

An-Najah National University Faculty of Engineering Urban Planning Engineering

Planning Agro-Industrial Park

In Kfr el Labad, Tulkarem

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Abstract

An Agro-Industrial Park (AIP) is a geographic cluster of independent industries grouped together to gain economies of scale and positive externalities by sharing infrastructure – roads, power, communication, storage, packaging, by-product utilization, effluent treatment, logistics and transport, laboratory facilities, etc. The development of the agrifood industry will obviously vary in different regions of the world depending on current levels of sophistication with respect to the production, preservation and processing of agricultural commodities.

To establish a viable Palestinian industrial estate specializing in agro-industries, many stages have been done, the major target, agriculture and agro-industry is a potential driving force for sustainable economic development .The targeted industries :target area of any investment of agricultural industries as food industries and related services. Foundations and requirements of planning AIP have been studied in West Bank ,Tulkarem Governorate in Kfr el Labad town with 850 dunums in many levels such as Regional ,local analysis, to decide where is the best location ,the site selection has been done, planning general master plan of AIP , Contains main zones as livestock industries zone ,Citrus zone..etc .And Detailed master plan and urban design.

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God bless all who support me in my life ,To my mother and the next to my mother and the next to my mother then to the world ,and thanks to my Supervisors, Dr. Ali Abdehameed and Dr. Zahraa Zawawi

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Nomenclature

List of Abbreviation

- GIS Geographic Information System
- MP Master Plan
- AIP Agricultural Industrial Park

TAIP	Tulkarem Agricultural IndustrialPark
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- MP Master Plan
- AIP Agricultural Industrial Park

Chapter 1

1. INTRODUCTION

1.1 Overview

An Agro-industrial Park is a geographic cluster of independent firms grouped together to gain economies of scale and positive externalities by sharing infrastructure – roads, power, communication, storage, packaging, by-product utilization, effluent treatment, logistics and transport, laboratory facilities, etc. – and taking advantage of opportunities for bulk purchasing and selling, training courses and extension services. Multiple agro-processing functions take place in the IAIPs, such as final processing, storage, packaging, marketing and distribution. Support businesses and social infrastructure are also present.

AIPs will include open area production zones, controlled environment growing, precision farming, knowledge hubs and research facilities, rural hubs, agriinfrastructure, collection centres, primary processing hubs, RTCs, social infrastructure and agri-marketing infrastructure, among others. AIPs will have state of the art infrastructure. General infrastructure will include: roads, power, water, communications, drainage, sewerage, sewage treatment plant, effluent treatment plant, storm water drains, rain water harvesting, and firefighting facilities, among others. Specialized infrastructure will consist of cold storage units, quarantine facilities, quality control labs, quality certification centres, raw material storage, controlled and modified atmospheric storage, central processing centres, etc. In

addition, infrastructure at the IAIPs will emphasize environmental sustainability.(2012,UNIDO,p14)

The establishment of dedicated industrial estates of idea of AIP started between the late 19th century and the early 20th century ,agriculture felt the effects of the industrial revolution that until then had only involved other production industries. real modern industries were created that were nevertheless physically located in rural contexts where the economy and social fabric were still of the traditional type. It is in this social and economic scenario that the first agro–food buildings of impressive architectonic size and structure emerged.(2012,UNIDO,p18)

The targeted industries:target area of any investment respect to, in some way, and agricultural industries and related services. If there is, mixing, or you do not specify, for business or industry, with falls within the domain of the decision, or not; the body and the developer to review the details of the field of agro-industrial business, to report it.(2014,UNIDO,p20)

The development of the agrifood industry will obviously vary in different regions of the world depending on current levels of sophistication with respect to the production, preservation and processing of agricultural commodities.

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current situation of Palestinian agricultural industrial park

To establish a viable Palestinian state, its sustainable economic development is indispensable. The role of the private sector, esp. SMEs, is crucial in achieving the sustainable economic development.

In the West Bank, agriculture and agro-industry is a potential driving force for sustainable economic development.

The concept is to materialize projects through regional cooperation for the prosperity of the region, working collaboratively with neighboring countries; such as establishing an agro-industrial park at the strategic site in the Jordan Valley.

