are read in the gathering.

Getting a 'Hafez reading' from the book of great Persian poet Shamsu d-Din Muhammad Hafez-e Shirazi is also practiced in this night.



Yalda Night

## The Final Day of Nowruz: Sizdeh Bedar

The haft-seen table remains in the family home for thirteen days after the beginning of Nowruz. The thirteenth day is called Sizdeh Bedar, which literally means in Persian “getting rid of the thirteenth.” The celebrations that take place on Sizdeh Bedar are just as festive as those on the first day of Nowruz. On this day, families pack a special picnic and go to the park to enjoy food, singing and dancing with other families. It is customary to bring new sprouts, or sabzeh, grown especially for this occasion. At the park, the green blades of the sabzeh are thrown on the ground or in a nearby river or lake to symbolize the return of the plant to nature. Sizdeh Bedar marks the end of the Nowruz celebrations, and the next day children return to school and adults return to their jobs.



Sizdeh bedar

# NOMADS

Population 66,500 Person



Iran has one of the largest nomadic populations in the world, an estimated 1.5 million in a country of about 70 million, according to the government's agency for nomad affairs.

Shahsavans means "protectors of the king" and refers to the fact that this nomadic tribe guards one of Iran's most remote and vulnerable frontiers, at Azerbaijan. The Shahsavans are a tribe in north-western Iran. There are several groups of Shahsavans nomads scattered throughout the region. The majority of the Shahsavans tribe lives in the northwest Iran near the city of Ardabil and Dasht-e Mughan of Shahsavans nomads scattered throughout the region. The majority of the Shahsavans tribe lives in the northwest Iran near the city of

Ardabil and Dashteh Moghan.

Despite the relatively large documentation about the history of the Shahsavans, the origins of the emergence of Shahsons and Il Shahsavan are still unclear. It is believed that Ile Shahson is a group of tribal groups that gathered in the midst of the sixteenth and eighteenth centuries in union form. According to the existing traditions and doctrines, the Ilh Shahsun Union consists of several tribes including the natives of the Moghan Plain (probably the Alanians and the Dark Aryan Negroes “ Imaninities such as the descendants of the tribes of Afshar and tribes of Shamlou (immigrants from Anatolia), and some of the tribes of Qizilbash and the Turks of Central Asia, formed under a political, military and social union with the official Turkish language An elitist gathering for the people of Israel And in the 16th and 18th centuries, they had a rich political and military role in the history of the region and even in Iran. Shahsons call it a set of arbors and commas that have been set up in one place. The place where it is located or where the tents are raised therein is called Yord. The main characteristic of the yard is the shape of a crescent-shaped crested arches, in which the first altars or comets were deployed there for the time being, to place the field (woolen bed) and other furnishings and tents for a distance of approximately one meter outside this grunge Crescent are arranged. The main reason for picking these rocks

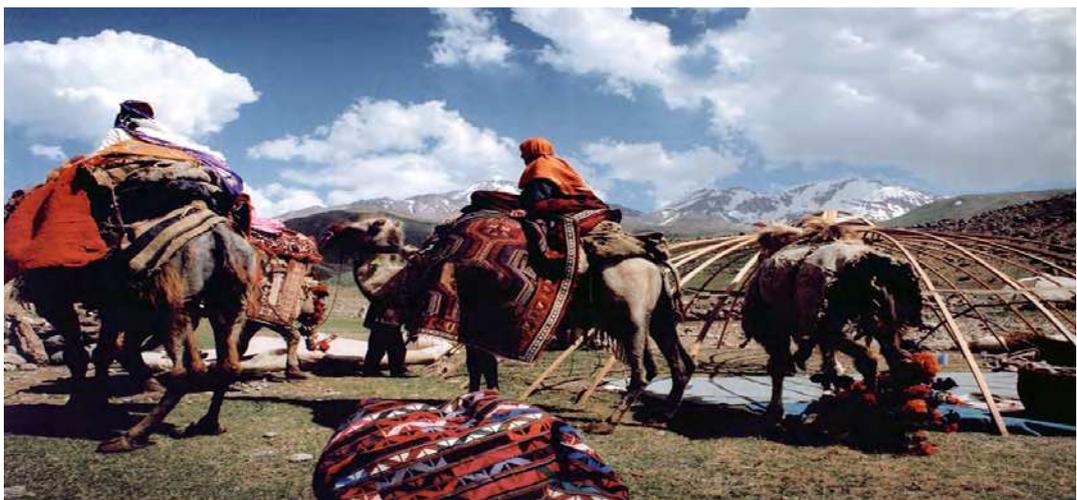
is to keep the shingles and fixtures out of contact with the floor, preventing penetration and moisture inside them. Usually, every tribe nomads remembered at which age it was born. Also, each of these has special titles or titles, some of which may be a reminder of a historical or eventful event. Due to the fact that in comparison with other nomadic regions of Iran, both cold and hot areas of the Shahsun (summer summers and winter gashlagh) have cold weather, so Shahsun's tribesmen have experienced the experience of using a cluster that even the most consistent with the conditions An ambience is the main residence of the Shahsun tribes in the country.



Shahsavan Nomads

## ALTAR AND COMA

The Altar is one of the characteristics of the Shahsavan tribes, which has a semi-circular tent and a ridge-shaped tent. It is usually smaller than the alder and is not comparable with the ruggedness of the carvings, which is precisely crafted and elegant. Alabak is always with Komeh.



# CLOTHING

Today, Shahsavan men and women clothes are like the garments of the villagers around the region, and any change in the type or form of the clothes of the villagers has been created in the combination and kind of nomadic Shahsavan's clothing, these changes have been observed. In ancient times, men and women in the region were dressed in special clothing that nowadays, even in the most remote parts of Azerbaijan and elsewhere, there are no traces of this cover. Shahsavan women (of course, some especially older women) have somewhat preserved their traditional textiles, and in some cases, they have not created any new patterns or combinations in their traditional dress.



Traditional Clothing of Shahsavan Nomads

# ACTIVITY

In the economic study of Shahsavan nomads, Handicrafts are after livestock and farming activities. The nomadic life based on the breeding of livestock and the production of livestock products, especially lamb and goat, provides the opportunity to produce raw materials for the production of handmade textiles by utilizing the mastery of the art and creative art of Shahsavani women.

Among the handicrafts produced by women by Shahsavan nomads are the carpet and rug-gilim, Zilu, Jajim and Korgjins-Plus (tent) - Chowka or Burk - hat - Gloves - Socks - Ghiw - Powush - Wool - Mufresh - Salt and ....

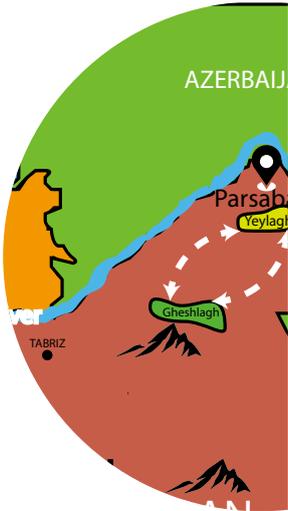


Crafts of Shahsavan Nomads



# Landscape

# Activity



# The Altar (main residence)



# Handicraft



# Traditional Clothes



# CRITICAL POINTS

40 pelleh



-increasing the possibility of cultivation



-lack of care and attention



## Mill moghan dam

-ambient for many birds from Siberia

-illegal hunting



## Aras river

-unique supplier of drinkable and agricultural water

-contaminated water from industry



## Factory of Kesht o sanaat moghan



-creating a lot of job oppurtunities



-high rate of evnironmental polution



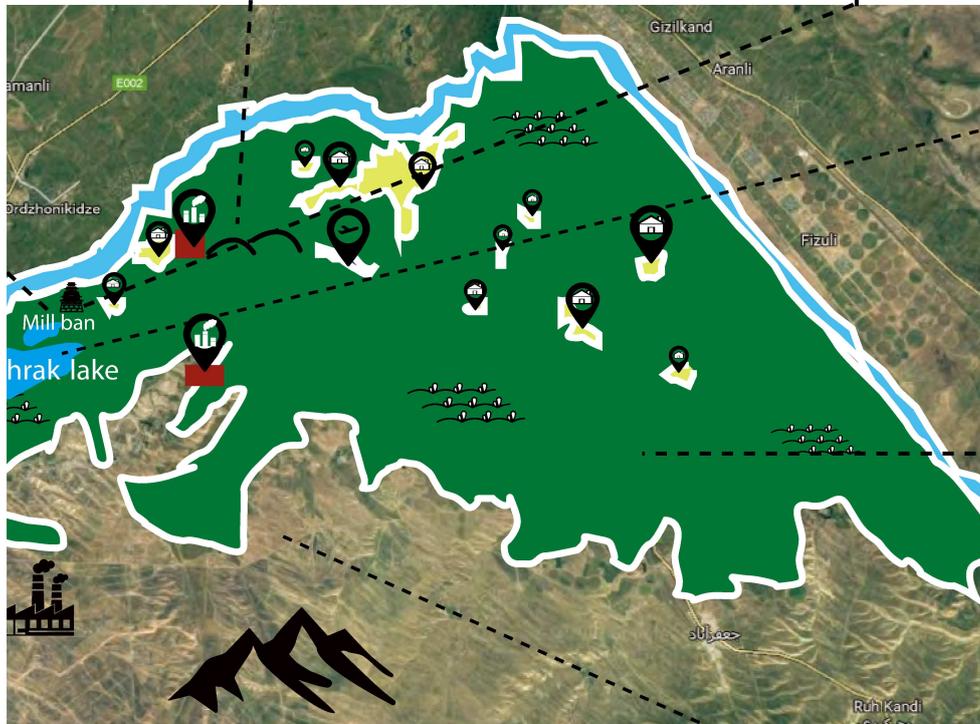
## Naderi Hill

- ✔ -MAB's biosfer reserve
- ⚠ -lack of care and attention



## Oltan castle

- ✔ -historical tourist attraction
- ⚠ -erosion of the walls of castle in the vicinity of the Aras river



## Shahrak lake

- high effect on moderating the climate ✔
- ambient for many birds ✔
- drying gradually ⚠



## Moghan plain

- beautiful scenery
- high amount of crops production ✔
- ⚠ -uncontrolled use of soil

## Khuruslo mountain

- ✔ -tourist attraction
- ⚠ -lack of care and attention



## Shahsavan Nomads in Moghan Plain

- ✔ -Animal husbandry and supplying the high percentage of dairy products in territory.
- ⚠ -Urban life



## **PROBLEMS ANALYSIS**

-Gradual drying of Moghan shahrak lake:

Water needed for 96 thousand hectares of Parsabad, Ballard and a large part of the drinking water of the city of Parsabad, the ride and warmth of the lake is provided. With the dredging of the Moghan Town Lake, the renovation and coating of the canals The main transfer of water, in addition to preventing water leakage and aggravated agricultural land, has been wasted and water losses are dramatically reduced.

-Urban life for nomads :

The nomadic community is an independent society whose dominant cause is the traditional livestock industry. In the nomadic society, a lot of customs, beliefs, and culture are rooted in the trap of trapping. Hence, the tribal culture has a radical and structural difference with the rural culture. It is clear that the tribes, due to their economic weakness, have been forced to choose this way of life, otherwise, no one has a comfortable life in this way of life. Trouble and risky. But it is worth noting that these people chose this method among several. Why did not these people get marginalized? Because they felt that they would be better able to adapt to this way of life. Contrary to the opinion of some who think this is a comfortable and unobtrusive way of life, one must say that one of the most prolific, most dangerous and most insecure ways of life.

