

Local Food

Local food is a movement of "think global, act local". It is a "collaborative effort to build more locally based, self-reliant food economies - one in which sustainable food production, processing, distribution, and consumption is integrated to enhance the economic, environmental and social health of a particular place."^[1] It is a preference to buy locally produced goods and services rather than those produced by corporatized institutions.

Resources

(1) Feenstra, G. (2002) Creating space for sustainable food systems: lessons from the field. *Agriculture and Human Values*. 19(2), 99-106.

t?f

The Why Factory

LOCAL FOOD CITY

Tutors: Ulf Hackauf - Huib Plomp

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2.

Calculation Formula

Agriculture Farming Surface Calculation Formula

Need

Kcal/day

÷

Ingredients

Kcal/Kg

=

Food Eaten

Kg/day

Food Eaten

Kg/day

×

Waste

% (percentage)

=

Food Produced

Kg/day

365 (days)

×

Food Produced

Kg/day

÷

Yield

Kg/year

=

Area/p.p.

m2/p.p.

Local food system, which is very different from global food system, is a "collaborative effort to build more locally based, self-reliant food economies - one in which sustainable food production, processing, distribution, and consumption is integrated to enhance the economic, environmental and social health of a particular place."

Resources:
(1) Feenstra, G. (2002) Creating space for sustainable food systems: lessons from the field. Agriculture and Human Values. 19(2). 99-106.

This chapter describes its characteristics, organization, and finally summarizes its three most important characteristics.

3.

Local Food

Think Global, Act Local

Local Food System

Local Food Organization Model

Community Based Food System

Local Cooperative

Diversity Value

Agritourism

3.1

General Introduction

Think Global, Act Local

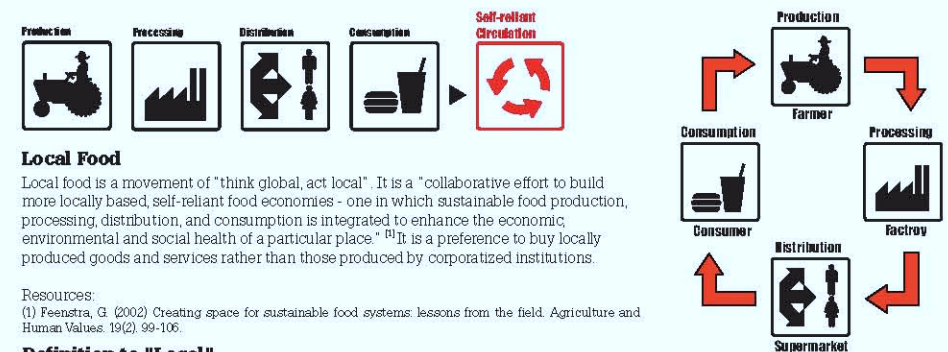
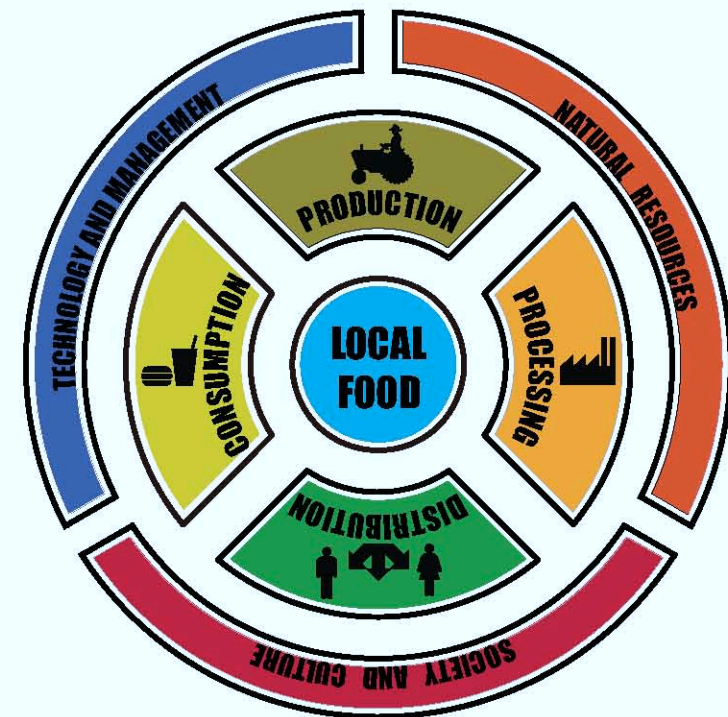
Local Food System

Advantage of Local Food System

Disadvantage of Local Food System

Local Food Organization Model

Local Food System



Local Food

Local food is a movement of "think global, act local". It is a "collaborative effort to build more locally based, self-reliant food economies - one in which sustainable food production, processing, distribution, and consumption is integrated to enhance the economic, environmental and social health of a particular place." ^[1] It is a preference to buy locally produced goods and services rather than those produced by corporatized institutions.

Resources:

(1) Feenstra, G. (2002) Creating space for sustainable food systems: lessons from the field. *Agriculture and Human Values*. 19(2), 99-106.

Definition to "Local"

In 2008 Congress passed H.R. 2419, which amended the "Consolidated Farm and Rural Development Act". In the amendment "locally" and "regionally" are grouped together and are defined as:

"(I) the locality or region in which the final product is marketed, so that the total distance that the product is transported is less than 400 miles from the origin of the product; or
(II) the State in which the product is produced." ^[2]

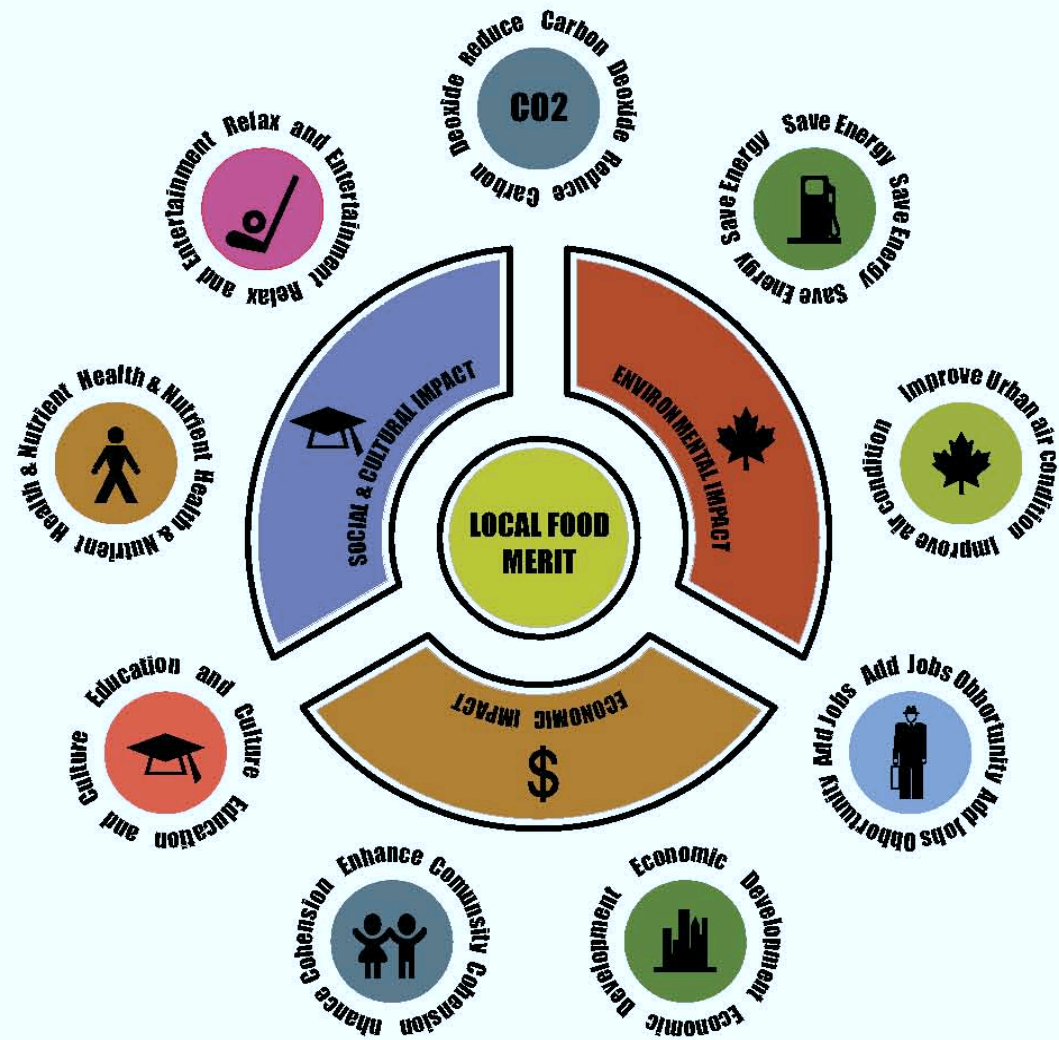
—Bill Text - 110th Congress (2007-2008) - THOMAS (Library of Congress)

In May 2010 the USDA acknowledged this definition.

Resources:

(2) Definition to "local": <http://thomas.loc.gov/cgi-bin/query/z?c110:h2419>.

Advantage of Local Food System



Three Advantages of Local Food

Environmental Impact

Food miles are one factor used when assessing the environmental impact of food, including the impact on global warming. Local food can largely reduce the environmental impact of food miles.

A low carbon diet minimizes the emissions released from the production, packaging, processing, transport, preparation and waste of food.

Economical Impact

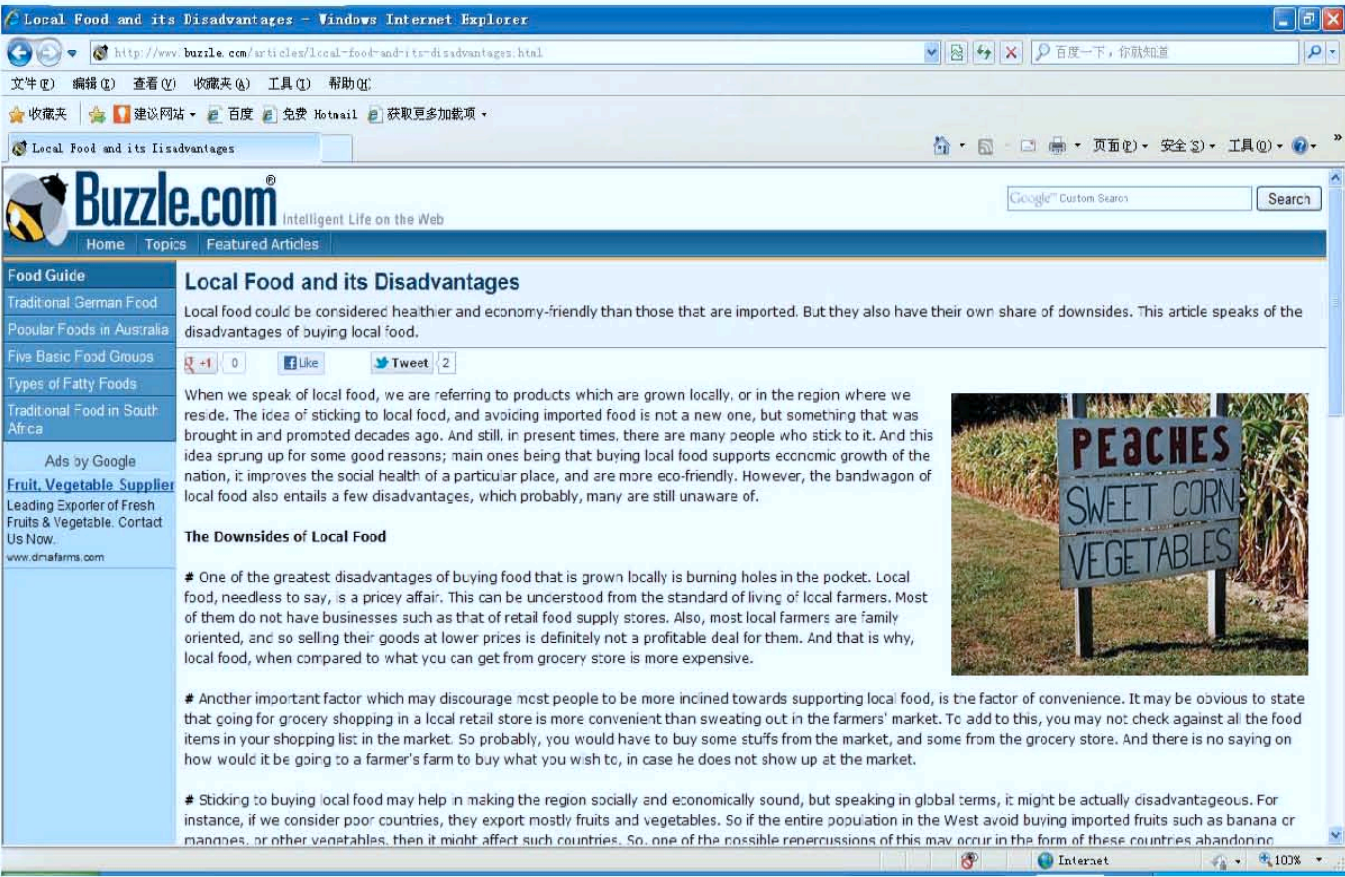
Local food systems have a positive and potential impact on the local economic development. It is very common that the impact of local food to the economic development-in the form of income and employment growth-in the researches by numbers of scholars to local foods. The most obvious and most direct way of local food systems to the local economy is through import substitution. We can imagine that, if consumers buy food produced in the local region, rather than imported products, the economy level of local consumers and merchants are more likely to be raised.

Social and Cultural Impact

Garden-based learning is essentially an instructional strategy, which utilizes the garden as a teaching tool, in local food system. The practice of garden-based learning is a growing global phenomenon. In some settings it is the educational curriculum and in others it supports or enriches the curriculum.

The relationship between local foods and healthy food items, such as fresh fruits and vegetables, has led to claims that local food systems may provide health benefits from improved nutrition, obesity prevention, and a reduced risk of chronic diet-related disease.

Disadvantage of Local Food System



Disadvantages of Local Food System

However, just like the both sides of the coin, there are also disadvantages.

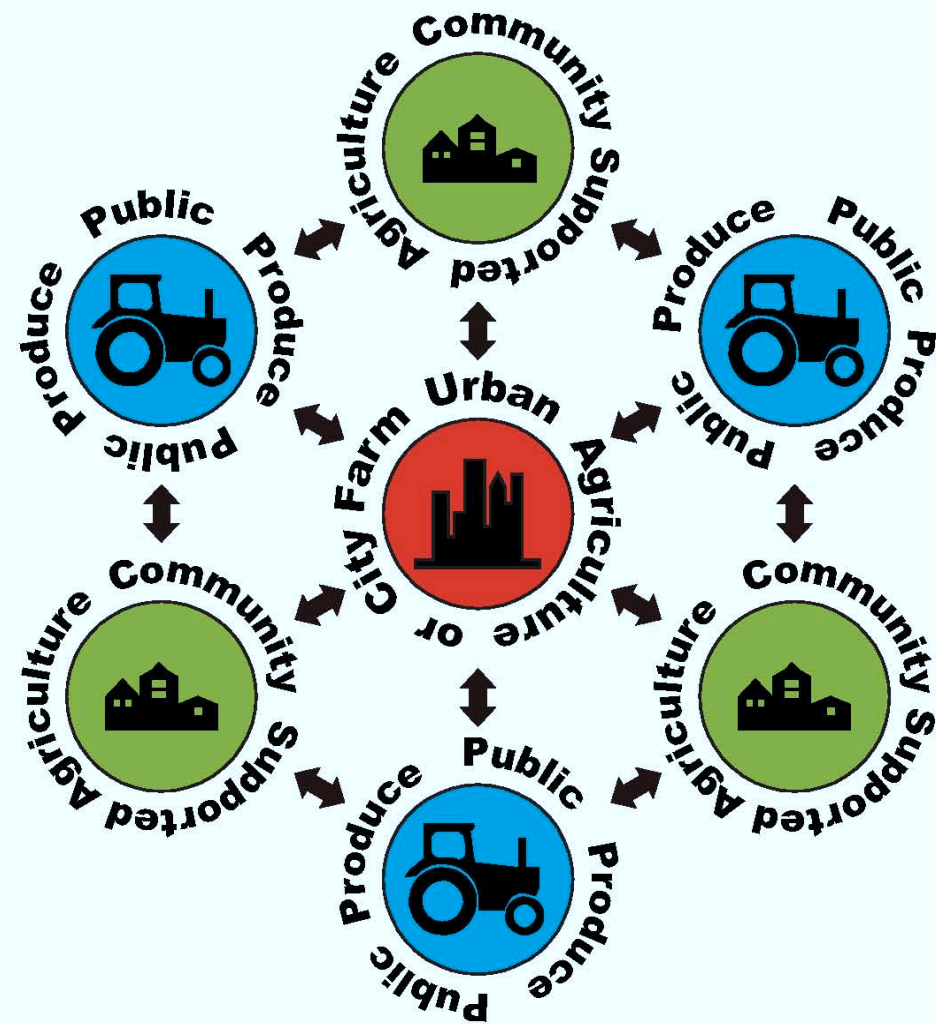
When we speak of local food, we are referring to products which are grown locally, or in the region where we reside. The idea of sticking to local food, and avoiding imported food is not a new one, but something that was brought in and promoted decades ago. And still, in present times, there are many people who stick to it. And this idea sprung up for some good reasons; main ones being that buying local food supports economic growth of the nation, it improves the social health of a particular place, and are more eco-friendly. However, the bandwagon of local food also entails a few disadvantages, which probably, many are still unaware of^[1]

Generally, local food system has following disadvantages:^[1]

1. One of the greatest disadvantages of buying food that is grown locally is burning holes in the pocket.
2. Sticking to buying local food may help in making the region socially and economically sound, but speaking in global terms, it might be actually disadvantageous.
3. There is no denial to the fact that locally, all varieties of food cannot be grown, and supplied to the consumers.
4. And another concern, that may surface with local food, is the subject of regulation or certification. Most farmers owing small farms are not regulated thus, you may never be sure if what they label as organic fruits or vegetables, are really organic or not.
5. Buying local food and its disadvantages may make more sense to people living in colder climates like Iceland. In such areas, if people happen to support local farming, then they may not have a healthy lifestyle.

Resources:
<http://www.buzzle.com/articles/local-food-and-its-disadvantages.html>

Organization Model Of Local Food System



Urban Agriculture



Vertical Farm Tower Urban Roof Farm Facade Farm

Urban agriculture is the practice of cultivating, processing and distributing food in, or around, a village, town or city. Urban agriculture in addition can also involve animal husbandry, aquaculture, agro-forestry and horticulture. These activities also occur in peri-urban areas.

Community Supported Agriculture (CSA)



Urban Community Suburb Community Countryside Community

A form of an alternative food network, CSA is a socio-economic model of agriculture and food distribution. A CSA consists of a community of individuals who pledge support to a farming operation where the growers and consumers share the risks and benefits of food production.

Public Agriculture Produce



Urban Plaza produce Suburb Public Produce Countryside Agricultural work

Public produce is a subset of urban agriculture. It refers to fruits, vegetables, nuts, and herbs cultivated in public space, such as in parks, plazas, or town squares; along streets; or on the grounds of public institutions, such as city halls, courthouses, libraries, and schools. And they are freely available to the public.

Urban Agriculture

Vertical Farm Tower



Vertical Farm by Jung Min Nam Vertical Farm by Chris Jacobs Vertical Farm by Blake Kurasek

Despommier's concept of "The Vertical Farm" emerged in 1999 at Columbia University. It promotes the mass cultivation of plant and animal life for commercial purposes in skyscrapers.^[1] Using advanced greenhouse technology such as hydroponics and aeroponics, the skyscrapers could theoretically produce fish, poultry, fruit and vegetables.

Resource:

1. Venkataraman, Bina (2008-07-15). "Country, the City Version: Farms in the Sky Gain New Interest". The New York Times. <http://www.nytimes.com/2008/07/15/science/15farm.html>. Retrieved 2011-01-05.

Urban Roof Farm



Roof Farm in Tokyo Roof Farm in New York Roof Farm in Chicago

Rooftop farming is the practice of cultivating food on the rooftop of buildings.^[1] Besides using the already present space at the roof itself, additional platforms could possibly be created between high-rise buildings called "aero-bridges".^[2]

Resource:

1. <http://www.cityfarmer.info/2008/11/10/tokyo-rooftop-and-underground-urban-farming-lures-young-japanese-office-workers/>
2. <http://www.urbanhabitchicago.org/projects/true-nature-foods/>

Facade Farm



Facade Farm in Santiago Facade Farm in New York Facade Farm in Tokyo

Facade farming are becoming more and more common. More recently, the larger facade farming concept has been utilized with innovative hydroponics technology. The vegetation for a green façade is always attached on outside walls; with living walls this is also usually the case, although some living walls can also be green walls for interior use.^[1]

Resource:

1. Vegetated Complex Wall research presentation on Aurélien P. JEAN research website

Public Agriculture Produce



Public Agricultural produce in Urban Plaze



Public Agricultural produce in Suburb



Public Agricultural produce in Countryside

Public produce is a subset of urban agriculture. It refers to fruits, vegetables, nuts, and herbs cultivated in public space, and freely available to the public.^[1] Public produce differs from traditional community gardens, as the produce from the latter is generally not for public consumption, but for those who tend the garden.

According to Darrin Nordahl, public produce (a term he coined in his book Public Produce: The New Urban Agriculture) comprises three facets:^[1]

1. The food must be grown in true public space (parks, plazas, streets, or any space where all members of the public are welcome);
2. The food must be freely available to all members of the public; and
3. The garden is permitted, funded, and/or maintained by public officials, as part of a broad public policy to improve the diets of citizens.

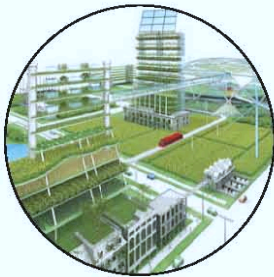
Resource:

1. Nordahl, Darrin (2009). Public Produce: The New Urban Agriculture Washington DC: Island Press. ISBN 9781597265881. <http://islandpress.org/bookstore/details607b.html>.

Community Supported Agriculture



Practice in Urban Community



Practice in Suburb Community



Practice in Countryside Community

Community-supported agriculture (in Canada, community-shared agriculture) (CSA) is an alternative, locally-based socio-economic model of agriculture and food distribution. A CSA also refers to a particular network or association of individuals who have pledged to support one or more local farms, with growers and consumers sharing the risks and benefits of food production.^[1]

Similar experiences worldwide:

Association pour le maintien de l'agriculture paysanne (AMAP) in France,

Agriculture soutenue par la communauté (ASC) in Québec,

Teikei in Japan,

Reciproco in Portugal,

Landwirtschaftsgemeinschaftshof in Germany,

Andelslandbruk in Norway,

Gruppi di Acquisto Solidale (GAS) in Italy, (see also, Ethical purchasing groups),

Resource:

- 1 Community Supported Agriculture (CSA): An Annotated Bibliography and Resource Guide, by Suzanne DeMuth. Sep. 1993. Retrieved 16-Feb-2006.

3.2

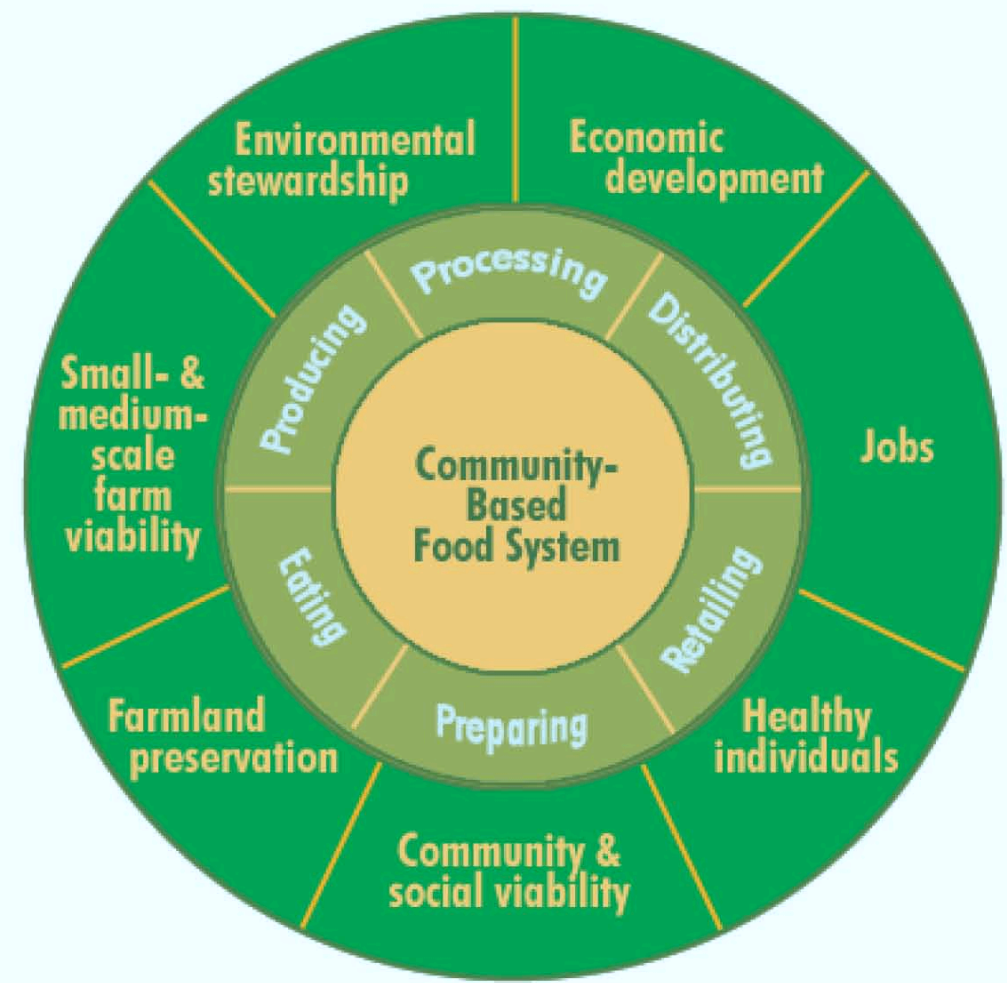
Two Characteristics

Community Based Food System
Diversity Value

1.

Community Based Food System

Community Based Food System



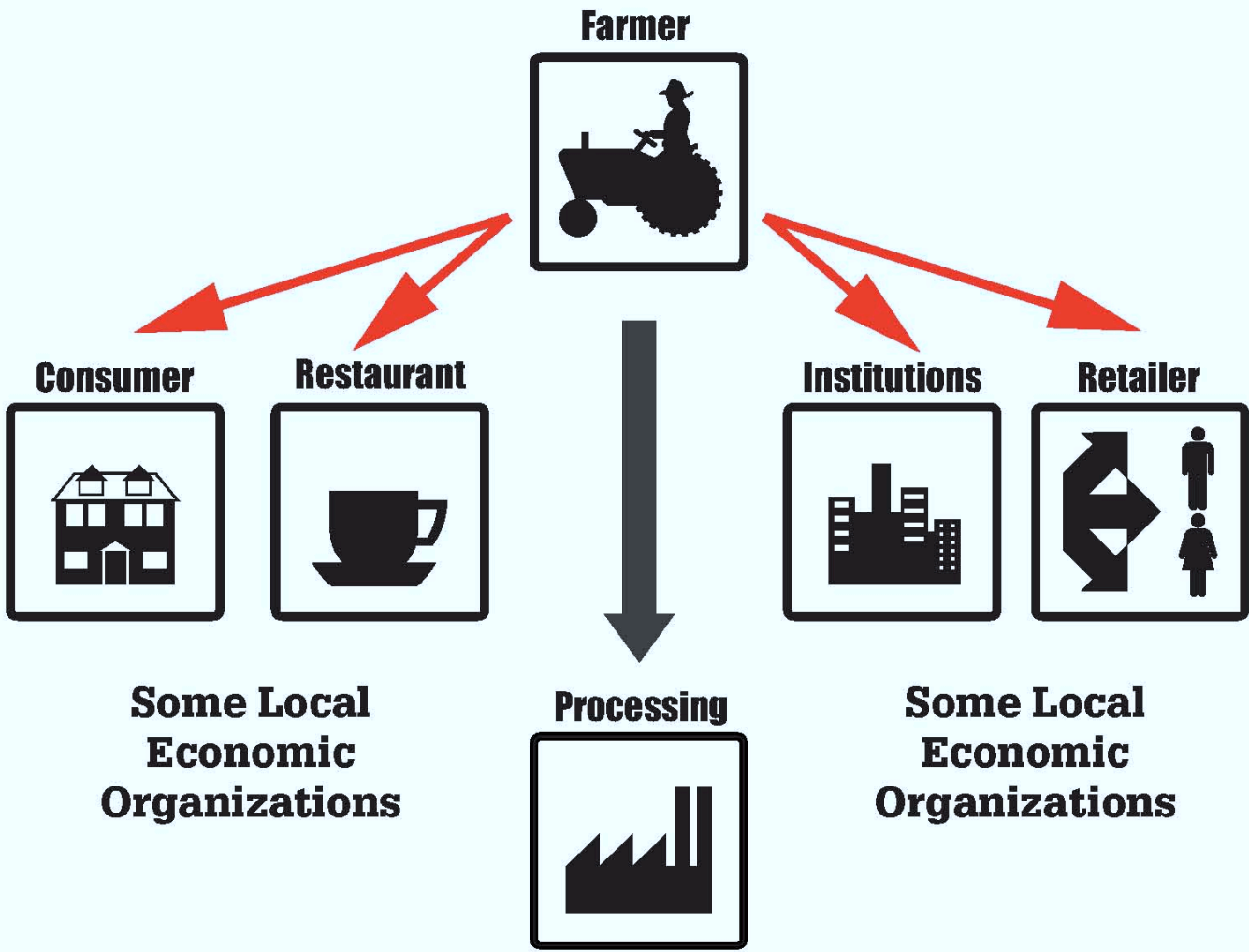
Community-supported Agriculture

CSAs generally focus on the production of high quality foods for a local community, often using organic or biodynamic farming methods, and a shared risk membership–marketing structure. This kind of farming operates with a much greater degree of involvement of consumers and other stakeholders than usual — resulting in a stronger consumer-producer relationship. The core design includes developing a cohesive consumer group that is willing to fund a whole season's budget in order to get quality foods. The system has many variations on how the farm budget is supported by the consumers and how the producers then deliver the foods. CSA theory purports that the more a farm embraces whole-farm, whole-budget support, the more it can focus on quality and reduce the risk of food waste or financial loss.

Members of Economic Organizations (self-reliant food economies)

- | | |
|---|--|
| 1. Farmers' market | 6. Farm-to-table |
| 2. Vegetable box scheme | 7. Farm to School (Farm to Institutions) |
| 3. U-pick (Pick your own) | 8. Farm to restaurant |
| 4. Community gardening, / household gardening | 9. Farm to Retailer (Local Supermarket) |
| 5. Public Producing | 10. Consumer cooperatives |

Some Local Economic Organizations Of Community Based Food System



Farmers' market



Carrots and other vegetables for sale at Ballard Sunday Farmers' Market, Ballard Avenue (historic district), Ballard, Seattle, Washington. Photo by Joe Mabel

A farmers' market (also or farmers market) consists of individual vendors—mostly farmers—who set up booths, tables or stands, outdoors or indoors, to sell produce, meat products, fruits and sometimes prepared foods and beverages. Farmers markets add value to communities.^[1]

- Farmers/producers sell directly to consumers, minimizing profit loss by circumventing the middleman.
- Consumers can buy direct from the farmer/producer.
- Consumers can obtain organic fruits and vegetables from Certified Organic farmers
- Consumers can enjoy fresh, seasonally-grown food that was produced within a drivable distance from their homes.
- More capital remains in the consumers' community.

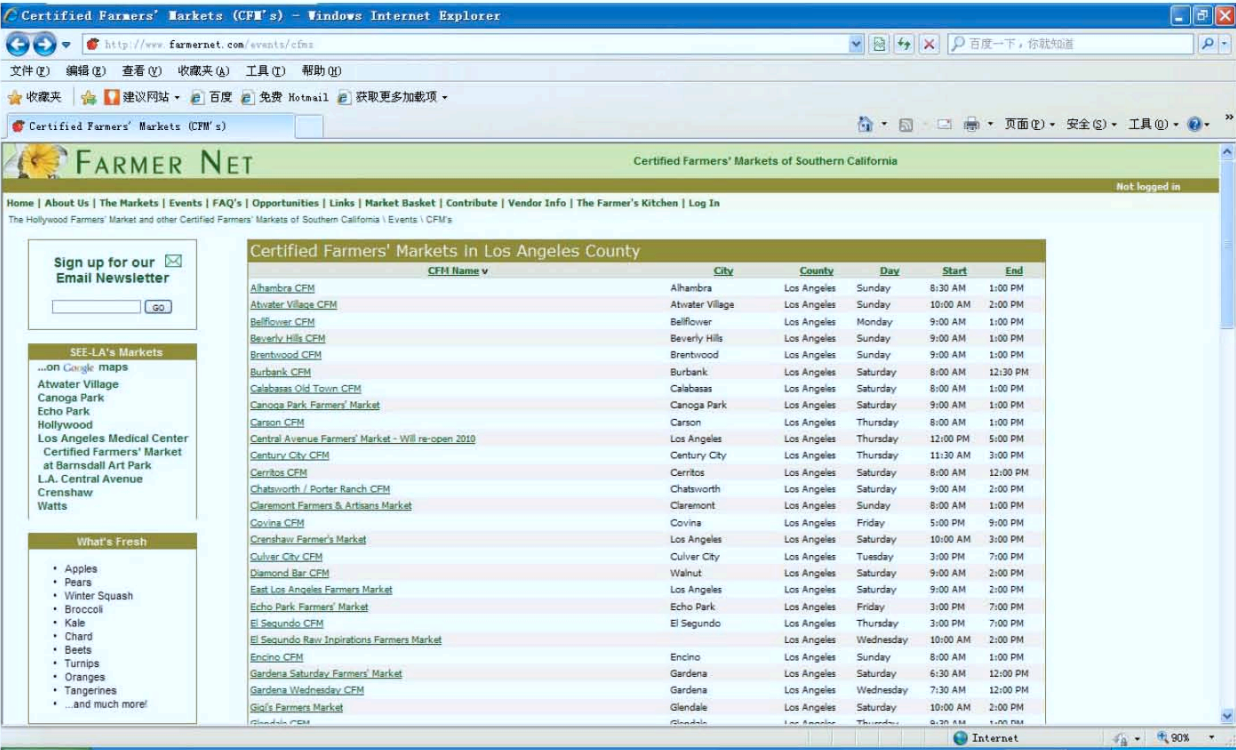
Growing Farmers' Market:

In the U.S. and Canada, due in part to the increased interest in healthier foods, a greater desire to preserve local types of cultivars or livestock (some of which may not be up to commercial shipping or yield standards) and an increased understanding of the importance of maintaining small, sustainable farms on the fringe of urban environments, farmers markets in the US have grown from 1,755 in 1994 to 4,385 in 2006^[3] to 5,274 in 2009.^[4] In New York City, there are 107 farmers markets in operation.^[5] In the Los Angeles area, 88 farmers markets exist, many of which support Hispanic and Asian fare.

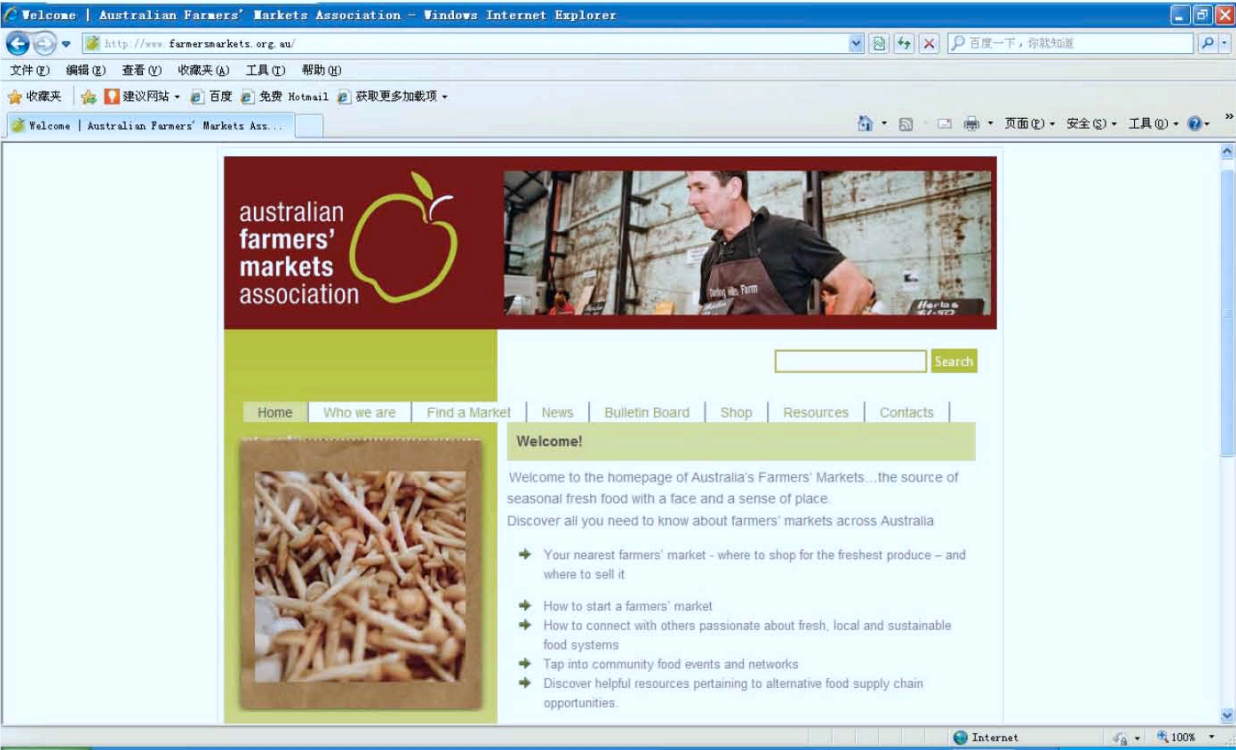
Resource:

1. "The Economic Benefits of Farmers' Markets." Friends of the Earth. Accessed June 2011. Online at: http://www.foe.co.uk/resource/briefings/farmers_markets.pdf
2. USDA Agricultural Marketing Services (2006). Farmers Market Growth. <http://www.ams.usda.gov/AMSV1.0/farmersmarkets> accessed on Dec 6, 2006 at 1044 pm PST
3. Black, Jane (October 2, 2009). "Number of Farmers Markets Mushrooms". Washington Post. <http://voices.washingtonpost.com/all-we-can-eat/food-politics/number-of-farmers-markets-mush.html?wprss=all-we-can-eat>
4. New York State Dept. of Agriculture and Markets (2009) list of farmers markets. <http://www.agmkt.state.ny.us/AP/CommunityFarmersMarkets.asp> accessed on Mar 7, 2010 at 1020:am EST

Farmers' market Online



Farmers' Market website in Los Angeles County. Online at: <http://www.farmernet.com/events/>



Farmers' Market website in Australian. Online at: <http://www.farmersmarkets.org.au/>

With the continuous development of the network economy, local farmers are now co-operating to build up farmers' market on the Network in UK, Europe, as well as in Canada and the United States, to provide customers with an online farmers market. Through this way, more and more consumers who now can not participate in the local farmers' markets, could purchase online local products. This provides local farmers and producers with another market access, share site costs and lower management costs.



Vegetable Box Scheme in Shropshire, UK
(Online at: http://www.sourcewire.com/releases/rel_display.php?relid=32739)

Vegetable Box Scheme

A vegetable box scheme is a delivery of fresh vegetables, usually locally grown and organic, either directly to the customer or to a local collection point.

A vegetable box scheme is usually operated by the grower or a small co-operative to add value and support the local food economy. There are approximately 600 such schemes operating in the UK^[1] and by early 2007, according to the Soil Association, retail sales via such schemes were in excess of £100 million per annum^[2].

Resource:
1. Boxes of delight". BBC Green. <http://www.bbcgreen.com/Travel/UK-Holidays/Food/Organic/organic-box-schemes> Retrieved 2008-08-10.
2. "How to set up a vegetable box scheme". The Soil Association. 2007. <http://www.soilassociation.org/web/sa/saweb.nsf/%0Bb0062cf005b02c180256a6b003d987f1fb6952fe3232ff4d8025729f0052b8ce?OpenDocument>. Retrieved 2008-08-10.



A child is picking her strawberry with her farther in the "U-Pick" programme.
(Online at: <http://bloominthyme.com/kid-buzz/sprouts-alive/>)

U-pick (Pick your own)

A U-pick or pick your own farm is a type of farm where customers are allowed to harvest their own produce. Since customers are allowed and often encouraged to eat while picking, the entry fee usually covers any produce customers may eat. Despite this, the produce at U-pick farms often cost lower since the cost of hiring farmers to harvest the produce is precluded.

In the UK, the public is actively encouraged to pick their own. The farmer can still pick for the market, while the public can enjoy themselves in the same field. This was very popular in the 1970s and 1980s, when there was a season for fruit, but has declined in popularity now that the global market can provide the same fruit for most of the year.



People in the community gardening
(Online at: <http://ucanr.org/blogs/blogcore/postdetail.cfm?postnum=3599>)

Community Gardening

A community garden is a single piece of land gardened collectively by a group of people.^[1]

Community gardens provide fresh produce and plants as well as satisfying labor, neighborhood improvement, sense of community and connection to the environment.^[2]They are publicly functioning in terms of ownership, access, and management,^[3] as well as typically owned in trust by local governments or not for profit associations.

Resource:
1. American Community Garden Association (2007). What is a community garden? Retrieved on 2007-11-01 from <http://www.communitygarden.org/learn/>.
2. Hannah, A K., & Oh, P. (2000). Rethinking Urban Poverty: A look at Community Gardens. Bulletin of Science, Technology and & Society. 20(3). 207-216.
3. Fernis, J., Norman, C., & Sempik, J. (2001). People, Land and Sustainability: Community Gardens and the Social Dimension of Sustainable Development. Social Policy and Administration. 35(5). 559-568.



Public are busy with their agricultural working
(Online at: http://www.clifbar.com/blog/detail/double_rock_double_rocked)

Public Producing

Public produce is a subset of urban agriculture. It refers to fruits, vegetables, nuts, and herbs cultivated in public space, and freely available to the public.^[1]

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Resource:
1. Nordahl, Darrin (2009). Public Produce: The New Urban Agriculture. Washington DC: Island Press. ISBN 9781597265881. <http://islandpress.org/bookstore/details607b.html>.
2. Lawson, Laura (2005). City Bountiful: A Century of Community Gardening in America. Berkeley: University of California Press. ISBN 0520243439.



Huron Perth Farm to Table Logo, Australia
(Online at: <http://www.huronperthfarmtotable.ca/>)

Farm To Table

Farm-to-table (or farm-to-fork) refers to, in the food safety field, the stages of the production of food: harvesting, storage, processing, packaging, sales, and consumption.

Farm-to-table also refers to a movement concerned with producing food locally and delivering that food to local consumers. Linked to the local food movement, the movement is promoted by some in the agriculture, food service, and restaurant communities. It may also be associated with organic farming initiatives, sustainable agriculture, and community-supported agriculture.^[1]

Resource:

1. Sari Edelstein, Food and nutrition at risk in America: food insecurity, biotechnology, food safety, and bioterrorism (2009), p. 72.

Farm To School

Farm to School is broadly defined as a program that connects schools and local farms with the objectives of serving healthy meals in school cafeterias, improving student nutrition, providing agriculture, health and nutrition education opportunities, and supporting local and regional farmers.^[1]

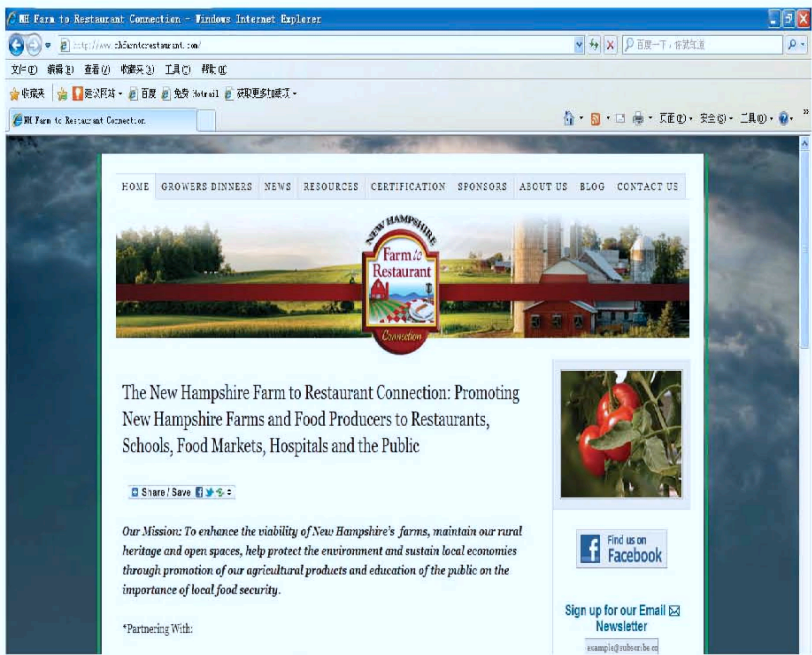
Farm to School provides a model for positively influencing children's eating habits through school cafeteria improvements, hands-on nutrition education, and community involvement and support. Since each Farm to School program is shaped by its unique community and region, the Farm to School Network in America does not prescribe or impose a list of practices or products for the Farm to School approach.^[1]

Resource:

1. <http://www.farmtoschool.org/>



Students engaged in farm-to-table activities at Cleveland Elementary
(Online at: <http://arcadiafood.blogspot.com/2011/10/dc-farm-to-school-week-recap.html>)



The New Hampshire Farm to Restaurant Connection, America
(Online at: <http://www.nhfarmtorestaurant.com/>)

Farm To Restaurant

Farm to restaurant is an organization of local food. And restaurants are considered a cornerstone in a community's economy. Nearly every community has at least one restaurant and most communities have many.^[1]

Restaurant operators consider several factors deciding to purchase locally grown or produced foods. These factors are:^[1]

- seasonality and availability of products
- adequate supply to meet needs of the restaurant
- product packaging and labeling to meet safety regulations
- ease and efficiency of ordering and payment

Resource:

1. <http://www.extension.iastate.edu/Publications/pm1853b.pdf>

Farm To Local Retailer

Supermarkets are beginning to tap into the local foods market as well. Walmart announced plans in 2008 to spend \$400 million during that year on locally grown produce.^[1]

Wegman's, a 71-store chain across the northeast, has purchased local foods for over 20 years as well. In their case, the produce manager in each store controls the influx of local foods- the relationships with the local farms are not centrally controlled.^[1]

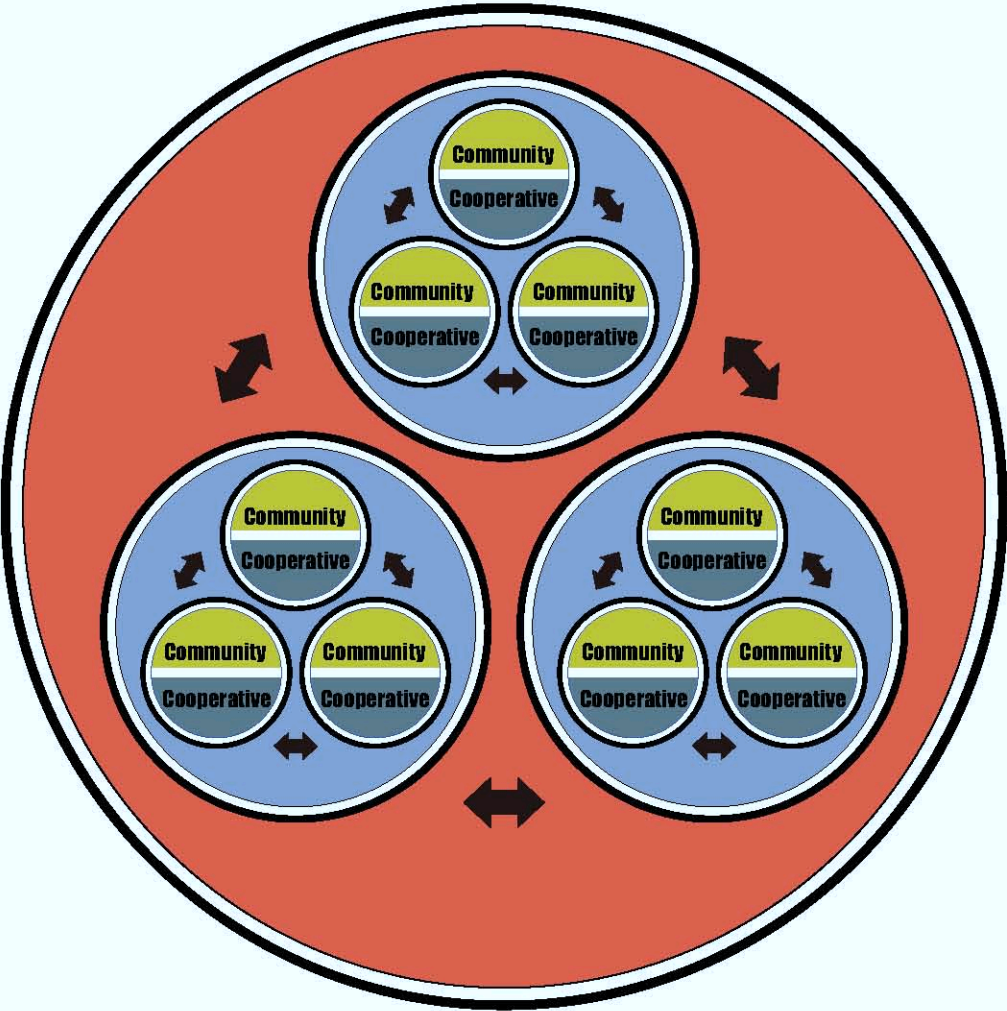
Resource:

1. Burros, Marian (6 August 2008). "Supermarket Chains Narrow Their Sights". The New York Times. <http://www.nytimes.com/2008/08/06/dining/06local.html>. Retrieved 20 July 2011.

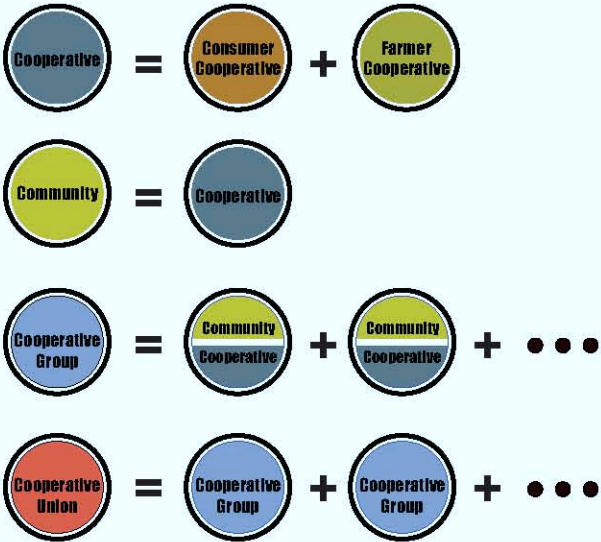


Local produced food in local supermarket
(Online at: <http://www.progressivegrocer.com/top-stories/headlines/fresh-food/id32993/local-produce-available-at-the-fresh-grocer/>)

Community Cooperative



2. Diversity Value

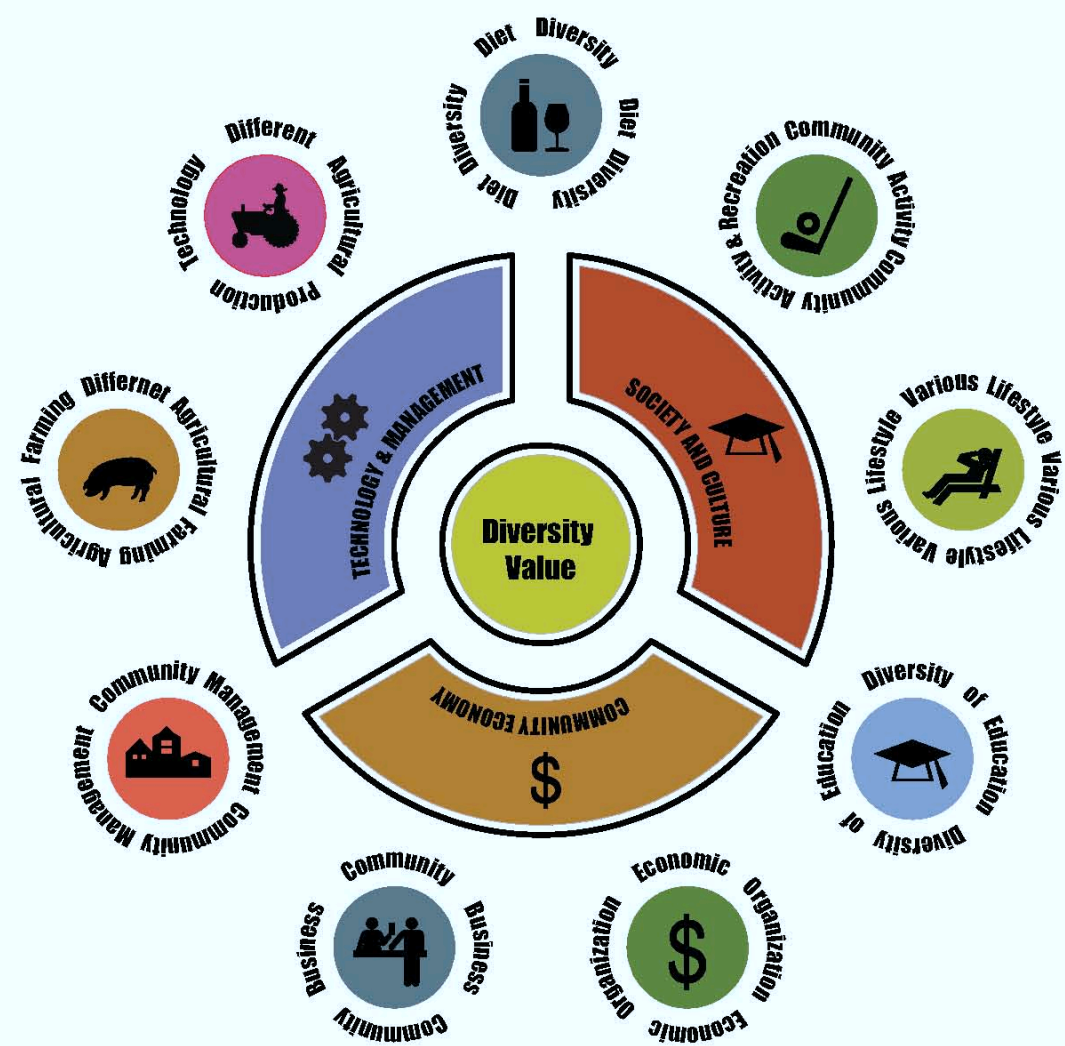


Cooperstive

A cooperative (also co-operative or co-op) is a business organization owned and operated by a group of individuals for their mutual benefit. In local food system, one community is a cooperative. It is composed by community farmer cooperative and community consumer cooperative.

A cooperative is defined by the International Cooperative Alliance's Statement on the Cooperative Identity as "an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through jointly owned and democratically controlled enterprise". A cooperative may also be defined as a business owned and controlled equally by the people who use its services or by the people who work there

Diversity Value



Diversity Value of Community Based Food System



1. Society And Culture

Community based food system has the ability of appreciation, acceptance or promotion of multiple cultures. According to the different tastes of people, there will be different diet groups even in small diet communities. The culture in different communities are different, so the entertainment, activity, lifestyle and education are also very different.

2. Community Economy

The organization of economy is very different among communities. There are many economic organizations under community-based food systems, such as vegetable box schemes, pick your own, farm-to-table, community gardening, consumer cooperatives, farm to institute, farm to retailer... Each community can choose some of them based on their diet and the food they produce.

Diet Diversity



Farming Diversity



Farming Technology Diversity

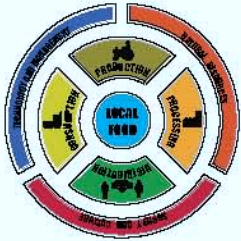


Community Activity



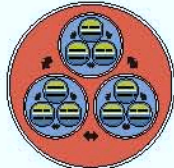
3. Technology and Management

Different communities will produce different food. Then the economic organization outside the community could work. According to the different food farmed by communities, they will utilize different agricultural production technologies.



Local Food Three Essential Characteristics:

1. COMMUNITY BASED FOOD SYSTEM



Community-supported agriculture is the most essential part in local food system. It consists of the agricultural producer and consumer in the community, who promised to support the community's agricultural production. In this system, producers and consumers form a coalition together to enjoy the benefits and risks of committing to agricultural production.

2. DIVERSITY VALUE



Diversity Value is another important aspect in local food. This feature is particularly prominent in the United States. The United States is a multi-ethnic country, with significant cultural differences. In the United States, according to the differences living population in the different communities, there are very different cultures. Different communities will have a variety of lifestyles, diet habits, cooking skills, community activities. Accordingly, there will be a variety of farming varieties, farming techniques and so on.

The culture of the world is very rich, accordingly, there are a wide variety of diets. The nutrient ingredients are also very different among these diets. Except culture, there are also numbers of diets relation with medicine and weight loss. In this chapter, 10 diets are compared. Their nutrient ingredients and farming surface are also explained and illustrated by the charts and formulas.

3. Diet, Nutrients & Surface

Agricultural Surface Calculation Formula

Calorie In Food

Food Print

Food Waste

Diets In The World

10 Diets, Nutrients And Surface

10 Diets Surface Compare

3.1

Surface Calculation Formula

Agricultural Surface Calculation Formula
Calorie In 10 Diets
Average Calorie In Food
Food Waste
Food Print

Agriculture Farming Surface
Calculation Formula

Need

Kcal/day

÷

Ingredients

Kcal/Kg

=

Food Eaten

Kg/day

Food Eaten

Kg/day

×

Waste

% (percentage)

=

Food Produced

Kg/day

365 (days)

×

Food Produced

Kg/day

÷

Yield

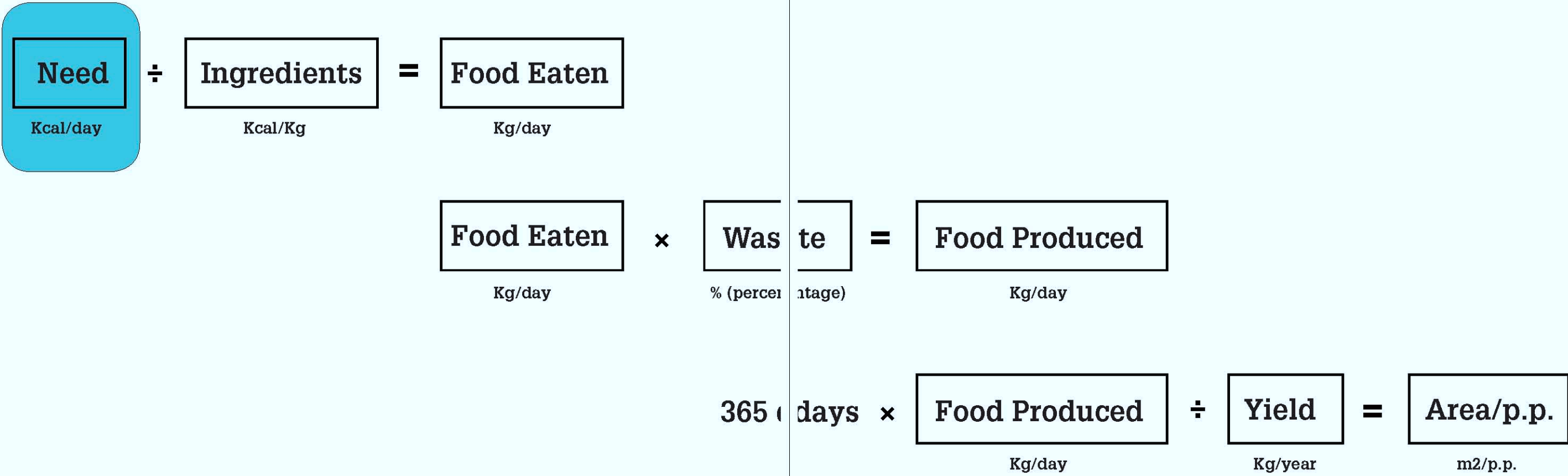
Kg/year

=

Area/p.p.

m2/p.p.

Agriculture Farming Surface
Calculation Formula

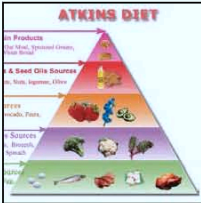
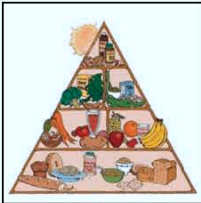


Calorie In 10 Diets

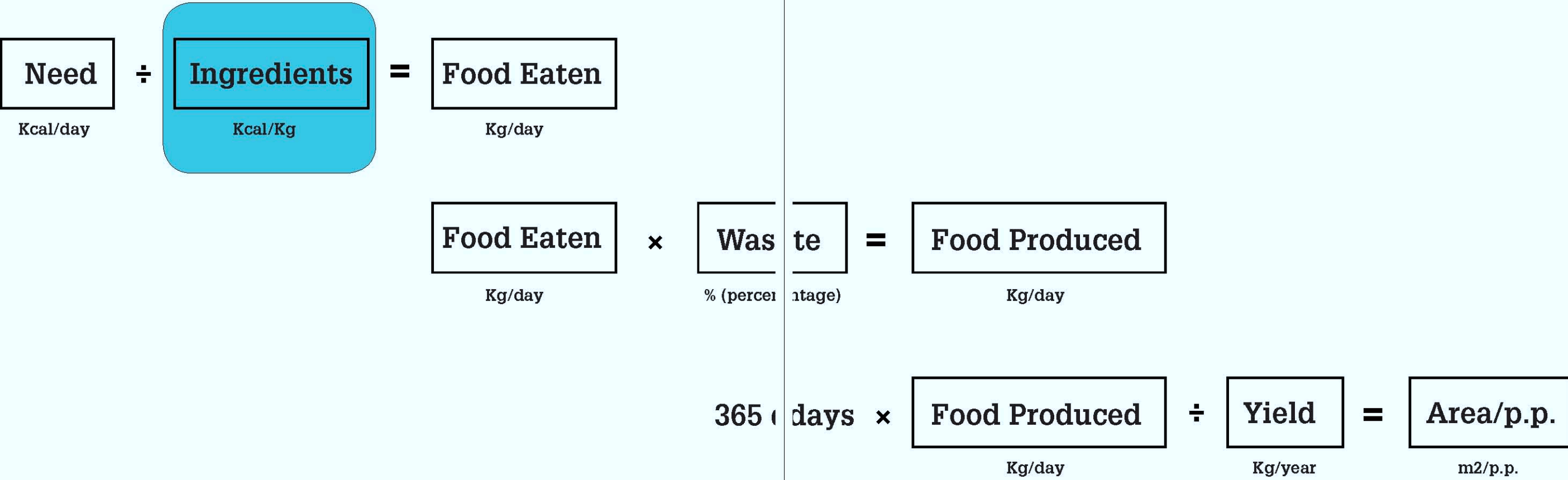
Calorie In 10 Diets

Average European Calorie Consumption

| Calorie of 10 Diets | |
|--|----------------|
| Diets | Calorie (Kcal) |
| European Healthy Diet | 2100 |
| Reference: http://ec.europa.eu/health/archive/ph_determinants/life_style/nutrition/report01_en.pdf | |
| Japanese Healthy Diet | 1800 |
| Reference: http://www.maff.go.jp/j/balance_guide/ | |
| Finland Healthy Diet | 1800 |
| Reference: http://www.eufic.org/article/en/expid/food-based-dietary-guidelines-in-europe/ | |
| Buddhist Veganism Diet | 1800 |
| Reference: http://en.wikipedia.org/wiki/Buddhist_vegetarianism | |
| Raw Veganism Diet | 1250 |
| Reference: http://www.beyondveg.com/billings-t/cal-par/calorie-paradox1c.shtml | |
| Fruitarianism Diet | 1250 |
| Reference: http://www.veganforum.com/forums/showthread.php?27993-Opinions-on-Semi-Fruitarian-Diet | |
| Montiganac Diet | 2000 |
| Reference: http://www.montignac.com/en/the-failure-of-low-calorie-diets/ | |
| Atkins Diet | 2000 |
| Reference: http://www.the-atkins-diet.info/ | |
| Organic Food Diet | 2100 |
| Reference: http://www.livestrong.com/article/224198-diet-plan-with-organic-foods/ | |
| Junk Food Diet | 2500 |
| Reference: http://www.webmd.com/diet/features/the-fast-food-diet | |



Agriculture Farming Surface Calculation Formula



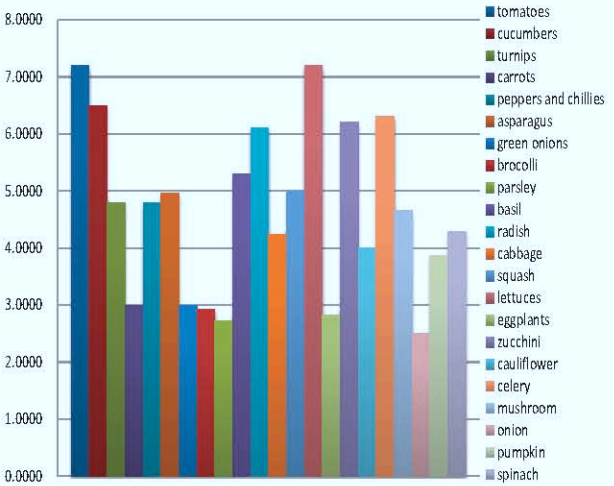
Average Calorie In Food

Calorie In Vegetable And Fruit

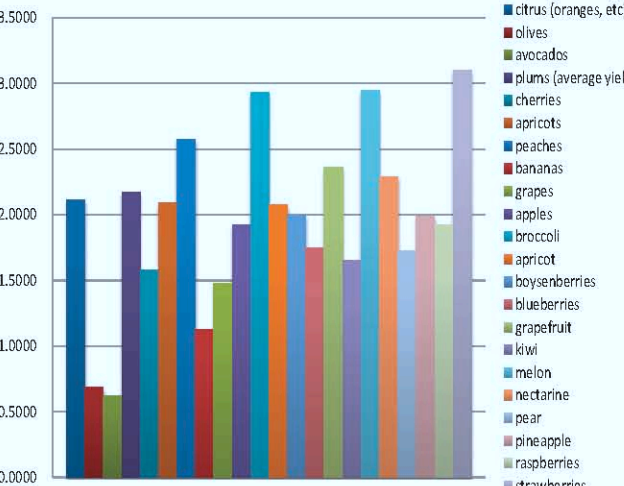
| Fruit | Gram/Calorie |
|-------------------------------|--------------|
| citrus (lemons, oranges, etc) | 2.115 |
| olives | 0.685 |
| avocados | 0.625 |
| plums (average yield) | 2.170 |
| cherries | 1.580 |
| apricots | 2.090 |
| peaches | 2.575 |
| bananas | 1.125 |
| grapes | 1.480 |
| apples | 1.920 |
| broccoli | 2.935 |
| apricot | 2.080 |
| boysenberries | 2.000 |
| blueberries | 1.747 |
| grapefruit | 2.365 |
| kiwi | 1.652 |
| melon | 2.950 |
| nectarine | 2.290 |
| pear | 1.729 |
| pineapple | 1.987 |
| raspberries | 1.922 |
| strawberries | 3.102 |
| watermelon | 3.348 |
| | |
| Average | 2.021 |

| Vegetable | Gram/Calorie |
|----------------------|--------------|
| tomatoes | 7.200 |
| cucumbers | 6.500 |
| turnips | 4.790 |
| carrots | 3.000 |
| peppers and chillies | 4.790 |
| asparagus | 4.963 |
| green onions | 3.000 |
| broccoli | 2.933 |
| parsley | 2.725 |
| basil | 5.300 |
| radish | 6.105 |
| cabbage | 4.235 |
| squash | 5.000 |
| lettuces | 7.200 |
| eggplants | 2.825 |
| zucchini | 6.205 |
| cauliflower | 4.000 |
| celery | 6.316 |
| mushroom | 4.667 |
| onion | 2.500 |
| pumpkin | 3.867 |
| spinach | 4.286 |
| | |
| Average | 4.655 |

Calorie In Vegetable Per Gram



Calorie In Fruit Per Gram



Calorie In Other Food

| Legumes | Gram/Calorie |
|------------------|--------------|
| peas | 1.020 |
| lentils | 0.860 |
| red kidney beans | 1.191 |
| white beans | 1.000 |
| black beans | 1.228 |
| pinto beans | 1.214 |
| | |
| Average | 1.086 |

1.09

| Carbohydrate | Gram/Calorie |
|--------------|--------------|
| potato | 0.953 |
| rice | 0.770 |
| wheat | 0.406 |
| barley | 0.283 |
| oat | 0.257 |
| maize | 0.464 |
| buckwheat | 0.292 |
| | |
| Average | 0.412 |

| | |
|--------|-------|
| Potato | 0.953 |
|--------|-------|

| Oil plants | Gram/Calorie |
|--------------------|--------------|
| Sunflower oil | 0.117 |
| Olive oil | 0.113 |
| Grape seed oil | 0.117 |
| Virgin Coconut oil | 0.112 |
| Peanut oil | 0.113 |
| Canola oil | 0.125 |
| Walnut oil | 0.113 |
| Vegetable oil | 0.125 |
| Sesame Oil | 0.118 |
| Soybean oil | 0.113 |
| | |

| | |
|---------------|-------|
| Oil plants | 0.117 |
| Sunflower oil | 0.127 |

| Nuts and Seeds | Gram/Calorie |
|----------------|--------------|
| Walnuts | 0.153 |
| Cashew Nuts | 0.186 |
| Brazil Nuts | 0.146 |
| Coconut Meat | 0.283 |
| Macadamia Nuts | 0.138 |
| Peanuts | 0.175 |
| Pecans | 0.143 |
| Pistachio Nuts | 0.180 |
| | |

| | |
|---------|-------|
| Average | 0.176 |
|---------|-------|

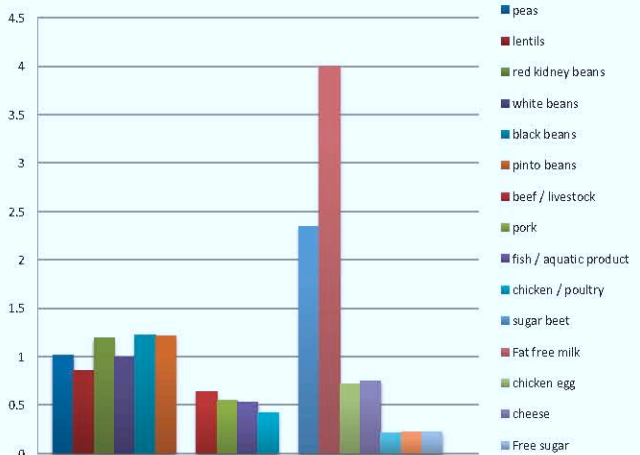
| Animal oil | Gram/Calorie |
|------------|--------------|
| butter | 0.135 |
| lard | 0.111 |
| fish oil | 0.115 |
| | |

| | |
|---------|-------|
| Average | 0.125 |
|---------|-------|

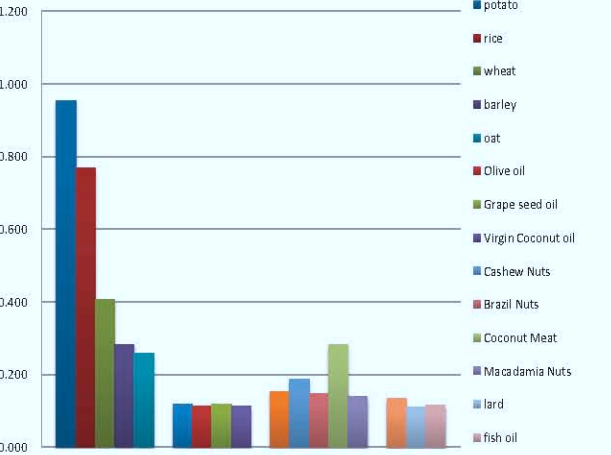
| Meat | Gram/Calorie |
|-----------------------------|--------------|
| beef / livestock (25%) | 0.635 |
| pork (35%) | 0.551 |
| fish / aquatic product(10%) | 0.532 |
| chicken / poultry (30%) | 0.420 |

| Others | Gram/Calorie |
|---------------|--------------|
| sugar beet | 2.343 |
| Fat free milk | 4.000 |
| chicken egg | 0.715 |
| cheese | 0.753 |
| coffee bean | 0.212 |
| cocoa bean | 0.219 |
| Free sugar | 0.225 |

Calorie In Legumes, Meat and Others Ietms Per Gram



Calorie In Carbohydrate, Oil plants, Nuts and seeds, Animal oil Per Gram



Calorie In Food

- 1 Calorie in food, online at <http://www.thecaloriecounter.com/>
- 2 Calorie in food, online at <http://www.calorie-counter.net/>
- 3 Calorie in food, online at http://www.freedieting.com/tools/calories_in_food.htm

Calorie In Fruit

Calorie in fruit, online at <http://caloriecount.about.com/calories-fruits-fruit-juices-ic0900>
Calorie in fruit, online at http://www.freedieting.com/tools/calories_in_fruit.htm

Calorie In Vegetable

Calorie in vegetable, online at http://www.freedieting.com/tools/calories_in_vegetables.htm
Calorie in vegetable, online at <http://caloriecount.about.com/calories-vegetables-ic1100>

Calorie In Potato

Calorie in potato, online at <http://caloriecount.about.com/calories-potatoes-yams-ic1113>

Calorie In Cereal

Calorie in cereal, online at <http://caloriecount.about.com/calories-cold-cereals-ic0801>
Calorie in cereal, online at http://www.freedieting.com/calories/grains_pasta_2000.htm

Calorie In Sugar

Calorie in sugar, online at <http://caloriecount.about.com/calories-sugars-sweeteners-ic1970>

Calorie In Pork

Calorie in pork, online at http://www.freedieting.com/tools/calories_in_meat.htm

Calorie In Fish

Calorie in fish, online at http://www.freedieting.com/tools/calories_in_fish.htm

Calorie In Beef and Livestock

Calorie in beef and livestock, online at http://www.freedieting.com/tools/calories_in_meat.htm

Calorie In Chicken and Poultry

Calorie in beef, online at http://www.freedieting.com/tools/calories_in_chicken.htm

Calorie In Egg

Calorie in egg, online at http://www.freedieting.com/tools/calories_in_eggs.htm

Calorie In Milk

Calorie in milk, online at <http://www.freedieting.com/calories/milk.htm>

Calorie In Cheese

Calorie in cheese, online at <http://www.freedieting.com/calories/cheese.htm>

Calorie In Sunflower Oil

Calorie in sunflower oil, online at <http://caloriecount.about.com/calories-wesson-sunflower-oil-i235738>

Calorie In Other Plant Oil

Calorie in other plant oil, online at <http://www.freedieting.com/calories/oil.htm>
Calorie in other plant oil, online at <http://caloriecount.about.com/calories-oils-ic0407>

Calorie In Animal Oil

Calorie in animal oil, online at http://www.freedieting.com/calories/butter_oil.htm
Calorie in animal oil, online at http://www.freedieting.com/calories/fish_oil.htm

Calorie In Bean

Calorie in bean, online at <http://caloriecount.about.com/calories-beans-legume-products-ic1600>
Calorie in bean, online at http://www.freedieting.com/calories/beans_vegetarian_1600.htm

Calorie In Nuts and Seeds

Calorie in nuts and seeds, online at http://www.freedieting.com/tools/calories_in_nuts.htm
Calorie in nuts and seeds, online at <http://caloriecount.about.com/calories-nut-seed-products-ic1200>

Agriculture Farming Surface
Calculation Formula

Need

Kcal/day

÷

Ingredients

Kcal/Kg

=

Food Eaten

Kg/day

Food Eaten

Kg/day

×

Waste

% (percentage)

=

Food Produced

Kg/day

365 (days)

×

Food Produced

Kg/day

÷

Yield

Kg/year

=

Area/p.p.

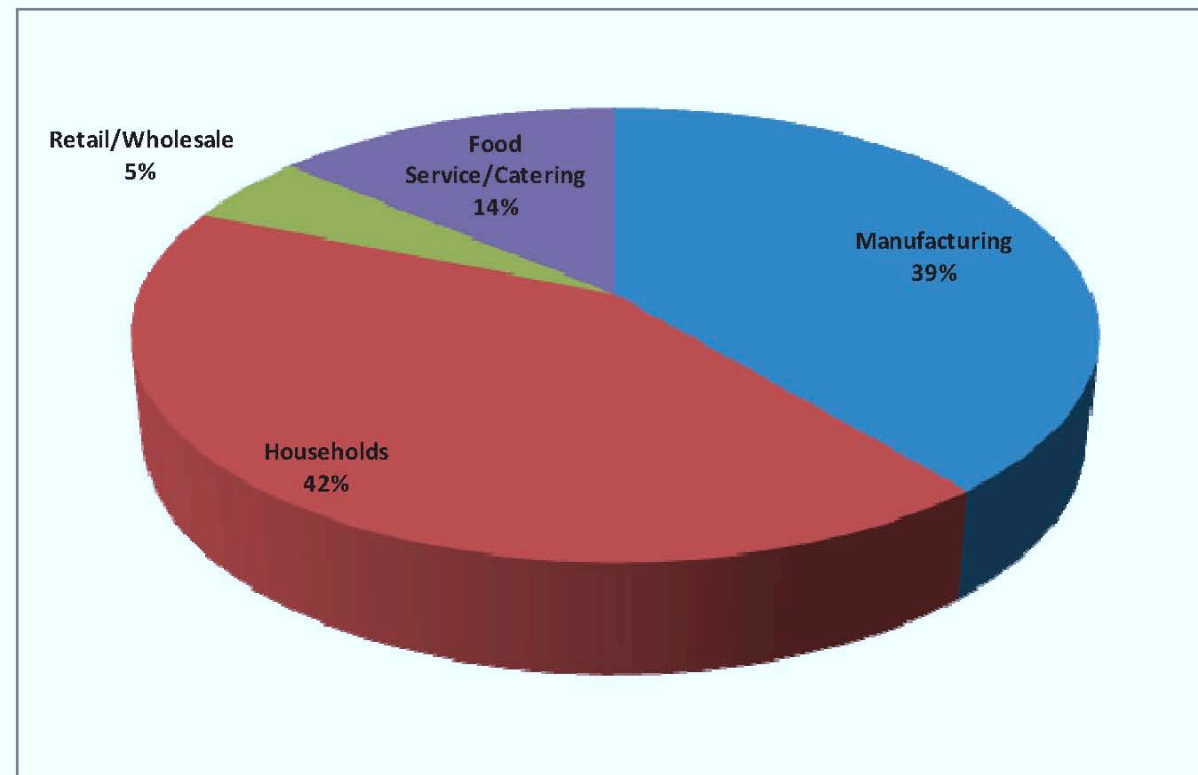
m2/p.p.

Food Waste

Organization Of European Food Waste



Percentage breakdown of EU27 food waste arisings by Manufacturing, Households, Wholesale/Retail, and Food Service/Catering sectors (best estimate)



Source: 2006 EUROSTAT data (EWC_09_NOT_093), Various national sources

Households produce the largest fraction of EU food waste among the four sectors considered, at about 42% of the total or about 38Mt, an average of about 76kg per capita.

Manufacturing food waste was estimated at almost 35 Mt per year in the EU27 (70kg per capita), although a lack of clarity over the definition of food waste (particularly as distinct from by-products) among MS makes this estimate fragile.

European Food Waste In 2020

European Waste in 2011

Total waste: ≥30%

Vegetable waste: 35%

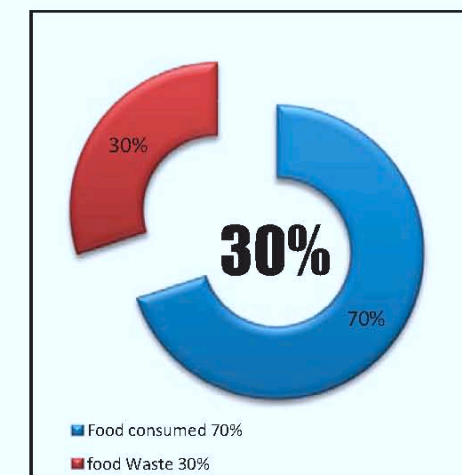
Fruit waste: 35%

Grain and other carbohydrate waste: 30%

Meat and meat substitutes waste: 25%

Egg, dairy and cheese waste: 25%

Plant oil waste: 25%



European Waste in 2020 (2011)

Total waste: 15%

Vegetable waste: 17.5%

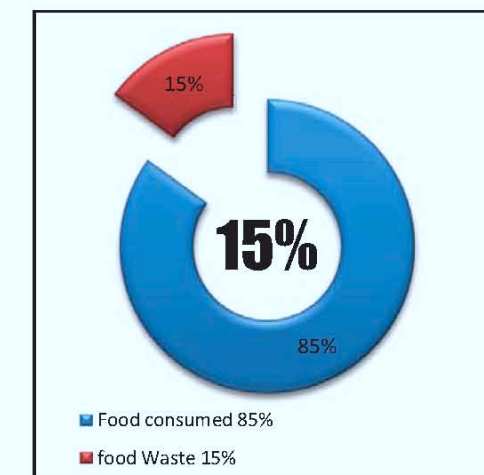
Fruit waste: 17.5%

Grain and other carbohydrate waste: 15%

Meat and meat substitutes waste: 12.5%

Egg, dairy and cheese waste: 12.5%

Plant oil waste: 12.5%



Defination to food waste

A 2011 study by the Swedish Institute for Food and Biotechnology (SIK) on behalf of Food and Agriculture Organization of the United Nations (FAO), Global Food Losses and Food Waste, distinguishes between "food loss" and "food waste", and provides figures for both:

Food Loss

Food loss measures the decrease in edible food mass (excluding inedible parts and seed) "throughout the part of the supply chain that specifically leads to edible food for human consumption", that is, loss at the production, postharvest and processing stages. This definition of loss includes biomass originally meant for human consumption but eventually used for some other purpose, such as fuel or animal feed.

Food Waste

Food waste is food loss occurring during the retail and final consumption stages due to the behavior of retailers and consumers— that is, the throwing away of food.

European Commission Aims to Cut Food Waste 50 Percent by 2020

Europe may be facing much larger problem than what to do with its food waste. Per year, the average person throws away 300 kg (660 lbs) per year, and of this, two thirds is still edible. MEPs are railing against what they see as unsustainable levels of waste. The resolution being passed through parliament is set to be approved. The goal is to cut food waste in half through various means. To do so will have to address the long cycle of food, from farm to fork. Cutting down on food processing is most important because it is the single largest source.

Resource: http://www.enr.com/enr_original_news/article/43878

Agriculture Farming Surface
Calculation Formula

Need

Kcal/day

÷

Ingredients

Kcal/Kg

=

Food Eaten

Kg/day

Food Eaten

Kg/day

×

Waste

% (percentage)

=

Food Produced

Kg/day

365 (days)

×

Food Produced

Kg/day

÷

Yield

Kg/year

=

Area/p.p.

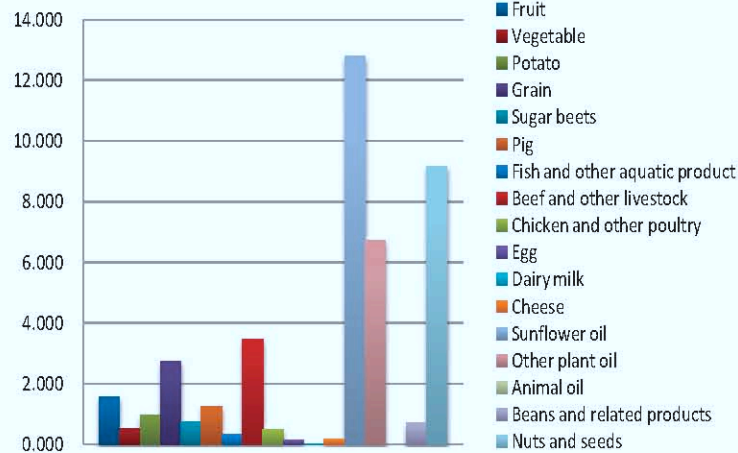
m2/p.p.

Yield

Foodprint In Different Ingredients By Different Research

| Average Foodprint Per Year By Different research | | | |
|---|------------------------------|-----------------------------------|---|
| Species | ZHOU Bo (m ² /kg) | MVRDV in KM3 (m ² /kg) | FAO, World Bank & Nationmaster (m ² /kg) |
| Fruit, Vegetable and Carbohydrate | | | |
| Fruit and Vegetable | | | |
| Fruit | 1.58 | 1.76 | 1.58 |
| Vegetables | 0.53 | 0.63 | X |
| Carbohydrate | | | |
| Potato | 0.96 | 0.76 | 0.96 |
| Grain | 2.74 | 2.93 | 2.74 |
| Sugar beets | 0.74 | 0.53 | X |
| Animal (feeding area included) | | | |
| Pig | 1.25 | 1.25 | 1.25 |
| Fish and other aquatic product | 0.34 | 0.21 | 0.34 |
| Beef and other livestock | 3.47 | 4.55 | 4.32 |
| Chicken and other poultry | 0.50 | 0.62 | X |
| Egg, Milk & Cheese | | | |
| Eggs | 0.16 | 0.31 | X |
| Dairy milk | 0.02 | 0.04 | 0.02 |
| Cheese | 0.17 | 0.28 | 0.17 |
| Plants Oil, Legumes & Nuts | | | |
| Sunflower oil | 12.81 | 11.42 | X |
| Other plant oil | 6.74 | 8.13 | 6.74 |
| Animal oil | Included | Included | Included |
| Beans and related products | 0.71 | 0.91 | 0.71 |
| Nuts and seeds | 9.18 | 9.11 | 9.18 |
| Selected resources: | | | |
| 1 http://www.fao.org/ | | | |
| 2 http://data.worldbank.org/ | | | |
| 3 http://www.nationmaster.com/ | | | |
| 4 http://en.wikipedia.org/ | | | |

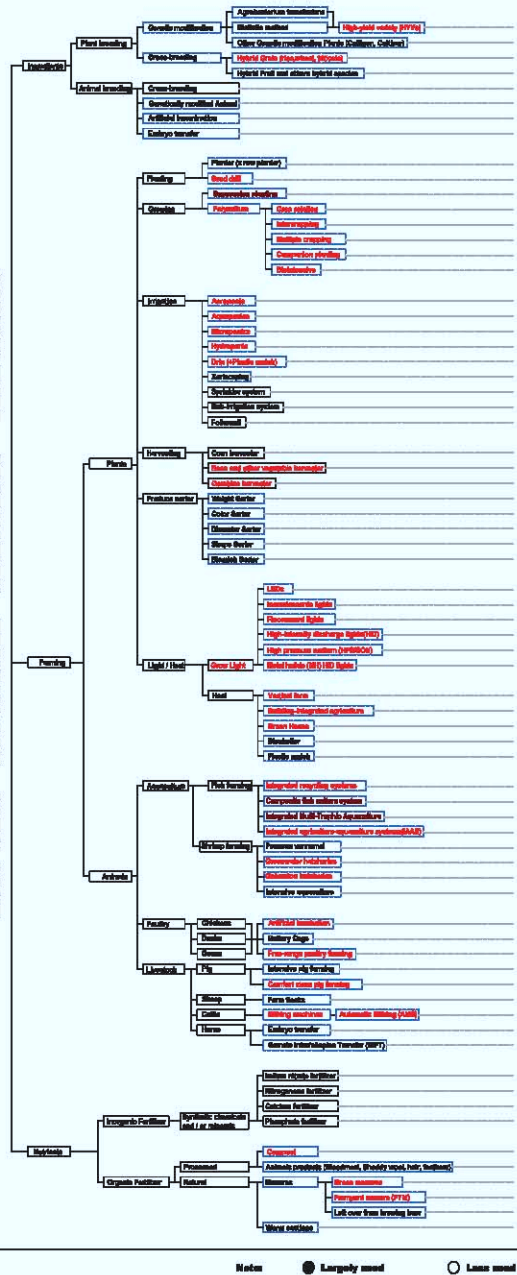
Average Food Print per Year



Traditional Agricultural Technology Application

Description

AGRICULTURE PRODUCTION TECHNOLOGY CATALOGUE



Author
A list of authors and their affiliations is provided at the top of the page. The authors are listed in a table format, with their names and affiliations clearly defined.

Keywords
A list of keywords is provided below the author information, highlighting the main topics and themes of the research.

Abstract
A brief summary of the research findings is provided in the abstract section, outlining the objectives, methods, and conclusions of the study.

Introduction
The introduction section provides a detailed overview of the research background, the significance of the study, and the specific research questions being addressed.

Materials and Methods
This section describes the experimental design, the materials used, and the methods employed to collect and analyze the data.

Results
The results section presents the findings of the study, including data tables, figures, and statistical analyses, clearly showing the outcomes of the research.

Discussion
The discussion section interprets the results, compares them with existing literature, and discusses the implications and limitations of the study.

Conclusion
The conclusion summarizes the main findings and provides a final statement on the significance and future directions of the research.

References
A list of references is provided at the bottom of the page, citing the sources used in the research and acknowledging the contributions of other scholars.