The Palestinian Authority, Israel, Jordan and Japan established the Four- Party Consultation Unit, and started working on Jericho Agro Industrial Park as its core project.

The Major Target (2012, Japan's Initiative): Industry:Food industries Targeted Market: West Bank and Abroad Developer: JAIP Co. (Concession contract signed on June 12, 2012) Incentive, lease fee to be finalized [] Financial support by the Government of Japan: < Infrastructure > Upgrading Road to Jericho city (UNDP) Land Reclamation of the Stage I (UNDP) Establishment of Solar Power Plant (JICA) Water supply to JAIP for Stage I (UNDP) Administration Building (UNDP) Jericho Waste Water Treatment Plant (JICA) Substation (UNDP) < soft component > PIEFZA capacity development (JICA) Support for hiring PIEFZA General Director(UNDP)







1.2 Research Problem

One of the perspective solutions of the problems of food security is to create an agro-industrial park, which will provide the infrastructure for agricultural producers during production, processing and sales of products by small producers. There will be organized the production process from raw material supply and production process control to pre-packaging, packaging and delivery of products to the consumer in the agro-industrial park based on principles of public-private partnership.

The ability of agricultural and food industries to continue to respond to the undoubtedly substantial increase in demand in future decades will be highly dependent on the increased application of existing technologies as well as the exploitation of new and innovative technologies. By 2050, the world demand for food will double, driven by the predicted population growth and the projected broad-based economic growth, which will lift low-income consumers out of poverty.

1.5 Research Significane

1.5.1 Objectives

The main object is to develop agro-industrial area

The sub objectives:

- Diagnosis of the agro-industrial situation in Palestine
- Identify the problem and needs
- The study of the geographical and physical characteristics of the study area
- Providing planning proposals for the agro-industrial zone
- The strategic goal of creating the agro-industrial park is the production of competitive products and improvement of socio-economic development of rural areas.
- There will be organized the production process from raw material supply and production process control to pre-packaging, packaging and delivery of products to the consumer in the agro-industrial park based on principles of public-private partnership.
- to provide master planning and design services for AIP that here is not case studies such as this project.
- Achieve industrial decentralization
- environment protection with high-leveled technology, Minimized post-harvest losses and reduced wastage
- This will reduce the maximum level of product loss and wastage.
- AIP could become a sustainable economic development model
- encouraging investment, promoting trade and creating job opportunities
- To reduce rural poverty:

Poverty reduction will be achieved through the integration of smallholder farmers, small-scale processing enterprises and allied industries in commercial value chains. This, in turn, will increase local value-addition,

create additional jobs in rural areas and improve the overall efficiency of the agricultural value chain. Medium- and large-scale firms will also benefit from more efficient value chains, through reduced transaction costs, allowing for additional growth and job creation.

• To drive the structural transformation of the economy:

Structural transformation will be driven by the development of the agricultural production system from its current fragmented and supply-driven practices, to one that is organized and based on quality and demand. Such a change will boost agro-processing and will help stimulate a shift in investment and human resources from agriculture to agro-industries.

- Provide a close interface between research, extension mechanisms, industry and farmers in the agricultural sector.
- Protect Environment:

major consequences for agricultural production and food processing. Such scarcity of water will strongly influence the use and methods of irrigation, plant

breeding...etc, water recycling and reuse in food production

and processing systems.

1.6 Report Organization

This report will be arranged as follows: Section 1 introduce the problem and the hypothesis of this report. Section 2 presents the methodology followed to test the hypothesis. Section 3 presents sets of simulation studies. Conclusion of the study is presented section 4.

خطة الدراسة :

اطار عام ونظري:يشمل النماذج والمفاهيم ذات العلاقة بالمناطق الصناعية ,ومنهج تاريخي في الحالات الدراسية اطار معلوماتي:خطة معلومات عن المناطق الصناعية ,ومنطقة الدراسة من خلال المنهج الوصفي اطار التحليل والاستنتاج: تحليل الوضع القائم وتقديم مقترحات عن المنطقة الصناعية الزراعية .

1.7 Methodology

سوف تعتمد هذه الدراسة في منهجيتها على الأساليب التالية: 1. الأسلوب النظري الوصفي من خلال دراسة التقارير وآليات العمل المتبعة الصادرة عن هيئة المدن الصناعية والوزارات ذات العلاقة,اضافة إلى الإطلاع على الدراسات والأبحاث في مجال الصناعة.