If all of the nomadic population is to be left behind and provided

with the necessary facilities for a life, it may be very far-fetched and impossible. However, there are many problems with the part of our tribes that have been called “single-dwelling” villages. Because the villages did not accept this population. As part of reports from the tribal population of the country, there was a lack of facilities such as lack of adequate water for forage production, lack of fuel, lack of sanitation.

Lack of care and attention of khoroslu mountain:

Khorsloo mountain range is located in the south of Moghan plain, 40 km northwest of Garmi Moghan city, and the highest and most famous peak is Khanlu. Rows of tea and gorohchay originate from this mountain range and separate the plain and plain Moghan from the sections of Angut and Eudorud. This mountain is the most gracious nature of the city of Garmi Moghan, But unfortunately, people who go for climbing or visiting are infected with all types of non-recyclable plastics in nature.

-Contaminated water from industry Aras river

One of the major problems of rivers in Iran is pollution with various urban, agricultural and industrial wastewaters that have irrecoverable damages to aquatic, river ecosystems and environment. Aras Creek and Behmanshir River are two rivers of rivers that are surrounded by arable land and small industrial units. The presence of heavy metals such as iron, nickel, zinc, copper,

and lead is one of the pollution problems in these rivers. The use of pesticides in small farms and small industrial wastewater around the Aras river has contaminated the rivers.

-lack of care and attention in Oltan castle

Due to its proximity to the Aras River and the water leakage to the walls of the Oltan castle, this historic site is in danger of being destroyed.

-lack of care and attention in Naderi hill

It is exposed to extinction because of being exposed to the open air and constantly exposed to heat and cold.

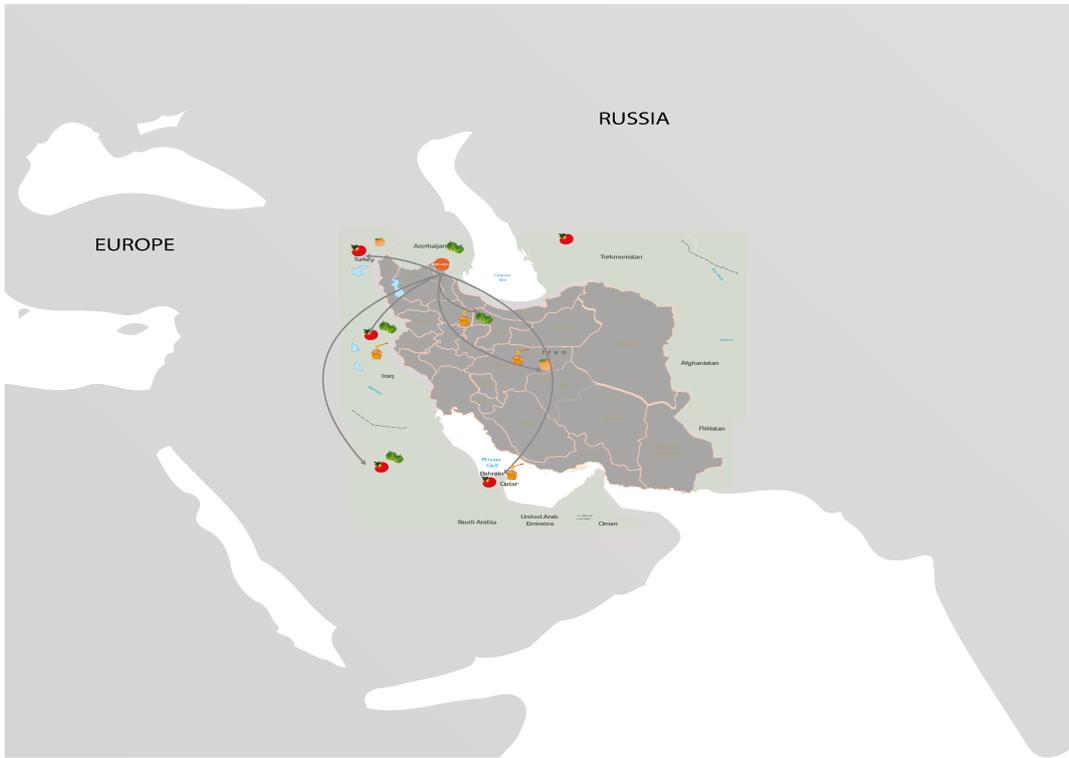
-Illegal hunting

Unfortunately, every year, the vast number of sheltered birds, the only remaining part of the bitterness and rare birds of the Wildlife Bird, has been hunted by predators and predators, even though it has been observed frequently that the nests of these birds are also by individuals. The children of ignorance and sometimes of children have been destroyed, and thus a large number of beautiful and well-deserved birds have been extinct and extinct in the area ..

-lack of care and attention in 40 pelle

The environmental pollution with non-recyclable plastics by tourists is one of the negative aspects of this beautiful and spectacular area.

# Exportation



Parsabad and Moghan territory have an agricultural based economy. parsabad is export a big amount of the food all around the country and even to some neighbor nations.

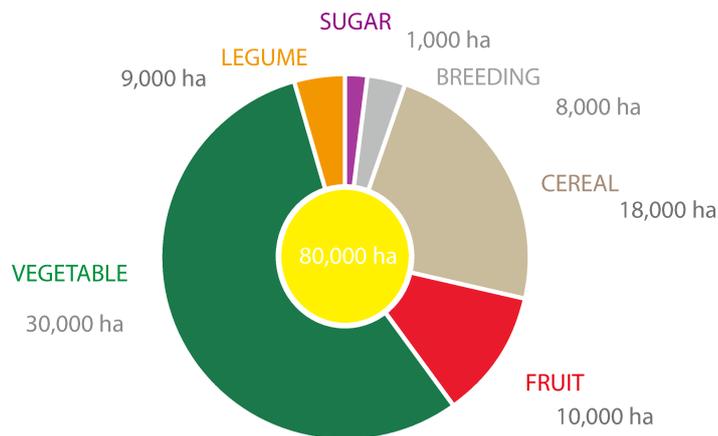
unfortunately, the lack of management for exporting products has contributed to waste over 40% of the products.

A large portion of the needs of fruits and vegetables of countries located in the around the Persian Gulf are supplied by agricultural products produced in this territory.



— **LINEAR** —

# USED AGRICULTURAL SURFACE



In this territory, the utilized agricultural surface is 80,000 ha. this area supplies a big amount of crops and food staff to the population living in the territory and also a lot of territory near that. the largest part of the agricultural surface is dedicated to the cultivation of vegetables around 30,000 h

Cereal is the second most commonly cultivated in that's territory around the 18,000 ha.

Fruit is the third commonly cultivated in the agricultural surface area around 10,000 ha.

## **Current Crops**

In this territory, the utilized agricultural surface is 80,000 ha, this area supplies a big amount of crops and food stuff to the population living in the territory and also some other near and far territories. Intensive farming is a common practice in agriculture nowadays. When practicing the intensive farming methods the aim is to produce more quantity in a smaller portion of land, indifferently the things that must be done to get it. However, the things that must be done do not always measure the consequences that can reverberate in the social and ecological sector, for example, the use of chemical pesticides and fertilizer and the mechanization of the cultivation process.

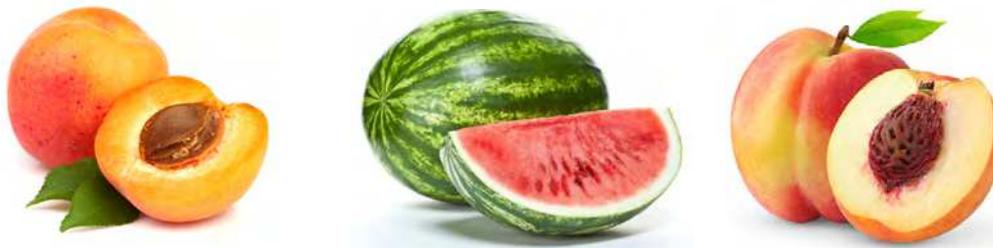
The largest part of the agricultural surface is dedicated to cultivation of vegetables around 37.5 percent of the agricultural land is dedicated to cultivation of this important food stuff.



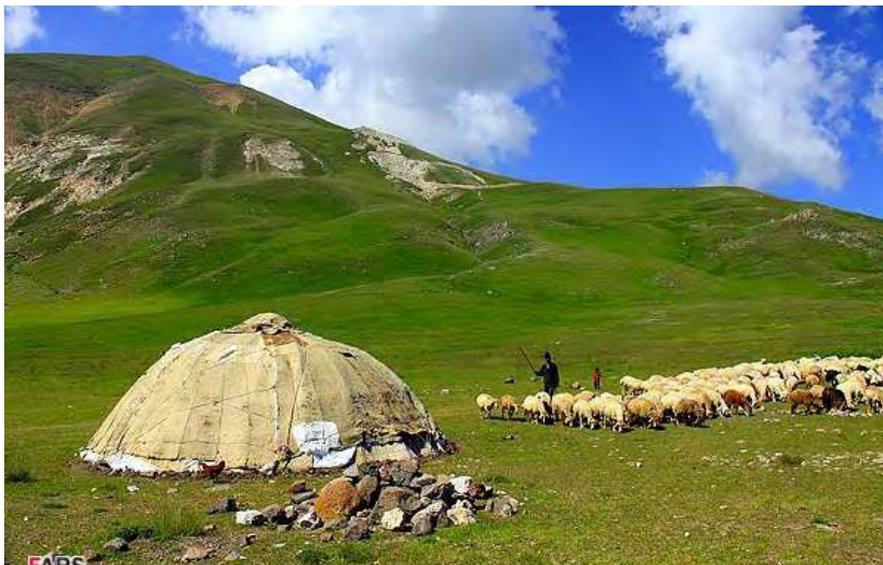
After vegetables, near 18,000 hectares of the cultivated soil belongs to cereal, wheat, corn and barely are the most regularly cultivated crops.



Many type of different fruits are cultivated there such az Watermelon, Grape, Peach, Apricot.



In this territory, 1000 ha of the agricultural surface is dedicated to breeding Meat, Milk, Chiken and egg. A big part of meat and milk in this territory is supplied by Shajsavan Nomads.





# **PROBLEMS OF CURRENT AGRICULTURE**

According to Wikipedia, Linear programming is „a method to achieve the best outcome (such as maximum profit or lowest cost) in a mathematical model whose requirements are represented by linear relationships. Linear programming is a special case of mathematical programming“.

The Linear programming is among the first and most used techniques of the Operational research in agriculture. There are fields of agriculture where the technique of linear programming can be successfully applied for solutions of various problems.

The models in linear programming differ upon many characteristics: the nature of problem to be solved, the size of the model, the level on which the planning refers, etc.

The linear programming is very often used for optimization of the crop production.

Linear programming (LP) technique is relevant in optimization of resource allocation and achieving efficiency in production planning particularly in achieving increased agriculture production of food crops (Rice, Maize,wheat, Pulses and other crops).