Yield and Foodprint

Fruit

The horticulture sector in the European Union, fruit and vegetable online at http://ec.europa.eu/agriculture/publi/fact/horti/2003_en.pdf

Vegetable

Anton Puškari, Marko Jelonić, Lana Ivanović, "Analysis of Vegetable Production in the European Union", online at <http://www.upg-bulletin-se.ro/archive/2009-3/5.%20Puskari,%20Jelonic,%20Ivanovic.pdf>

Root and Tuber Production

Root and Tuber Production online at http://www.nationmaster.com/graph/agr_roo_and_tub_pro-agriculture-root-and-tuber-production

Potato

Søren Marcus Pedersen, Jan Bizik, Luisa Dalla Costa, João Coutinho, František Doležal and Anna Gluska, "Potato production in Europe – a gross margin analysis" online at <http://www.foi.life.ku.dk/publikationer/~media/migration%20folder/upload/foi/docs/publikationer/working%20papers/2005/5.pdf> ashx

Cereal

Cereal yield in different countries, online at <http://data.worldbank.org/indicator/AG.YLD.CREL.KG>

Sugar Beet

Sugar Beet yield, online at http://en.wikipedia.org/wiki/Sugar_beet

Pig

Pork production in different countries, online at http://www.nationmaster.com/graph/agr_hog_pro-agriculture-hog-production

Fish and Aquatic Products

The European Market for Seafood, online at <http://www.fao.org/docrep/013/i1675e/i1675e01.pdf>

Cow and Livestock

Cow and Livestock production, online at <http://www.organicrules.info/?q=node/57>

Chicken and Poultry

Chicken and Poultry production, online at <http://www.thepoultrysite.com/articles/1791/european-chicken-meat-production-trends-2010>

Egg

Egg production, online at <http://www.thepoultrysite.com/articles/1576/eu-egg-production-beyond-the-2012-cage-ban>

Dairy

European Commission report, "Milk and milk products in the European Union", online at http://ec.europa.eu/agriculture/publi/fact/milk/2007_en.pdf

Cheese

European Commission report, "Milk and milk products in the European Union", online at http://ec.europa.eu/agriculture/publi/fact/milk/2007_en.pdf

Sunflower

Sunflower yield, online at http://wiki.answers.com/Q/What_is_the_yield_per_acre_of_sunflower_seeds

Other Oil Plant

"Total Oilseed Area, Yield, and Production in the World and Selected Countries and Regions", online at <http://www.fas.usda.gov/wap/circular/2005/05-08/Oils.pdf>
"Olives oil yield", online at <http://cesonoma.ucdavis.edu/files/27239.pdf>

Bean

Bean production, online at http://www.nationmaster.com/graph/agr_are_soy-agriculture-area-soybean

Nuts and Seeds

European Commission Report, "Nuts Sector – Impact Of The Coupled Payment Suppression On Nuts Margins", online at http://ec.europa.eu/agriculture/rca/pdf/sa0401_nuts.pdf

In this section, 10 diets are introduced: European healthy diet, Japanese healthy diet, Finland healthy diet, raw veganism diet, buddhist diet, fruitarianism diet, Atkins diet, montignac diet, organic food diet and junk food diet. There are many more detailed information in the table including the simple description for each diet, the calorie intake and so on. And from the pie chart and bar chart, you can clearly see the difference of the nutrient ingredients and farming surface between different diets.

4.2

10 Diets, Nutrients, Surface

European Healthy Diet

Japanese Healthy Diet

Finland Healthy Diet

Raw Veganism Diet

Buddhist Veganism Diet

Fruitarianism Diet

Atkins Diet

Montignac Diet

Organic Food Diet

Junk Food Diet

Diets In The World

Diets Catalogue

Diets A-G

- 1 Alkaline diet
- 2 Atkins diet
- 3 Best Bet Diet
- 4 Blood Type Diet
- 5 Breatharian diet
- 6 Buddhist diet
- 7 Cabbage Soup Diet
- 8 Cookie diet
- 9 Crash diet
- 10 Detox diet
- 11 Diabetic diet
- 12 Diet for a New America
- 13 DASH Diet
- 14 Dr. Hay diet
- 15 Dukan Diet
- 16 Eat Clean Diet
- 17 Earth Diet
- 18 Edenic diet
- 19 Elemental diet
- 20 Elimination diet
- 21 Fatfield Diet
- 22 Feingold diet
- 23 Fit for Life diet
- 24 Flexitarian diet
- 25 Food combining diet
- 26 F-plan diet
- 27 Fruitarian diet
- 28 Fad diet
- 29 Gerson diet
- 30 Gluten-free diet
- 31 Casein-free diet
- 32 The Graham Diet
- 33 Grapefruit diet

Diets H-N

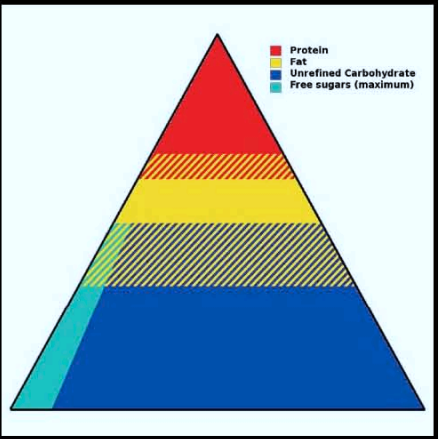
- 1 Hacker's diet
- 2 Hay diet
- 3 Herbalife
- 4 Halal diet
- 5 Hallelujah diet
- 6 High-protein diet
- 7 High residue diet
- 8 Healthy Six diet
- 9 Inuit diet
- 10 Israeli Army diet
- 11 Jenny Craig diet
- 12 Joel Fuhrman diet
- 13 Junk food diet
- 14 Juice diet
- 15 Kangatarian diet
- 16 Kosher diet
- 17 Ketogenic diet
- 18 Lacto vegetarianism
- 19 Liquid diet
- 20 Low-carbohydrate diet
- 21 Low-fat diet
- 22 Low glycemic index diet
- 23 Low-protein diet
- 24 Low sodium diet
- 25 Lutein-free diet
- 26 Lemonade diet
- 27 Macrobiotic diet
- 28 Master Cleanse
- 29 McDougall diet
- 30 Medifast Diet
- 31 Mediterranean diet
- 32 Montignac diet
- 33 Natural Foods Diet
- 34 Negative calorie diet
- 35 Nutrisystems Diet

Diets O-Z

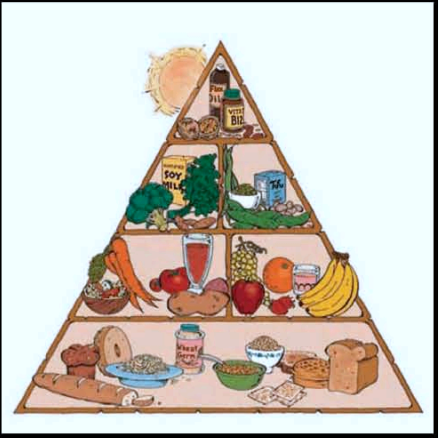
- 1 Okinawa diet
- 2 Omnivore
- 3 Organic food diet
- 4 Ornish Diet
- 5 Ovo vegetarian diet
- 6 Paleolithic diet
- 7 Perricone diet
- 8 Pescetarian diet
- 9 Plant-based diet
- 10 Prison loaf
- 11 Rastafarian diet
- 12 Raw foodism
- 13 Scarsdale Medical Diet
- 14 Shangri-La Diet
- 15 Slimming World diet
- 16 Smart For Life
- 17 Sonoma diet
- 18 South Beach diet
- 19 SparkPeople diet
- 20 Stillman diet
- 21 Subway diet
- 22 Swank diet
- 23 Sugar Busters diet
- 24 Vegan diet
- 25 Vegetarian diet
- 26 Very low calorie diet
- 27 Weight Down diet
- 28 Weight Watchers
- 29 Western pattern diet
- 30 Word of Wisdom
- 31 Zone diet



Healthy Diet Food Pyramid (WHO/FAO)



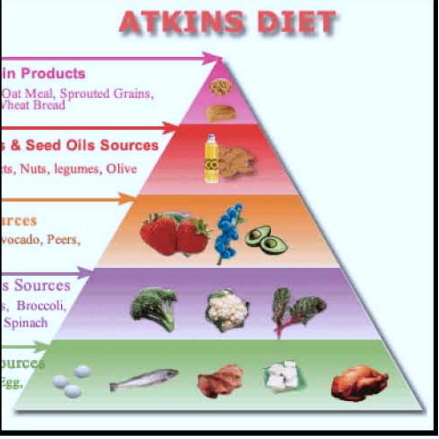
Veganism Diet Food Pyramid



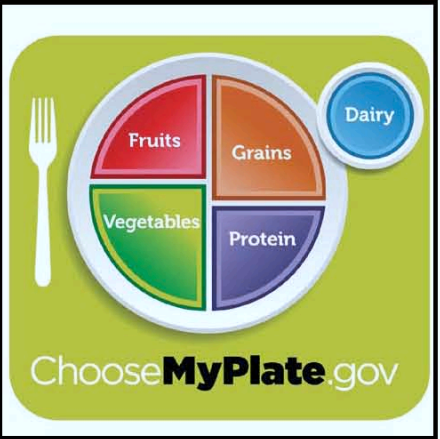
Healthy Diet Food Pyramid (NL)



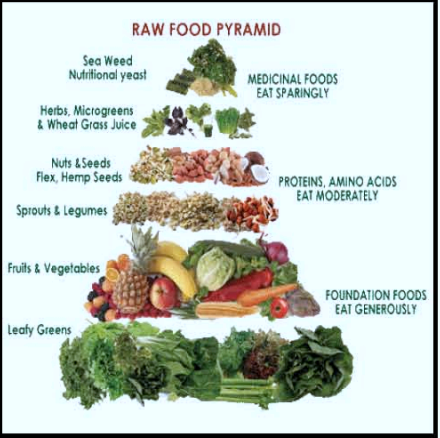
Atkins Food Pyramid



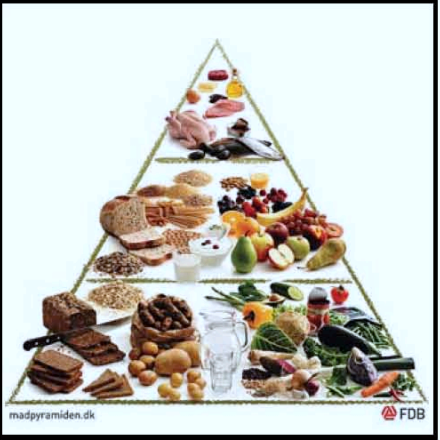
Healthy Diet Food Pyramid (USDA)



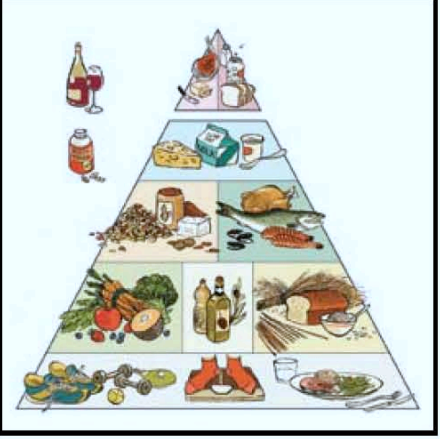
Raw Veganism Food Pyramid



Healthy Diet Food Pyramid (Danish)

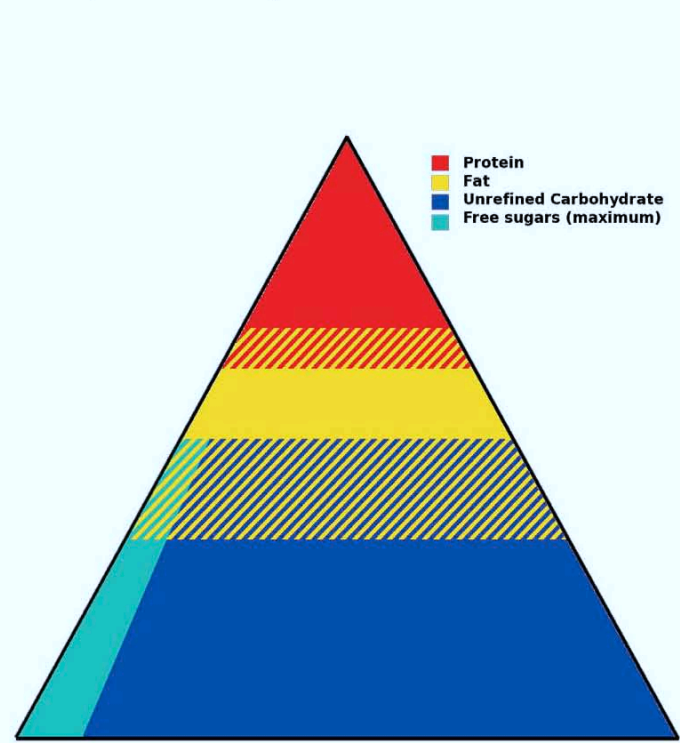


Harvard Food Pyramid



Criteria Of Some Typical Diets

Healthy Diet Food Pyramid (WHO/FAO)



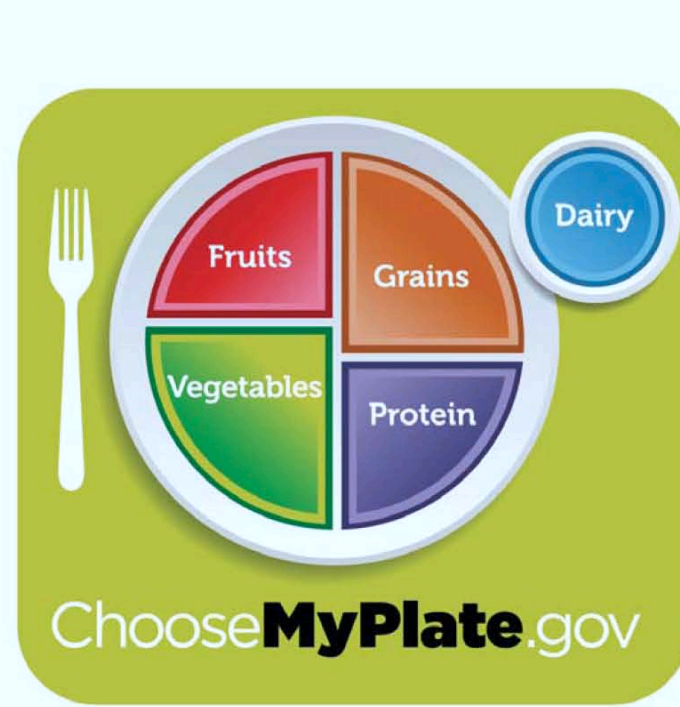
| GUIDELINES FOR HEALTHY DIET | |
|--|---------------------|
| Joint WHO/FAO Expert Consultation recommendation | |
| Total fat | 15 – 30% |
| Saturated fatty acids (SFAs) | <10% |
| Polyunsaturated fatty acids (PUFAs) | 6–10% |
| n-6 PUFAs | 5–8% |
| n-3 PUFAs | 1–2% |
| Trans fatty acids | <1% |
| Monounsaturated fatty acids (MUFAs) | By difference |
| Total carbohydrate | 55–75% |
| Free sugars | <10% |
| Complex carbohydrate | No recommendation |
| Protein | 10–15% |
| Cholesterol | <300 mg/day |
| Sodium chloride (Sodium) | <5 g/day (<2 g/day) |
| Fruits and vegetables | ≥400g/day |
| Total dietary fibre | From foods |
| NSP | From foods |

The World Health Organization, in conjunction with the Food and Agriculture Organization, published guidelines that can effectively be represented in a food pyramid relating to objectives to prevent obesity, chronic diseases and dental caries based on meta-analysis though they represent it as a table rather than a "pyramid".

Some food substances are singled out due to the impact on the target issues the "pyramid" is meant to address, while in a later revision, some recommendations are omitted since they follow automatically from other recommendations while other sub-categories are added. The reports quoted here explain that where there is no stated lower limit in the table below, there is no requirement for that nutrient in the diet.

Resource:
Joint WHO/FAO Expert Consultation, 2003, "WHO Technical Report Series 916 Diet, Nutrition

Healthy Diet Food Pyramid (USDA)



Criteria of USDA Healthy Diet

MyPlate is the current nutrition guide published by the United States Department of Agriculture, depicting a place setting with a plate and glass divided into five food groups.^[1]

Ingredients: (approximately)
1 Grains: 30%
2 Vegetables: 30%
3 Fruit: 20%
4 Protein: 20%

MyPlate is divided into sections of approximately 30 percent grains, 30 percent vegetables, 20 percent fruits and 20 percent protein, accompanied by a smaller circle representing dairy, such as a glass of low-fat/nonfat milk or a yogurt cup.

This diet is supplemented with additional recommendations, such as "Make half your plate fruits and vegetables," "Switch to 2% or skim milk," "Make at least half your grains whole," and "Vary your protein food choices."^[2] The guidelines also recommend portion control while still enjoying food, as well as reductions in sodium and sugar intakes.^[4]

Resource:
1. USDA's MyPlate". United States Department of Agriculture. <http://www.choosemyplate.gov/>. Retrieved 2 June 2011.

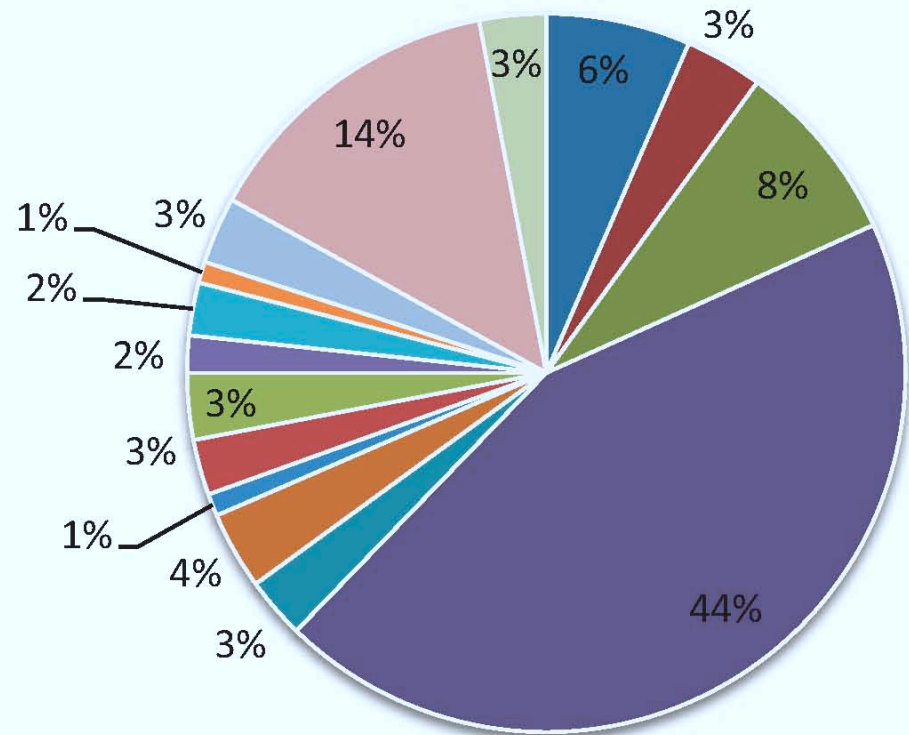
2. "Let's eat for the health of it" (PDF). United States Department of Agriculture. <http://www.choosemyplate.gov/downloads/MyPlate/DG2010Brochure.pdf>. Retrieved 2 June 2011.

| European Healthy Diet | | | | | | | | |
|---|-------------|-------------------|------------------------------|--------------|--------------|----------------------|----------------------------------|----------------------------------|
| European Healthy Diet | | | | | | | | |
| "Eurodiet" Core Report Supported by European Commission | | | | | | | | |
| Prefer: total carbohydrate: >55%; fruits and vegetables: >400g/day | | | | | | | | |
| Moderate: total fat: <30%; free sugars:<4%; | | | | | | | | |
| Item | Calorie (%) | Calorie/day (cal) | Ingredient Aaverage Gram/Cal | Gram/day (g) | Kg/year (Kg) | Food Waste (Kg/year) | Average Food Prints (m²/kg/year) | Farming Surface (m²/people/year) |
| Total calories | 100.00% | 2100.00 | | | | | | |
| Fruits, Vegetables and Carbohydrate | 65.00% | 1365.00 | 10.054 | 1175.43 | 429.03 | 69.99 | 6.54 | 771.28 |
| Fruits and Vegetables | 10.00% | 210.00 | 6.676 | 618.01 | 225.57 | 39.48 | 2.10 | 263.94 |
| Fruit | 65.00% | 136.50 | 2.021 | 275.87 | 100.69 | 17.62 | 1.576 | 186.46 |
| Vegetable | 35.00% | 73.50 | 4.655 | 342.14 | 124.88 | 21.85 | 0.528 | 77.48 |
| Carbohydrate | 55.00% | 1155.00 | 3.378 | 557.42 | 203.46 | 30.52 | 4.44 | 507.34 |
| Potato | 15.00% | 173.25 | 0.953 | 165.11 | 60.26 | 9.04 | 0.96 | 66.53 |
| Grain and other carbohydrate | 80.00% | 924.00 | 0.412 | 380.69 | 138.95 | 20.84 | 2.736 | 437.20 |
| Free sugar (by sugar beets) | 5.00% | 57.75 | 2.013 | 11.63 | 4.24 | 0.64 | 0.74 | 3.61 |
| Protein | 15.00% | 315.00 | 7.61 | 351.55 | 128.32 | 16.04 | 5.89 | 79.27 |
| Meat | 66.67% | 210.00 | 2.138 | 111.47 | 40.69 | 5.09 | 5.56 | 75.26 |
| Pork | 23.33% | 73.50 | 0.551 | 40.50 | 14.78 | 1.85 | 1.25 | 20.79 |
| Fish and other aquatic product | 6.67% | 21.00 | 0.532 | 11.17 | 4.06 | 0.51 | 0.335 | 1.54 |
| Beef and other livestock | 16.67% | 52.50 | 0.635 | 33.34 | 12.17 | 1.52 | 3.47 | 47.50 |
| Chicken and other poultry | 20.00% | 63.00 | 0.42 | 26.46 | 9.66 | 1.21 | 0.5 | 5.43 |
| Egg, Milk and Cheese | 33.33% | 105.00 | 5.47 | 240.08 | 87.63 | 10.95 | 0.34 | 4.01 |
| Egg (1egg=50g) | 11.11% | 35.00 | 0.715 | 25.03 | 9.13 | 1.14 | 0.155 | 1.59 |
| Fat free milk (1cup=400ml) | 15.87% | 50.00 | 4.000 | 200.00 | 73.00 | 9.12 | 0.0168 | 1.38 |
| Low fat cheese (1 piece=15g) | 6.35% | 20.00 | 0.753 | 15.06 | 5.50 | 0.69 | 0.168 | 1.04 |
| Total Fat | 20.00% | 420.00 | 0.37 | 50.57 | 18.46 | 2.31 | 19.55 | 138.09 |
| Sunflower oil | 15.00% | 63.00 | 0.127 | 8.00 | 2.92 | 0.37 | 12.808 | 42.08 |
| Other plant oil | 70.00% | 294.00 | 0.118 | 34.69 | 12.66 | 1.58 | 6.74 | 96.01 |
| Animal oil | 15.00% | 63.00 | 0.125 | 7.88 | 2.87 | 0.36 | Included | included |
| SUM | 100.00% | 2100.00 | 18.03 | 1577.55 | 575.81 | 88.34 | 31.98 | 988.64 |
| Selected resources: | | | | | | | | |
| 1 http://www.ecpa.eu/page/healthy-diet/ | | | | | | | | |
| 2 http://ec.europa.eu/health/archive/ph_determinants/life_style/nutrition/report01_en.pdf | | | | | | | | |
| 3 http://www.livestrong.com/article/470612-european-culture-and-diet/ | | | | | | | | |
| 4 http://www.eufic.org/article/en/expid/food-based-dietary-guidelines-in-europe/ | | | | | | | | |
| 5 http://medicalxpress.com/news/2011-10-policies-healthier-european-diet-effective.html | | | | | | | | |

Table of European Healthy Diet

| Component | Population goals |
|--|---|
| Physical Activity Levels (PAL) | PAL > 1.75 ³ |
| Adult Body Weight as BMI | BMI 21-22 |
| Dietary Fat % E | <30 ³ |
| Fatty Acids % total E | |
| Saturated | < 10 |
| Trans | <2 |
| Polyunsaturated (PUFA) | |
| n-6 | 4-8 |
| n-3 | 2 g linolenic + 200 mg very long chain |
| Carbohydrates Total % E | >55 |
| Sugary food consumption, occasions per day ⁴ | =< 4 |
| Fruit and Vegetables (g.d ⁻¹) | >400 |
| Folate from food (µg.d ⁻¹) | >400 |
| Dietary Fibre (g.d ⁻¹) | >25 (or 3g/MJ) |
| Sodium (expressed as sodium chloride) (g.d ⁻¹) | <6 |
| Iodine (µg/d) | 150 (infants - 50) (pregnancy - 200) |
| Exclusive Breast Feeding | About 6 months |

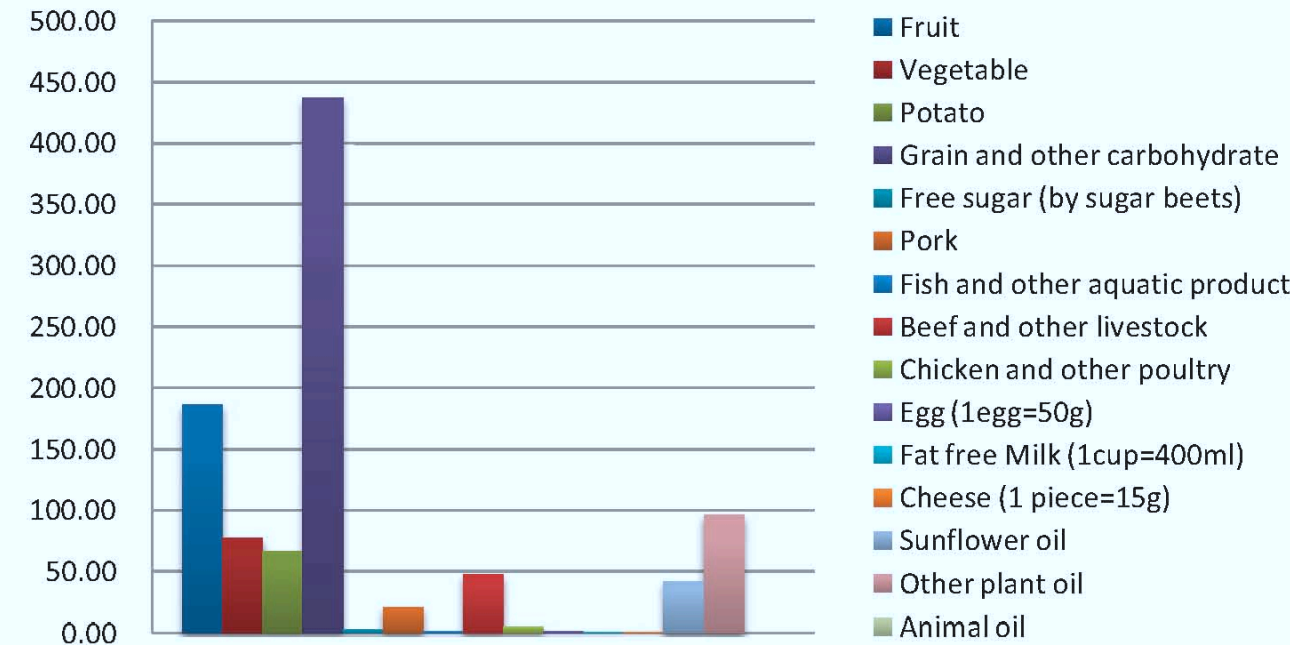
Calorie compare per capita per day (%)



There are very different food pyramids in different countries in European based on different standards. So in 1998 the European Commission funded a project with the aim to contribute towards a co-ordinated approach on nutrition, diet and healthy lifestyles – the "Eurodiet" project. This is a "Eurodiet" Core Report funded by the European Commission addresses a wide range of significant issues. And it will serve to stimulate a lively discussion on contemporary European nutrition issues.

Resource:
1. http://ec.europa.eu/health/archive/ph_determinants/life_style/nutrition/report01_en.pdf

Surface compare per capita per year (m2)



Japanese Healthy diet

Prefer:carbohydrates (5 to 7 servings a day), vegetables (5 to 6); dairy (2) and fruit (2)

Moderate: protein: meat, fish, eggs (3 to 5); sweet beverages and moderate exercise

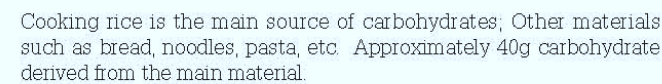
| |
|---|
| Selected resources: |
| 1 http://www.maff.go.jp/j/balance_guide/ |
| 2 http://www.healthy-dietpedia.com/japanese-diet.html |
| 3 http://www.everydiet.org/diet/japanese-diet |
| 4 http://www.everydiet.org/diet/japanese-diet |
| 5 http://www.naturalhews.com/024715_diet_japan_Japanese.html |

| Food Item | Intake (g) |
|--------------------------------|------------|
| Fruit | 120.00 |
| Vegetable | 95.00 |
| Potato | 65.00 |
| Grain and other carbohydrate | 410.00 |
| Free sugar (by sugar beets) | 5.00 |
| Pork | 10.00 |
| Fish and other aquatic product | 2.00 |
| Beef and other livestock | 30.00 |
| Chicken and other poultry | 5.00 |
| Egg (1egg=50g) | 60.00 |
| Fat free Milk (1cup=400ml) | 2.00 |
| Cheese (1 piece=15g) | 2.00 |
| Sunflower oil | 25.00 |
| Other plant oil | 60.00 |
| Animal oil | 2.00 |

The Food Guide from Japan's Health and Agriculture ministries, is depicted as a spinning top with a wide upper layer tapering to a narrow bottom.

- Fruit
- Vegetable
- Potato
- Grain and other carbohydrate
- Free sugar (by sugar beets)
- Pork
- Fish and other aquatic product
- Beef and other livestock
- Chicken and other poultry
- Egg (1egg=50g)
- Fat free Milk (1cup=400ml)
- Cheese (1 piece=15g)
- Sunflower oil
- Other plant oil
- Animal oil

Food Pyramid of Japanese Healthy Diet



The main ingredients are vegetables (except soy), which is a source of vitamins, minerals, dietary fiber vegetables, potatoes, beans, mushrooms, seaweed, etc. mainly.

1. http://www.maff.go.jp/j/balance_guide/

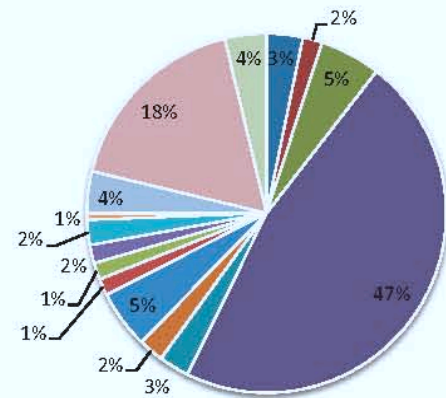
The main ingredients contains cooking meat, which is a source of protein, fish, eggs, soybeans and soy products, etc.

Mainly contains a source of calcium, milk, yogurt, and cheese.

Mainly contains fruit which contain a source of vitamin C, such as potassium, watermelon and apple fruit, such as oranges, and strawberries.

| Finland Healthy Diet | | | | | | | | |
|---|-------------|-------------------|-----------------------------|--------------|--------------|----------------------|---|---|
| Finland Healthy Diet | | | | | | | | |
| Research by Finnish The National Public Health Institute (KTL) | | | | | | | | |
| Prefer fish a primary source of protein in Finnish cuisine, fast food as a common element in their diet | | | | | | | | |
| Moderate: country's climate limits the production of plant-based foods | | | | | | | | |
| Item | Calorie (%) | Calorie/day (cal) | Ingredient Average Gram/Cal | Gram/day (g) | Kg/year (Kg) | Food Waste (Kg/year) | Average Food Prints (m ² /kg/year) | Farming Surface (m ² /people/year) |
| Total calories | 100.00% | 2100.00 | | | | | | |
| Fruits, Vegetables and Carbohydrate | 60.00% | 1260.00 | 10.054 | 835.18 | 304.84 | 48.55 | 6.54 | 644.45 |
| Fruits and Vegetables | 5.00% | 105.00 | 6.676 | 309.00 | 112.79 | 19.74 | 2.10 | 131.97 |
| Fruit | 65.00% | 68.25 | 2.021 | 137.93 | 50.35 | 8.81 | 1.576 | 93.23 |
| Vegetable | 35.00% | 36.75 | 4.655 | 171.07 | 62.44 | 10.93 | 0.528 | 38.74 |
| Carbohydrate | 55.00% | 1155.00 | 3.378 | 526.18 | 192.05 | 28.81 | 4.44 | 512.49 |
| Potato | 10.00% | 115.50 | 0.953 | 110.07 | 40.18 | 6.03 | 0.96 | 44.35 |
| Grain and other carbohydrate | 85.00% | 981.75 | 0.412 | 404.48 | 147.64 | 22.15 | 2.736 | 464.52 |
| Free sugar (by sugar beets) | 5.00% | 57.75 | 2.013 | 11.63 | 4.24 | 0.64 | 0.74 | 3.61 |
| Protein | 15.00% | 315.00 | 7.61 | 341.18 | 124.53 | 15.57 | 5.89 | 56.18 |
| Meat | 70.00% | 220.50 | 2.138 | 117.92 | 43.04 | 5.38 | 5.56 | 52.65 |
| Pork | 15.00% | 47.25 | 0.551 | 26.03 | 9.50 | 1.19 | 1.25 | 13.36 |
| Fish and other aquatic product | 35.00% | 110.25 | 0.532 | 58.65 | 21.41 | 2.68 | 0.335 | 8.07 |
| Beef and other livestock | 10.00% | 31.50 | 0.635 | 20.00 | 7.30 | 0.91 | 3.47 | 28.50 |
| Chicken and other poultry | 10.00% | 31.50 | 0.42 | 13.23 | 4.83 | 0.60 | 0.5 | 2.72 |
| Egg, Milk and Cheese | 30.00% | 94.50 | 5.47 | 223.26 | 81.49 | 10.19 | 0.34 | 3.54 |
| Egg (1egg=50g) | 11.00% | 34.65 | 0.715 | 24.77 | 9.04 | 1.13 | 0.155 | 1.58 |
| Fat free milk (1cup=400ml) | 15.00% | 47.25 | 4.000 | 189.00 | 68.99 | 8.62 | 0.0168 | 1.30 |
| Low fat cheese (1 piece=15g) | 4.00% | 12.60 | 0.753 | 9.49 | 3.46 | 0.43 | 0.163 | 0.65 |
| Total Fat | 25.00% | 525.00 | 0.37 | 63.21 | 23.07 | 2.88 | 19.55 | 172.62 |
| Sunflower oil | 15.00% | 78.75 | 0.127 | 10.00 | 3.65 | 0.46 | 12.808 | 52.60 |
| Other plant oil | 70.00% | 367.50 | 0.118 | 43.37 | 15.83 | 1.98 | 6.74 | 120.02 |
| Animal oil | 15.00% | 78.75 | 0.125 | 9.84 | 3.59 | 0.45 | Included | included |
| SUM | 100.00% | 2100.00 | 18.03 | 1239.57 | 452.44 | 67.00 | 31.98 | 873.26 |
| Selected resources: | | | | | | | | |
| 1 http://www.eufic.org/article/en/expid/food-based-dietary-guidelines-in-europe/ | | | | | | | | |
| 2 http://www.ktl.fi/porta/english/public_health_monitoring_promotion/nutrition_in_finland/nutrition_and_health | | | | | | | | |
| 3 http://www.livestrong.com/article/876342-diet-nutrition-in-finland/ | | | | | | | | |
| 4 http://edition.cnn.com/2010/HEALTH/diet.fitness/05/14/finland.cheese.immune.system.elderly/index.html | | | | | | | | |
| 5 http://countyofstudies.us/finland/72.htm | | | | | | | | |

Calorie compare per capita per day (%)

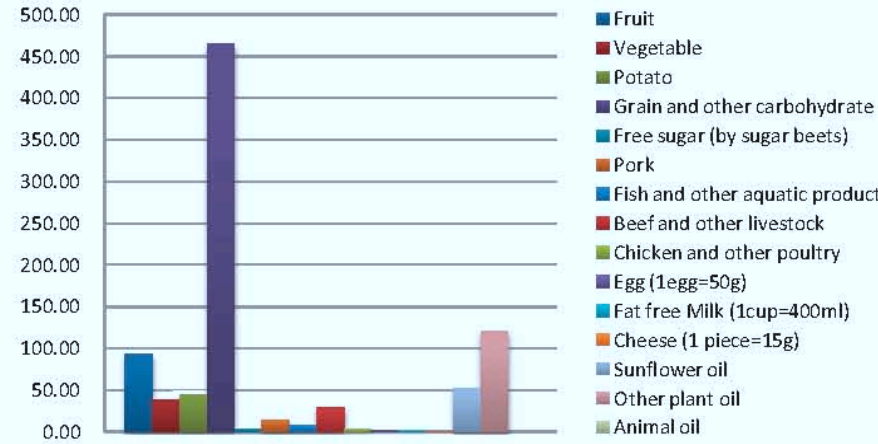


Description

The weather of Finland has a significant impact on the country's cuisine, although Western-style fast food has become a common element of the Finnish diet in recent decades, because the country's climate limits the production of plant-based foods. Finns have grown increasingly dependent on pizzas, hamburgers, french fries and other Western fast food fare.

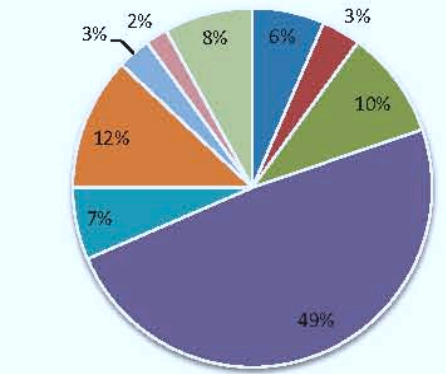
Bread has been a staple of Finnish food for centuries.

Surface compare per capita per year (m2)



| Buddhist Veganism Diet | | | | | | | | |
|---|-------------|-------------------|-----------------------------|--------------|--------------|----------------------|---|---|
| Buddhist Vegetarianism Diet | | | | | | | | |
| Description: a kind of religion diet, a little different between different buddhisms. | | | | | | | | |
| Exclude: all animal products, as well as vegetables in the allium family, like onion, garlic... | | | | | | | | |
| Item | Calorie (%) | Calorie/day (cal) | Ingredient Average Gram/Cal | Gram/day (g) | Kg/year (Kg) | Food Waste (Kg/year) | Average Food Prints (m ² /kg/year) | Farming Surface (m ² /people/year) |
| Total calories | 100.00% | 1800.00 | | | | | | |
| Fruits, Vegetables and Carbohydrate | 75.00% | 1350.00 | 10.05 | 1082.06 | 394.35 | 64.08 | 6.54 | 716.14 |
| Fruits and Vegetables | 10.00% | 180.00 | 6.68 | 529.72 | 193.35 | 33.84 | 2.10 | 226.23 |
| Fruit | 65.00% | 117.00 | 2.021 | 236.46 | 86.31 | 15.10 | 1.576 | 159.82 |
| Vegetable | 35.00% | 63.00 | 4.655 | 293.27 | 107.04 | 18.73 | 0.528 | 66.41 |
| Total Carbohydrate | 65.00% | 1170.00 | 3.38 | 552.33 | 201.60 | 30.24 | 4.44 | 489.91 |
| Potato | 15.00% | 175.50 | 0.953 | 167.25 | 61.05 | 9.16 | 0.96 | 67.40 |
| Grain and other carbohydrate | 75.00% | 877.50 | 0.412 | 361.53 | 131.96 | 19.79 | 2.736 | 415.19 |
| Free sugar (by sugar beets) | 10.00% | 117.00 | 2.013 | 23.55 | 8.60 | 1.29 | 0.74 | 7.32 |
| Protein | 15.00% | 270.00 | 1.26 | 244.08 | 89.09 | 11.14 | 9.89 | 103.93 |
| Beans and related products | 80.00% | 216.00 | 1.086 | 234.58 | 85.62 | 10.70 | 0.707 | 68.10 |
| Nuts and Seeds | 20.00% | 54.00 | 0.176 | 9.50 | 3.47 | 0.43 | 9.182 | 35.83 |
| Total Fat | 10.00% | 180.00 | 0.25 | 21.56 | 7.87 | 0.98 | 19.55 | 71.97 |
| Sunflower oil | 20.00% | 36.00 | 0.127 | 4.57 | 1.67 | 0.21 | 12.808 | 24.05 |
| Other plant oil | 80.00% | 144.00 | 0.118 | 16.99 | 6.20 | 0.78 | 6.74 | 47.03 |
| SUM | 100.00% | 1800.00 | 11.56 | 1347.70 | 491.91 | 76.20 | 35.98 | 891.14 |
| Selected resources: | | | | | | | | |
| 1 http://www.dietstareview.com/diets/buddhist-diet/ | | | | | | | | |
| 2 http://en.wikipedia.org/wiki/Buddhist_vegetarianism | | | | | | | | |
| 3 http://vegepeace.org/buddhistvegetarian.html | | | | | | | | |
| 4 http://online.sfsu.edu/~rone/Buddhism/Buddhist%20Diet.htm | | | | | | | | |
| 5 http://en.wikipedia.org/wiki/Buddhist_cuisine | | | | | | | | |

Calorie compare per capita per day (%)

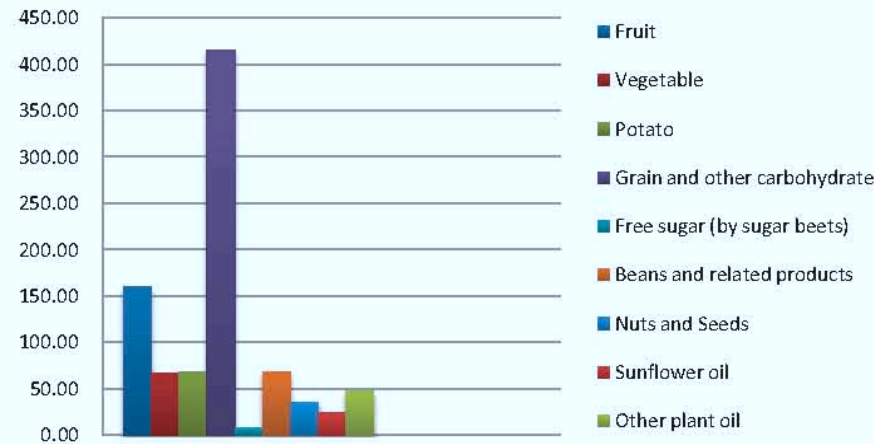


Description

Culture of Buddhist Diet:
It is a kind of religion diet. In Buddhism, what is most important is to recognise that being alive, by its very nature, is the cause of direct or indirect suffering and death to other beings (samsara). One should avoid gluttony and greedy consumption, while maintaining a healthy diet and lifestyle which is conducive to attaining enlightenment.

Some buddhist vegetarianism exclude all animal products, as well as vegetable in the allium, like onion, garlic...

Surface compare per capita per year (m2)



Raw Veganism Diet

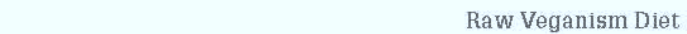
Include: mainly fresh and uncooked fruit, nuts, seeds, and vegetables, at least 75% raw foods.

Calorie compare per capita per day (%)



The definition of a raw vegan diet can be loosened to include vegan diets with at least 75% raw foods.

Surface compare per capita per year (m2)



Sea Weed Nutritional Yeast

Herbs, Microgreens and Wheat Grass Juice

Proteins, Amino Acids Eat Moderately

Fruits and Vegetables

**Foundation Foods
Eat Generously**

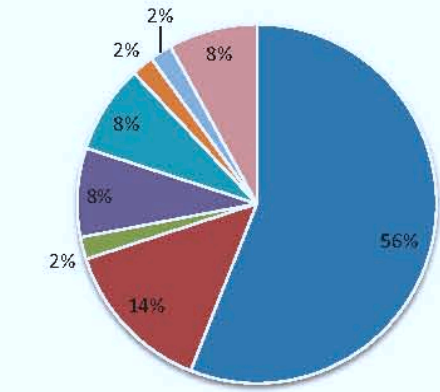
Raw veganism is a diet that combines the concepts of veganism and raw foodism. Some followers of a raw vegan diet place importance on spiritual gain. Ruthann Russo, Ph.D and author of two books on the raw foods diet, says that the movement aims to look at "the way food, living, treatment of the earth, our treatment of each other, and our quest for physical, spiritual, and mental health all fit together."¹¹

- A raw vegan diet includes raw vegetables and fruits, nuts and nut pastes, grain and legume sprouts, seeds, plant oils, sea vegetables, herbs, and fresh juices.
There are many different versions of the diet, including fruitarianism, juicearianism, and sproutarianism.

Resource:
1. The Raw Food Diet Myth, Ruthann Russo, Ph D, MPH 2008 <http://www.therawfoodlifestylebook.com/downloads/TheRawFoodDietMythPreview.pdf>

| Fruitarianism Diet | | | | | | | | |
|---|-------------|-------------------|------------------------------|--------------|--------------|----------------------|----------------------------------|----------------------------------|
| Fruitarianism Diet | | | | | | | | |
| Description: It may be adopted for different reasons: ethical, health, religious, political... | | | | | | | | |
| Prefer: a diet that mainly includes raw fruits (about 75%), nuts and seeds. Definitions are different. | | | | | | | | |
| Exclude: all animal flesh and related products, most vegetables and grains. | | | | | | | | |
| Item | Calorie (%) | Calorie/day (cal) | Ingredient Aaverage Gram/Cal | Gram/day (g) | Kg/year (Kg) | Food Waste (Kg/year) | Average Food Prints (m²/kg/year) | Farming Surface (m²/people/year) |
| Total calories | 100.00% | 1250.00 | | | | | | |
| Fruits, Vegetables and Carbohydrate | 80.00% | 1000.00 | 8.04 | 2284.35 | 837.44 | 151.11 | 5.80 | 1187.59 |
| Fruits and Vegetables | 70.00% | 875.00 | 6.68 | 2229.33 | 813.70 | 142.40 | 2.10 | 1140.67 |
| Fruit | 80.00% | 700.00 | 2.021 | 1414.70 | 516.37 | 90.36 | 1.576 | 956.21 |
| Vegetable | 20.00% | 175.00 | 4.655 | 814.63 | 297.34 | 52.03 | 0.528 | 184.47 |
| Total Carbohydrate | 10.00% | 125.00 | 1.37 | 65.03 | 23.73 | 8.72 | 3.70 | 56.92 |
| Potato | 20.00% | 25.00 | 0.953 | 23.83 | 8.70 | 1.30 | 0.96 | 9.60 |
| Grain and other carbohydrate | 80.00% | 100.00 | 0.412 | 41.20 | 15.04 | 2.26 | 2.736 | 47.32 |
| Protein | 10.00% | 125.00 | 1.26 | 113.00 | 41.25 | 5.16 | 9.89 | 48.12 |
| Beans and related products | 80.00% | 100.00 | 1.086 | 108.60 | 39.64 | 4.95 | 0.707 | 31.53 |
| Nuts and Seeds | 20.00% | 25.00 | 0.176 | 4.40 | 1.61 | 0.20 | 9.182 | 16.59 |
| Total Fat | 10.00% | 125.00 | 0.25 | 14.98 | 5.47 | 0.68 | 19.55 | 49.36 |
| Sunflower oil | 20.00% | 25.00 | 0.127 | 3.18 | 1.16 | 0.14 | 12.808 | 16.70 |
| Other plant oil | 80.00% | 100.00 | 0.118 | 11.80 | 4.31 | 0.54 | 6.74 | 32.66 |
| SUM | 100.00% | 1250.00 | 9.55 | 2422.33 | 884.15 | 156.95 | 35.24 | 1295.06 |
| Selected resources: | | | | | | | | |
| 1 http://www.thefruitarian.com/index.php/tag/fruitarianism/ | | | | | | | | |
| 2 http://www.living-foods.com/articles/fruitarianprocon.html | | | | | | | | |
| 3 http://www.fruitarianvibes.com/ | | | | | | | | |
| 4 http://en.wikipedia.org/wiki/Fruitarianism | | | | | | | | |
| 5 http://www.copperwiki.org/index.php?title=Fruitarianism | | | | | | | | |

Calorie compare per capita per day (%)



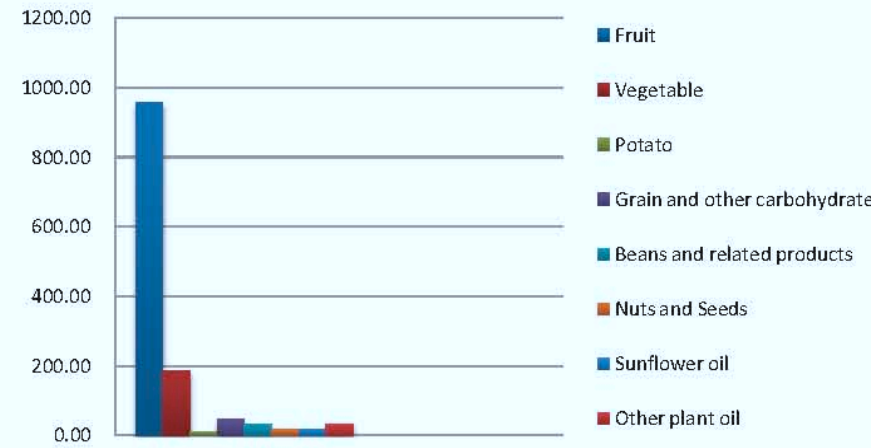
Description

Fruitarianism may be adopted for different reasons, including: ethical, health, religious, political, environmental, cultural, aesthetic and economic. Some fruitarians will eat only what falls (or would fall) naturally from a plant; that is: foods that can be harvested without killing or harming the plant.

There are many varieties of the diet. Some people whose diet consists of 75% or more fruit consider themselves fruitarians.

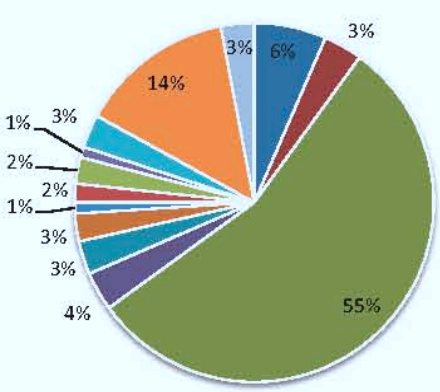
However, children should not follow a fruitarian diet.

Surface compare per capita per year (m2)



| Montiganac Diet | | | | | | | | |
|---|-------------|-------------------|------------------------------|--------------|--------------|----------------------|----------------------------------|----------------------------------|
| Montignac diet | | | | | | | | |
| Mainly popular in Europe, fats and carbohydrates should not be mixed in a single meal, two phases. | | | | | | | | |
| Prefer: food with low GI (glycemic index); using good fats and a lot of fiber in the diet. | | | | | | | | |
| Avoided: Sugar, refined grains, glucose, potatoes etc; caffeine and alcohol should be minimized. | | | | | | | | |
| Item | Calorie (%) | Calorie/day (cal) | Ingredient Aaverage Gram/Cal | Gram/day (g) | Kg/year (Kg) | Food Waste (Kg/year) | Average Food Prints (m²/kg/year) | Farming Surface (m²/people/year) |
| Total calories | 100.00% | 2000.00 | | | | | | |
| Fruits, Vegetables and Carbohydrate | 65.00% | 1300.00 | 7.09 | 1041.78 | 380.25 | 62.41 | 4.84 | 771.84 |
| Fruits and Vegetables | 10.00% | 200.00 | 6.68 | 588.58 | 214.83 | 37.60 | 2.10 | 251.37 |
| Fruit | 65.00% | 130.00 | 2.021 | 262.73 | 95.90 | 16.78 | 1.576 | 177.58 |
| Vegetable | 35.00% | 70.00 | 4.655 | 325.85 | 118.94 | 20.81 | 0.528 | 73.79 |
| Carbohydrate | 55.00% | 1100.00 | 0.41 | 453.20 | 165.42 | 24.81 | 2.74 | 520.47 |
| Grain and other carbohydrate | 100.00% | 1100.00 | 0.412 | 453.20 | 165.42 | 24.81 | 2.736 | 520.47 |
| Protein | 15.00% | 300.00 | 7.61 | 339.29 | 123.84 | 15.48 | 5.89 | 74.97 |
| Meat | 36.67% | 200.00 | 2.14 | 110.64 | 40.38 | 5.05 | 5.56 | 71.15 |
| Pork | 23.33% | 70.00 | 0.551 | 38.57 | 14.08 | 1.76 | 1.25 | 19.80 |
| Fish and other aquatic product | 20.00% | 60.00 | 0.532 | 31.92 | 11.65 | 1.46 | 0.335 | 4.39 |
| Beef and other livestock | 16.67% | 50.00 | 0.635 | 31.75 | 11.59 | 1.45 | 3.47 | 45.24 |
| Chicken and other poultry | 6.67% | 20.00 | 0.42 | 8.40 | 3.07 | 0.38 | 0.5 | 1.72 |
| Egg, Milk and Cheese | 33.33% | 100.00 | 5.47 | 228.65 | 83.46 | 10.43 | 0.34 | 9.82 |
| Egg (1egg=50g) | 11.11% | 33.33 | 0.715 | 23.83 | 8.70 | 1.09 | 0.155 | 1.52 |
| Fat free milk (1cup=400ml) | 15.67% | 47.62 | 4.000 | 190.48 | 69.52 | 8.69 | 0.0168 | 1.31 |
| Low fat cheese (1 piece=15g) | 6.35% | 19.05 | 0.753 | 14.34 | 5.24 | 0.65 | 0.168 | 0.99 |
| Total Fat | 20.00% | 400.00 | 0.37 | 48.16 | 17.58 | 2.20 | 19.55 | 131.52 |
| Sunflower oil | 15.00% | 60.00 | 0.127 | 7.62 | 2.78 | 0.35 | 12.808 | 40.08 |
| Other plant oil | 70.00% | 280.00 | 0.118 | 33.04 | 12.06 | 1.51 | 6.74 | 91.44 |
| Animal oil | 15.00% | 60.00 | 0.125 | 7.50 | 2.74 | 0.34 | included | included |
| SUM | 100.00% | 2000.00 | 15.06 | 1429.23 | 521.67 | 80.09 | 30.28 | 978.33 |
| Selected resources: | | | | | | | | |
| 1 http://www.montignac.com/ | | | | | | | | |
| 2 http://montignacrecipes.co.uk/ | | | | | | | | |
| 3 http://www.dietspotlight.com/montignac-review/ | | | | | | | | |
| 4 http://www.mondorecipes.com/content/Montignac-Diet-Recipes/ | | | | | | | | |
| 5 http://en.wikipedia.org/wiki/Montignac_diet | | | | | | | | |

Calorie compare per capita per day (%)

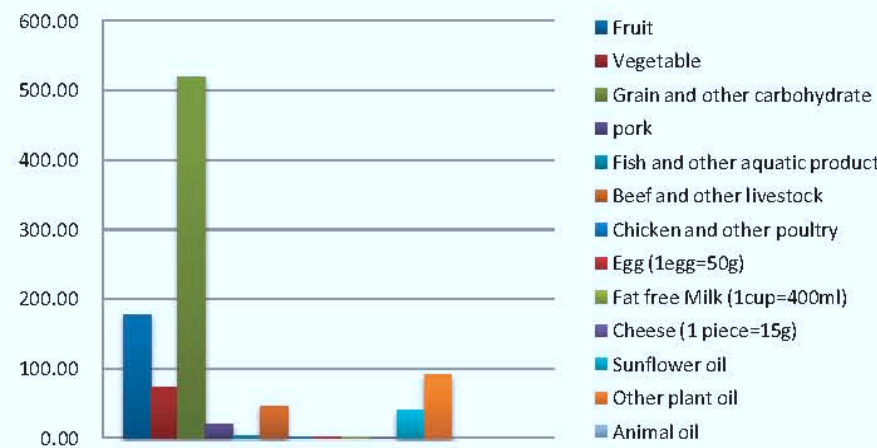


Description

The Montignac diet is a weight-loss diet that was popular in the 1990s mainly in Europe. It encourages eat low glycemic index carbs. Sweets, potatoes, rice, and white bread, may not be taken together with fats. Sugar, refined grains, glucose, potatos and caffeine, alcohol should be minimized.

The Montignac Method is divided into two phases.
Phase I: the weight-losing phase.
Phase II: stabilization and prevention phase.

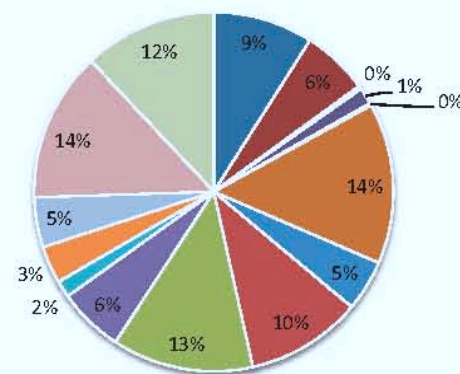
Surface compare per capita per year (m2)



Atkins Diet

| Atkins Diet | | | | | | | | |
|---|-------------|-------------------|-----------------------------|--------------|--------------|----------------------|---|---|
| Low-carbohydrate diet (about 20g/day), meat and meat related food are large | | | | | | | | |
| Item | Calorie (%) | Calorie/day (cal) | Ingredient Average Gram/Cal | Gram/day (g) | Kg/year (Kg) | Food Waste (Kg/year) | Average Food Prints (m ² /kg/year) | Farming Surface (m ² /people/year) |
| Total calories | 100.00% | 2000.00 | | | | | | |
| Fruits, Vegetables and Carbohydrate | 17.00% | 340.00 | 18.054 | 94.126 | 343.56 | 59.95 | 6.54 | 389.12 |
| Fruits and Vegetables | 15.00% | 300.00 | 6.676 | 922.38 | 336.67 | 58.92 | 2.10 | 372.37 |
| Fruit | 60.00% | 180.00 | 2.021 | 363.78 | 132.78 | 23.24 | 1.576 | 245.88 |
| Vegetable | 40.00% | 120.00 | 4.655 | 558.60 | 203.89 | 35.68 | 0.528 | 126.49 |
| Carbohydrate | 2.00% | 40.00 | 3.378 | 18.88 | 6.89 | 1.03 | 4.44 | 16.75 |
| Potato | 15.00% | 6.00 | 0.953 | 5.72 | 2.09 | 0.31 | 0.96 | 2.30 |
| Grain and other carbohydrate | 75.00% | 30.00 | 0.412 | 12.36 | 4.51 | 0.68 | 2.736 | 14.19 |
| Free sugar (by sugar beets) | 10.00% | 4.00 | 2.013 | 0.81 | 0.29 | 0.04 | 0.74 | 0.25 |
| Protein | 53.00% | 1060.00 | 7.61 | 704.45 | 257.12 | 32.14 | 5.89 | 308.92 |
| Meat | 79.67% | 844.47 | 2.138 | 447.74 | 163.43 | 20.43 | 5.56 | 299.22 |
| Pork | 27.33% | 289.73 | 0.551 | 159.64 | 58.27 | 7.28 | 1.25 | 81.94 |
| Fish and other aquatic product | 8.67% | 91.87 | 0.532 | 48.87 | 17.84 | 2.23 | 0.335 | 6.72 |
| Beef and other livestock | 19.67% | 208.47 | 0.635 | 132.38 | 48.32 | 6.04 | 3.47 | 188.62 |
| Chicken and other poultry | 24.00% | 254.40 | 0.42 | 106.85 | 39.00 | 4.87 | 0.5 | 21.94 |
| Egg, Milk and Cheese | 20.33% | 215.53 | 5.47 | 256.71 | 93.70 | 11.71 | 0.34 | 9.70 |
| Egg (1egg=50g) | 11.11% | 117.78 | 0.715 | 84.21 | 30.74 | 3.84 | 0.155 | 5.36 |
| Fat free milk (1cup=400ml) | 2.87% | 30.45 | 4.000 | 121.82 | 44.46 | 5.56 | 0.0168 | 0.84 |
| Low fat cheese (1 piece=15g) | 6.35% | 67.30 | 0.753 | 50.68 | 18.50 | 2.31 | 0.168 | 3.50 |
| Total Fat | 30.00% | 600.00 | 0.37 | 73.29 | 26.75 | 3.34 | 19.55 | 148.29 |
| Sunflower oil | 15.00% | 90.00 | 0.127 | 11.43 | 4.17 | 0.52 | 12.808 | 60.11 |
| Other plant oil | 45.00% | 270.00 | 0.118 | 31.86 | 11.63 | 1.45 | 6.74 | 88.18 |
| Animal oil | 40.00% | 240.00 | 0.125 | 30.00 | 10.95 | 1.37 | Included | Included |
| SUM | 100.00% | 2000.00 | 18.03 | 1719.00 | 627.43 | 95.44 | 31.98 | 846.33 |
| Selected resources: | | | | | | | | |
| 1 http://www.the-atkins-diet.info/ | | | | | | | | |
| 2 http://www.atkinsdietfreeplan.com/ | | | | | | | | |
| 3 http://www.atkins-diet-advisor.com/ | | | | | | | | |
| 4 http://en.wikipedia.org/wiki/Atkins_Nutritional_Approach | | | | | | | | |
| 5 http://www.atkins.com/ | | | | | | | | |

Calorie compare per capita per day (%)

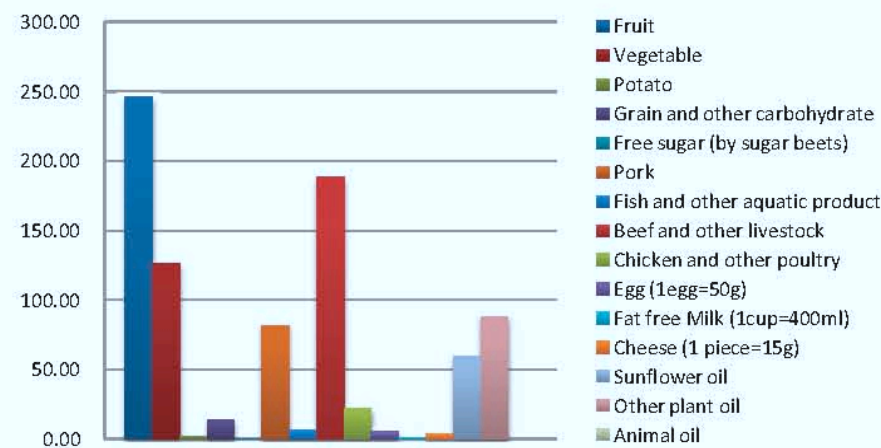


Description

It is a low-carbohydrate high protein diet created by Robert Atkins.

The diet is based on the theory that overweight people eat too many carbohydrates. Our bodies burn both fat and carbohydrates for energy, but carbs are used first. By drastically reducing carbs and eating more protein and fat, our bodies naturally lose weight by burning stored body fat more efficiently.

Surface compare per capita per year (m2)



Atkins Diet

Food Pyramid of Atkins Diet

Whole Grain Products

Wheat Flour, Oat Meal, Sprouted Grains, Brown rice, Wheat Bread

Vegetables & Seed Oils Sources

Dairy Products, Nuts, legumes, Olive

Fruits Sources

Blueberry, Avocado, Peers,

Vegetables Sources

Salad greens, Broccoli, Cauliflower, Spinach

Protein Sources

Sea Foods, Egg, Meat, Soya Products,

Description of Atkins Diet

The Atkins diet, officially called the Atkins Nutritional Approach, is a low-carbohydrate diet created by Robert Atkins. Many people use this diet to lose weight.

There are four phases of the Atkins diet: induction, ongoing weight loss, pre-maintenance and lifetime maintenance.

1. Induction:

It lasts for 14 days. During this 14 days your consumption of carbohydrates is restricted to below 20 grams a day.

2. Ongoing weight loss:

At this phase you add carbohydrate, in the form of nutrient-dense and fibre-rich foods, by increasing to 25 grams daily the first week, 30 grams daily the next week.

The rungs are as follows:

Induction of acceptable vegetables in larger quantities, Fresh cheese, Nuts and seeds, Berries, Alcohol, Legumes, Other fruits, Starchy vegetables, Whole grains.

3. Pre-maintenance

Increasing the daily carbohydrate intake in 10-gram increments each week.

4. Lifetime maintenance

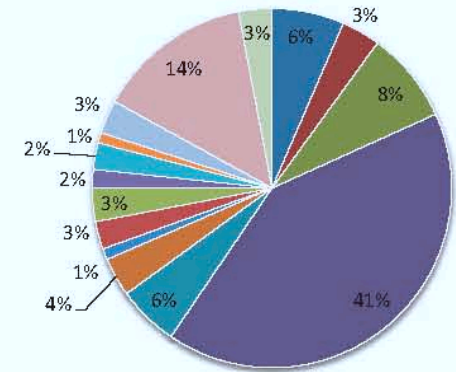
In this phase you can select from a wide variety of foods while controlling carbohydrate intake to ensure weight maintenance and a sense of well-being.

Resource:

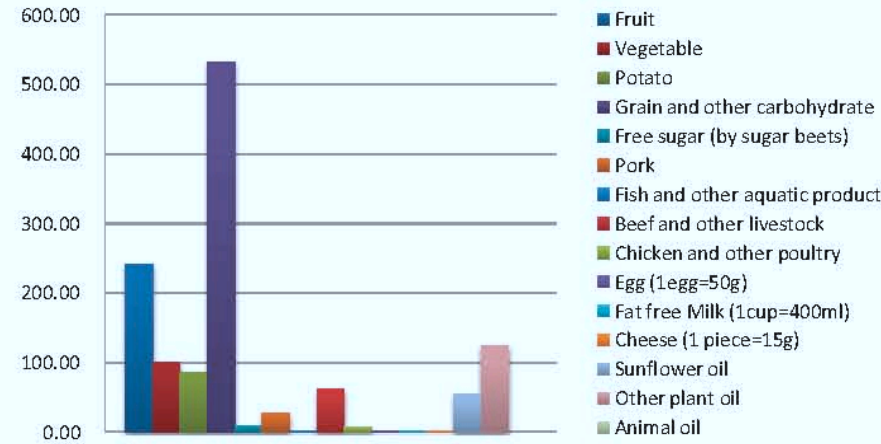
1 <http://www.the-atkins-diet.info/>

| Organic Food Diet | | | | | | | | |
|---|-------------|-------------------|------------------------------|--------------|--------------|----------------------|---|---|
| Organic Food Diet | | | | | | | | |
| 20% smaller yield from organic farms using 50% less fertilizer and 97% less pesticide | | | | | | | | |
| Prefer: plants and animals farming by natural way or using organic ingredients. | | | | | | | | |
| Exclude: synthetic pesticides, chemical fertilizers, genetically modified organisms, chemical food additives... | | | | | | | | |
| Item | Calorie (%) | Calorie/day (cal) | Ingredient Aaverage Gram/Kal | Gram/day (g) | Kg/year (Kg) | Food Waste (Kg/year) | Average Food Prints (m ² /kg/year) | Farming Surface (m ² /people/year) |
| Total calories | 100.00% | 2100.00 | | | | | | |
| Fruits, Vegetables and Carbohydrate | 65.00% | 1365.00 | 10.054 | 1163.26 | 424.59 | 69.33 | 6.54 | 971.83 |
| Fruits and Vegetables | 10.00% | 210.00 | 6.676 | 618.01 | 225.57 | 39.48 | 2.10 | 343.12 |
| Fruit | 65.00% | 136.50 | 2.021 | 275.87 | 100.69 | 17.62 | 1.576 | 242.40 |
| Vegetable | 35.00% | 73.50 | 4.655 | 342.14 | 124.88 | 21.85 | 0.528 | 100.72 |
| Carbohydrate | 55.00% | 1155.00 | 3.378 | 345.25 | 199.02 | 29.85 | 4.44 | 628.71 |
| Potato | 15.00% | 173.25 | 0.983 | 165.11 | 60.26 | 9.04 | 0.96 | 86.49 |
| Grain and other carbohydrate | 75.00% | 886.25 | 0.412 | 356.90 | 130.27 | 19.54 | 2.736 | 532.83 |
| Free sugar (by sugar beets) | 10.00% | 115.50 | 2.013 | 23.25 | 8.49 | 1.27 | 0.74 | 9.39 |
| Protein | 15.00% | 315.00 | 7.61 | 351.55 | 128.32 | 16.94 | 5.89 | 103.05 |
| Meat | 66.67% | 210.00 | 2.138 | 111.47 | 40.69 | 5.09 | 5.56 | 97.84 |
| Pork | 23.33% | 73.50 | 0.551 | 40.50 | 14.78 | 1.85 | 1.25 | 27.02 |
| Fish and other aquatic product | 6.67% | 21.00 | 0.532 | 11.17 | 4.08 | 0.51 | 0.335 | 2.00 |
| Beef and other livestock | 16.67% | 52.50 | 0.635 | 33.34 | 12.17 | 1.52 | 3.47 | 61.75 |
| Chicken and other poultry | 20.00% | 63.00 | 0.42 | 26.46 | 9.66 | 1.21 | 0.5 | 7.06 |
| Egg, Milk and Cheese | 33.33% | 105.00 | 5.47 | 240.08 | 87.63 | 10.95 | 0.34 | 5.21 |
| Egg (1egg=50g) | 11.11% | 35.00 | 0.715 | 25.03 | 9.13 | 1.14 | 0.155 | 2.07 |
| Fat free milk (1cup=400ml) | 15.87% | 50.00 | 4.000 | 200.00 | 73.00 | 9.12 | 0.0168 | 1.79 |
| Low fat cheese (1 piece=15g) | 6.35% | 20.00 | 0.753 | 15.06 | 5.50 | 0.69 | 0.168 | 1.35 |
| Total Fat | 20.00% | 420.00 | 0.37 | 50.57 | 18.46 | 2.31 | 19.55 | 179.52 |
| Sunflower oil | 15.00% | 63.00 | 0.127 | 8.00 | 2.92 | 0.37 | 12.808 | 54.70 |
| Other plant oil | 70.00% | 294.00 | 0.118 | 34.69 | 12.66 | 1.58 | 6.74 | 124.82 |
| Animal oil | 15.00% | 63.00 | 0.125 | 7.88 | 2.87 | 0.36 | Included | Included |
| SUM | 100.00% | 2100.00 | 18.03 | 1565.38 | 571.36 | 87.67 | 31.98 | 1254.40 |
| Selected resources: | | | | | | | | |
| 1 http://www.organicfoodinfo.net/ | | | | | | | | |
| 2 http://www.organicfoodzen.com/organic-food-diet/ | | | | | | | | |
| 3 http://en.wikipedia.org/wiki/Organic_food | | | | | | | | |
| 4 http://www.the-natural-path.com/natural-and-organic-food.html | | | | | | | | |
| 5 http://reallyworks.org/blog/2010/07/28/eating-organic-food-diet-can-lead-to-weight-gain/ | | | | | | | | |

Calorie compare per capita per day (%)



Surface compare per capita per year (m2)



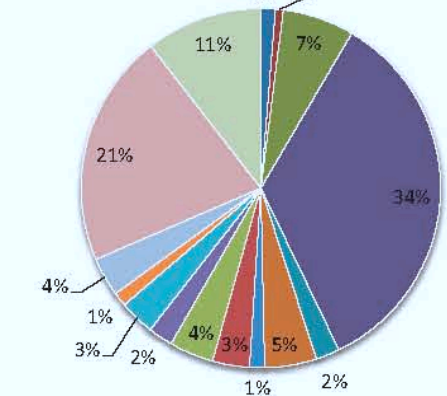
Description

Organic food diet eat food which do not involve modern synthetic inputs such as synthetic pesticides and chemical fertilizers, do not contain genetically modified organisms, and are not processed using irradiation, industrial solvents, or chemical food additives.

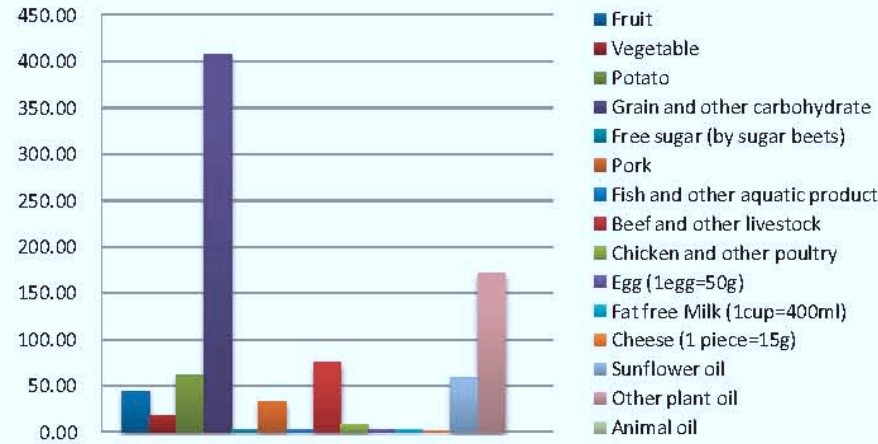
People of this diet believe that it is a lifestyle change that promotes good health and long life. Because the natural and organic food diet is more likely to provide the nutrition your body needs and also has a cleansing effect on your body, it will allow your body to heal itself

| Junk Food Diet | | | | | | | | |
|---|-------------|-------------------|------------------------------|--------------|--------------|----------------------|---|---|
| Junk Food Diet | | | | | | | | |
| They are typically ready-to-eat convenience foods, have little or no health benefits. | | | | | | | | |
| Prefer: containing high levels of saturated fats, protein, salt, or sugar (chips, sweet desserts, fried fast food) | | | | | | | | |
| Little: little or no fruit, vegetables, or dietary fiber; | | | | | | | | |
| Item | Calorie (%) | Calorie/day (cal) | Ingredient Aaverage Gram/Kal | Gram/day (g) | Kg/year (Kg) | Food Waste (Kg/year) | Average Food Prints (m ² /kg/year) | Farming Surface (m ² /people/year) |
| Total calories | 100.00% | 2500.00 | | | | | | |
| Fruits, Vegetables and Carbohydrate | 45.00% | 1125.00 | 10.054 | 665.96 | 243.97 | 37.80 | 6.54 | 535.04 |
| Fruits and Vegetables | 2.00% | 50.00 | 6.676 | 147.15 | 53.71 | 9.40 | 2.10 | 62.84 |
| Fruit | 65.00% | 32.50 | 2.021 | 65.68 | 23.97 | 4.20 | 1.576 | 44.40 |
| Vegetable | 35.00% | 17.50 | 4.655 | 81.46 | 29.73 | 5.20 | 0.528 | 18.45 |
| Carbohydrate | 43.00% | 1075.00 | 3.378 | 518.81 | 189.37 | 28.40 | 4.44 | 472.20 |
| Potato | 15.00% | 161.25 | 0.983 | 153.67 | 56.09 | 8.41 | 0.96 | 61.92 |
| Grain and other carbohydrate | 80.00% | 860.00 | 0.412 | 354.32 | 129.33 | 19.40 | 2.736 | 406.91 |
| Free sugar (by sugar beets) | 5.00% | 53.75 | 2.013 | 10.82 | 3.95 | 0.59 | 0.74 | 3.36 |
| Protein | 20.00% | 500.00 | 7.61 | 558.02 | 203.68 | 25.46 | 5.89 | 125.62 |
| Meat | 66.67% | 333.33 | 2.138 | 176.93 | 64.58 | 8.07 | 5.56 | 119.46 |
| Pork | 23.33% | 166.67 | 0.551 | 64.28 | 23.46 | 2.93 | 1.25 | 33.00 |
| Fish and other aquatic product | 6.67% | 33.33 | 0.532 | 17.73 | 6.47 | 0.81 | 0.335 | 2.44 |
| Beef and other livestock | 16.67% | 83.33 | 0.635 | 52.92 | 19.31 | 2.41 | 3.47 | 75.40 |
| Chicken and other poultry | 20.00% | 100.00 | 0.42 | 42.00 | 15.33 | 1.92 | 0.5 | 8.62 |
| Egg, Milk and Cheese | 33.33% | 166.67 | 5.47 | 381.09 | 139.10 | 17.39 | 0.34 | 6.37 |
| Egg (1egg=50g) | 11.11% | 55.56 | 0.715 | 39.72 | 14.50 | 1.81 | 0.155 | 2.53 |
| Fat free milk (1cup=400ml) | 15.87% | 79.37 | 4.000 | 317.46 | 115.67 | 14.48 | 0.0168 | 2.19 |
| Low fat cheese (1 piece=15g) | 6.35% | 31.75 | 0.753 | 23.90 | 8.73 | 1.09 | 0.168 | 1.65 |
| Total Fat | 35.00% | 875.00 | 0.37 | 105.88 | 38.64 | 4.83 | 19.55 | 229.90 |
| Sunflower oil | 10.00% | 87.50 | 0.127 | 11.11 | 4.06 | 0.51 | 12.808 | 58.44 |
| Other plant oil | 60.00% | 525.00 | 0.118 | 61.95 | 22.61 | 2.83 | 6.74 | 171.45 |
| Animal oil | 30.00% | 262.50 | 0.125 | 32.81 | 11.98 | 1.50 | Included | Included |
| SUM | 100.00% | 2500.00 | 18.03 | 1329.65 | 485.40 | 68.09 | 31.98 | 890.76 |
| Selected resources: | | | | | | | | |
| 1 http://www.webmd.com/diet/features/the-fast-food-diet | | | | | | | | |
| 2 http://en.wikipedia.org/wiki/Junk_food | | | | | | | | |
| 3 http://www.mayoclinic.com/health/junk-food-diet/MY01589 | | | | | | | | |
| 4 http://www.junkfooddietsite.com/ | | | | | | | | |
| 5 http://www.livestrong.com/article/4021-need-junk-food-diet/ | | | | | | | | |

Calorie compare per capita per day (%)



Surface compare per capita per year (m2)



Description

People with this diet prefer food typically ready-to-eat convenience foods containing high levels of saturated fats, salt, or sugar, and little or no fruit, vegetables, or dietary fiber; and are considered to have little or no health benefits.

Common junk foods include salted snack foods like chips (crisps), candy, gum, most sweet desserts, fried fast food and carbonated beverages (sodas) as well as alcoholic beverages. High-sugar cereals, particularly those targeted at children, such as Froot Loops, are also classified as junk food.

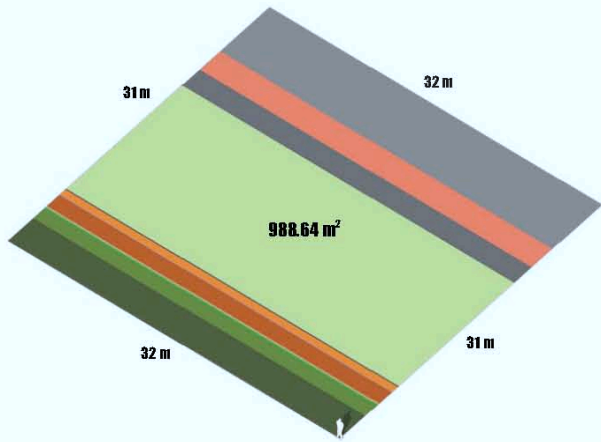
10 diets agricultural surface per person per year are compared with Berlin and Barcelona based on the same population density. From these diagrams, we can clearly see how mang agricultural surface do we need for different diets to feed the whole Berlin and Barcelona.

3.3

10 Diets Surface Compare

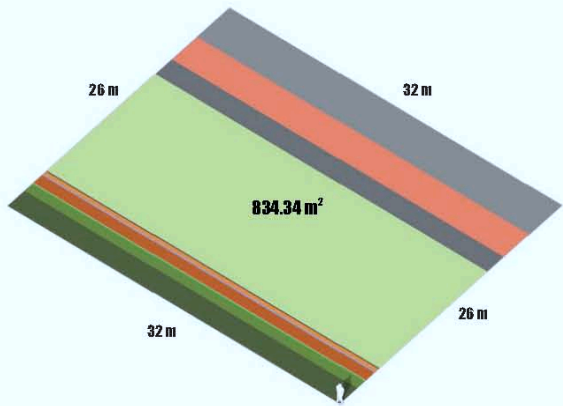
10 Diet Surface Per Person Per Year

European Healthy Diet



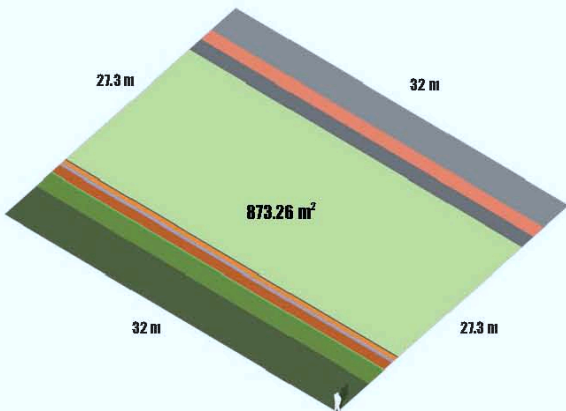
| | | |
|---|--|---|
| Fruit Surface = 186.4 | Sugar Beet Surface = 3.61 m ² | Chicken and Poultry Surface = 5.43 m ² |
| Vegetable Surface = 77.48 m ² | Pig Surface = 20.79 m ² | Egg, Milk and Cheese Surface = 4.01 m ² |
| Potato Surface = 66.53 m ² | Fish and Aquatic products Surface = 1.54 m ² | Sunflower Surface = 42.08 m ² |
| Grain and other carbohydrate Surface = 437.20 m ² | Cow and Livestock Surface = 47.50 m ² | Other Oil Plant Surface = 95.01 m ² |

Japanese Healthy Diet



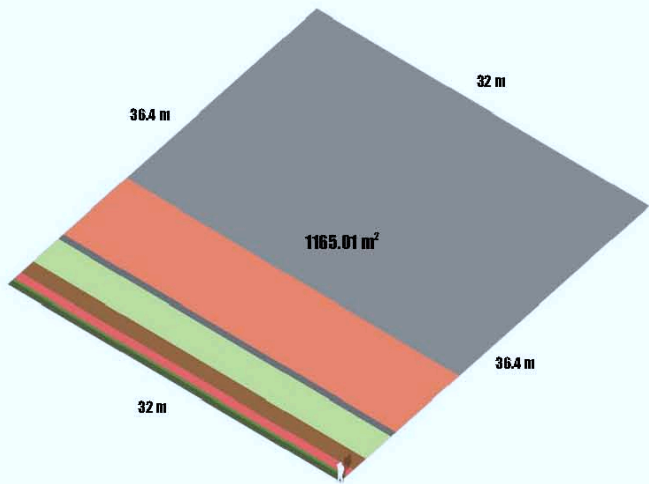
| | | |
|---|--|---|
| Fruit Surface = 122.94 m ² | Sugar Beet Surface = 3.38 m ² | Chicken and Poultry Surface = 3.03 m ² |
| Vegetable Surface = 94.82 m ² | Pig Surface = 9.93 m ² | Egg, Milk and Cheese Surface = 3.62 m ² |
| Potato Surface = 62.21 m ² | Fish and Aquatic products Surface = 5.14 m ² | Sunflower Surface = 27.05 m ² |
| Grain and other carbohydrate Surface = 408.81 m ² | Cow and Livestock Surface = 31.76 m ² | Other Oil Plant Surface = 61.72 m ² |

Finland Healthy Diet



| | | |
|---|--|---|
| Fruit Surface = 93.23 m ² | Sugar Beet Surface = 3.61 m ² | Chicken and Poultry Surface = 2.72 m ² |
| Vegetable Surface = 38.74 m ² | Pig Surface = 13.36 m ² | Egg, Milk and Cheese Surface = 3.54 m ² |
| Potato Surface = 44.35 m ² | Fish and Aquatic products Surface = 0.07 m ² | Sunflower Surface = 52.60 m ² |
| Grain and other carbohydrate Surface = 464.52 m ² | Cow and Livestock Surface = 28.50 m ² | Other Oil Plant Surface = 120.02 m ² |

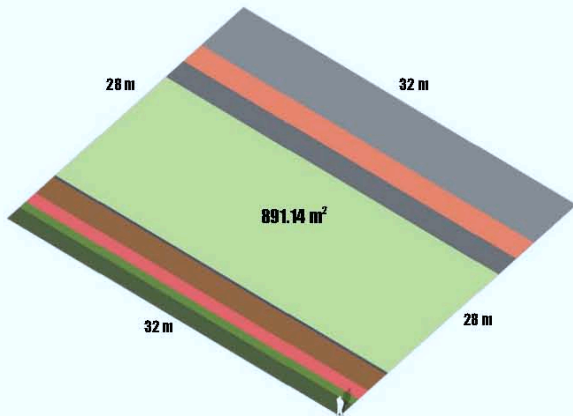
Veganism Diet



| | | |
|--|--|---|
| Fruit Surface = 717.15 m ² | Grain and other carbohydrate Surface = 94.63 m ² | Nuts and Seeds Surface = 24.88 m ² |
| Vegetable Surface = 237.17 m ² | Sugar Beet Surface = 0 m ² | Sunflower Surface = 8.35 m ² |
| Potato Surface = 19.20 m ² | Bean Surface = 47.29 m ² | Other Oil Plant Surface = 16.33 m ² |

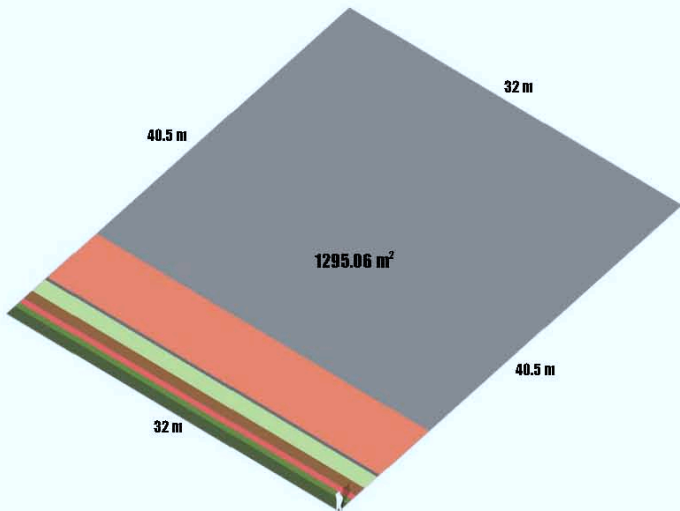
10 Diet Surface Per Person Per Year

Buddhist Vegetarianism Diet



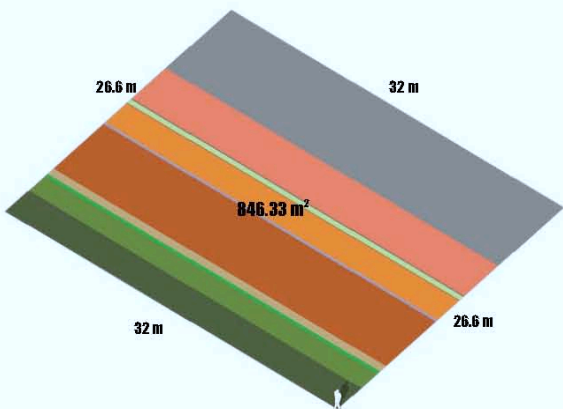
| | | |
|---|---|---|
| Fruit Surface = 169.82 m ² | Grain and other carbohydrate Surface = 415.19 m ² | Nuts and Seeds Surface = 35.83 m ² |
| Vegetable Surface = 66.41 m ² | Sugar Beet Surface = 7.32 m ² | Sunflower Surface = 24.05 m ² |
| Potato Surface = 67.40 m ² | Bean Surface = 68.10 m ² | Other Oil Plant Surface = 47.93 m ² |

Fruitarianism Diet



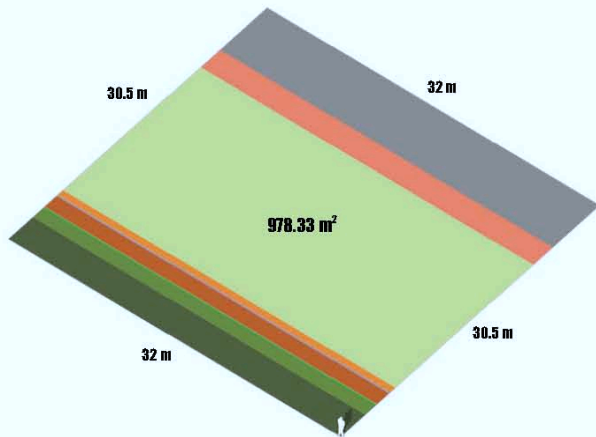
| | | |
|--|--|---|
| Fruit Surface = 956.21 m ² | Grain and other carbohydrate Surface = 47.32 m ² | Nuts and Seeds Surface = 16.59 m ² |
| Vegetable Surface = 184.47 m ² | Sugar Beet Surface = 0 m ² | Sunflower Surface = 16.70 m ² |
| Potato Surface = 9.60 m ² | Bean Surface = 31.53 m ² | Other Oil Plant Surface = 32.66 m ² |

Atkins Diet



| | | |
|--|--|---|
| Fruit Surface = 245.88 m ² | Sugar Beet Surface = 0.25 m ² | Chicken and Poultry Surface = 21.94 m ² |
| Vegetable Surface = 126.49 m ² | Pig Surface = 81.94 m ² | Egg, Milk and Cheese Surface = 9.70 m ² |
| Potato Surface = 2.30 m ² | Fish and Aquatic products Surface = 6.72 m ² | Sunflower Surface = 60.11 m ² |
| Grain and other carbohydrate Surface = 14.19 m ² | Cow and Livestock Surface = 188.62 m ² | Other Oil Plant Surface = 88.18 m ² |

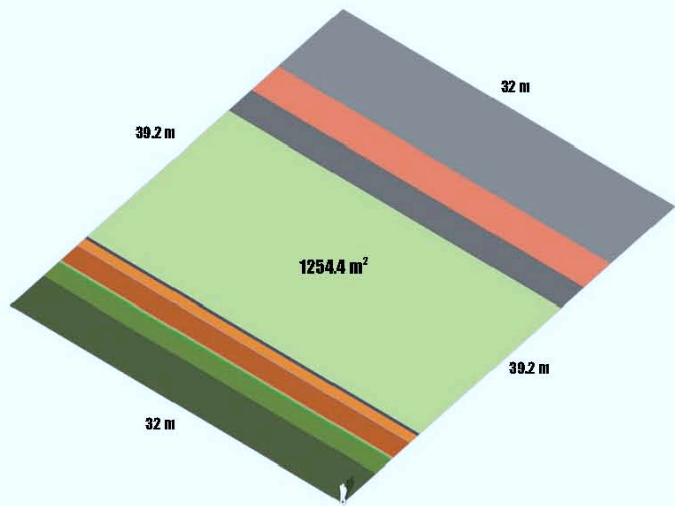
Montignac Diet



| | | |
|---|--|---|
| Fruit Surface = 177.58 m ² | Sugar Beet Surface = 0 m ² | Chicken and Poultry Surface = 1.72 m ² |
| Vegetable Surface = 73.79 m ² | Pig Surface = 19.80 m ² | Egg, Milk and Cheese Surface = 3.82 m ² |
| Potato Surface = 0 m ² | Fish and Aquatic products Surface = 4.39 m ² | Sunflower Surface = 40.08 m ² |
| Grain and other carbohydrate Surface = 520.47 m ² | Cow and Livestock Surface = 45.24 m ² | Other Oil Plant Surface = 91.44 m ² |

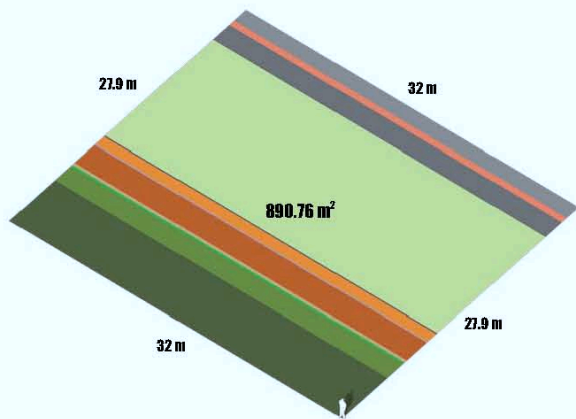
10 Diet Surface Per Person Per Year

Organic Food Diet



| | | |
|---|--|---|
| Fruit Surface = 242.40 m ² | Sugar Beet Surface = 9.39 m ² | Chicken and Poultry Surface = 7.06 m ² |
| Vegetable Surface = 100.72 m ² | Pig Surface = 27.02 m ² | Egg, Milk and Cheese Surface = 5.21 m ² |
| Potato Surface = 86.49 m ² | Fish and Aquatic products Surface = 2.00 m ² | Sunflower Surface = 54.70 m ² |
| Grain and other carbohydrate Surface = 532.83 m ² | Cow and Livestock Surface = 617.5 m ² | Other Oil Plant Surface = 124.82 m ² |

Junk Food Diet



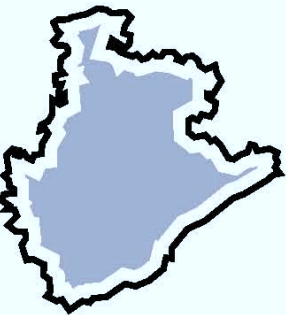
| | | |
|---|--|---|
| Fruit Surface = 44.40 m ² | Sugar Beet Surface = 3.36 m ² | Chicken and Poultry Surface = 8.62 m ² |
| Vegetable Surface = 18.45 m ² | Pig Surface = 33.00 m ² | Egg, Milk and Cheese Surface = 6.37 m ² |
| Potato Surface = 61.92 m ² | Fish and Aquatic products Surface = 2.44 m ² | Sunflower Surface = 58.44 m ² |
| Grain and other carbohydrate Surface = 406.91 m ² | Cow and Livestock Surface = 75.40 m ² | Other Oil Plant Surface = 171.45 m ² |

10 Diet Surface Compare With Berlin And Barcelona



Population: 3,479,740
City Area: 891.85 km²
Population Density: 3,901.7 /km²

Barcelona



Population: 1,621,537
City Area: 101.9 km²
Population Density: 15,991 /km²

10 Diet Surface Compare With Berlin



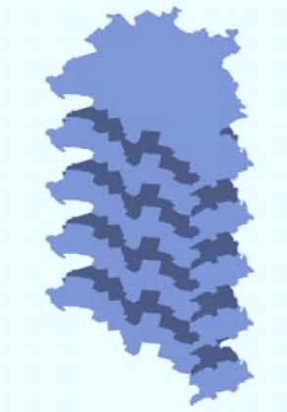
European Healthy Diet
Surface: 3.8 Berlin



Japanese Healthy Diet
Surface: 3.25 Berlin



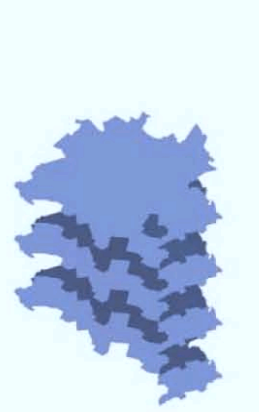
Finland Healthy Diet
Surface: 3.4 Berlin



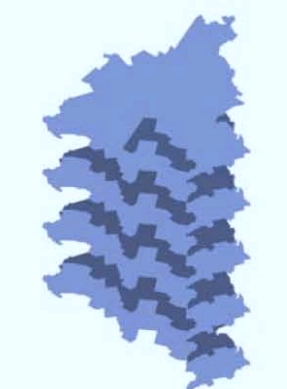
Fruitarianism Diet
Surface: 5 Berlin



Atkins Diet
Surface: 3.3 Berlin



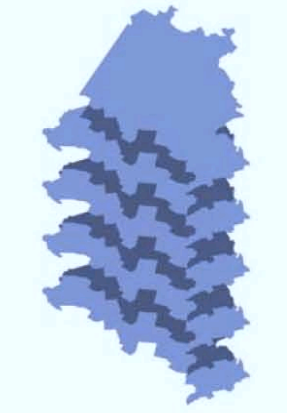
Montignac Diet
Surface: 3.8 Berlin



Raw Veganism Diet
Surface: 4.5 Berlin



Buddhist Vegetarianism Diet
Surface: 3.5 Berlin

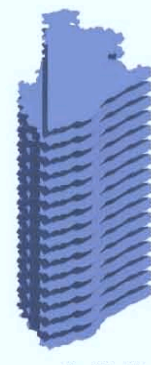


Organic Food Diet
Surface: 4.9 Berlin

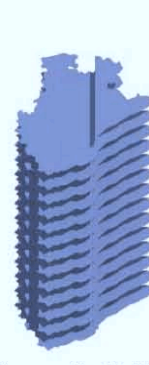


Junk Food Diet
Surface: 3.5 Berlin

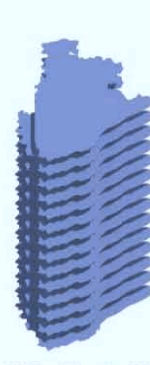
10 Diet Surface Compare With Barcelona



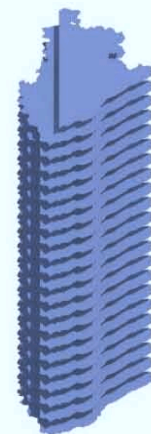
European Healthy Diet
Surface: 15.7 Barcelona



Japanese Healthy Diet
Surface: 13.3 Barcelona



Finland Healthy Diet
Surface: 13.9 Barcelona



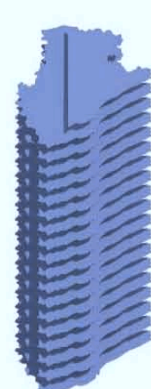
Fruitarianism Diet
Surface: 20.6 Barcelona



Atkins Diet
Surface: 13.5 Barcelona



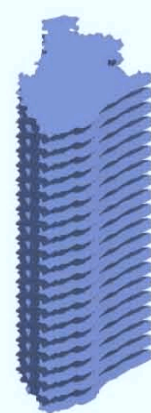
Montignac Diet
Surface: 15.5 Barcelona



Raw Veganism Diet
Surface: 18.5 Barcelona



Buddhist Vegetarianism Diet
Surface: 14.2 Barcelona



Organic Food Diet
Surface: 20 Barcelona



Junk Food Diet
Surface: 14.2 Barcelona

The current agricultural production technologies are introduced in this chapter. Because the nutrient ingredients are different between each diet, the technology applied in them are varied. Some typical farming technologies such as: hydroponics, aquaponics, intercropping, crop rotation are expressed by 3d image. After applying these technologies, the agricultural surface are largely reduced.