 2. الأسلوب الإجرائي العملي من خلال الدراسات والمسوحات الميدانية وجمع البيانات والإحصائيات، والمقابلات الشخصية مع المعنيين بهدف استكمال المعلومات اللازمة في الدراسة وتغطية الجوانب الفنية والتقنية والتخطيطية
 3. الأسلوب التحليلي الذي يتمثل في تحليل المعلومات التي سيتم جمعها ووضع الاستنتاجات والاقتراحات المطلوبة، والتي تعتمد على
 10. الأسلوب الخاصة بانشاء مجمع صناعي زراعي في مرحلة التخطيط والتغليف والتنفيذ.

1.8 Data Sources:

سترتكز المعلومات والبيانات الواردة في هذه الدراسة على عدد من المصادر أهمها:

المصادر المكتبية وتشمل الكتب، الأبحاث، التقارير، النشرات، رسائل الماجستير في الدول اللأخرى المتعلقة بالموضوع.

2. المصادر الرسمية وتضم الإحصائيات والبيانات الصادرة عن جهاز المركزي الاحصائي الزراعي والصناعي،والوزارات، والمؤسسات ذات العلاقة، إضافة إلى الخرائط والمخططات.

3. المصادر الميدانية وتشمل المعلومات التي سيتم الحصول عليها من المقابلات الشخصية مع موظفي هيئة المدن الصناعية والخبرات الأكاديمية في البحث والتطوير في هذا الجانب من مختصين وذوي العلاقة والخبرة الفنية والتقنية في هذا المجال.

2.1The concept of industrial zones Industry Definition

Industry is a practice of human activity in order to convert item or more of material to the other new material with specific properties and special conditions at their production in order to ease the marketing or for the performance of a particular function. (AlSamaak, Azhar and others, 1987)

The United Nations defines the industry as converting inorganic materials or organic materials, by mechanical operations or chemical processes to other products, whether it is accomplished by machine or by hand, and whether the place of production is in a factory, workshop or in the house, and either it was sold to a wholesaler or sold to retailers **(AlSayeh,2015,p19)**

2.2Genesis and Development of the industry

It can be said that the industry has appeared since that God created human on this earth, and it was found where people live and where raw materials of industry were available, after that the industry development appeared to satisfy the needs of people as hunting tools industry and the tools of war to protect from the dangers, and with the passage of time and the evolution of life have increased human needs to many things have developed industry, followed by clothing ,food and farming tools and other industries .the phases of industry(Sharef,1976) include:

First stage:when the little number of population and their limited needs, the practice of industrical activiites was in surrounding of family.it was that the family produced its needs of clothing industry *,*hunting and food tools.

Second phase:

When the population increased and increasing of their needs, they lived in communities, and their production of materials and tools was surplus of their needs, the specialization in industry was appeared as consequences of these factors, for example, as specialization in agriculture tools. In this phase, it was that the worker founded the raw material and produced by freehand without any equipment or machines.

Third phase:

In this phase, with continual increasing of population and their new needs, and expanding of markets, development of transportation, also because of apperance of traders whom transferred their goods between these markets, as a result, the itegrated relationship between workers of industries and traders was appeared, so the traders takes the goods from the workers of industries and soled them in regions far away from industries, but the traders gave the raw material for the workers of industries, for example, the wool.

Fourth phase:

In the latest of fiftenth century, the development of industry was accured with urban geographic was appeared , the industry in homes was substituted by industry in workshop independent of homes, and the teamwork was appeared in this phase instead of one worker.

Fifth phase(Al-Saqqar,1994,p201):

Previous phases have been known as (Eotechnic), but this phase started after the industrial revolution in the early of eighteenth century, Shift from agricultural production to industrial manufacturing, The industrial revolution is typically thought of in terms of technology – the invention of complex machines and use of inanimate energy sources that greatly increased worker productivity – but important cultural, social and population changes were also involved. this phase was known as (palaeotechnic), as consequence of this industrial revolution, the appearance of development of transportation system as railways, and there was Immigrants' Problems after immigration from rural area to cities to work in industrial area.