Agricultural planning is important in recent times due to the increased demand for the agricultural commodity because of population increase. Due to the increase in population, there is always a need for more production to meet the ever-increasing demand. One way of achieving high productivity is to increase the area under cultivation. Third world countries like India and others are losing land due to population growth and industrialization. As a result, the production of crop per unit area must be increased by proper utilization of resources. Planning of crops is the most crucial factor of agriculture planning. Crops planning depends on several resources like the availability of land, water, labor, and capital . It also requires consideration of methods of irrigation, soil characteristics, cropping pattern, cropping intensity, topography, socio-economic conditions, climate, and many other factors. Farmers use a wide range of production systems, which result in large variations in productivity among farms. Agricultural economics which deals with scientific planning for agricultural development has become an important area of specialization in agriculture. Optimal crop pattern and production of food crops with maximum profit is important information for agricultural planning using optimization methods. Crop yield, manpower, production cost and physical soil type are required to build the method. Economic development and social

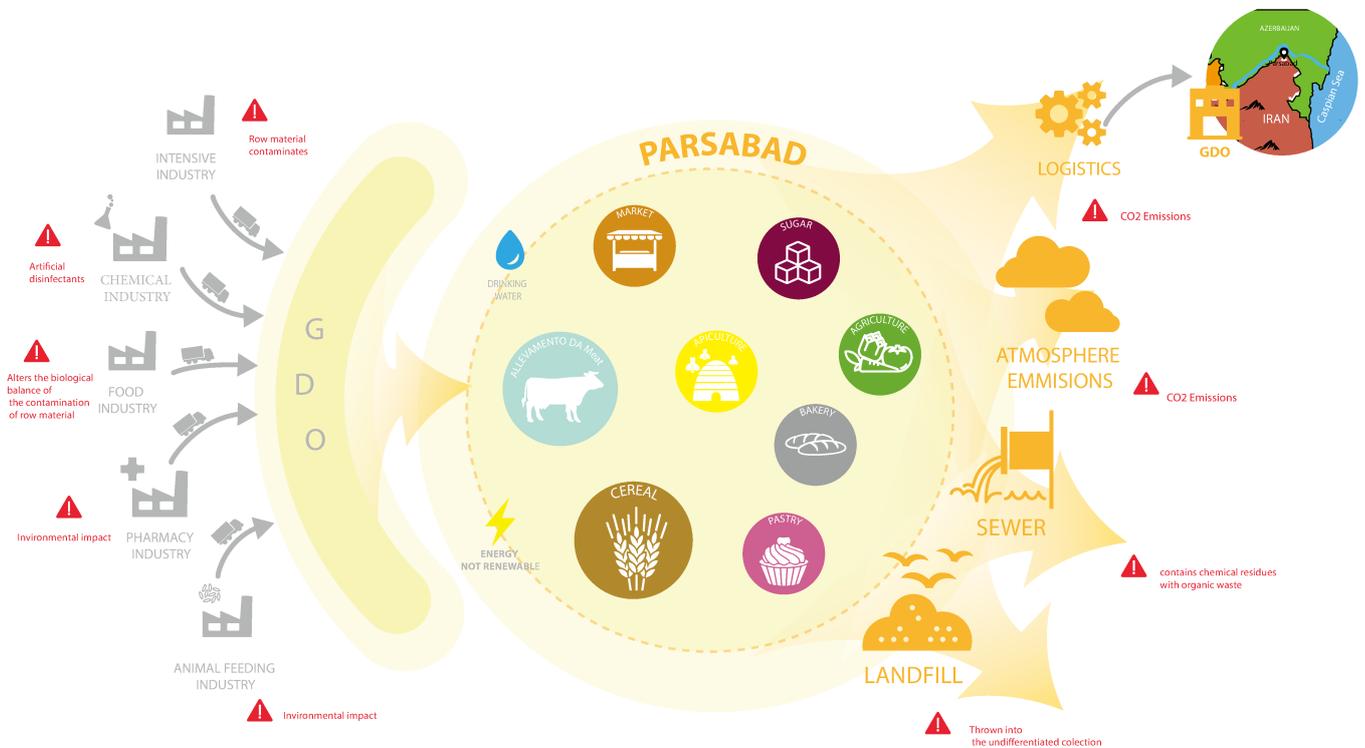
development must be placed in their environmental contexts. The economic goal of increasing gross national product, using more in- puts to produce more goods and services, contains the seeds of its own destruction. increased output brings with it not only goods and services but also more waste products. increased inputs demand more resources. The natural environment is the “sink” for the waste and “source” for the resources. Environmental pollution and depletion of resources are invariably the ancillaries to economic development. The interaction of economic and social development with the natural environment and the reciprocal impacts be- tween human actions and the biophysical world have been recognized by governments from local to international levels, and attempts have been made to manage the interaction better. Pulses and other crops).

Farmed areas – both on land and in the water – provide important habitats for many wild plants and animals. When farming operations are sustainably managed, they can help preserve and restore critical habitats, protect watersheds, and improve soil health and water quality. But when practiced without care, farming presents the greatest threat to species and ecosystems.

Negative environmental impacts from unsustainable farming practices include:

- .Land conversion & habitat loss
- .Wasteful water consumption
- .Soil erosion and degradation
- .Pollution
- .Climate change
- .Genetic erosion

# Critical points of LINEAR





# WATER

## LINEAR

Use of water contamination with industrial discard, detergent, heavy metals



Soil contamination



Water contamination



Plants and fruits contamination



Impact on human and animals



Contribution to the use of drinkable water





# FERTILIZATION

## LINEAR

Use of chemical fertilizers



Soil contamination



EUTROPHICATION of water



Plants and fruits Contamination



Impact on human and animals





# PESTICIDES

## LINEAR

Use of fungicide, insecticide ,  
weed killer to protect ground  
and culture



Contamination of soil



Contamination of water



Contamination  
Plants and fruits with  
chemical substances



Alternation of  
biological balance





# ENERGY

## LINEAR

Use of not renewable energy produced from global market 

Consume of fuel and other resources for transportation



Waste of not renewable resources



Mixing with cleaner forms of energy in the net

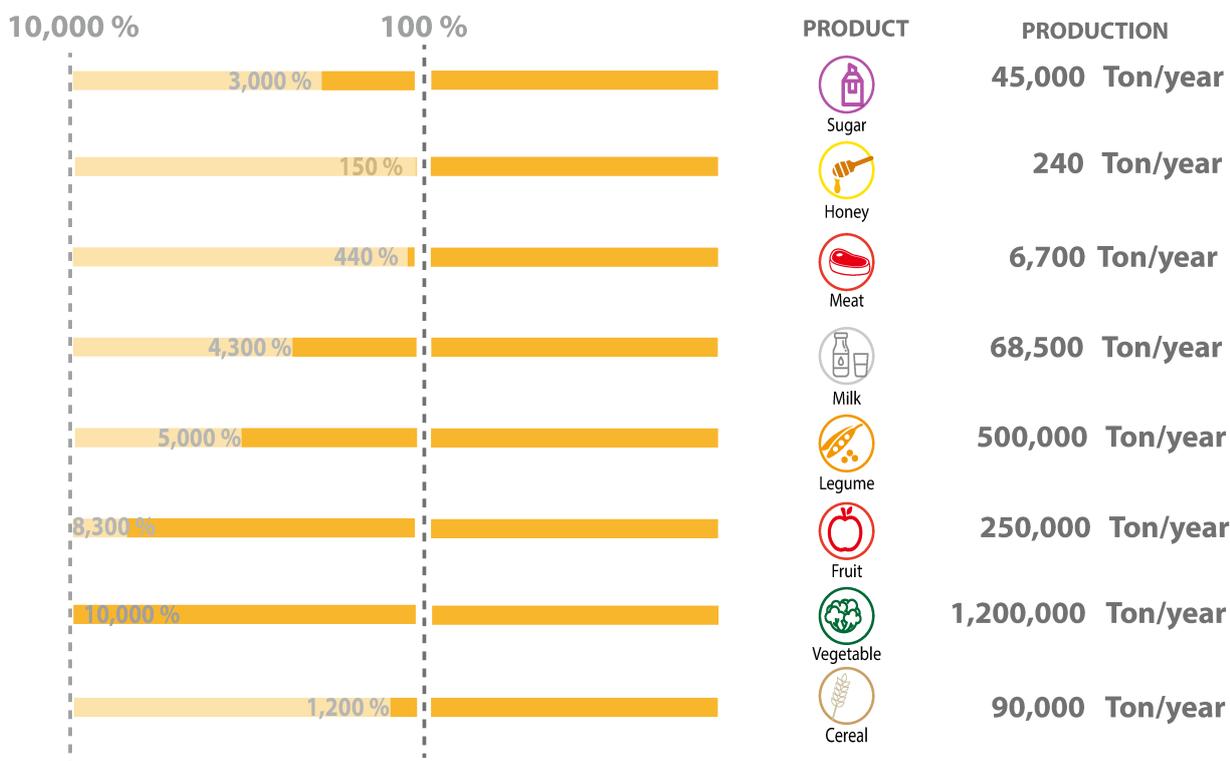


# **LINEAR** **Agriculture**

In order to guarantee the production, the farm will spray pesticide regularly every year, but in at the same time, guarantee the production of pesticides as soil, air and water, permeate every ecological system, has caused incalculable damage to the environment. Greenhouse vegetable production process there is a problem, make the product yield and quality were a great influence. Farmers will unilaterally without disease spot and the pesticide control understanding occurs for prevention, rather than to healthy plants cultivation agriculture comprehensive measures such as the prevention of disease occurs. Is common disease control on "Blocked water to soil, according to the and" disappear coffin not to shed a tear, blindly use chemical prevention and control, often have a variety of mixed pesticides used and the prevention and treatment of diseases, with the dose increase rarely adhere to agriculture, ecology, physical measures such as prevention and treatment of disease. This not only increased the cost of prevention and cure, also bring great difficulty to the production of pollution-free.