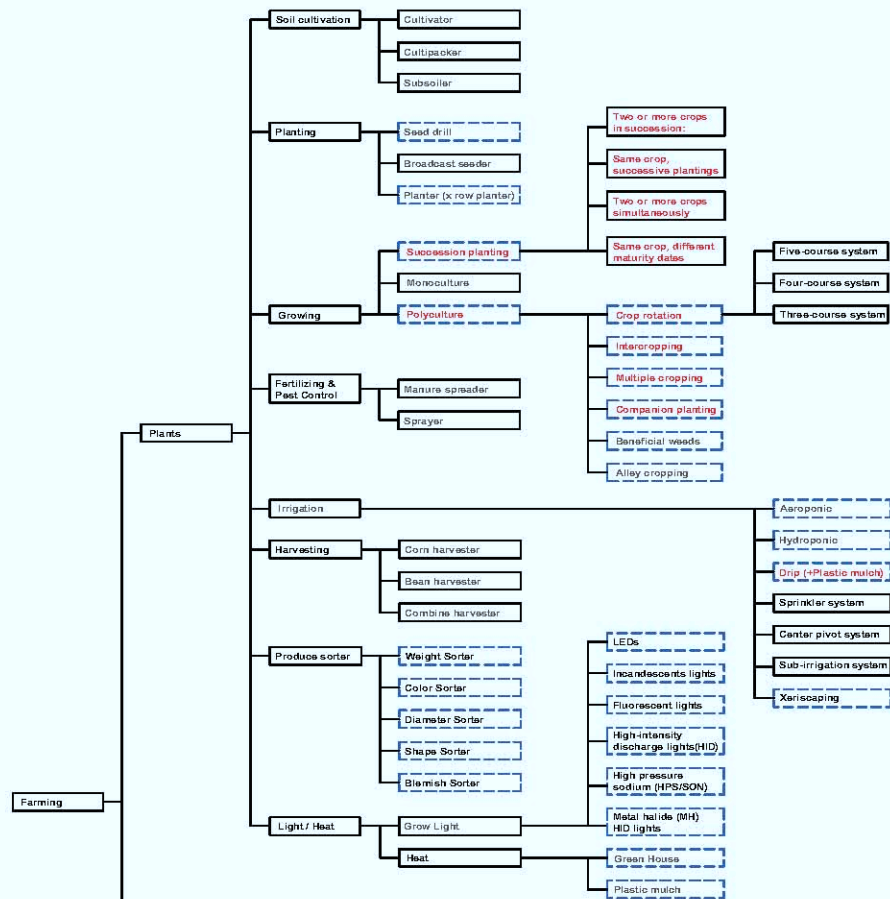
4. Agriculture Technology

Overview of Agricultural Production Technology
Technology Toolbox
Modular Design

4.1

Technology Overview

Overview of Agricultural Production Technology



Farming Technology

Broadcast seeder

- 1 a sowing device
- 2 not precise
- 3 not that high crop yield

Planter (x row planter)

- 1 big machine for planter (48 row planter)
- 2 high efficiency

Succession planting

- 1 increase crop availability during a growing season by making efficient use of space and timing.
- (1) After one crop is harvested, another is planted in the same space (The length of the growing season, climate, and crop selection are key factors.)
- (2) The plants mature at staggered dates, establishing a continuous harvest over an extended period.
- (3) Intercropping is one pattern approach, companion planting is a related, complementary practice.
- (4) the varieties mature one after the other over the season.

Polyculture

Polyculture is agriculture using multiple crops in the same space, in imitation of the diversity of natural ecosystems, and avoiding large stands of single crops, or monoculture. It includes crop rotation, multi-cropping, intercropping, companion planting, beneficial weeds, and alley cropping.

Intercropping
The most common goal of intercropping is to produce a greater yield on a given piece of land. (different height)

Multiple cropping
growing two or more crops in the same space during a single growing season. the others repel some pests.

Companion planting
Companion planting is the planting of different crops in proximity, on the theory that they assist each other in nutrient uptake, pest control, pollination, and other factors necessary to increasing crop productivity.

Fish farming

Fish farming is the principal form of aquaculture, while other methods may fall under mariculture. Fish farming involves raising fish commercially in tanks or enclosures, usually for food.

- 1 intensive aquaculture
In these kinds of systems fish production per unit of surface can be increased at will, as long as sufficient oxygen, fresh water and food are provided. Because of the requirement of sufficient fresh water, a massive water purification system must be integrated in the fish farm.
- 2 Irrigation ditch or pond systems
This system produces more edible protein per unit area than any other. A wide variety of plants can grow well in the hydroponic beds. Since the system lives in a greenhouse, it adapts to almost all temperate climates.

Greenwater hatcheries

Greenwater hatcheries are medium-sized hatcheries using large tanks with low animal densities. To feed the shrimp larvae, an algal bloom is induced in the tanks. The survival rate is about 40%.

Galveston hatcheries

Galveston hatcheries (named after Galveston, Texas, where they were developed) are large-scale, industrial hatcheries using a closed and tightly controlled environment. They breed the shrimp at high densities in large (15 to 30 ton) tanks. Survival rates vary between zero and 80%, but typically achieve 50%.

Intensive poultry farming

The vast majority of poultry are raised using intensive farming techniques. According to the Worldwatch Institute, 74 percent of the world's poultry meat, and 66 percent of eggs are produced this way. One alternative to intensive poultry farming is free range farming.

Artificial incubation

Incubation can successfully occur artificially in machines that provide the correct, controlled environment for the developing chick. Many commercial incubators are industrial-sized with shelves holding tens of thousands of eggs at a time, with rotation of the eggs a fully automated process.

Artificial insemination

Artificial insemination is widely used for livestock breeding, especially for dairy cattle and pigs. Techniques developed for livestock have been adapted for use in humans.

Embryo transfer refers to a step in the process of assisted reproduction in which one or several embryos are placed into the uterus of a female with the intent to establish a pregnancy.

Techniques such as artificial insemination and embryo transfer are frequently used today, not only as methods to guarantee that females breed regularly, but also to help improve herd genetics. On the one hand, this technology improves the ability of the animals to convert feed to meat, milk, or fibre more efficiently, and improve the quality of the final product. On the other, it decreases genetic diversity, increasing the severity of disease outbreaks among other risks.

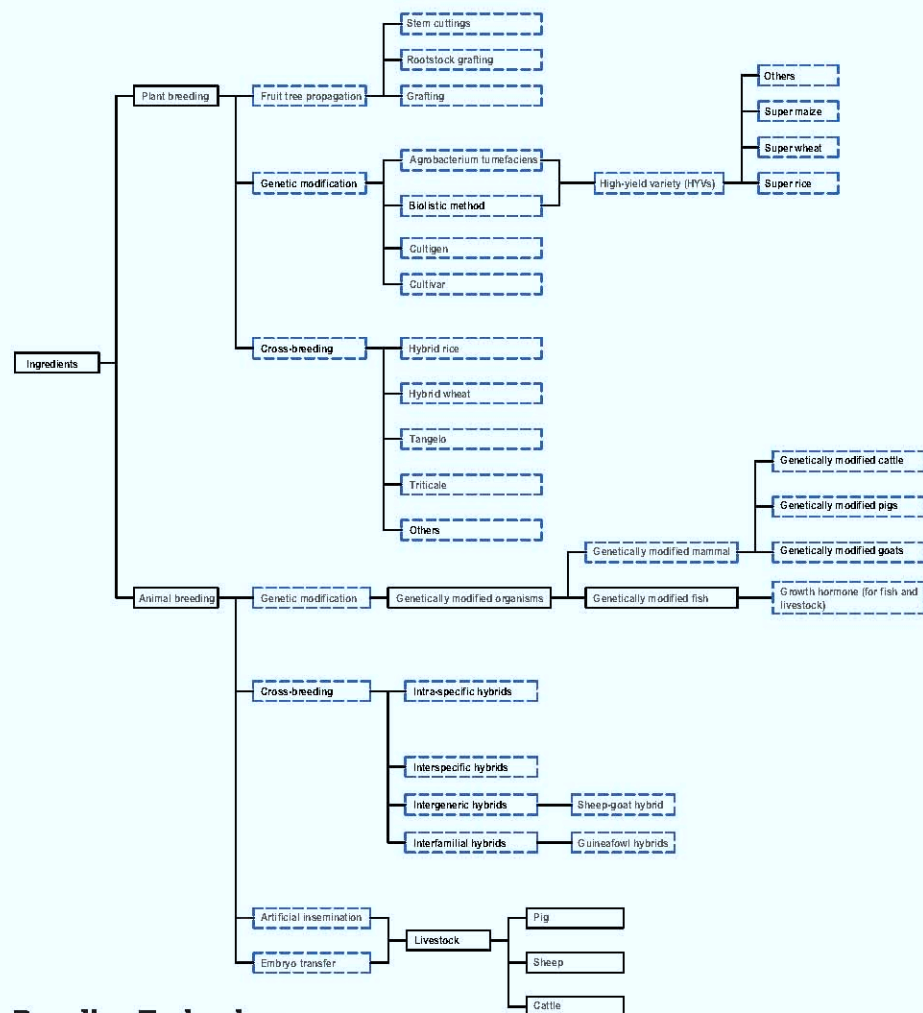
Milking machines

Milking machines are used to harvest milk from cows when manual milking becomes inefficient or labour intensive. Milking machines keep the milk enclosed and safe from external contamination.

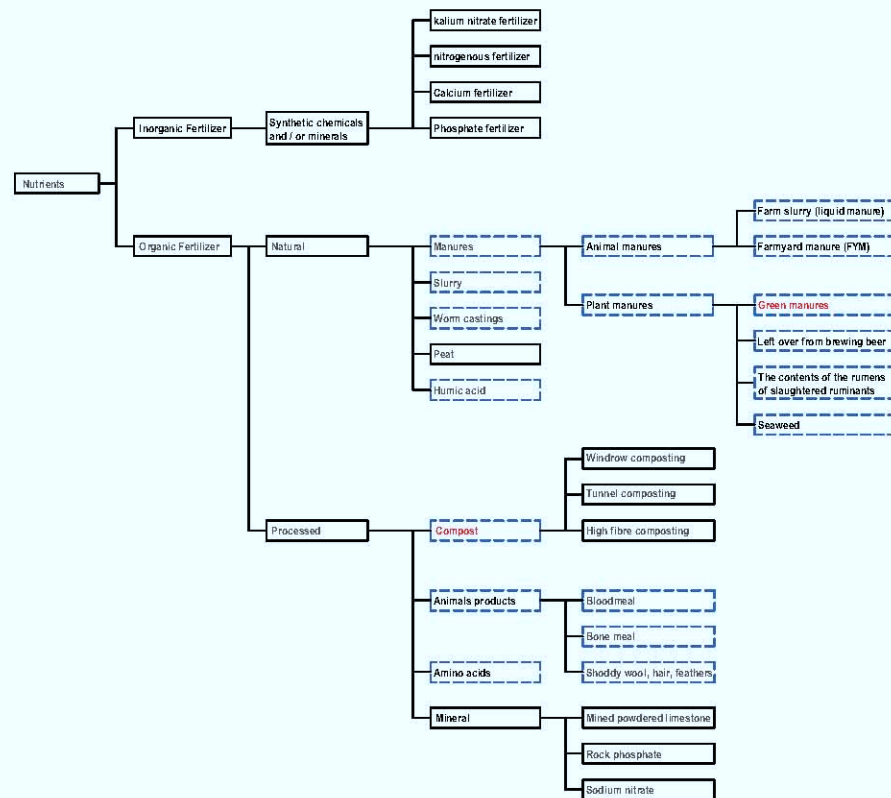
Automatic Milking (AMS)

- Advantages:
- 1 Elimination of labour
 - 2 Milking consistency
 - 3 Increased milking frequency
- The milking process is consistent for every cow and every visit, and is not influenced by different persons milking the cows. Milking frequency may increase to three times per day, however typically 2.5 times per day is achieved.

Overview of Agricultural Production Technology



Breeding Technology



Nutrient Technology

Cultivar

A kind of complex molecular techniques for plant breeding. A cultivar is a plant or group of plants selected for desirable characteristics that can be maintained by propagation. The world's agricultural food crops are almost exclusively cultivars that have been selected for characters like improved yield, flavor, and resistance to disease.

Cultigen

A kind of complex molecular techniques for plant breeding. Cultigens arise in the following ways: selections of variants from the wild or cultivation including vegetative sports, plants that are the result of plant breeding and selection programs, genetically modified plants, and graft-chimaeras.

Agrobacterium tumefaciens

Agrobacteria are natural plant parasites, and their natural ability to transfer genes is used for the development of genetically engineered plants. To create a suitable environment for themselves, these Agrobacteria insert their genes into plant hosts, resulting in a proliferation of plant cells near the soil level (crown gall). This method works especially well for dicotyledonous plants like potatoes, tomatoes, and tobacco. Agrobacteria infection is less successful in crops like wheat and maize.

Biolistic method

In the biolistic method, DNA is bound to tiny particles of gold or tungsten which are subsequently "shot" into plant tissue or single plant cells under high pressure. The accelerated particles penetrate both the cell wall and membranes. The DNA separates from the metal and is integrated into the plant genome inside the nucleus. This method has been applied successfully for many cultivated crops, especially monocots like wheat or maize.

Intra-specific hybrids

Hybrids between different subspecies within a species (such as between the Bengal tiger and Siberian tiger) are known as intra-specific hybrids.

Interspecific hybrids

Hybrids between different species within the same genus (such as between lions and tigers) are sometimes known as interspecific hybrids or crosses.

Intergenic hybrids

Hybrids between different genera (such as between sheep and goats) are known as intergeneric hybrids.

Interfamilial hybrids

Extremely rare interfamilial hybrids have been known to occur (such as the guinea fowl hybrids).

Growth hormone (for fish and livestock)

Growth hormone (GH) is a protein-based peptide hormone. It stimulates growth, cell reproduction and regeneration in humans and other animals. GH has been studied for use in raising livestock more efficiently in industrial agriculture and several efforts have been made to obtain governmental approval to use GH in livestock production. These uses have been controversial.

Seed drill

- 1 a sowing device
- 2 precisely position seeds in the soil at specific depths and specific seed rate
- 3 improve the rate of crop yield as much as 8 times

Gamete Intrafallopian Transfer (GIFT)

Gamete intrafallopian transfer (GIFT) is a tool of assisted reproductive technology against infertility. Eggs are removed from a woman's ovaries, and placed in one of the Fallopian tubes, along with the man's sperm. The technique, which was pioneered by endocrinologist Ricardo Asch, allows fertilization to take place inside the woman's uterus.

Inorganic Fertilizer

composed of synthetic chemicals and/or minerals.

Problems with inorganic fertilizer
1 Inorganic fertilizers are now produced in ways which theoretically cannot be continued indefinitely by definition as the resources used in their production are non-renewable.
2 Trace mineral depletion
3 High energy consumption

Organic Fertilizer

Naturally occurring organic fertilizers include manure, slurry, worm castings, peat, seaweed, humic acid, and guano. Sewage sludge use in organic agricultural operations in the U.S. has been extremely limited and rare due to USDA prohibition of the practice (due to toxic metal accumulation, among other factors).

Processed organic fertilizers include compost, bloodmeal, bone meal, humic acid, amino acids, and seaweed extracts. Other examples are natural enzyme digested proteins, fish meal, and feather meal. Decomposing crop residue (green manure) from prior years is another source of fertility.

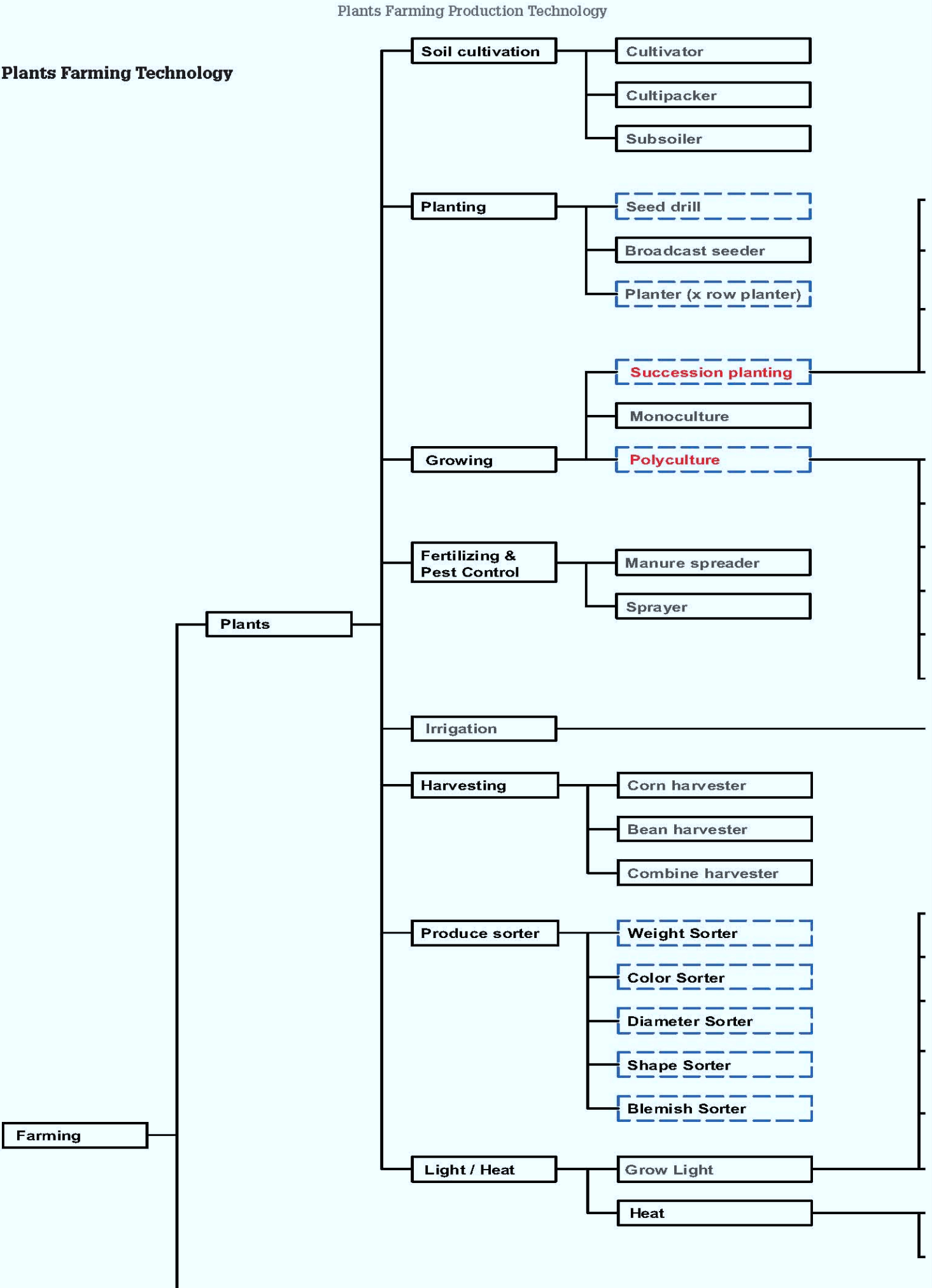
Compost

Compost is organic matter that has been decomposed and recycled as a fertilizer and soil amendment. Compost is a key ingredient in organic farming. At its most essential, the process of composting requires simply piling up waste outdoors and waiting a year or more. Modern, methodical composting is a multi-step, closely monitored process with measured inputs of water, air and carbon- and nitrogen-rich materials.

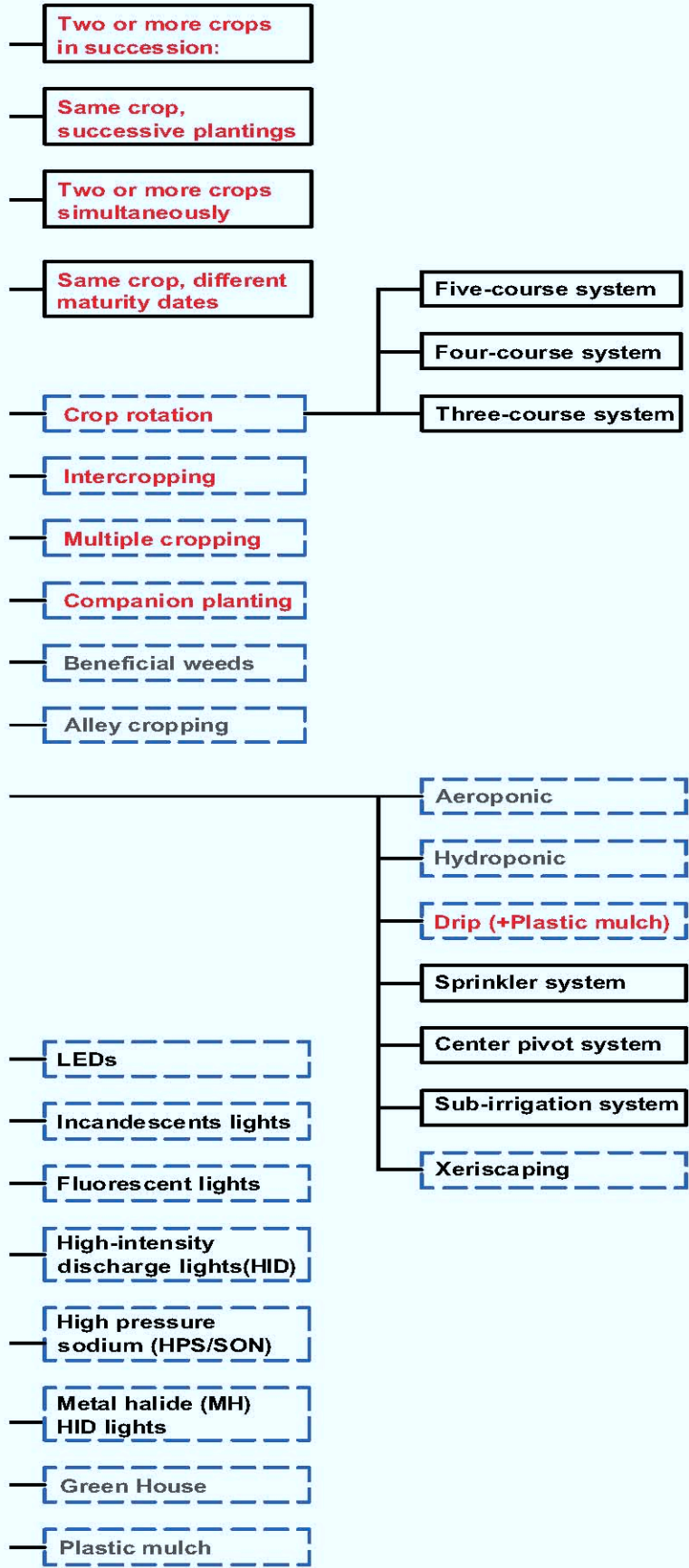
Integrated Multi-Trophic Aquaculture

It provides the by-products, including waste, from one aquatic species as inputs (fertilizers, food) for another. Farmers combine fed aquaculture (e.g., fish, shrimp) with inorganic extractive (e.g., seaweed) and organic extractive (e.g., shellfish) aquaculture to create balanced systems for environment remediation (bioremediation), economic stability (improved output, lower cost, product diversification and risk reduction) and social acceptability (better management practices).

Plants Farming Technology



Plants Farming Production Technology



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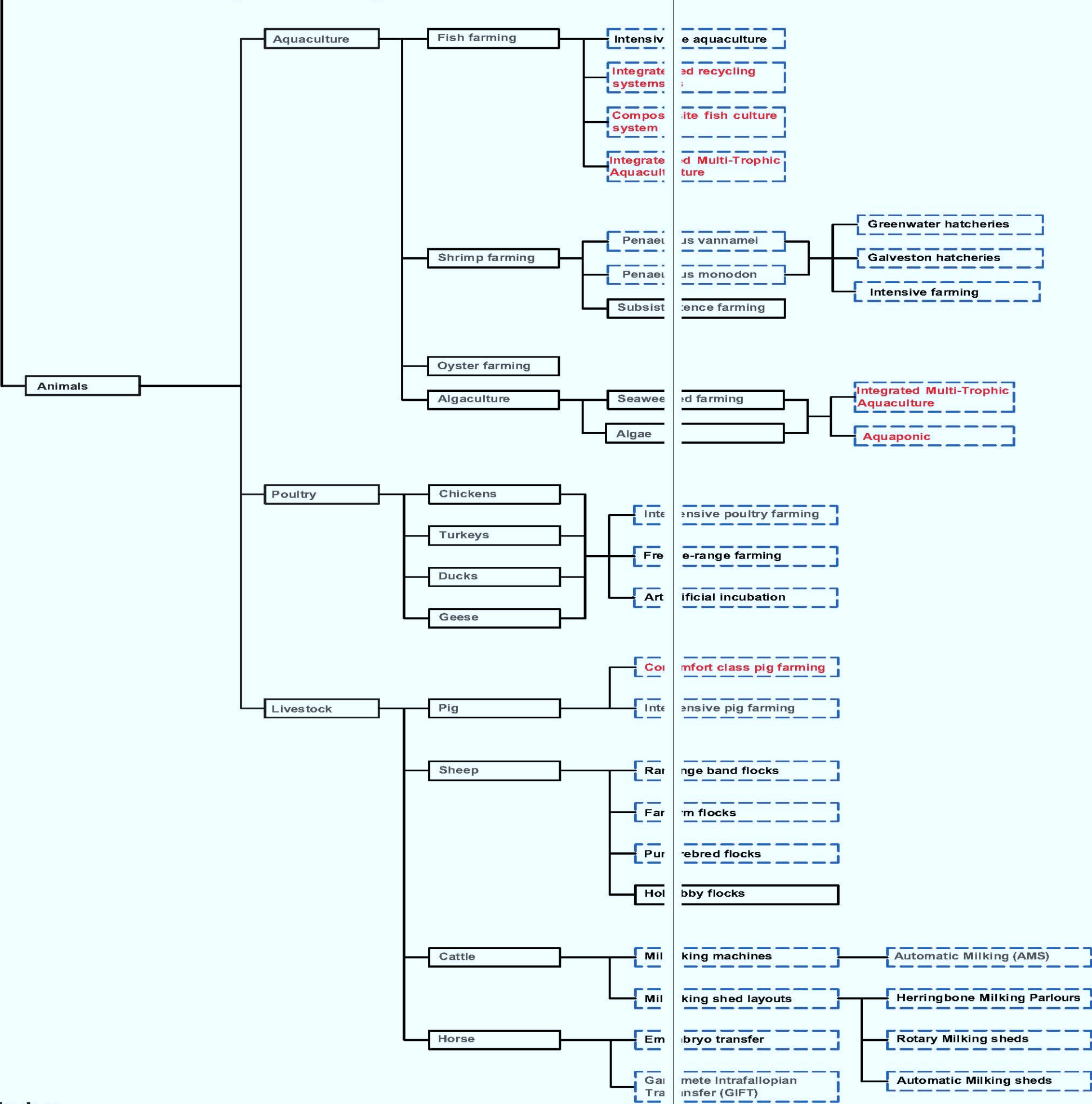
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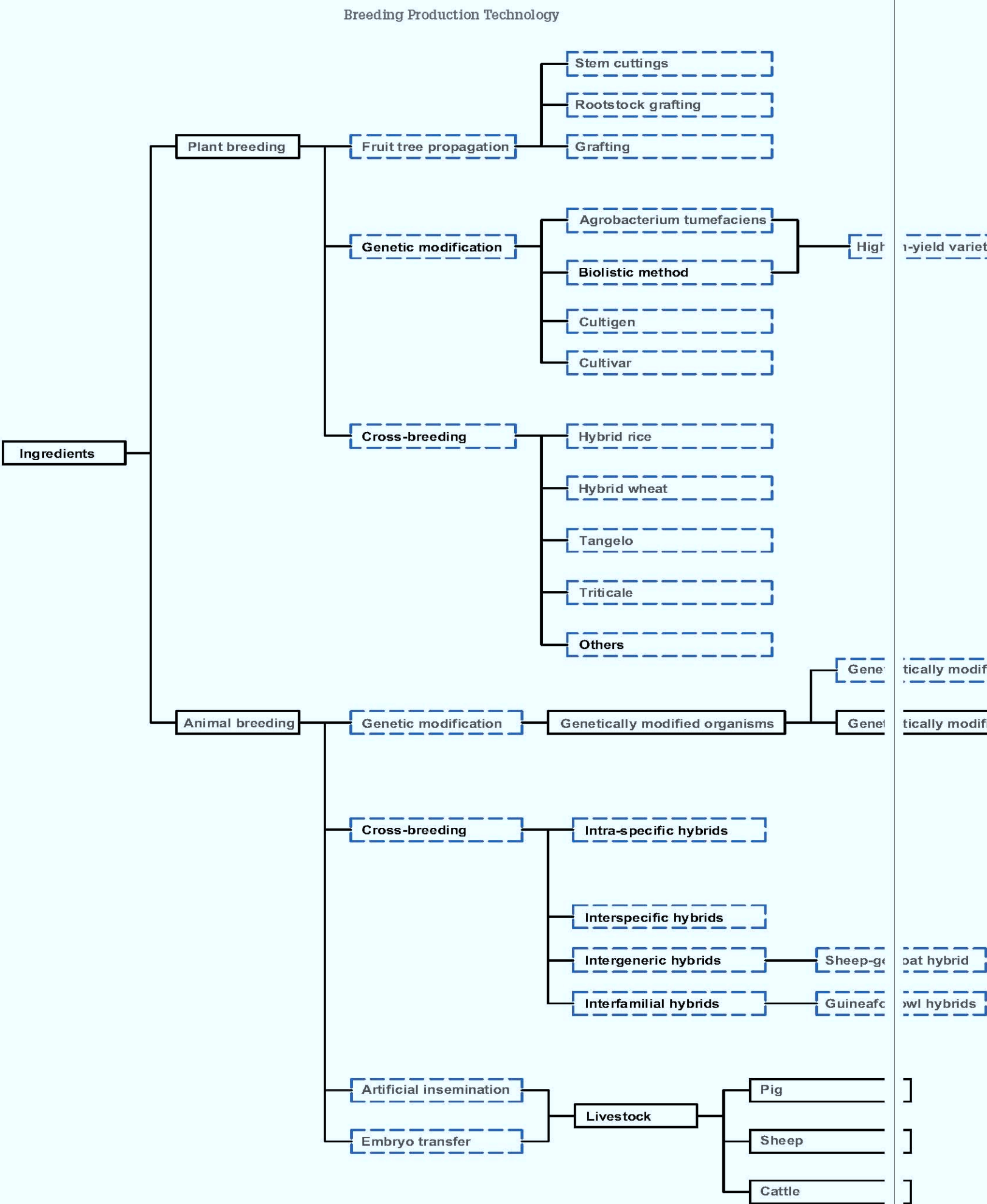
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Breeding Production Technology

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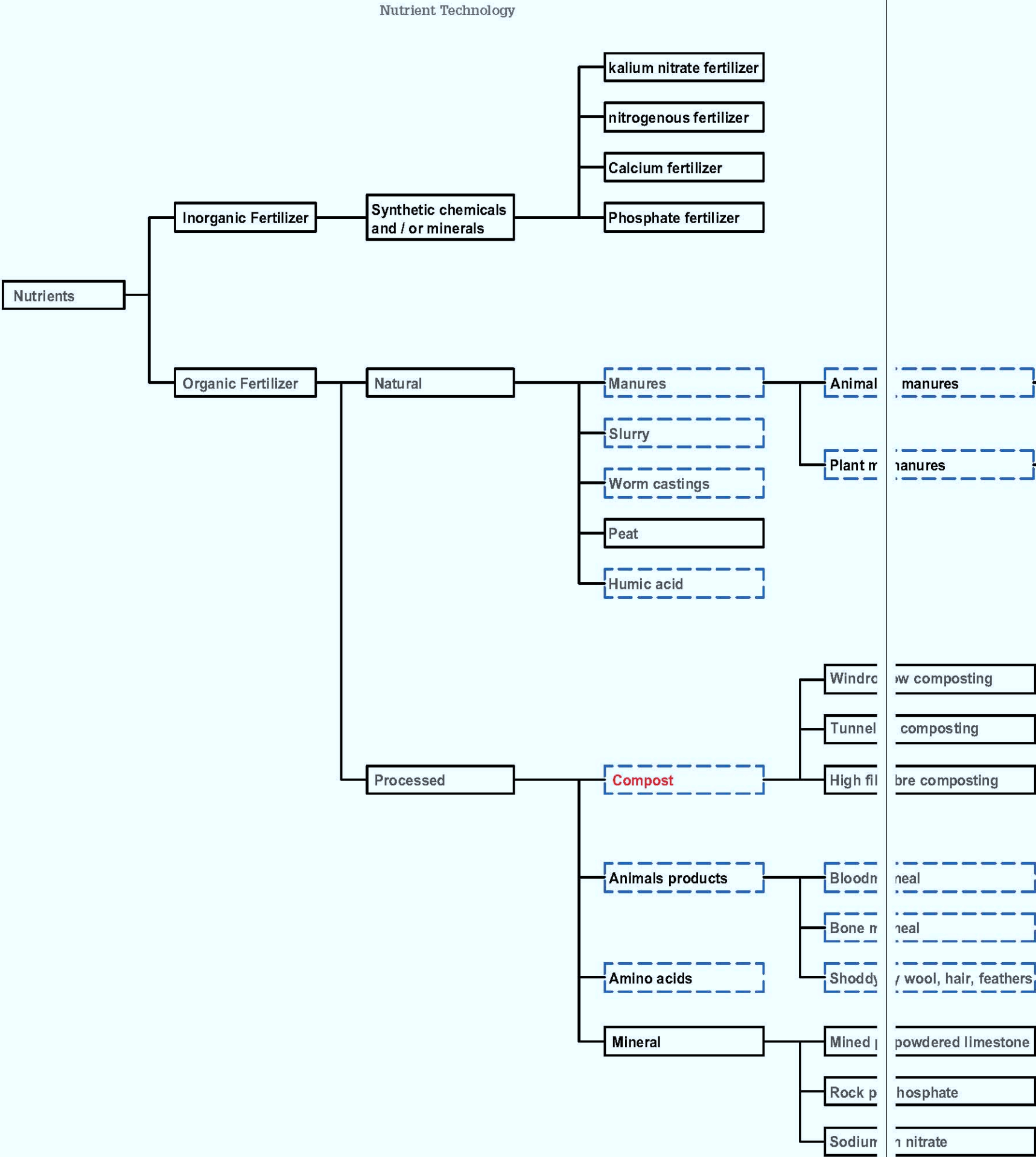
Hybrids between different genera (such as between sheep and goats) are known as intergeneric hybrids.

Interfamilial hybrids

Extremely rare interfamilial hybrids have been known to occur (such as the guineafowl hybrids).

Growth hormone (for fish and livestock)

Growth hormone (GH) is a protein-based peptide hormone. It stimulates growth, cell reproduction and regeneration in humans and other animals. GH has been studied for use in raising livestock more efficiently in industrial agriculture and several efforts have been made to obtain governmental approval to use GH in livestock production. These uses have been controversial.



Nutrient Technology

Inorganic Fertilizer

composed of synthetic chemicals and/or minerals.

Problems with inorganic fertilizer

- 1 Inorganic fertilizers are now produced in ways which theoretically cannot be continued indefinitely by definition as the resources used in their production are non-renewable.
- 2 Trace mineral depletion
- 3 High energy consumption

Organic Fertilizer

Naturally occurring organic fertilizers include manure, slurry, worm castings, peat, seaweed, humic acid, and guano. Sewage sludge use in organic agricultural operations in the U.S. has been extremely limited and rare due to USDA prohibition of the practice (due to toxic metal accumulation, among other factors).

Processed organic fertilizers include compost, bloodmeal, bone meal, humic acid, amino acids, and seaweed extracts. Other examples are natural enzyme digested proteins, fish meal, and feather meal. Decomposing crop residue (green manure) from prior years is another source of fertility.

Compost

Compost is organic matter that has been decomposed and recycled as a fertilizer and soil amendment. Compost is a key ingredient in organic farming. At its most essential, the process of composting requires simply piling up waste outdoors and waiting a year or more. Modern, methodical composting is a multi-step, closely monitored process with measured inputs of water, air and carbon- and nitrogen-rich materials.

Integrated Multi-Trophic Aquaculture

It provides the by-products, including waste, from one aquatic species as inputs (fertilizers, food) for another. Farmers combine fed aquaculture (e.g., fish, shrimp) with inorganic extractive (e.g., seaweed) and organic extractive (e.g., shellfish) aquaculture to create balanced systems for environment remediation (biomitigation), economic stability (improved output, lower cost, product diversification and risk reduction) and social acceptability (better management practices).

Some agricultural technologies have special forms. After using these technologies, the space will be changed accordingly. In this section, some technologies are introduced by simple 3d diagrams as toolboxes. They are center pivot irrigation system, hydroponics, drip irrigation, artificial light, automatic milk machine, integrated fish farming and so on. Some important datas such as the size and the minimal surface are explained for each toolbox. And the photos show what it is like after applying this technology.

4.2

Technology Toolbox

Irrigation Technology

Plant Farming Technology

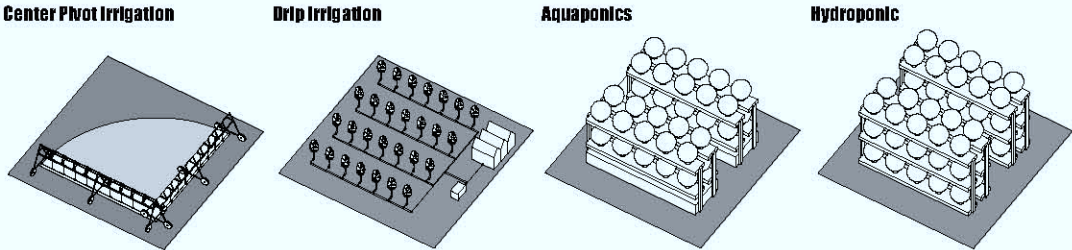
Animal Farming Technology

Other Technology

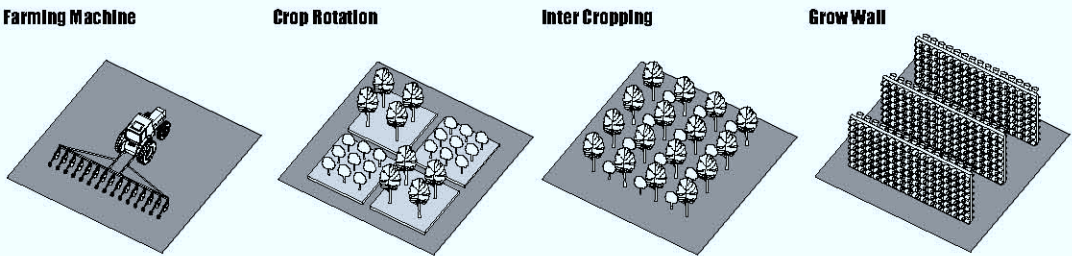
Farming Strategy

Agricultural Technology Toolbox Logo

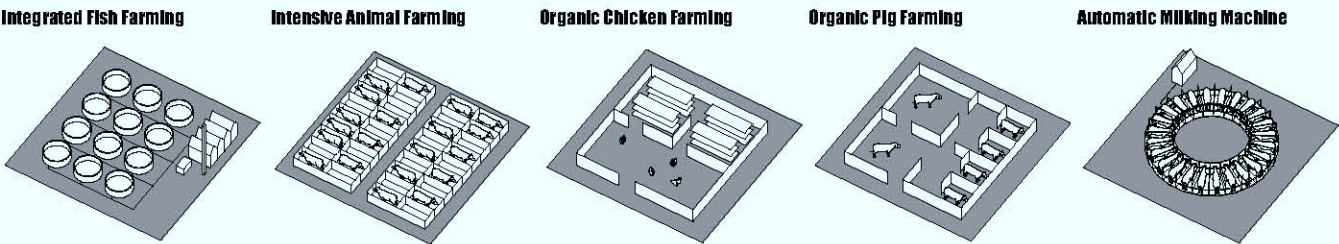
Irrigation Technology



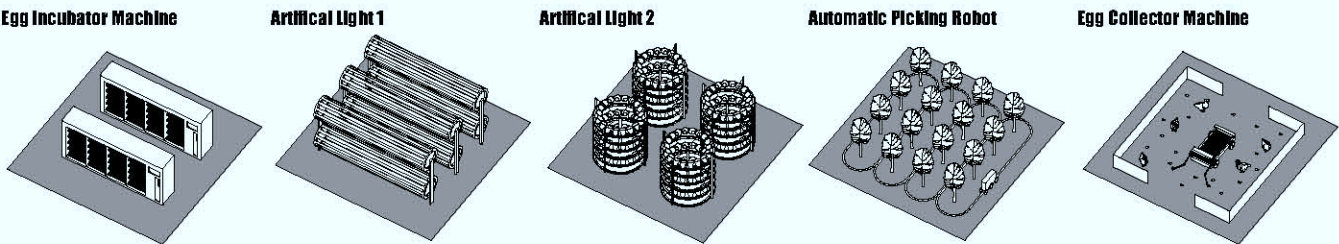
Plants Farming Technology



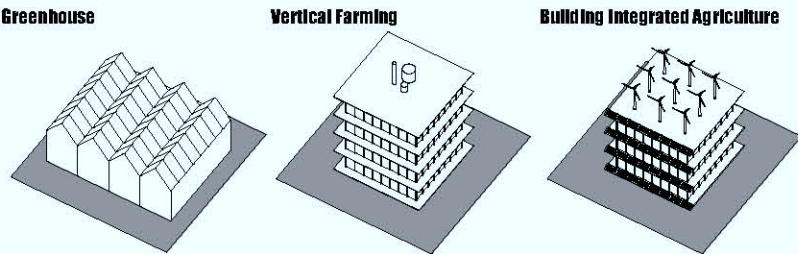
Animal Farming Technology



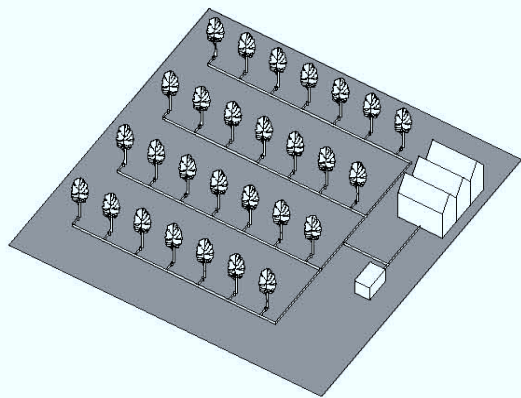
Other Technology



Farming Strategies



Drip Irrigation



Outdoor Farm size: 1 Hectare

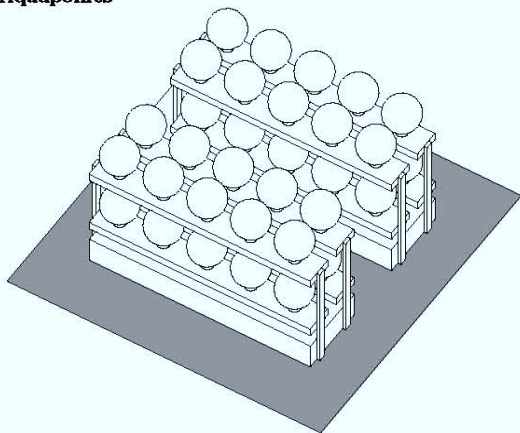
Indoor Farm size: $\geq 500 \text{ m}^2$

Drip irrigation, also known as trickle irrigation or microirrigation, or localized irrigation, is an irrigation method which saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters.

Drip irrigation

<http://agrie-horticulture.tamu.edu/greenhouse/hydroponics/drip.html>

Aquaponics



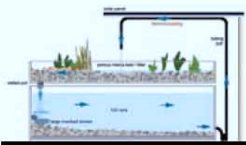
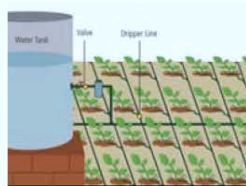
Size of grow beds: $\geq 100 \text{ m}^2$

Size of fish tanks: 4- 1200 gal fish tanks

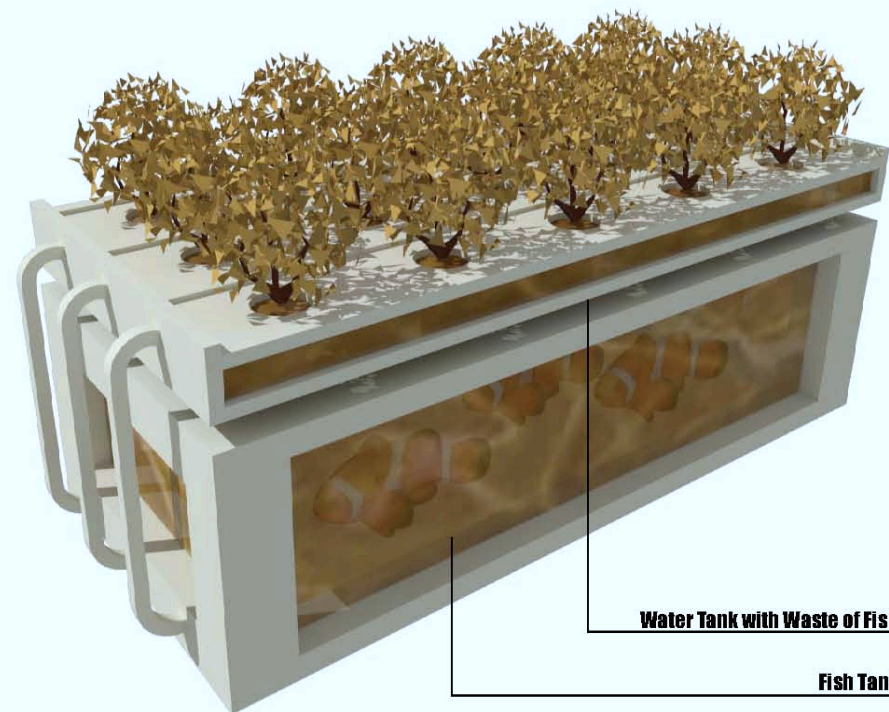
Aquaponics is a sustainable food production system that combines a traditional aquaculture (raising aquatic animals such as snails, fish, crayfish or prawns in tanks) with hydroponics (cultivating plants in water) in a symbiotic environment.

Aquaponics

<https://aquaponics.com/page/specifications-and-pricing-for-commercial-systems>



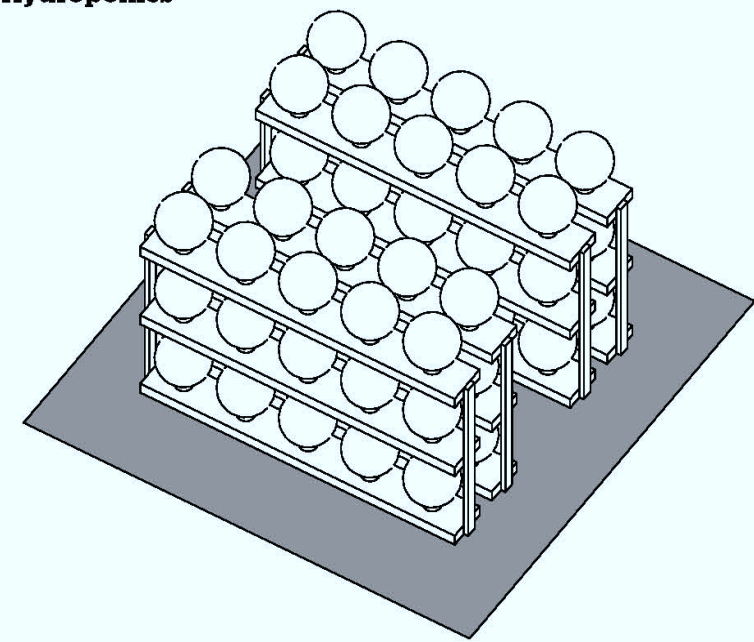
Aquaponics



Aquaponics is a sustainable food production system that combines a traditional aquaculture (raising aquatic animals such as fish, crayfish or prawns in tanks) with hydroponics (cultivating plants in water) in a symbiotic environment. In the aquaculture, effluents accumulate in the water, increasing toxicity for the fish. This water is led to a hydroponic system where the by-products from the aquaculture are filtered out by the plants as vital nutrients, after which the cleansed water is recirculated back to the animals. The term aquaponics is a portmanteau of the terms aquaculture and hydroponic.

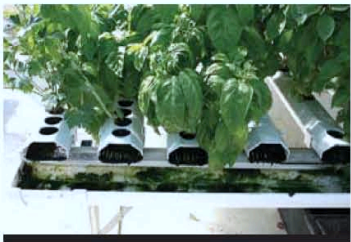
Hydroponics

Hydroponics

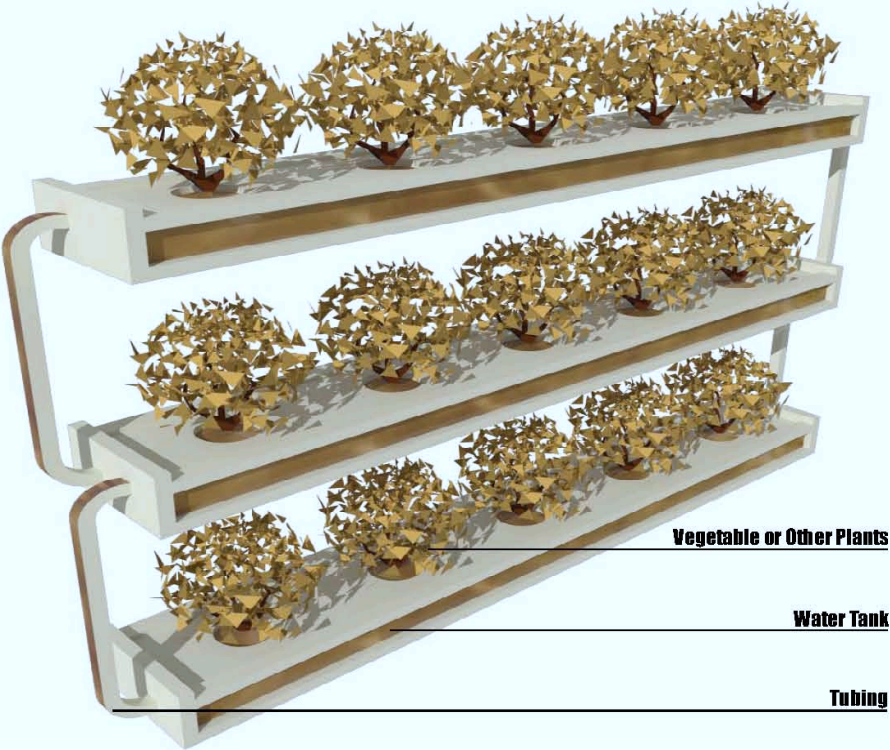


Size of grow beds: $\geq 100\text{ m}^2$
Hydroponic size: 12% greenhouse area
Hydroponics is a subset of hydroculture and is a method of growing plants using mineral nutrient solutions, in water, without soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only or in an inert medium, such as perlite, gravel, mineral wool, or coconut husk.

Hydroponics
<http://www.commercial-hydroponics.com/hydro.html>



Hydroponics is a method of growing plants using mineral nutrient solutions, in water, without soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only or in an inert medium, such as perlite, gravel, mineral wool, or coconut husk. When the mineral nutrients in the soil dissolve in water, plant roots are able to absorb them. When the required mineral nutrients are introduced into a plant's water supply artificially, soil is no longer required for the plant to thrive. Almost any terrestrial plant will grow with hydroponics. Hydroponics is also a standard technique in biology research and teaching.



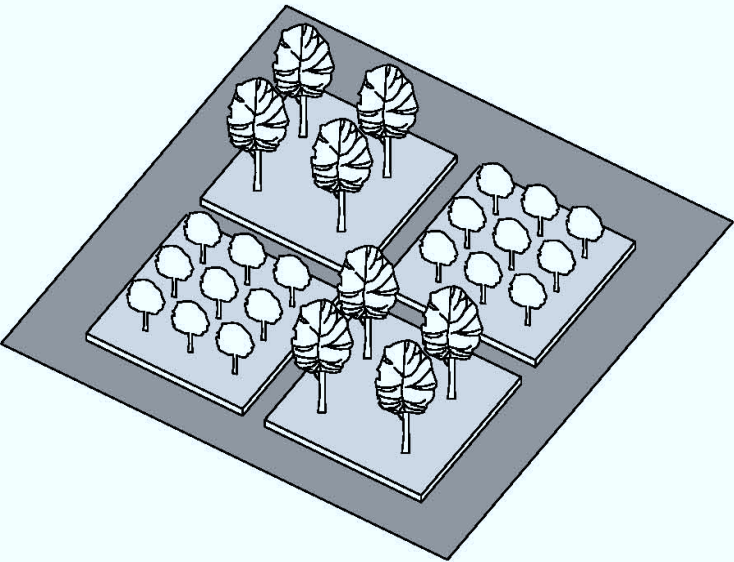
Vegetable or Other Plants

Water Tank

Tubing

Crop Rotation

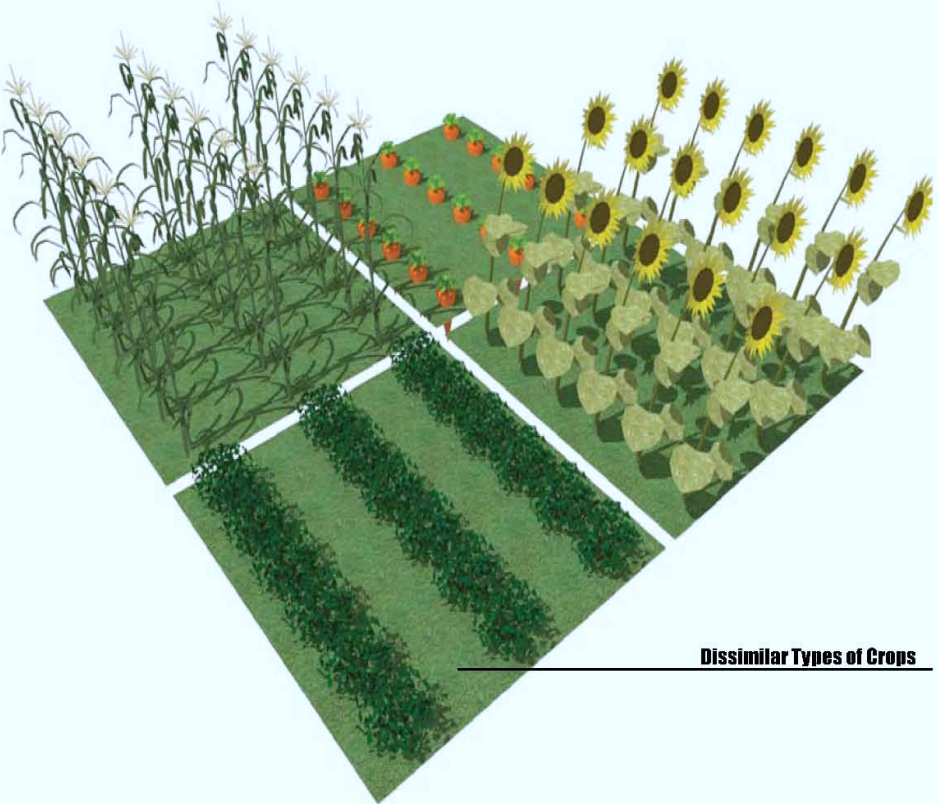
Crop Rotation



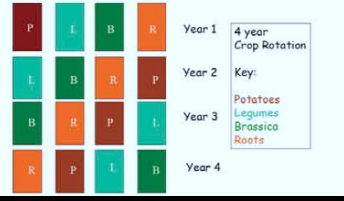
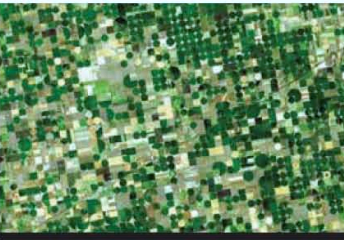
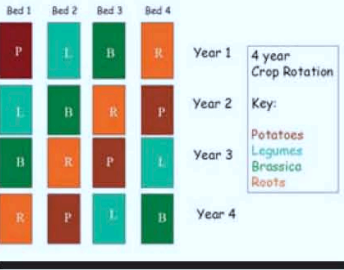
Outdoor farm size: 1 specie / 1 Hectare
Number of species: 2-6 even larger
Rotation Time: depend on the number of species
Hydroponics is a subset of hydroculture and is a method of growing plants using mineral nutrient solutions, in water, without soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only or in an inert medium, such as perlite, gravel, mineral wool, or coconut husk.

Crop rotation
http://en.wikipedia.org/wiki/Crop_rotation

Crop Rotation

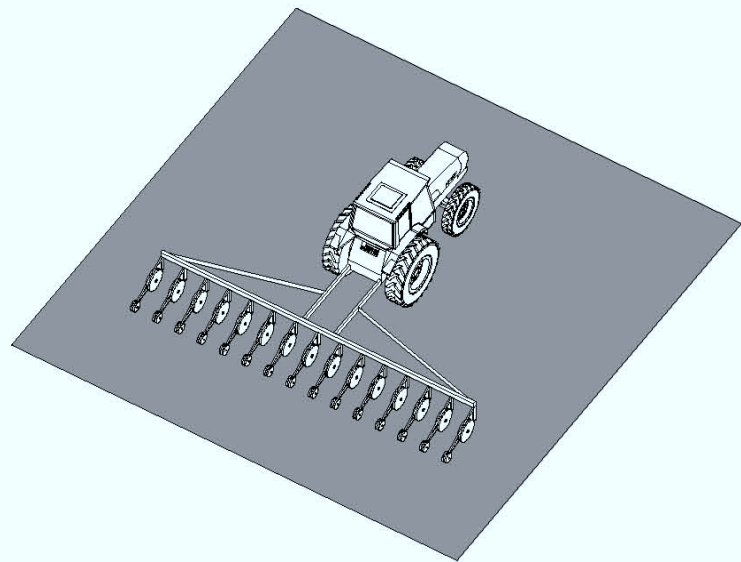


Dissimilar Types of Crops



Crop rotation is the practice of growing a series of dissimilar types of crops in the same area in sequential seasons. Crop rotation confers various benefits to the soil. A traditional element of crop rotation is the replenishment of nitrogen through the use of green manure in sequence with cereals and other crops. Crop rotation also mitigates the build-up of pathogens and pests that often occurs when one species is continuously cropped, and can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants.

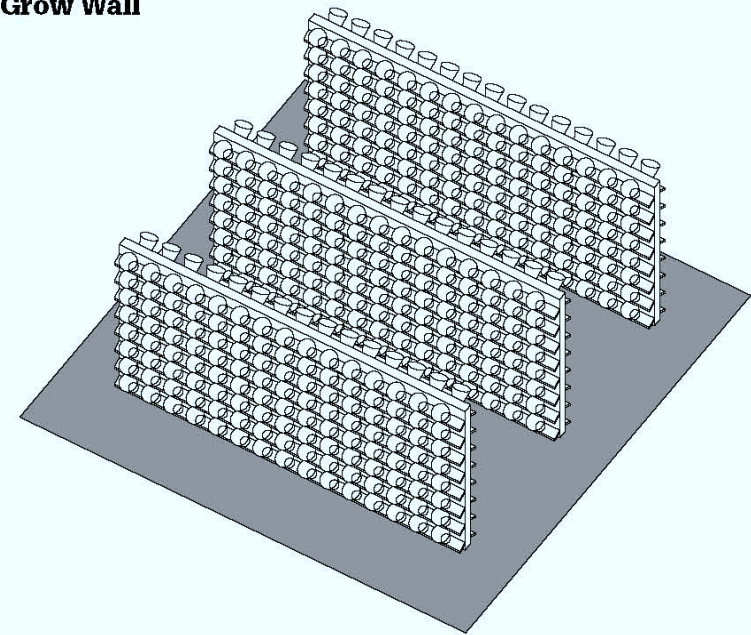
Farming Machine



Wide: 10-30 m
Farming Size: ≥ 5 Hectares
Farming machines can largely increase the yield. For example, a seed drill is a sowing device that precisely positions seeds in the soil and then covers them. The use of a seed drill can improve the ratio of crop yield by as much as nine times.

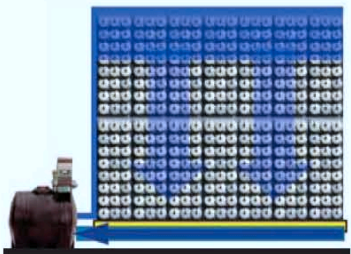


Grow Wall

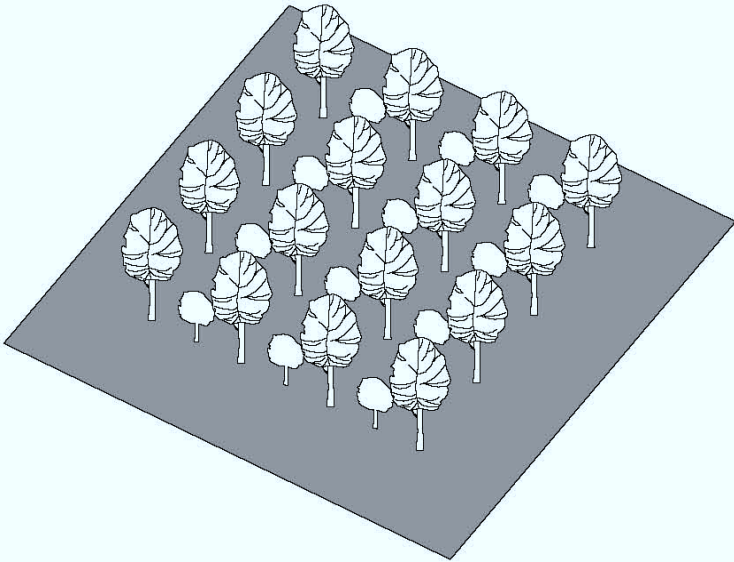


Height: 1.5 m ~ 2 m
One Unite: $\geq 100 \text{ m}^2$
The GroWall system is designed to be used vertically with watering methods such as drop by drop (droplets), and intermittent or continuous irrigation. Combined with the natural work of gravity, this growing method provides the perfect mix of nutrients and oxygen needed for fast-growing plants.

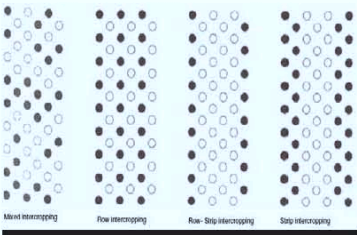
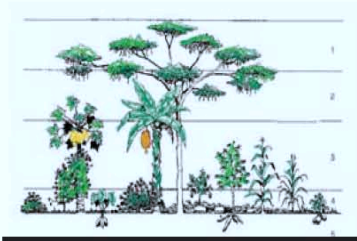
Grow wall
http://www.growwall.ca/Commercial_GrowWall.asp



Intercropping

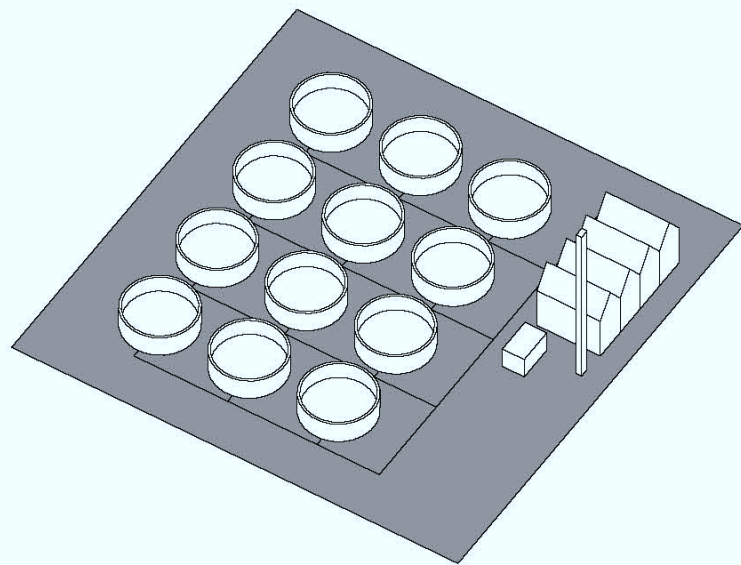


Raw Spacing: 1~2 m
Farming Size: ≥ 5 Hectares
Intercropping is the practice of growing two or more crops in proximity. The most common goal of intercropping is to produce a greater yield on a given piece of land by making use of resources that would otherwise not be utilized by a single crop.



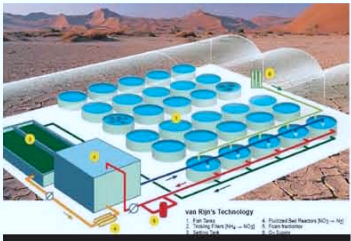
Intercropping is the practice of growing two or more crops in proximity. The most common goal of intercropping is to produce a greater yield on a given piece of land by making use of resources that would otherwise not be utilized by a single crop. Careful planning is required, taking into account the soil, climate, crops, and varieties. It is particularly important not to have crops competing with each other for physical space, nutrients, water, or sunlight. Examples of intercropping strategies are planting a deep-rooted crop with a shallow-rooted crop, or planting a tall crop with a shorter crop that requires partial shade.

Integrated Fish Farming

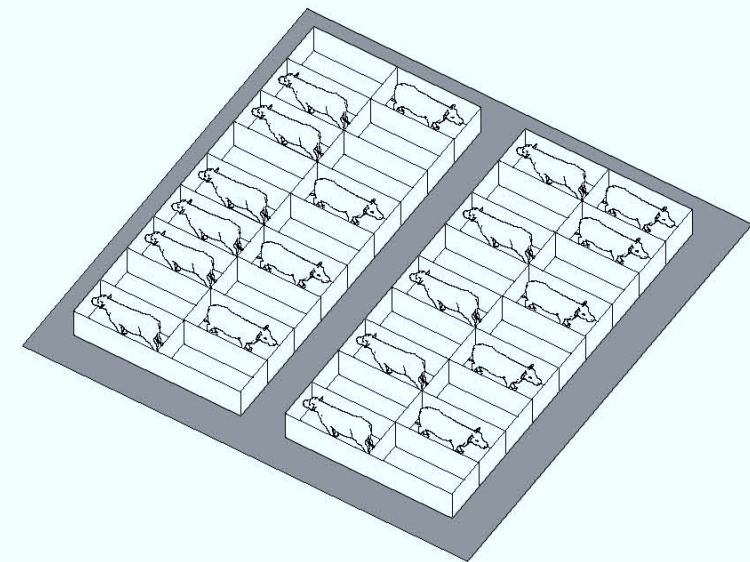


Radius of Fish Tank: 1-2.5 m
Outdoor Farming Size: ≥ 2 Hectares
Indoor Farming Size: ≥ 0.5 Hectares

If the system lives in a greenhouse, it adapts to almost all temperate climates, and may also adapt to tropical climates. The main environmental impact is discharge of water that must be salted to maintain the fishes' electrolyte balance.



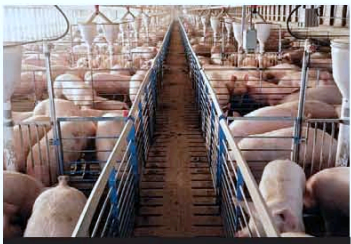
Intensive Pig Farming



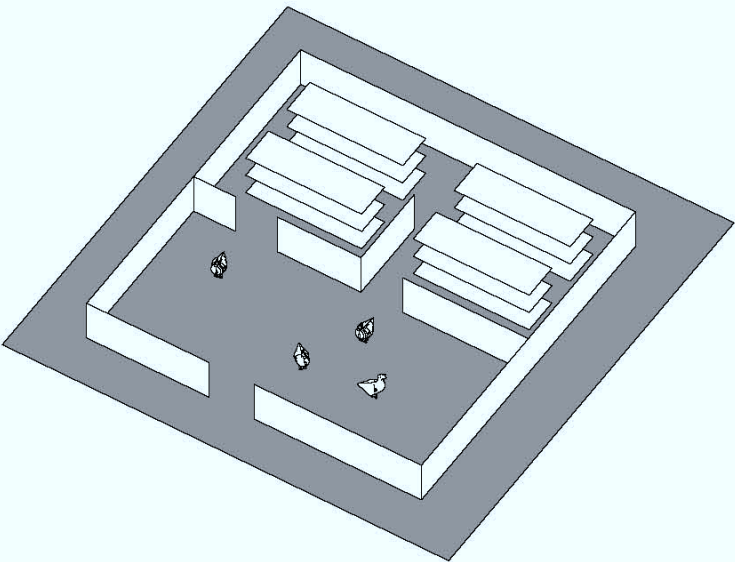
Space per Pig: 2~3 m²
Pig Number: ≥ 1000 pigs
Surface: ≥ 2 Hectares

Intensive piggeries are a type of factory farm specialized in the raising of domestic pigs up to slaughter weight. In this system of pig production, grower pigs are housed indoors in group-housing or straw-lined sheds, whilst pregnant sows are housed sow stalls (gestation crates) or pens and give birth in farrowing crates.

Intensive Pig Farming
http://en.wikipedia.org/wiki/Intensive_pig_farming

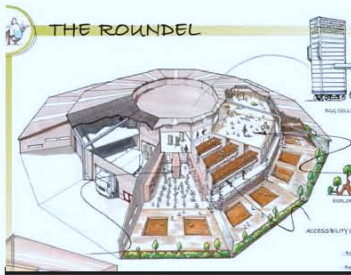


Organic Chicken Farming

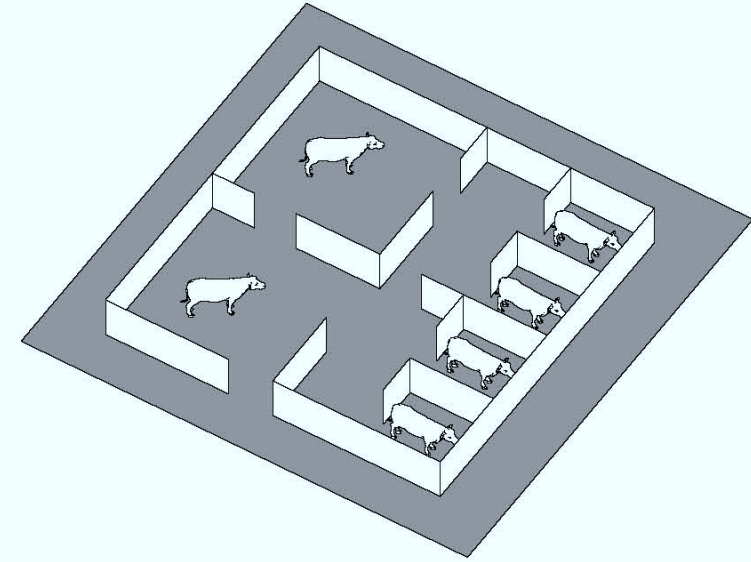


Outside Farming: ~ 4 chickens / m²
Indoor Farming: ~ 6~10 chickens / m²
Chicken Number: ≥ 10000 chicken

Organic Chicken Farming
1 <http://poultryfarming.co.za/what-size-chicken-house-do-i-need/>
2 http://www.ehow.com/about_5825343_chicken-farming-regulations.html



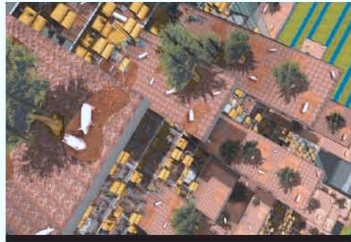
Organic Pig Farming



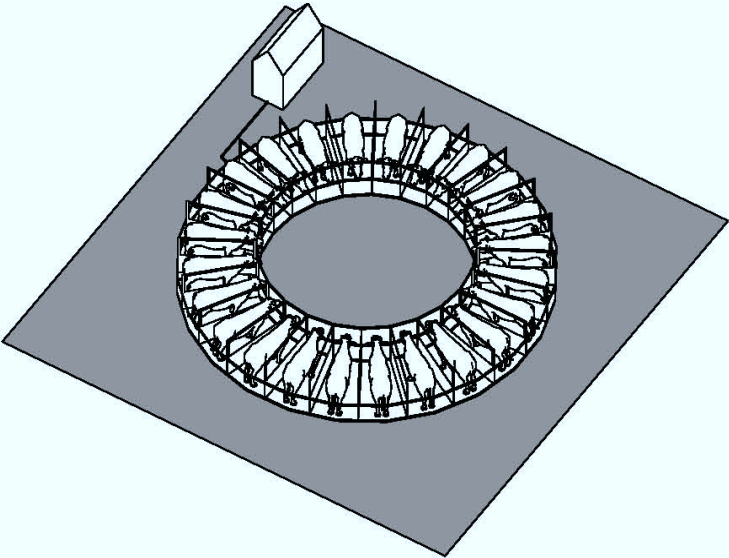
Space per Pig: ≥ 5 m²
Pig Number: ≥ 1000 pigs
Surface: ≥ 5 Hectare

Since 2003 EU legislation has required that pigs be given environmental enrichment, specifically they must have "permanent access to a sufficient quantity of material to enable proper investigation and manipulation activities, such as straw, hay, wood, sawdust, mushroom compost, peat or a mixture of such ..."

Organic Pig Farming
<https://www.fibl-shop.org/shop/pdf/mb-1549-organic-pig-production.pdf>

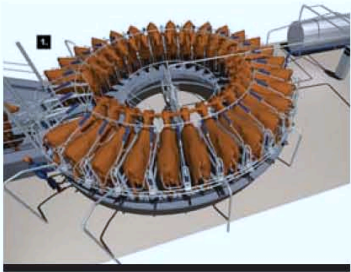


Automatic Milking Machine

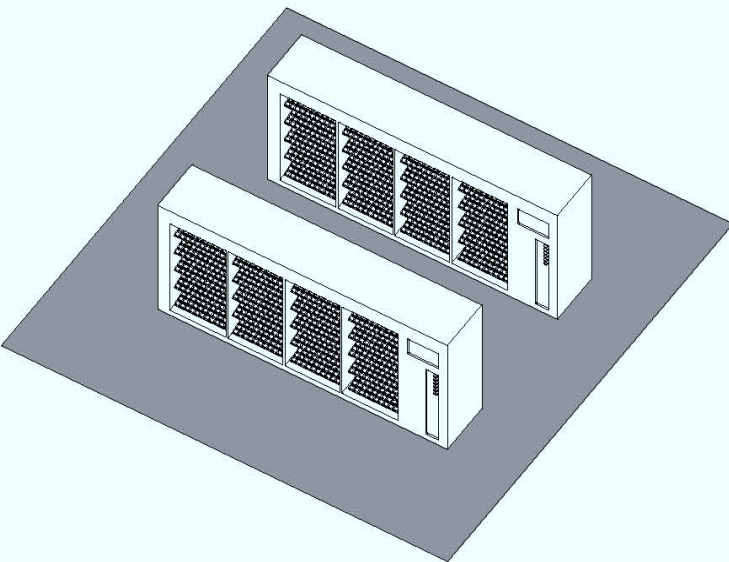


Number of cows: 30 - 70 cows
Radius of Machine: 10 - 20
Time of milking: 2-3 / day
Typical capacity for a AMS is 50–70 cows per milking unit. AMS usually achieve milking frequencies between 2 and 3 times per day, so a single milking unit handling 60 cows and milking each cow 3 times per day has a capacity of 7.5 cows per hour

Automatic Milking
http://en.wikipedia.org/wiki/Automatic_milking



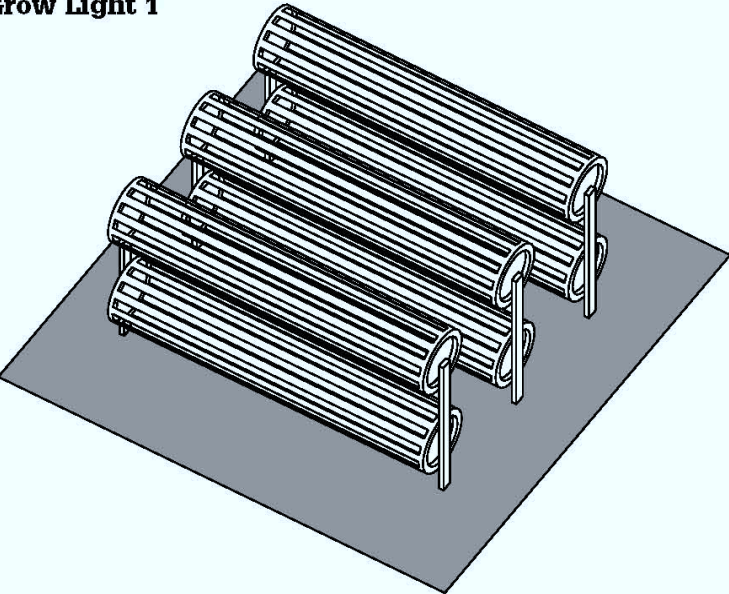
Egg Incubator Machine



Number of eggs: ≥ 1000 eggs
An egg incubator is used to hatch bird or reptile eggs. The incubator keeps the eggs warm, allowing the fetuses inside of them to grow and hatch without the mother present. The incubator is set at 98°F (37°C), and the eggs are placed inside. Chicken eggs usually hatch after 21 days, while other birds may take more or less time than this.



Grow Light 1

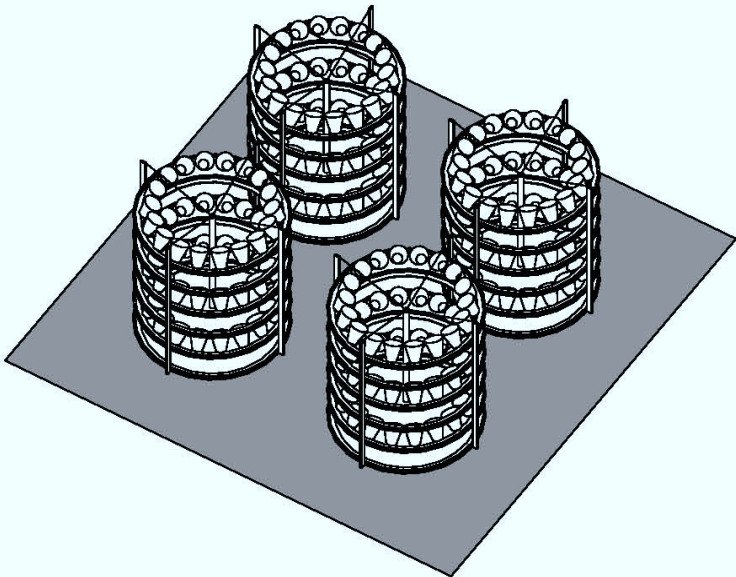


Radius: 0.3 - 0.5 m
Height: 1.5 m - 2 m
90 W LED Light: for 4' x 4' Square feet
A grow light or plant light is an artificial light source, generally an electric light, designed to stimulate plant growth by emitting an electromagnetic spectrum appropriate for photosynthesis.

Grow Light
<http://www.myhydroponicgardening.com/2011-best-led-grow-light-review/>

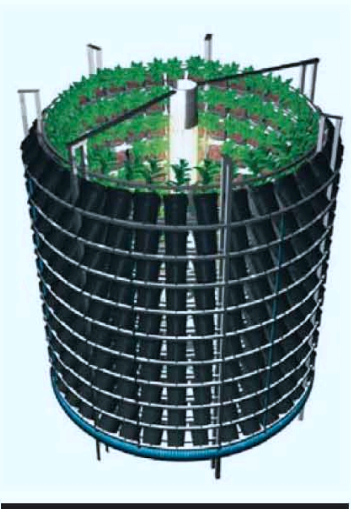


Grow Light 2

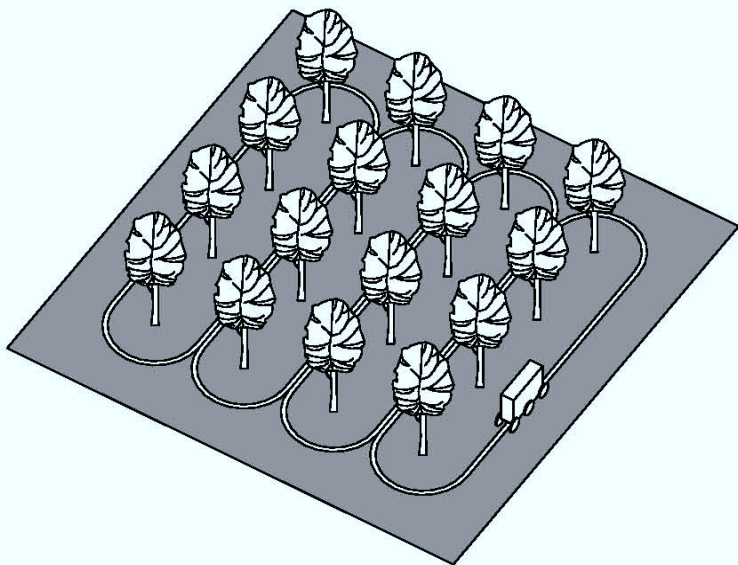


Radius: 0.5 - 2.5 m
Height: 1.5 m - 2 m
Grow lights either attempt to provide a light spectrum similar to that from the sun, or to provide a spectrum that is more tailored to the needs of the plants being cultivated.