The sixth stage:

This phase began in the mid-twentieth century, after World War II, where the industrial revolution technological appeared, and the production has become less expensive and more quality, this phase was known as (Neotechnic), it is characterized by depending on electricity, light metals. The change of manufacturing was called (Automation) through the use of electronic machines. after the development of the computer , the automatic machine replaced a large part of the mental work and labor, creating a new economic relations and what is called the global economy. **(Allam, 1998, p110).**

2.3 Types of industrial areas

1 Type the industrial zone, according to the site(Alsaed,2003 p42)

The industrial zone could be one of this types ,an urban or semi-urban or rural area, determined by national policies on regional and urban planning of industrial development goals.

2 type of industrial area by Activity (Saudi Industrial Propert Authority ,2014, p116, AlSayeh , 2015,p23-24)

Identifying the principal activity of units in industrial area, the food industry, textiles and garments industry, wood and wood products and furniture industry, Paper, printing and publishing industry, chemical and plastic products industry,building materials and porcelain glass industry, basic metal industries, metal products industries, machinery and equipment and Cooling and storage depots.

1.And it is classified as industries in modern times to primitive Industry, simple Industry and complex industries.

2.Light, medium and heavy industries:

Light industry needs to small areas and are often near residential areas, the medium needs more space, and may be close to residential areas, such as furniture and food industry ,heavy requires large area ,it is often dangerous as weapons and metal industry.

3.Natural classification, this classification depends on the nature of the industry, for example:

- Process- Based Production industry: transforming raw materials into a new substance in terms of form and use.
- Extractive industry: the extracting of raw matrials to use it in new industries are done by this type of extractive industry.
- Aggregated Industry: the compilation of the different products for the production of new goods such as cars and aircraft industry

3. The Type of industrial zone according to the motivation(Alsaed,2003 p23)

The industrial area can be classified based on the development, or promotional, or dispersal motivation, so the industrial area can be classified as follow:

"منطقة صناعية تطويرية"I.Developmenal Industrial Estate

The region is designed to develop ,improve and increase the level of industrial activity in the region where is located, and it is often in rural or semi-rural area,working to stimulate the profession of Contractors between artisans, this type establishes Nursery Estate" "المنطقة الحاضنة"

"منطقة صناعية ترويجية" 2.Promotional Industrial Estate

Entering new industries in the late economically regions and development of existing industries, as in the rural areas, where it helps to ensure the success and promotion of the industrial process in rural areas.

"منطقة صناعية احلالية" 3.Dispersal Industrial Estate

The main aim of this type is solving the problem of industrial concentration that suffers from high density of population and lack of places and environmental problems. Also it will contribute to the development of industrial activities in the region and the reduction of population migration from the rural areas to the cities ,it works on the distribution of investment and do not concentrate in a specific area as the capitals.

4. Type the industrial zone according to the Sponsorship (Alsaed, 2003 p24)

industrial areas are classified according to ownership, sponsorship and financing the all money or partially

"التمويل الحكومي" 1.Governmental funding

Local governments and local councils fund some industrial areas ,the rural, urban and semi-urban industrial areas, and they work on rules and regulations that must be followed in the planning and construction of industrial zones, and that's where government industrial areas are significantly contribute to the development of the industry in developing countries.

2. Private funding" التمويل الخاص

participation of the private funding is low in construction of industrial areas in developing countries because these projects need huge capital, and the public sector has larger responsibility, while in the developed industrial countries, the private sector has the ability to establish industrial zones through Co-Operative Society" ما المناعيت " or limited company, "شركات محدودة", An Association of Industrialist". "من الصناعيين

"تمويل خاص مدعوم" 3.supported Private funding

Governments provide grants and long-term loans to the private sector to help it construct industrial zones and foreign investment can contribute to support ,or global financial institution and may be funds from private and foreign sources.

5. Classification by type: (AlSayeh,2015,p24),this depends on:

- the type of inputs: the type of raw materials
- the type of products: the type of products produced by these industries
- the type of industrial processes, whether manufacturing or extractive or aggregate

6. Classification by the number of workers: (AlSayeh,2015,p24), this classification is based on labor-intensive:

- Low labor-intensive: it Requires a few number of workers.
- Intermediate labor-intensive Industries: that needs to be greater number of workers than the previous workers.
- High Labor-intensive industries: this needs a large number of workers and workers housing often is close to factories.