# PRODUCTION

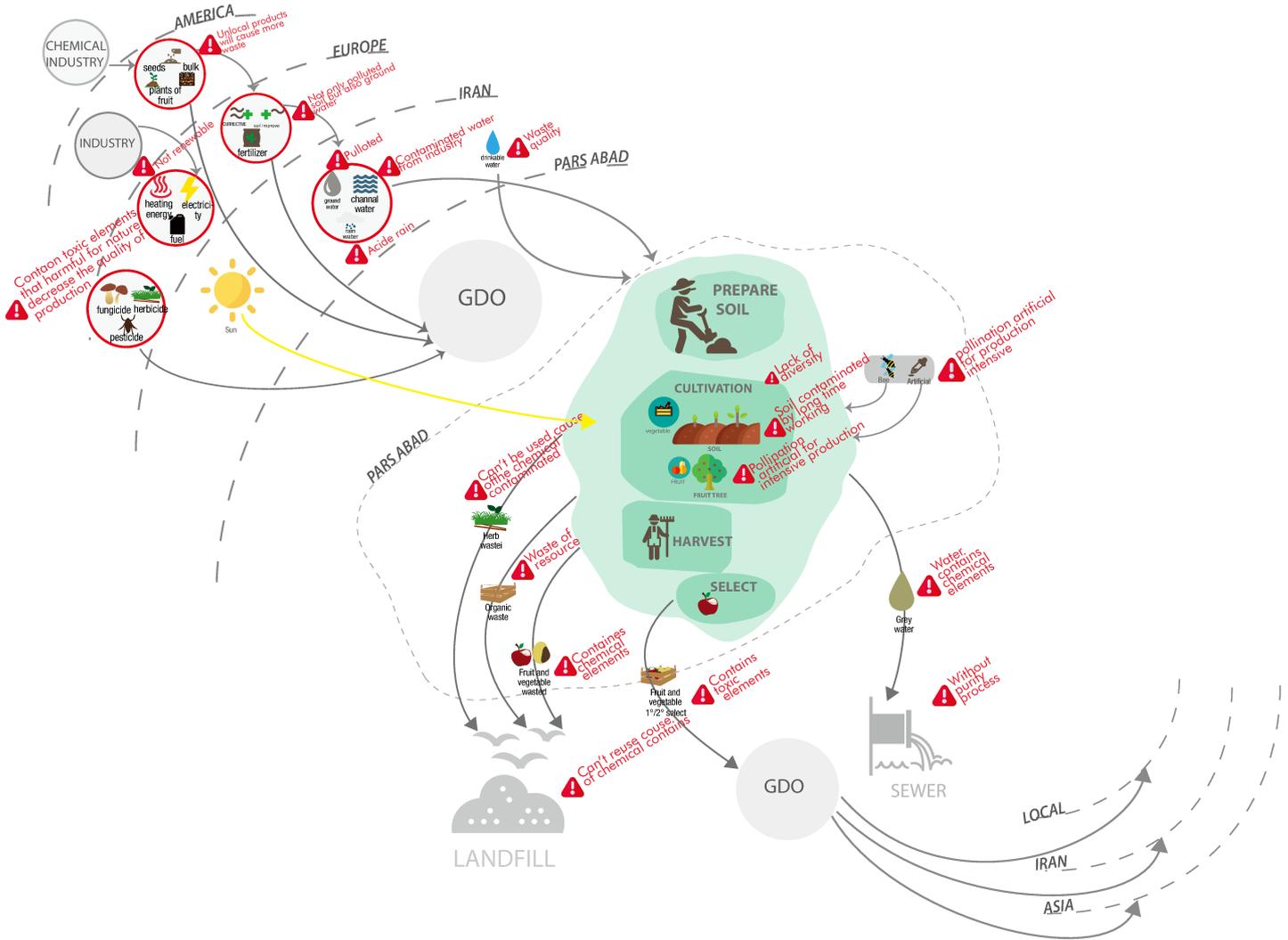
Percentage of the needs



The chart gives information about the proportion of the production percentage of the needs, can be seen about the graph, the highest proportion of percentage of the needs are production of vegetables around the 1,200,000 ton in the year, while the figure for honey is 240 ton in year.

However, the production of all products exceeds 100% of the territory's requirements.

# LINEAR Fruit & vegetables



The current productive model is based on gaining resources on a Global level on buying status through products that age rapidly, in a continuous race, and unconcerned in waste production. this chain of connected actions defines a linear production model.

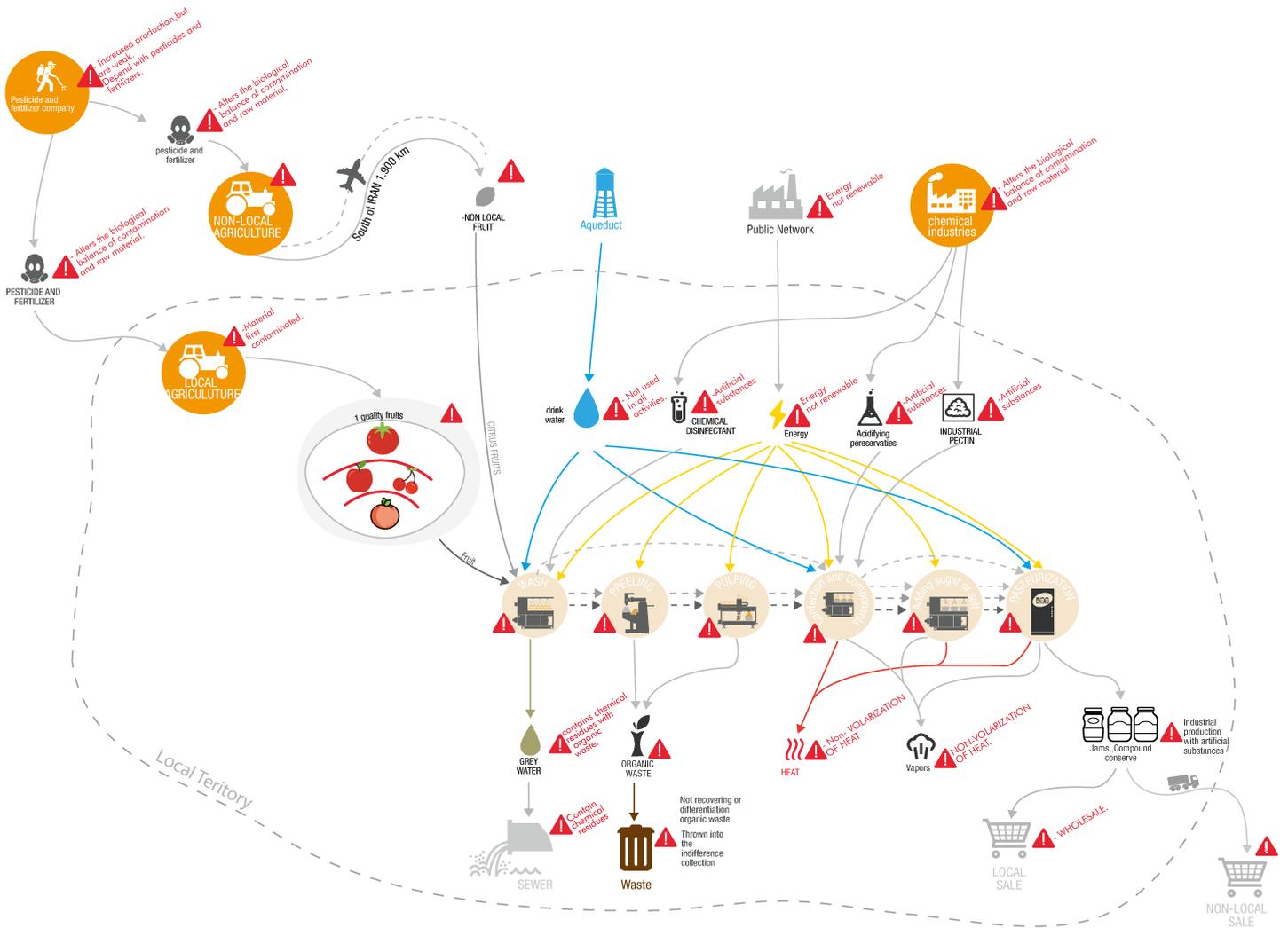
In linear farming methods, unfortunately, the lack of diversity and soil contamination by long time working, the use of fertilizers and chemical pesticides is common because they can produce more crops for less time; on the other hand, they do not use local seeds and they bring it nonlocal or genetically modified seeds, it will cause mass production, and waste of resources.

the final products contain chemicals and toxin elements due to the usage of fertilizers and pesticides.

also from the environmental point of view, these chemical and toxic elements have harmful effects to nature and underground water, soil and as a result, we will have a low quality of the products and intensive cultivation.

however, these are not only problems, this kind of agriculture will cause, environmentally and synthetically but also the big amount of local resources is going to the sewer and landfill by the wrong management of inputs and outputs.

# LINEAR Conservation



The consumption of fruits and vegetables globally has risen sharply, and, given the doctor's recommendations and the importance of health in today's society, there is an increasing demand for these products. Different types of fruits and vegetables are available in different forms, fresh, canned, juices, and vegetables, dried fruits or even frozen foods, and are welcomed to the unique world. Accordingly, the market for these products and their related industries has grown rapidly in recent years and is expected to continue in the coming years. One of the fruit and vegetable industries is the processing industry of these products that are marketed in a variety of compote, juice packets, consumer packaged products, and more. One of the strongest negative points in the canning industry in this area is the use of non-local fruits such as pineapples and mangoes and etc. for the preparation of canned food that may be attributed to the artificial Substances. Also, energy sources are nonrenewable, and it is often used as a high-quality fruit to prepare consonants. materials contain chemical residues with organic waste and do not recover or differentiation organic waste, as a result, we will have the wholesale instead of a local sale.

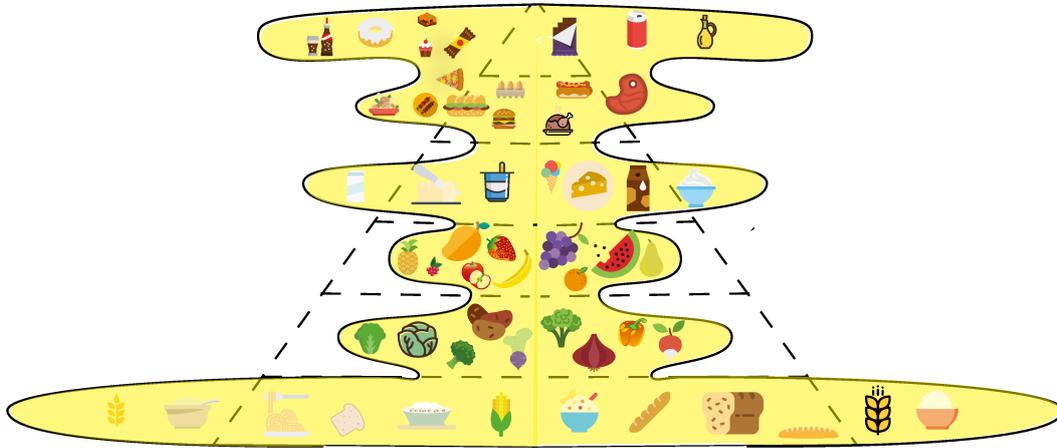
# CONSUMPTION

Looking at the current state of Iranian food habits that have been changed through the last decades. Traditional foods importance has decreased a lot, as it was in the past, except in the villages and perhaps in small towns.

Nutrition in Iran has undergone a transition from traditional and indigenous foods to western and western foods, and the same changes in eating habits have caused negative effects on their health status. One of the reasons for the prevalence of various diseases, such as obesity, cardiovascular disease, diabetes, and cancer, which we call disease civilization, is the changes in the nutrition of communities. If we ask our children how to name a few types of food, it is very likely that they name various Fast-foods than traditional foods and this will remind us of this forgotten place of traditional food.

Food pyramid suggested by health minister of Iran include a balanced diet for the citizen but as it seems in front, the Persian eating habit nowadays is concentrated in a large number of carbohydrates because rice and bread are fixed company with the many dishes and it is even higher than actual need.

The second most consuming group it is oil and sweets, then the red meat and poultry, otherwise the fruit and vegetable are less



**OIL & SWEET** : 6 \* 1800 T      ~ 10,800 T/Year

**PROTEIN** : 2 \* 11,000      ~ 22,000 T/year

**DAIRY** : 2 \* 26,000      ~ 52,000 T/year

**FRUIT** : 0.6 \* 23,000      ~ 13,800 T/year

**VEGETABLE** : 0.8 \* 18,000      ~ 14,400 T/year

than the amount of food pyramid recommended, this type of diet ends with obesity and endanger the health of a citizen.

another main problem in the current way of consumption is that people do not really consider the locality of the ingredient, many fruits, and vegetable are imported from a very long distance, not considering the negative effects this long-distance transportation.