Grow light
<http://www.pi-technics.com/24,pi-rack-new.html>



Automatic Picking Robot

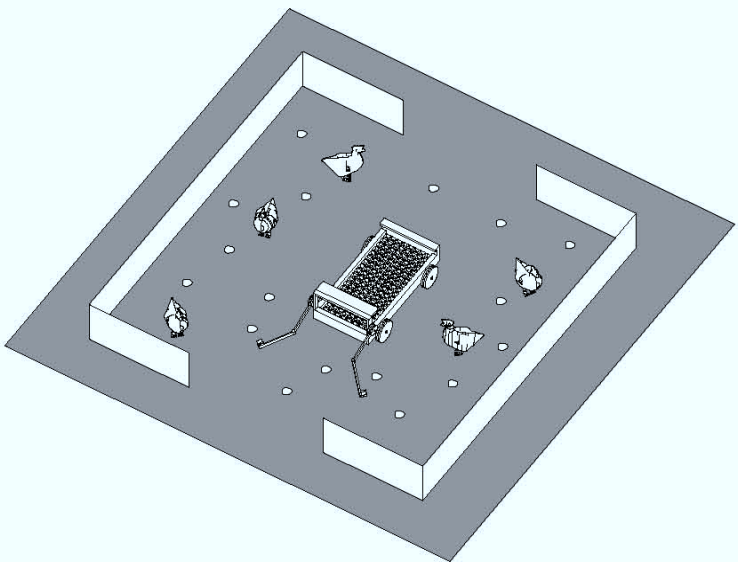


Turning Radious: 1.5 - 3 m (depend on the robot and the size of Fruit Tree)
As labor costs are still quite expensive in vegetable and fruit picking, robots are being designed that can replace humans for this kind of work. The research is still in full progress, especially as the robots need to be carefully designed so that they do not bruise the fruit while picking.

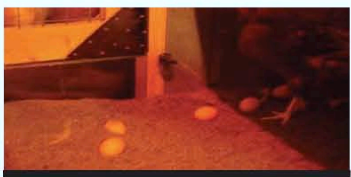
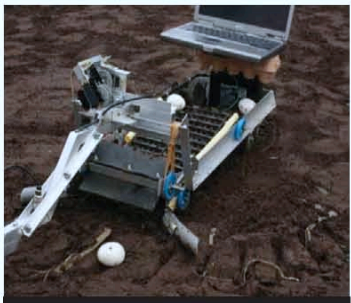
Fruit Picking
http://en.wikipedia.org/wiki/Fruit_picking



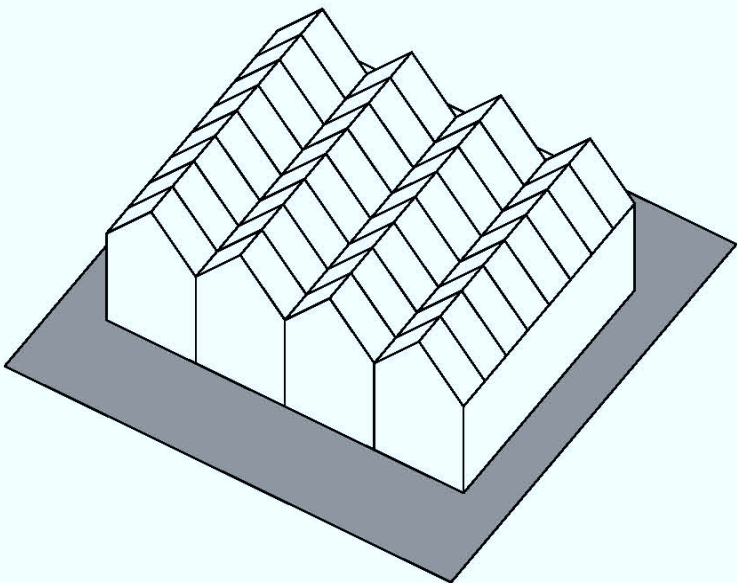
Egg Collector Machine



Eggs create an extra workload for the farmers and reduce their profits. The collection of these floor eggs is currently done by the farmer by hand. The development of the collection of floor eggs with the help of an autonomous vehicle is a try to settle this problem.



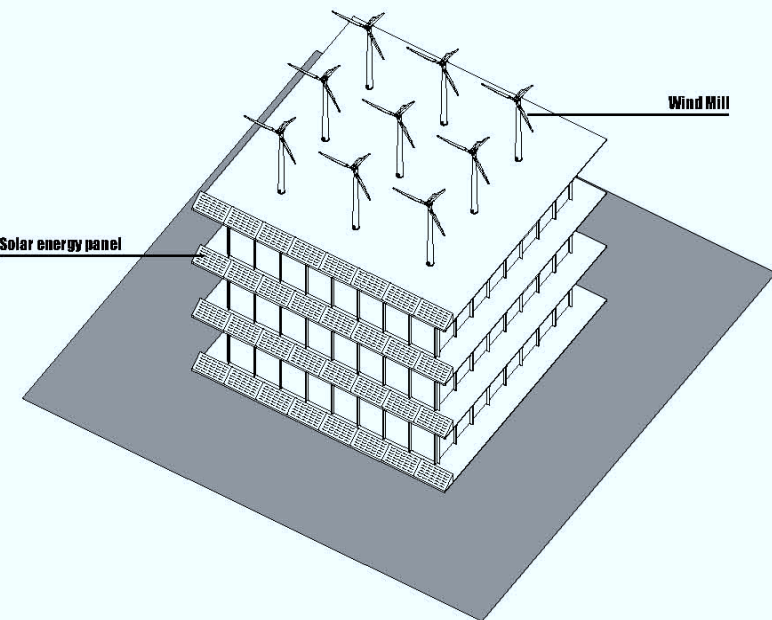
Greenhouse



Industrial Size: 1.5 Hectares
A greenhouse (also called a glasshouse) is a building in which plants are grown. These structures range in size from small sheds to very large buildings. Greenhouses can be divided into glass greenhouses and plastic greenhouses.



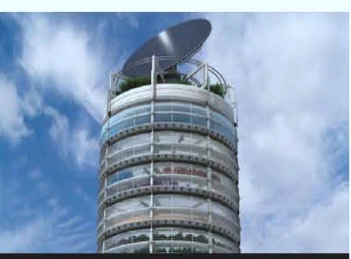
Building Integrated Agriculture



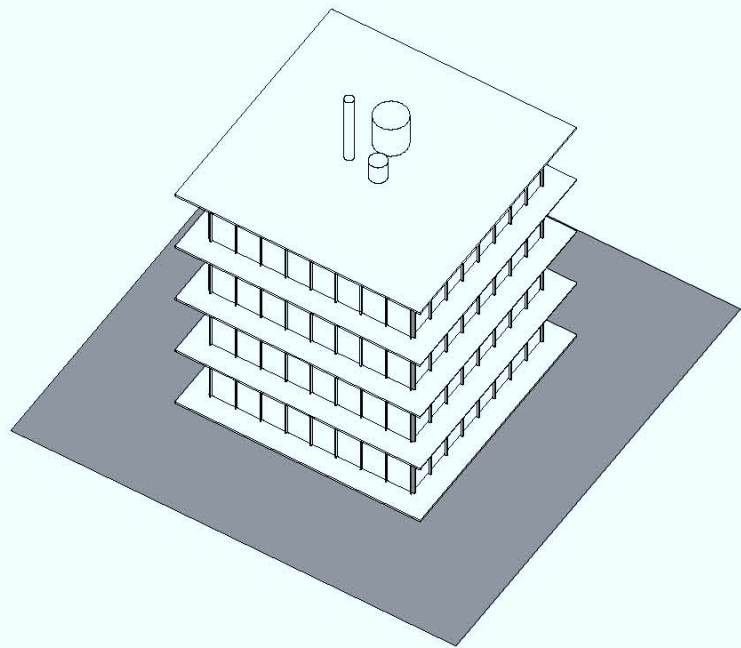
Building-integrated agriculture (BIA) is of the practice of locating high performance hydroponic greenhouse farming systems on and in mixed use buildings to exploit synergies between the built environment and agriculture.

Typical characteristics of BIA installations include: recirculating hydroponics, solar photovoltaics or other forms of renewable energy, rainwater catchment systems, and evaporative cooling. The term building-integrated agriculture was coined by Dr. Ted Caplow in a paper delivered at the 2007 Passive and Low Energy Cooling Conference in Crete, Greece.

Building Integrated Agriculture
Caplow, Ted. "Building Integrated Agriculture: Philosophy and Practice." Heinrich Böll Foundation: Urban Development and Urban Lifestyles of the Future 2009: 48-51.
http://www.boell.org/downloads/Urban_Futures_2030.pdf



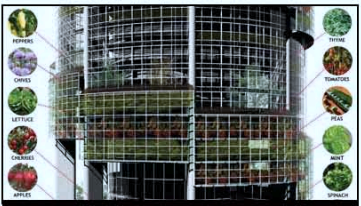
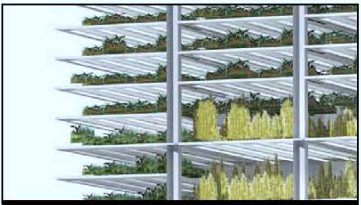
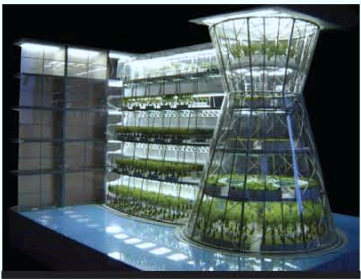
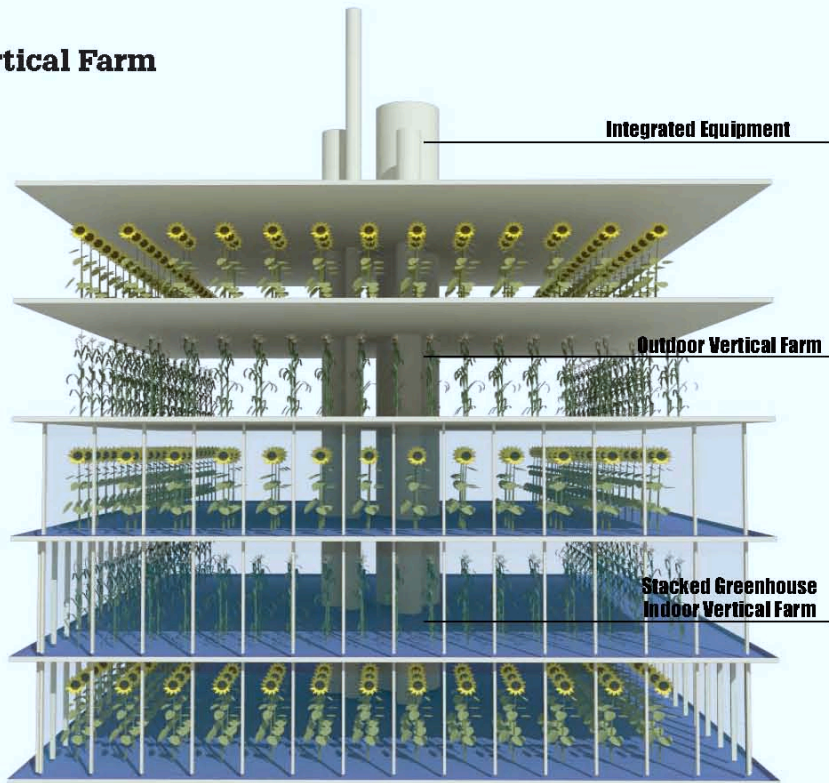
Vertical Farm



Vertical farming is a concept that argues that it is economically and environmentally viable to cultivate plant or animal life within skyscrapers, or on vertically inclined surfaces. Despommier's concept of "The Vertical Farm" emerged in 1999 at Columbia University. It promotes the mass cultivation of plant and animal life for commercial purposes in skyscrapers. Using advanced greenhouse technology such as hydroponics and aeroponics, the skyscrapers could theoretically produce fish, poultry, fruit and vegetables.

Vertical Farm
<http://www.miller-mccune.com/science-environment/farming-in-high-rises-raises-hopes-3705/>

Vertical Farm





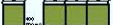
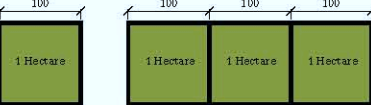

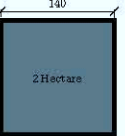


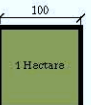

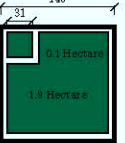

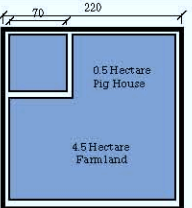

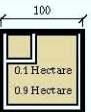




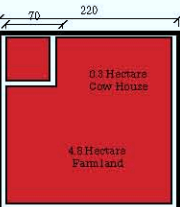




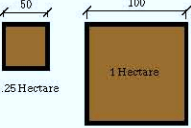




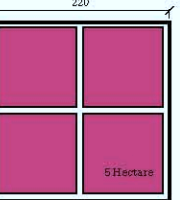
Vertical farming is a concept that argues that it is economically and environmentally viable to cultivate plant or animal life within skyscrapers, or on vertically inclined surfaces. Despommier argues that vertical farming is legitimate due to environmental reasons. He claims that the cultivation of plant and animal life within skyscrapers will produce less embedded energy and toxicity than plant and animal life produced on natural landscapes. Several potential advantages of vertical farming have been discussed by Despommier. Many of these benefits are obtained from scaling up hydroponic or aeroponic growing methods.

Modular design shows after using these toolboxes into different ingredients farming, what the forms are like in the vertical farm and the outside farm. We can see the agricultural farming forms are very different with each other.

5.3

Toolbox Modular

| Name | Indoor Farming | Outdoor Farming | Application |
|-------------------------|--|--|--|
| Drip Irrigation |  500 m2 |  1 Hectare | All the plants farming could use drip irrigation technology. |
| Aquaponics |  500 m2 | | Generally used for small plants especially vegetable with fish. |
| Hydroponics |  100 x 5 = 500 m2 | | Generally used for small plants. |
| Crop Rotation |  500 x 3 = 1500 m2 |  1 Hectare 1 Hectare 1 Hectare 1 Hectare | More than 3 plants species which has large different characters. |
| Intercropping |  500 m2 |  2 Hectare | A deep-rooted crop with a shallow-rooted crop, or planting a tall crop with a shorter crop |
| Grow Wall |  100 x 5 = 500 m2 | | Especially used for Small vegetable. |
| Integrated Fish Farming |  500 m2 |  1 Hectare | Generally in greenhouse. |
| Integrated Pig Farming |  1000 m2 |  0.1 Hectare 1.9 Hectare | Not welfare for pig. |
| Organic Pig Farming |  1000 m2 |  0.5 Hectare Pig House 4.5 Hectare Farmland | Welfare for pig. |
| Organic Chicken Farming |  500 m2 |  0.1 Hectare 0.9 Hectare | Welfare for chicken. |

| Name | Indoor Farming | Outdoor Farming | Application |
|---|---|--|---|
| Egg Incubator Machine |  100 X 3 = 300 m2 | | Instead of hens, more efficient. |
| Organic Cow Farming |  1000 m2 |  0.3 Hectare Cow House 4.5 Hectare Farmland | Welfare for cow. |
| Grow Light 1 |  500 m2 | | Suitable for all the plants. |
| Grow Light 2 |  500 m2 | | Especially suitable for small plants. |
| Automatic Picking Robot |  500 m2 |  1 Hectare | Especially used for trees, such as fruit trees and oil trees. |
| Green House | |  0.25 Hectare 1 Hectare | Suitable for all the plants and fish farming. |
| Drip Irrigation + Intercropping |  500 m2 |  5 Hectare | A deep-rooted crop with a shallow-rooted crop, or planting a tall crop with a shorter crop. All the plants farming could use drip irrigation technology. |
| Drip Irrigation + Auto-Picking Robot |  500 m2 |  1 Hectare | Especially used for trees, such as fruit trees and oil trees and in combination with drip irrigation. |
| Drip Irrigation + Intercropping + Crop Rotation + Farming Machine | |  5 Hectare | Especially used for grain and other plants which have very large farmland. |

Because the nutrient ingredients are different between each diet, the technology applied in them are varied. In the table, different signs express different technologies applied in each diet. After applying these technologies, the agricultural surface are largely reduced.

5.4

Surface After Technology

Technology Application Catalogue of 10 Diets

| AGRICULTURE PRODUCTION TECHNOLOGY CATALOGUE | | | | | | | | | | | Description | |
|--|-----------------------------|----------------------------|---------------------------|-------------------------|------------------|----------------------------|----------------------|-------------------|-------------------|-------------------------|------------------|----------------------|
| | European Healthy Diet | Japanese Health Diet | Finland Health Diet | Raw veganism Diet | Bud Diet | Idhist arianism Diet | Frutarianism diet | Atkins Diet | Montignac Diet | Organic Food Diet | | Junk Food Diet |
| Expendable | Plant Expendable | Animal Expendable | Plant Expendable | Animal Expendable | Plant Expendable | Animal Expendable | Plant Expendable | Animal Expendable | Plant Expendable | Animal Expendable | Plant Expendable | Animal Expendable |
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| | | | | | | | | | | | | |
| Essential | Plant Essential | Animal Essential | Plant Essential | Animal Essential | Plant Essential | Animal Essential | Plant Essential | Animal Essential | Plant Essential | Animal Essential | Plant Essential | Animal Essential |
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| | | | | | | | | | | | | |
| Forbidden | Plant Forbidden | Animal Forbidden | Plant Forbidden | Animal Forbidden | Plant Forbidden | Animal Forbidden | Plant Forbidden | Animal Forbidden | Plant Forbidden | Animal Forbidden | Plant Forbidden | Animal Forbidden |
| | | | | | | | | | | | | |
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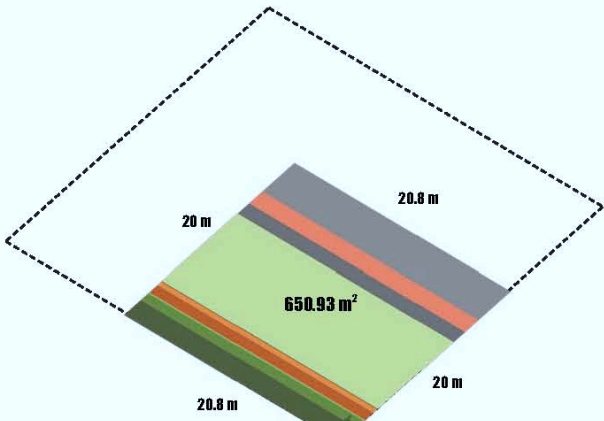
Note: Most of these technology can be used in different diet communities, the marked ones are more important than those doesn't. For some diet, such as veganism, the meat products are forbidden, so related technologies are forbidden.

★ Essential Technology ▲ Important Technology

★ Not That Important Technology ▲ Disposable Technology × Forbidden Technology

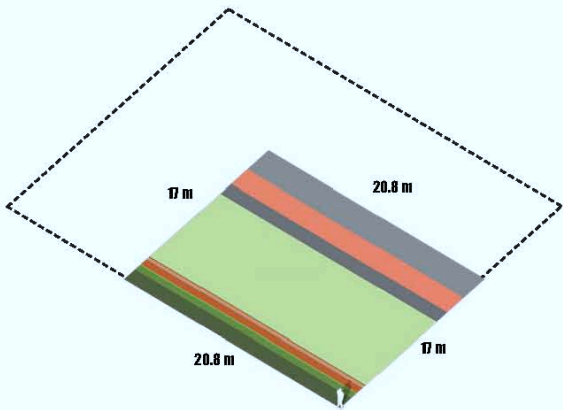
Note: Black Color means traditional technologies.

European Healthy Diet



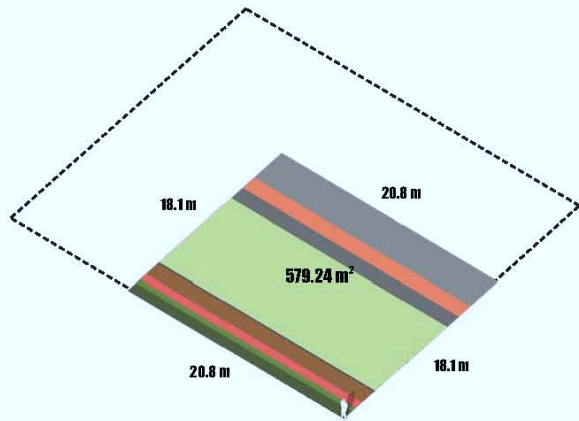
| | | |
|---|--|--|
| Fruit Surface = 124.31 m² | Sugar Beet Surface = 2.71 m² | Chicken and Poultry Surface = 4.34 m² |
| Vegetable Surface = 46.49 m² | Pig Surface = 12.47 m² | Egg, Milk and Cheese Surface = 3.2 m² |
| Potato Surface = 44.35 m² | Fish and Aquatic products Surface = 1.63 m² | Sunflower Surface = 28.05 m² |
| Grain and other carbohydrate Surface = 291.47 m² | Cow and Livestock Surface = 28.50 m² | Other Oil Plant Surface = 64.01 m² |

Japanese Healthy Diet



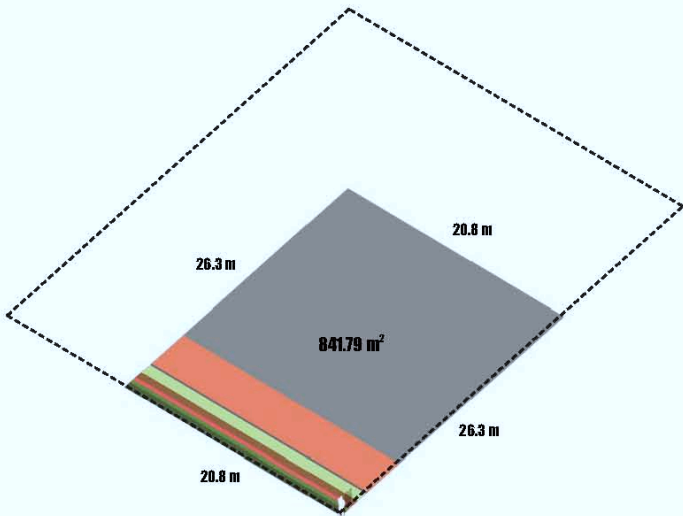
| | | |
|---|--|---|
| Fruit Surface = 79.91 m² | Sugar Beet Surface = 2.19 m² | Chicken and Poultry Surface = 1.97 m² |
| Vegetable Surface = 61.67 m² | Pig Surface = 6.45 m² | Egg, Milk and Cheese Surface = 2.29 m² |
| Potato Surface = 40.44 m² | Fish and Aquatic products Surface = 3.34 m² | Sunflower Surface = 17.58 m² |
| Grain and other carbohydrate Surface = 265.72 m² | Cow and Livestock Surface = 20.64 m² | Other Oil Plant Surface = 40.12 m² |

Buddhist Vegetarianism Diet



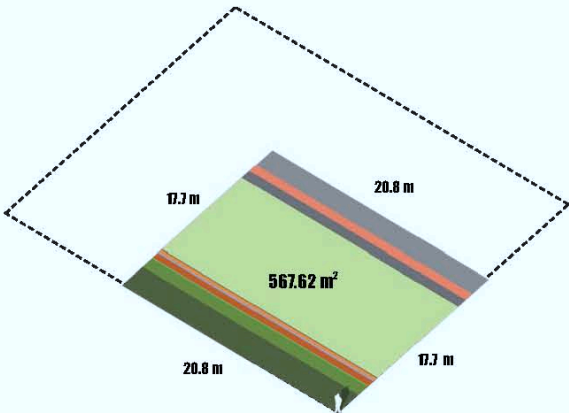
| | | |
|---------------------------------|---|---------------------------------------|
| Fruit Surface = 103.88 m² | Grain and other carbohydrate Surface = 269.88 m² | Nuts and Seeds Surface = 23.29 m² |
| Vegetable Surface = 43.17 m² | Sugar Beet Surface = 4.76 m² | Sunflower Surface = 15.63 m² |
| Potato Surface = 43.81 m² | Bean Surface = 44.27 m² | Other Oil Plant Surface = 30.57 m² |

Fruitarianism Diet



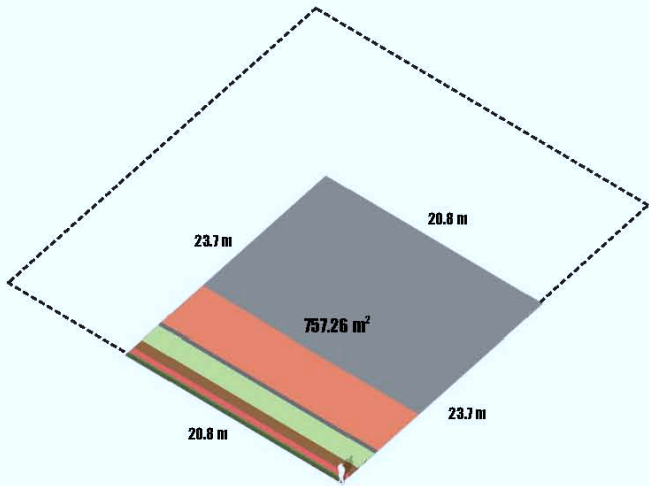
| | | |
|----------------------------------|--|---------------------------------------|
| Fruit Surface = 621.53 m² | Grain and other carbohydrate Surface = 30.76 m² | Nuts and Seeds Surface = 10.78 m² |
| Vegetable Surface = 119.90 m² | Sugar Beet Surface = 0 m² | Sunflower Surface = 10.85 m² |
| Potato Surface = 6.24 m² | Bean Surface = 20.49 m² | Other Oil Plant Surface = 21.23 m² |

Finland Healthy Diet



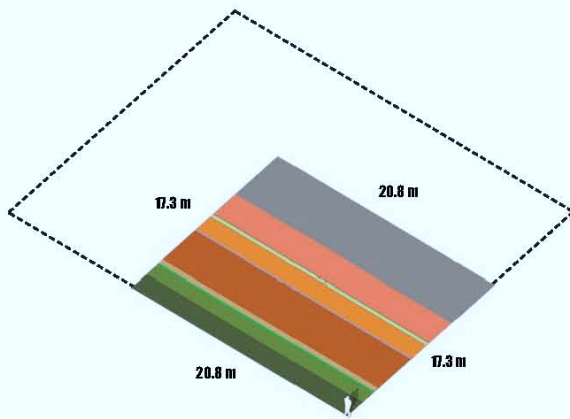
| | | |
|---|--|---|
| Fruit Surface = 60.60 m² | Sugar Beet Surface = 2.35 m² | Chicken and Poultry Surface = 1.77 m² |
| Vegetable Surface = 25.18 m² | Pig Surface = 8.69 m² | Egg, Milk and Cheese Surface = 2.30 m² |
| Potato Surface = 28.83 m² | Fish and Aquatic products Surface = 5.24 m² | Sunflower Surface = 34.19 m² |
| Grain and other carbohydrate Surface = 301.94 m² | Cow and Livestock Surface = 18.53 m² | Other Oil Plant Surface = 78.01 m² |

Veganism Diet



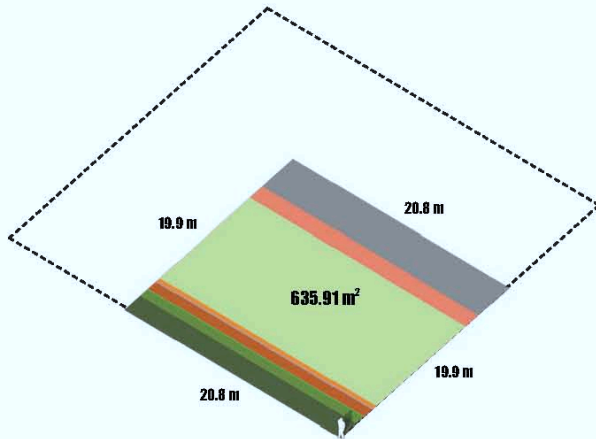
| | | |
|----------------------------------|--|---------------------------------------|
| Fruit Surface = 466.15 m² | Grain and other carbohydrate Surface = 61.61 m² | Nuts and Seeds Surface = 16.17 m² |
| Vegetable Surface = 154.16 m² | Sugar Beet Surface = 0 m² | Sunflower Surface = 5.43 m² |
| Potato Surface = 12.48 m² | Bean Surface = 30.74 m² | Other Oil Plant Surface = 10.61 m² |

Atkins Diet



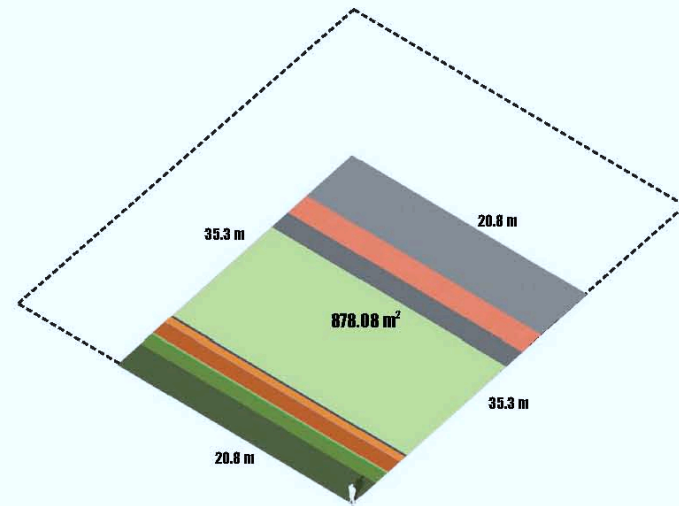
| | | |
|---|--|---|
| Fruit Surface = 159.82 m² | Sugar Beet Surface = 0.16 m² | Chicken and Poultry Surface = 14.26 m² |
| Vegetable Surface = 82.22 m² | Pig Surface = 53.26 m² | Egg, Milk and Cheese Surface = 6.30 m² |
| Potato Surface = 150 m² | Fish and Aquatic products Surface = 4.37 m² | Sunflower Surface = 39.07 m² |
| Grain and other carbohydrate Surface = 9.23 m² | Cow and Livestock Surface = 122.60 m² | Other Oil Plant Surface = 57.51 m² |

























Montignac Diet



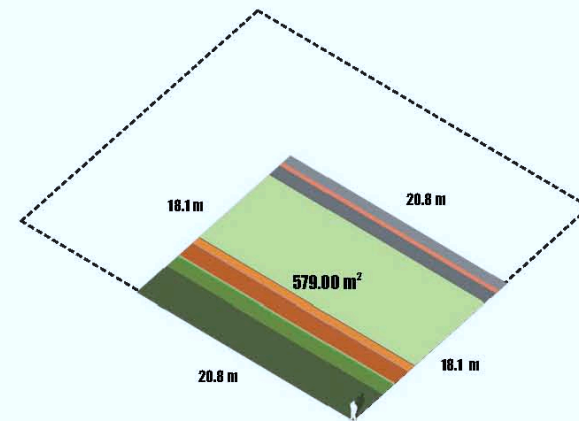
| | | |
|---|--|---|
| Fruit Surface = 115.43 m² | Sugar Beet Surface = 0 m² | Chicken and Poultry Surface = 1.12 m² |
| Vegetable Surface = 47.96 m² | Pig Surface = 12.87 m² | Egg, Milk and Cheese Surface = 2.48 m² |
| Potato Surface = 0 m² | Fish and Aquatic products Surface = 2.85 m² | Sunflower Surface = 26.05 m² |
| Grain and other carbohydrate Surface = 338.31 m² | Cow and Livestock Surface = 29.41 m² | Other Oil Plant Surface = 59.44 m² |

Organic Food Diet



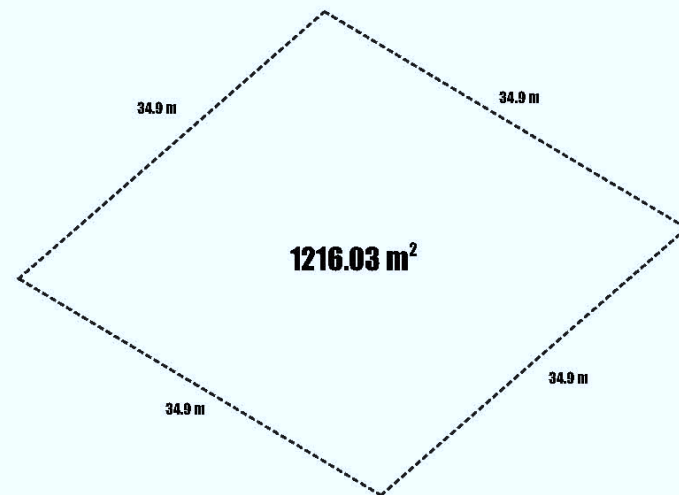
| | | | | | |
|--|---|--|--|---|--|
|  Fruit Surface = 169.68 m ² |  Sugar Beet Surface = 6.57 m ² |  Chicken and Poultry Surface = 4.94 m ² |  Fruit Surface = 28.86 m ² |  Sugar Beet Surface = 2.18 m ² |  Chicken and Poultry Surface = 5.61 m ² |
|  Vegetable Surface = 70.50 m ² |  Pig Surface = 18.82 m ² |  Egg, Milk and Cheese Surface = 3.65 m ² |  Vegetable Surface = 11.99 m ² |  Pig Surface = 21.45 m ² |  Egg, Milk and Cheese Surface = 4.14 m ² |
|  Potato Surface = 60.54 m ² |  Fish and Aquatic products Surface = 1.40 m ² |  Sunflower Surface = 38.29 m ² |  Potato Surface = 40.25 m ² |  Fish and Aquatic products Surface = 1.59 m ² |  Sunflower Surface = 37.99 m ² |
|  Grain and other carbohydrate Surface = 372.98 m ² |  Cow and Livestock Surface = 43.23 m ² |  Other Oil Plant Surface = 87.37 m ² |  Grain and other carbohydrate Surface = 264.49 m ² |  Cow and Livestock Surface = 43.01 m ² |  Other Oil Plant Surface = 114.4 m ² |

Junk Food Diet



| | | |
|--|---|--|
|  Fruit Surface = 28.86 m ² |  Sugar Beet Surface = 2.18 m ² |  Chicken and Poultry Surface = 5.61 m ² |
|  Vegetable Surface = 11.99 m ² |  Pig Surface = 21.45 m ² |  Egg, Milk and Cheese Surface = 4.14 m ² |
|  Petiole Surface = 40.25 m ² |  Fish and Aquatic products Surface = 1.69 m ² |  Sunflower Surface = 37.99 m ² |
|  Grain and other carbohydrate Surface = 264.49 m ² |  Cow and Livestock Surface = 43.01 m ² |  Other Oil Plant Surface = 11.44 m ² |

Agricultural Surface Research By MVRDV in KM3



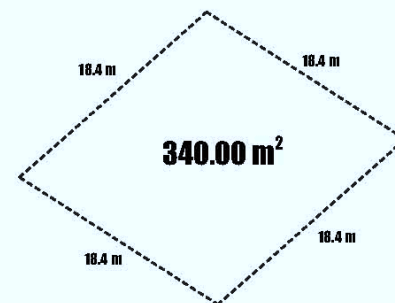
Food waste: 30%

Meat: Included

Technology: Some high-tech Included

Average Calorie: Based on the Netherland Diet

Agricultural Surface Research By T2F in Delft University of Technology



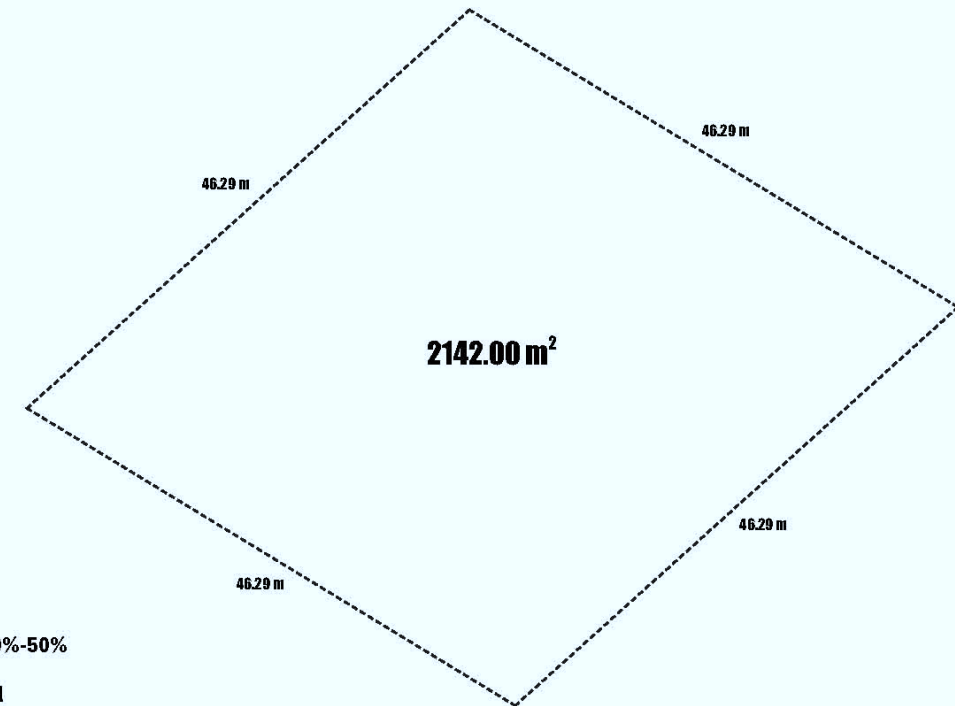
Food waste: 15%

Meat: Included

Technology: All high-tech Included

Average Calorie: Based on the European Diet

Agricultural Surface Research By Germany of Bio Farm



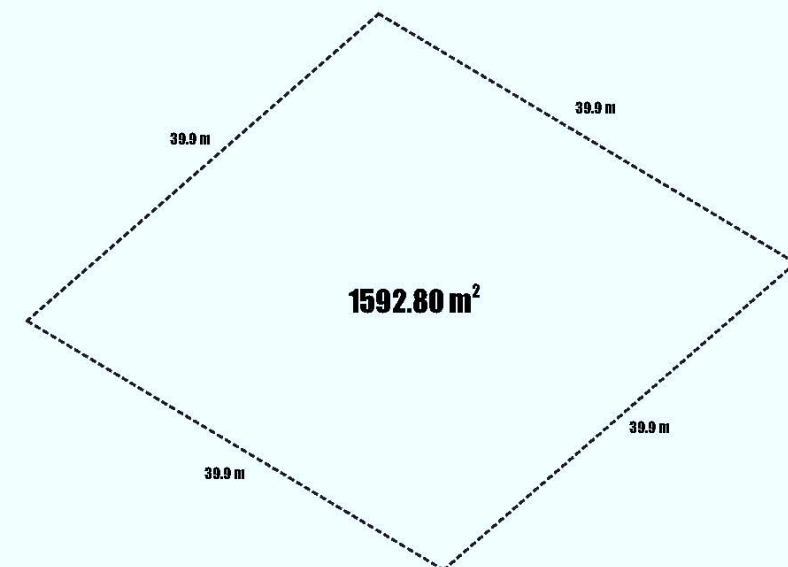
Food waste: 30%-50%

Meat: Included

Technology: Common Technology

Average Calorie: Based on German Diet

Agricultural Surface Research By TPF Msc 2 Group



Food waste: 30%

Meat: Included

Technology: Some high-tech Included

Average Calorie: Based on the European Diet

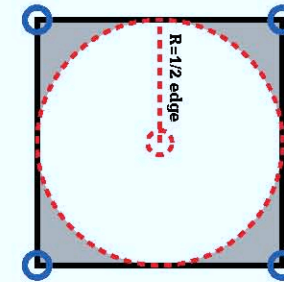
6.

Design Proposal

6.1

Distribution Model (Supermarket)

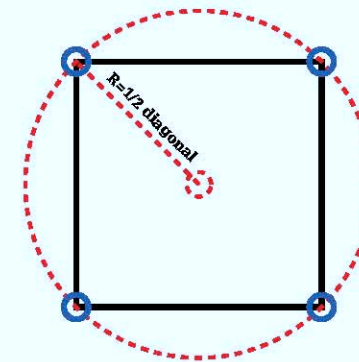
R=1/2 Edge



Not Optimal

The gray area are not served.

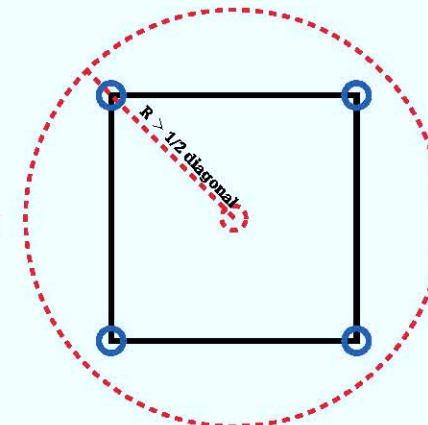
R=1/2 Diagonal



Optimal

The farthest point just included.

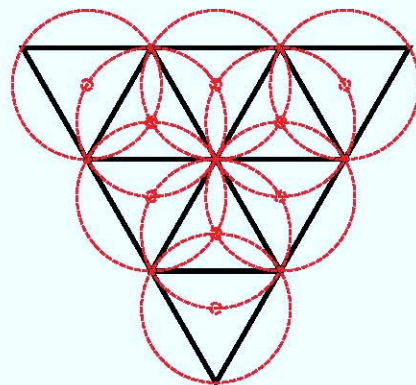
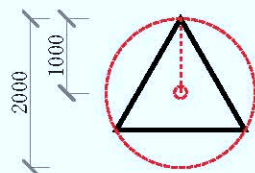
R > 1/2 Diagonal



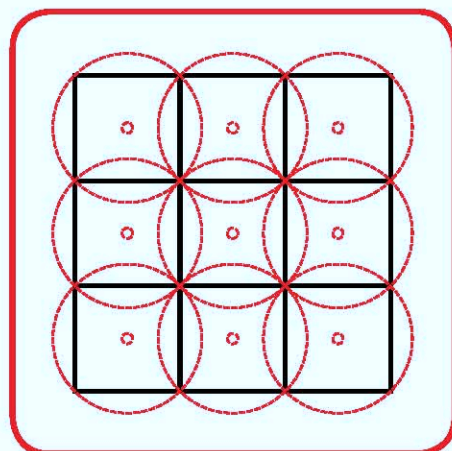
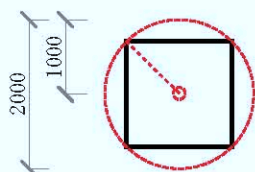
Not Optimal

The block area are too small, it can be bigger.

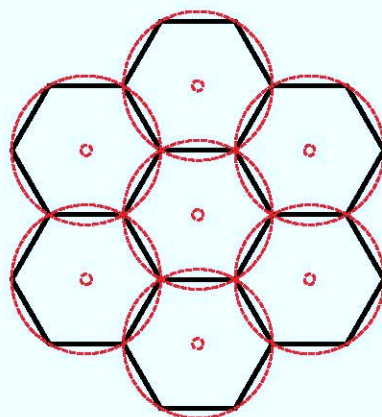
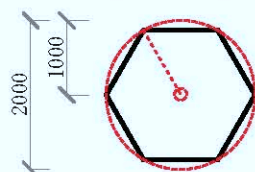
Triangle



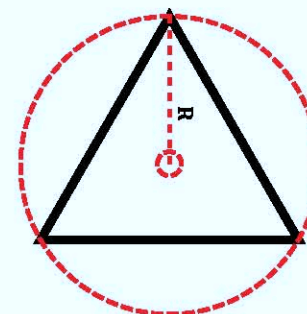
Square



Regular Hexagon



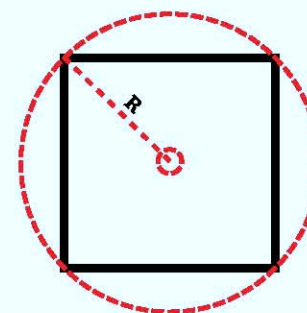
Triangle



Block Percentage:
 = Triangle Area / Round Area
41.35%

Number of the supermarkets:
 = City Area ÷ $(0.75\sqrt{3} \times R^2)$

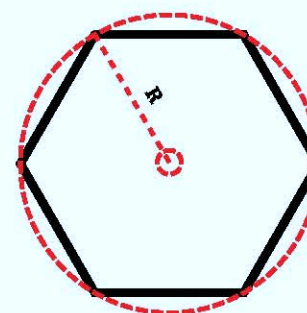
Square



Block Percentage:
 = Square Area / Round Area
63.66%

Number of the supermarkets:
 = City Area ÷ $(2 \times R^2)$

Regular Hexagon

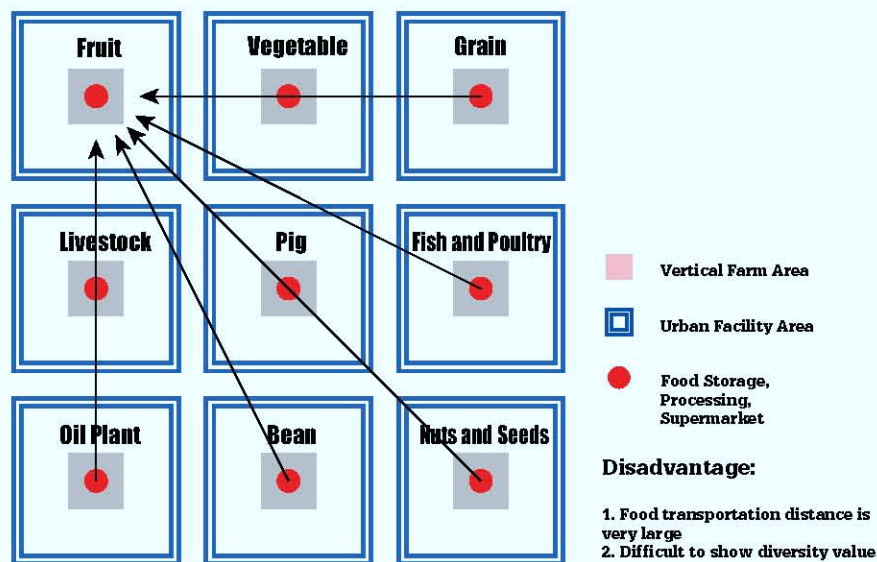


Block Percentage:
 = Hexagon Area / Round Area
82.70%

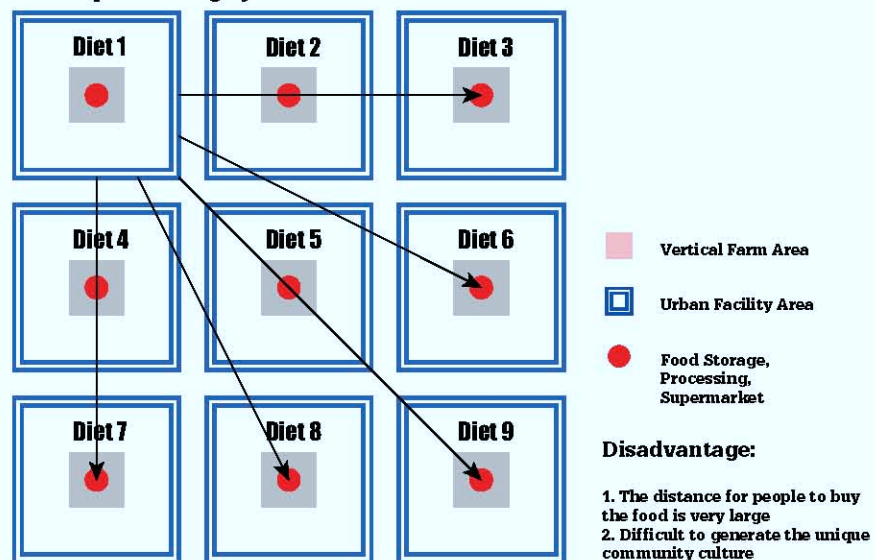
Number of the supermarkets:
 = City Area ÷ $(1.5\sqrt{3} \times R^2)$

If the area of the city is the same, it means that the hexagonal urban structure need the least supermarkets. The triangle urban structure need the largest number of supermarkets.

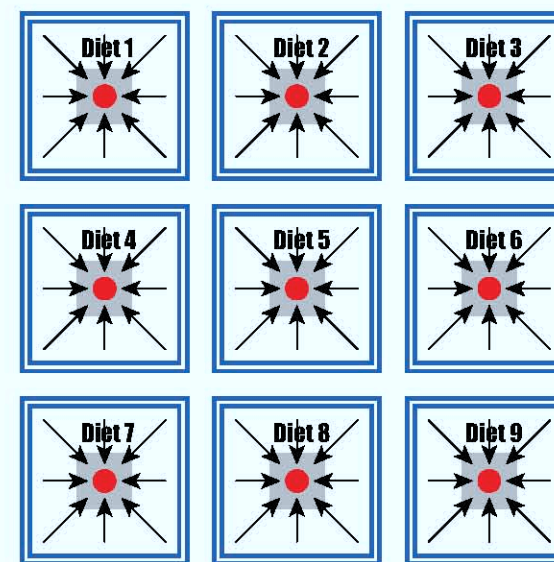
Block Farming According To The Nutrient Ingredient



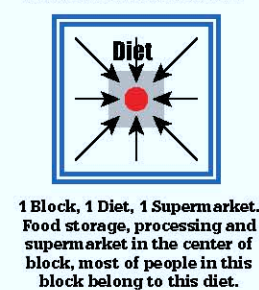
Block Farming According To Diet But People Are Largely Mixed



1 Block, 1 Diet Farming, 1 Supermarket



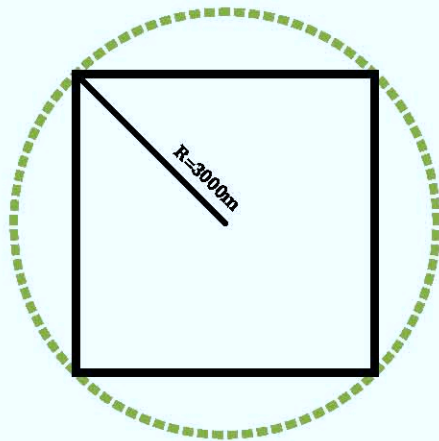
Autarkic Production



Advantage:

1. Food transportation distance is small
2. Largest Diversity Value (1 block, 1 diet)
3. Convenient for people to buy food, the distance to buy the food is small
4. Easy to generate the unique community culture
5. Easy to generate unique community agritourism

Large Supermarket

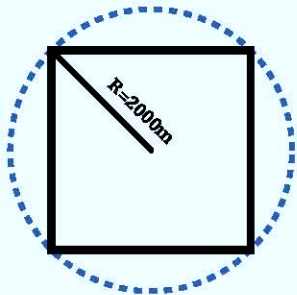


Largest Serve Radius:
 $R = 3000m$

Walking Time: 20-30
minutes

Largest Serve People:
100,000 People

Medium Supermarket



Largest Serve Radius:
 $R = 2000m$

Walking Time: 15-20
minutes

Largest Serve People:
66,000 People

Small Supermarket

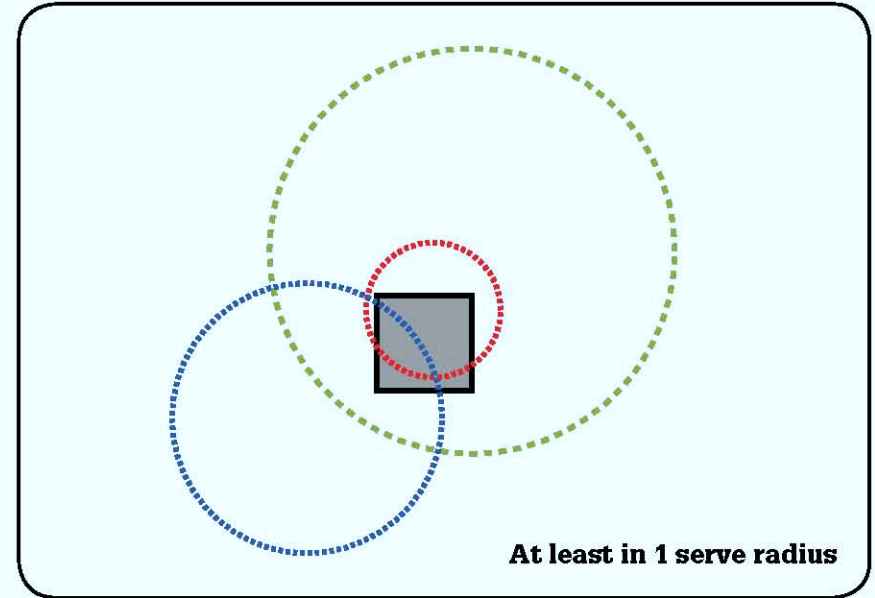


Largest Serve Radius:
 $R = 1000m$

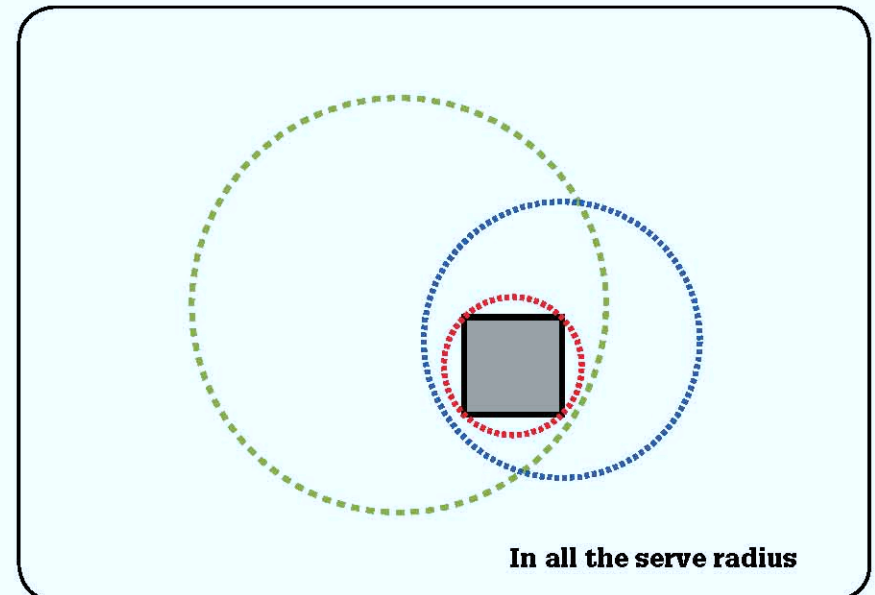
Walking Time: 5-10
minutes

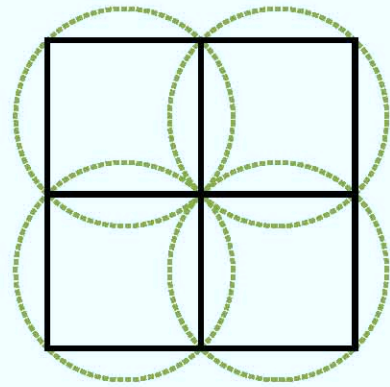
Largest Serve People:
33,000 People

Common Model For People In A Block On Foot to Buy Food

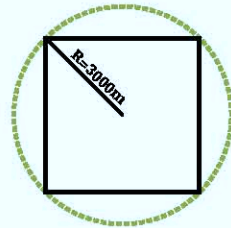


Optimal Model For People In A Block On Foot to Buy Food



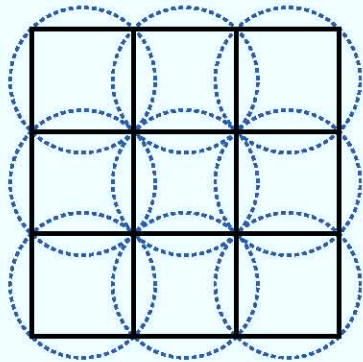


Large Supermarket

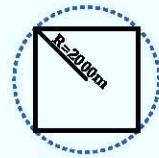


Serve radius $R = 3000\text{m}$ People
Serve People = 100,000 People

+

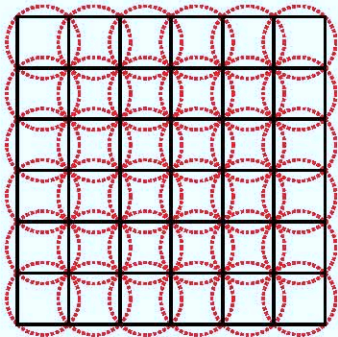


Medium Supermarket



Serve radius $R = 2000\text{m}$
Serve People = 66,000 People

+



Small Supermarket

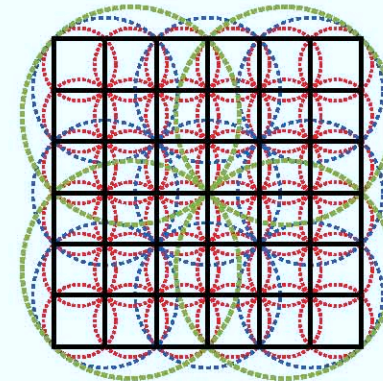


Serve radius $R = 1000\text{m}$
Serve People = 33,000 People

Optimal Unit (the most compact model)

Length = 8485 m ($6000\sqrt{2}$ m)

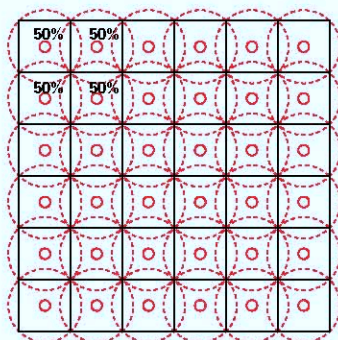
Width = 8485 m ($6000\sqrt{2}$ m)



Size of This Unit = $8485\text{m} \times 8485\text{m}$
Serve People=400,000 People
Population density: 5555.55 People/ km^2
36 Diets Blocks
4 Cooperative groups
1 Cooperative Union
36 Small Supermarkets
9 Medium Supermarkets
4 Large Supermarkets

The products sold by three supermarkets.

Small supermarket.



The whole supermarket area: 160000 m²

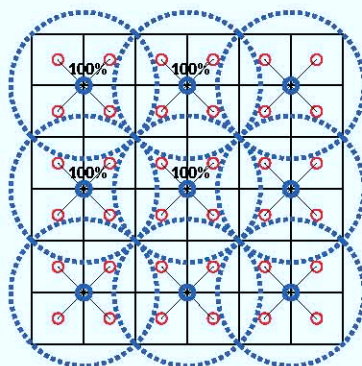
Supermarket: 0.4m²/person

Each block:
Sell 50% of the food produced by itself; 25% food send to the medium supermarket nearby; 25% food send to the large supermarket.

Small supermarket area: 2222.22 m²

Small supermarket sell products produced by the block itself.

Medium supermarket.



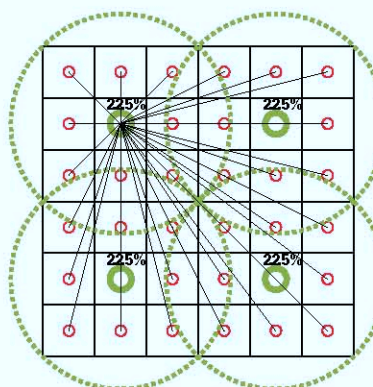
Supermarket: 0.4m²/person

Medium Supermarket:
Sell food from 4 block nearby.
25% x 4 = 100%

Medium supermarket area: 4444.44 m²

Medium supermarket sell products from 4 blocks nearby.

Largest supermarket.



Supermarket: 0.4m²/person

Large Supermarket:
Sell food from all the blocks: 225%

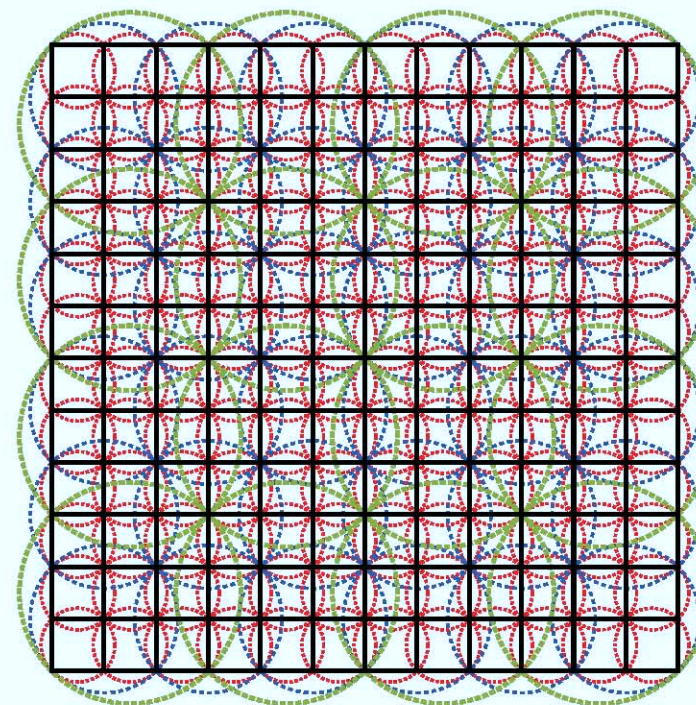
Large supermarket area: 9999.99 m²

Each Block:
Possible Mixed People: 50%
25% from 3 blocks nearby,
25% from any diet block.

Largest supermarket sell all the products of each block.

Length = 16,970 m (12000/√2 m)

Length = 16,970 m (12000/√2 m)



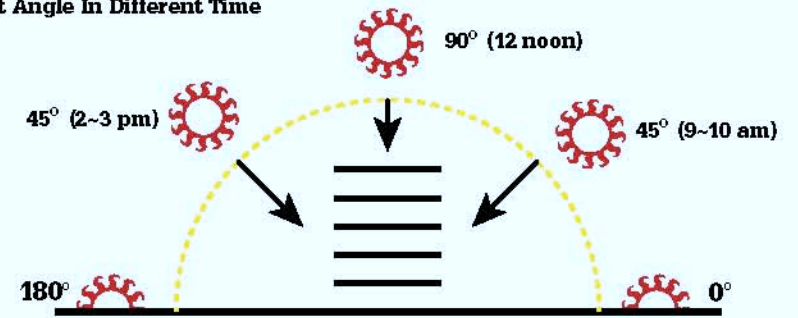
Size of The City = 16,970m × 16,970m
Serve People=1,600,000 People
Population density: 5555.55 People/km²
144 Diets Blocks
4 Cooperative groups
1 Cooperative Union
16 Consumer cooperative groups
144 Small Supermarkets
36 Medium Supermarkets
16 Large Supermarkets

In general, large supermarkets apply to the city which population are more than one million.

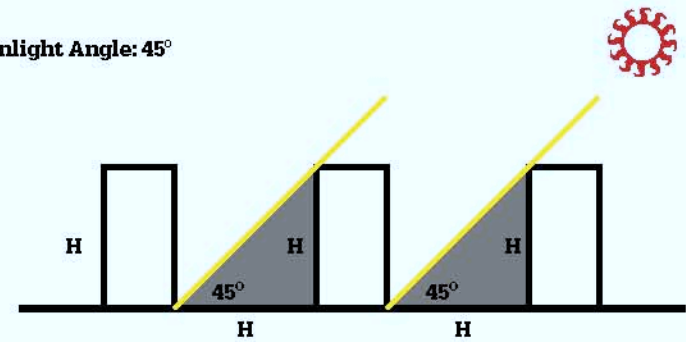
6.2

Optimal Sunlight Model

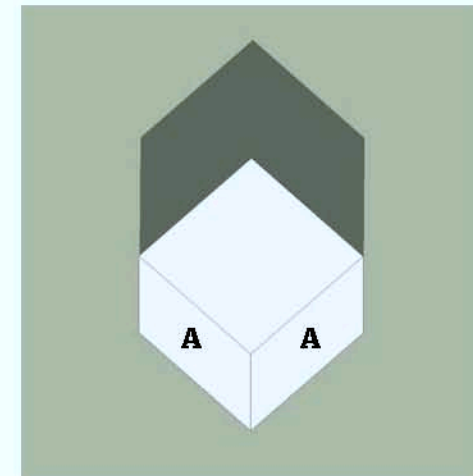
Sunlight Angle In Different Time



Average Sunlight Angle: 45°

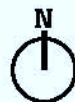
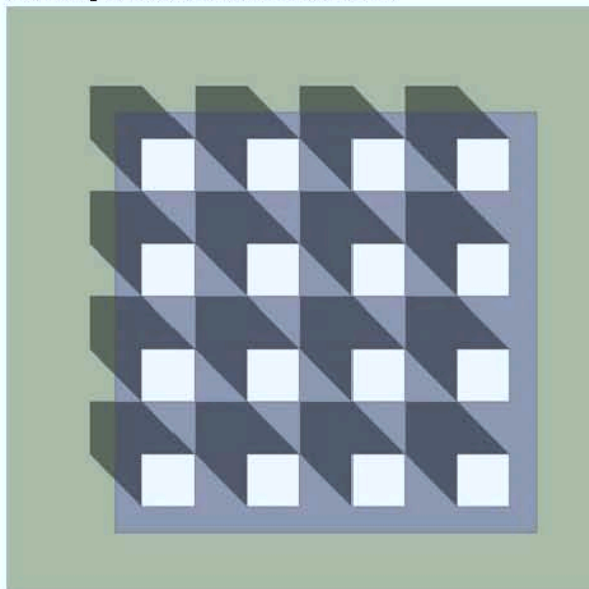


Basic Form and Insunlight Area

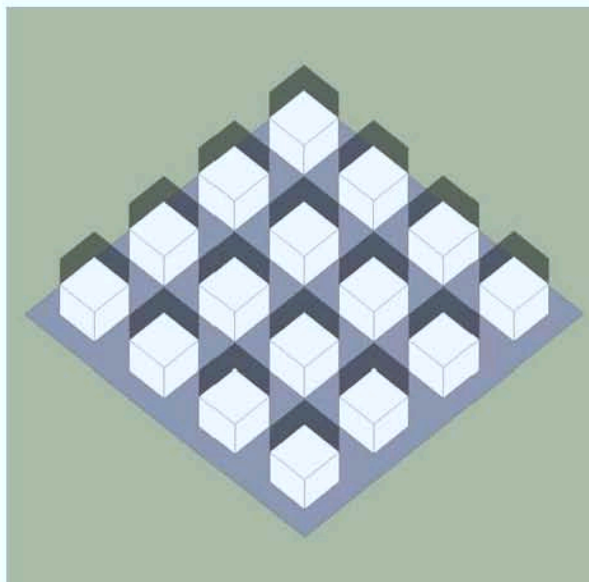


Basic form: cube
Insunlight Area: $2A$

Homogeneous cube structure



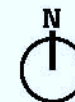
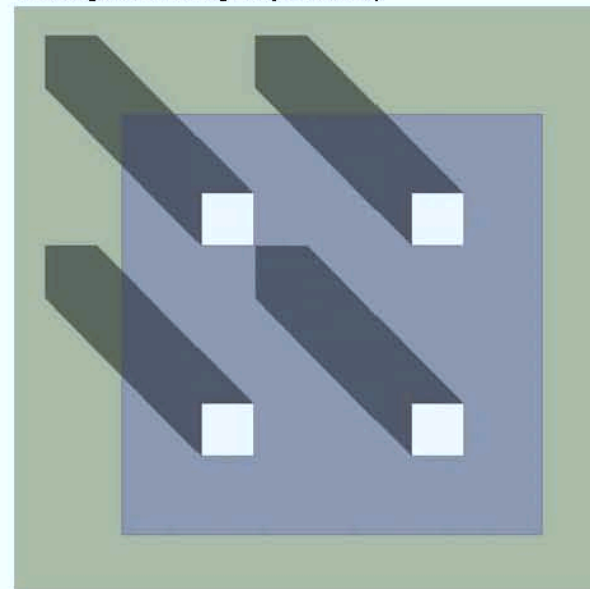
Block Image



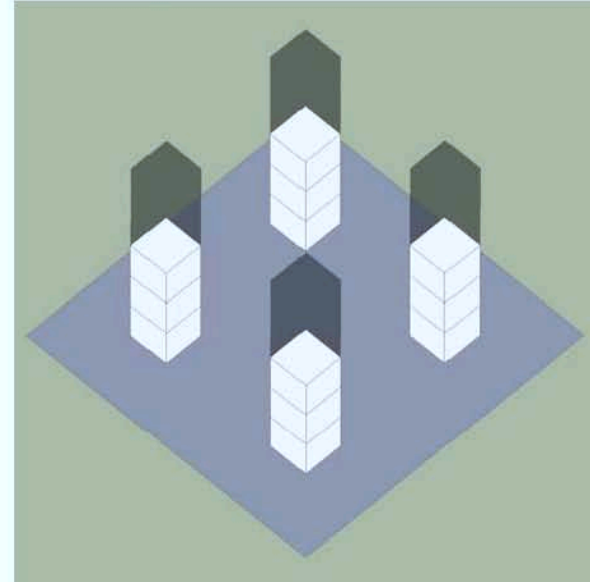
Insunlight area: 32 A

Cube Number: 16

Change the height (3 times)



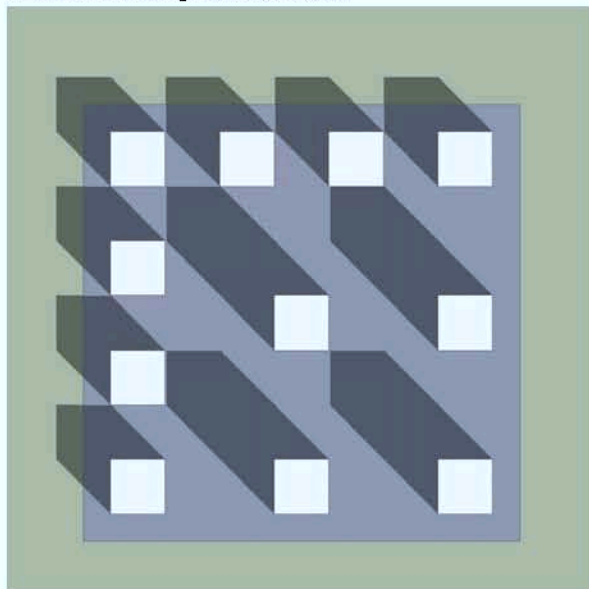
Block Image



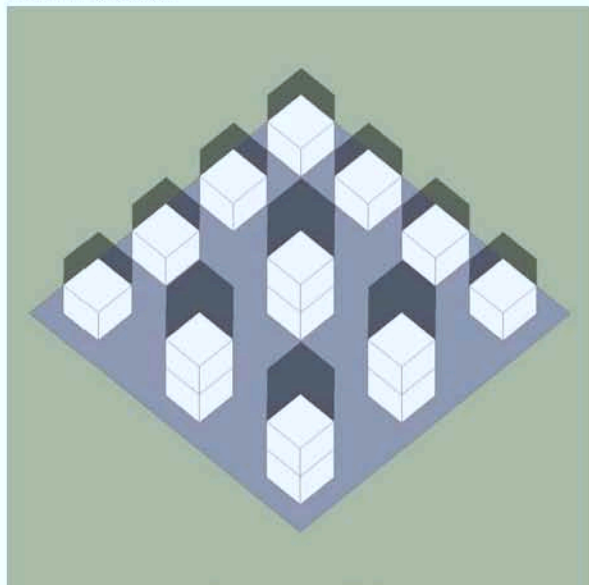
Insunlight area: 24 A

Cube Number: 12

Different height structure



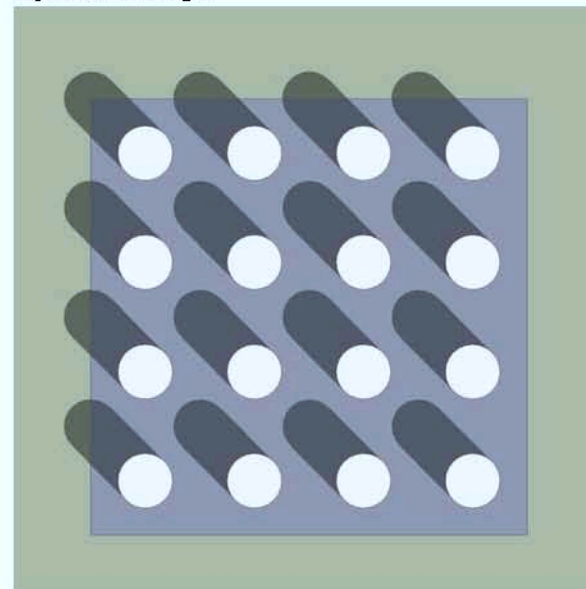
Block Image



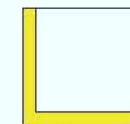
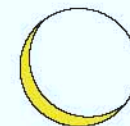
Insunlight area: 30 A

Cube Number: 15

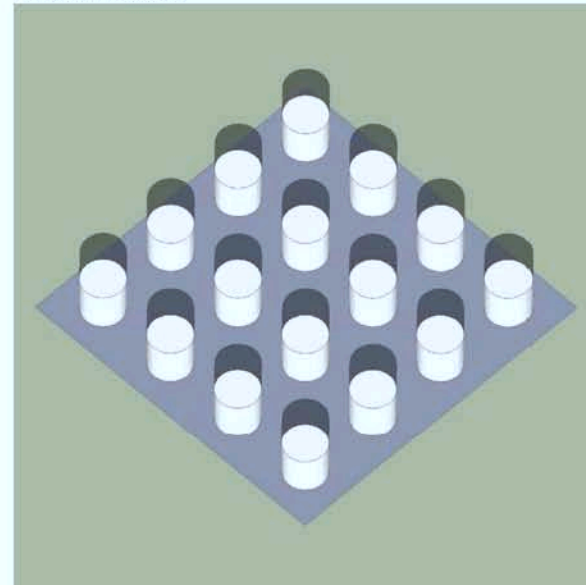
Cylinder shape



Insunlight
Area Compare



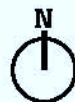
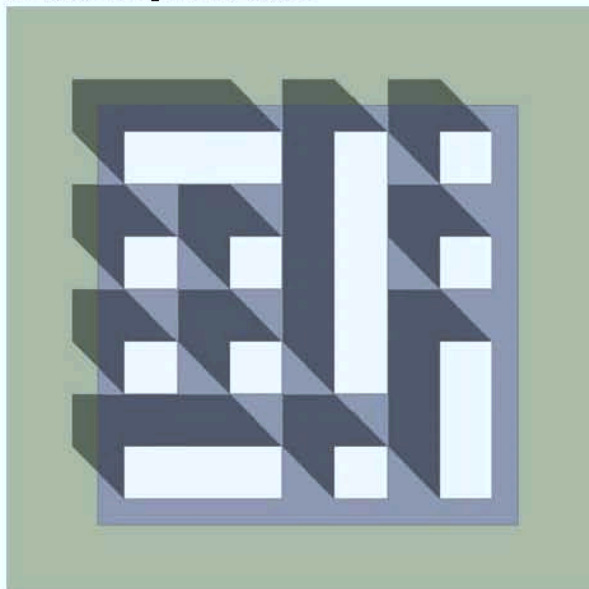
Block Image



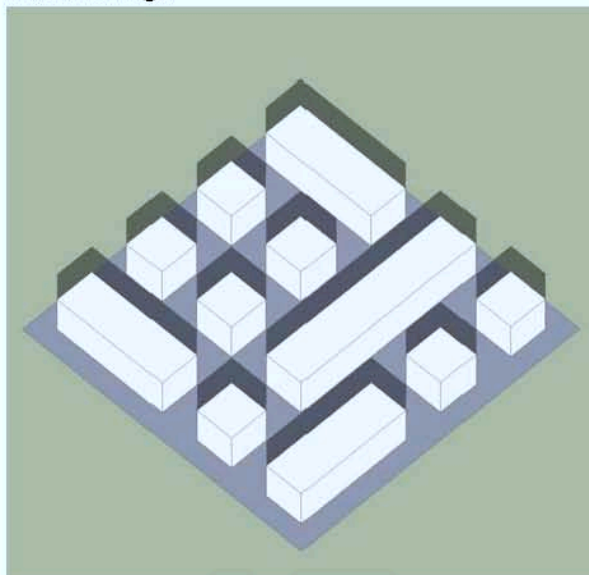
Insunlight area: less 32 A

Number: 15

Mixed shape structure



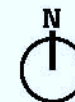
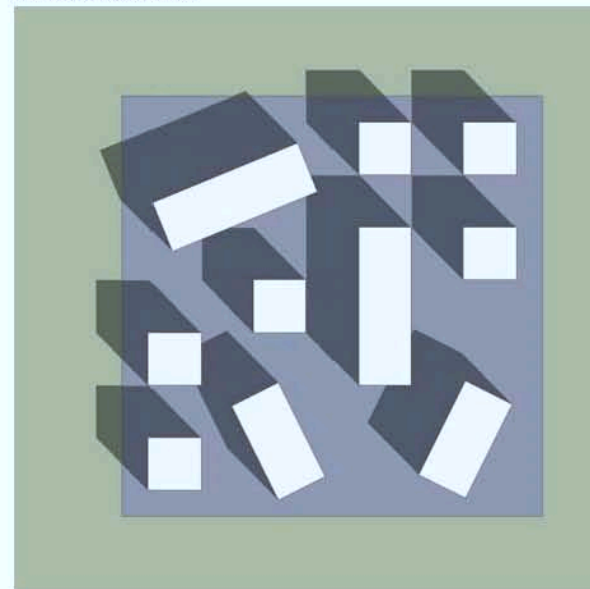
Block Image



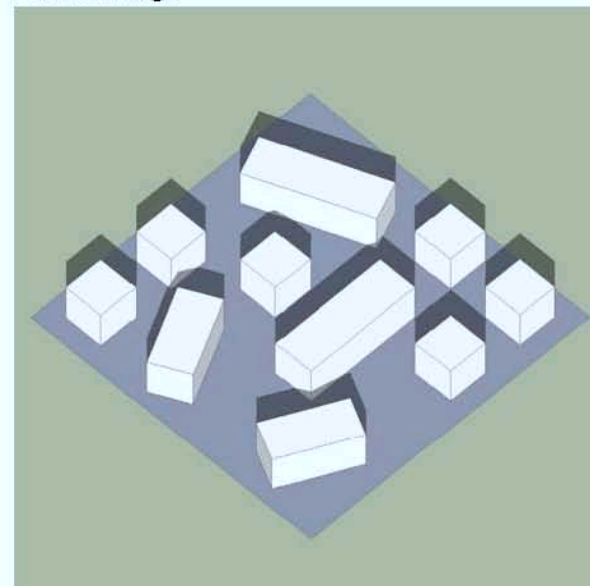
Insunlight area: 32 A

Cube Number: 21

Free structure



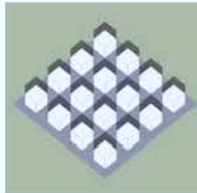
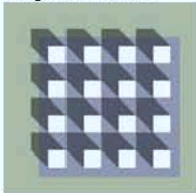
Block Image



Insunlight area: less 32 A

Number: 16

Homogeneous cube structure



Insunlight
Area (side)

Cube
Number

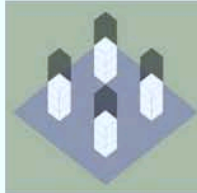
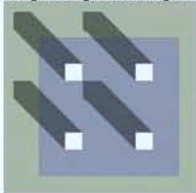
Insunlight
Area / Cube

32

16

2

Change the height to 3 time higher

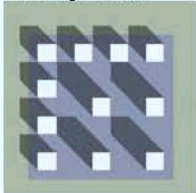


24

12

2

Different height structure

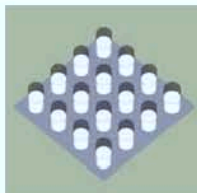
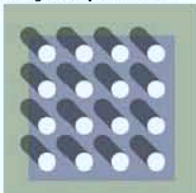


30

15

2

Homogeneous cylinder structure

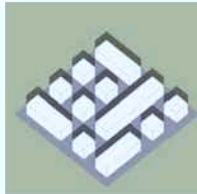


Less than
32

16

Less than
2

Change the shape



32

16

Less than
2

Free structure

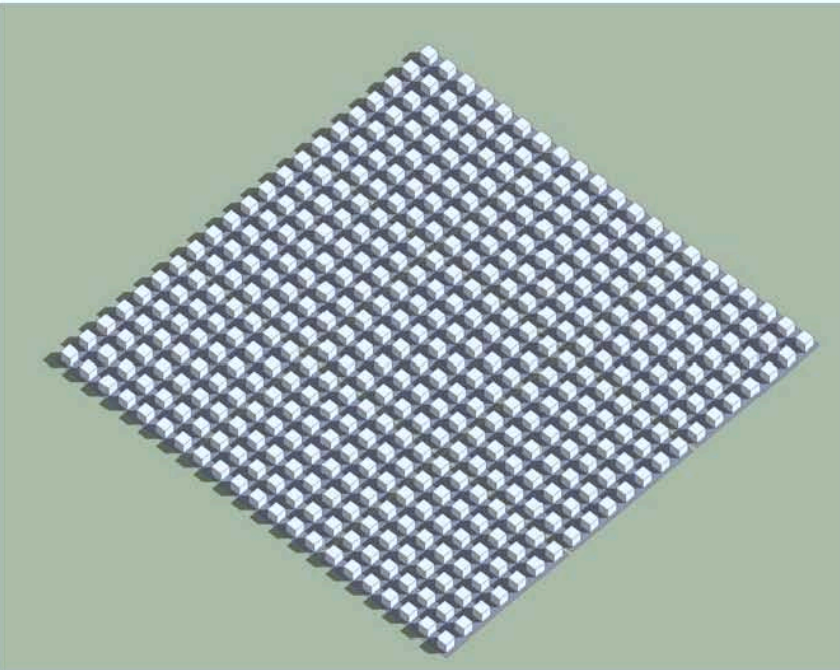
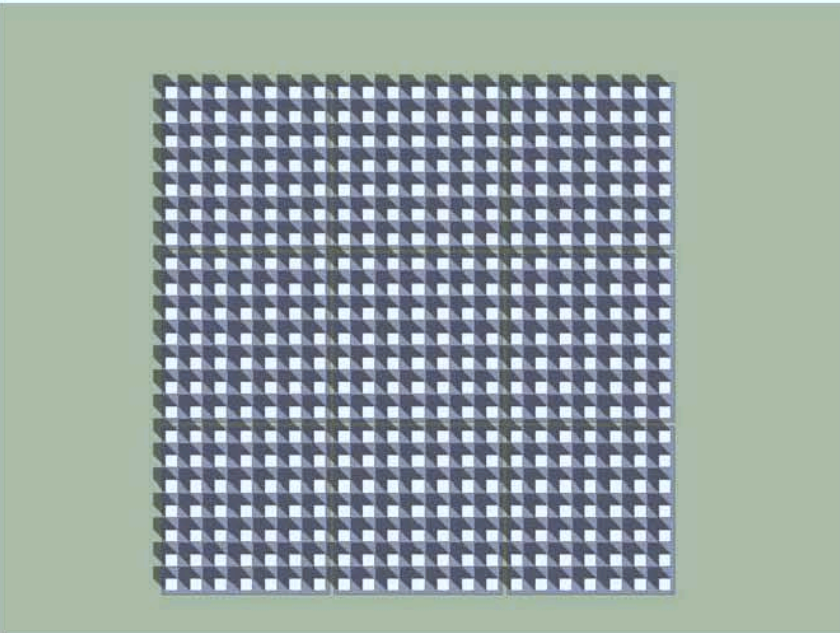


Less than
32

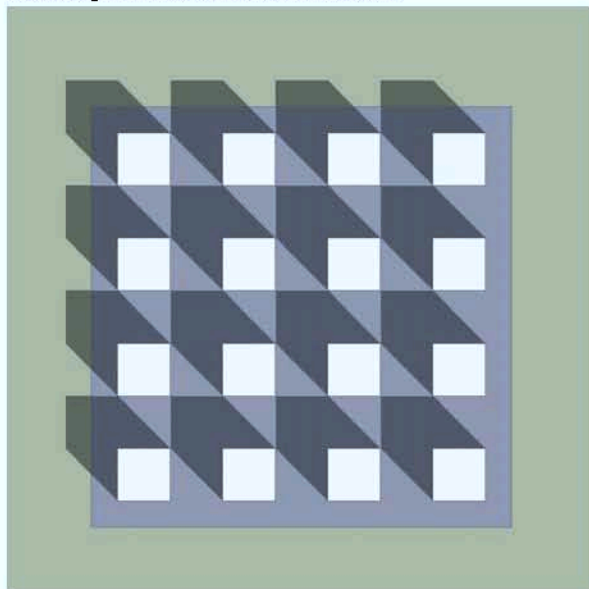
16

Less than
2

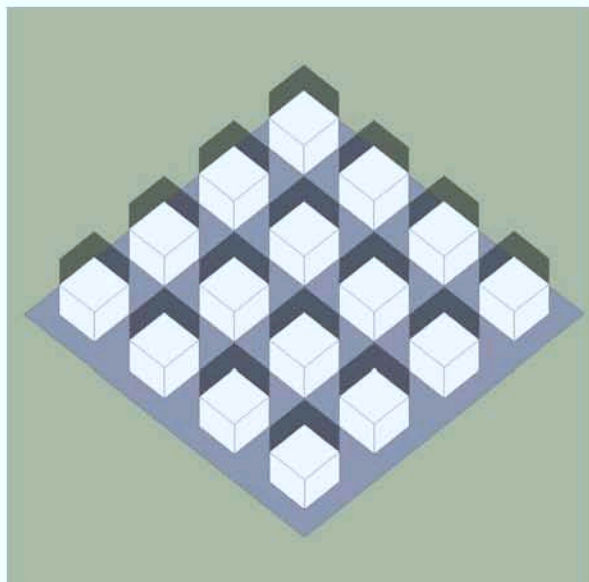
Optimal structure: Homogeneous cube structure



Homogeneous cube structure



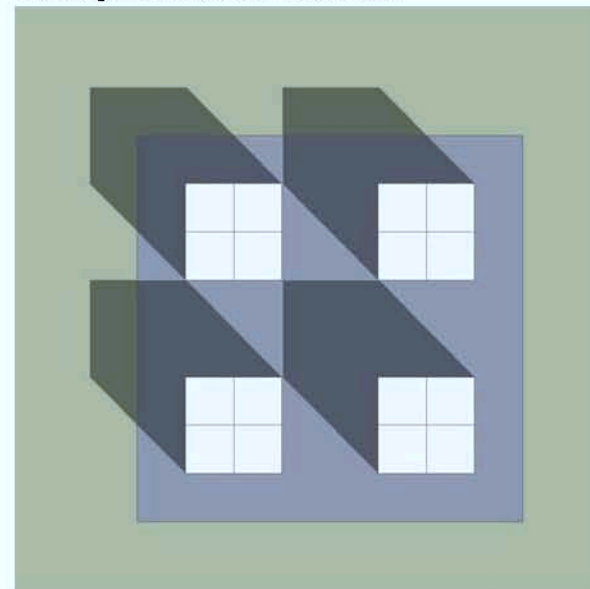
Block Image



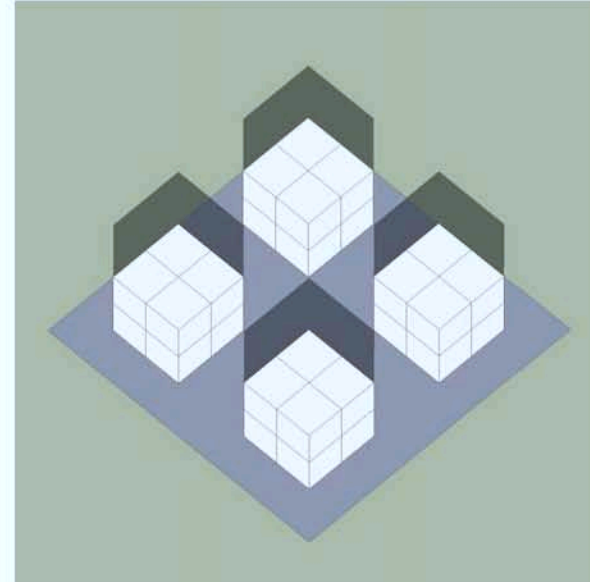
Insunlight area: 32 A

Cube Number: 16

Homogeneous cube structure

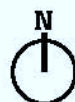
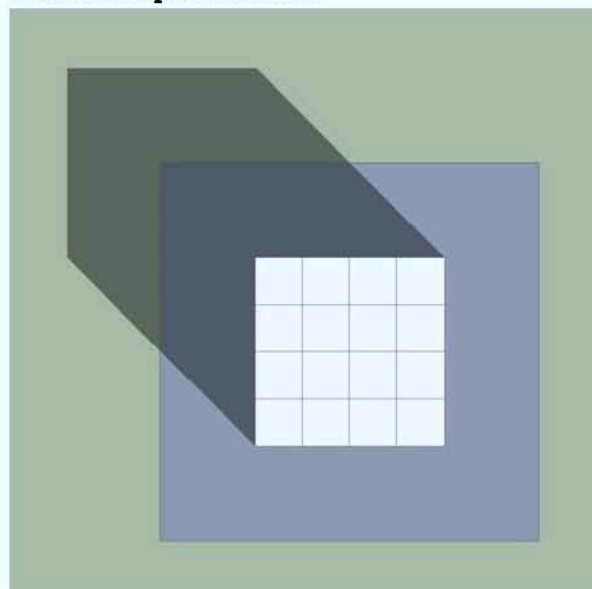
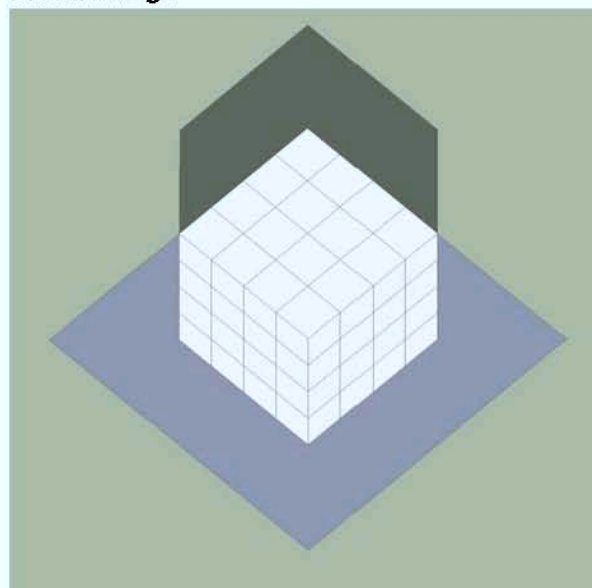