7. Classification by its impact on the environment (AlSayeh,2015,p25)

The two types are:

- by the quality of their outputs, which have an impact on gas environment, such as toxic gas emissions, air pollution, water pollution, such as the disposal of liquid wastes in seas or solid waste in the mountain environment.
- Classification of industries as environmental dangerous and divide into light and heavy industries with regard to its impact on the environment and public health.

2.4 The objectives of industrial areas

the most important reasons and motives for the establishment of cities and industrial areas at the national level of the Follows(AlBath,2003,p27):

1. The planning for the establishment of industrial zones is one of the important way to raise the level of development and the economy by increasing the return on the industry.

2. For coordination to absorb surplus labor in the agriculture sector to work in the sector

Industrial.

3. Work to mitigate the unemployment rate through the increase and diversity in employment.

4. work to mitigate the problems and suffering of the agricultural sector, which is suffering as a result of difficult situations o the prevailing conditions.

5. Achieve balance in the optimal use of the most appropriate and natural and human resources.

6. Raise the level of the local economy by attracting investors and attract scientific and technical expertise.

2.5Foundations and requirements of planning cities and industrial areas (AL -Buzz,2003,p27-28)

Many of the industries are in harmony with each other and sometimes they different ,and to achieve the balance and integration for the sustainability of the park at the industrial site, to satisfy future needs and expansion and the expansion of services. This is done through some of the requirements, they are:

1. social requirements. the main goal of which is to achieve prosperity requirement for visitors

that region and meeting their needs while they are there, taking into account working-class density and the percentage of visitors to the region in order to achieve their requirements and their needs, whether administrative, technical and other services such as parking lots and places of comfort and restaurants, banks and mosques as well as the Center for queries and security and fire services.

2.economic requirements.That area needs of development of economic sector is issue that several stakeholders make the economical feasibility study to achieve the public interest before thinking any gains. So if the achieving of correct and clear economic study can be done, which can

be promoted to it in different ways ,this will contribute to the work on attracting business investment. Thus contributing to the revitalization economy and an increase in national income level and raise the standard of living of the individual ,also increase job opportunities and to reduce the unemployment rate as well as to limit immigration.

3. aesthetic and sensual requirements. This aspect, in which various other sciences may share. In order to keep the archaeological, historical and urban monuments, which are seeking to survive in the event of identification the land use. Therefore, the aesthetic, historical, heritage and cultural elements, they as a whole in the event of concerted relations between them and help to build the confidence of investors to do investment process and without any hesitation or reservation.

2.6 Factors that affect in size selection of industrial zones and cities (AL -Buzz,2003,p27-30)

The size of the project will be established depends on factors that contribute with each other Of the progress and development of industrial facilities where their impact on investor and Owners of capital to attract them in order to increase investment opportunities that increase later Jobs and employment, and for this, it is necessary to take into account the following factors:

1. Nature of the market (the region) .That demand for the commodity may usually be either a seasonal or intermittent .It is wobbling according to the needs and requirements of the market so that production are considered a particular sector, domestic only focus is on the production of goods and services for daily consumption. This type of production here does not require large volumes of buildings for such another projects , whereas if the demand increased This means an increase in production as well as an increase in the size of the project so it is important Taking into account the expansion of all needs.

2. The nature and type of industry. The nature of the industry and the used technical processes in Production and technological development for the use of modern machinery completely define and advance the spatial needs. As well as service-estimate the space required by the type of industry to be applied.

3. Type and nature of the product where some goods production depends on each other, therefore thethere is a sequence or thread to complete these production operations while producing goods with big size is reason of the required of increasing the space required, therefore, the criteria that falls has a classify and determine the size of these projects are either (AlBath, 2004, p24): -

- A production capacity per unit of industrial size.
- the size of human resources and labor-based project.
- capital, which governs and determines the size of the project, according to the type of industry the light, medium or heavy industries

4. Future developments and needs of the project ,the growth of the size of the project also depends on the expected growth rate based on studies and economic feasibility of the project as well as identifying the objectives of the establishment of this project and this means that future developments should not be overlooked by adecision maker. Considering all needs for growth and development through the vision of a future in which a totalitarian and the balance enhances the sense of security and peace to the owners of capital and encourage them to investment also contributes to raising the efficiency of production in quantity and quality, particularly when

modern technology will be used by some investors.