**— SYSTEMIC —**

# **Systemic approach development of agricultural farming**

Ecological agriculture- refers to the protection, under the promise of improving agriculture ecological environment follow the rules of ecology and ecological economies, using system engineering method and modern science and technology, intensive management mode of agricultural development, is in accordance with the principle of ecology and economics principle, applying modern scientific and technological achievements and modern management means, and established effective experience of the traditional agriculture can obtain higher economic benefits of modern agriculture.

System approach offers a possibility of ecological development of the agriculture farmnn.

Ecological agriculture is an agricultural ecological economic compound system, agricultural ecological system with an integrated unified agricultural economic system, the maximum ecological economic efficiency and reduce the pollution to the environment as a whole. it is agriculture,forestry, animal husbandry, fisheries various combined agriculture, industry and agriculture production, processing and marketing together to adapt to the market economy in the development of modern agriculture.

Ecological agriculture is based on ecology theory as the leading factor, using system engineering method , for the rational utilization of agricultural natural resources and protect the good ecological environment as the prerequisite, adjust measures to local conditions to plan organize and conduct the agricultural production of a kind of agriculture . mainly by increasing the fixed rate of solar energy and utilization, biomass conversion , the utilization rate of waste recycling,etc., to promote the material inside the agricultural ecosystem recycling and reuse for many times, with a little investment, worked out the production of as much as possible and get the production development, energy reuse, ecological environment protection, the unity of economic benefits, such a comprehensive effect, make the agricultural production in the virtuous circle.

Now many have obvious increase production efficiency mode of ecological agriculture, such as rice-fish, ping, grain, fruit, lin intercropping mode, the main body of agriculture farming, forestry, animal husbandry, grain , mulberry, fishing and planting and raising compound ecosystem models, such a chicken manure , the fish and other organic waste multistage comprehensive utiliza

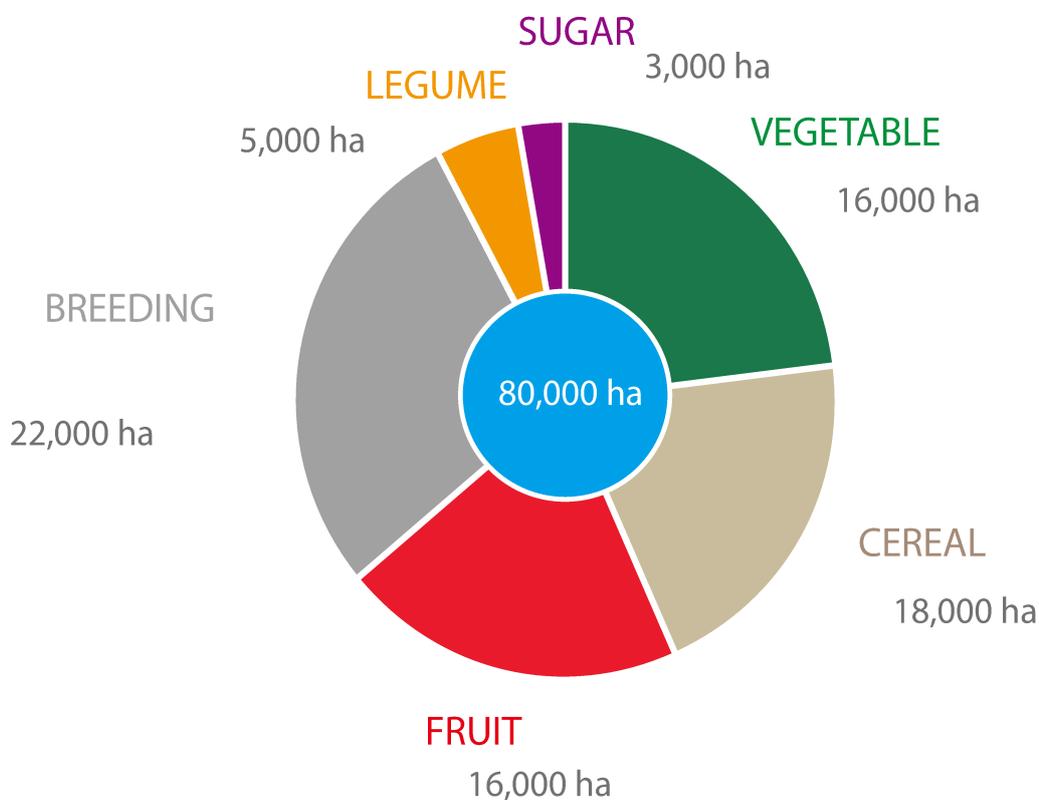
tion pattern. Ecological agriculture production to sustainable use of resources and ecological environment production as the premise, according to the life in harmony with the environment to adapt to species optimization combination, energy efficient, input and output balance principle, using system engineering method, rely on modern science and technology and social economic information input and organize production.

Through the food chain network, agricultural wastes, give full play to resource potential.

all wastes And species diversity advantage, set up benign substance circulation system, promote steady development of agriculture and realize the unification of the economic, social and ecological benefits.

Therefore the ecological agriculture is a kind of knowledge intensive system of modern agriculture, is a new model of agriculture development.

# USED AGRICULTURAL SURFACE

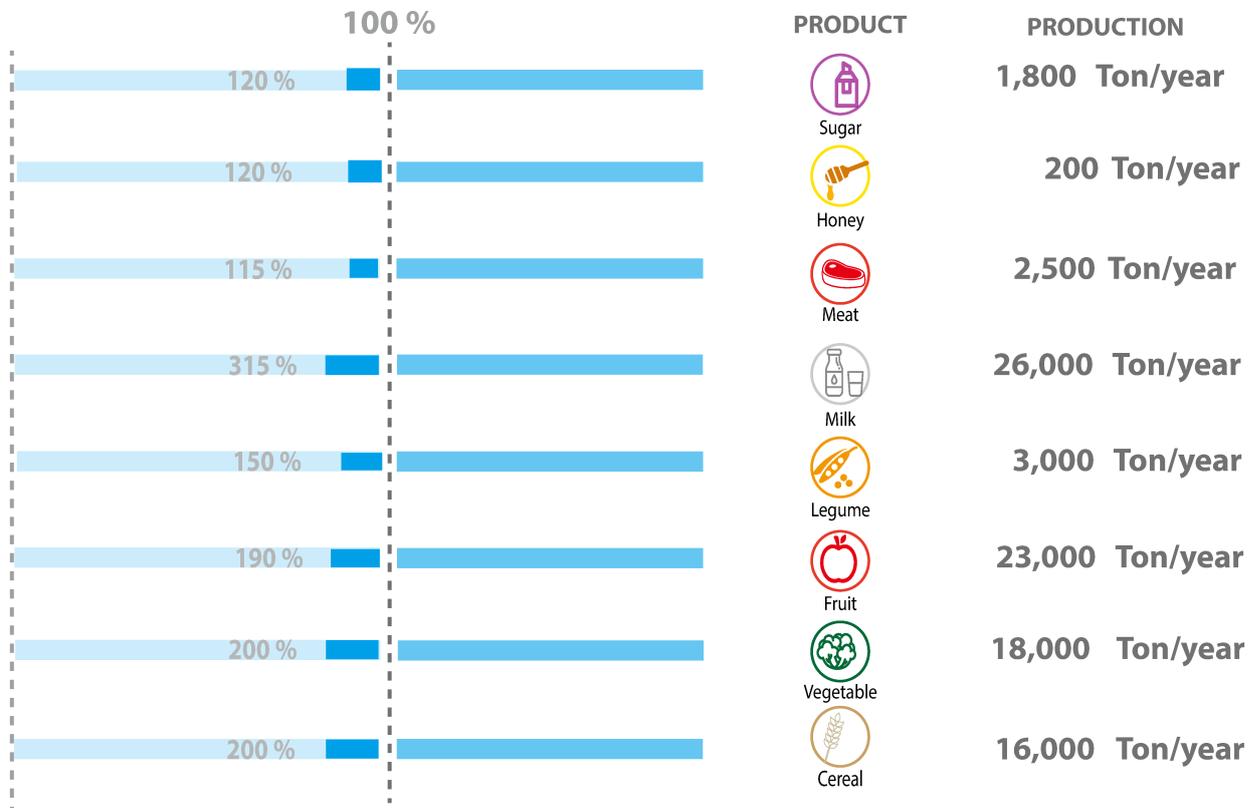


Changing the amount of production of each agricultural crop requires making change in the utilized agricultural surface. Agricultural surface is around 80,000 hectares and in the current situation near the 30,000 ha of the land is under cultivation of vegetables, but after reprogramming the production of the territory breeding is a very important of the healthy diet and the dedicated the difference is used to increase the production of fruit, sugar.

Dairy products is a very important of the healthy diet

# PRODUCTION

Percentage of the needs



In the systemic territorial production design, the target is to supply the demand of the population living in the territory to the highest possible proportion. the systemic approach generates a zero waste production model as nature does. there's a complete change in the values; the economy is based on the complete use of matter, flowing and changing through various phases and activating relations.in systemic production, the amount of production will fulfill the population need and near territories.

# INTERCHANGE

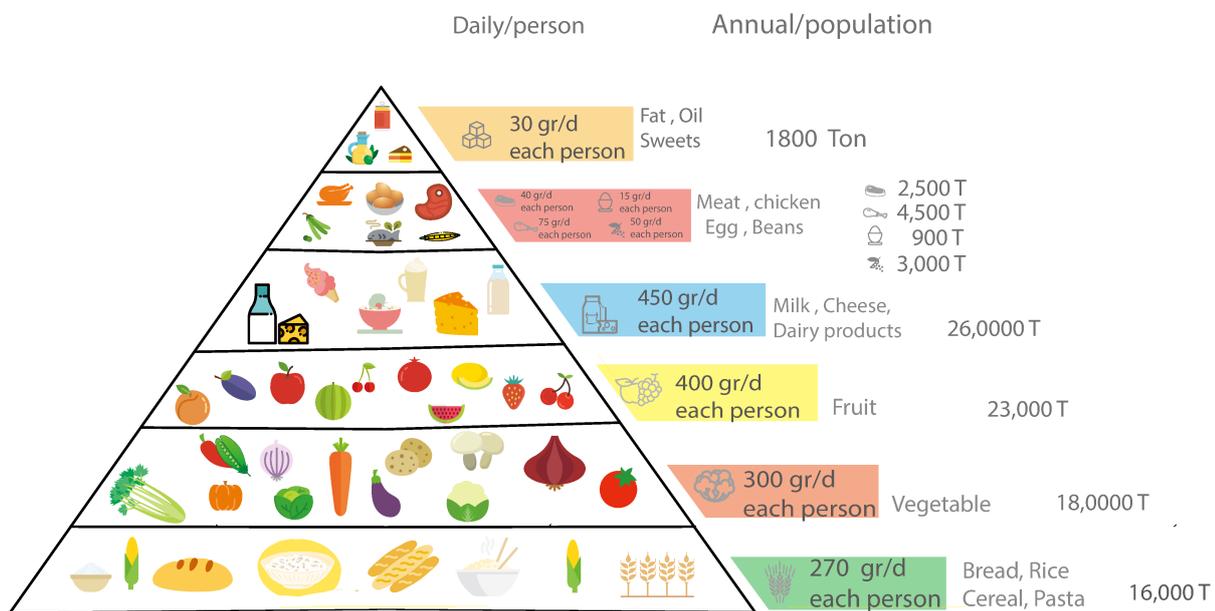
In this territory due to the specific climate situation and local potentialities, there is not the possibility of producing every ingredient used for food preparation by the consumers; ingredients such as salt or oil are the main ones which should be supplied through neighbour territories and it is always suggested by systemic design to fulfill the needs from the nearest possible territories.