Block Image



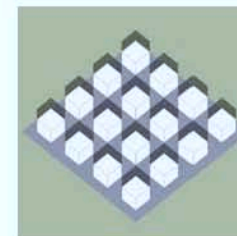
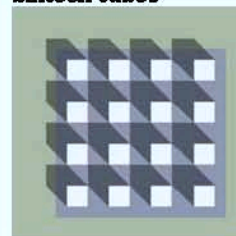
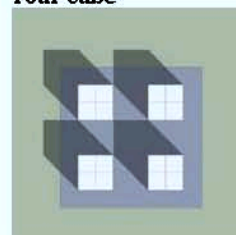
Insunlight area: 32 A

Cube Number: 32

Mixed shape structure**Block Image**

Insunlight area: 32 A

Cube Number: 64

Sixteen cubesInsunlight
Area (side)Cube
NumberInsunlight
Area / Cube**32****16****2****Four cube****32****32****1****One cube (the largest cube structure)****32****64****0.5****Test insunlight area and volumn of different size of cubes.****These models prove that:****1 Although the size of the cube is different, the insunlight area are all the same,****2 The larger the cube structure, the smaller the insunlight area per cube.**

6.3

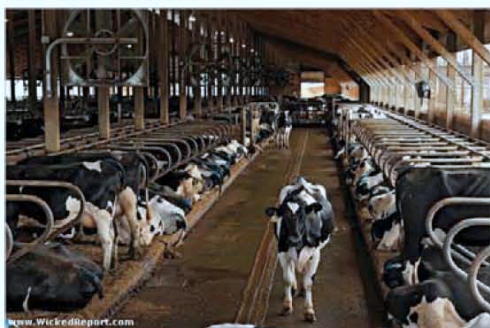
10 Diet Block Organization

Greenhouse**Aaverage Industrial Farm Size****1 Hectare****Pig Farm****5 Hectare**

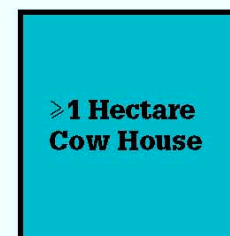
1 Hectare: Pig House
4 Hectare: Feeding Area

Chicken and Poultry Farm**4 Hectare**

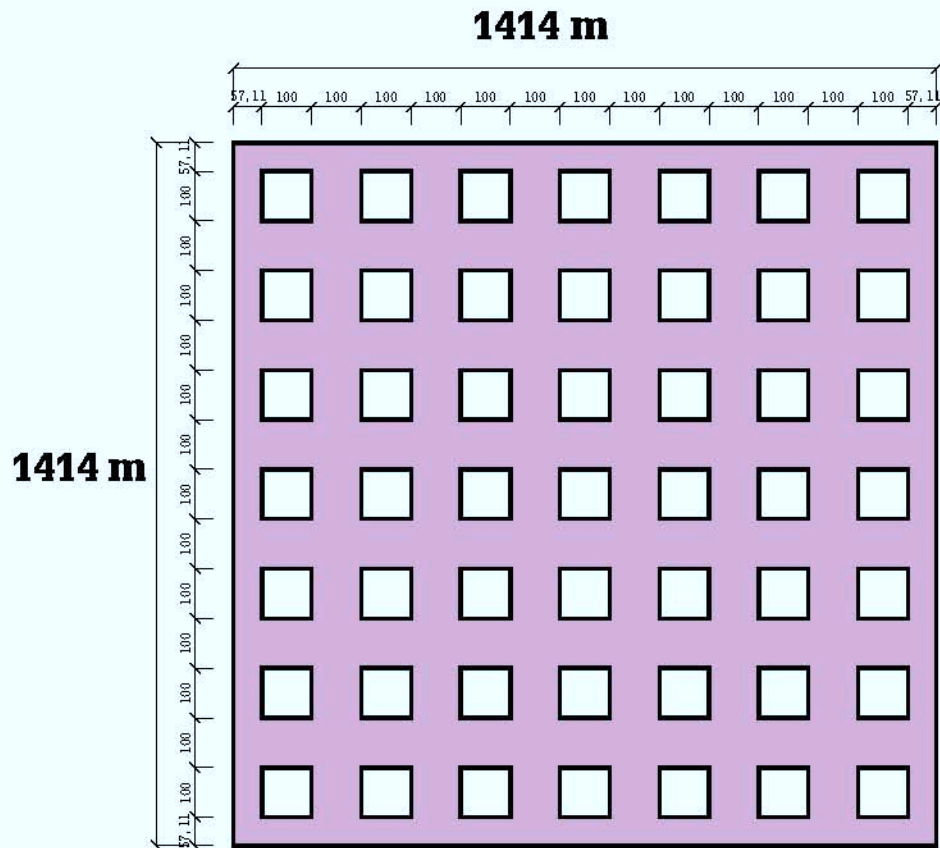
1 Hectare: Chicken House
3 Hectare: Feeding Area

Cow and Livestock Farm**37 Hectare**

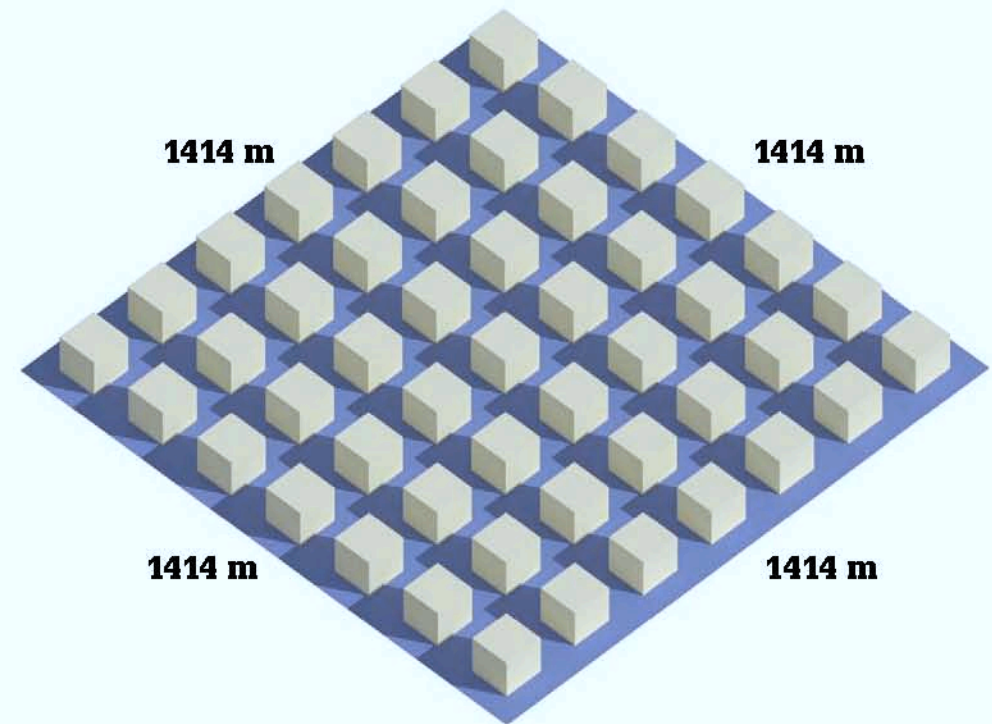
1.2 Hectare: Cow House
35.8 Hectare: Feeding Area

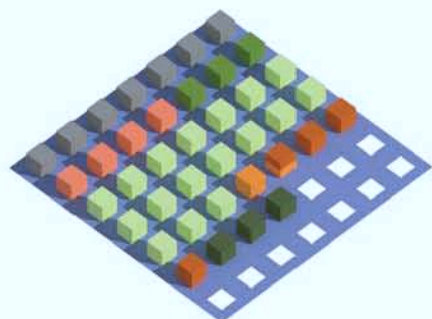
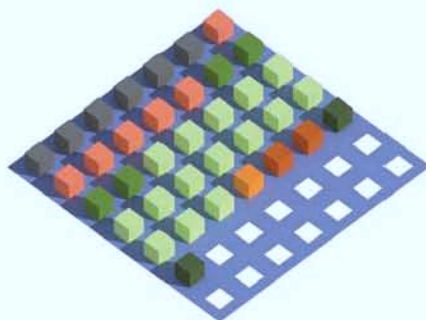
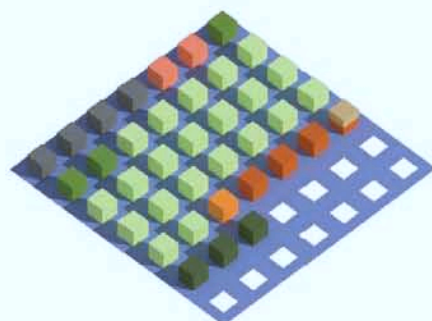
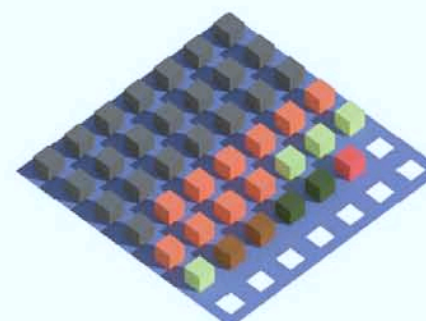
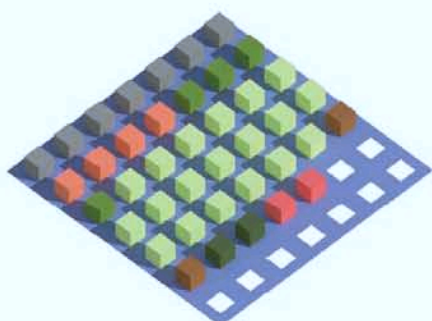
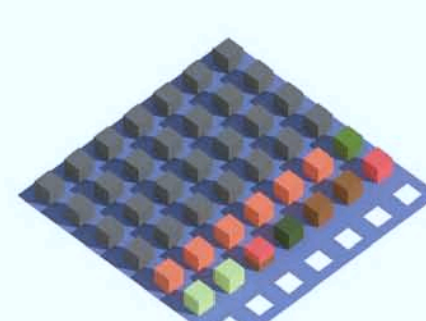
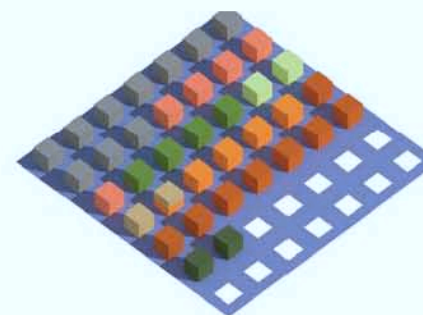
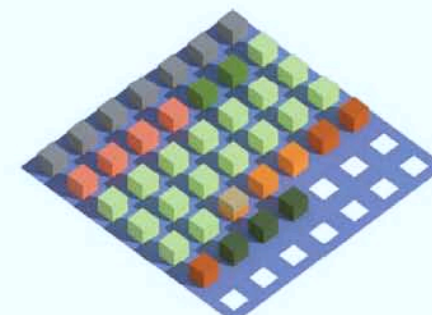
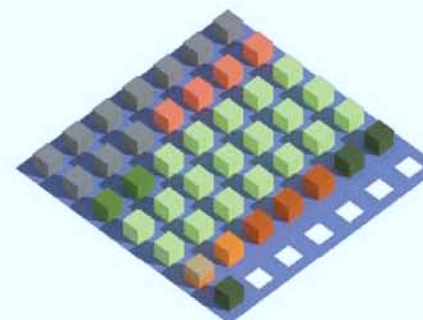
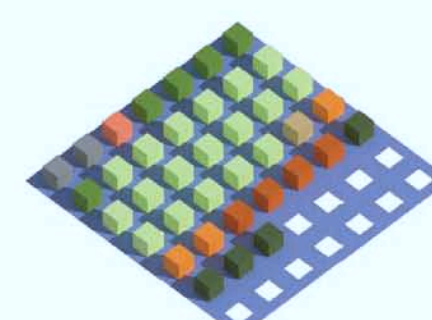
Greenhouse**Pig Farm****+ 4****Chicken and Poultry Farm****+ 3****Cow and Livestock Farm****+ 36**

Optimal sunlight organization in a block



Optimal sunlight organization in a block

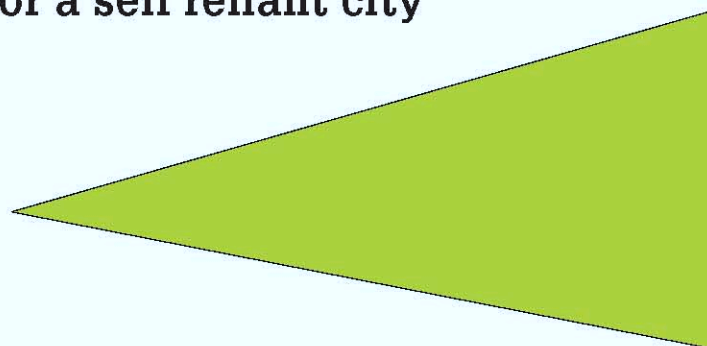


European Diet**Japanese Diet****Finland Diet****Raw Veganism Diet****Buddhist Veganism Diet****Fruitarianism Diet****Atkins Diet****Montiganac Diet****Organic Diet****Junk Food Diet****Floor Height of food tower:**

Fruit Farming: 6m
 Vegetable and fish: 5m
 Potato and Sunflower: 5m
 Pig farm: 8m

Cow and livestock: 10m
 Chicken and poultry: 5m
 Oil plant: 5m
 Bean: 5m
 Nuts and seeds: 5m





airport ~~_____~~

residential
31,000,000 m2

offices —
23,300,000 m²

commercial buildings
13,300,000 m²

City Other Items

agriculture
340,000,000 m²

industry
12,000,000 m²

- public buildings
16,700,000 m2

parks and squares
14,300,000 m2

Housing in each block:

surface=330,000 m², Volum= 1,650,000 m³;

Office in each block:

surface=250,000 m², Volum= 1,250,000 m³;

Commercial in each block:

surface=150,000 m², Volum= 750,000 m³;

Public facility and Institutions in each block:

surface=180,000 m², Volum= 900,000 m³;

Industrial in each block:

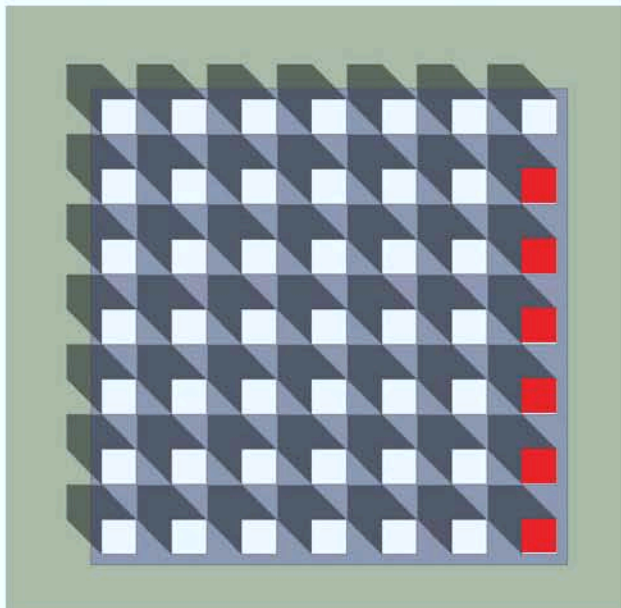
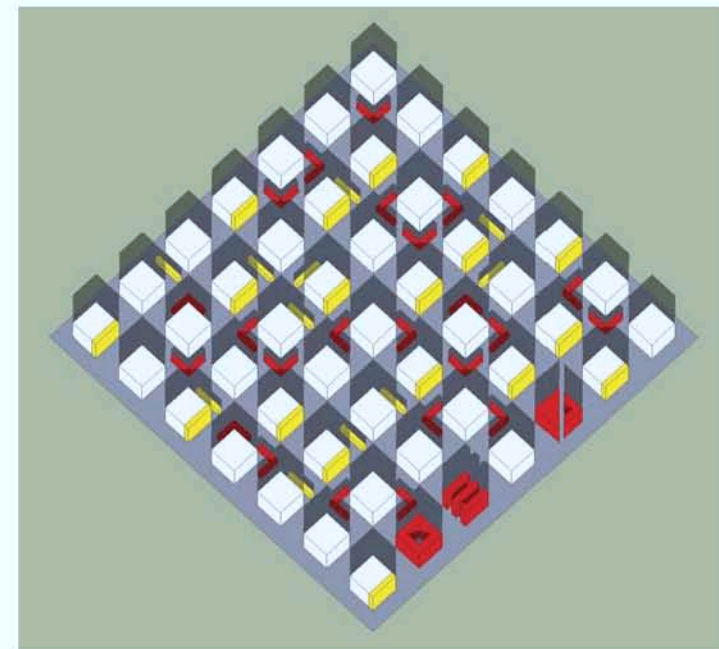
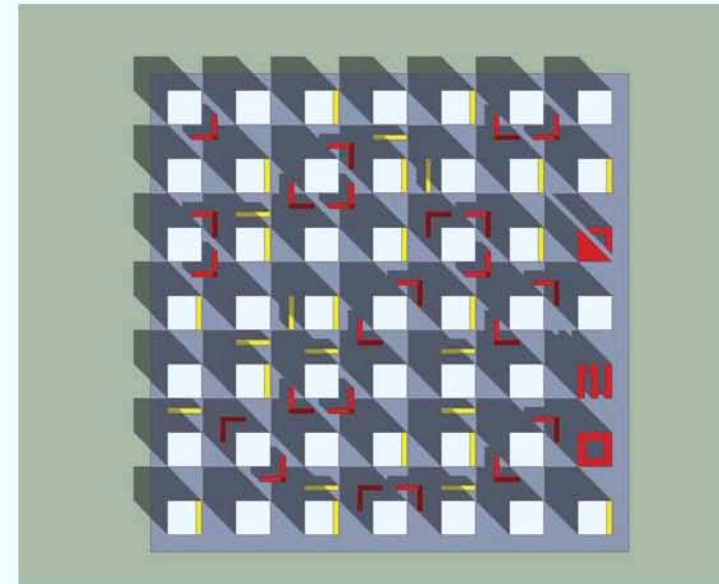
surface=100,000 m², Volum= 1000,000 m³;

Parks and Squares in each block:

surface=150,000 m²,

Public surface in each block= 1,300,000 m² (enough)

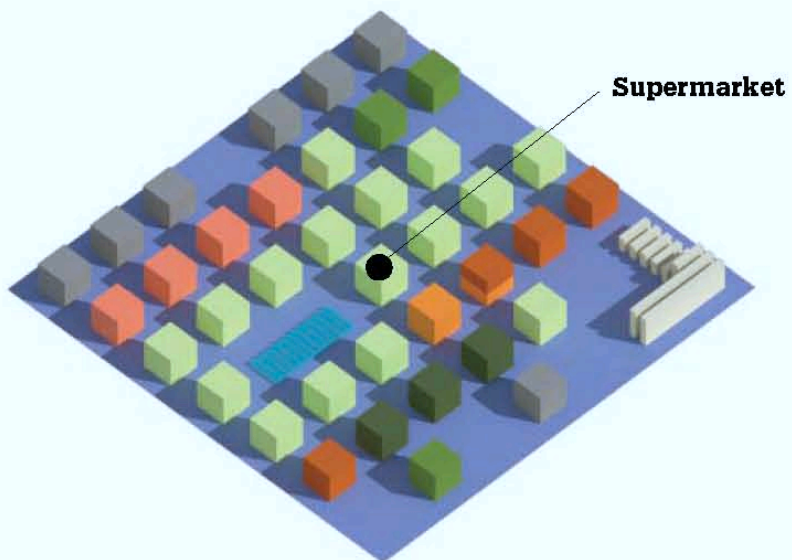
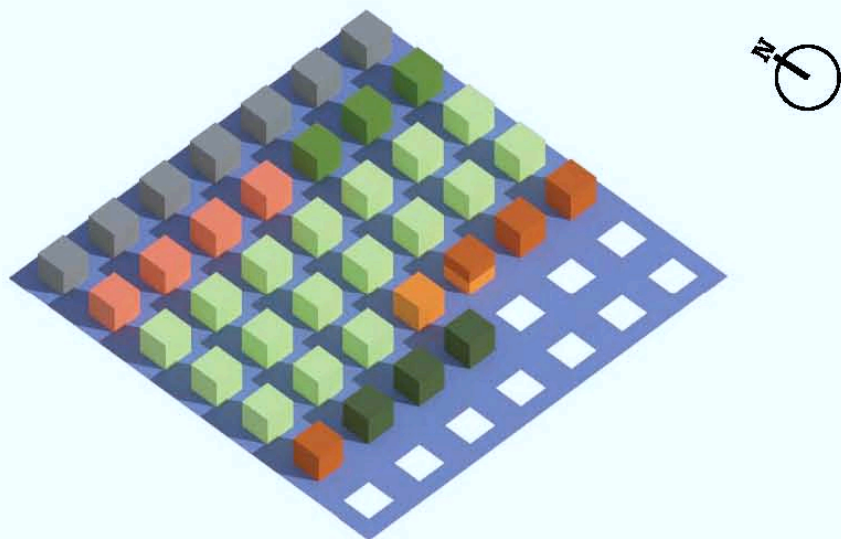
Total volum is about 6 cubes(100m) in each block, if calculation by average.

**Form and location of these city items.**

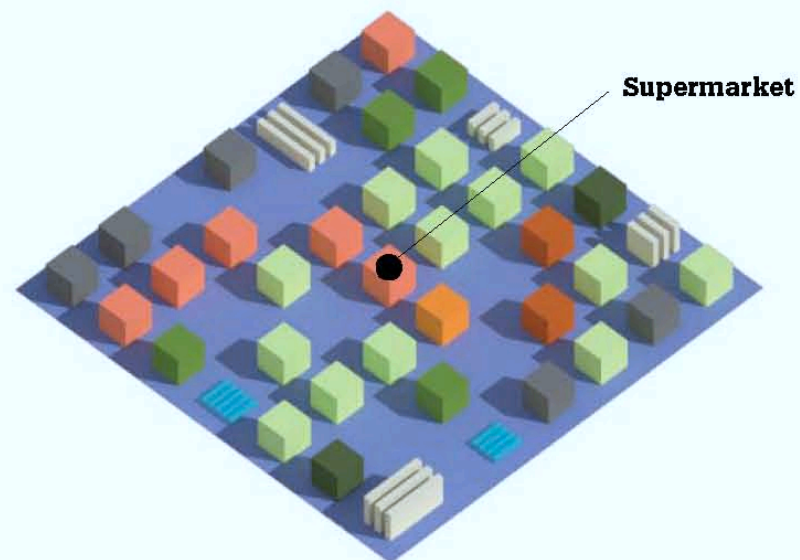
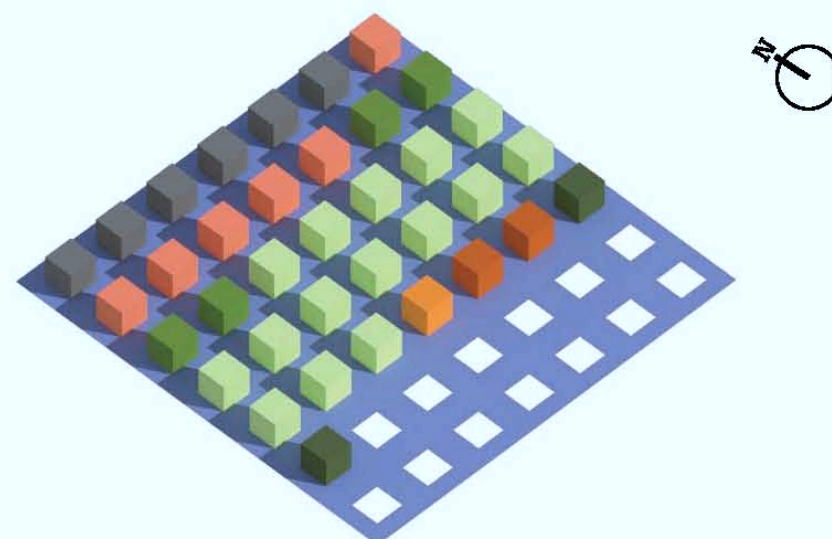
■ Housing

■ Other city items

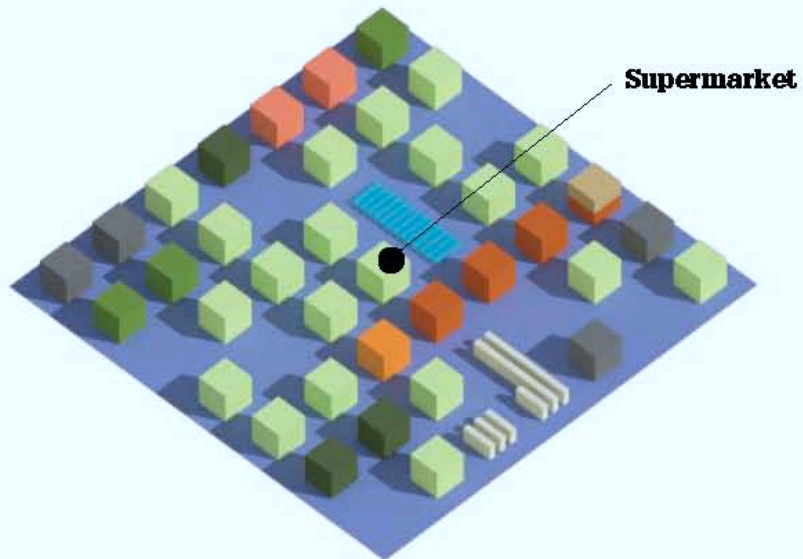
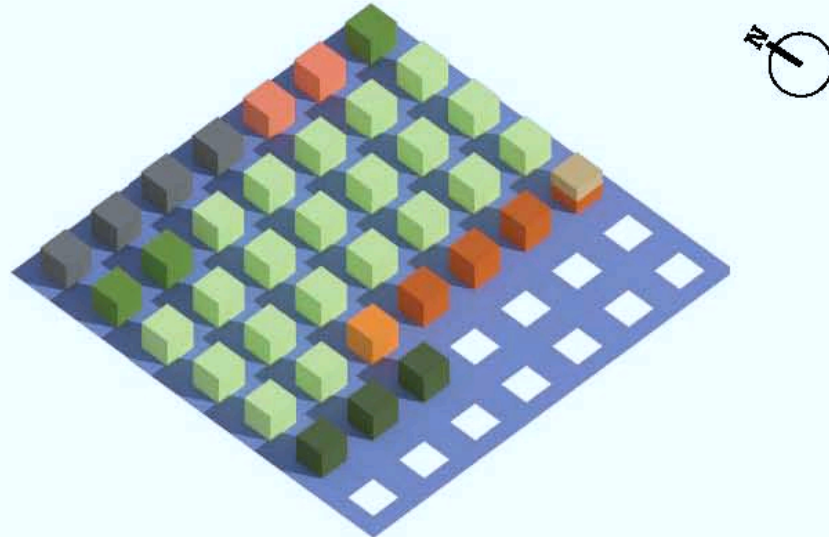
European Diet Community



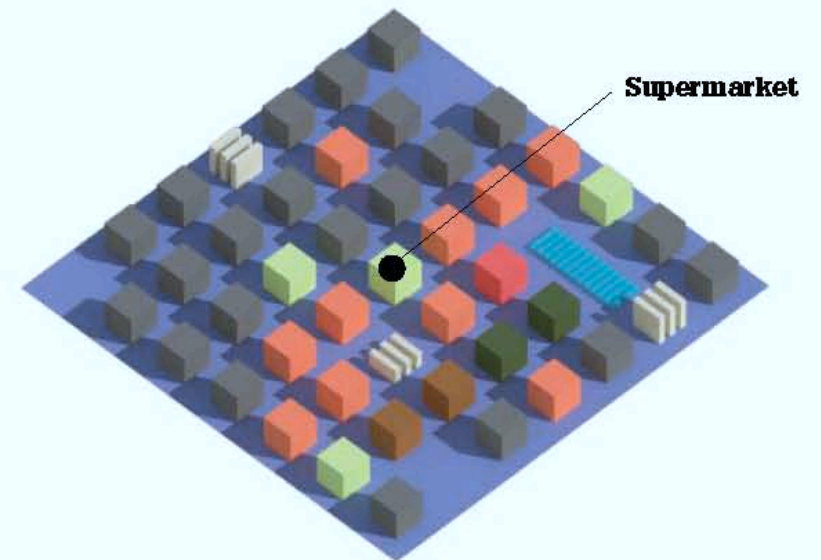
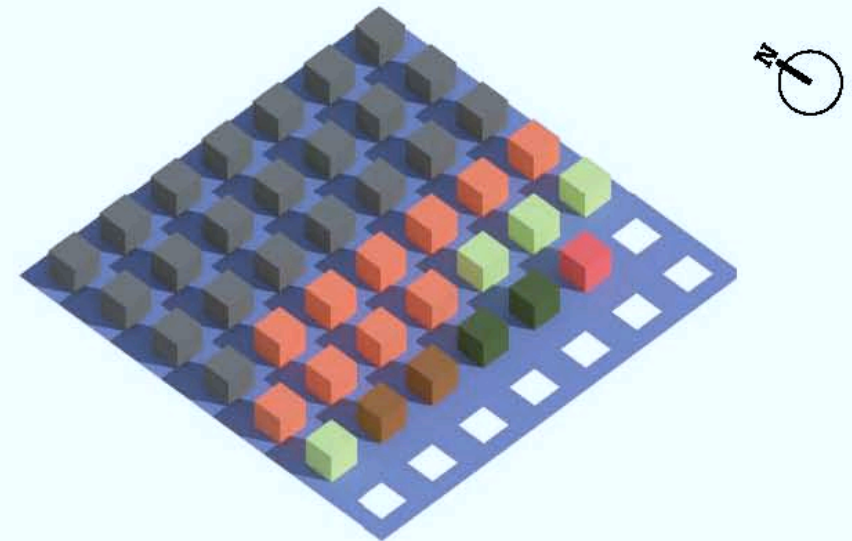
Japanese Diet Community



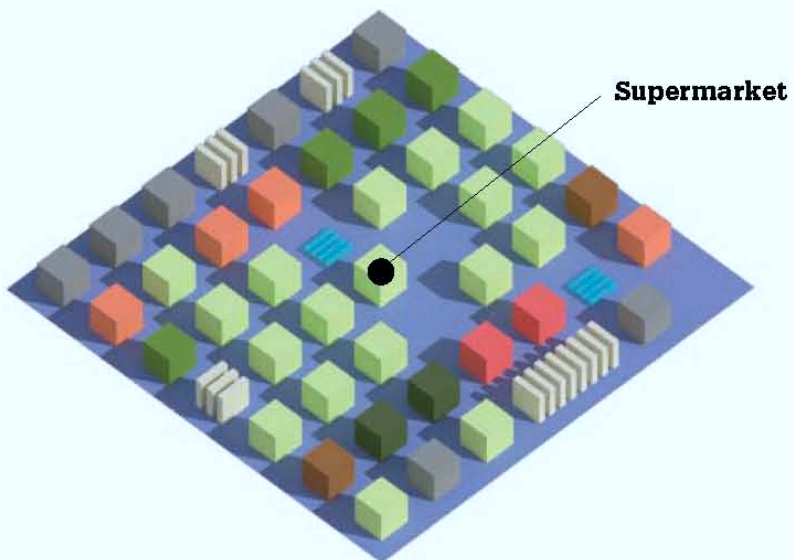
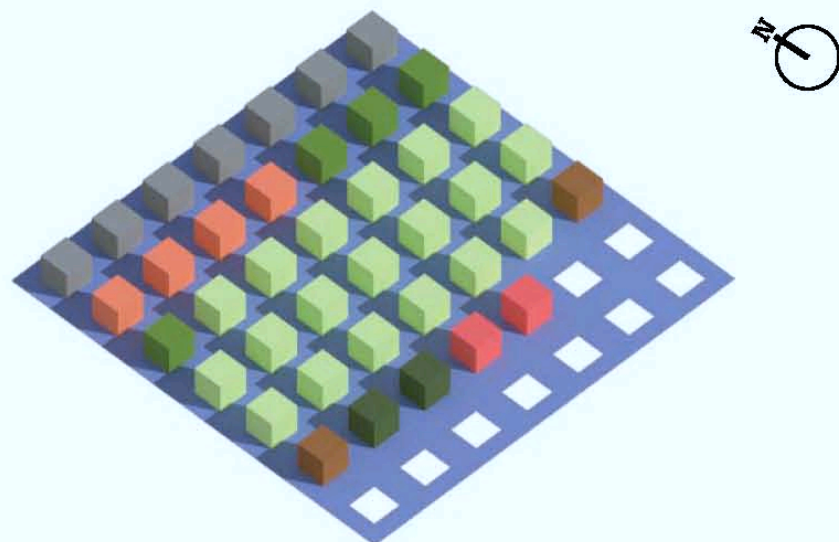
Finland Diet Community



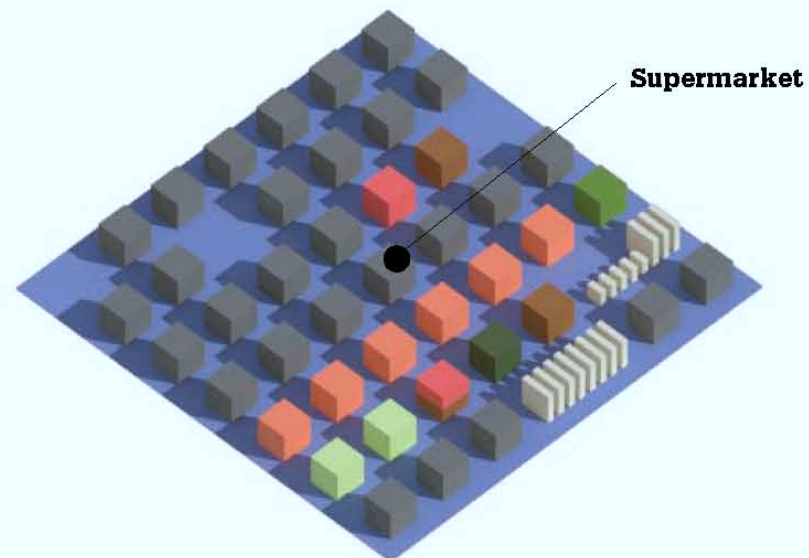
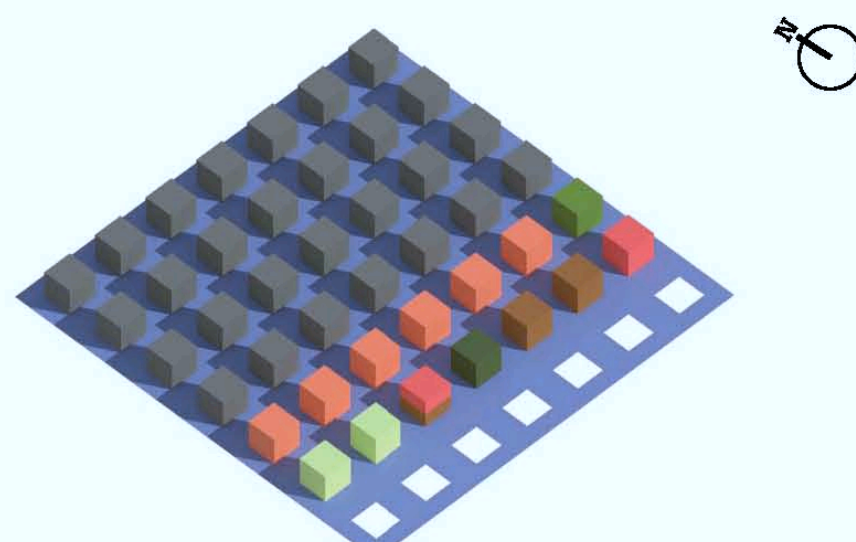
Raw Veganism Diet Community



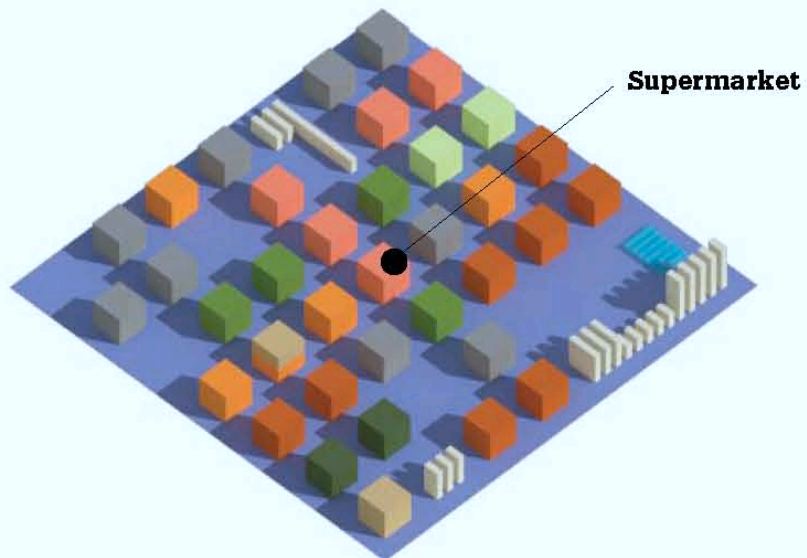
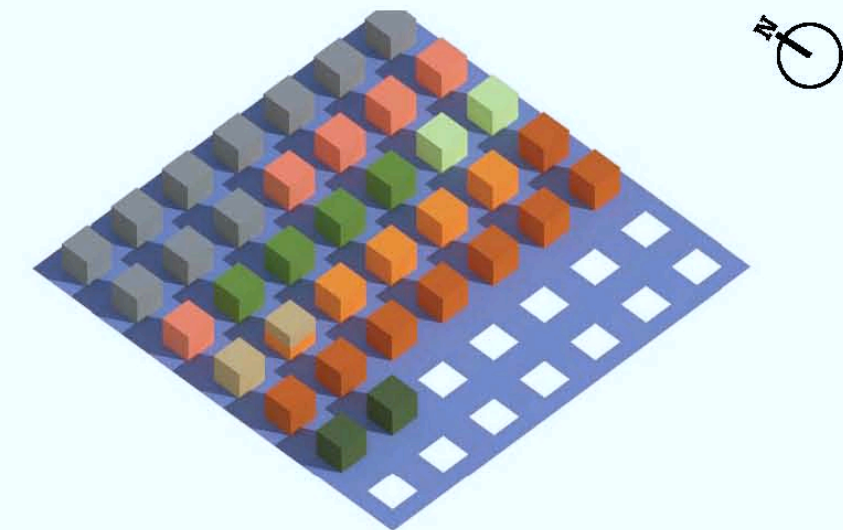
Buddhist Veganism Diet Community



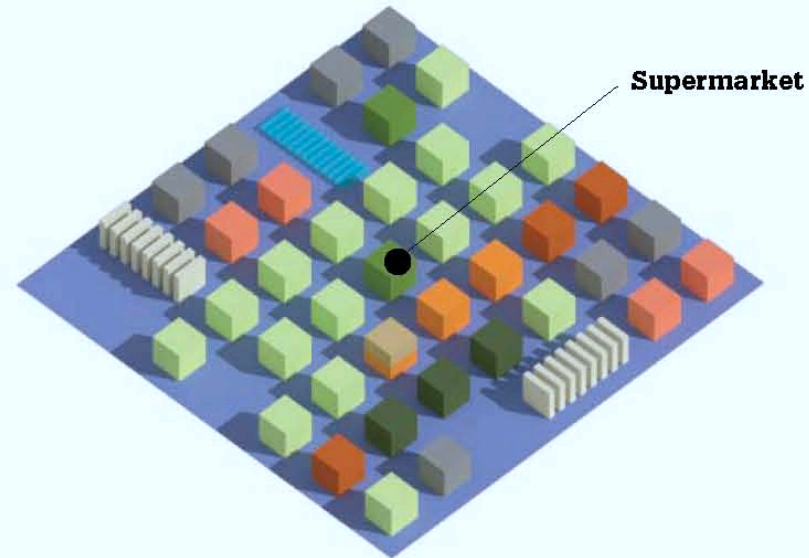
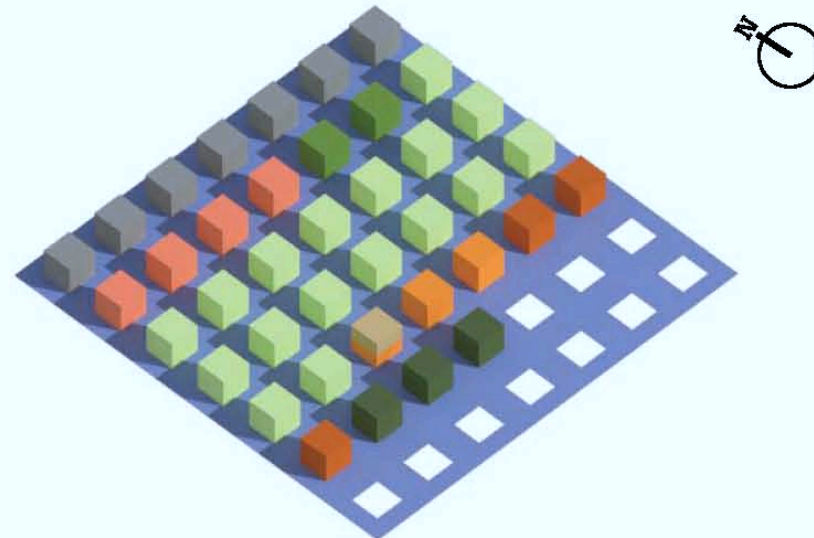
Fruitarianism Diet



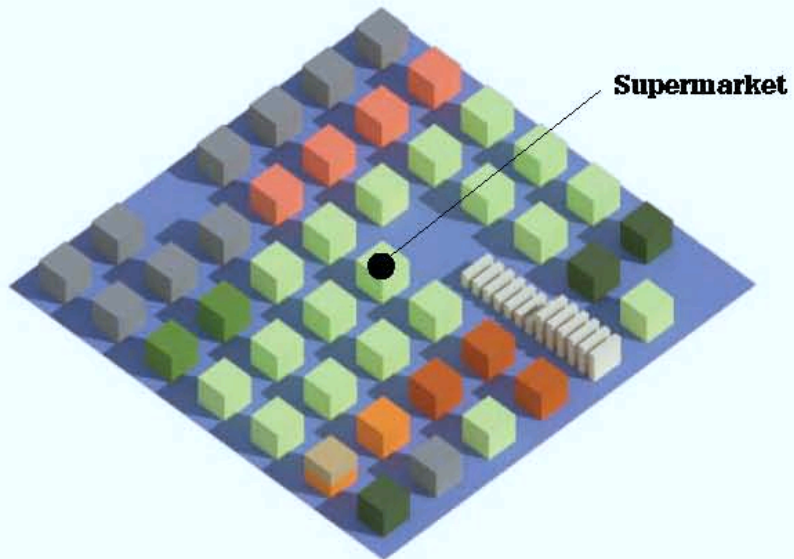
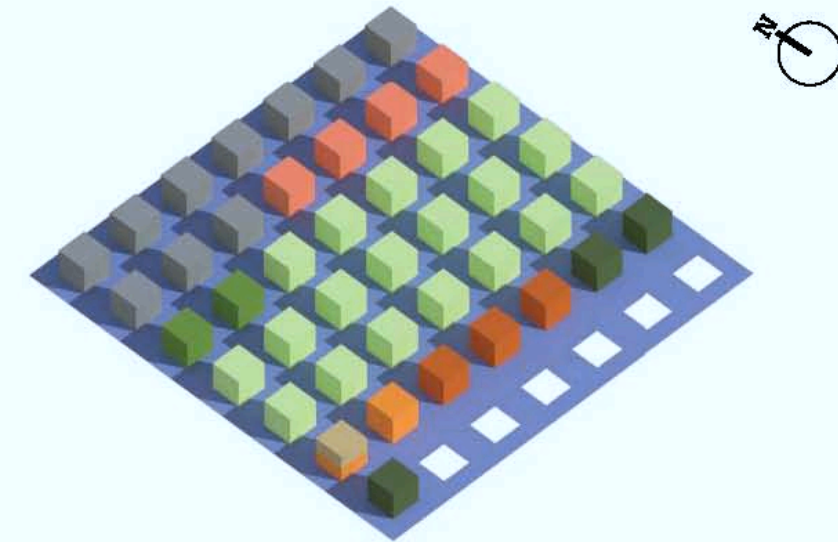
Atkins Diet Community



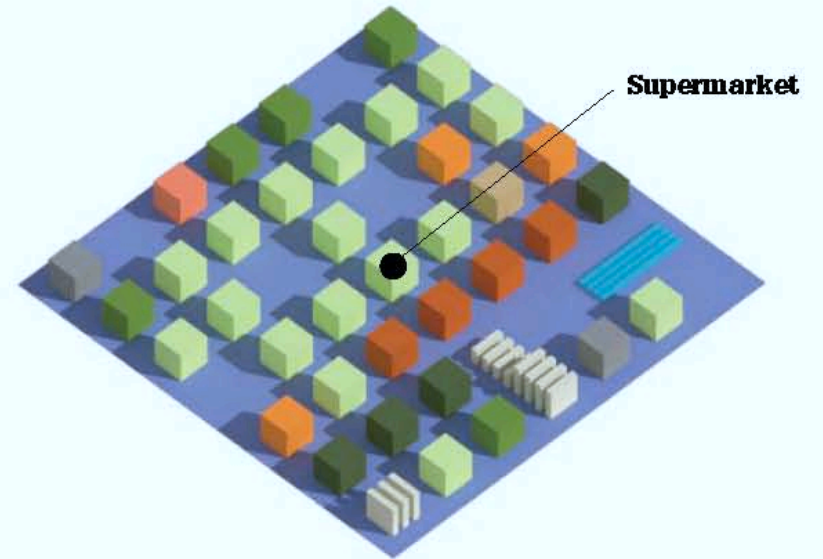
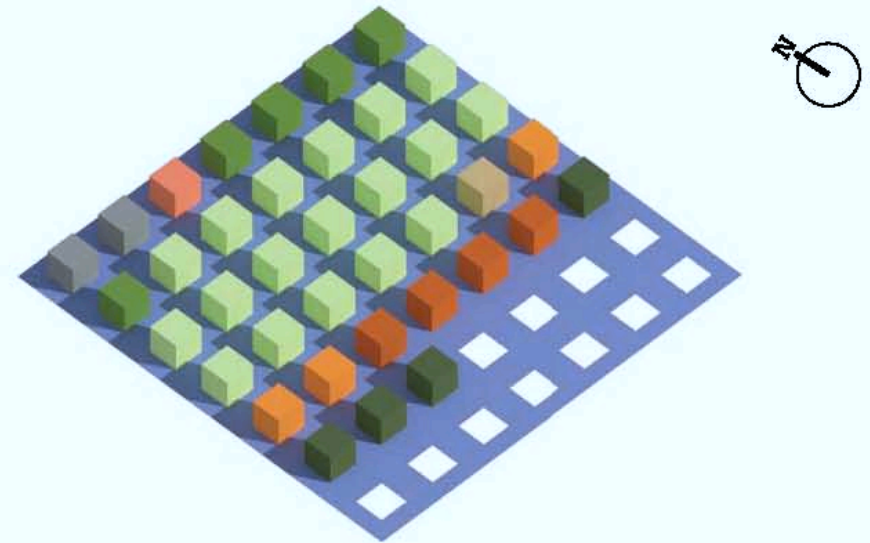
Montiganac Diet Community



Organic Diet Community



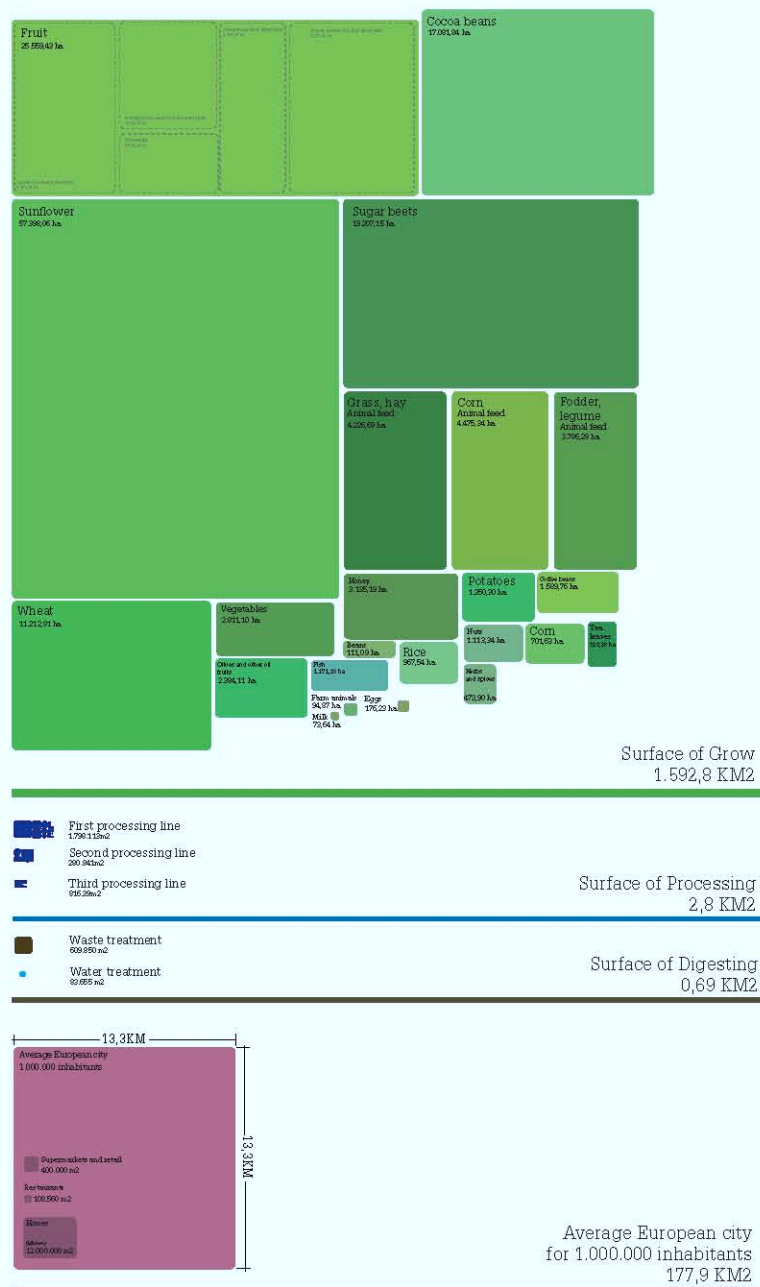
Junk Food Diet



6.4

Distribution Model (Transportation)

Surface researched by MSC2

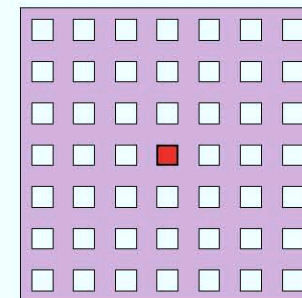
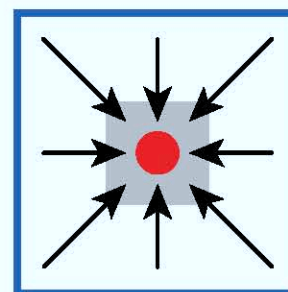


For 1 million city 1 year:

Supermarket:
Small: 3,500 m²
Medium: 7,000 m²
Large: 15,000 m²

Processing: 30,000 m²
Storage: 50,000 m²
Each tower: 1,000 m²
Central tower: 10,000 m²

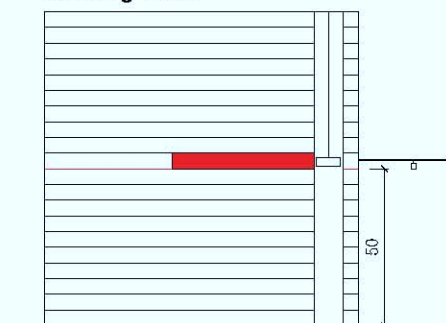
Best Location of supermarket, storage and processing



Supermarket in the center of the block. Food storage and processing are also in the center of block, this makes food storage, processing and supermarket have the most convenient contact.

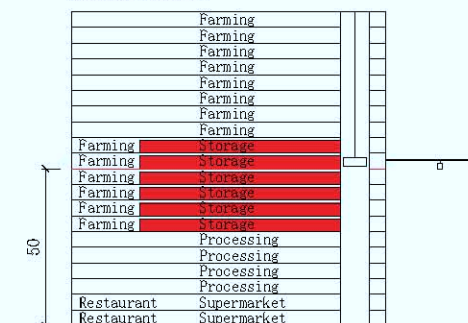
100 m

Farming tower



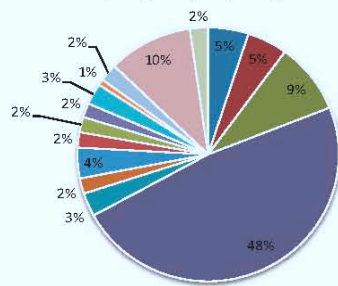
100 m

Center tower

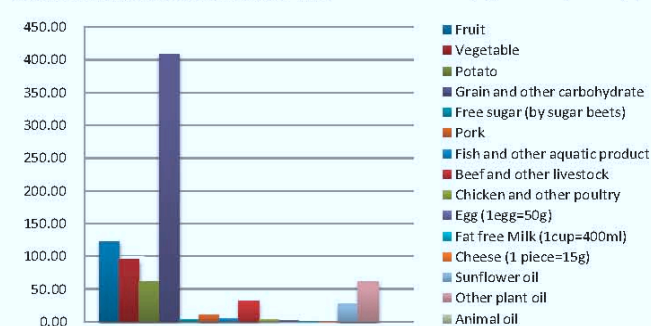


| Japanese Healthy diet | | | | | | | | |
|---|-------------|-------------------|-----------------------------|--------------|--------------|----------------------|---|---|
| Research by Japan Health and Agriculture Ministries | | | | | | | | |
| Prefer carbohydrates (5 to 7 servings a day), vegetables (5 to 6); dairy (2) and fruit (2) | | | | | | | | |
| Moderate: protein: meat, fish, eggs (3 to 5); sweet beverages and moderate exercise | | | | | | | | |
| Item | Calorie (%) | Calorie/day (cal) | Ingredient Average Gram/Cal | Gram/day (g) | Kg/year (kg) | Food Waste (Kg/year) | Average Food Prints (m ² /kg/year) | Farming Surface (m ² /people/year) |
| Total calories | 100.00% | 1800.00 | | | | | | |
| Fruits, Vegetables and Carbohydrate | 70.00% | 1260.00 | 19.854 | 1122.06 | 408.55 | 66.82 | 6.54 | 682.20 |
| Fruits and Vegetables | 10.00% | 180.00 | 6.676 | 600.84 | 210.31 | 38.38 | 2.10 | 217.81 |
| Fruit | 50.00% | 90.00 | 2.021 | 181.89 | 66.39 | 11.62 | 1.576 | 122.94 |
| Vegetable | 50.00% | 90.00 | 4.655 | 418.95 | 152.92 | 26.76 | 0.528 | 94.87 |
| Carbohydrate | 60.00% | 1080.00 | 3.378 | 521.22 | 190.25 | 28.54 | 4.44 | 474.30 |
| Potato | 15.00% | 162.00 | 0.983 | 154.39 | 56.35 | 8.45 | 0.96 | 62.21 |
| Grain and other carbohydrate | 80.00% | 864.00 | 0.412 | 355.97 | 129.93 | 19.49 | 2.736 | 408.81 |
| Free sugar (by sugar beets) | 5.00% | 54.00 | 2.013 | 10.87 | 3.97 | 0.60 | 0.74 | 3.38 |
| Protein | 15.00% | 270.00 | 7.61 | 324.45 | 117.33 | 14.67 | 5.89 | 53.37 |
| Meat | 5.00% | 175.50 | 2.138 | 93.72 | 34.21 | 4.28 | 5.96 | 49.85 |
| Pork | 13.00% | 35.10 | 0.551 | 19.34 | 7.06 | 0.88 | 1.25 | 9.93 |
| Fish and other aquatic product | 26.00% | 70.20 | 0.532 | 37.35 | 13.63 | 1.70 | 0.335 | 5.14 |
| Beef and other livestock | 13.00% | 35.10 | 0.635 | 22.29 | 8.14 | 1.02 | 3.47 | 31.76 |
| Chicken and other poultry | 13.00% | 35.10 | 0.42 | 14.74 | 5.38 | 0.67 | 0.8 | 3.03 |
| Egg, Milk and Cheese | 55.00% | 99.50 | 5.47 | 227.73 | 83.12 | 10.59 | 0.34 | 3.52 |
| Egg (1egg=50g) | 12.00% | 32.40 | 0.715 | 23.17 | 8.46 | 1.06 | 0.155 | 1.47 |
| Fat free milk (1cup=400ml) | 18.00% | 48.60 | 4.000 | 194.40 | 70.96 | 8.87 | 0.0160 | 1.34 |
| Low fat cheese (1 piece=15g) | 5.00% | 13.50 | 0.733 | 10.17 | 3.71 | 0.46 | 0.168 | 0.70 |
| Total Fat | 15.00% | 270.00 | 0.37 | 32.51 | 11.87 | 1.48 | 10.55 | 88.77 |
| Sunflower oil | 15.00% | 40.50 | 0.127 | 5.14 | 1.88 | 0.23 | 12.808 | 27.05 |
| Other plant oil | 70.00% | 189.00 | 0.118 | 22.30 | 8.14 | 1.02 | 6.74 | 61.72 |
| Animal oil | 15.00% | 40.50 | 0.125 | 5.06 | 1.85 | 0.23 | Included | included |
| SUM | 100.00% | 1800.00 | 18.03 | 1476.02 | 538.75 | 83.06 | 31.86 | 634.34 |
| Selected resources: | | | | | | | | |
| 1 http://www.naff.go.jp/balance_guide/ | | | | | | | | |
| 2 http://www.healthy-dietpedia.com/japanese-diet.html | | | | | | | | |
| 3 http://www.everydiet.org/diet/japanese-diet | | | | | | | | |
| 4 http://www.everydiet.org/diet/japanese-diet | | | | | | | | |
| 5 http://www.naturalnews.com/024715_diet_Japan_Japanese.html | | | | | | | | |

Calorie compare per capita per day (%)



Surface compare per capita per year (m2)



Description

The Food Guide from Japan's Health and Agriculture ministries, is depicted as a spinning top with a wide upper layer tapering to a narrow bottom.

At the large upper level: carbohydrates, including rice, bread and noodles (5 to 7 servings a day); followed below by a side dish of vegetables, potatoes, beans, mushrooms and seaweed (5 to 6); then a smaller main course of protein, including meat, fish, eggs and soy (3 to 5 servings); finally the narrow point, divided between dairy (2) and fruit (2servings).

Number of people in each community: 11,111

Consume per person per day: 2 kg (include food waste)

Total weight: 22,222 kg/day

Average density of food: 650 kg/m³

Total volum consume: 35 m³/day

Towers in Japanese diet community: 36 towers

Transportation of each tower: 1 m³ /per day

Transportation: 1 m³ per time

Working time: 10 hours

Receive food for the center tower: 18 minutes / 1 package

So Electrified monorail system is the best transoprt tool.

Largest speed: 120km/h (35m/s)

Acceleration time: 24 second

Deceleration time: 24 second

Turning radius for the largest speed: 90m (less than 100m)

Largest transportation time (in 1 block): 95 seconds

Safe interval: 5 seconds

Largest teansportation volum in 10 hours: 7200 m³

Transportation volum needed for 1 year: 35x365=12775 m³

It means that in 1 day (24 hours) can transportate 1 year's food.

So 1 lane is enough!

It is also proved that build up large infrustructure to transport food to everyhouse is not economic.

Transportation Tool Typology:

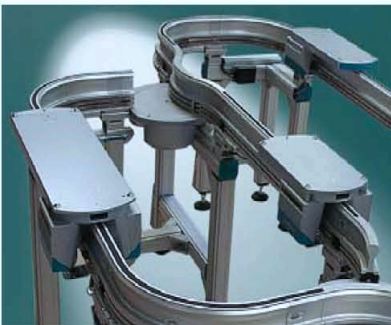
Skytrain: for large container



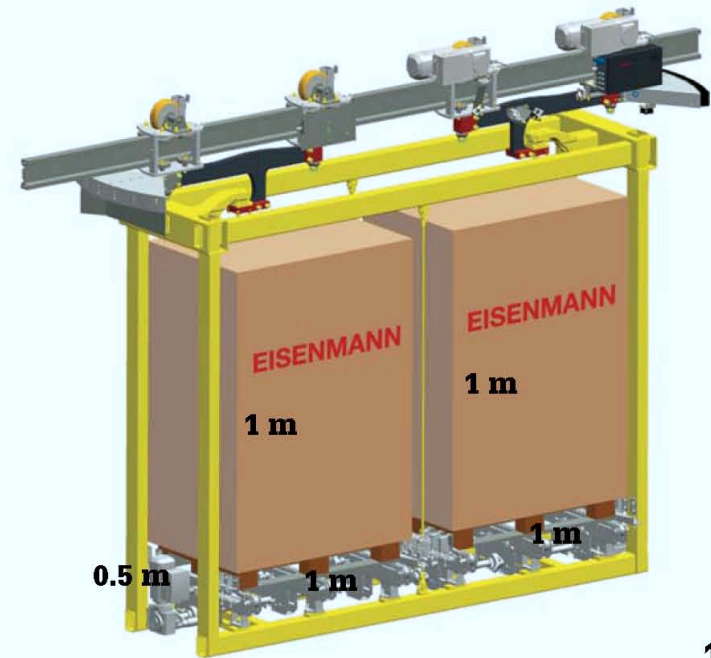
Electrified monorail system (medium size)



Montech Montrac (small size)

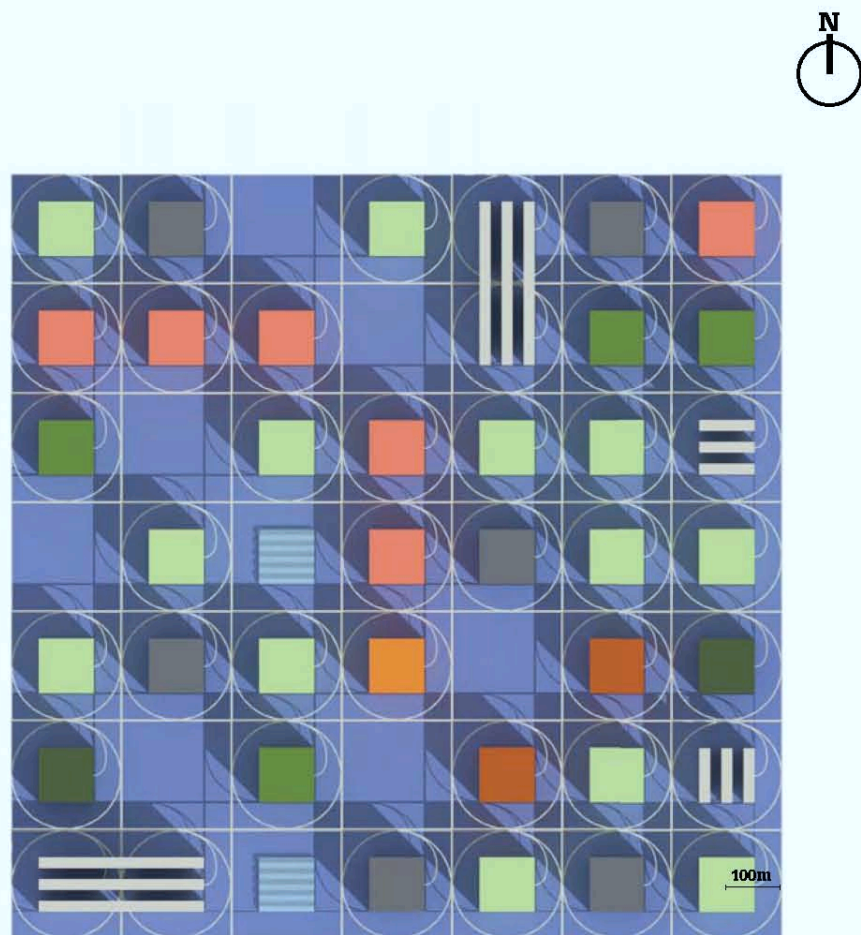


Electrified monorail system



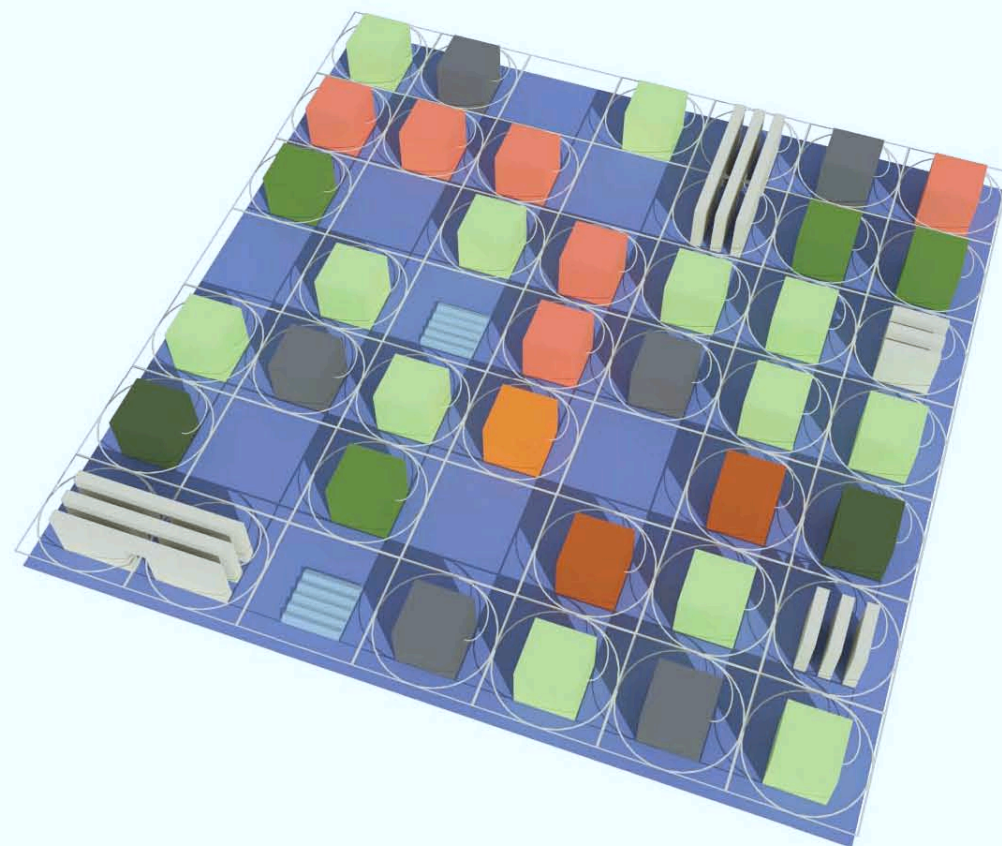
1 M³

Plan of Japanese Diet block food transportation



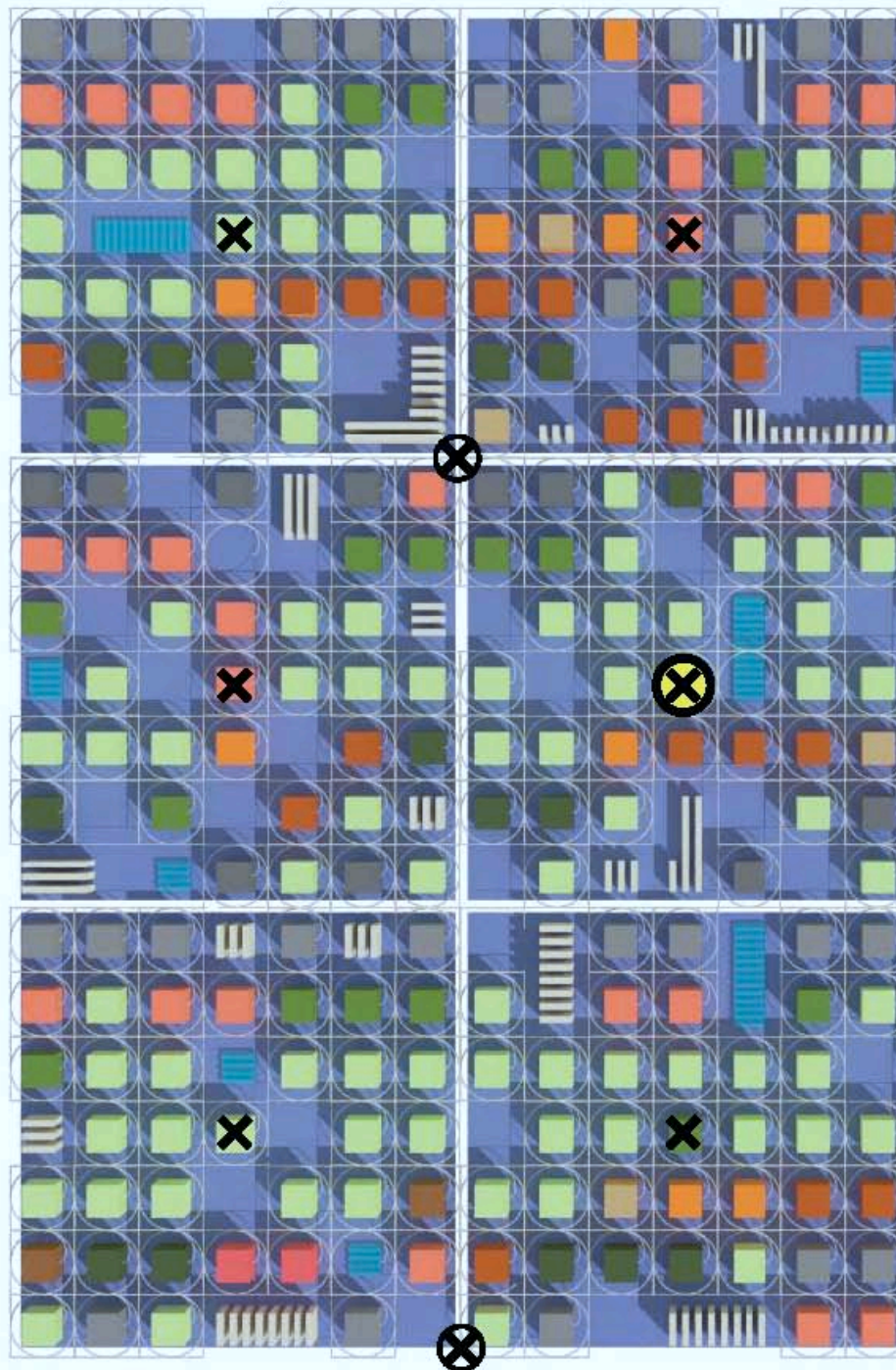
Turn radius: $R=100M$

Image of Japanese Diet block food transportation

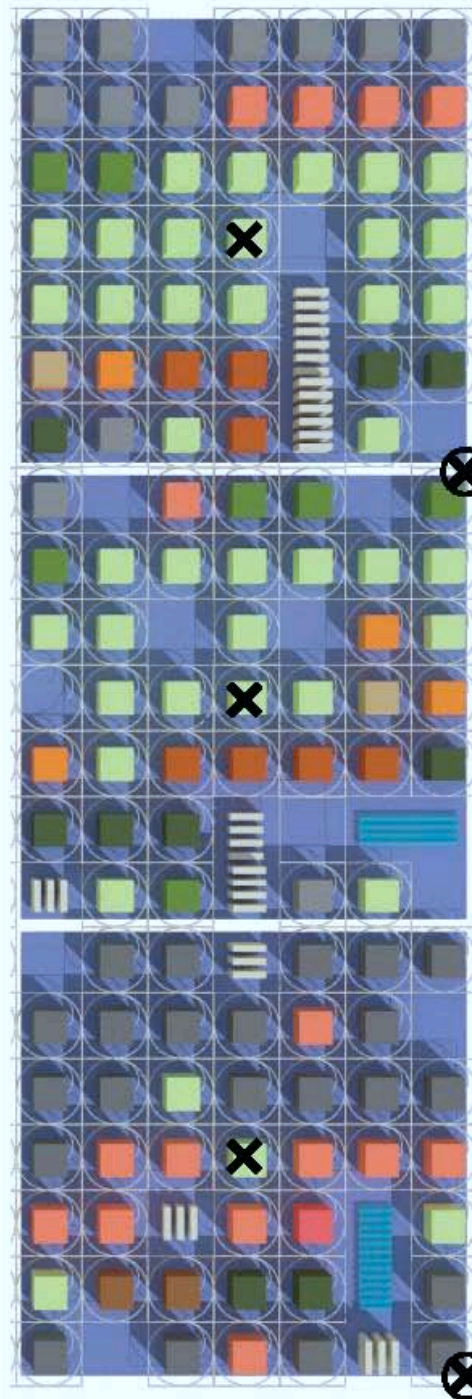




Transportation Distribution Model

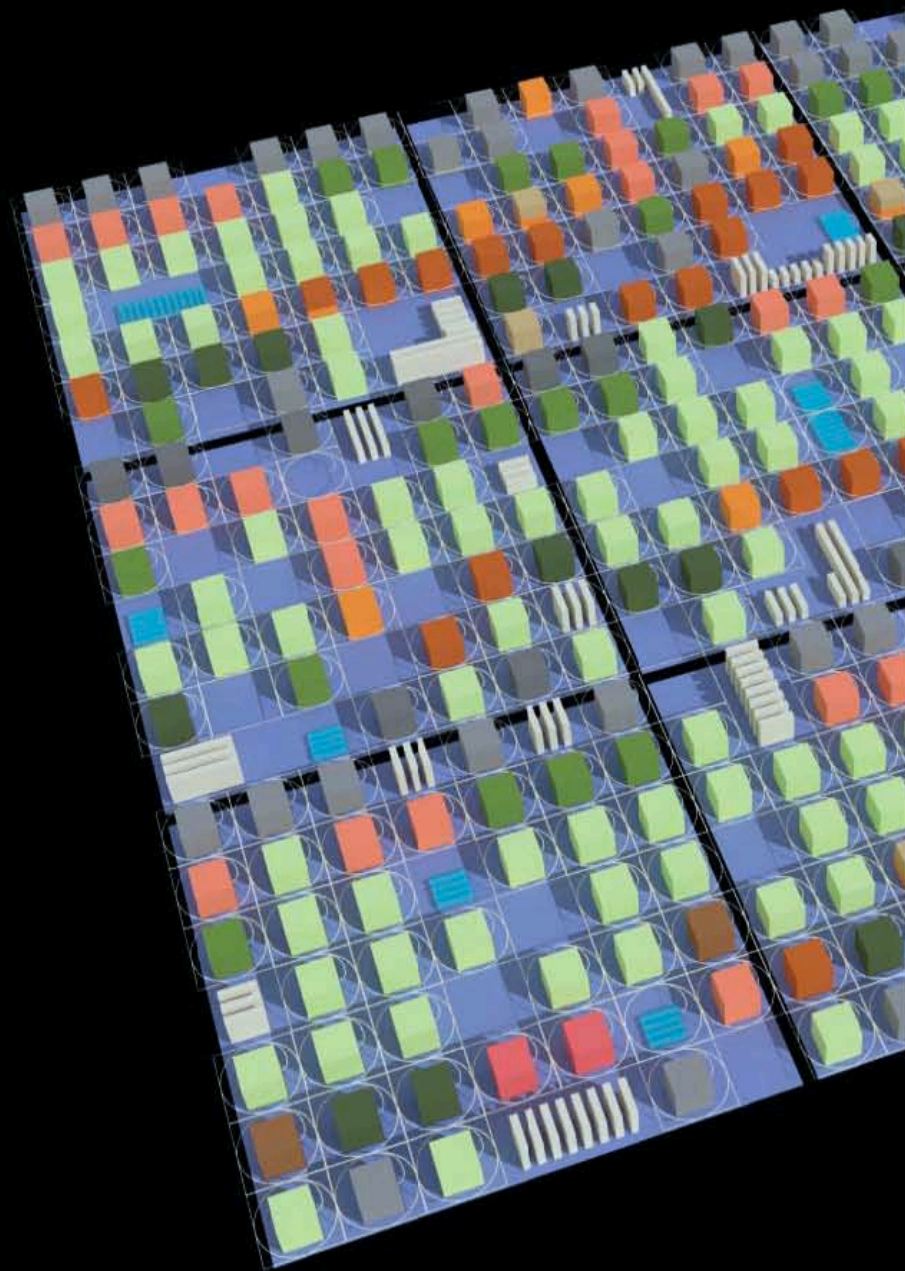


Transportation Distribution Model

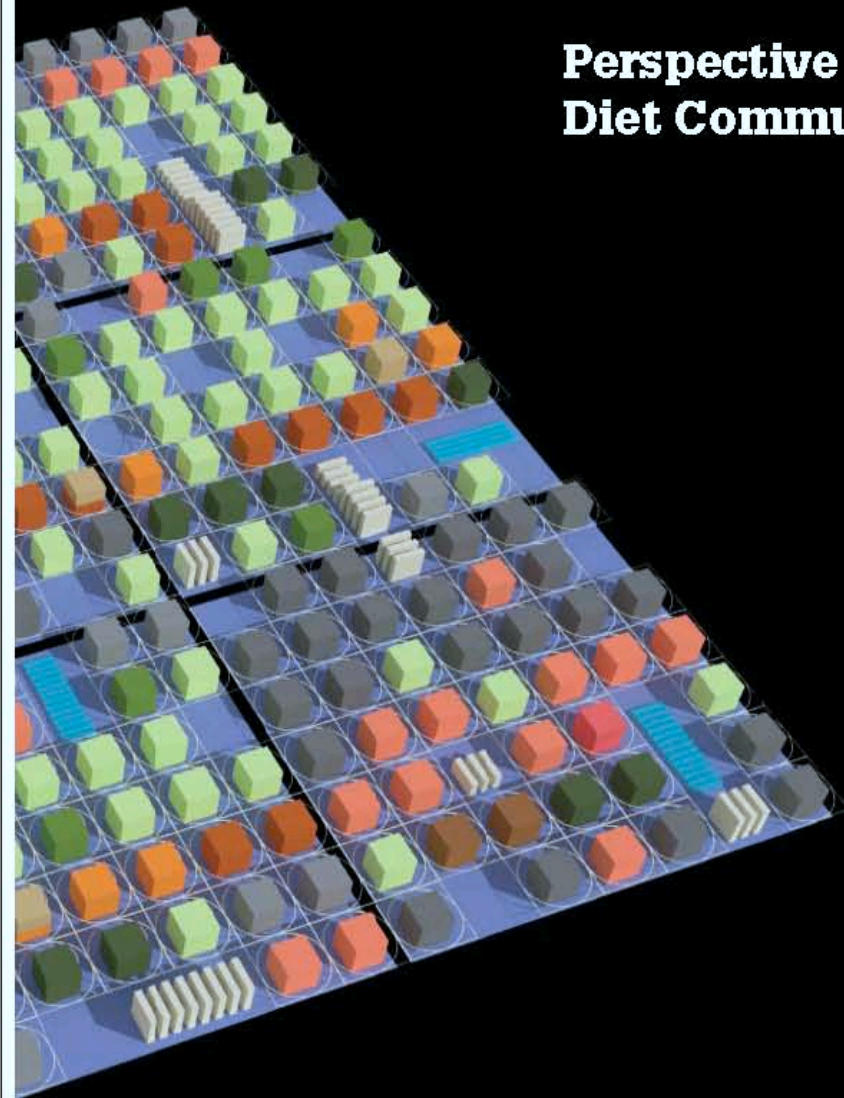


Plan of 9 Diet Communities

- ✕ Small Supermarket
- ⊗ Medium Supermarket (Underground)
- ⦿ Large Supermarket



**Perspective of 9
Diet Communities**



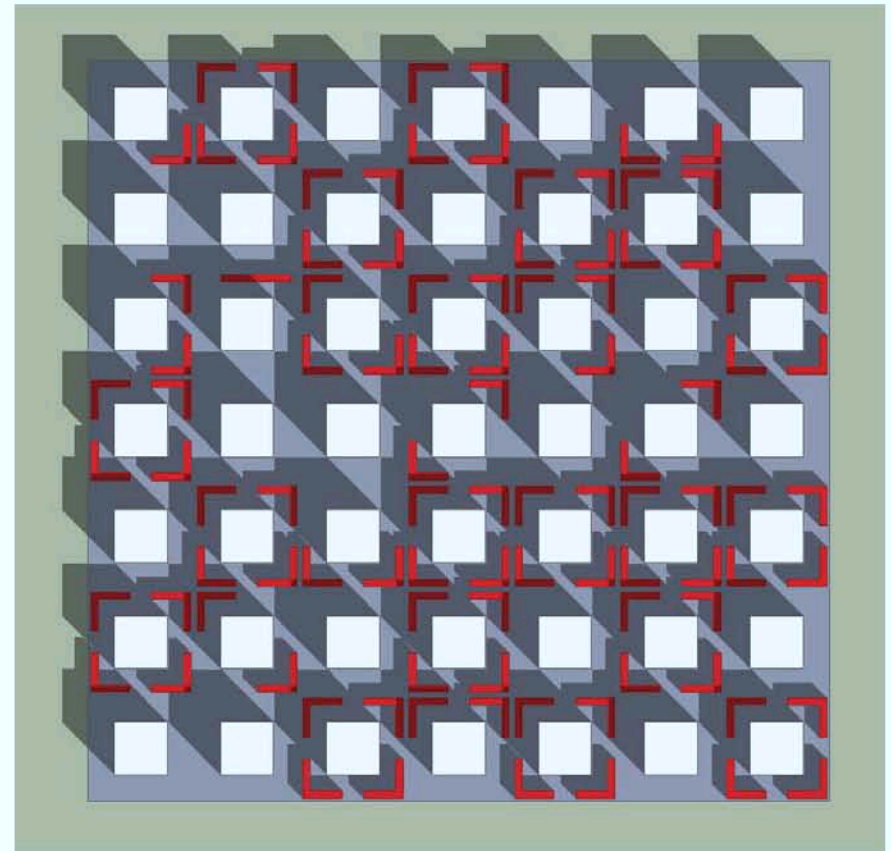
6.5

Suitable For Real Condition

6.5.1

Diet Changing (Add Surface)

Largest farming surface (not add cube)



People number: 11,111

Farming surface: 9,800,000 m²

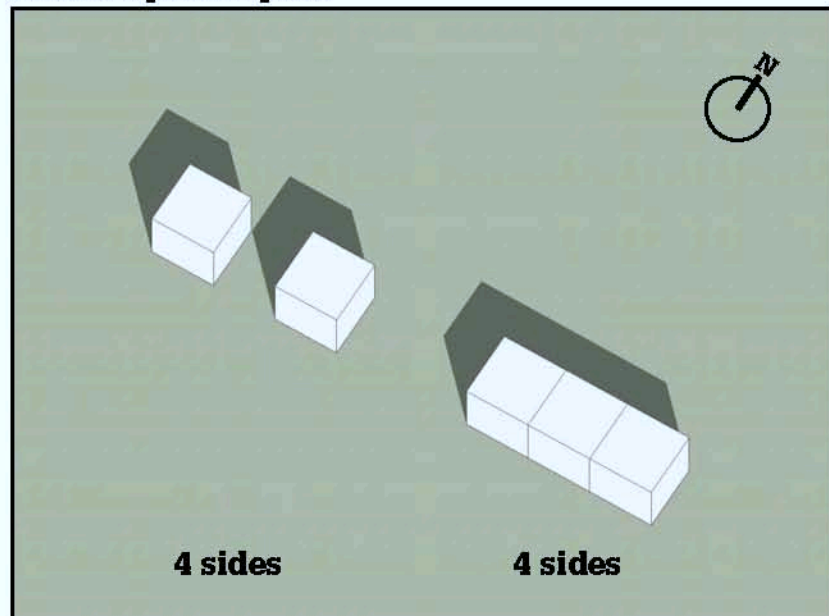
Number of cubes: 49

Farming surface per person: 980 m²/year

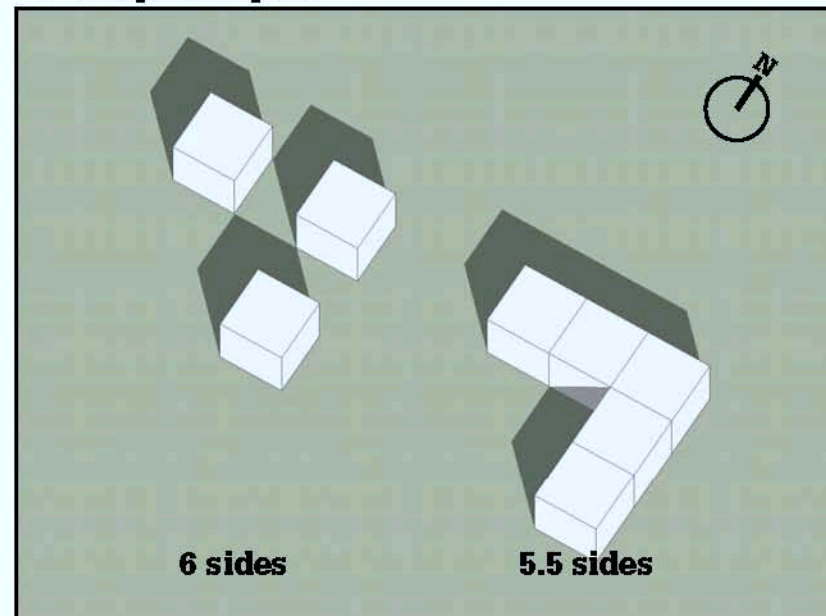
Larger than 10 diets surface



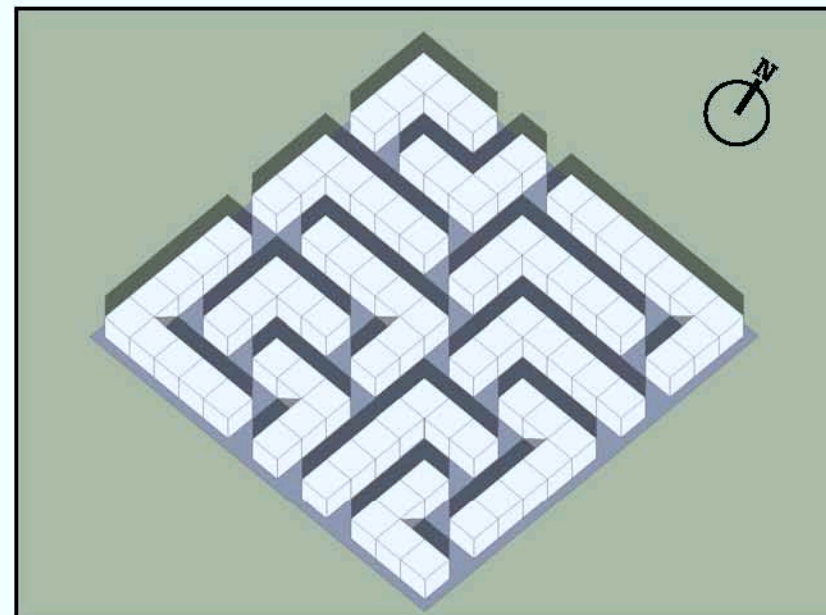
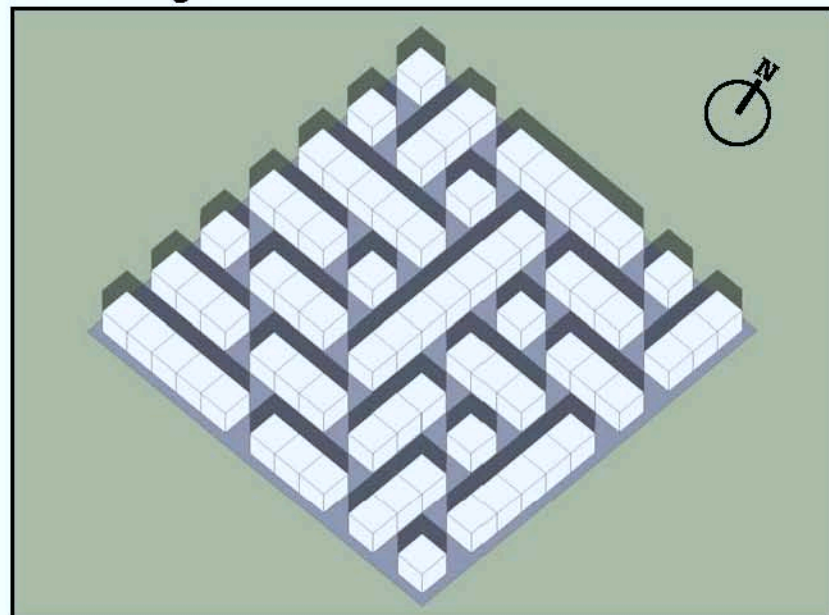
Line shape compare