2.7 Industrial areas planning

Industrial areas planning is an essential component of urban and regional planning for cities planning ,in addition to the planning of residential areas, commercial and agricultural, transportation, and other. in planning geographers , engineers and Economists cooperate with each other. (AlSaqqar,1994,p378)

Intended planning methods, procedures and measures taken by the human to turn reality into a better and better picture and derive the area of industry planning its importance from the industry itself in the life , where the industry is the true measure of economic development where some countries put five or tenth or twenties plans for the development of the industry and the economy.

(Yaaqoub, Almosawe, 2006, p59)

Many planners tend to realize the idea of industrial concentration where all the best areas away from population. (A.Sayeh,2015,p26)

Number	Type Usage	Percentage%
1	industrial buildings	60-70%
2	stores	20 <=
3	Administration	10-15
4	Workers services	5-7%
5	Streets and corridors	12%

Table no():The needs of the industrial areas of space facilities

6	infrastructure	2%
7	Green areas	5%

Source: Time Saver Standards for Building Types, Saudi Industrial Propert Authority ,2014 p 74, AlBath,2003,p27-30

2.7.1 requirements of Industrial City site

One of the most important industrial city requirements include (AlBath,2004,p24):

1. Topography of the land should be easy and the slope nor the inclination percentage increase of 5%. In order to avoid increased expenses or risk of flooding in low-lying areas.

2. Appropriate use of the land to the type of industry and taking into account the needs of the region after determining wind direction and planning for open spaces and the establishment of green belts.

- 3. The existence of roads and good transport links.
- 4. Availability of facilities and services and get easy it.
- 5. To be signed at a place close to transportation and housing workers.
- 6. Availability spaces to plan of arenas and parking, restaurants and mosque.
- 7. Save energy and water security and fire services and extension services.
- 8. The presence of administration offices and the offices of technical consultancy and training.

2.7.2 forms of industrial endemic:

It is known that there is no one form of industrial endemic or geographical spread for economic and industrial activities in all states or within a state , there are several forms Industrial endemic and every form of these forms positives and negatives that can not be overlooked is that Forms(AlSaqqar, 1994, p. 194 + p195)

• distribution network "التوزيع الشبكي"

And is the industries that are concentrated in limited areas, but spread all cities within And it spreads as well as in many of the neighborhoods in the same city was Link networked, so it is called a state or mostly,this distribution network and this model pros and cons, it is the pros link these industriesClosely linked to the consumption market, reducing product transportation costs, and make it easier for citizens to take advantage of them.And buy them with minimal effort, as it uses the labor of more than one area.The cons of this model is represented with noise and pollution caused by the population there, and after all Raw materials, and Moanl and airports as well, and the narrow streets and roads are not designed for any useGrown for human use ... etc., so the fit of this model for all industries, but Can fit for some light industries such as food industries and services, it is difficult to Residents benefit from these industries as if they were concentrated in one place in the state.

narrow distribution network

The industries that span distances and wide but not distributed in all parts of the region such as The previous model we call) a narrow distribution network or limited, or what might be called

Industrial scale "belt industrial." Name This model is characterized by the presence of industrial zones close to but separate from each other despite the neighboring, similar The pros and cons of this model to some extent the previous model with some differences in the severity of these effects, since the distribution does not include all areas of the region, which limits the effects in the areas where industries and not in all regions, for example the cotton plants in the US United started spreading widely.

• concentration of the cluster "التمركز العنقودي"

If increased industrial concentration for that model called positioning cluster ,name or region industrial " industrial district," and this has grown the model has the industry concentrated in one place, that are found in relatively small regions, and the positives of this form near the industry of raw materials and ease noise relative to its distance from residential areas, and the availability of infrastructure such as suitable for these industries , while the drawbacks is represented revive another, and the migration of workers as well as form a major problem, and the distance from the market increases the costs and burdens If increased industrial concentration.