On the other hand there are many different food ingredients that after applying systemic approach on the territory, due to the balanced diet of citizens and systemic managing of the resources which prevent waste, are produced more than the need of people living on the territory. Some part of this extra amount is conserved for cold seasons and some part could be transported to the neighbour territories which face with the lack of supply seasonally. Also there are some conserved food ingredients which could be subject of interchange. For this aim, systemic design suggests a local network of distribution and transportation which always prioritize the nearest neighbour as the destination of this interchange; first on the provincial and then national level.

# LOCAL CUNSUMPTION

The effectiveness of bioactive food components in promoting human health and well-being is the result of complex interactions of food composition, predisposition/lifestyle factors, and the gut microbiome. All three are subject to genetic and environmental variation.

To most effectively utilize food or food bioactive compounds to promote human health and reduce chronic disease requires a clear understanding of these interactions. Food nutritive value can readily be altered through genetic and environmental manipulation; understood about their complex interactions and their role in promoting human health. Acquisition of this knowledge, which requires a systems biology proach, could allow us to tailor optimal nutrition programs for each individual for maximum effect in promoting human health and reducing chronic disease.



In the systemic food system the design starts from the necessity and therefore consumption pattern plays a very important role in the food system.

The average current diet is based on a low variety of foods, often industrially produced and too refined and causes nutritional imbalance. to properly analyze a regional potential, it is important to cross-check its agricultural features with that of the balanced and healthy diet. Considering that the area is very rich in fruits and vegetables, 23,000 tonnes/year of fruit in highest and 18,000 tonnes/year of vegetables per year can produce a healthier diet.

and also pay attention to the seasonality of crops in order to always eat the freshest crops with the highest quality.

## **Management and Energy Consumption in Sustainable Agriculture**

Agriculture has greatly changed the structure and operation of natural ecosystems as the most important way of providing human food. Human exploitation of natural resources is always unilateral and extrinsic, and the exploitation of these resources without observing its protective aspects and solely on the basis of short-term interests. The growing population and the food shortage crisis have caused excessive exploitation of natural resources and, consequently, a deterioration of the biological balance. Excessive use of chemicals in agriculture has led to various environmental problems. Sustainable agriculture refers to the proper management of agricultural resources that is used to meet the changing needs of humans while preserving and even improving the natural resources as well as the quality of the environment. Sustainable agriculture is beneficial and sustainable, based on the preservation of natural resources. This agricultural method is the most economical and at the same time the most beneficial way to use energy and convert it into agricultural products, without degrading soil fertility and environmental quality.

The Importance of Biological Fertilizers: Nowadays, given the environmental and chemical pollution that comes from the use of fertilizers, experts are urged to use more soil organisms to meet the plant's nutritional needs, thus producing and consuming biological fertilizers. The title is the most important development in the field of agriculture and has attracted investors from the agricultural sector worldwide.

#### The Benefits of Using Biological Fertilizers

- Economic saving is one of the most important uses of biological fertilizers. Replacing biohazardous fertilizers rather than fertilizers offers good economic benefits for farmers and the country.
- There are many environmental benefits.
- Conservation and development of Soil Productivity in spite of the increase in Soil Fertility.
- Preventing contamination of soil and surface water and underground water sources caused by the remaining chemical fertilizers.
- Prevent the development of diseases caused by water and contaminated products.

- In addition to creating and sustaining the available resources in the soil, it increases the production potential in the long run and reduces environmental pollution.

-Weed control in organic farming

Weeds have long been considered as rivals of crops to reduce their production. One of the main ways of combating weeds is the use of herbicides, which have become widespread today. Given the high cost of poisoning and the environmental impact of it today, researchers are trying to use a variety of agronomic methods, such as rotation, plowing methods, or biological methods such as the use of insects and pathogens to reduce the contribution Toxins take control of weeds. None of the methods used in organic farming alone can replace herbicides, and we must always combine these methods to control weeds. It should be noted that if the selection and application of these methods are based on the study and the conditions of the region, it will greatly reduce the use of herbicides and consequently reduce the environmental impact of their use.

Organic farming is based on certain principles that familiarity with these principles is essential for a better understanding of organic agriculture. These principles have provided the basis for the development of organic agriculture and have led to the improvement and promotion of global agriculture. Because of the people's daily need for nutrition, agriculture is one of the most important and most human activities from the beginning to the present and in the future.

History, social and cultural values have surrounded agriculture. Applying these principles to agriculture depends on having a broad sense of responsibility in protecting soil, water, plants and animals, and the instructions for the production, processing and distribution of food and other goods. The belief in That human life has a strong dependence on the dynamics of gardens and they are a valuable heritage for future generations.