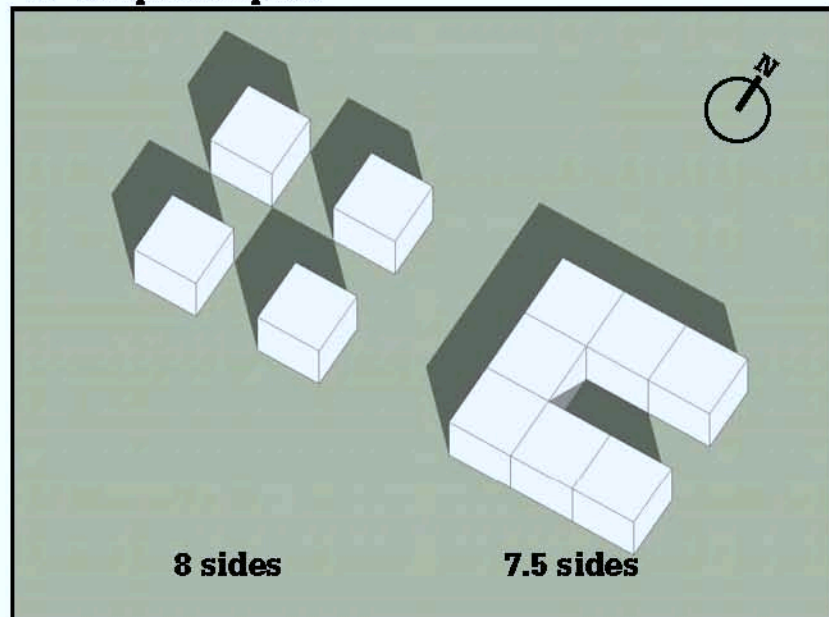
"L" shape compare



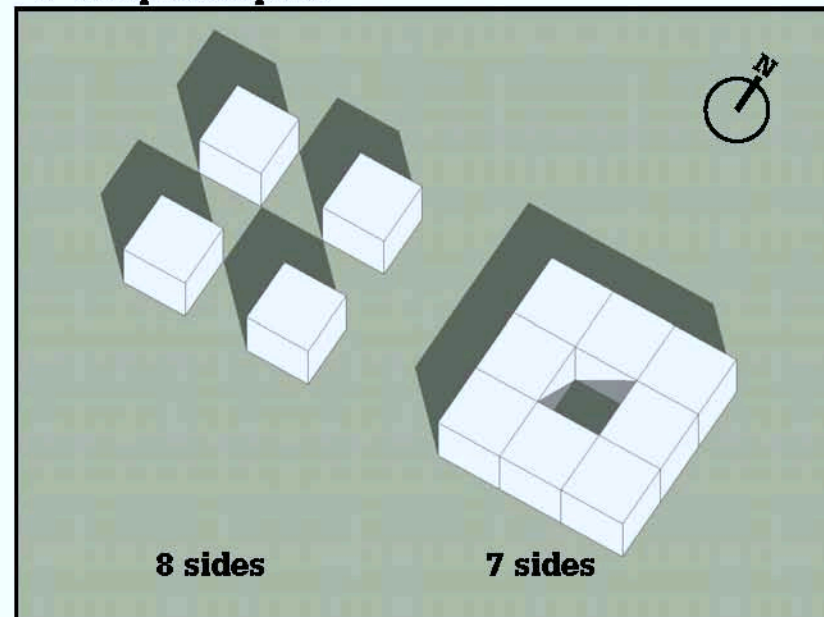
Block Image



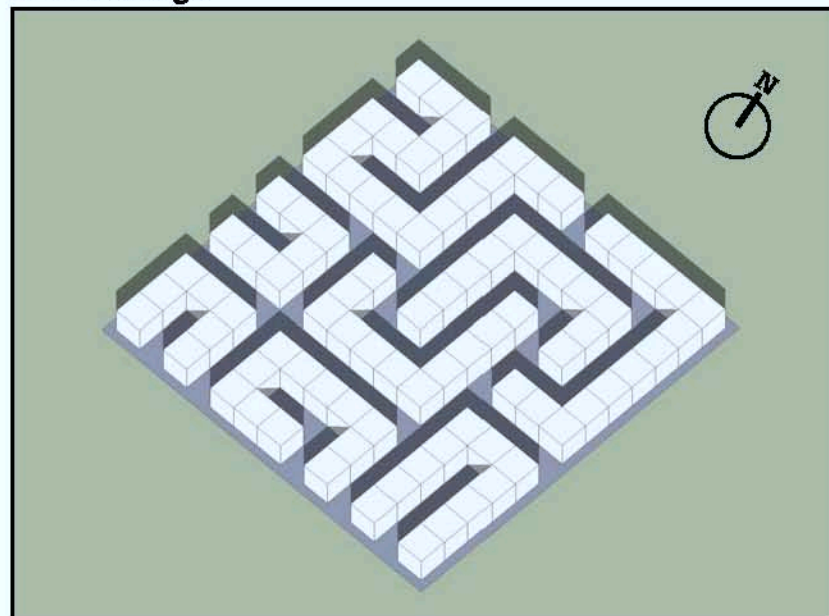
"C" shape compare



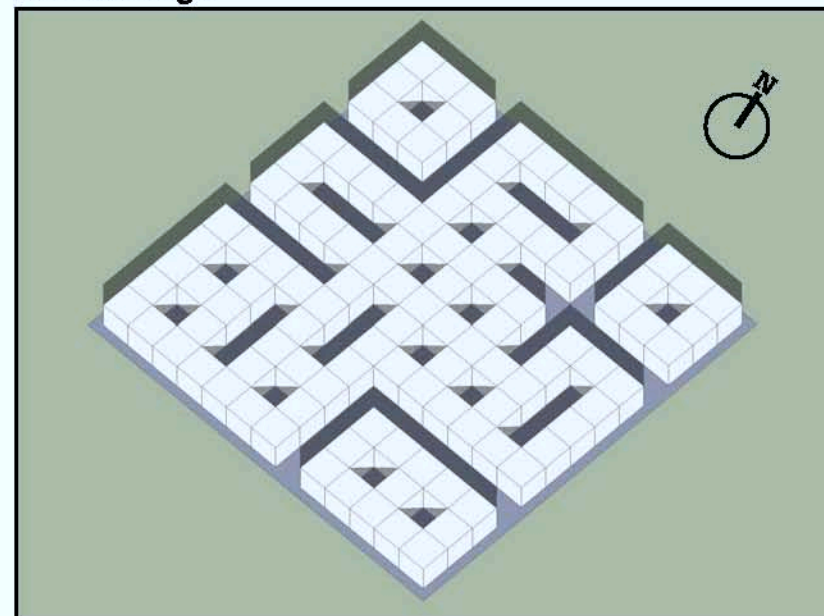
"O" shape compare



Block Image

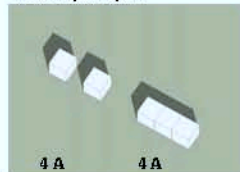


Block Image



Changing Diet (Adding Surface)

"Line" shape compare



Block Image

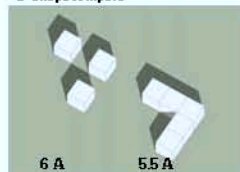
Insunlight
Area (side)Cube
NumberInsunlight
Area / Cube

4A

3

1.3A

"L" shape compare



Block Image

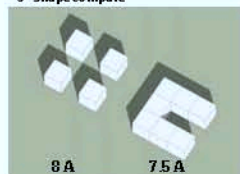


5.5A

5

1.1A

"C" shape compare



Block Image

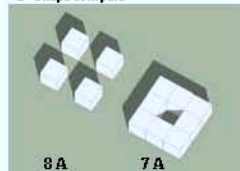


7.5A

7

1.07A

"D" shape compare



Block Image

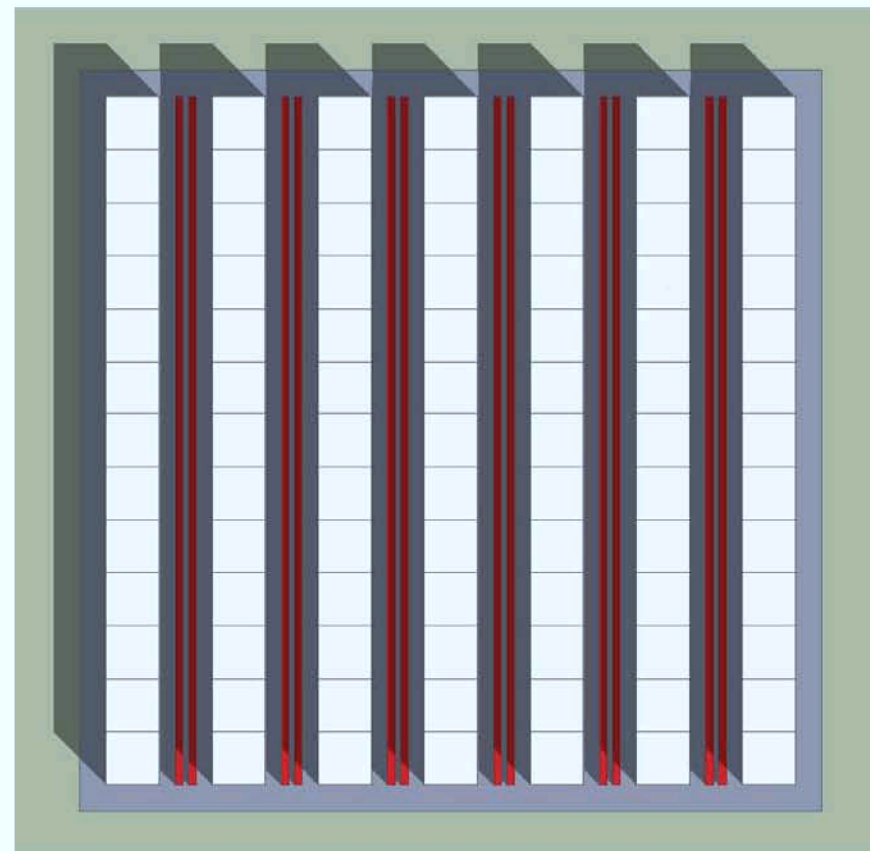


7A

8

0.875A

Largest farming surface based on "Line" model (after adding cube)



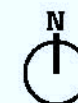
People in block: 11,111

Farming surface: 18,200,000 m²

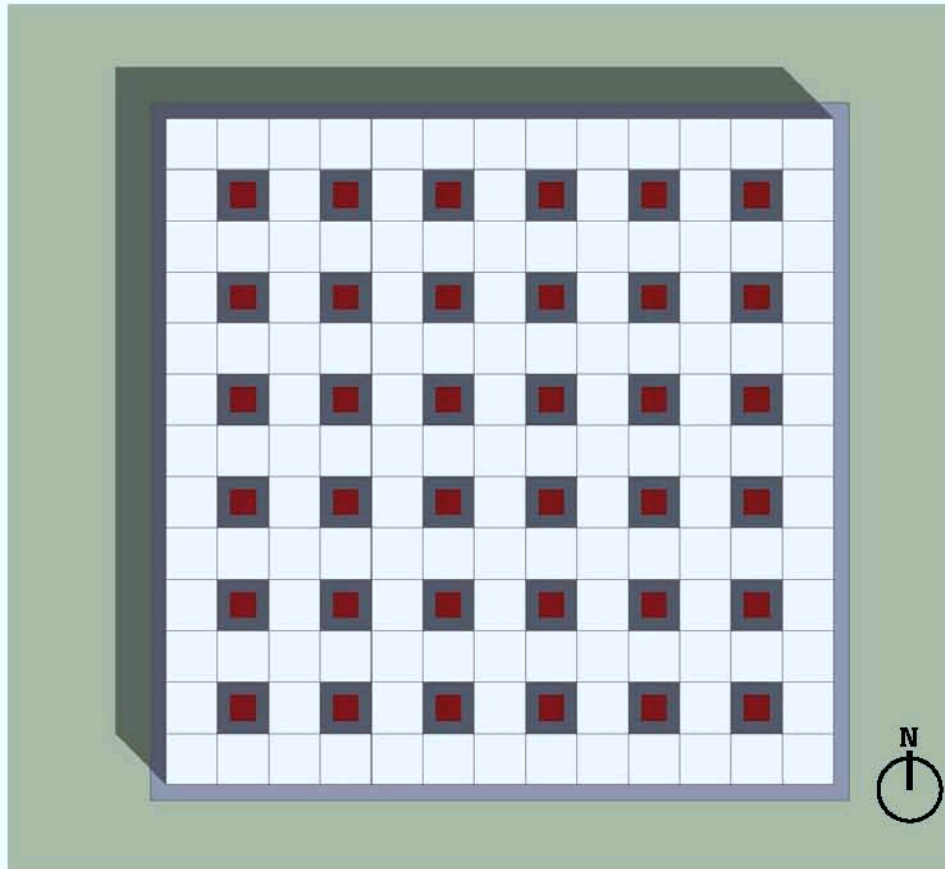
Number of cubes: 91

Farming surface per person: 1,820 m²/year

Farming surface larger than diet 70% calorie
by eating beef



Largest farming surface based on "Line" model (after adding cube)



People in block: 11,111

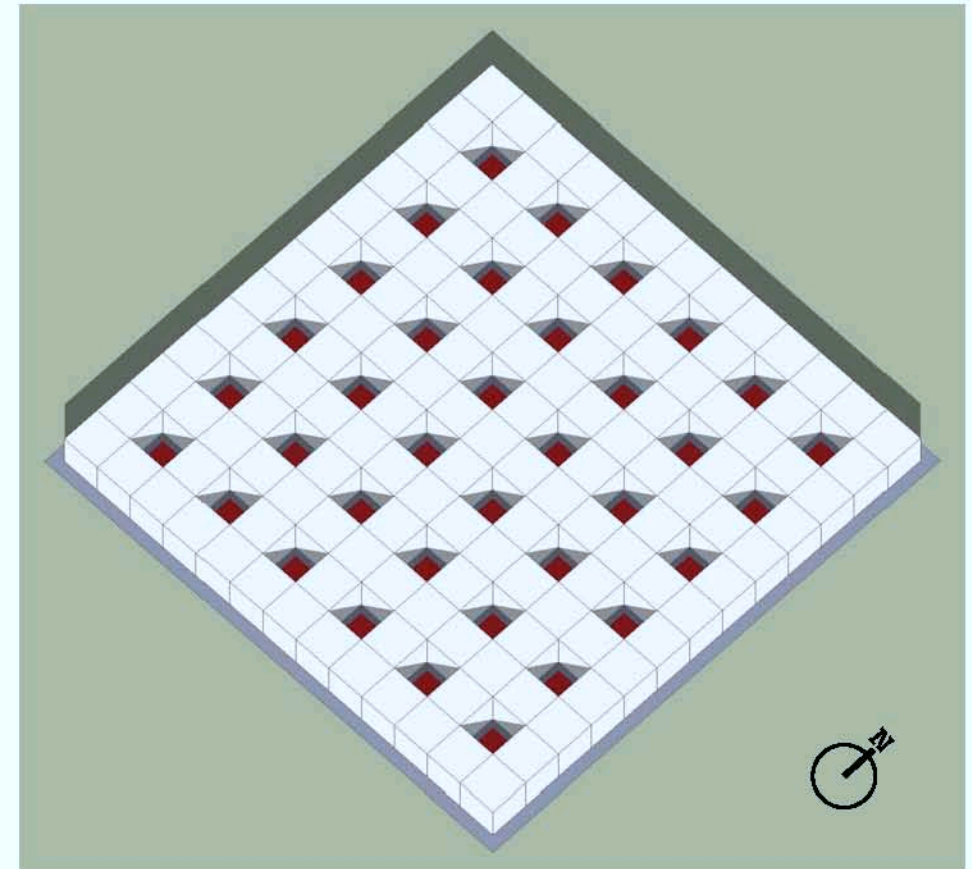
Farming surface: 24,200,000 m²

Number of cubes: 121

Farming surface per person: 2,420 m²/year

**Farming surface larger than diet 100% calorie
by eating beef**

Largest farming surface based on "Line" model (after adding cube)



People in block: 11,111

Farming surface: 24,200,000 m²

Number of cubes: 121

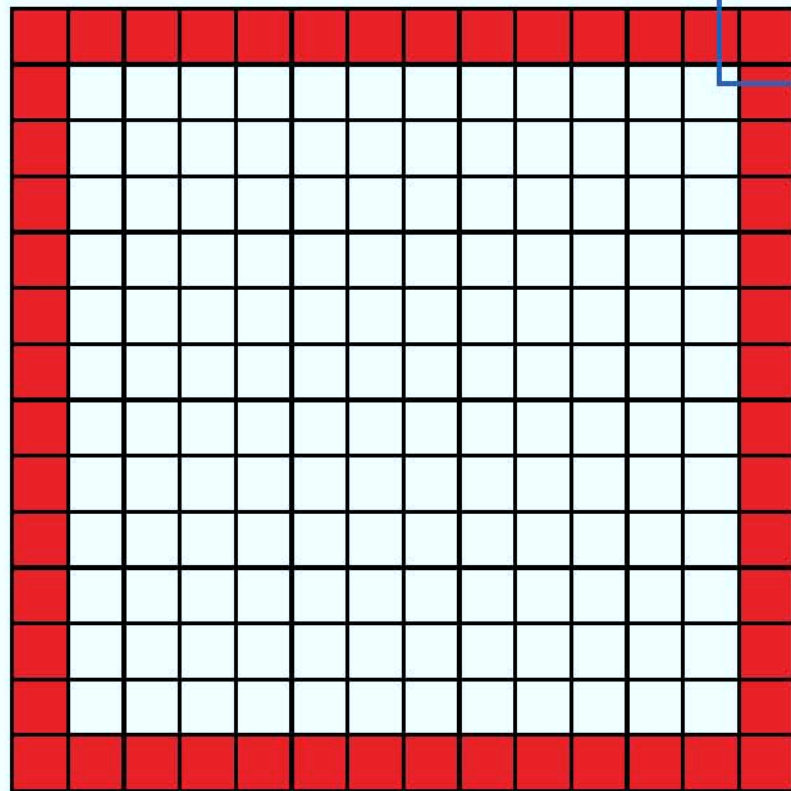
Farming surface per person: 2,420 m²/year

**Farming surface larger than diet 100% calorie
by eating beef**

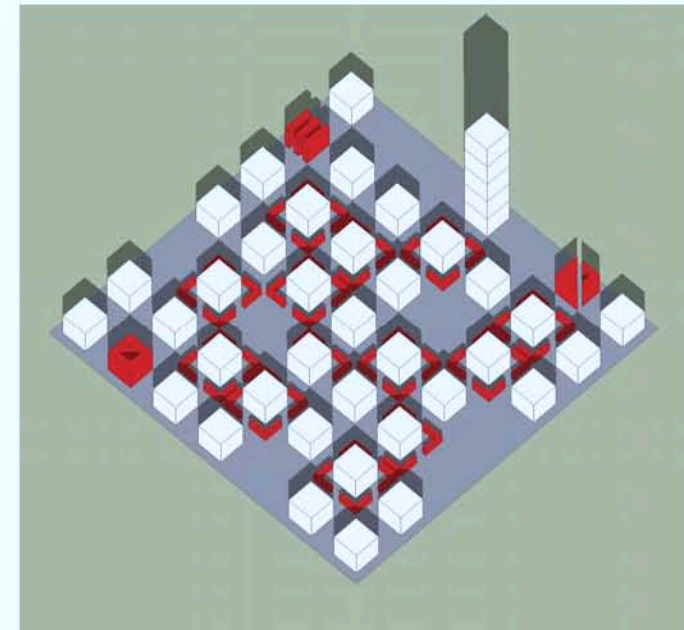
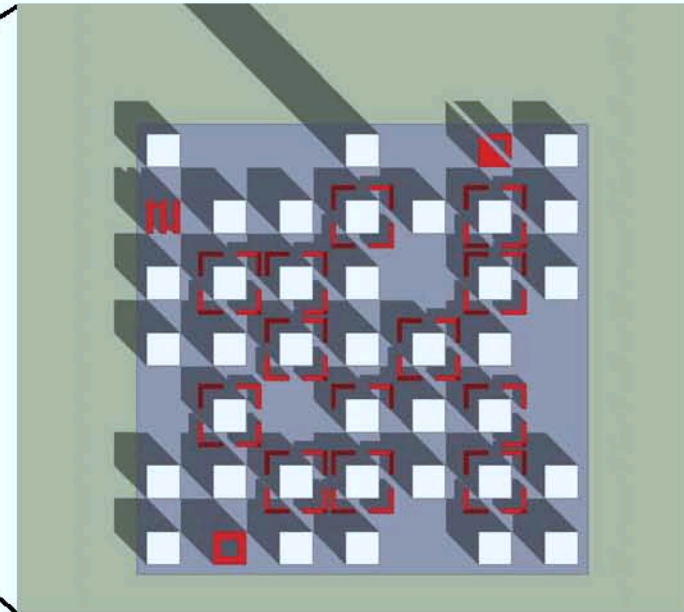
6.5.2

Diverse Block Typology

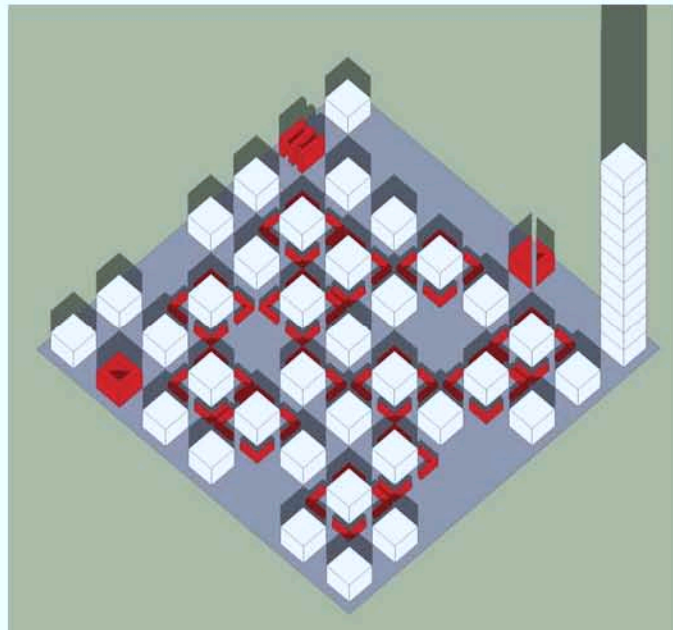
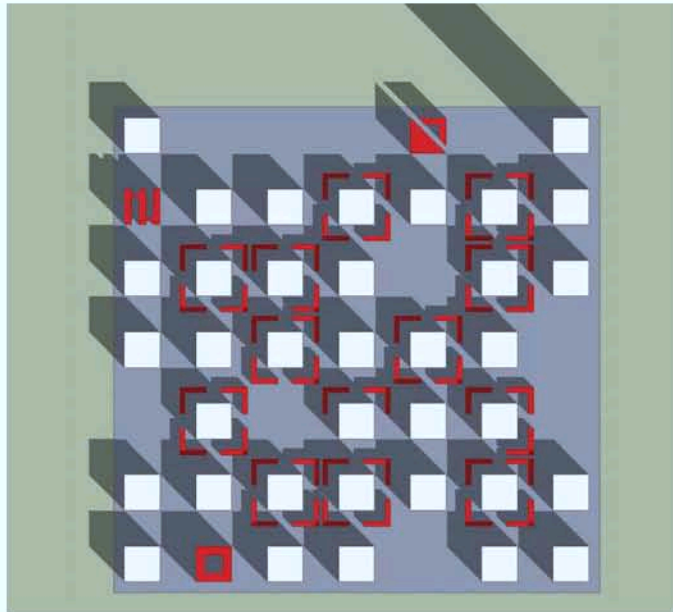
Research to the edge block of the city



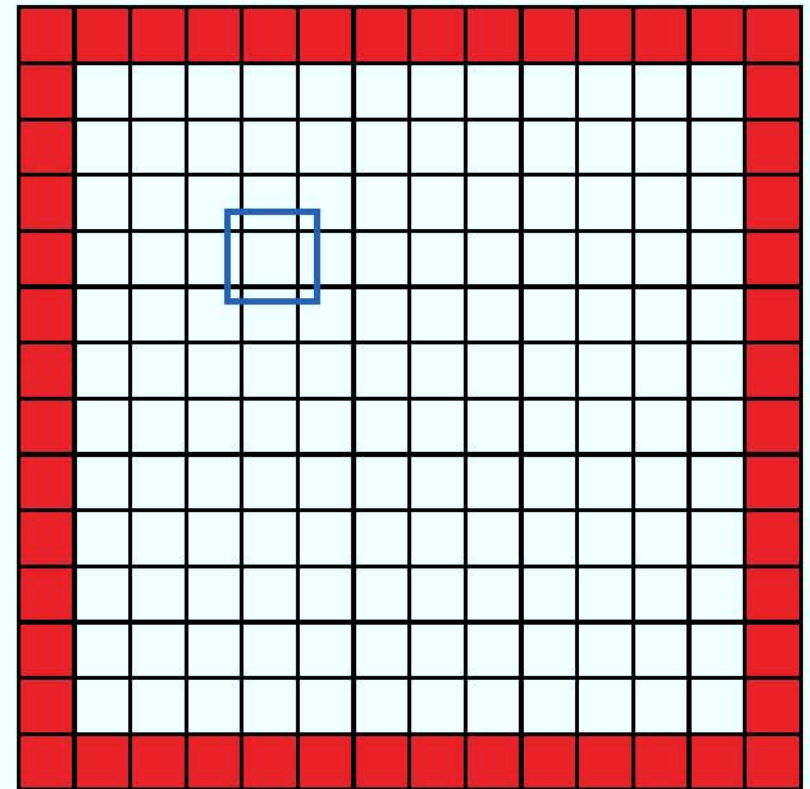
Corner Block Zoom In



Corner tower at corner Block

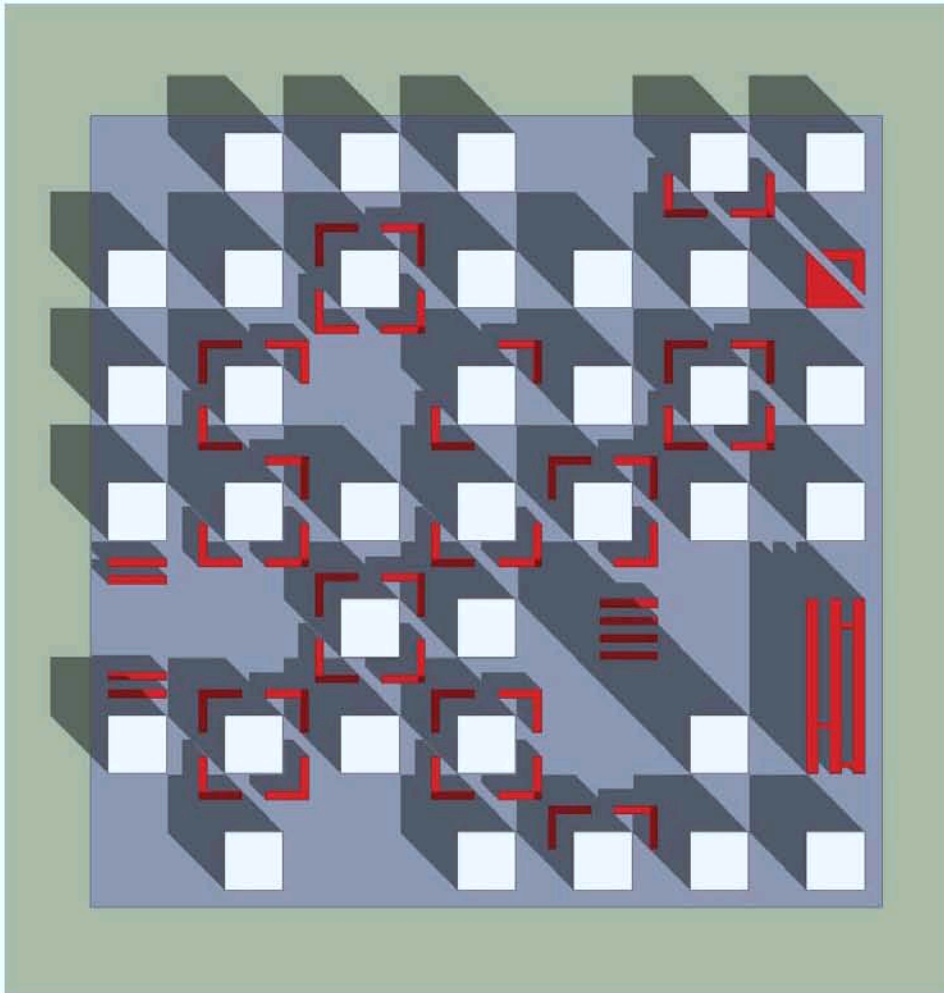


Research to the inner block of the city



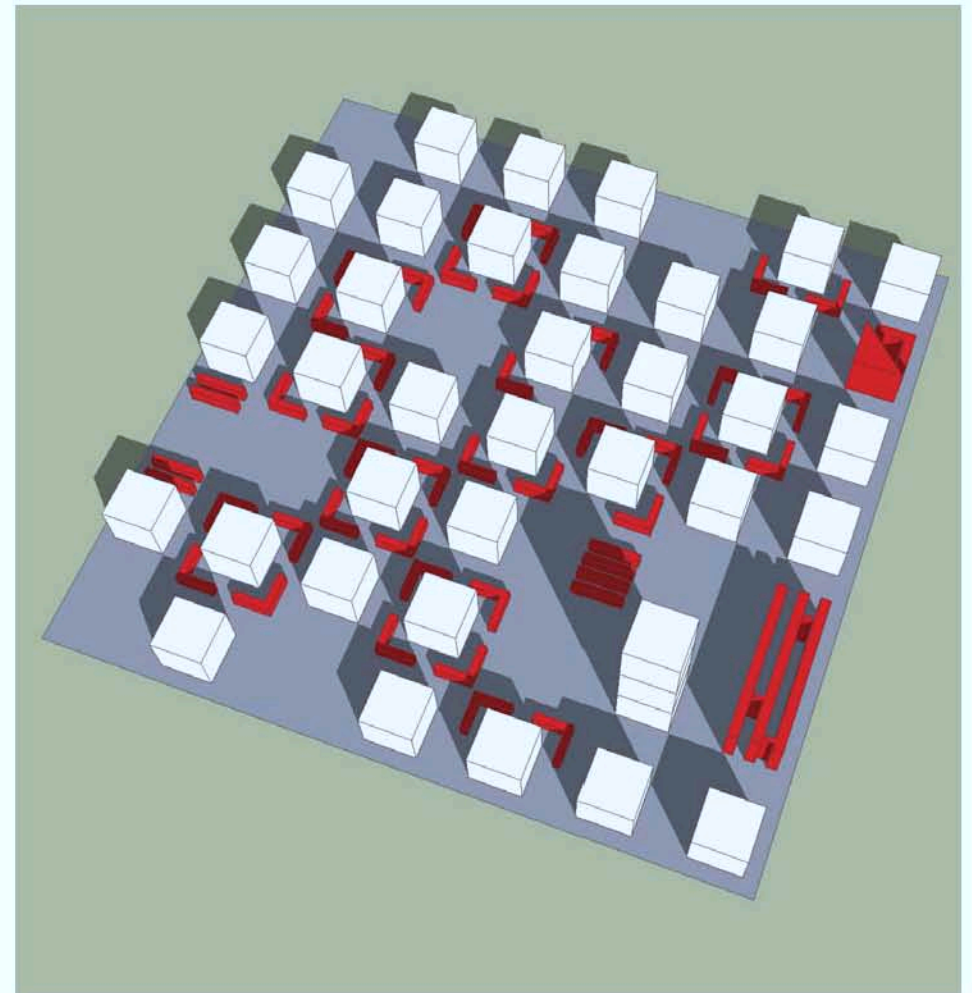
Tower could be heigher at large void space

Plan



Tower could be heigher at large void space

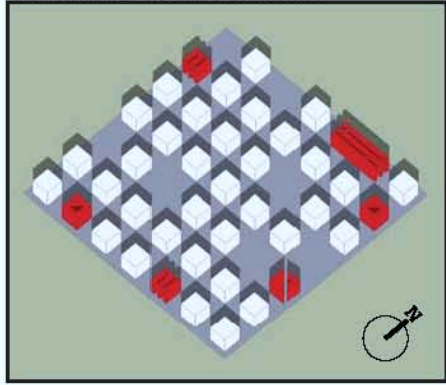
Image



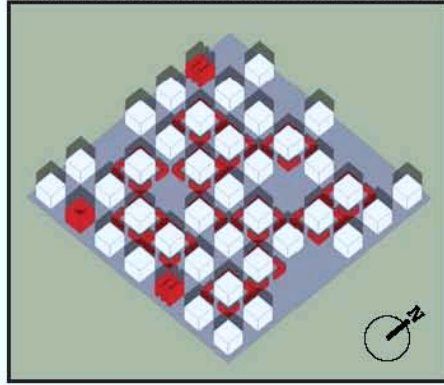
Diverse Block Typology

Condition 1: Optimal Homogeneous cube structure is enough for farming

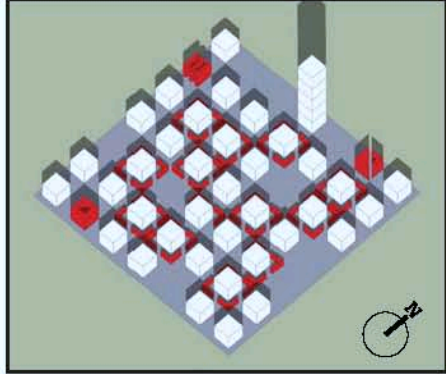
City item fill in cube structure



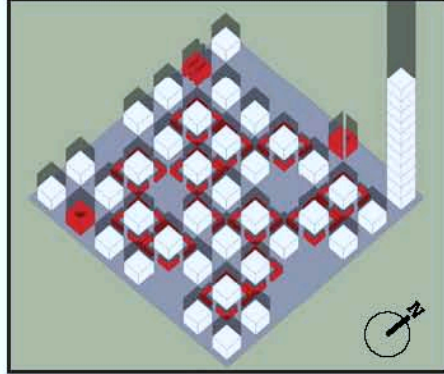
City item separate in the shade of block



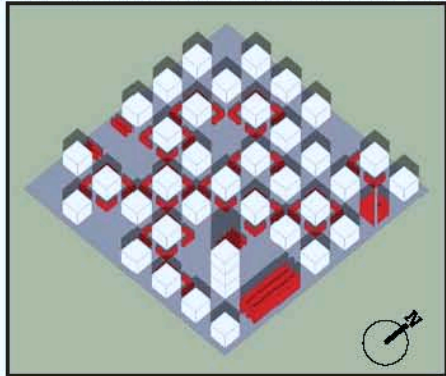
Last row at the edge block of the city



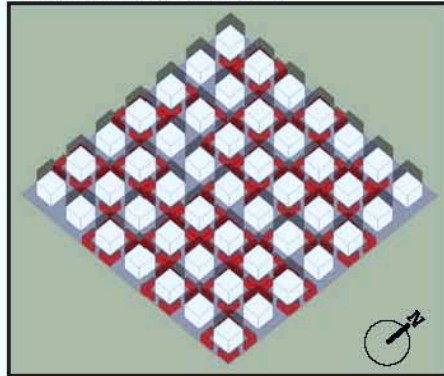
Corner tower at the corner of the city



Heigher tower in the large area inner city

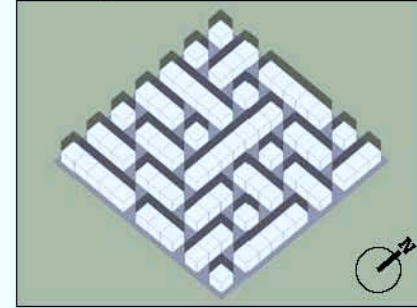


Largest farming condition

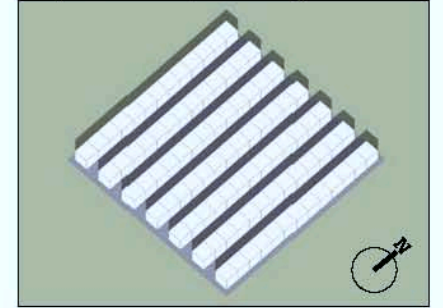


Condition 2: Cubes not enough, need add

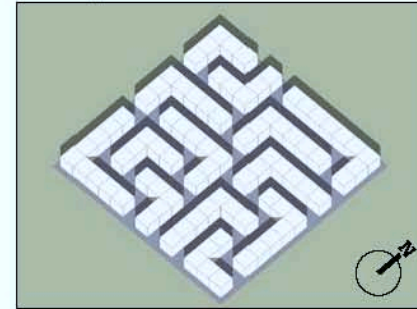
Line shape structure



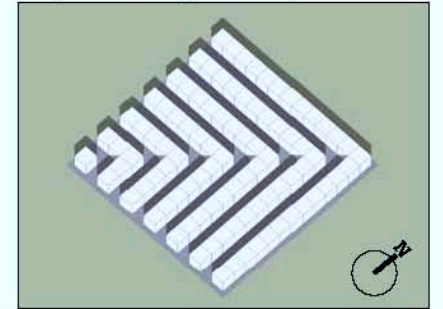
Largest line shape farming



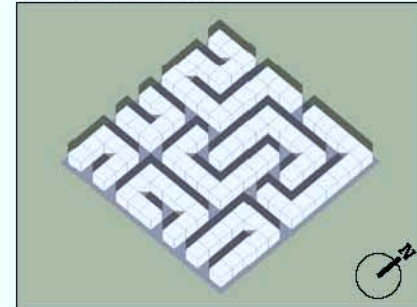
"L" shape structure



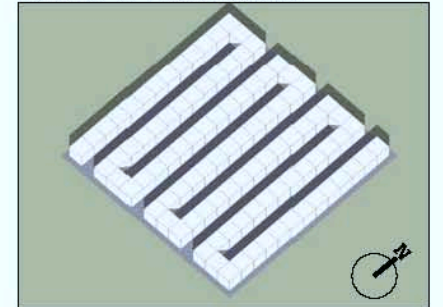
Largest "L" shape farming



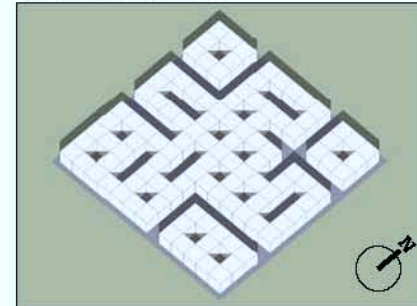
"C" shape structure



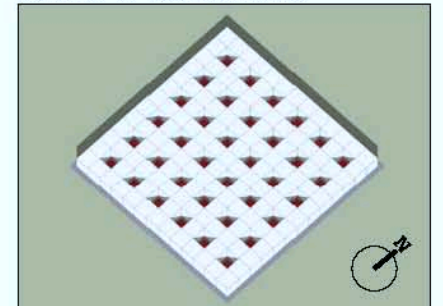
Largest "C" shape farming



"O" shape structure



Largest "O" shape farming

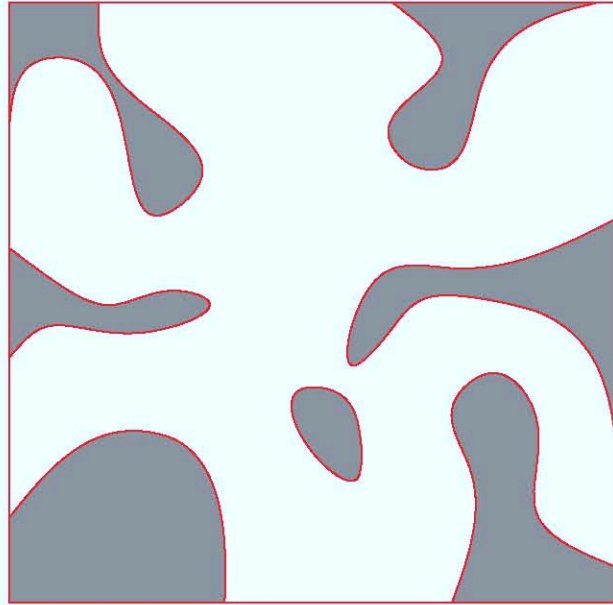


6.5.3

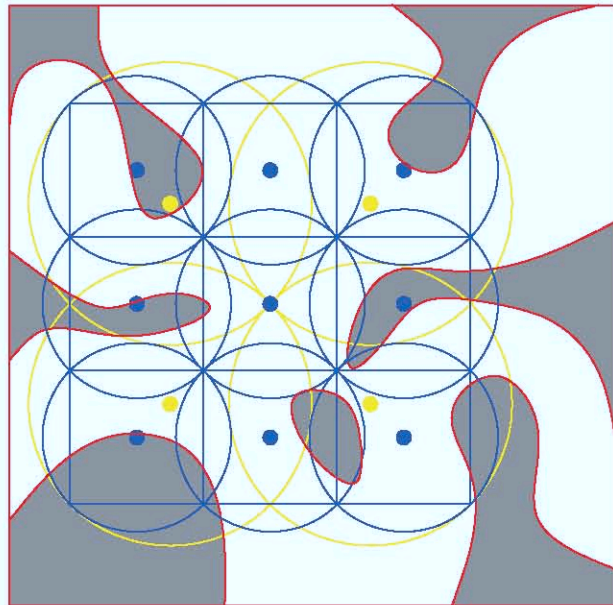
Complex Site

Suitable For Real Location

Complex Location

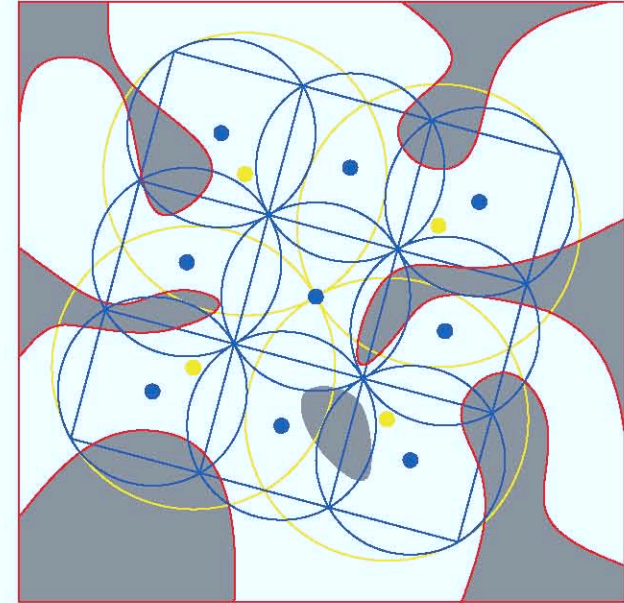


Random put city in this location



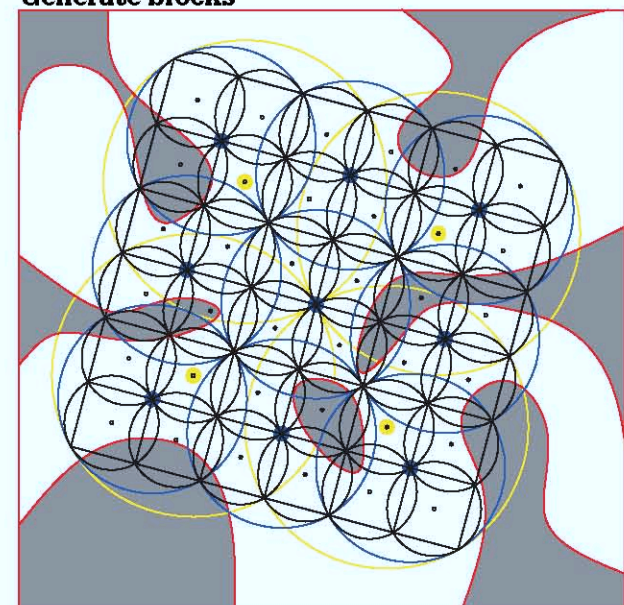
- L Supermarket
- M Supermarket
- S Supermarket

Adjust the direction according to the north direction and supermarket location



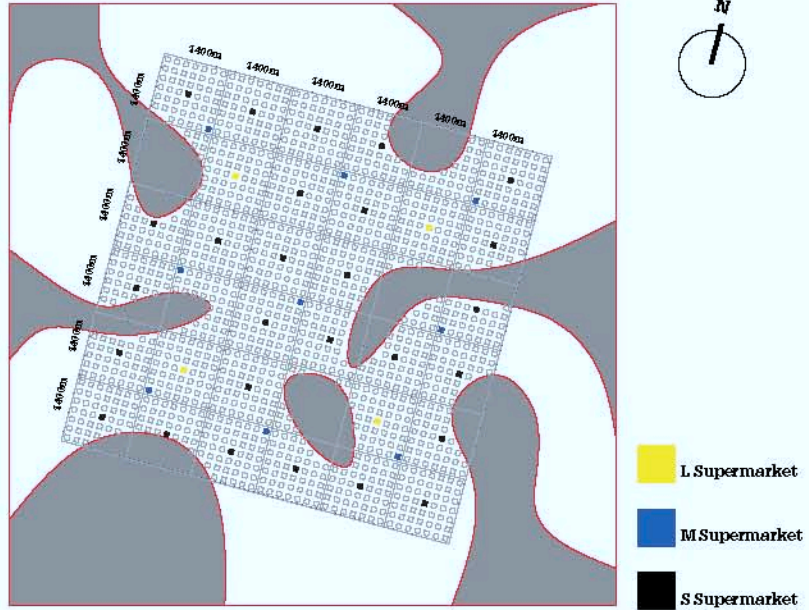
- L Supermarket
- M Supermarket
- S Supermarket

Generate blocks

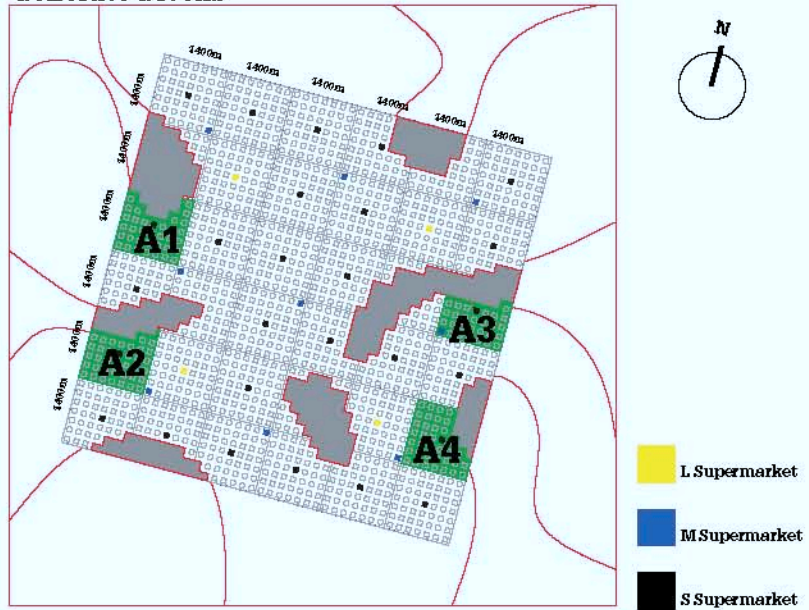


- L Supermarket
- M Supermarket
- S Supermarket

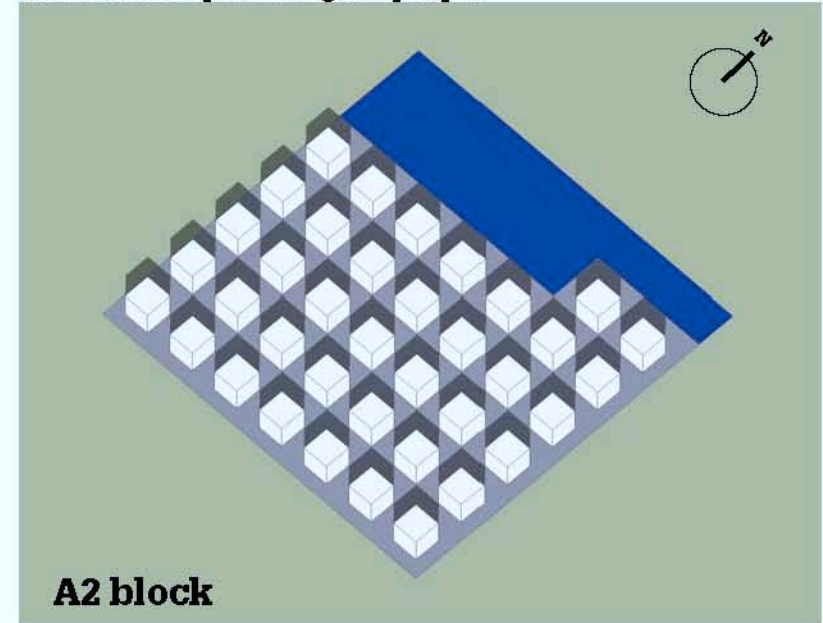
Generate cube structure



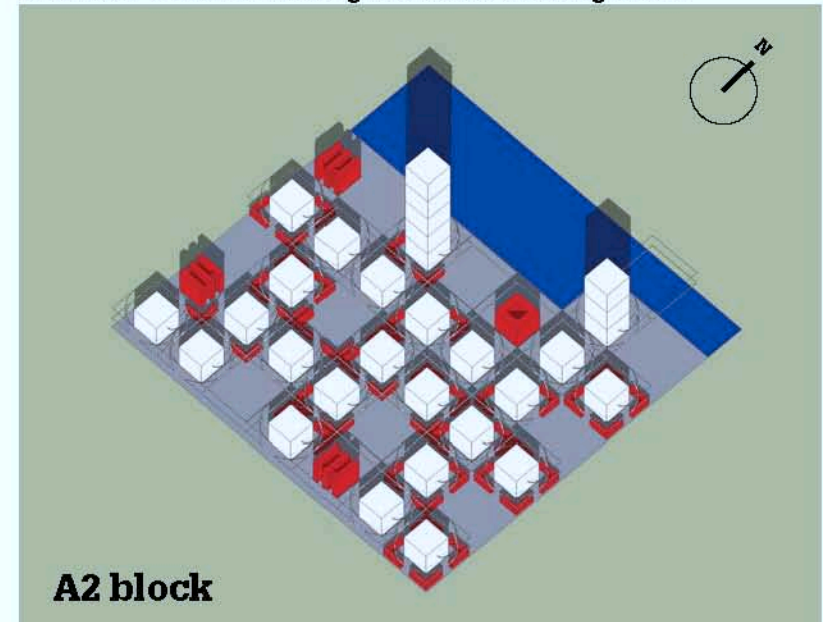
Generate blocks

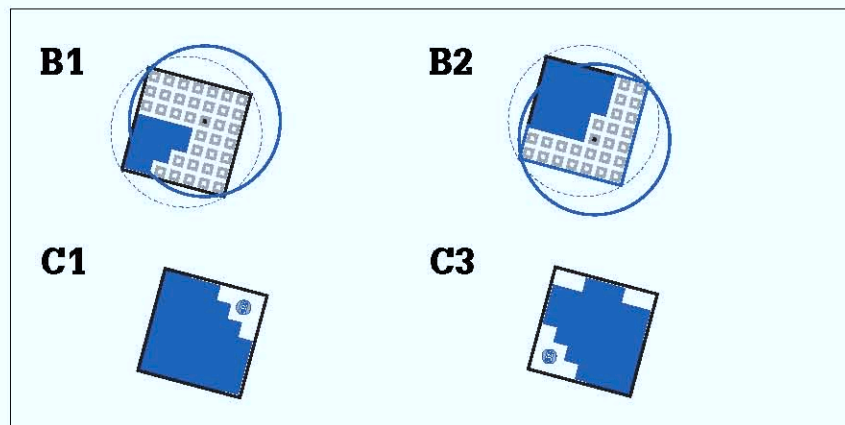
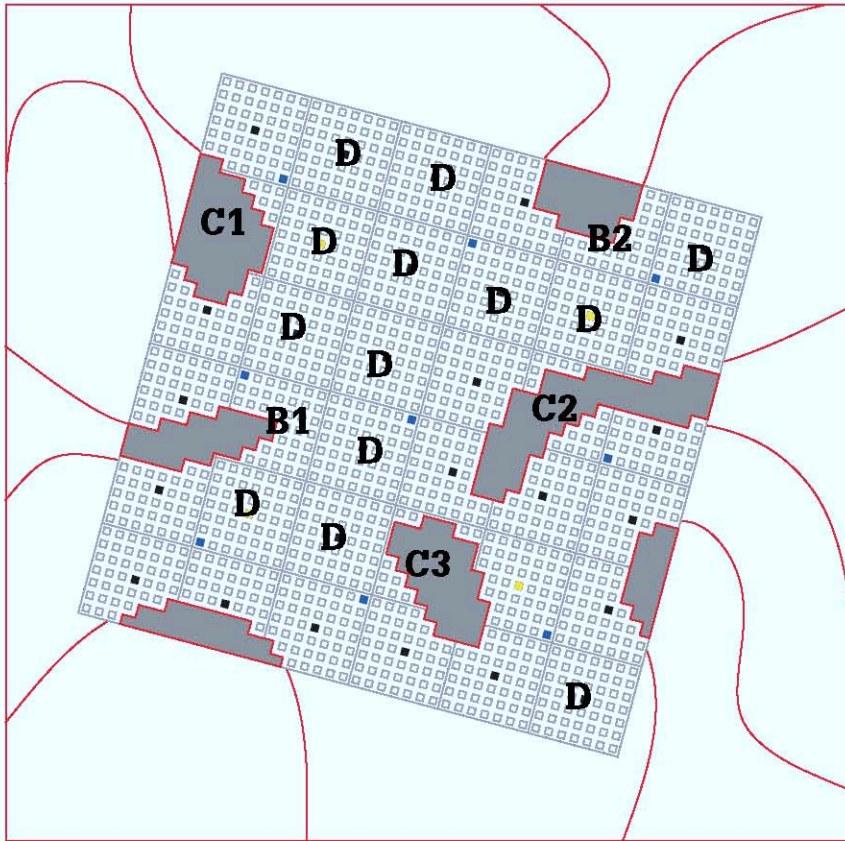


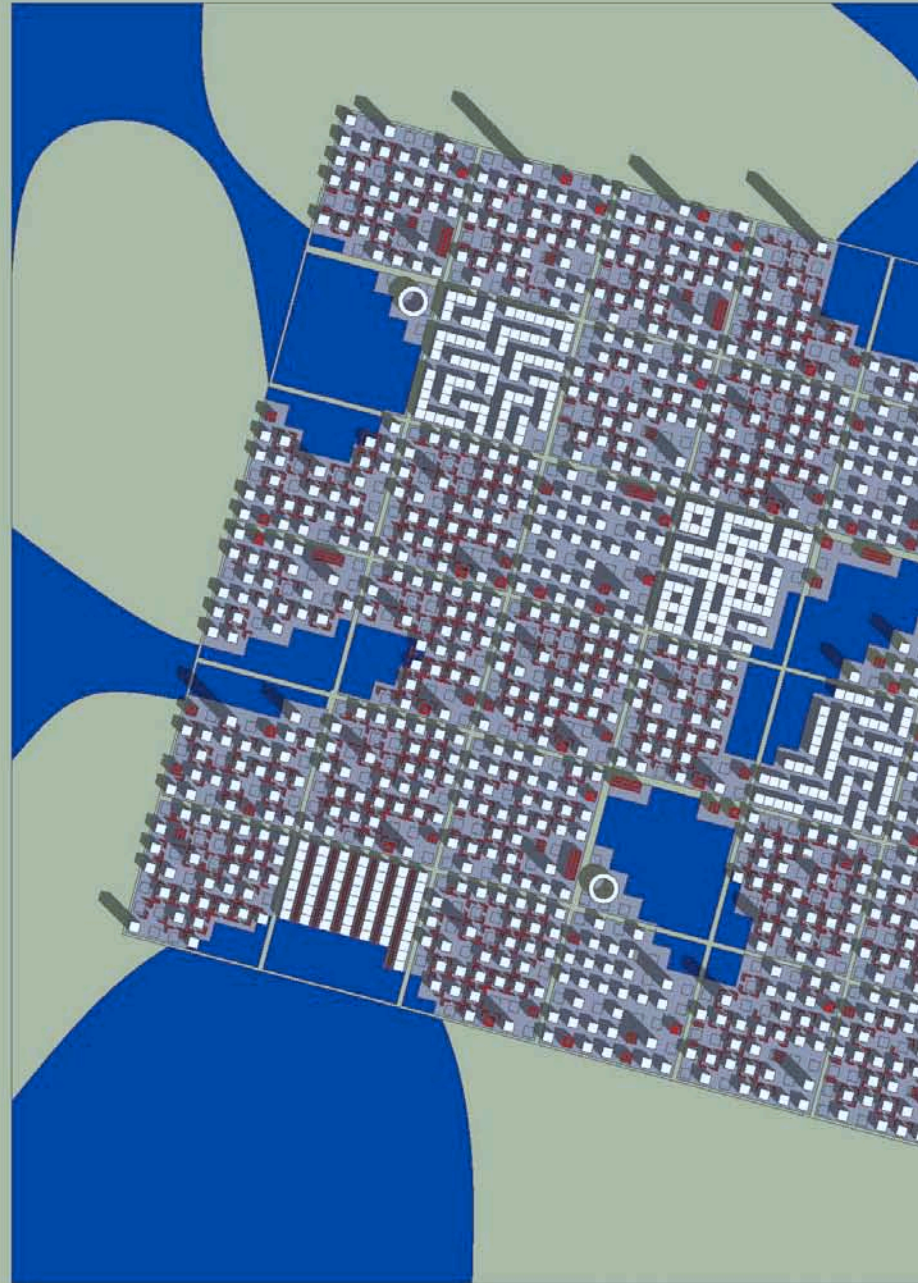
Calculate the percentage of people



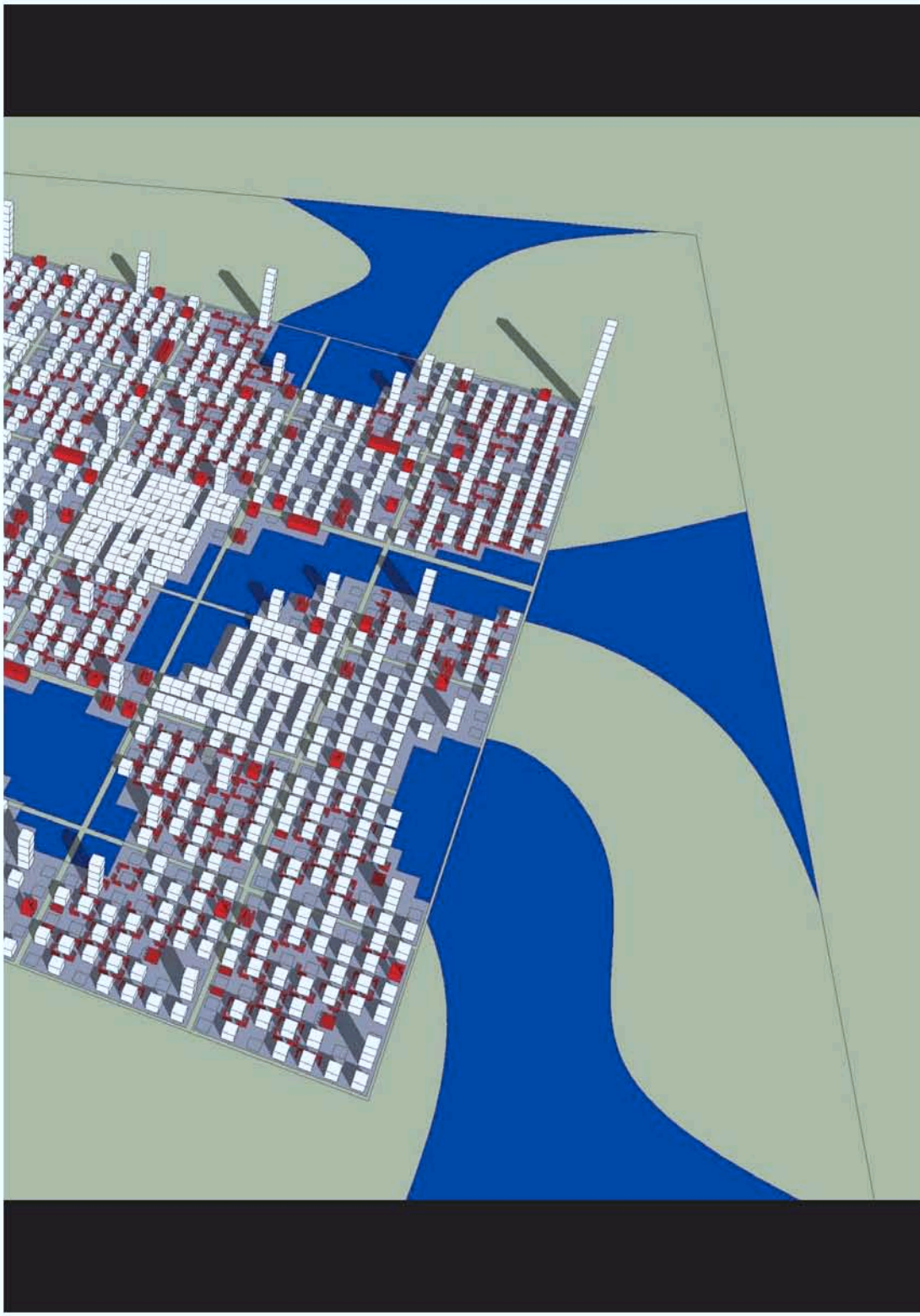
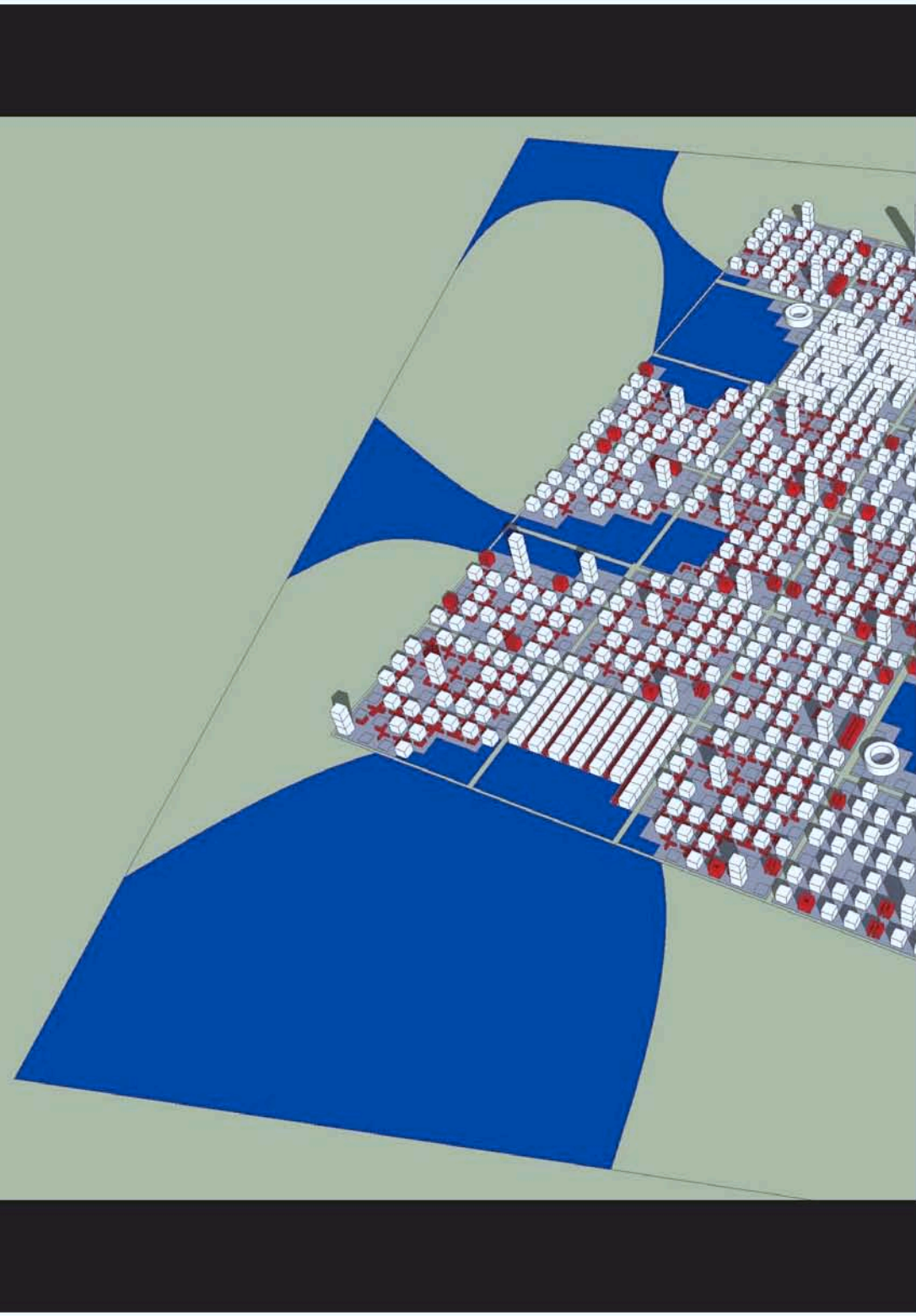
Generate the real farming surface according t diet

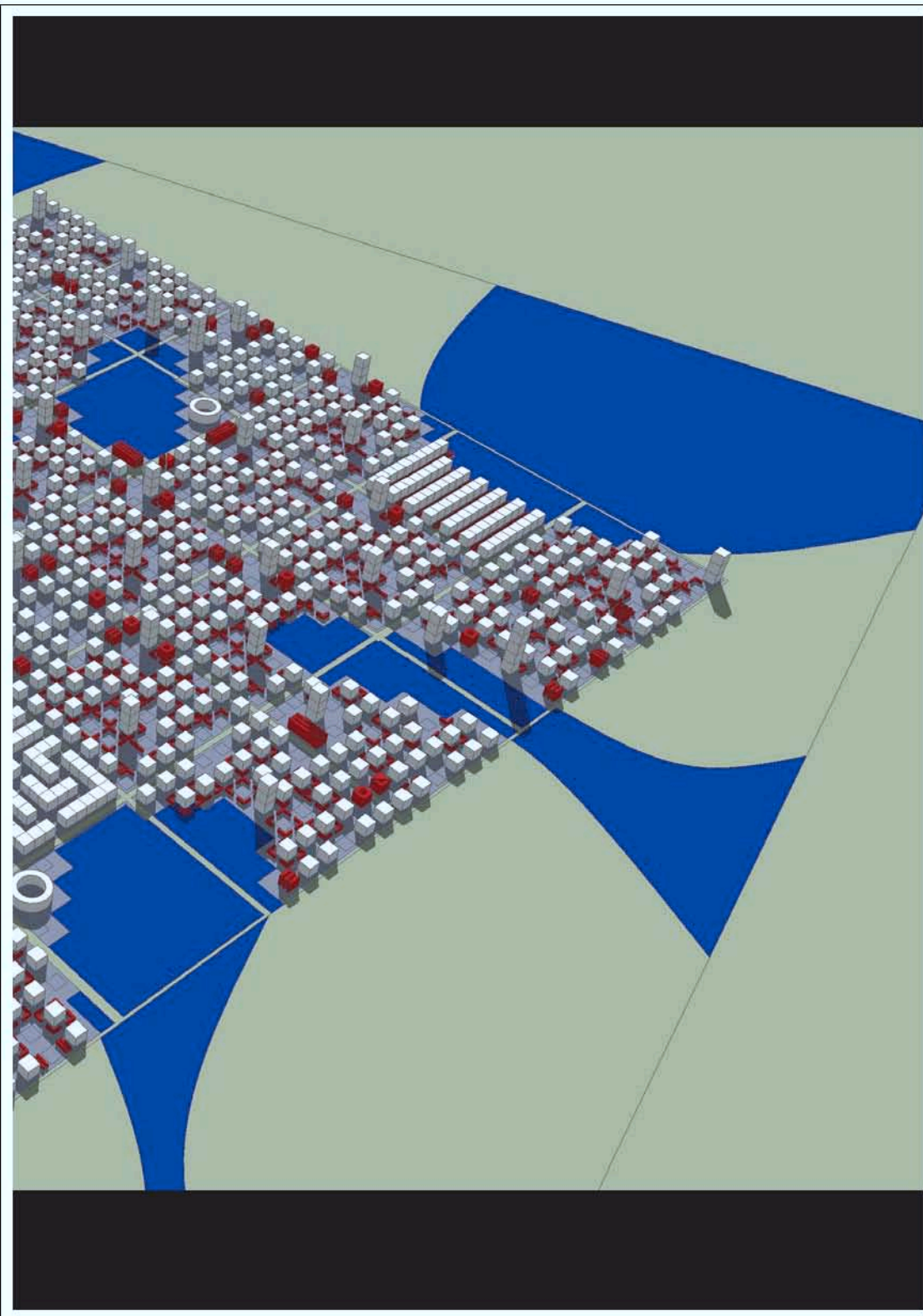
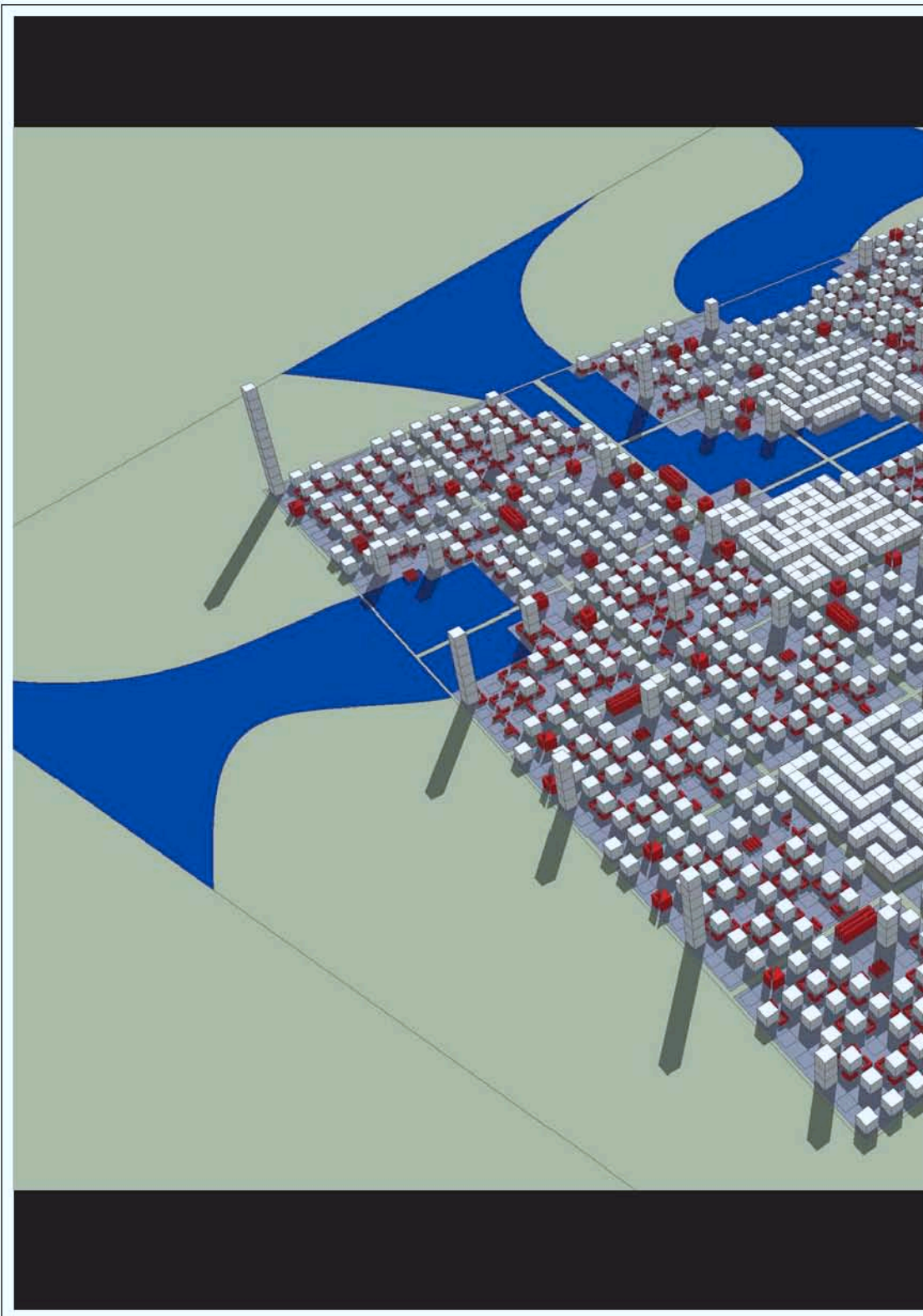


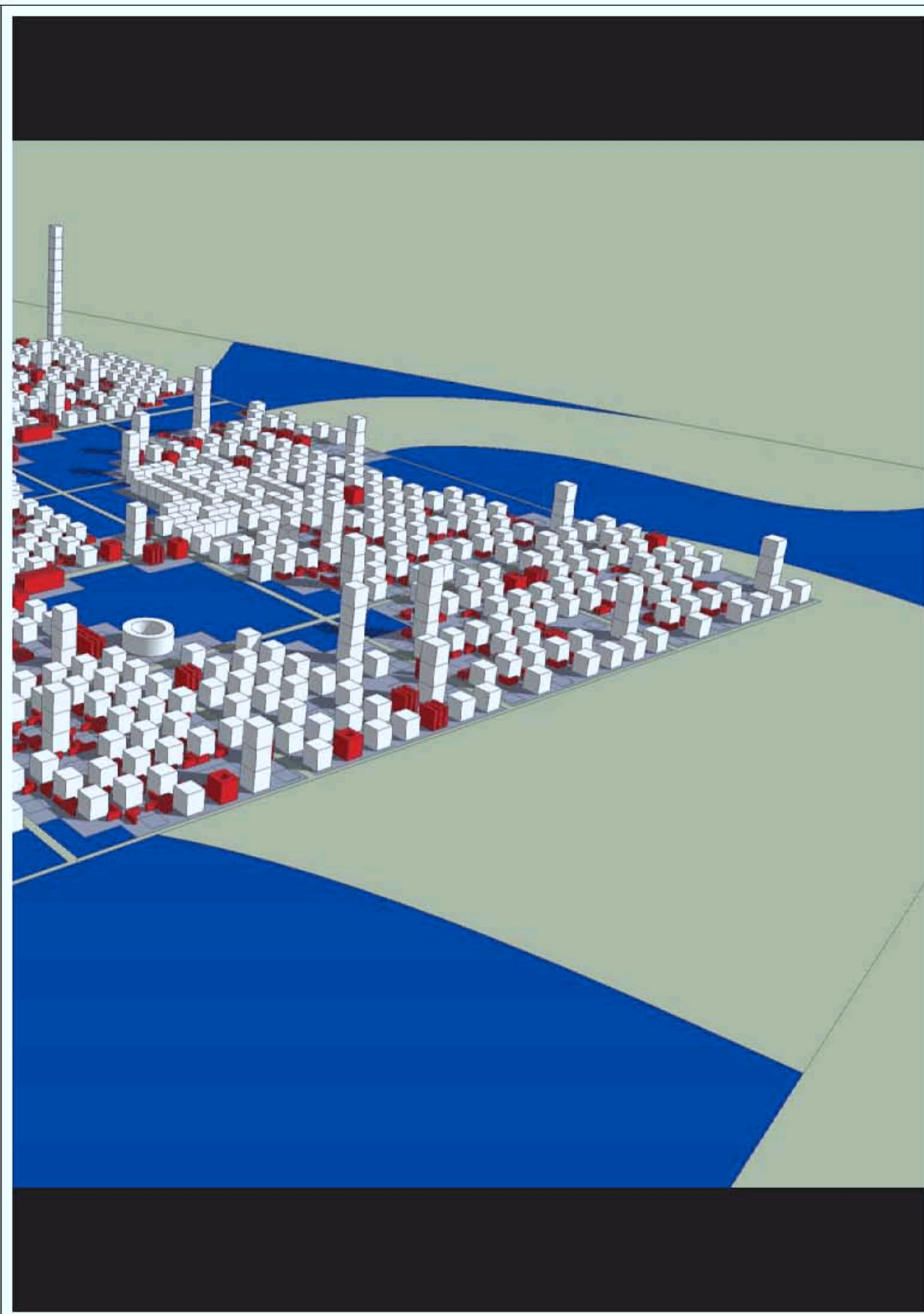
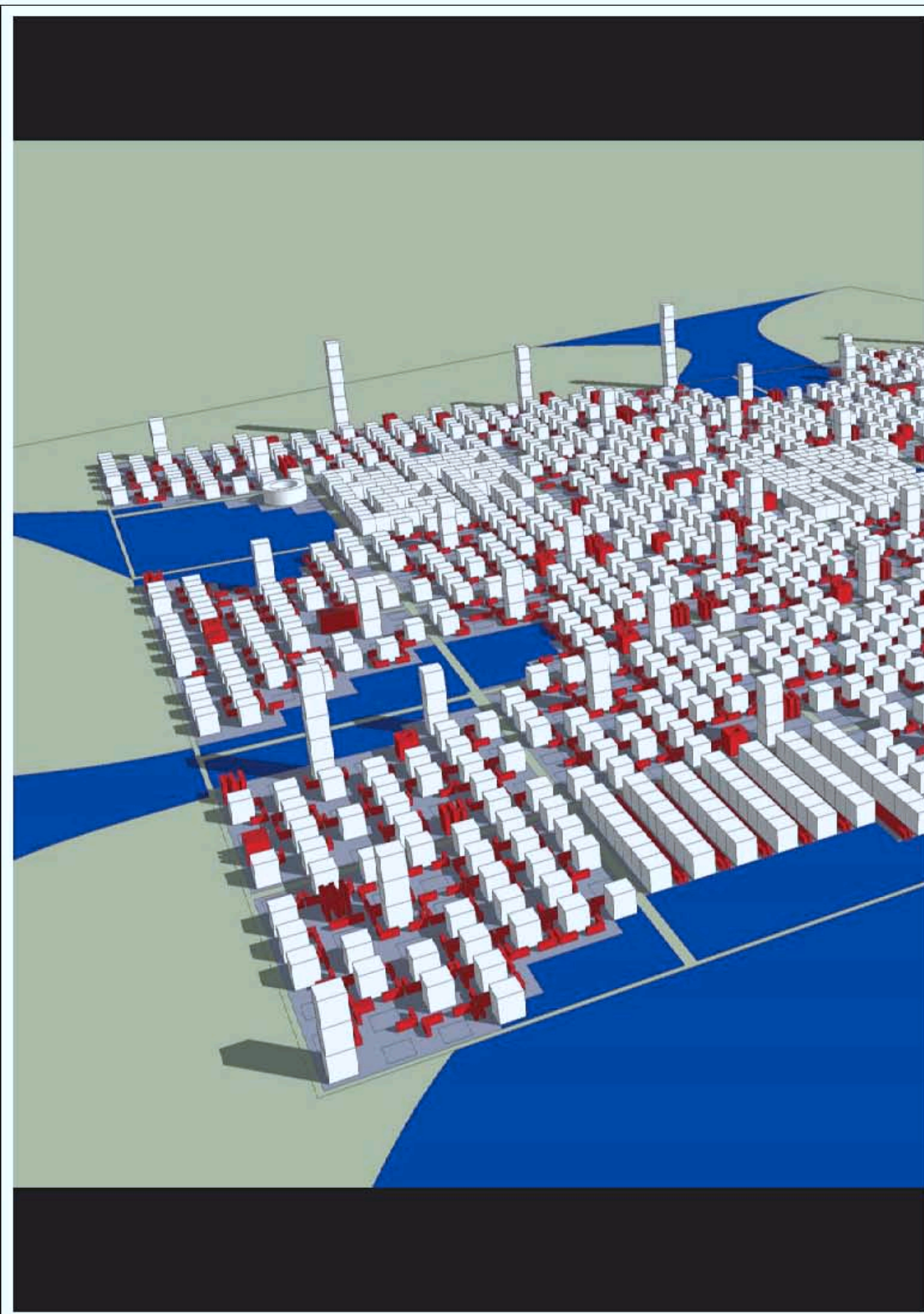


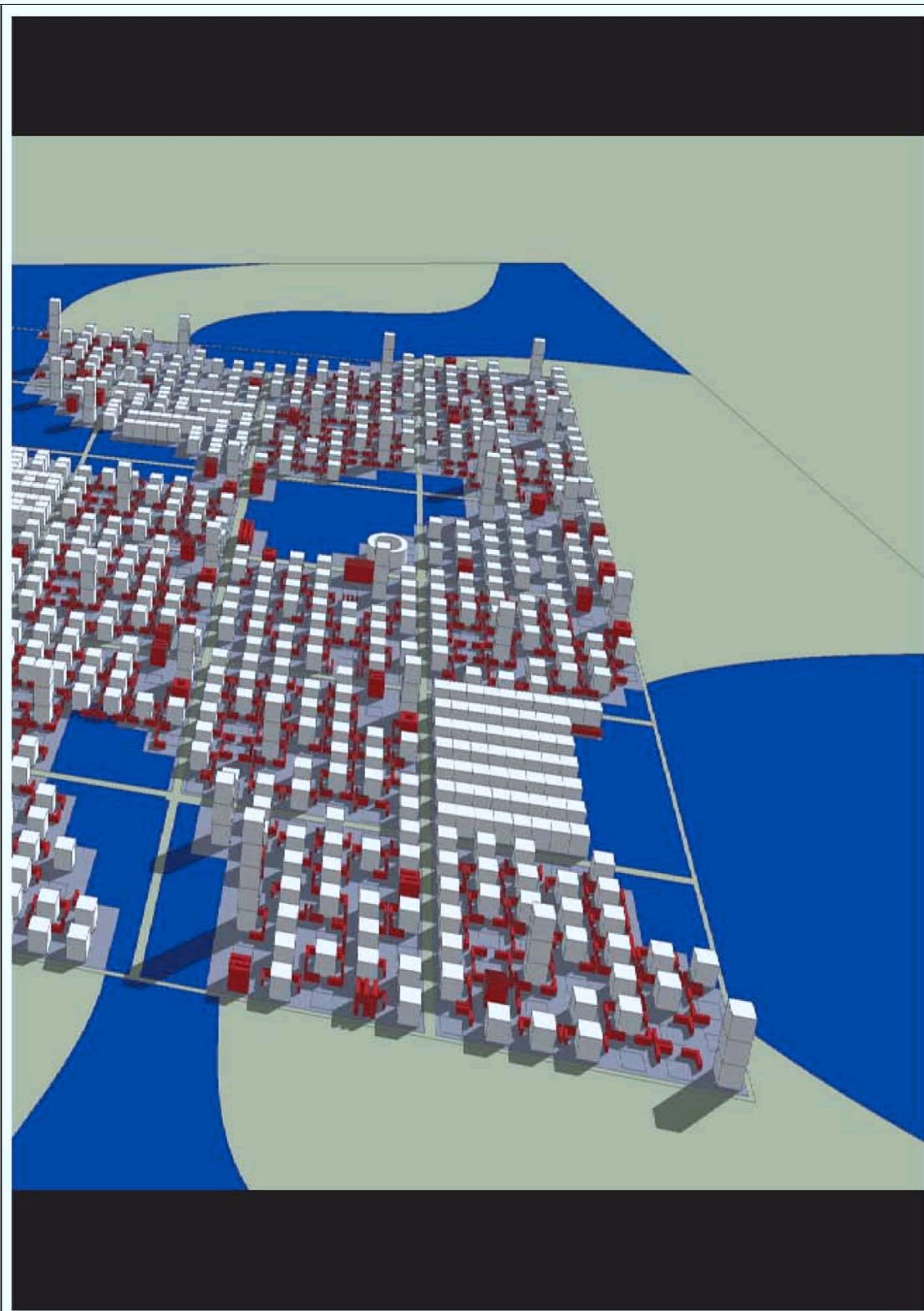
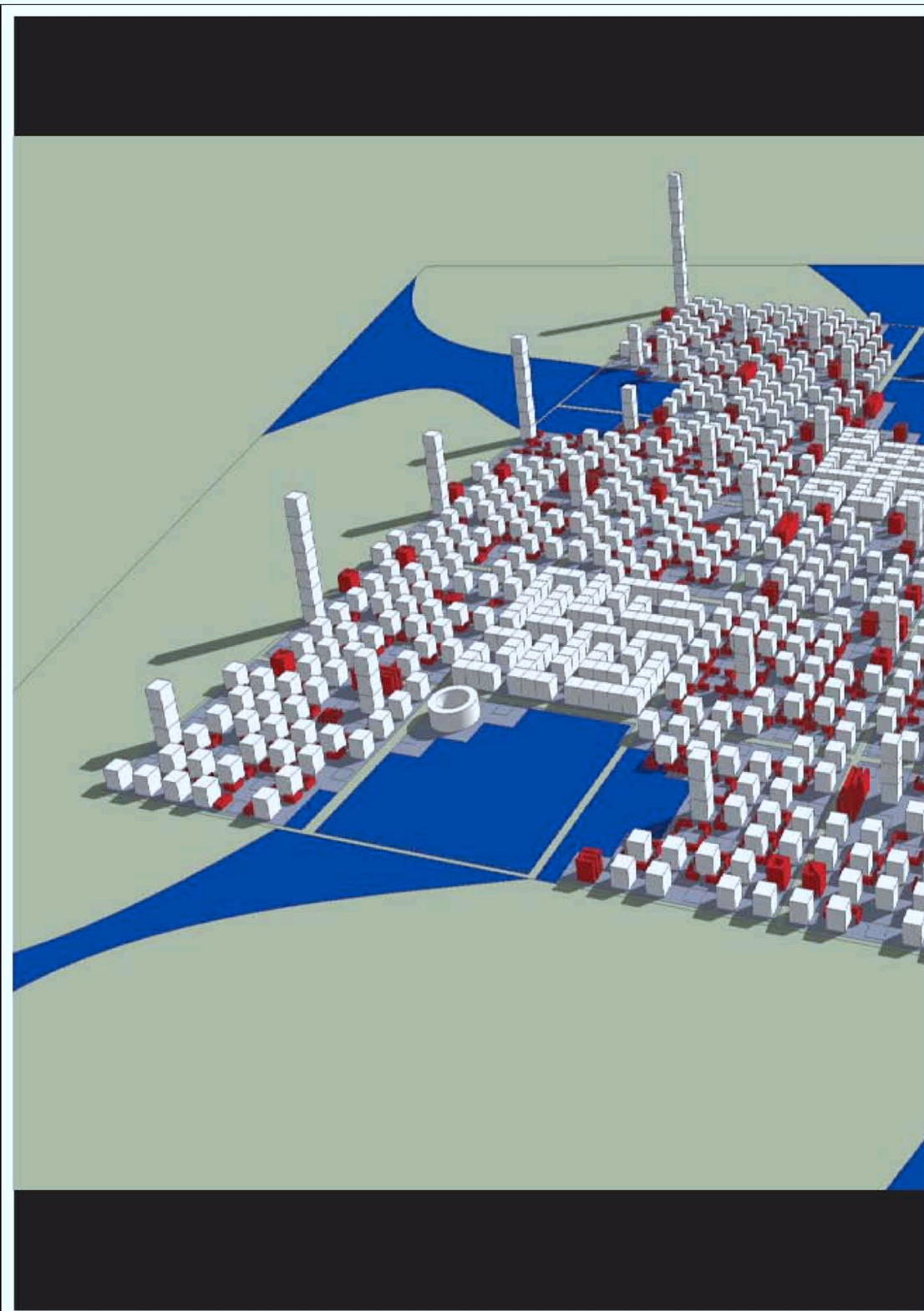


City Image









6.6

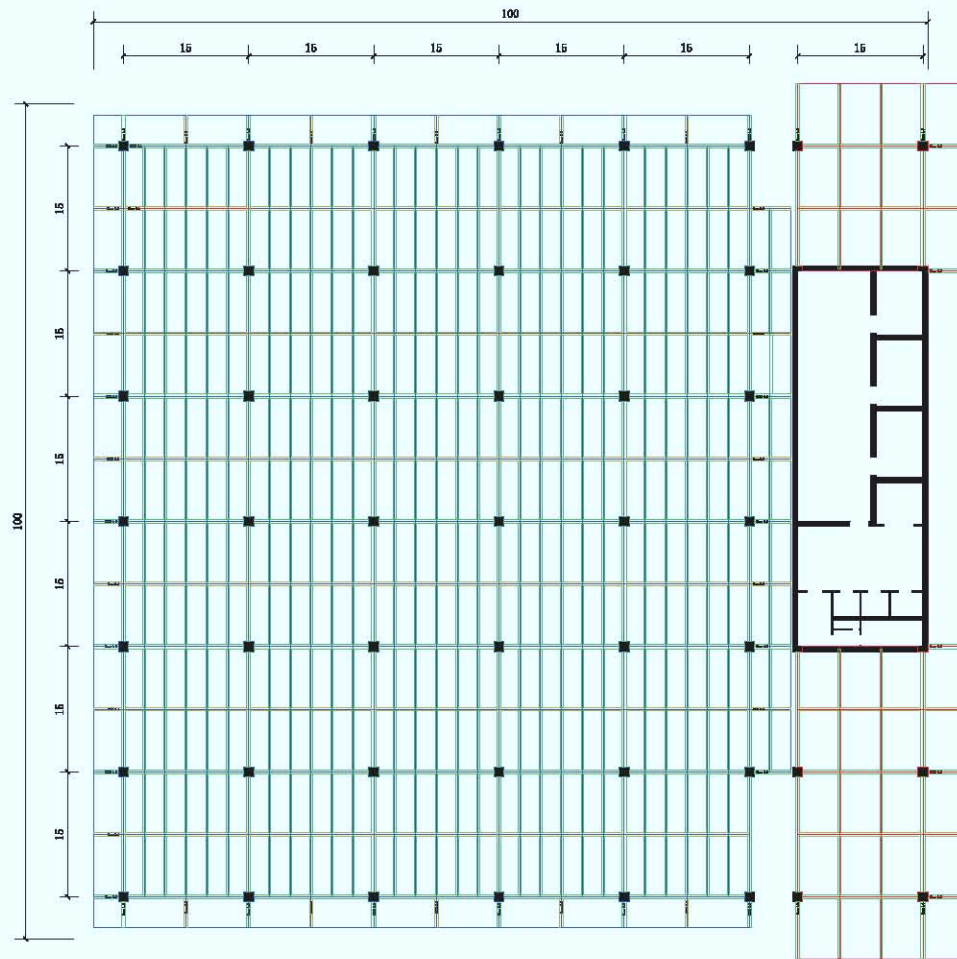
Ingredients

Farm Tower

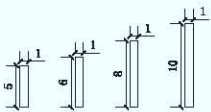
6.6.1

Modular Construction

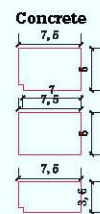
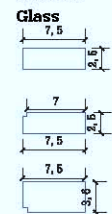
Plants farming modular construction