• Industrial zones, industrial estate, "المناطق الصناعية أو المستعمرات الصناعية".

If the increased focus on the concentration of industry cluster, or confined in a place or one area

And narrow, we get to the intense concentration or so-called industrial colonies name), an area

Officially planned and customized commercial and industrial use is separated from residential facilities and areas.(A.Sayeh,2015,p28)

2.8 Theories of industrial site

Many theories that dealt with industrial site and the foundations of his choice, which appeared confined

These theories in three main areas (Alaghabr, 2007, p. 24, +p 23)::

- Theory of Weber Alferd :where he addressed in his theory known as the theory of industrial site industrial site solo issue did not mention to the communities or industrial cities, and revolves around the industrial site, which provides the maximum profit by reducing production costs to a minimum by reducing production costs to a minimum.
- theories focused addressed on the site and its importance by market factors and with industrial Products including Loesch theory.
- theories worked to integrate the former two types together, including studies of Isard individual theory ,Weber is the origin of all the theories and studies on the industrial site in the third axis, and said that the site is optimized for the industry in the region where the distance between the production of raw materials and parts to be manufactured in only the minimum.

2.9Theories industrial endemicity

There is a set of theories that dealt with industrial endemic, and most important of these theories, the following: (Alaghabr, 2007, p. 26, pp 25+:)

• central growth theory (Berger 1925):that he said that the industrial zone is located on the edge

of the two regions, the central business district and region transitional, which is of mixed land use is concentrated in light industries.

- sectors Theory (Humbert 1936): It believes that the growth of the city in the form of growth sectors to the outside, and is located on the industrial zone along the transport routes of the central region of the Suburbs.
- multiple nucleus Theory (to American ,Shawn Harris and Edwar IMann, 1945):Re-growing cities on more than one line, and leads the growth of the city to the emergence of other centers as nucleus.
- Theory of minimum cost(Lauber 1945):the industry has identified site for less than the cost of transportation and with the lack of workers' wages

- Theory of market space(to Indar): this theory is trying to answer the question what the industrial resettle, industrial endemicity by taking price and endemic of raw materials into consideration.
- Marginal theory: Says the industry is moving to the cities depending on their size, that is endemic in the industry and is moving at rates proportional the size of the markets measured the size of cities.

• Vertical integration(Basem Makhol): with population density through a series of years, when economies of scale exist, large firms may be more efficient than small firms, and the industry may consist of a monopoly or a few large firms.Production may be imperfectly competitive in the sense that excess or monopoly profits are captured by large firms.so we will know the relationship between the development between economic of scale &the desity of population that makes the development of cities.

- Vertical integration is an important factor in economic development. The Benefits of Vertical Integration are Securing critical supplies
- Lowering costs (efficiency)
- Improving quality and Facilitating scheduling and planning .

2.10 DEVELOPMENT CONTEXT

2.10.1 Economic context

Few countries in the world have reached a high level of economic and social development without having developed an advanced industrial sector. It contributes to poverty reduction by generating employment and creating income. The industrial sector also has extensive linkages with other sectors of the economy. Agriculture-based industry is particularly important for developing countries and is a first step towards the structural transformation of the economy.

To sustain and translate this growth into structural transformation, the development of higher-productivity activities, such as manufacturing, is critical.(UNIDO,2014)

2.10.2 An Integrated Agro-industrial Park Definition and History of it

An Agro-industrial Park is a geographic cluster of independent firms grouped together to gain economies of scale and positive externalities by sharing infrastructure – roads, power, communication, storage, packaging, by-product utilization, effluent treatment, logistics and transport, laboratory facilities, etc. – and taking advantage of opportunities for bulk purchasing and selling, training courses and extension services. Multiple agro-processing functions take place in the IAIPs, such as final processing, storage, packaging, marketing and distribution. Support businesses and social infrastructure are also present.