# PESTICIDES

## SYSTEMIC



Insertion of colonies  
of other insects

Disinfection with  
natural products

Fortification of plants  
through alternation with  
other plants, herbs, trees

Fortification of the  
ground through  
crop rotation



**No contamination with  
chemical substances**



**Increase of  
biodiversity**



**Increase of different  
types of products**



# ENERGY

## SYSTEMIC



Use of deputed water  
with natural system



No waste of resources and  
materials from transportation



Local production and  
consumption



No waste of energy



# FERTILIZATION

## SYSTEMIC



Use of animal manure, compost and natural, fertilizers



**No contamination**



**NO IMPACT** to human and animals



Contribution with **NOURSHING SUBSTANCES**



**INTERCONNECTION WITH OTHER LOCAL ACTIVITIES**



# WATER

## SYSTEMIC



Use of deputed water  
with natural system



No contamination

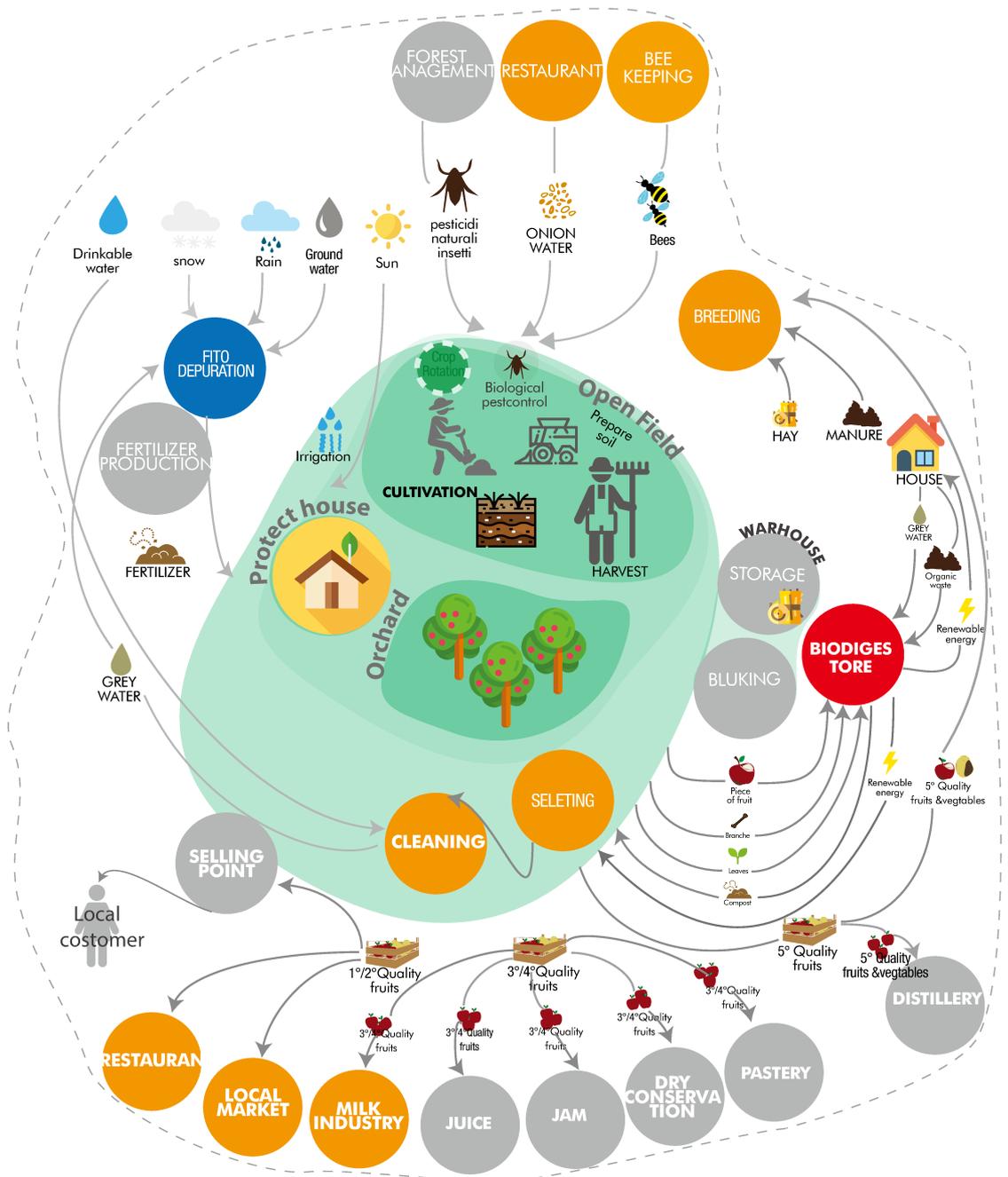


Reuse of grey water



Contribution with nourishing  
substances

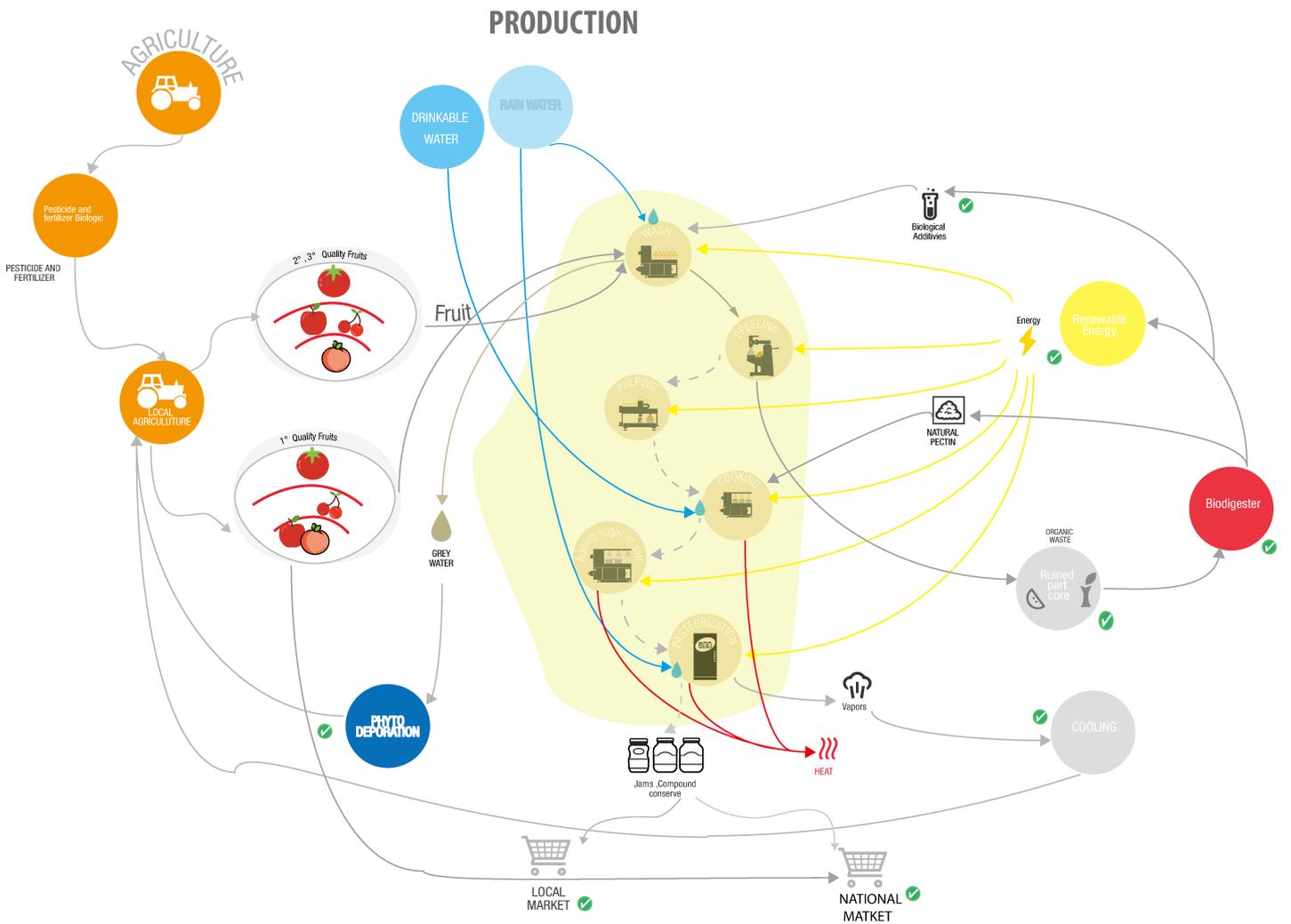
# SYSTEMIC Fruit and Vegetable



this scheme has been showed the production of fruit and vegetable in the systemic model.as it shown the largest amount of water usage is from Rain and resources and inputs are the non-chemical substitute.Sustainable crop production is a way of growing or raising food in an ecological and ethical manner.This includes observing agricultural and food production practices not to harm the environment or biodiversity, to support and sustain local communities and provide fair treatment to workers. some new activity is generated that has been shown by Orange color. the new system is generated by eliminating the negative effects of current (linear) mode.the waste has been eliminated and the crops are bio because it hast biological pest control, the connection between the agriculture and restaurant or direct selling point generate the new relationship between the consumer and producer that cut the brokers role in between.

after the crop has cultivated, it is going to separate base on it is quality, unlike the previous system, that the 3rd and 4th quality directly counts as waste, but in the new system the first and second quality is going to the market and restaurant, and lower quality has also the usage for other activity like juice and jam production, or conservation and pastry, even the seeds are coming back to the system to produce local seeds as an input for agricultural activities.

# SYSTEMIC CONSERVATION



As can be seen in the scheme of conservation of fruits and vegetables in systemic approach shows changing the inputs and outputs without any waste. Due to the mass production of agricultural products in this territory, the conservation of the second and third-grade products helped to reduce the droughts by more than 40% of the production that we saw in the current agriculture. the first quality of fruits can sell in the national market. using of biological additives and also renewable energy resources can help to energy saving. however for recycling the organic waste we can use the Biodigester system that can link again to energy and natural pectin, and grey water that after using for washing the fruit we can use the phytodeporation.

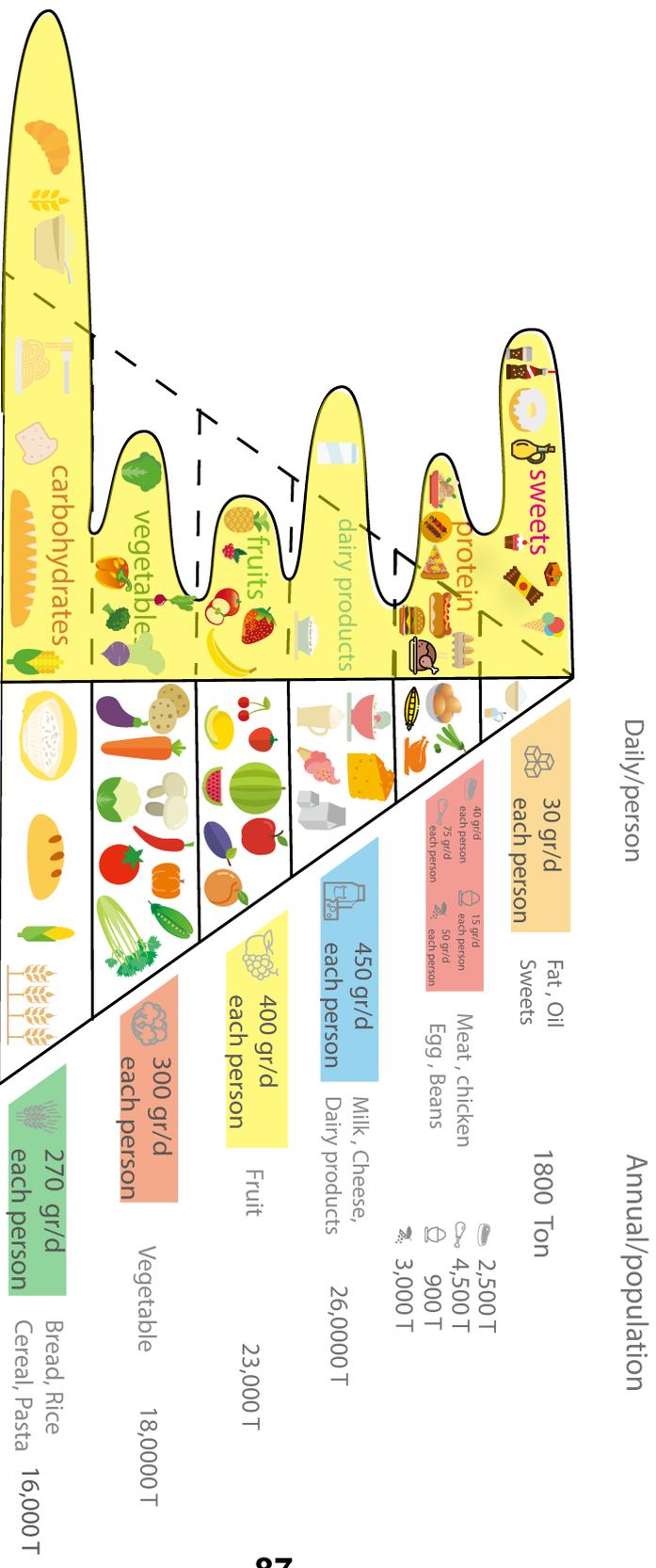
also, create new jobs in the territory and the local economy of the territory It is possible to increase the variety of salad products if it observes the health aspects and the correct packaging of good-quality products, In fact, it will help preserve the environment.