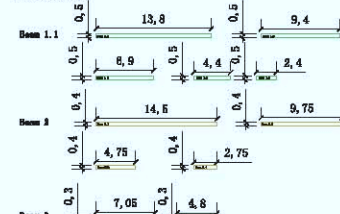
Column



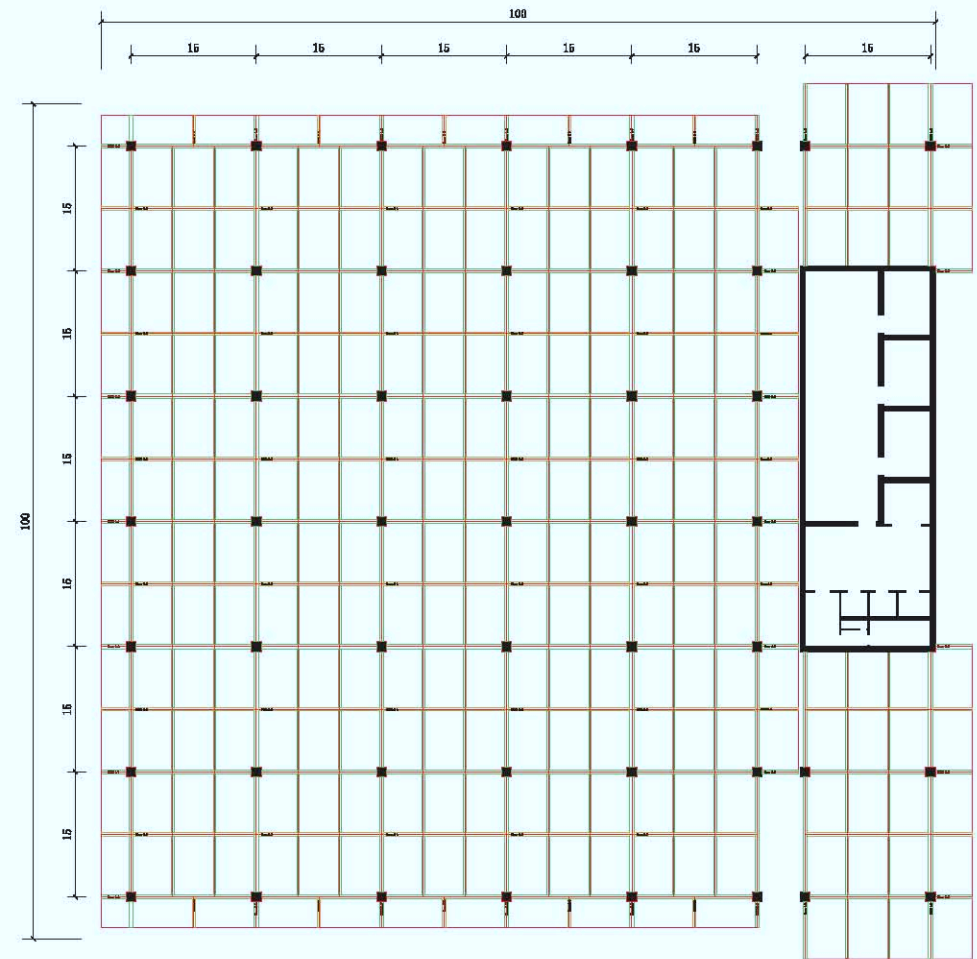
Floor



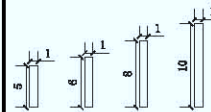
Beam



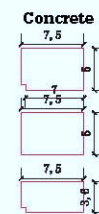
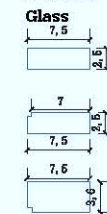
Animal farming modular construction



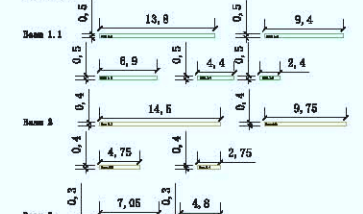
Column



Floor



Beam

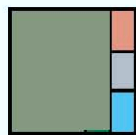


6.6.2

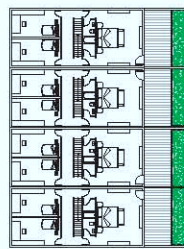
Ingredients

Farm Tower

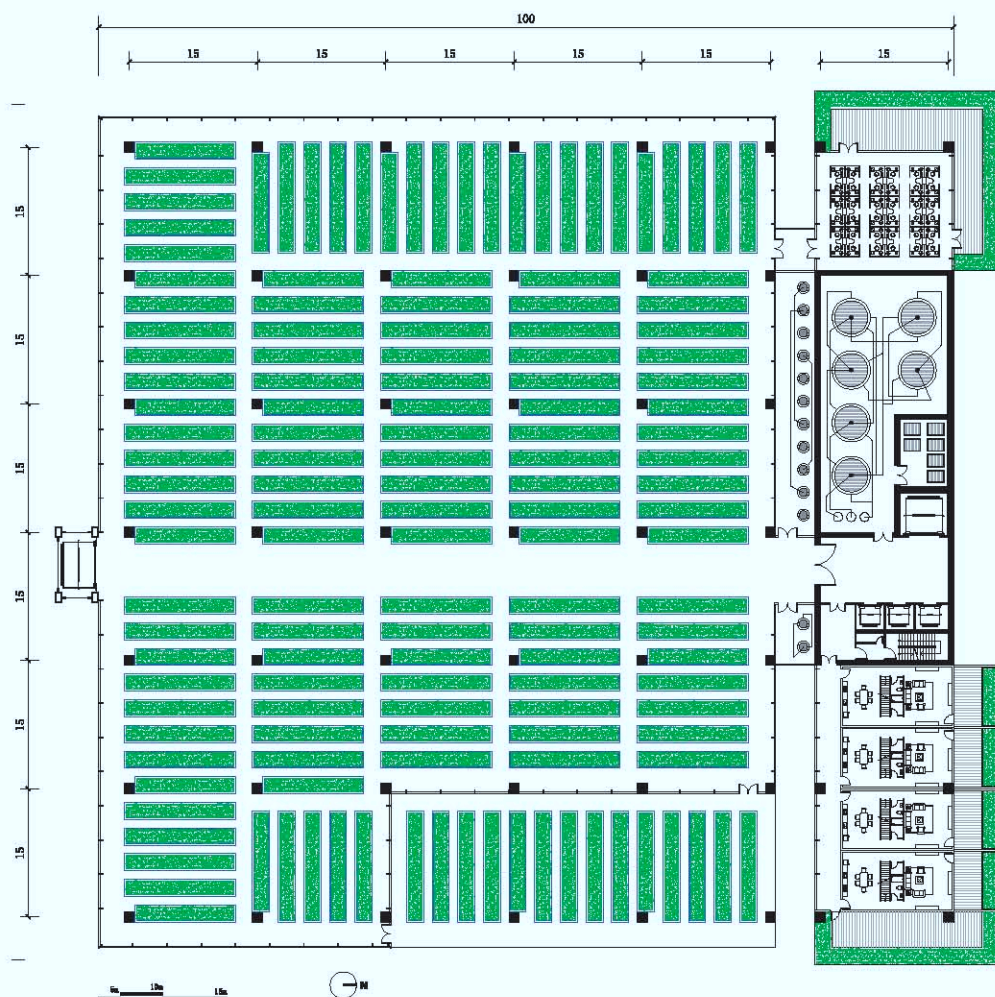
Vegetable Farm Typical Plan



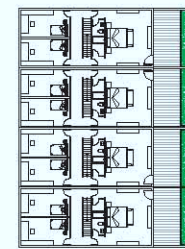
Toolbox Application



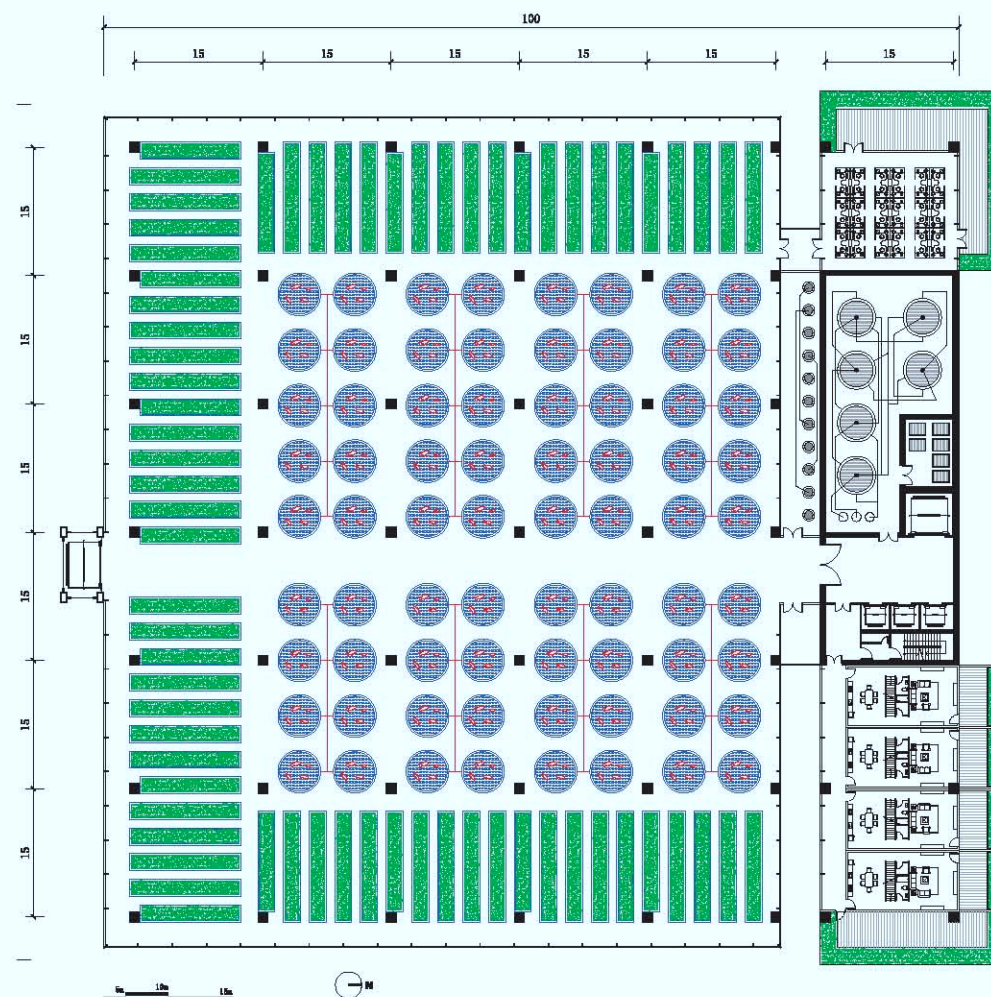
Housing second floor

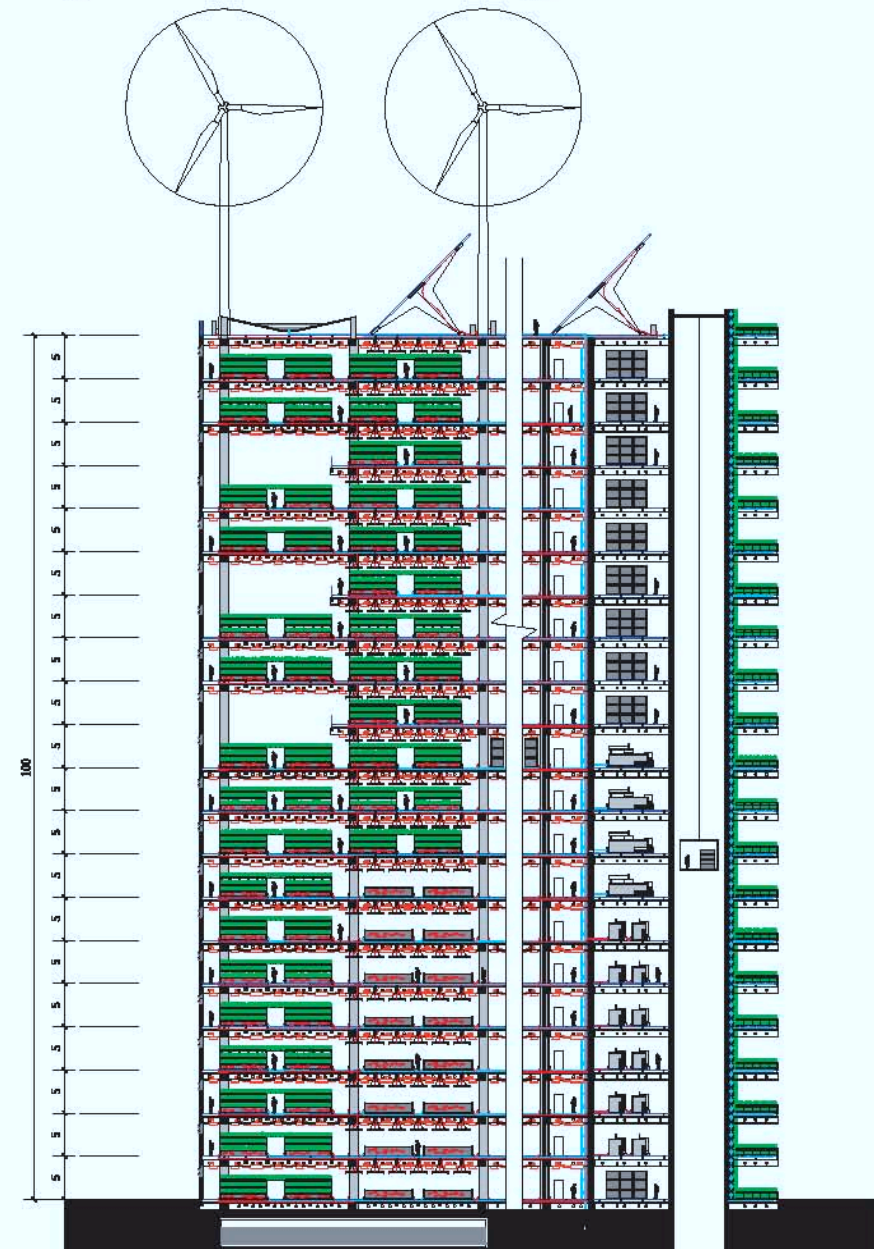


Vegetable and Fish Farm Typical Plan

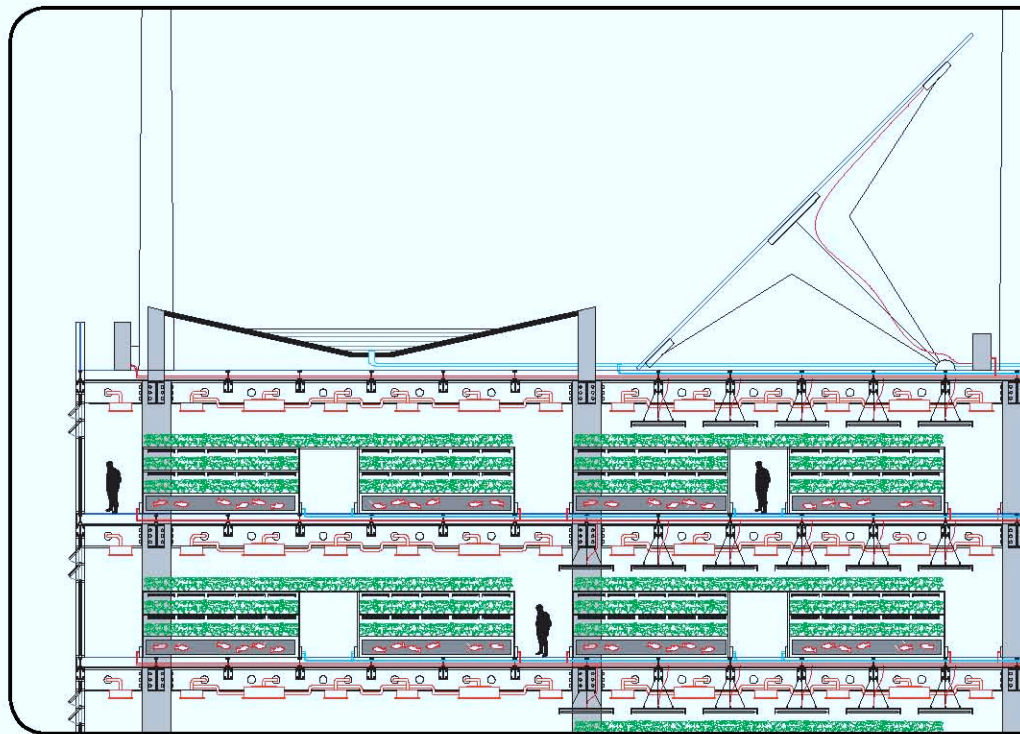


Housing second floor

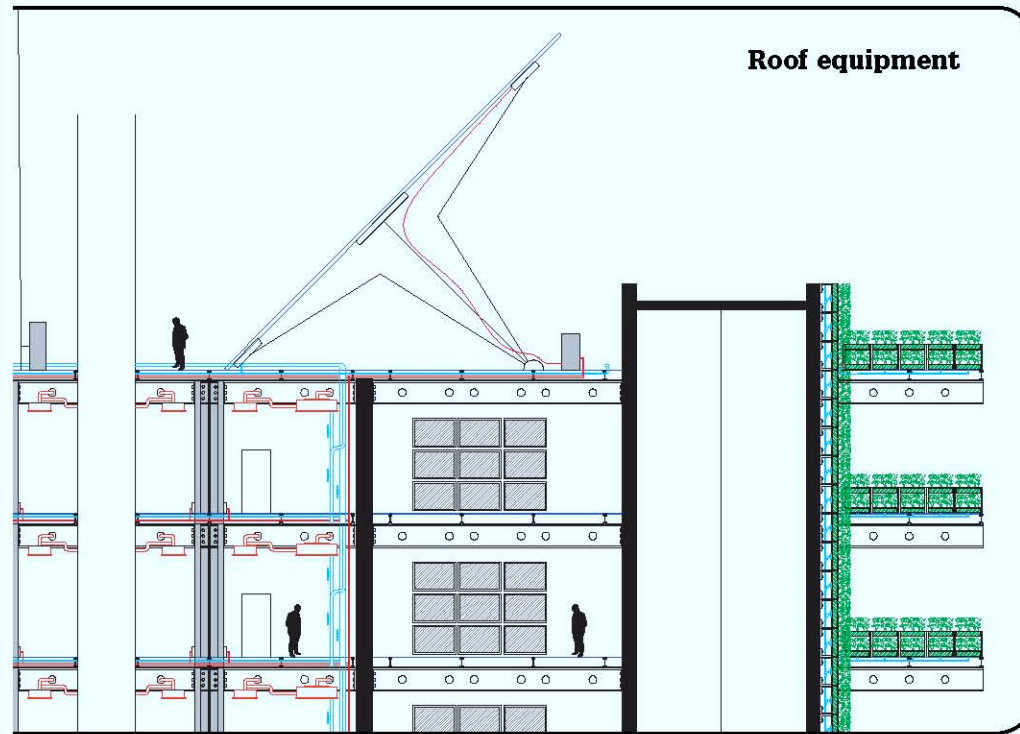




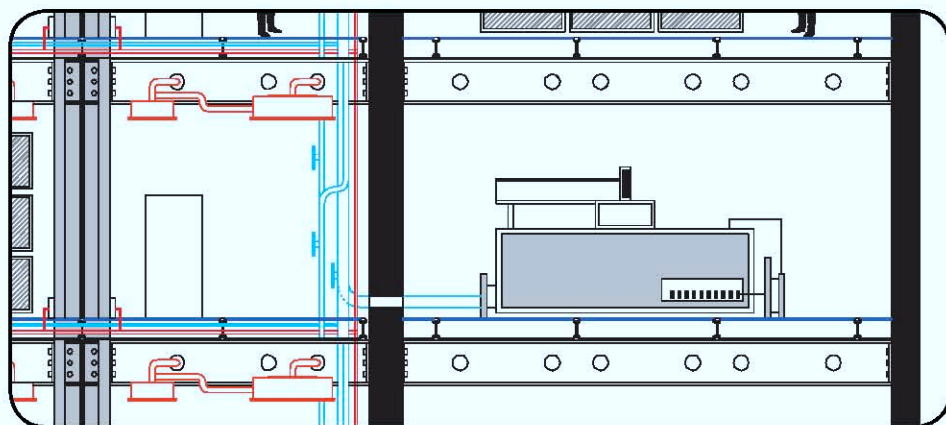
Detail



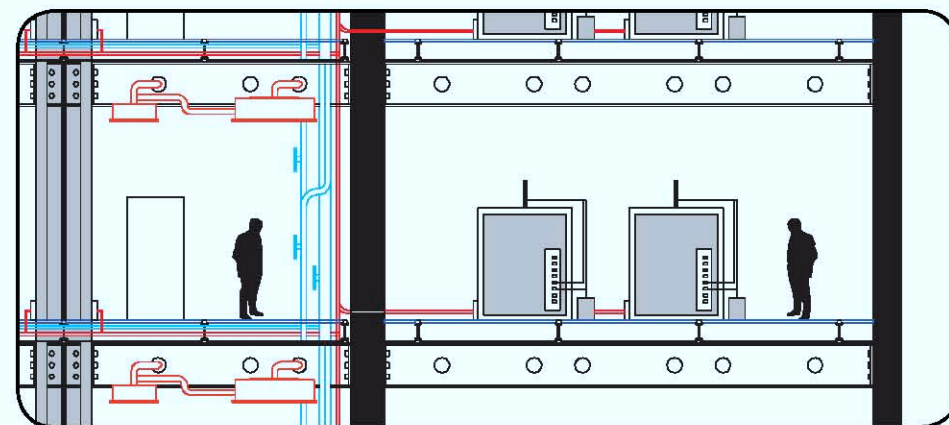
Roof equipment

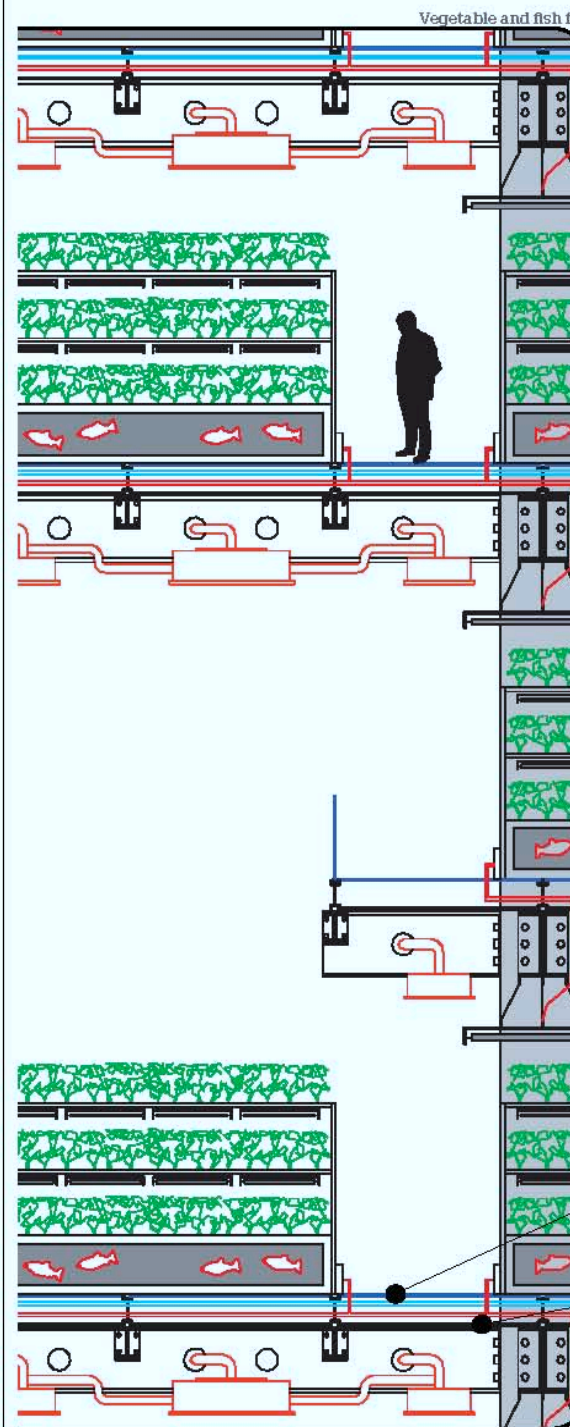
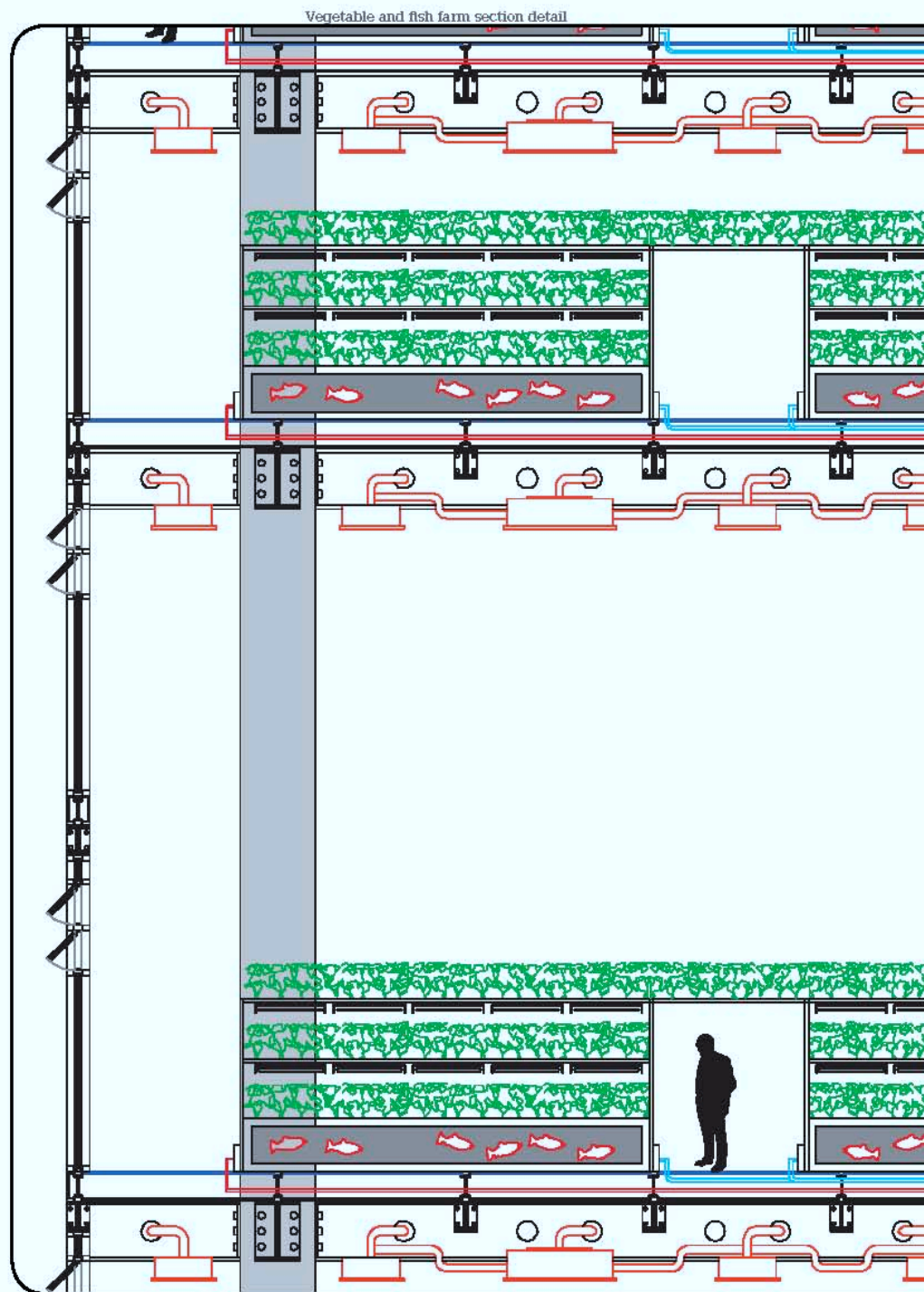


Water purification equipment



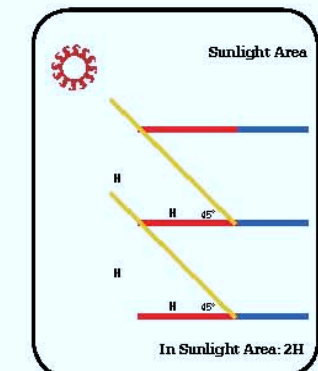
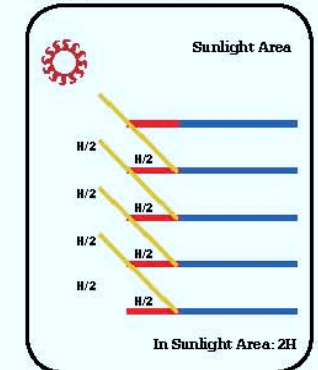
Electricity machine and equipment





Aquaponics

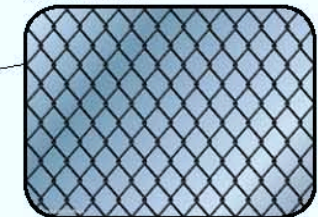
Sunlight analysis



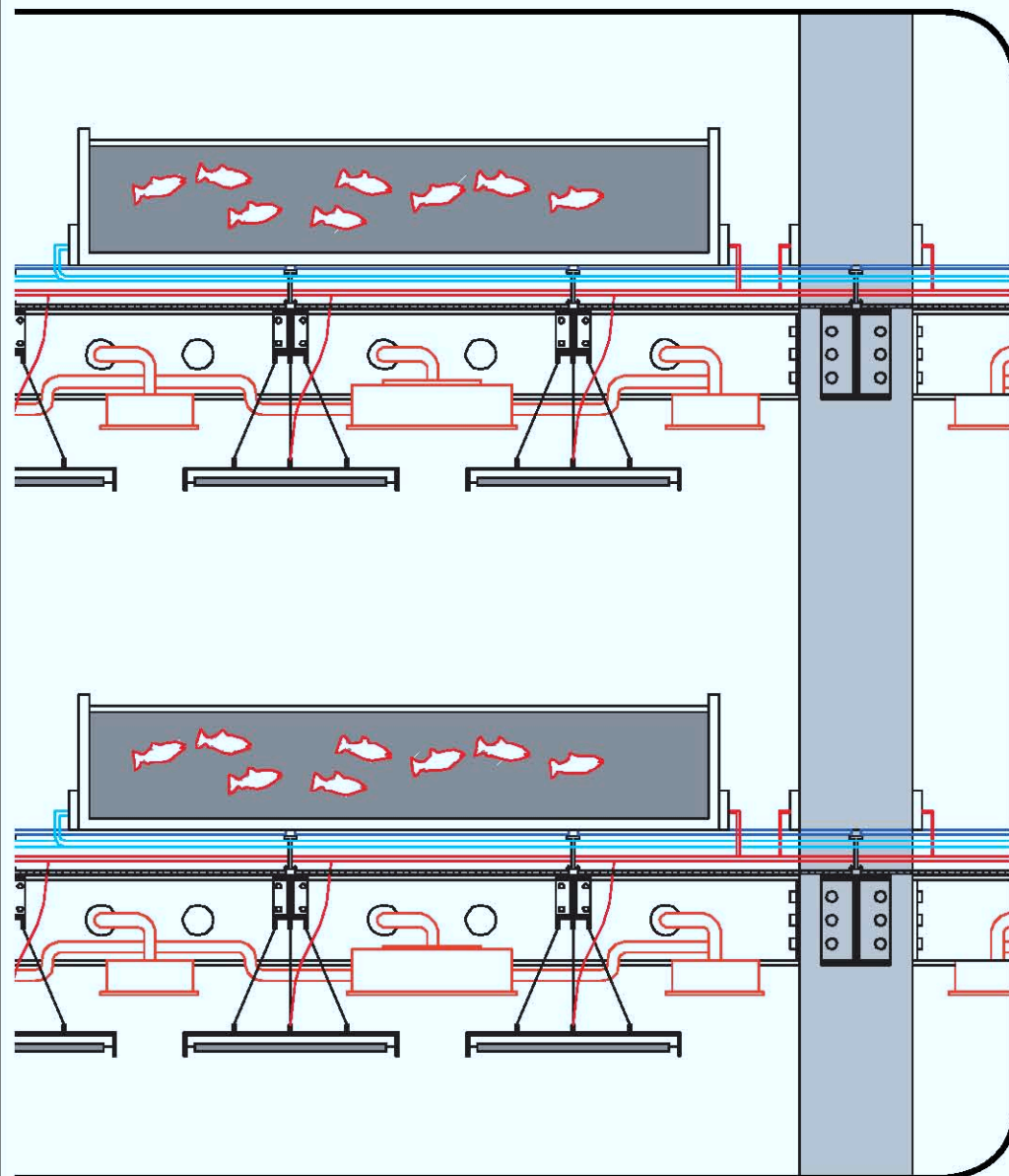
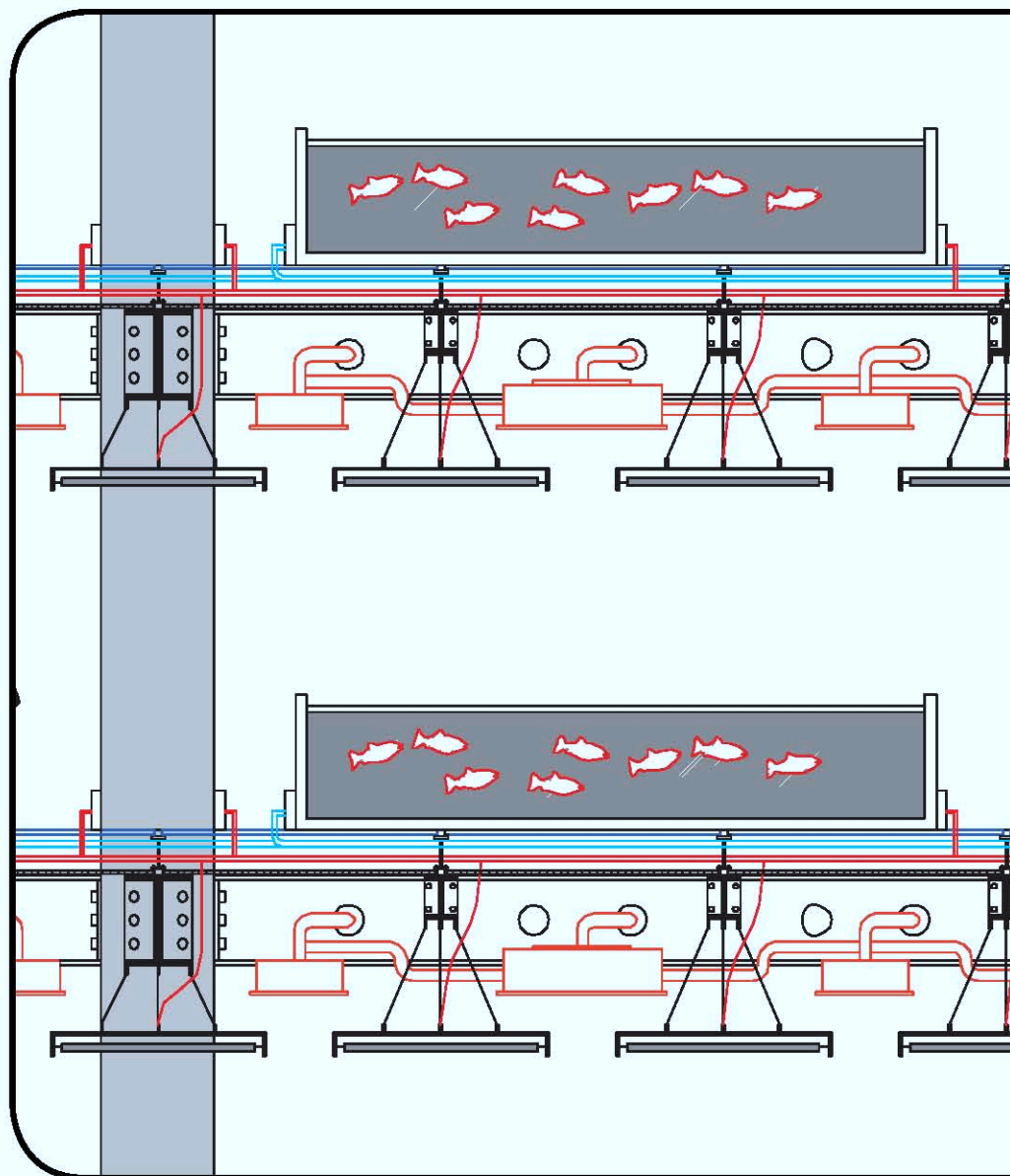
Modular glass floor



Metal mesh



Fish Farming



Vegetable and fish farm section

Solar panels

A solar cell (also called photovoltaic cell or photoelectric cell) is a solid state electrical device that converts the energy of light directly into electricity by the photovoltaic effect.



Aquaponics

Aquaponics is a sustainable food production system that combines a traditional aquaculture (raising aquatic animals such as snails, fish, crayfish or prawns in tanks) with hydroponics (cultivating plants in water) in a symbiotic environment.



Hydroponics

Hydroponics is a subset of hydroculture and is a method of growing plants using mineral nutrient solutions, in water, without soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only or in an inert medium, such as perlite, gravel, mineral wool, or coconut husk.

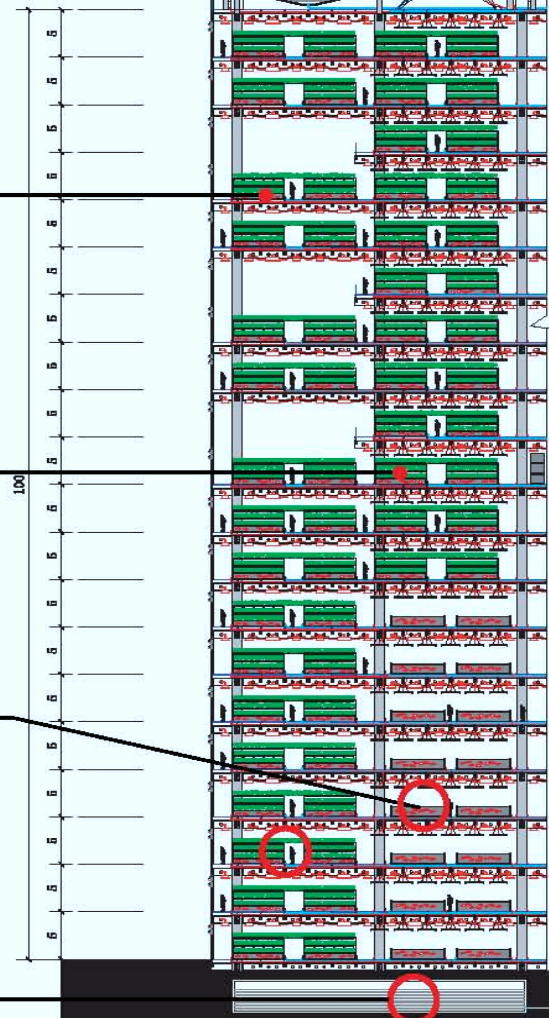
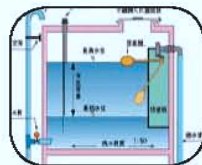


Integrated fish farming

If the system lives in a greenhouse, it adapts to almost all temperate climates, and may also adapt to tropical climates. The main environmental impact is discharge of water that must be salted to maintain the fishes' electrolyte balance.



Rain water tank

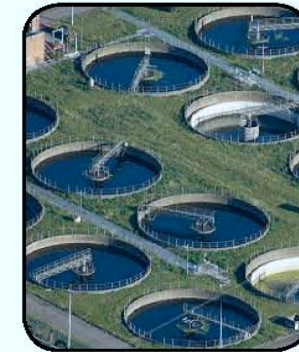


Vegetable and fish farm section



Food storage

Waste storage (for Green manure)

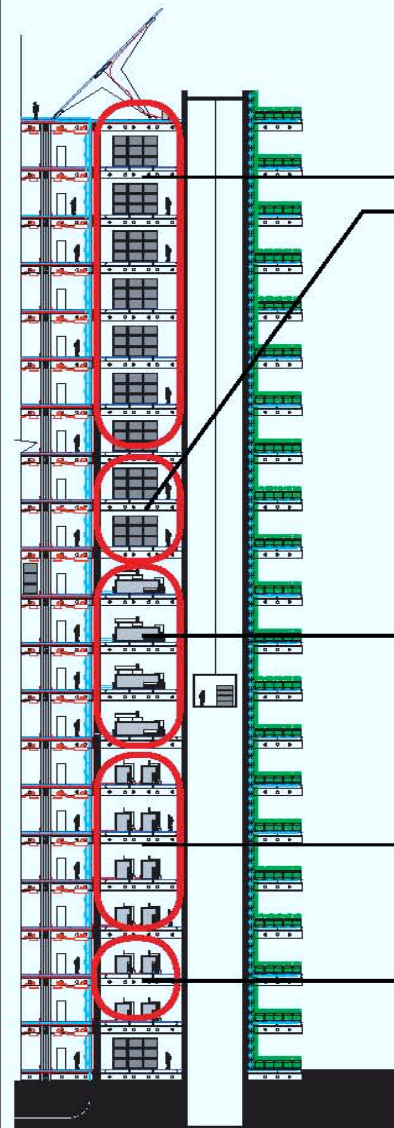


Water purification

1. Anaerobic reactor
2. Anoxic reactor
3. Aerobic reactors
4. Filter and clarifier

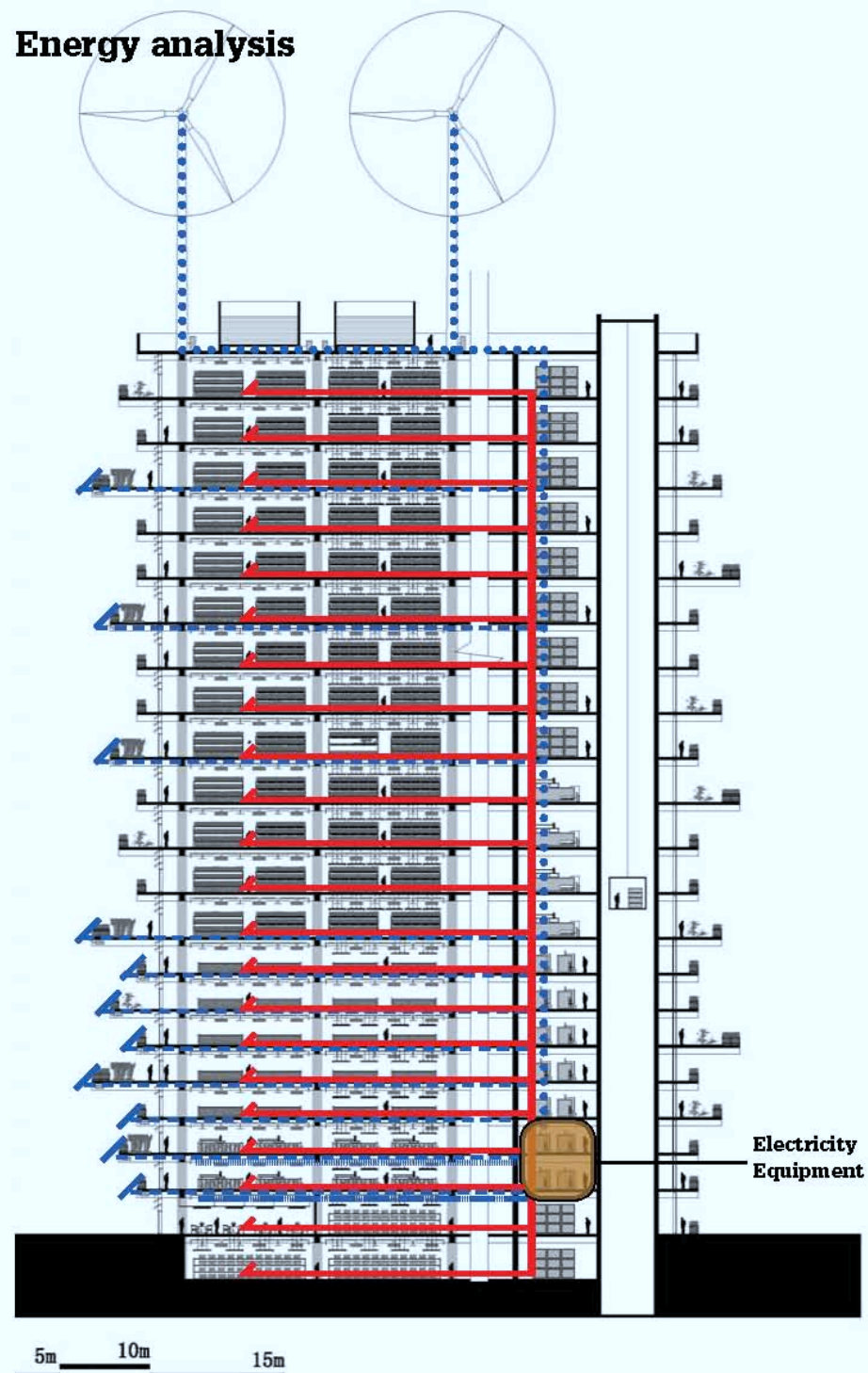
Machine and equipment of fish farming

Electricity machine and equipment

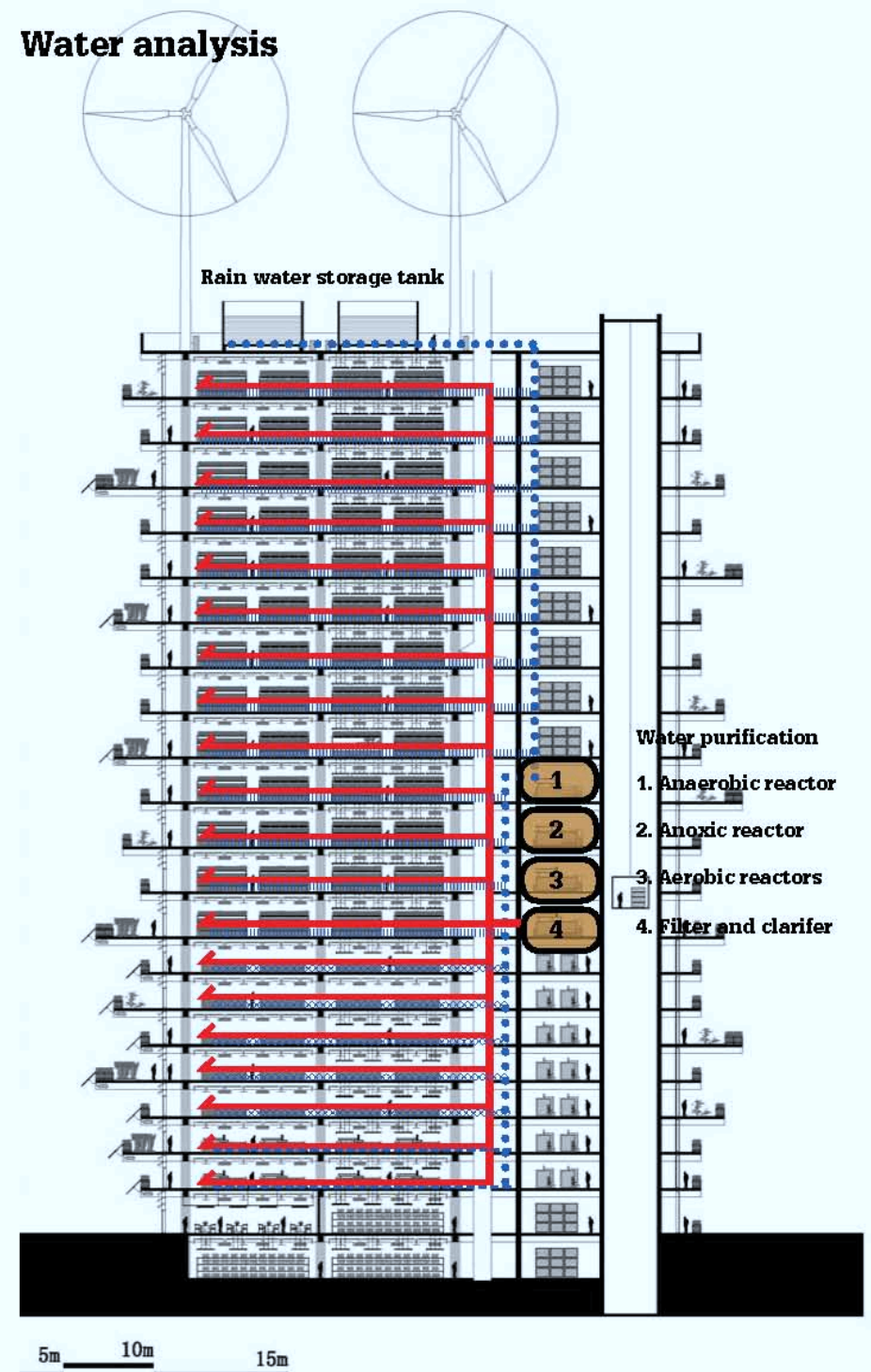


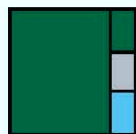
Vegetable and fish farming tower

Energy analysis

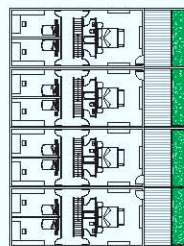


Water analysis

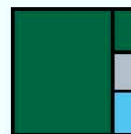
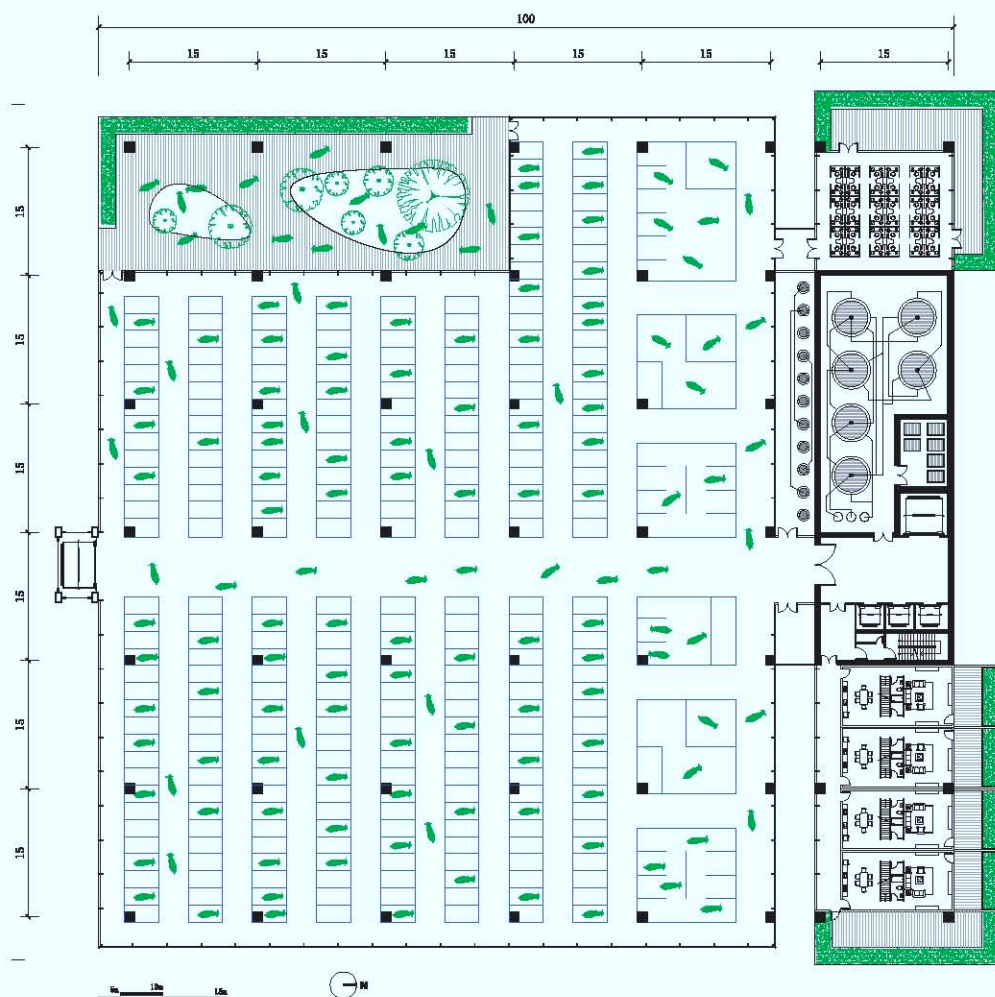




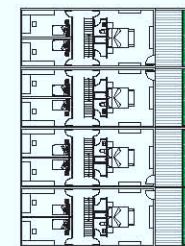
Toolbox Application



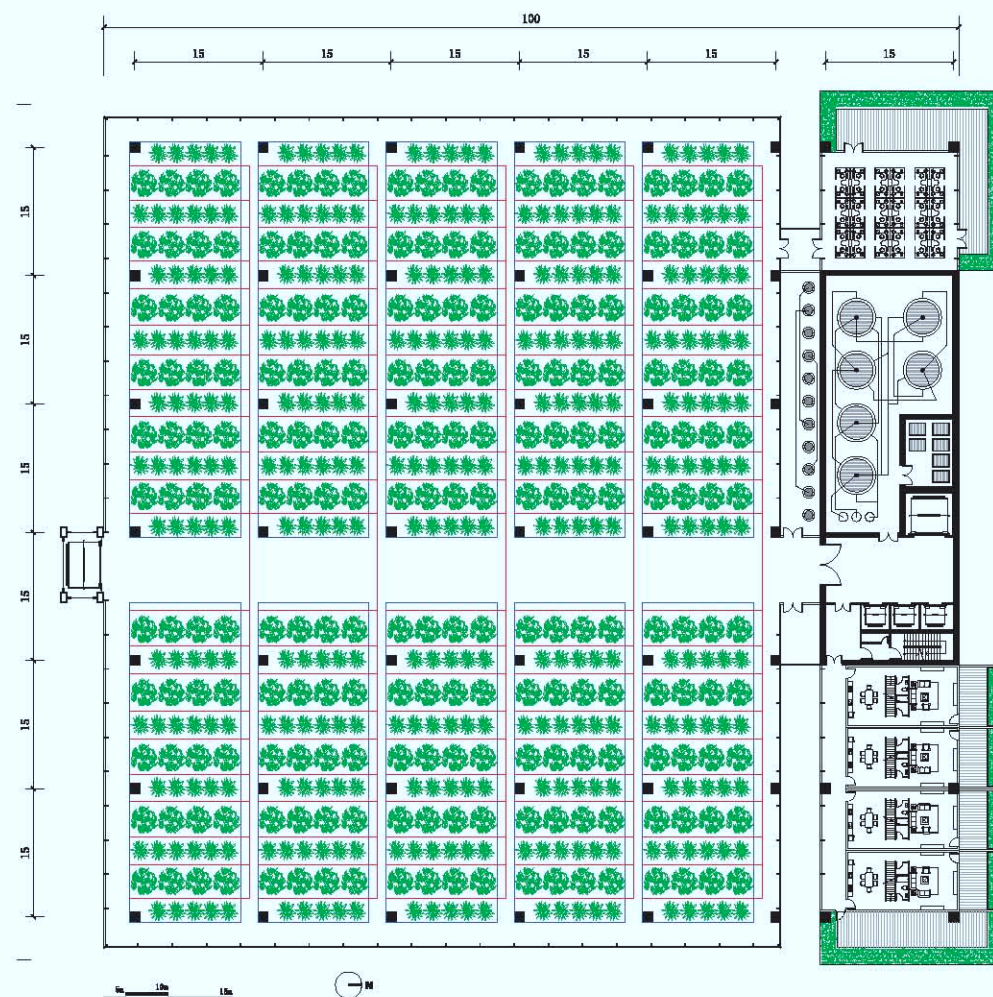
Housing second floor



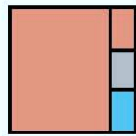
Toolbox Application



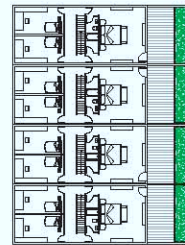
Housing second floor



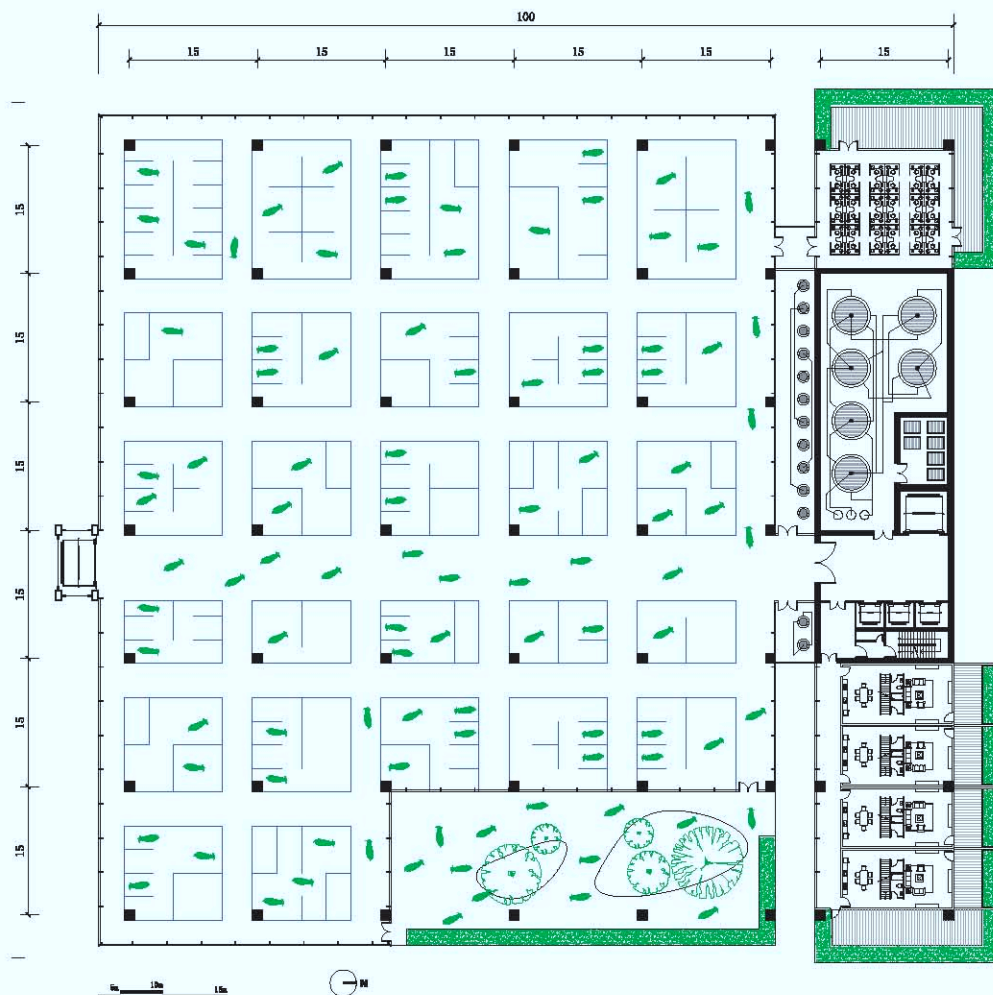
Organic Pig Farm Typical Plan



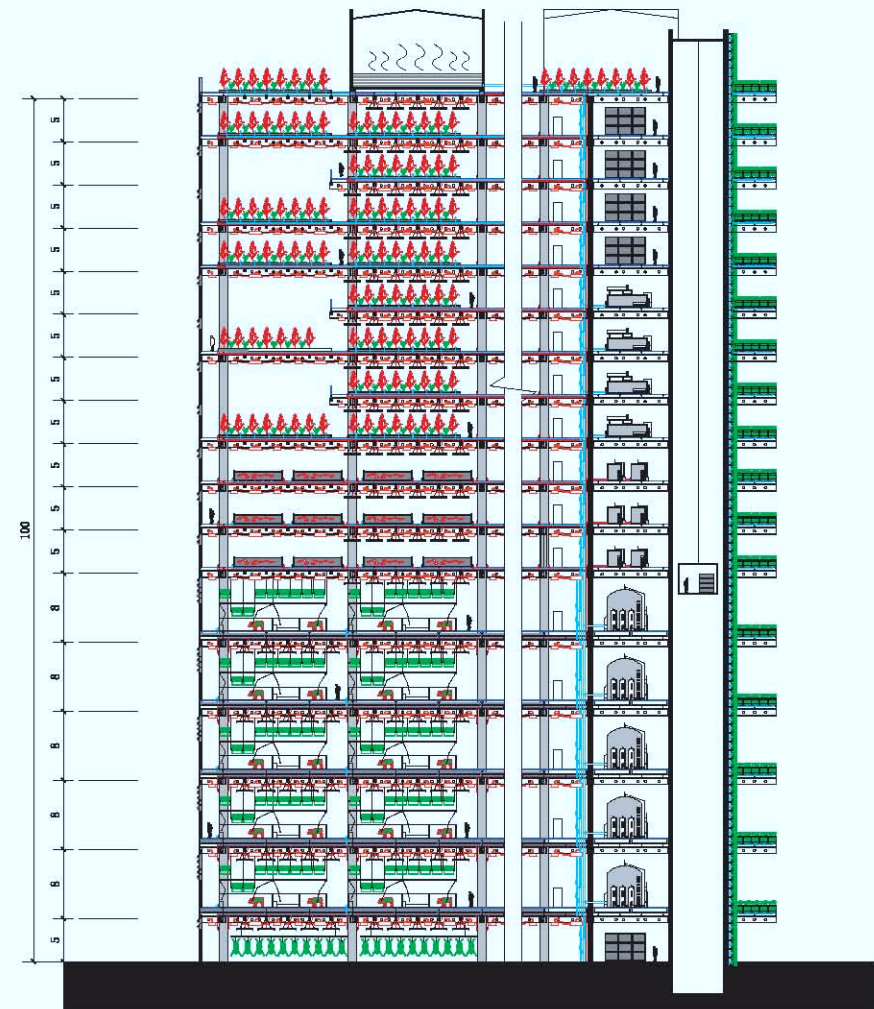
Toolbox Application



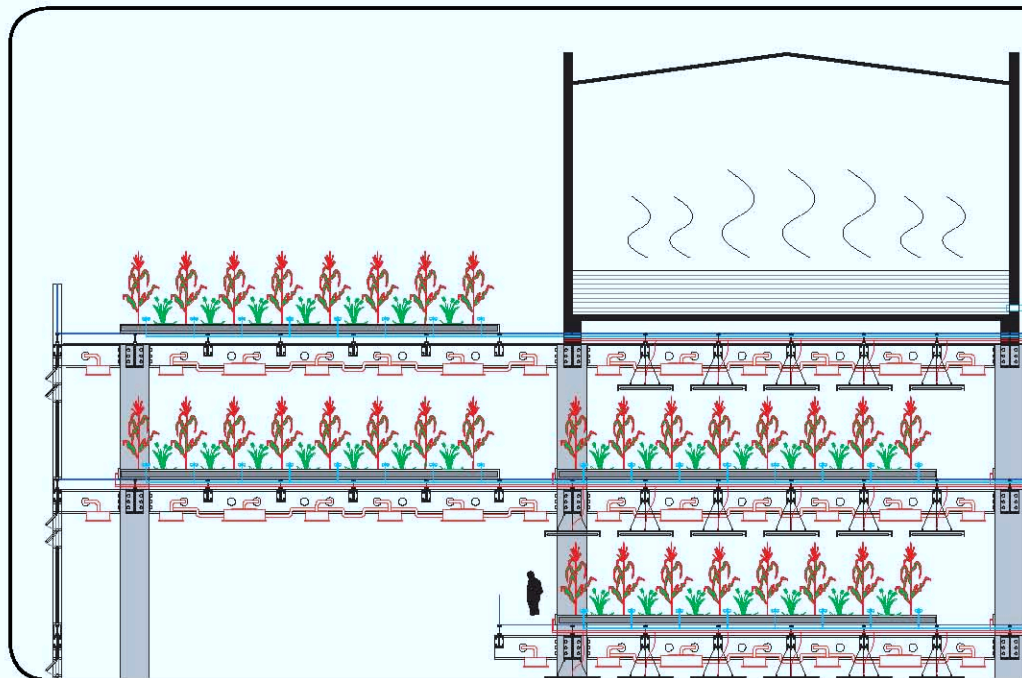
Housing second floor



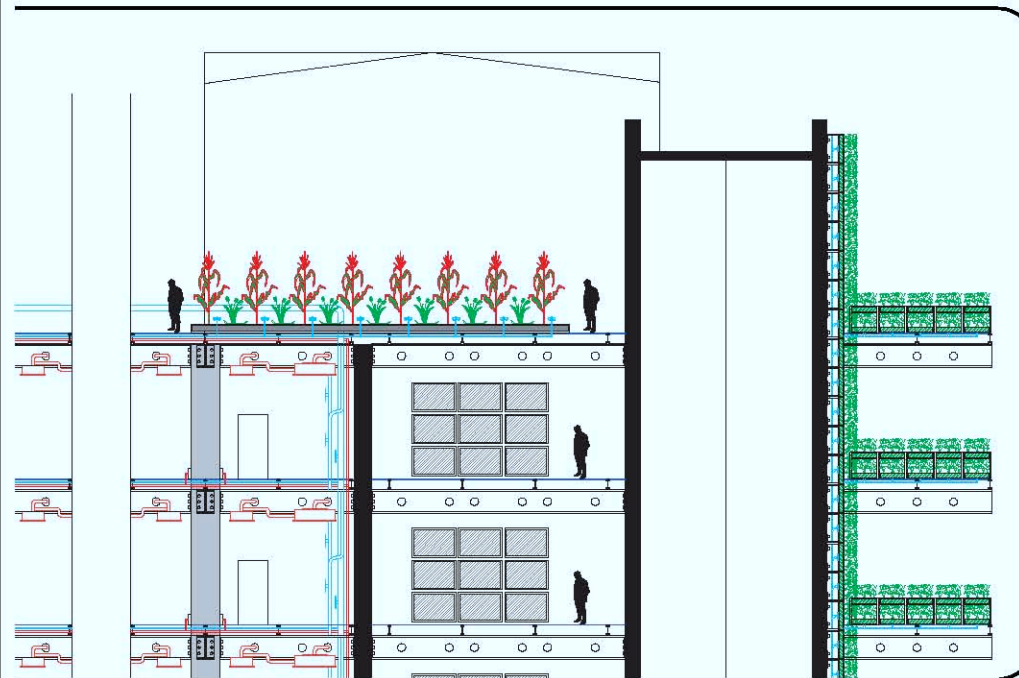
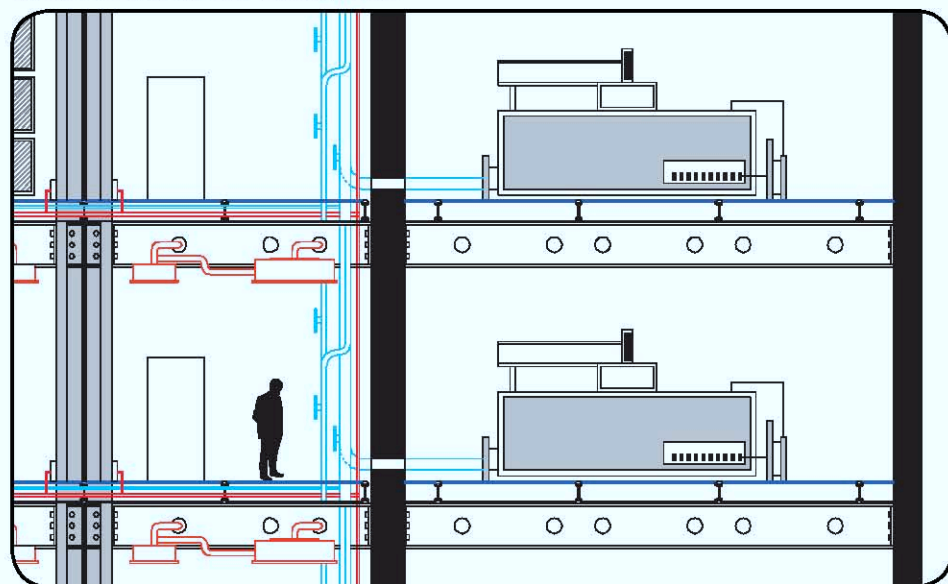
Organic Pig Farm Typical Section



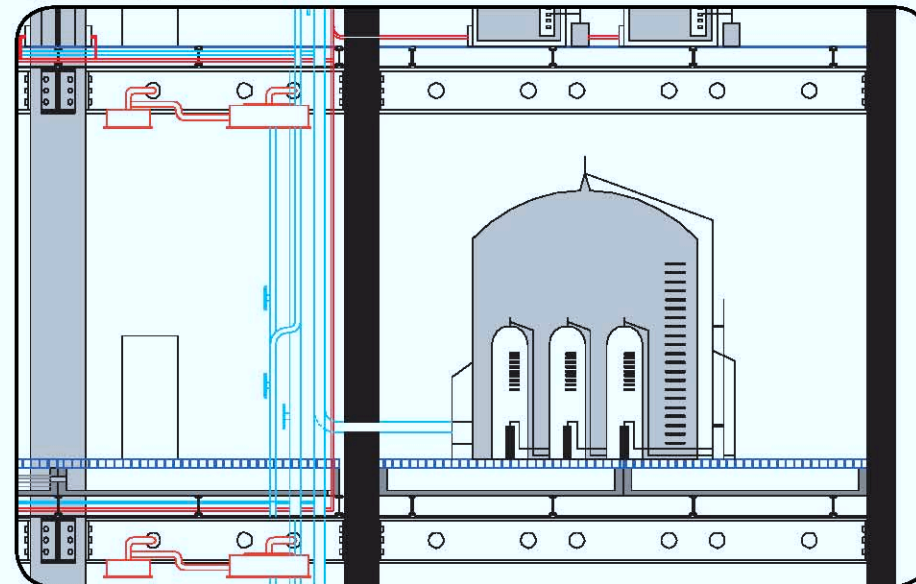
Detail



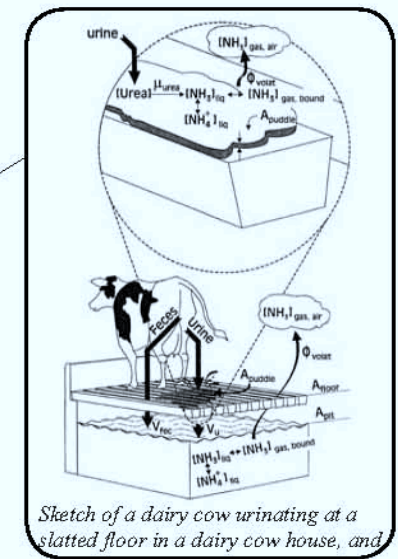
Water purification equipment



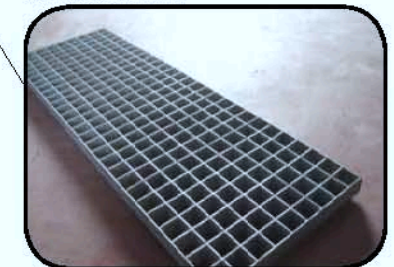
Anaerobic equipment



Organic pig farming



Metal grid floor



Intercropping

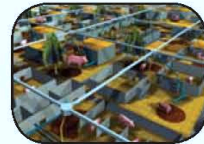
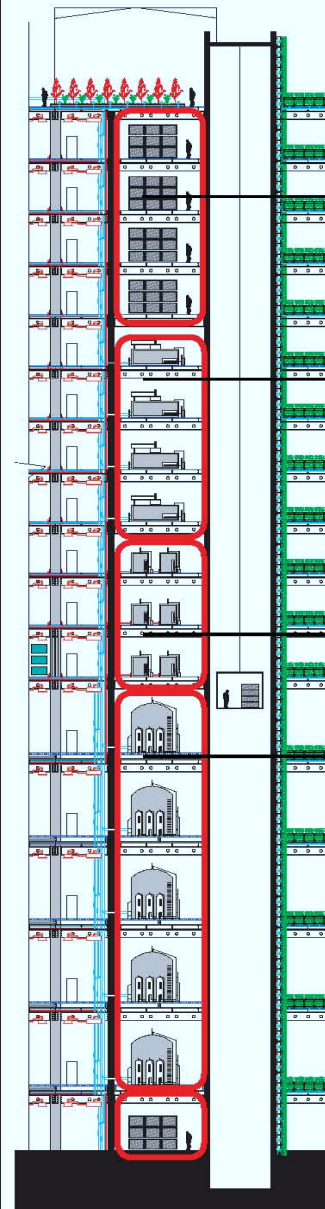
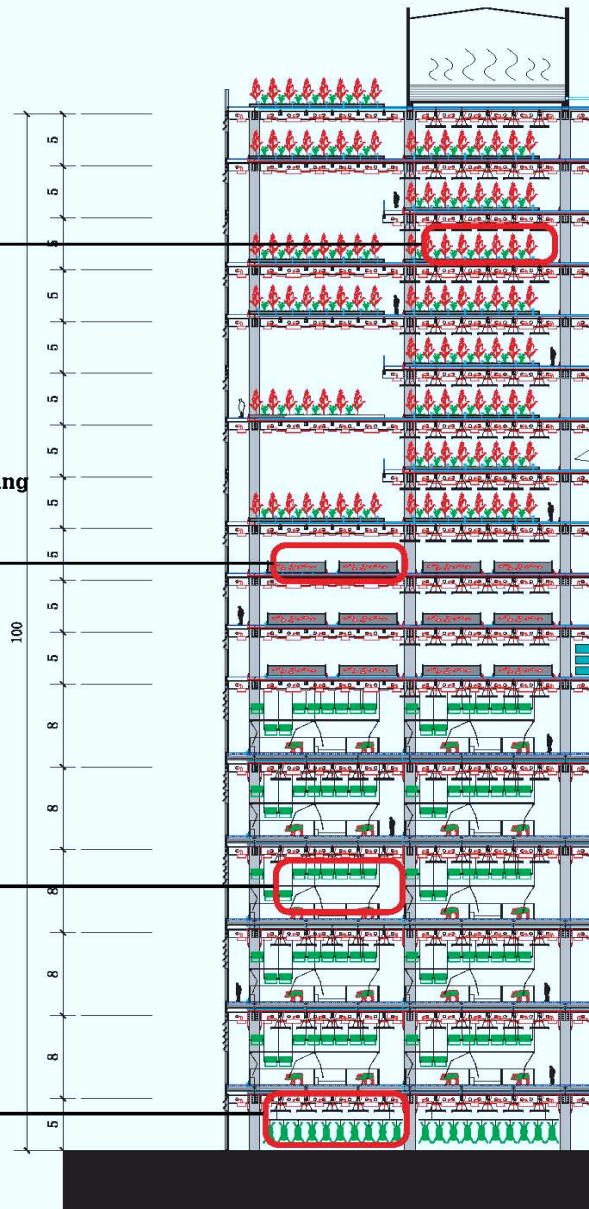
Intercropping is the practice of growing two or more crops in proximity. The most common goal of intercropping is to produce a greater yield on a given piece of land by making use of resources that would otherwise not be utilized by a single crop.

**Integrated fish farming**

If the system lives in a greenhouse, it adapts to almost all temperate climates, and may also adapt to tropical climates. The main environmental impact is discharge of water that must be salted to maintain the fishes' electrolyte balance.

**Organic pig farming**

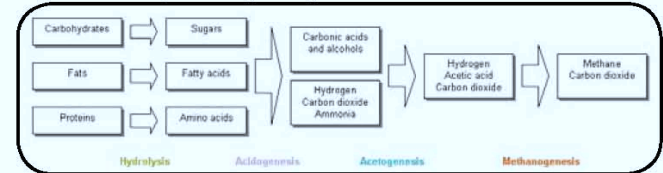
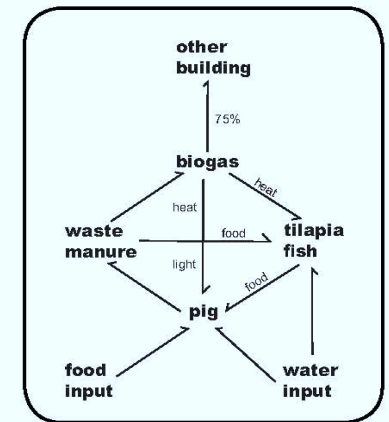
required that pigs be given environmental enrichment, specifically they must have "permanent access to a sufficient quantity of material to enable proper investigation and manipulation activities..."

**pig slaughterhouse****Food storage****Water purification**

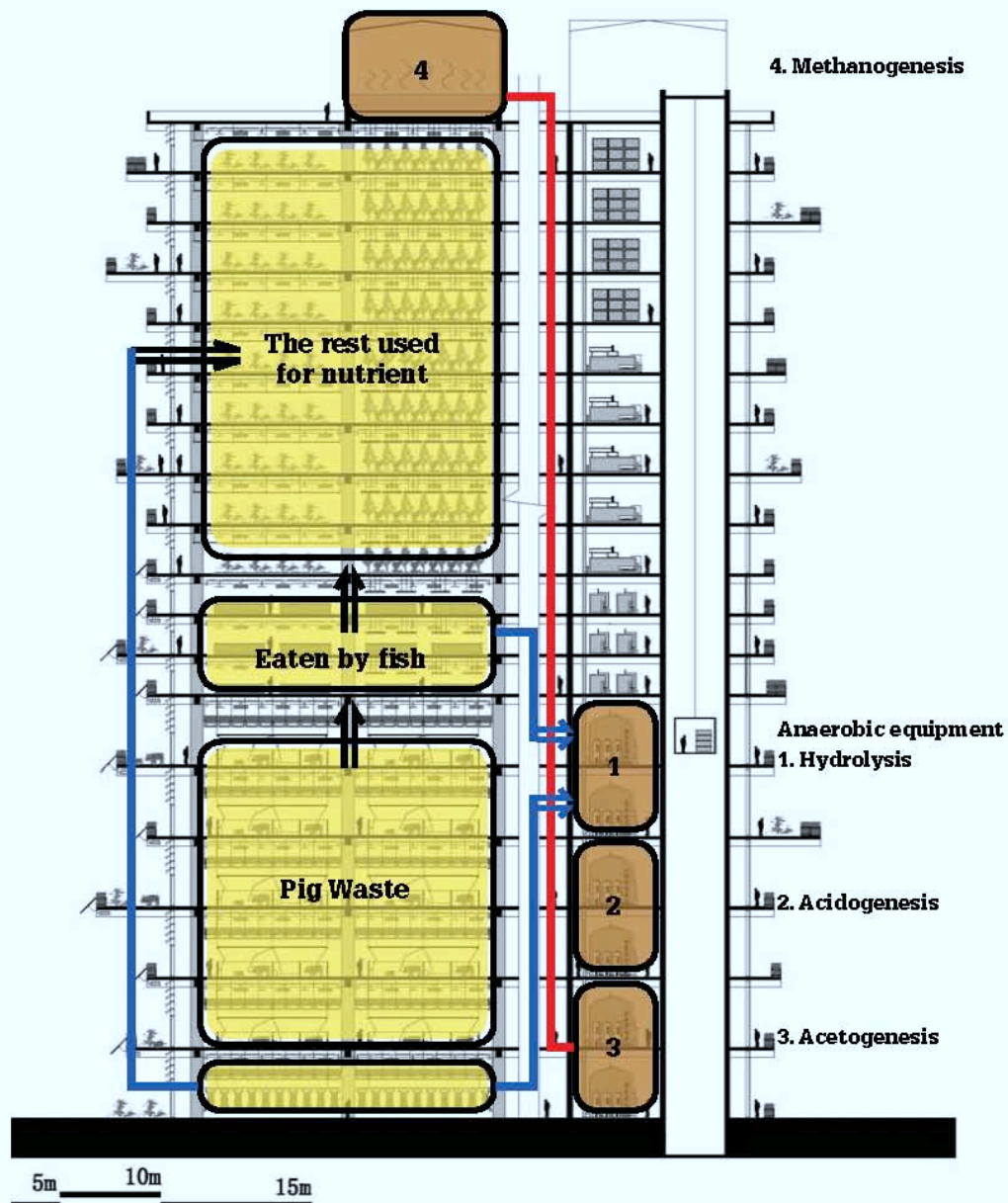
1. Anaerobic reactor
2. Anoxic reactor
3. Aerobic reactors
4. Filter and clarifier

Machine and equipment of fish farming**Anaerobic equipment**

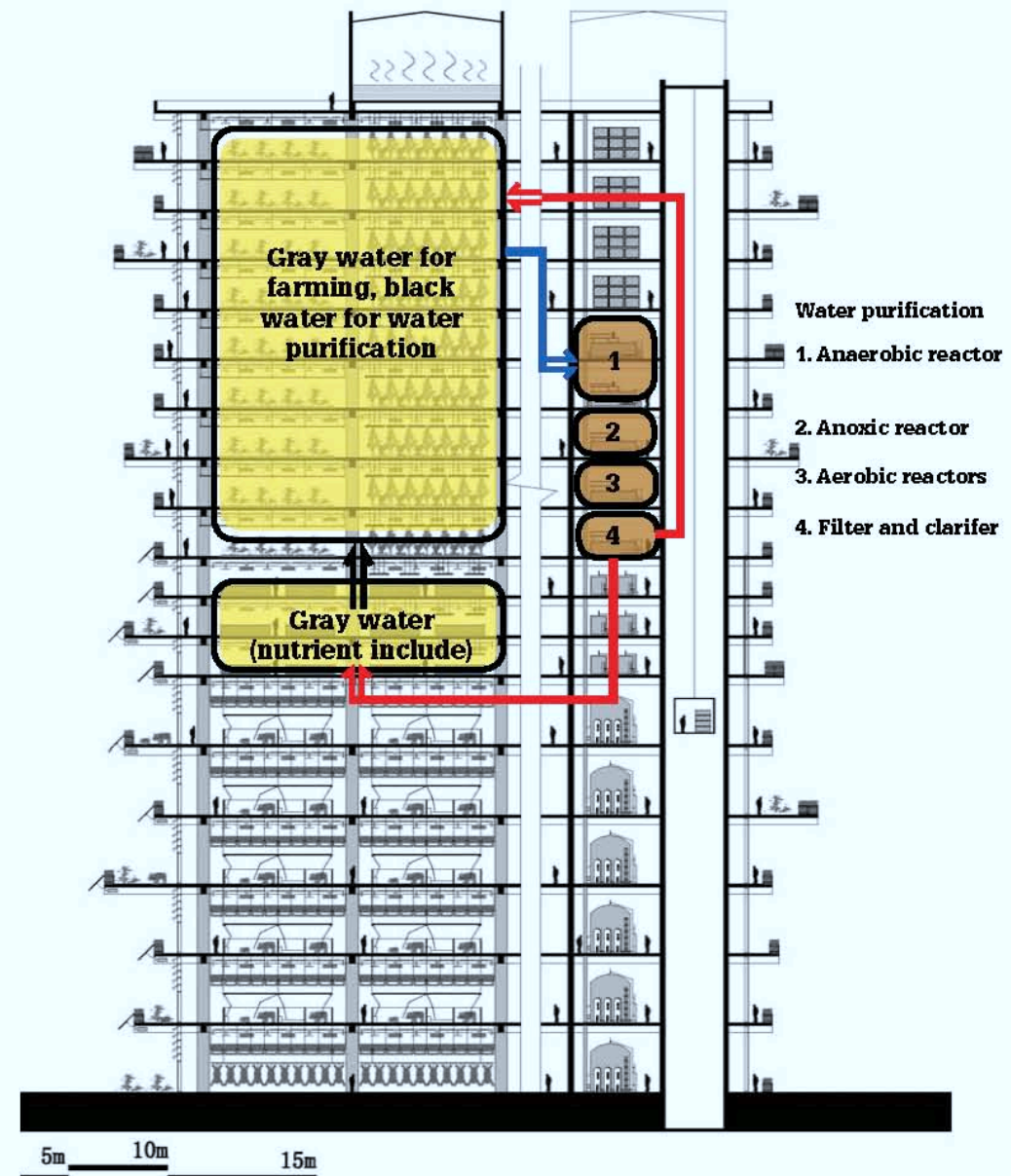
1. Hydrolysis
2. Acidogenesis
3. Acetogenesis
4. Methanogenesis

Anaerobic digestion principle flow chart**Organic pig farming tower****Pig Farming Principle Flow Chart**

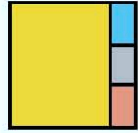
Energy analysis (include waste)



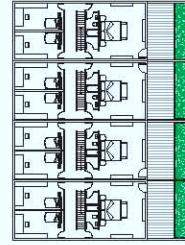
Water analysis



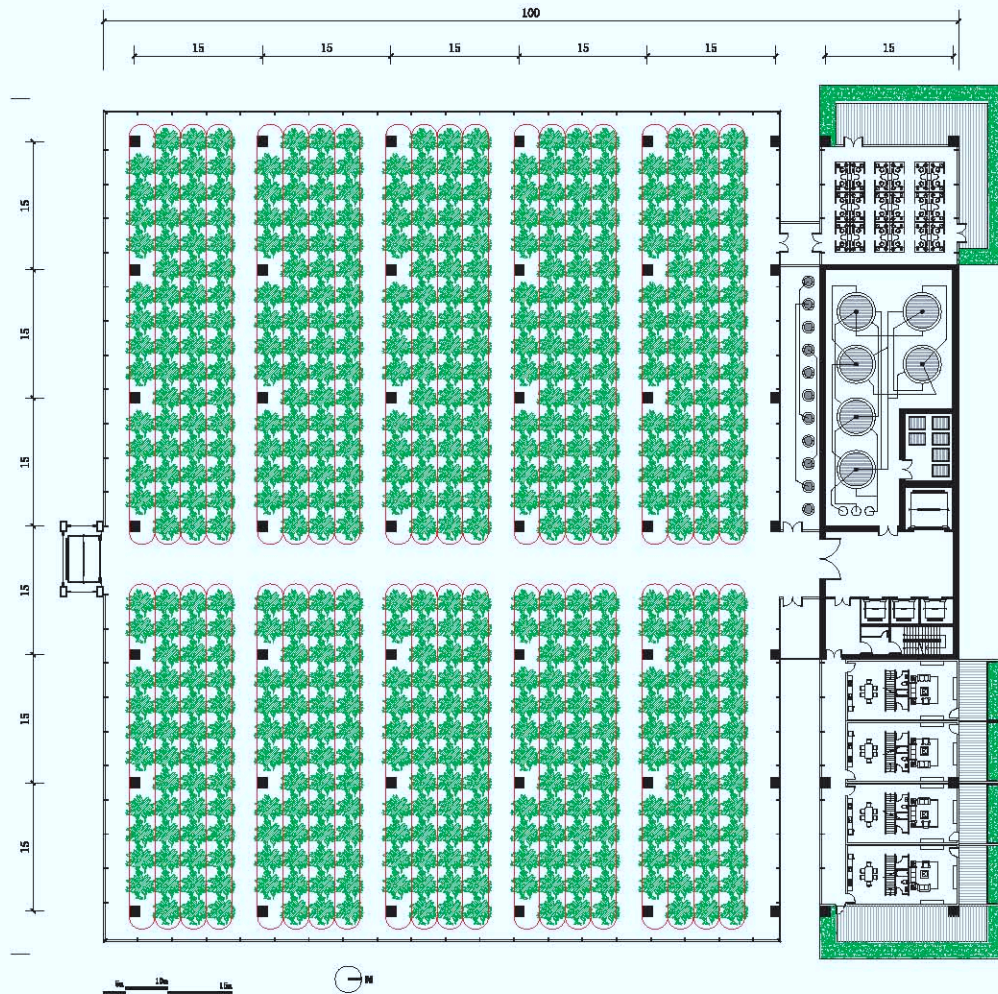
Fruit Farm typical plan



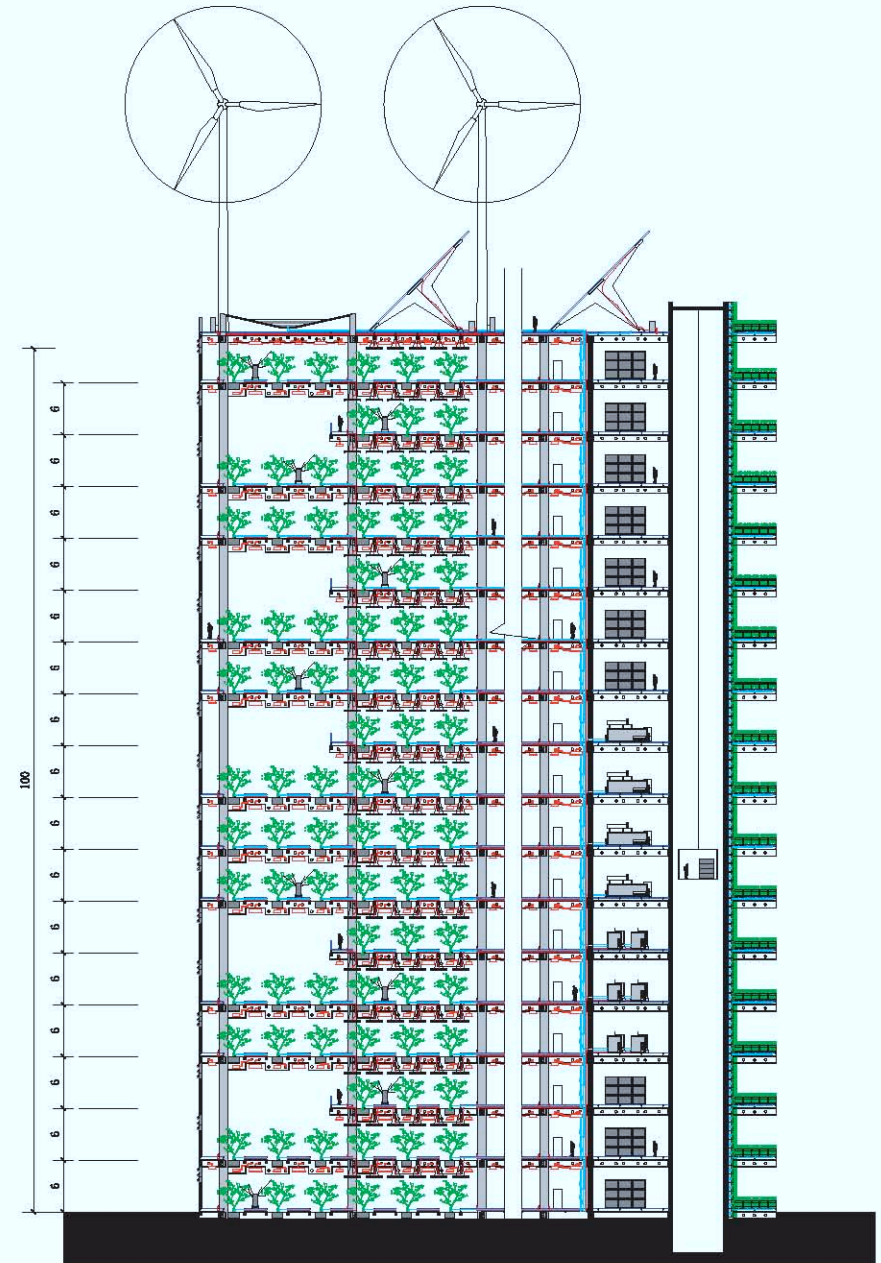
Toolbox Application



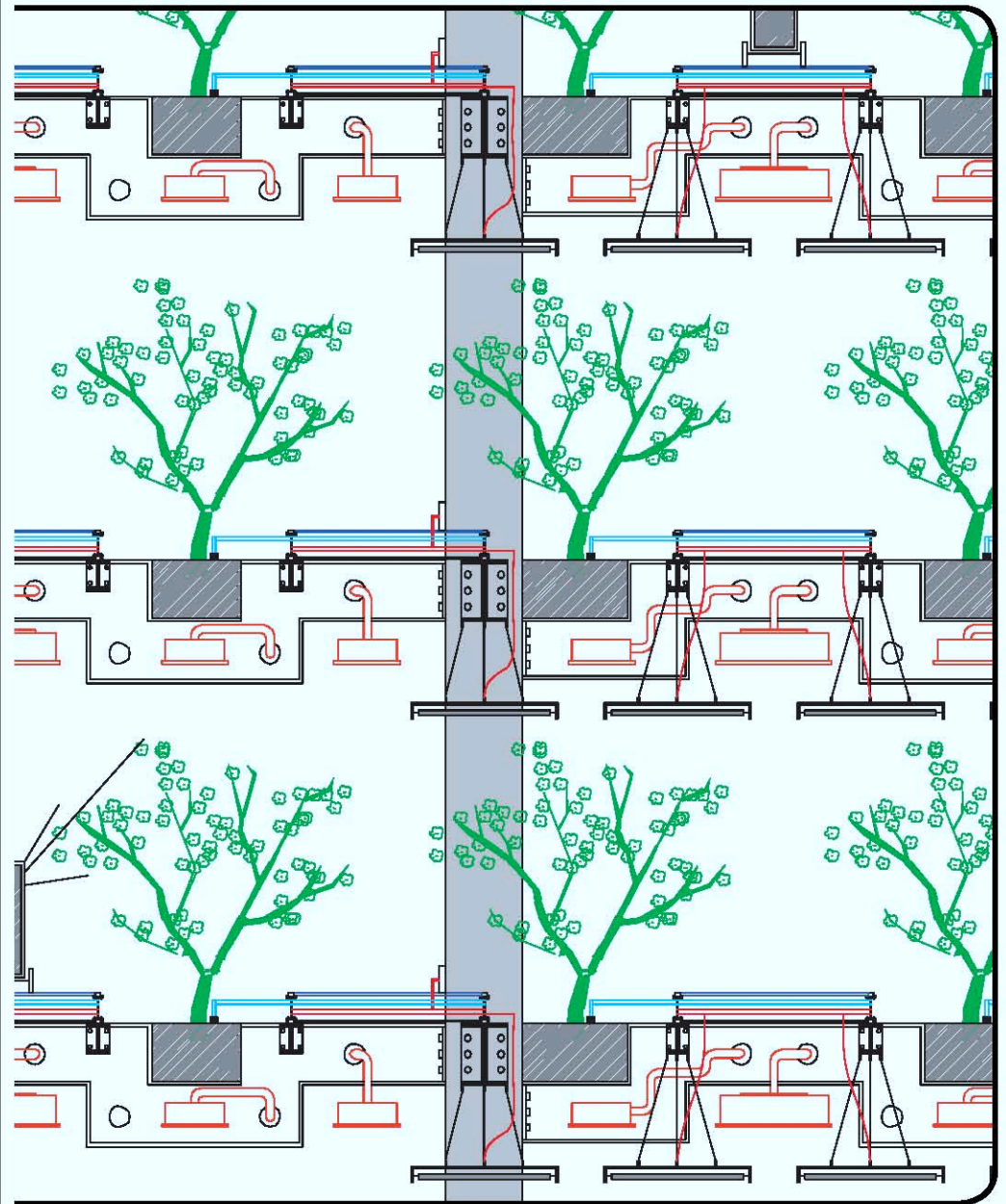
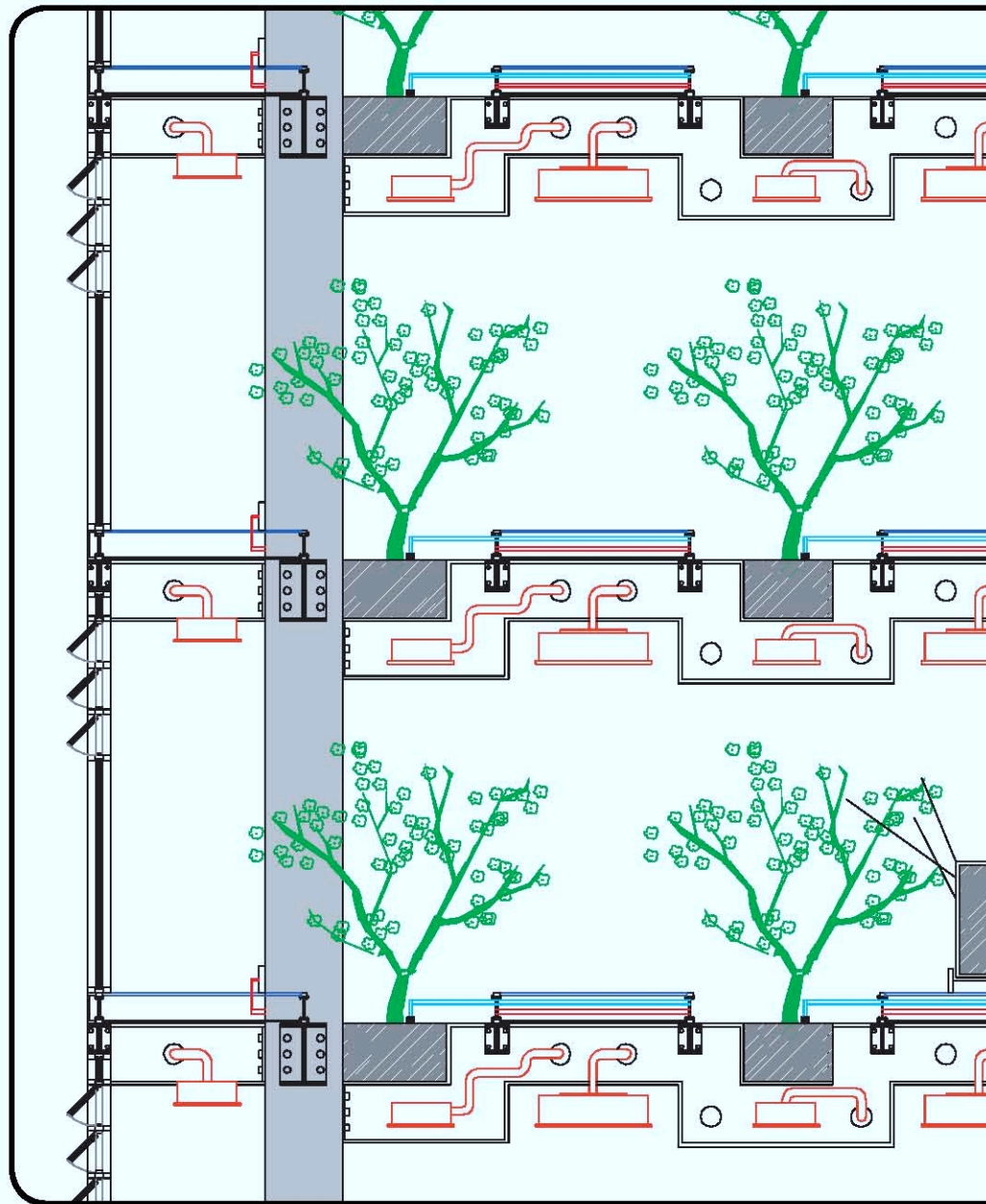
Housing second floor

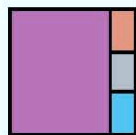


Fruit Farm Typical Section

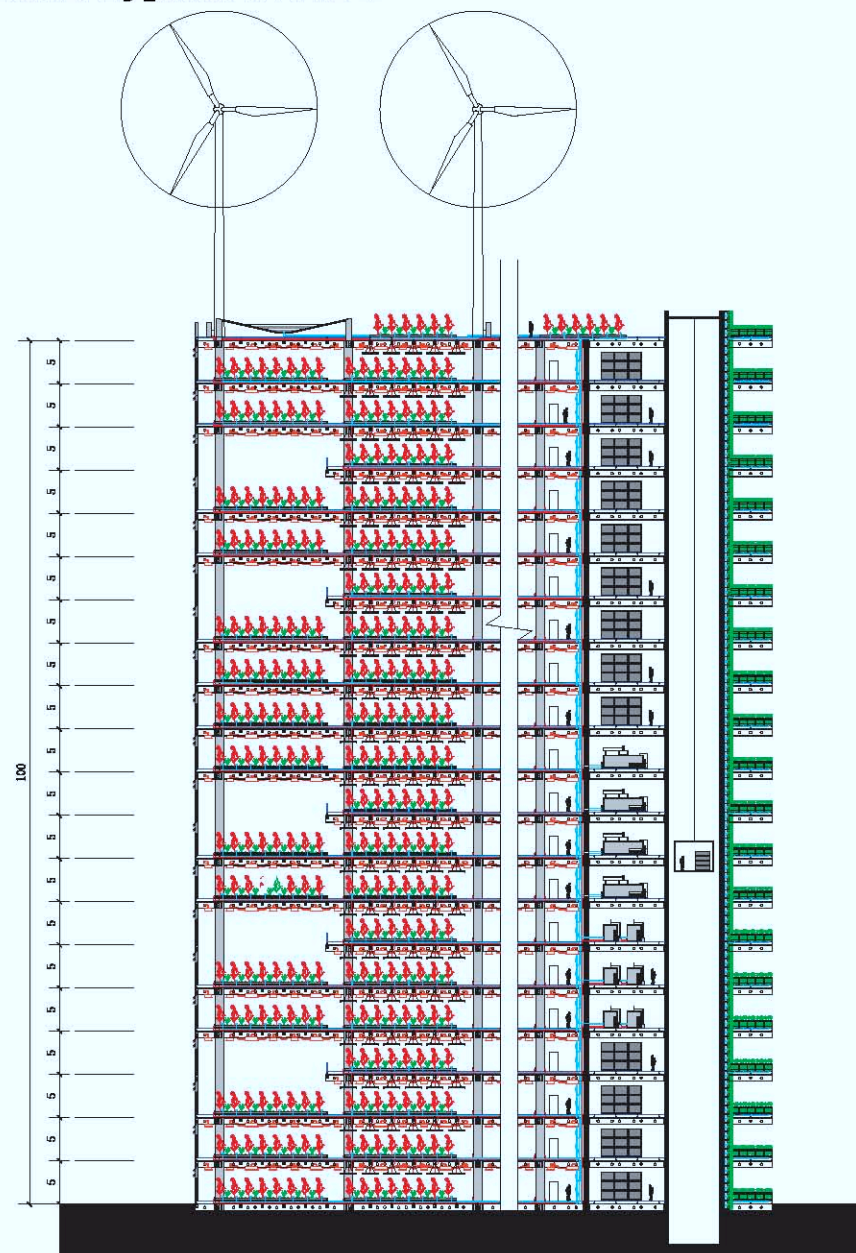


Fruit farming

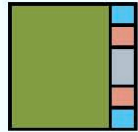




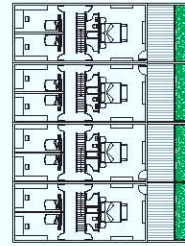
The schematic diagram illustrates the experimental site layout. It features a large rectangular field divided into a grid of 10 rows and 5 columns of plots. Each plot contains a 3x3 grid of green plants. The field is surrounded by a fence. To the right of the field, there are several buildings, including a large one with a flat roof and a smaller one with a gabled roof. A scale bar at the bottom left indicates 0m, 10m, and 15m. A north arrow is located at the bottom center.



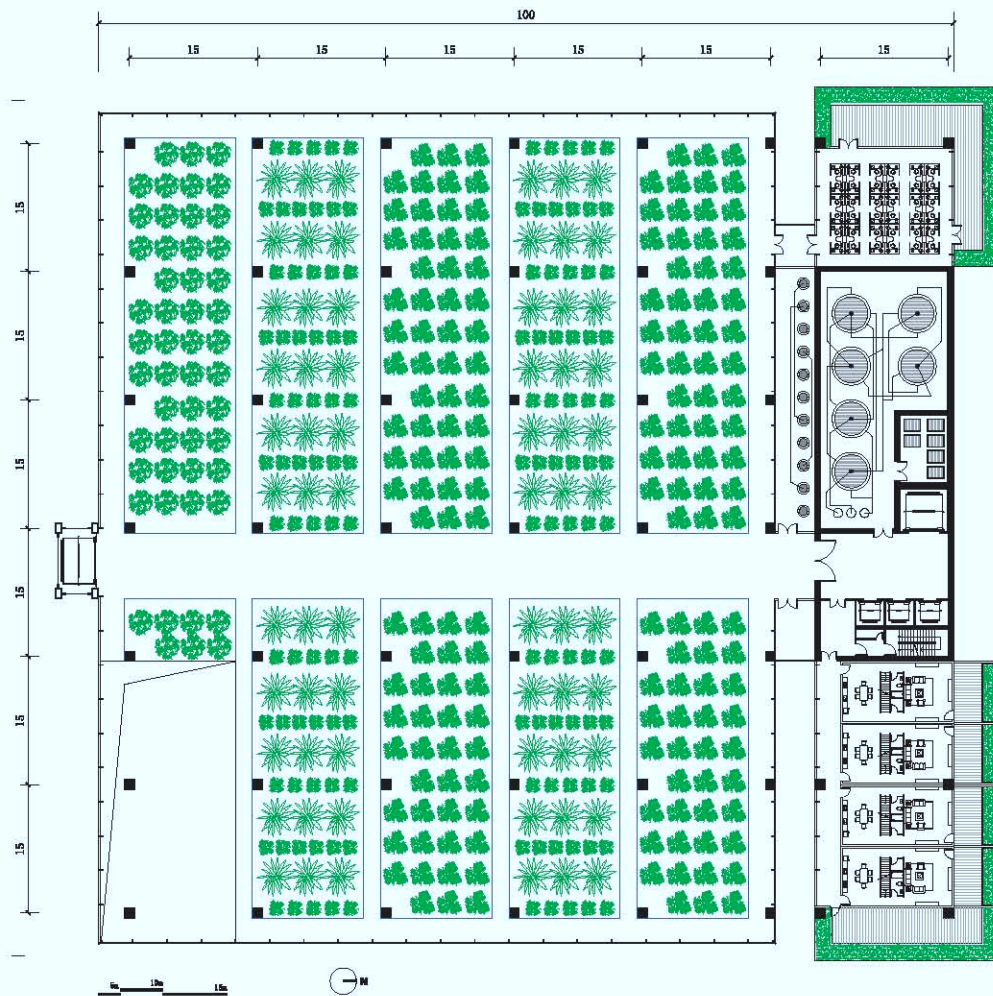
Grain and Other Carbohydrate Farm typical plan



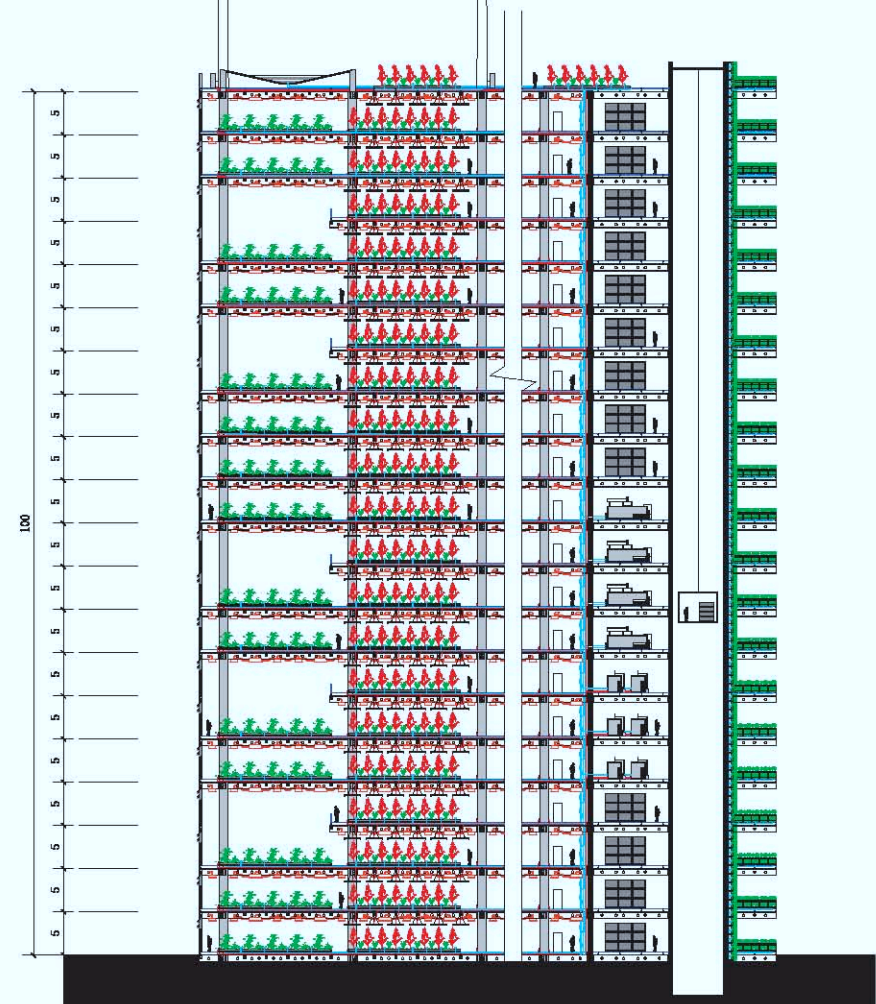
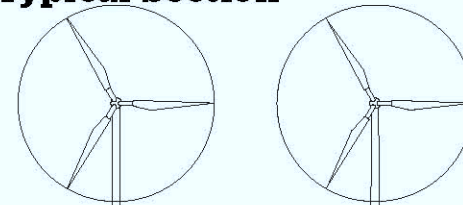
Toolbox Application



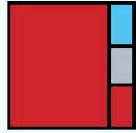
Housing second floor



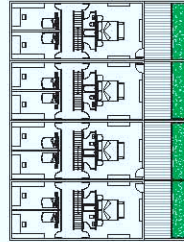
Grain and Other Carbohydrate Farm Typical Section



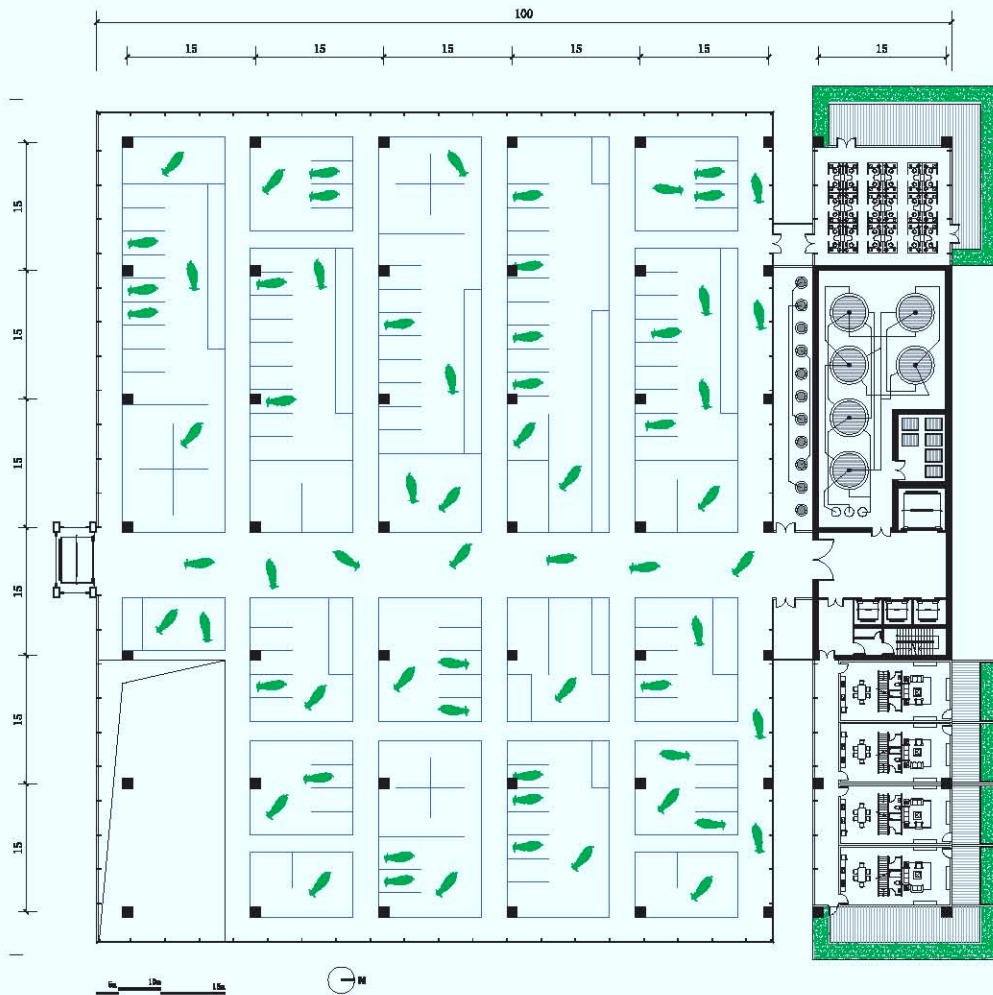
Cow and Livestock Farm Typical Plan



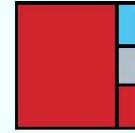
Toolbox Application



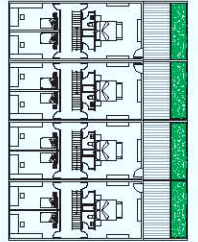
Housing second floor



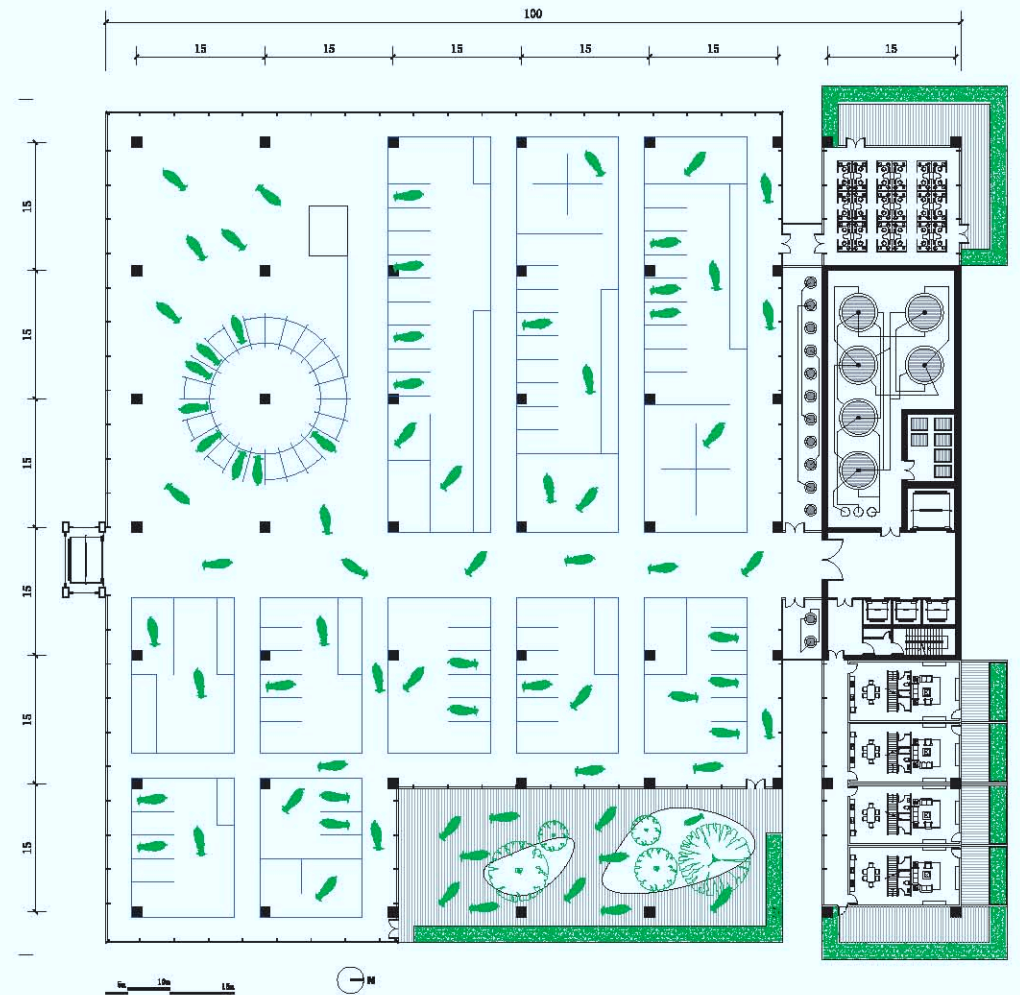
Cow and Livestock Farm Typical Plan



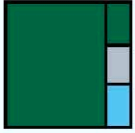
Toolbox Application



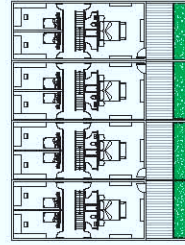
Housing second floor



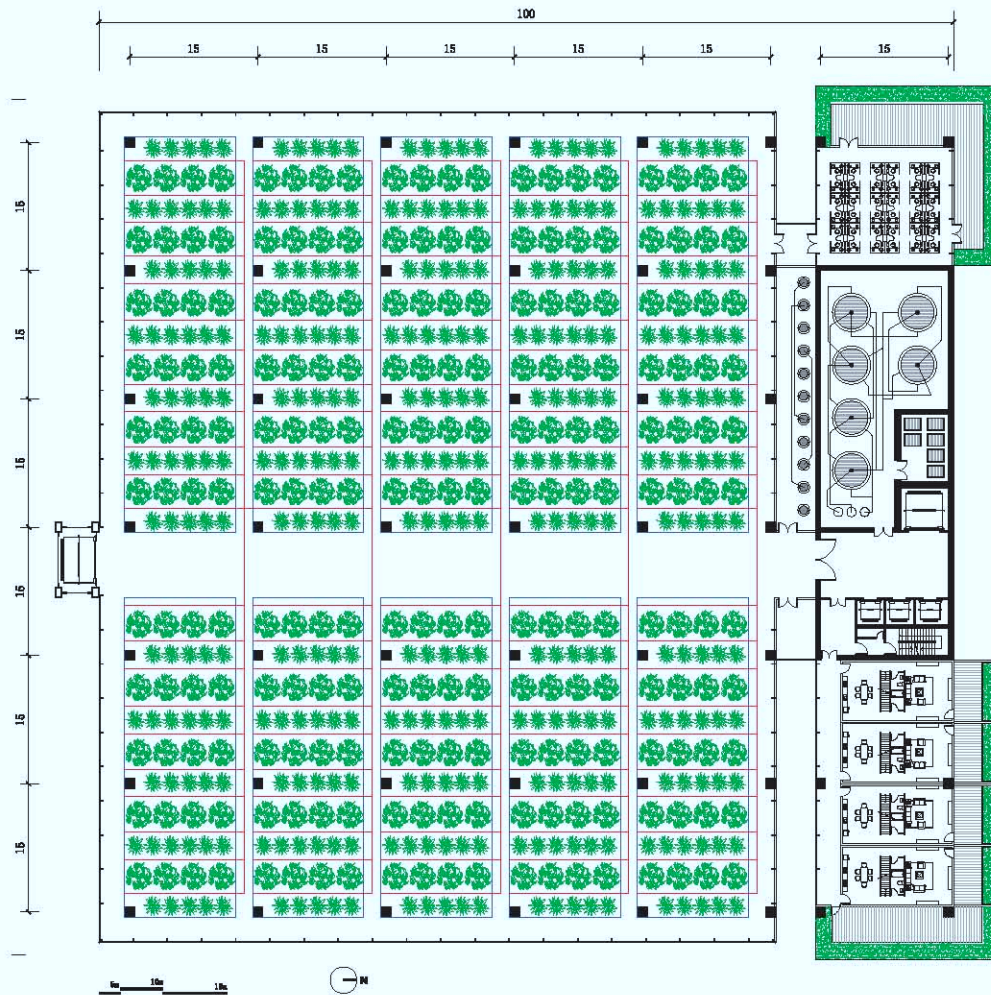
Animal Feeding Farm Typical Plan



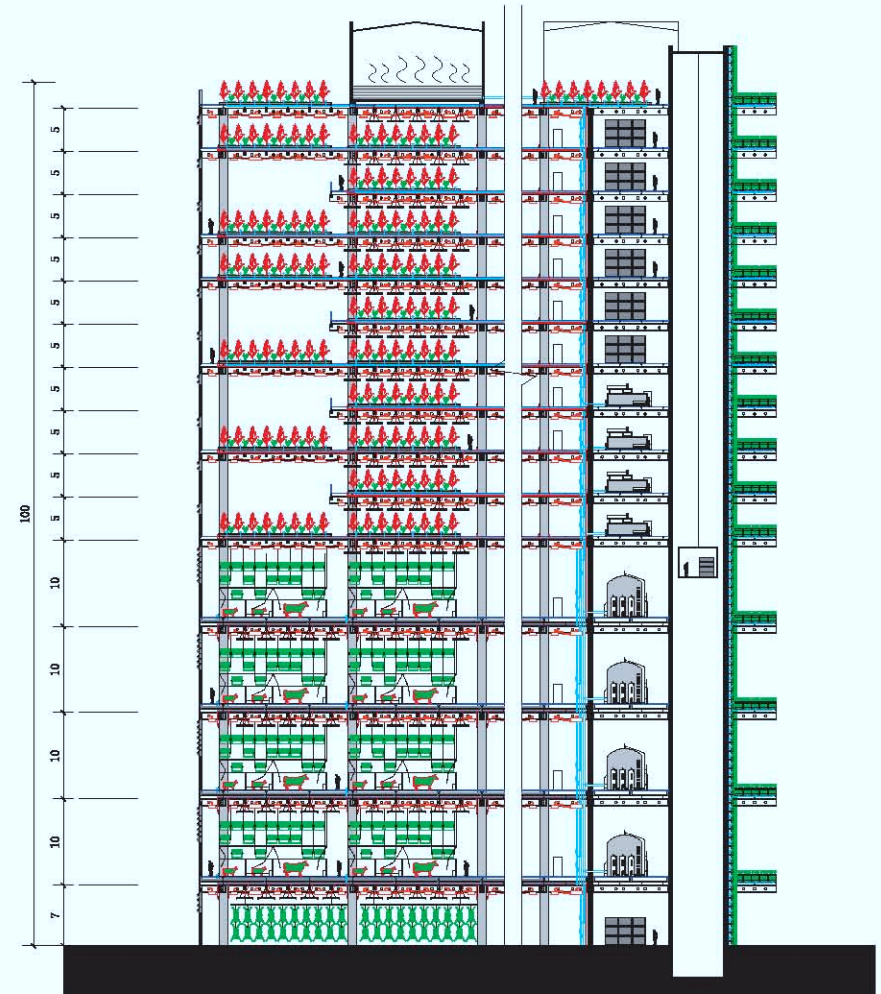
Toolbox Application



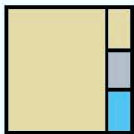
Housing second floor



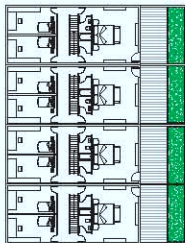
Cow and Livestock Farm Typical Section



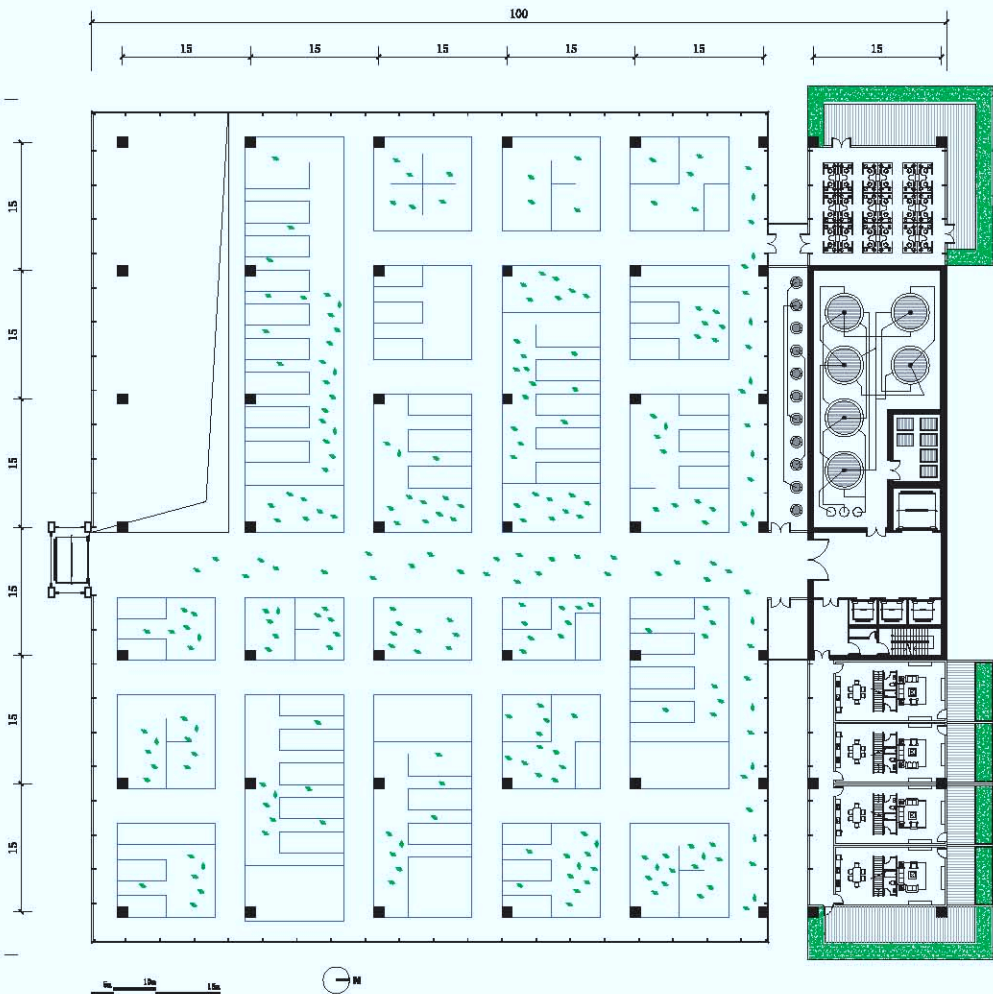
Chciken and Poultry
Farm Typical Plan



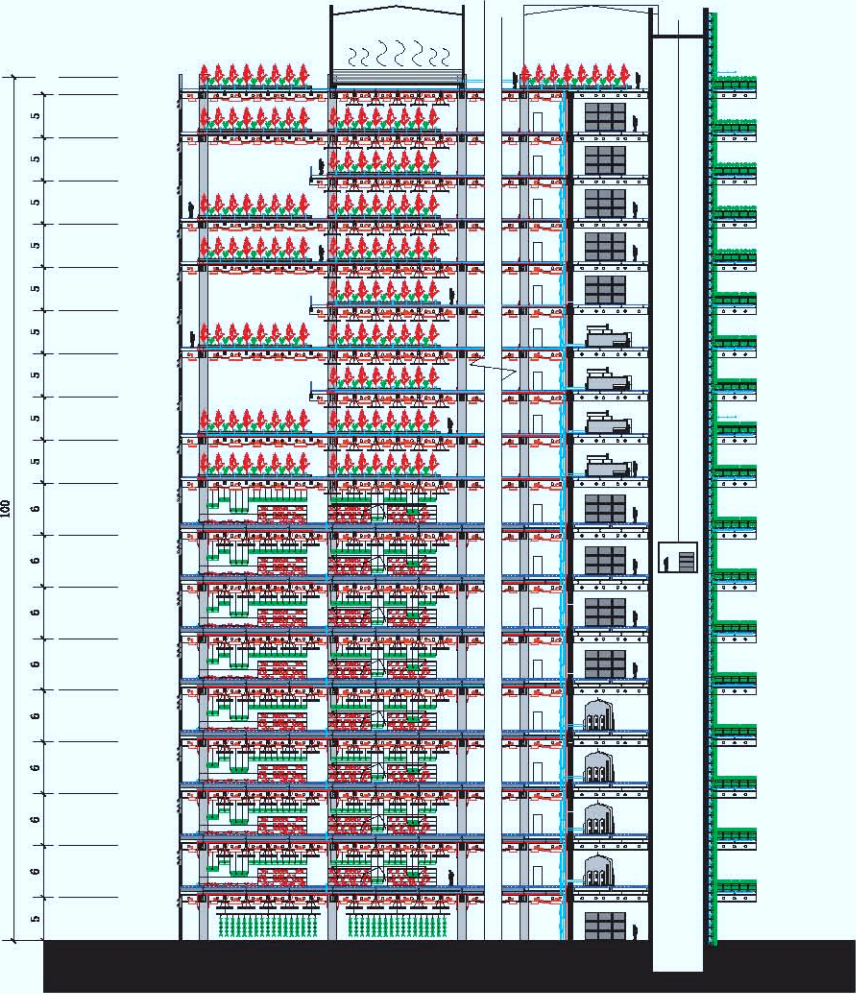
Toolbox Application



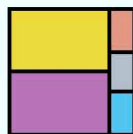
Housing second floor



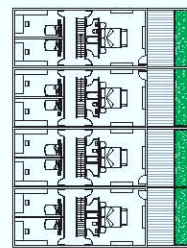
Chciken and Poultry
Farm Typical Section



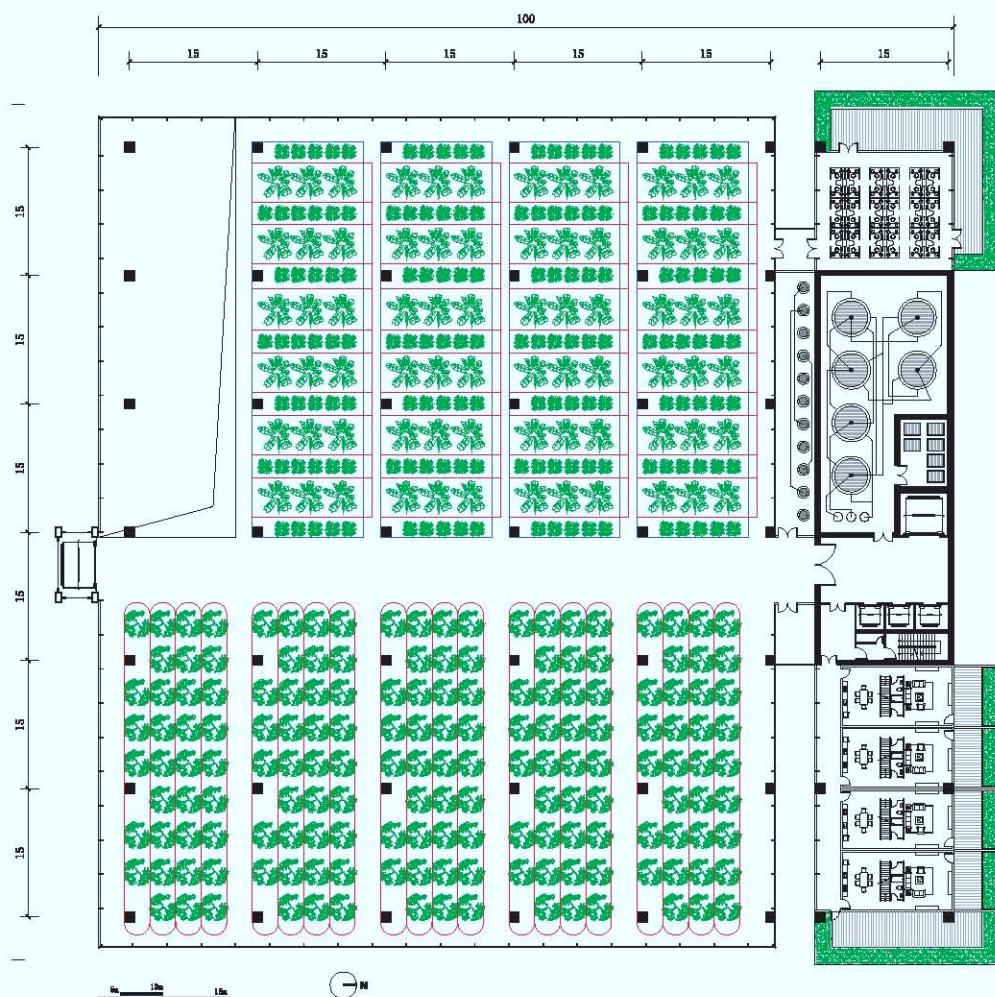
Oil Plants Farm Typical Plan



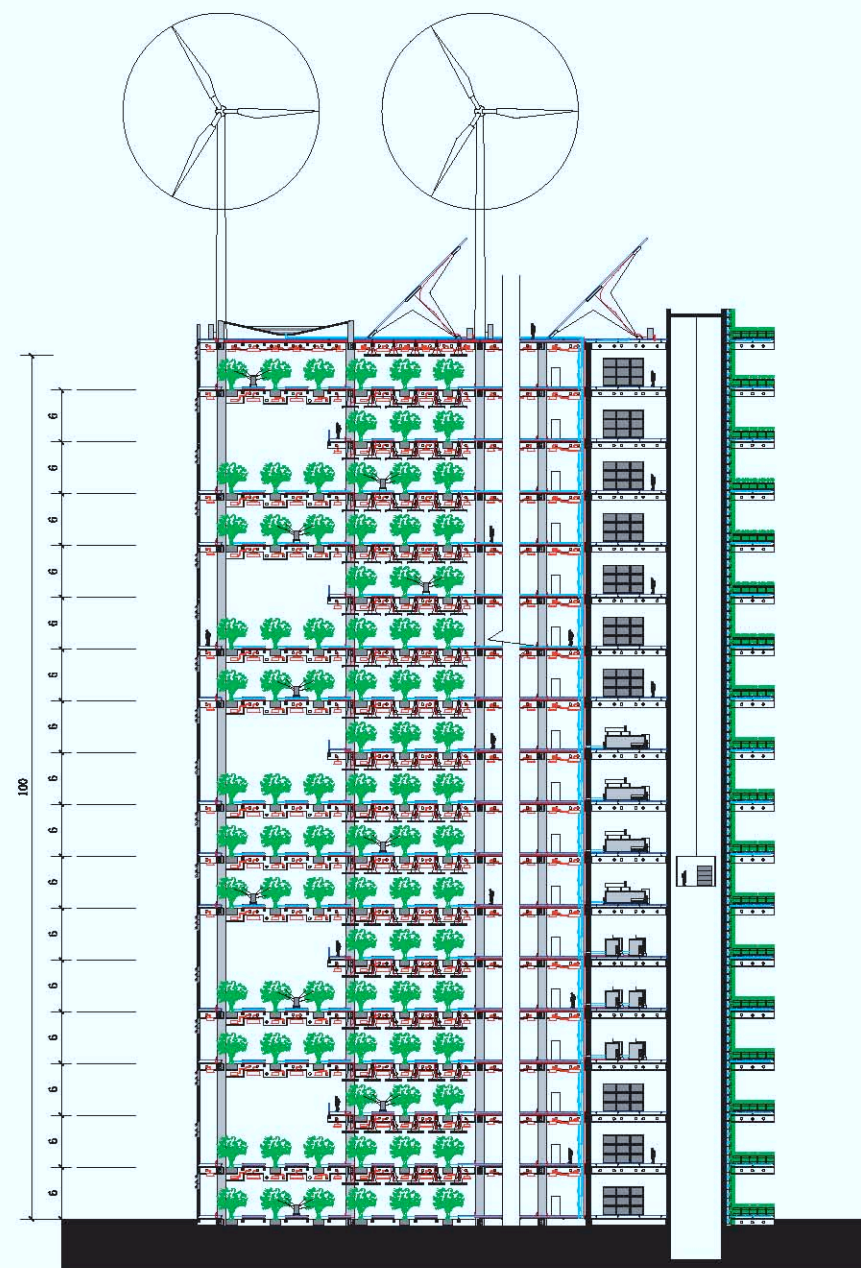
Toolbox Application

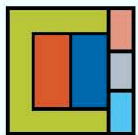


Housing second floor

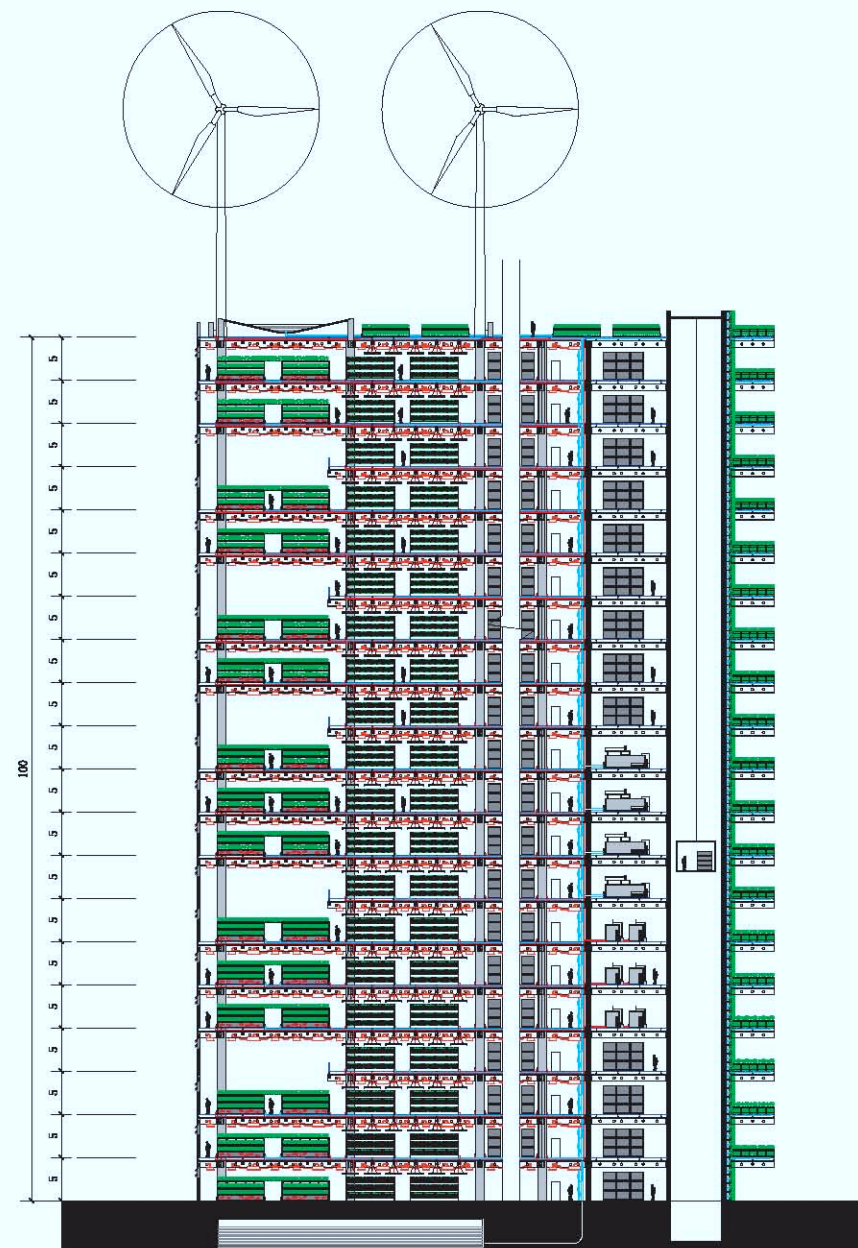
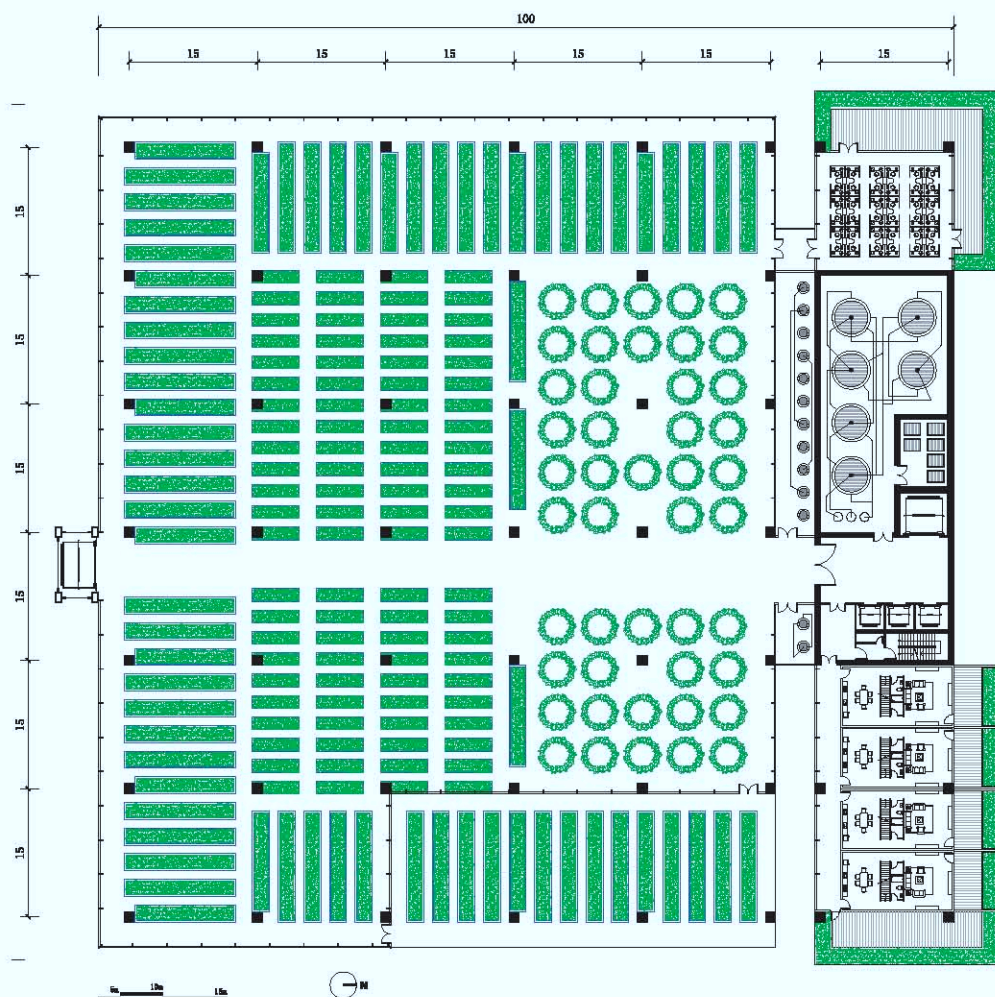


Oil Plants Farm Typical Section

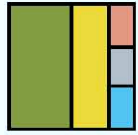




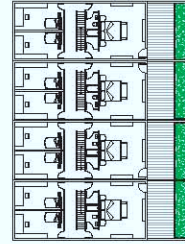
Housing second floor



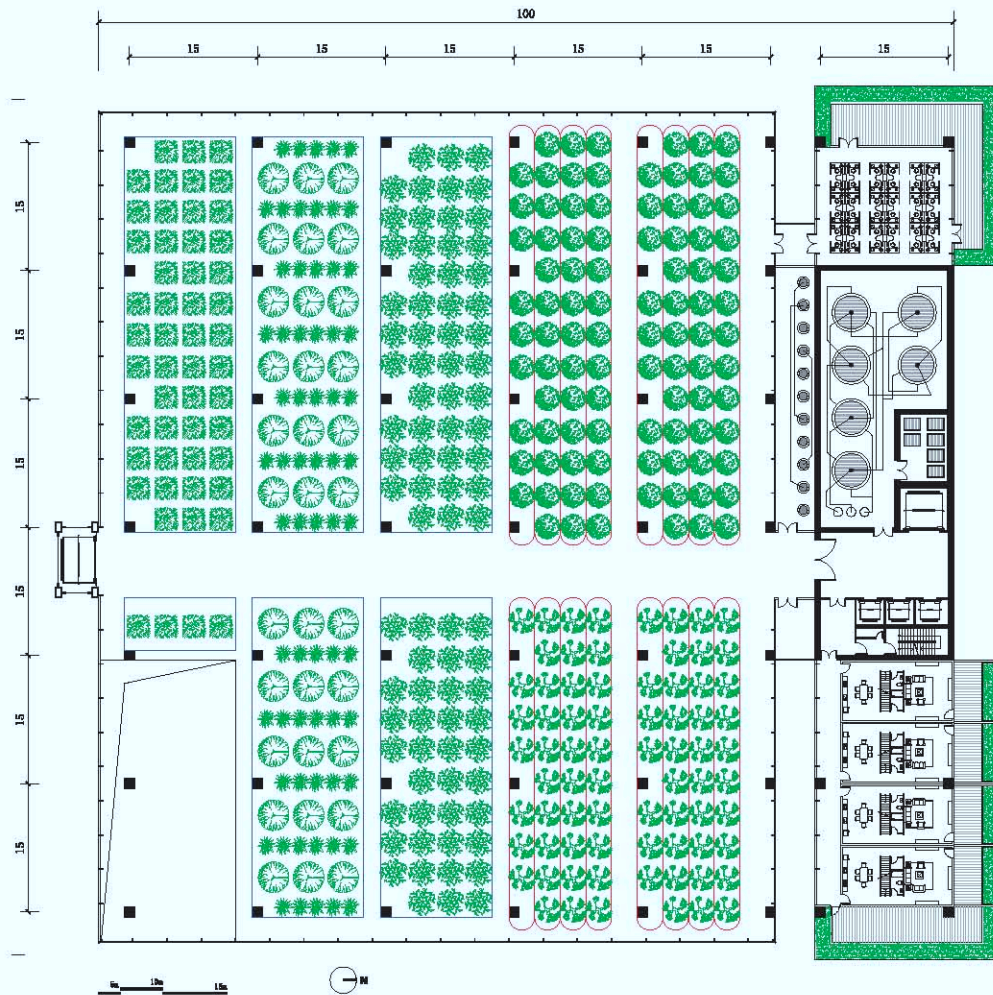
Nuts and Seeds Farm Typical Plan



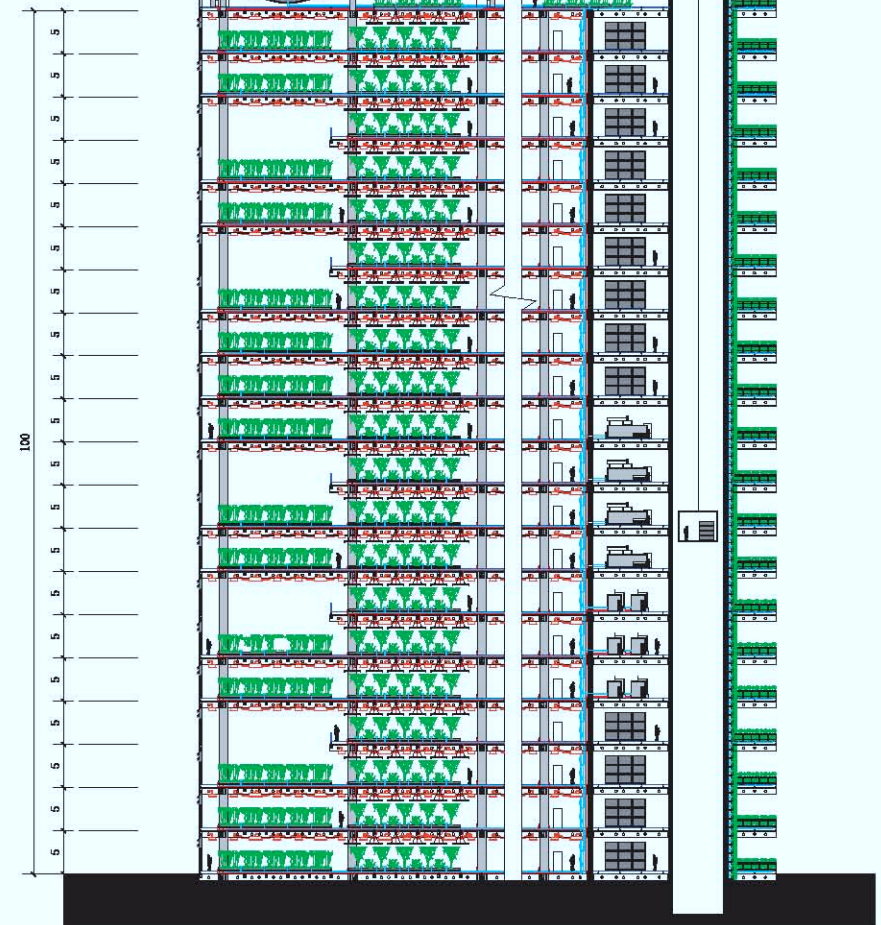
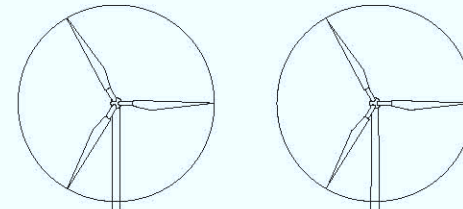
Toolbox Application



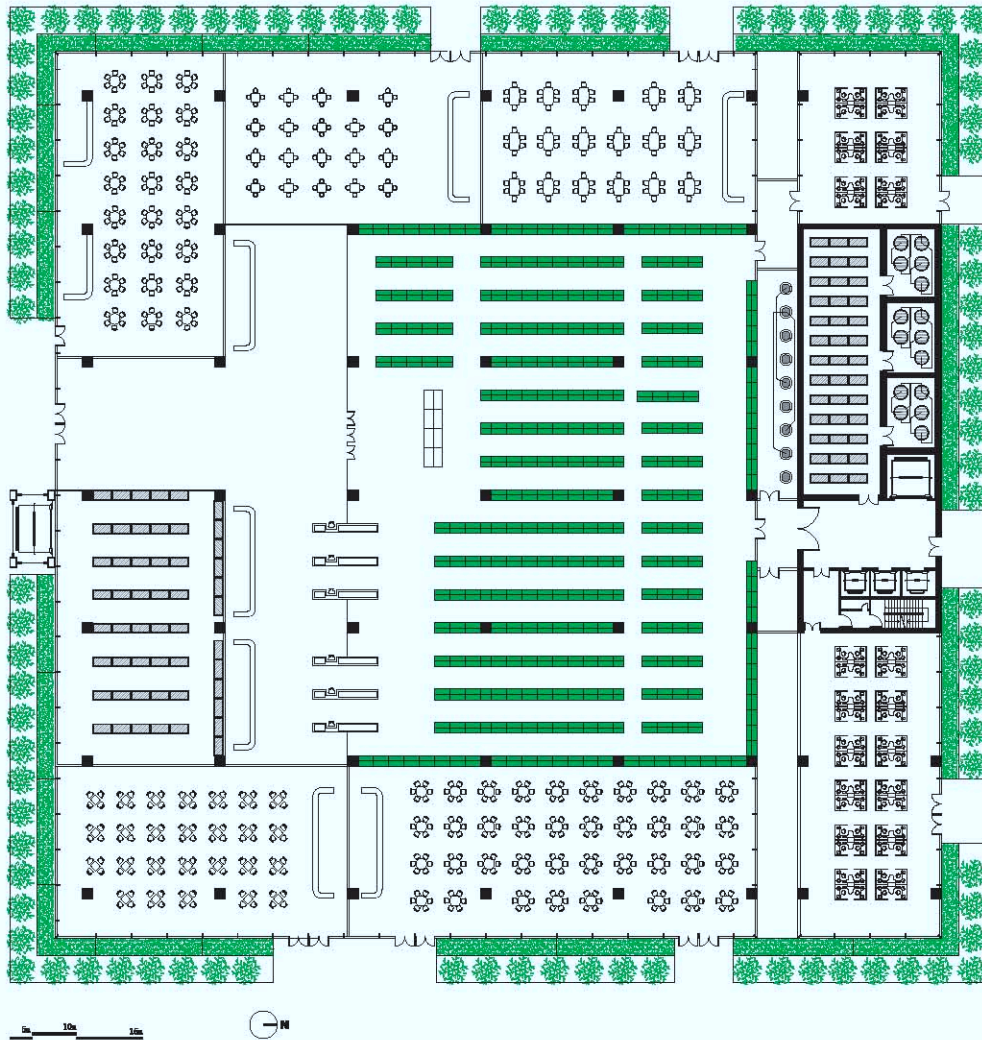
Housing second floor



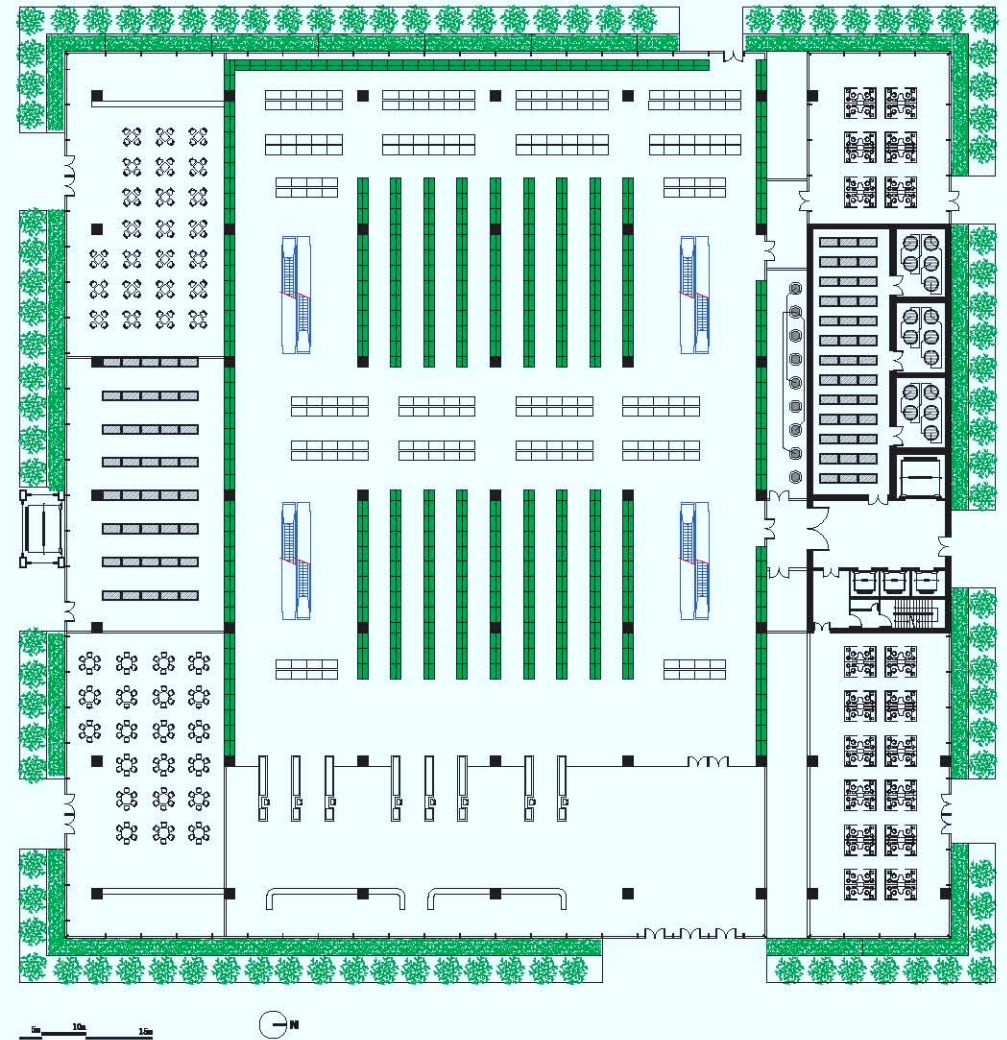
Nuts and Seeds Farm Typical Section



Small supermarket Typical Plan

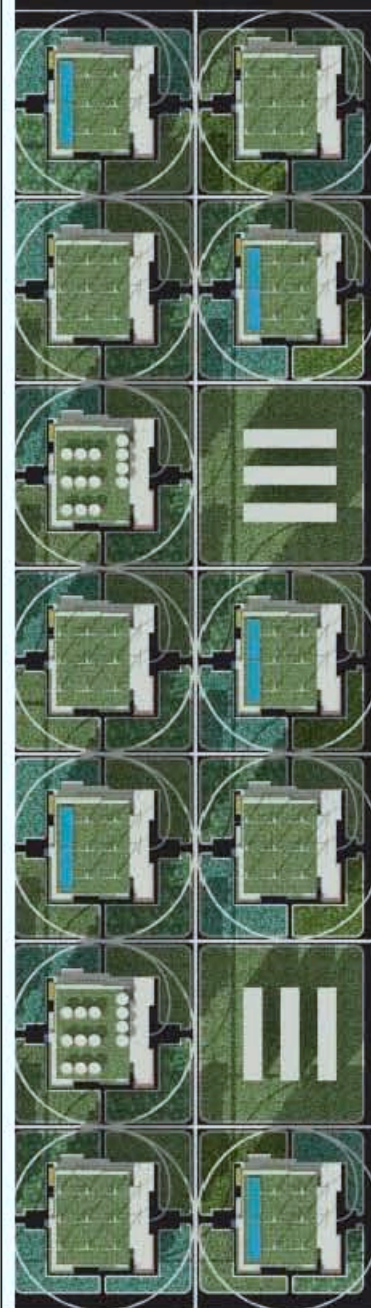
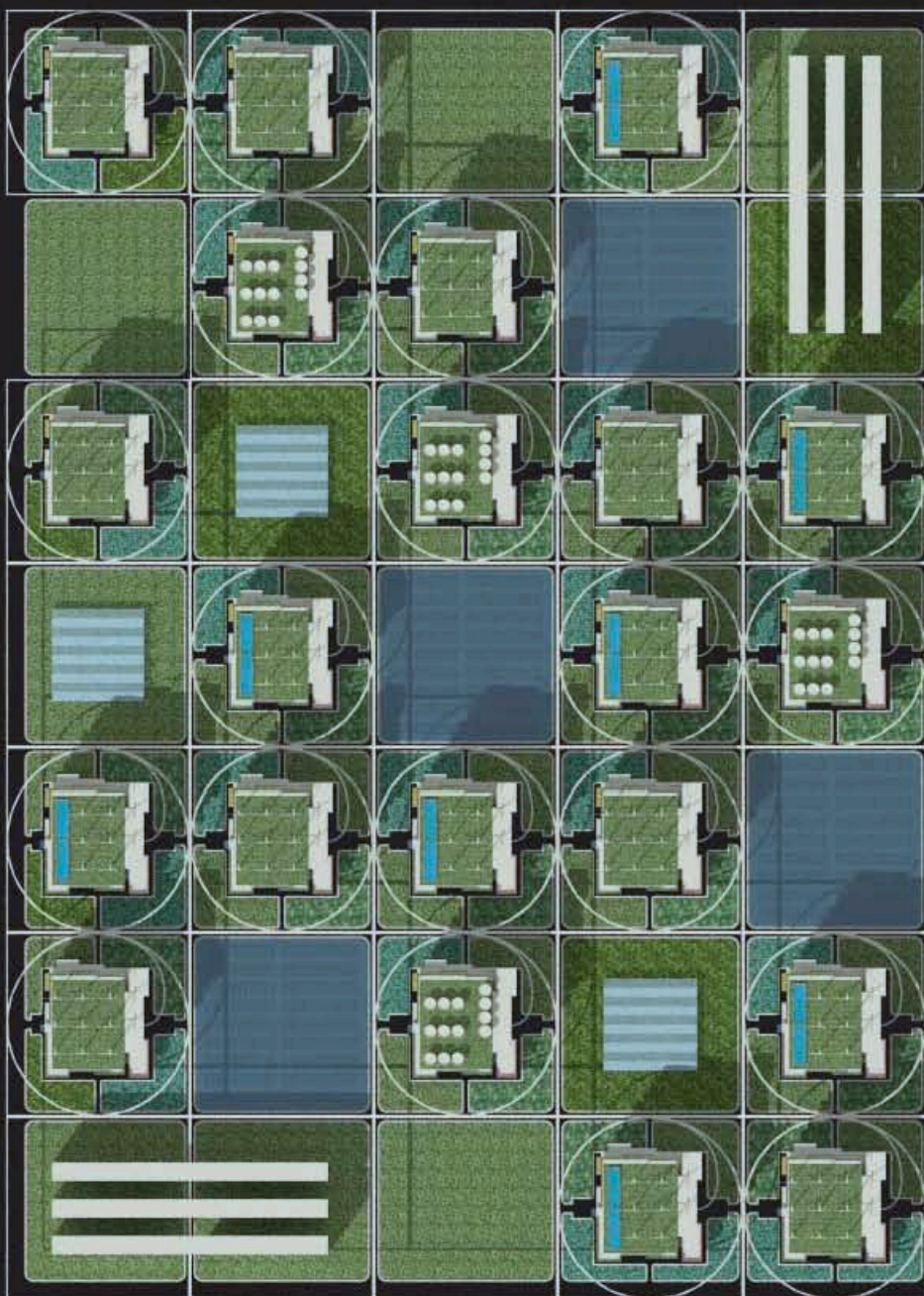


Large supermarket Typical Plan

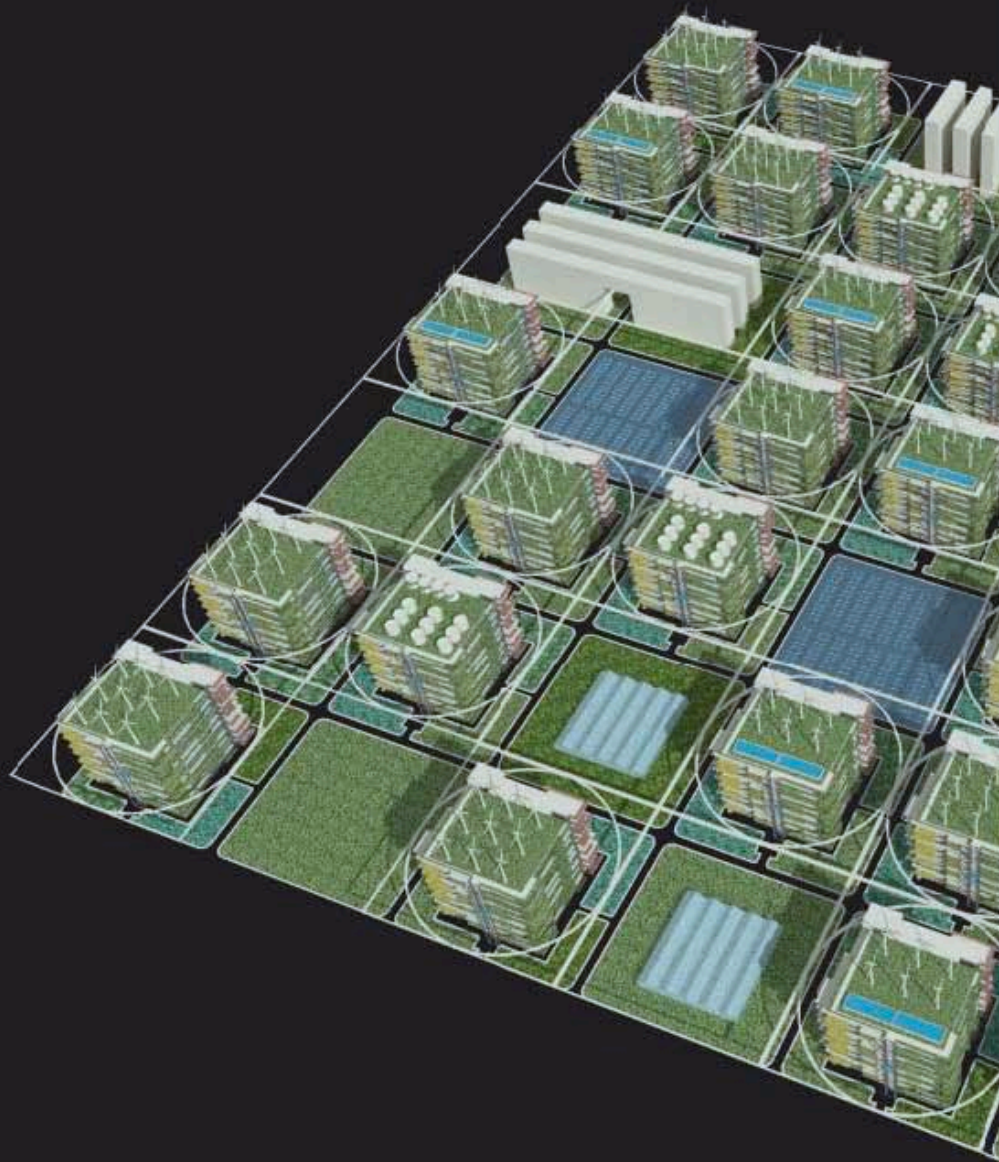


6.7

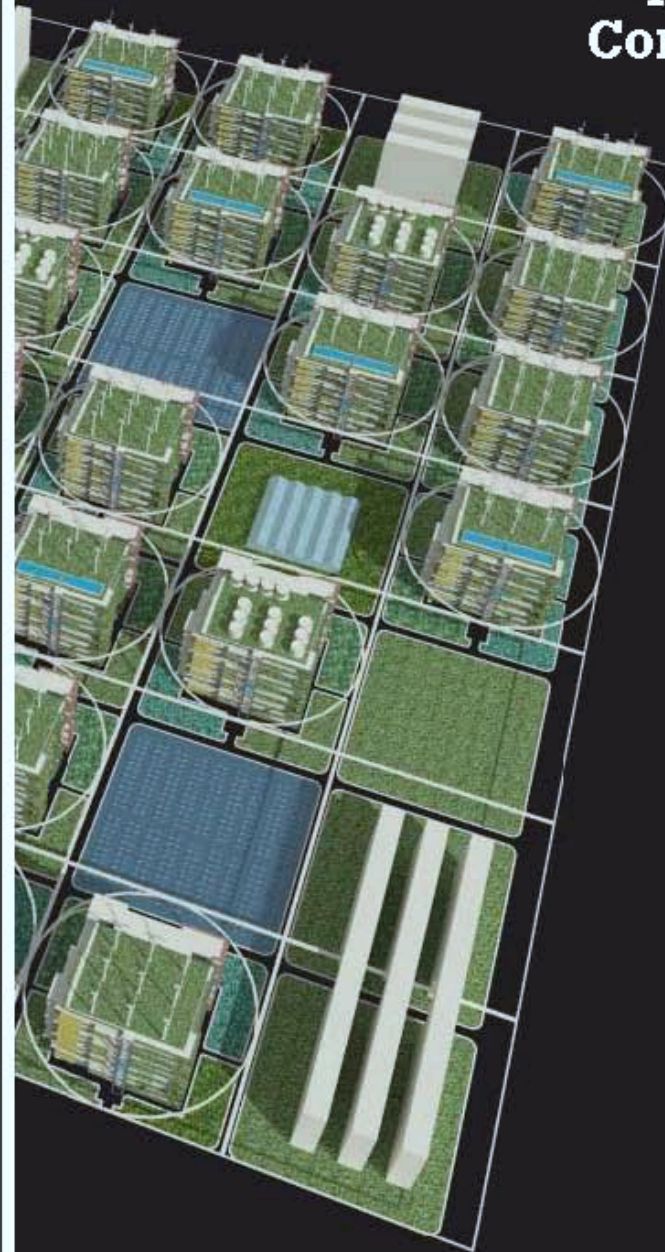
Two Community And City Image

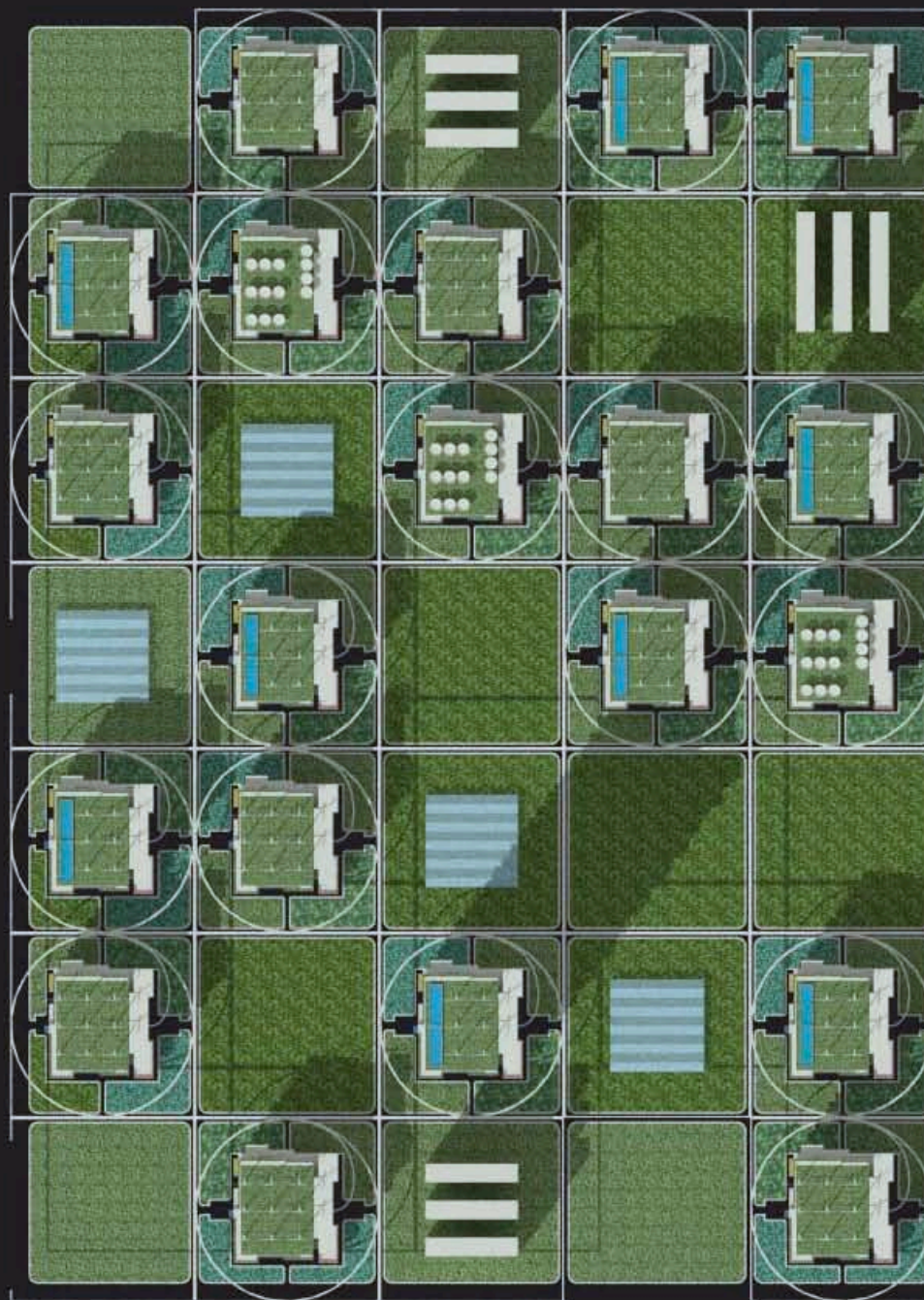


Japanese Diet Community



**Japanese Diet
Community**

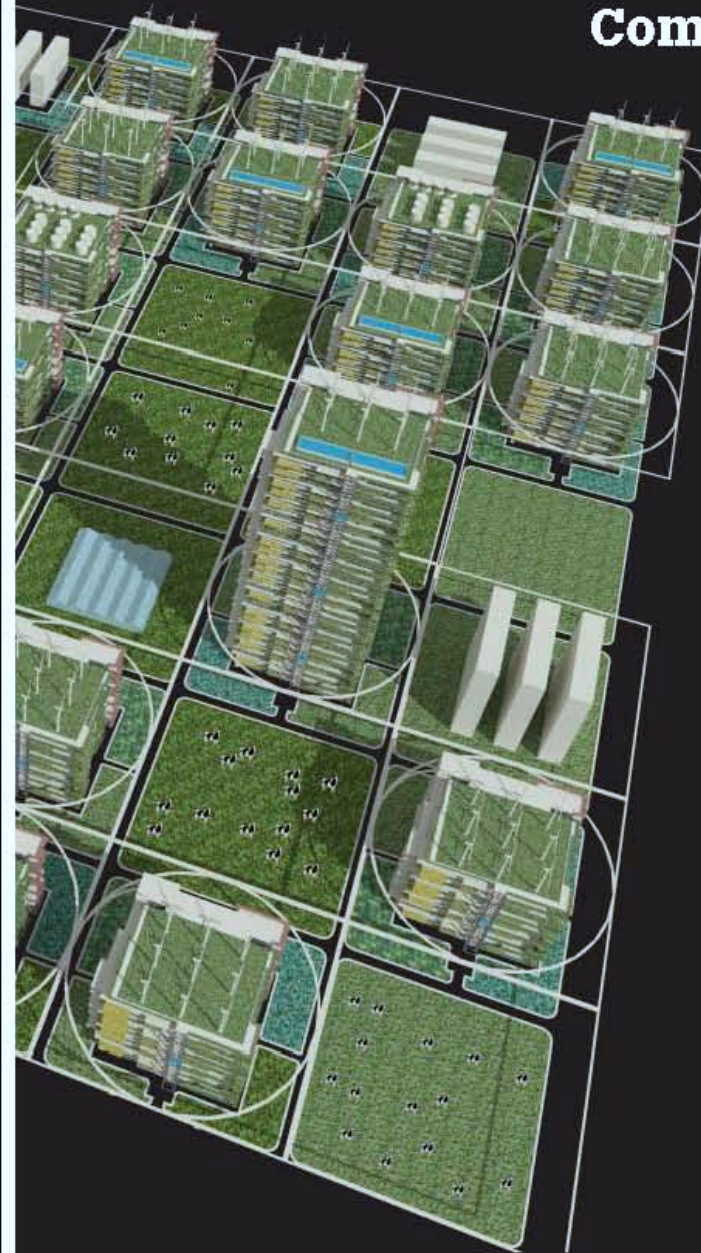
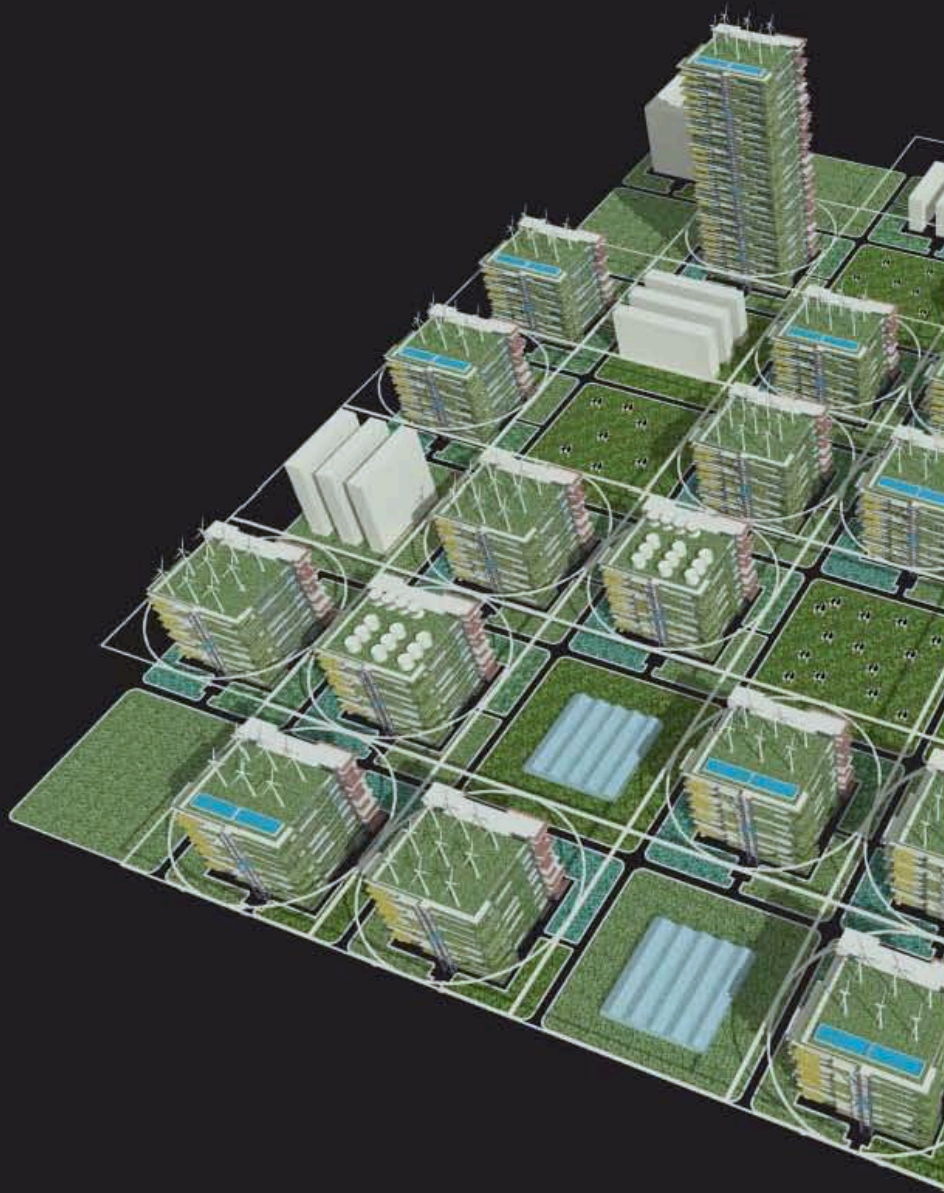


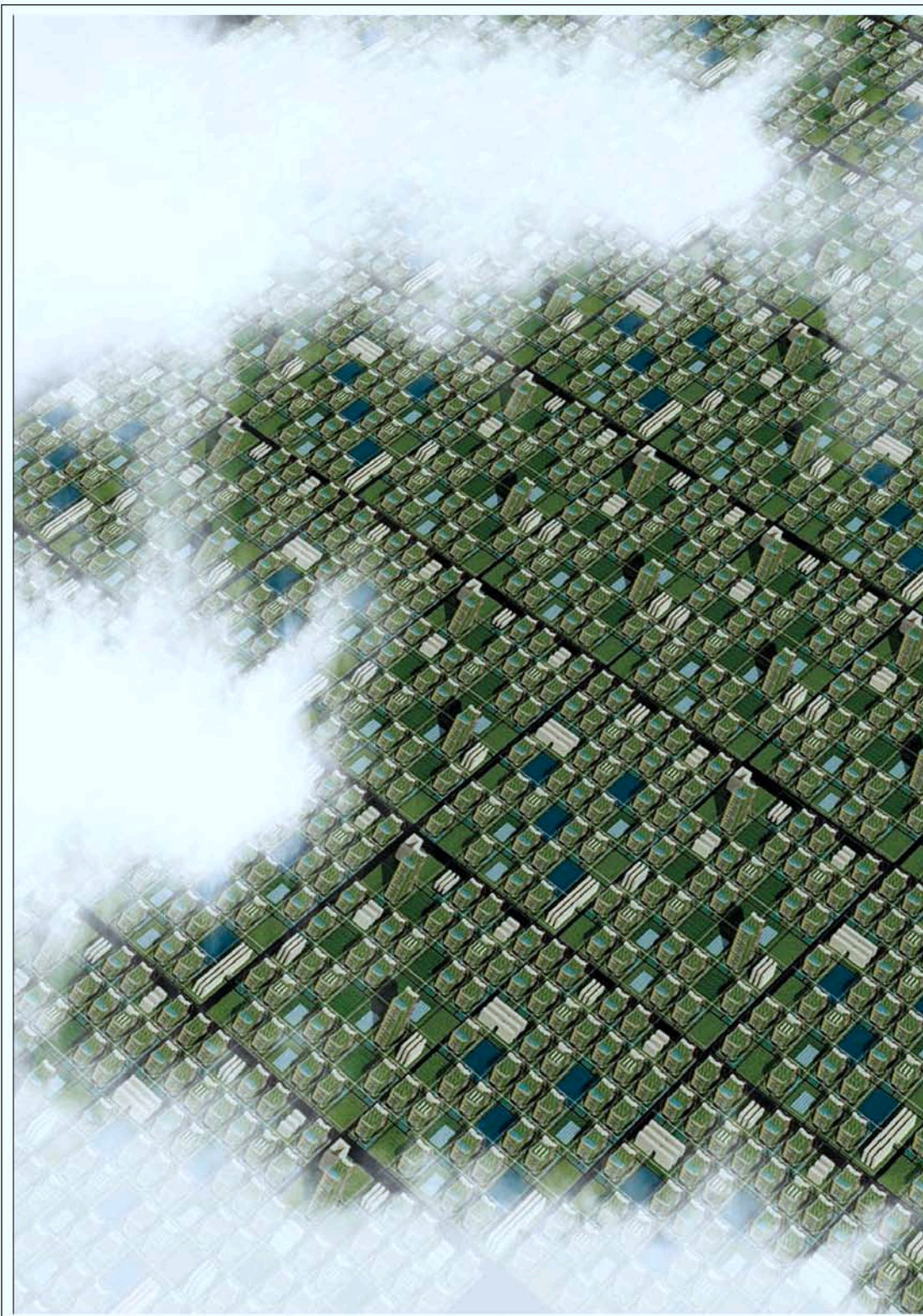


Junk Food Diet Community



Junk Food Diet Community





Thanks!