# ———— Comparison ————

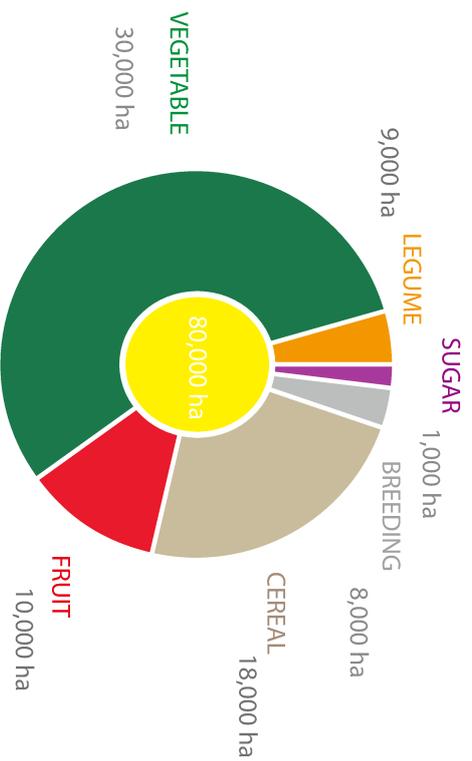
# LINEAR Consumption

# SYSTEMIC

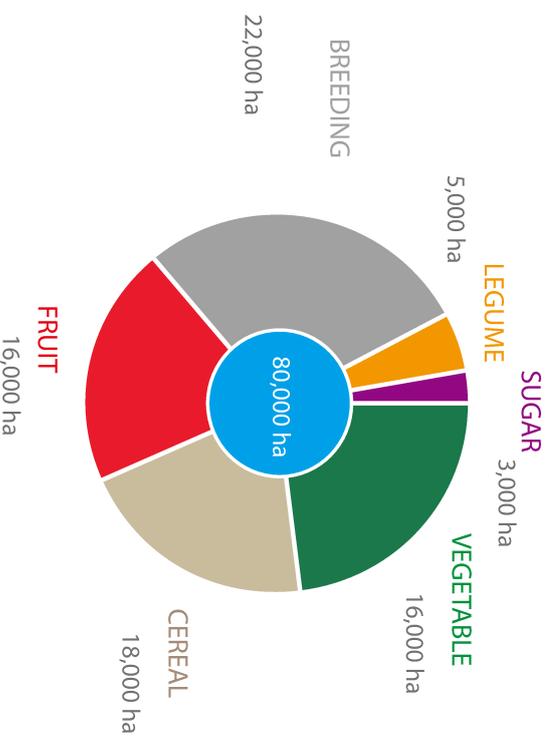


# Utilized agricultural surface

## LINEAR



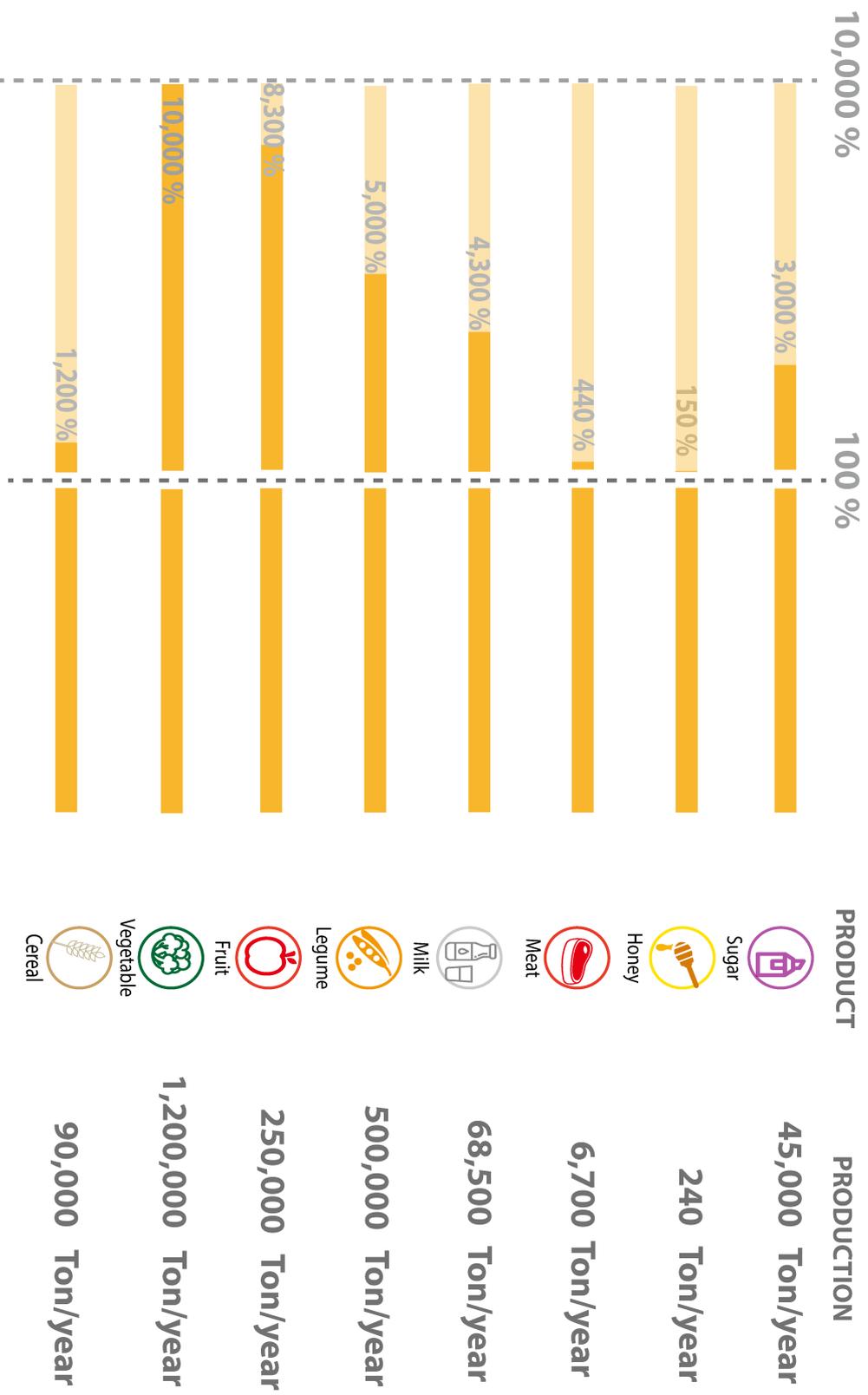
## SYSTEMIC



# LINEAR

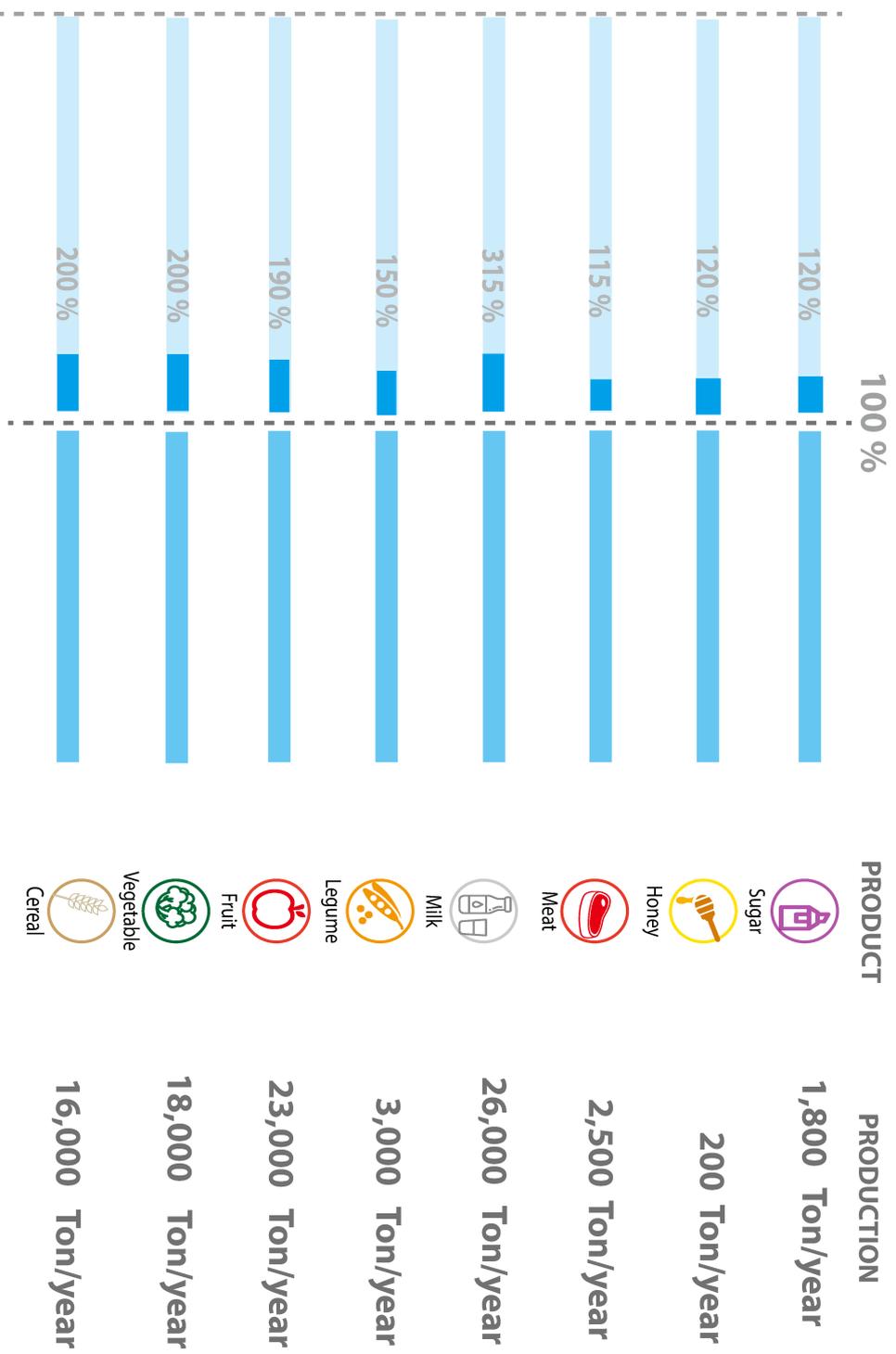
## PRODUCTION

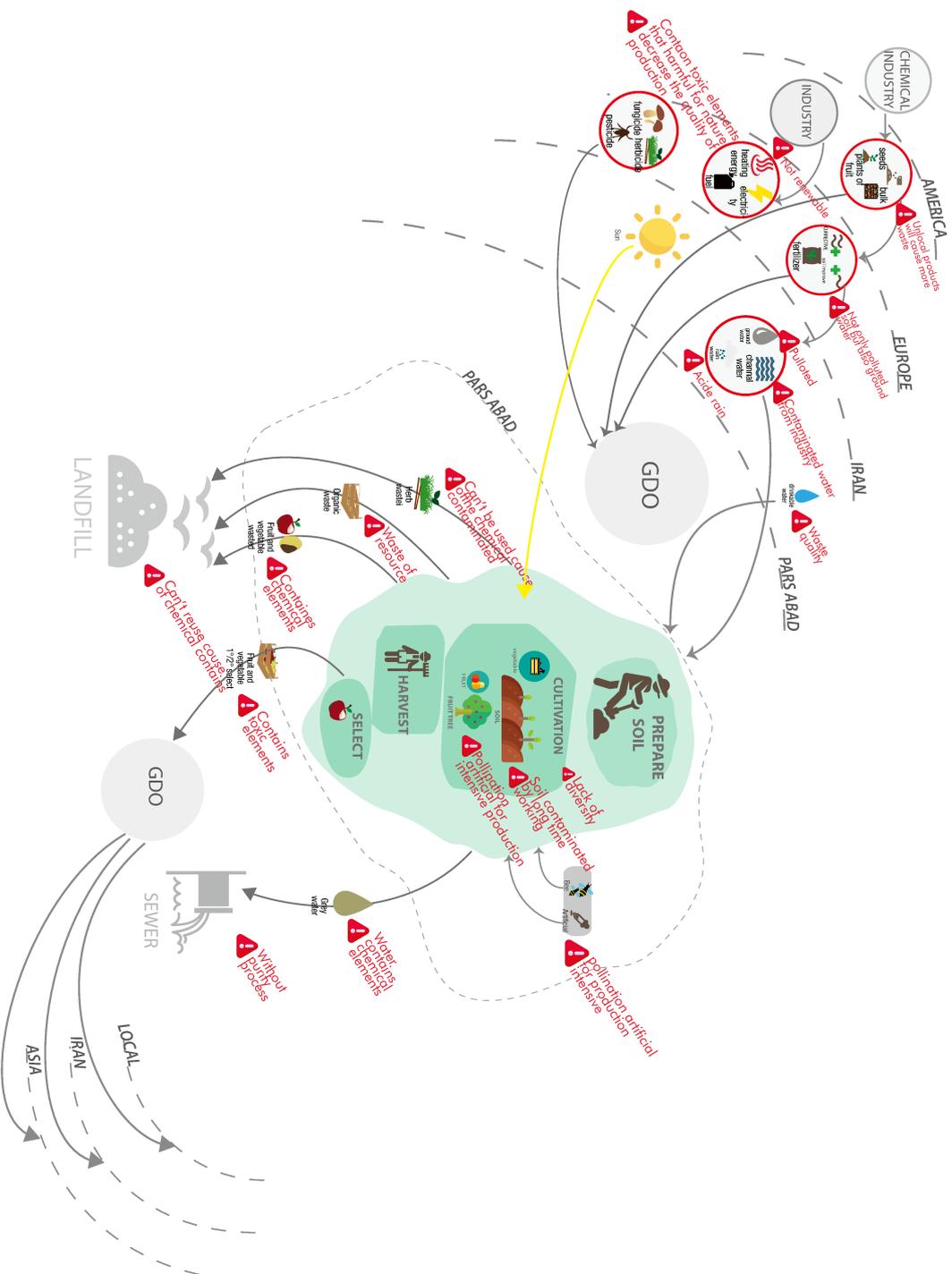
### Percentage of the needs



# SYSTEMIC

## PRODUCTION Percentage of the needs









# Conclusion

In fact, the Parsabad area due to the possession of a large part of the Moghan plain; one of the largest agricultural poles in Iran. According to my research, it was in fact in the linear agriculture; the territory's production was more than 100% But unfortunately, with over 40% of the discarded products due to lack of proper management of the territory's products.

The value of the system approach is found in the interaction of species in the territory. a systemic approach is required to create a set of relationships in which a system output becomes the input for another one. the creation of a relationship network is then promoted, producing in general wellness improvement in people. Eventually, by systemic approach in this territory ; in fact, by changing the habits, including the use of more fruits and vegetables for health, and the located of an industrial town in this territory, it is possible to grow the economy and also use plant protection products to protect This rich and plentiful territory of production has been achieved.

this will lead to the creation of new local products. With Moghan Plain and Moghan Agro-Industry Co., this territory can be a powerful economic pole in Iran using its abilities and mass

production. With proper planning and utilization of modern equipment, export of products to all over Iran as well as outside of Iran will play a significant role in economic growth.

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