AIPs will include open area production zones, controlled environment growing, precision farming, knowledge hubs and research facilities, rural hubs, agriinfrastructure, collection centres, primary processing hubs, RTCs, social infrastructure and agri-marketing infrastructure, among others. AIPs will have state of the art infrastructure. General infrastructure will include: roads, power,

water,communications, drainage, sewerage, sewage treatment plant, effluent treatment plant, storm water drains, rain water harvesting, and firefighting facilities, among others. Specialized infrastructure will consist of cold storage units, quarantine facilities, quality control labs, quality certification centres, raw material storage, controlled and modified atmospheric storage, central processing centres, etc. In addition, infrastructure at the IAIPs will emphasize environmental sustainability.(UNIDO,2014,p6)

Evolution of the Agro-industrial Sector

Since the early 1990s, there has been a rapid process of agro-industrialization in many developing countries, characterized by the establishment of private and formal sector firms across an increasing array of food and non-food.

sectors. In order to understand the nature and consequences of this evolution, however, it needs to be viewed in the context of the wider restructuring of theentire agribusiness complex. In this regard we can posit three broad sets of changes (Reardon, 2007). First, the growth of agro-processing, distribution and agricultural input provision activities off-farm by agro-industrial firms.

Second, institutional and/or organizational changes to the relations between agro-industrial firms and primary producers, for example, increasing levels of vertical integration. Third, changes in the primary production sector in terms of product composition, technology, sectoral and market structures, etc. (Reardon and Barrett, 2000). Thus, we can see the growth of the agroindustrial sector as being integral to profound changes in the entire way in which the agro-food complex is structured and organized. In turn, this suggests impacts on actors at all levels of the supply chain, from primary production to consumption. The framework developed by Reardon and Barrett (2000) provides a useful lens through which one can understand these processes of agro- industrialization in developing countries, the factors driving these processes and their consequences (Figure 1). **(Silva, Baker and others, 2012)**

Underlying meta-trends

Underlying the evolution of the agro-industrial sector is a broad set of metatrends, at both the national and international levels, that condition the way in which the sector is structured and operates over time. With respect to domestic markets for the products of agro-industries, population and income growth are driving changes in food consumption patterns at the broad commodity level, away from starchy staples and towards meat, dairy products, fruits and vegetables, oils and processed grains (see e.g. Cranfield et al., 1998; Pingali and Khwaja, 2004).

With increasing urbanization , greater participation of women in the paid labour force and greater ownership of household appliances (e.g. refrigerators and microwave ovens), demand for more highly processed and higher value food products with high income elasticities is growing This trend is driving the evolution of the food-processing sector and providing a mechanism through which enterprises can counteract the downwards pull on relative food expenditure . In turn, this leads to an increased demand for raw materials from primary production, accompanied by shifts in the types and qualities of raw materials being demanded, which can generate economic benefits for the agriculture, fisheries and forestry sectors (Reardon and Barrett, 2000).

Through the 1980s and 1990s, the political economy in which agroindustries operated changed radically, both nationally in developing countries and internationally.



Figure 1. Process of agro-industrialization in developing countries. (From Reardon and Barrett, 2000.)

The establishment of dedicated industrial estates of idea of AIP started between the late 19th century and the early 20th century ,agriculture felt the effects of the industrial revolution that until then had only involved other production industries. real modern industries were created that were nevertheless physically located in rural contexts where the economy and social fabric were still of the traditional type. It is in this social and economic scenario that the first agro-food buildings of impressive architectonic size and structure emerged.

The targeted industries:target area of any investment respect to, in some way, and agricultural industries and related services. If there is, mixing, or you do not specify, for business or industry, with falls within the domain of the decision, or not; the body and the developer to review the details of the field of agro-industrial business, to report it.

The development of the agrifood industry will obviously vary in different regions of the world depending on current levels of sophistication with respect to the production, preservation and processing of agricultural commodities. .(UNIDO,2014,p)

Each IAIP is served by a network of rural transformation centres which provides linkages to producers. An RTC is a facility that provides integrated services to rural communities within a 100 kilometer radius of the proposed IAIP site. RTCs are rural development initiatives of the GoE which not only facilitate inclusive rural development, but also serve as a linkage to the IAIP in terms of raw material supply.

RTCs (Regional Training Centers) are geographic clusters of infrastructure and services, though on a smaller scale than IAIPs. Farmers and farmer groups deliver their produce and receive agricultural inputs. At the RTCs, agricultural produce is collected, sorted, stored and may undergo primary processing before onward transport to an IAIP. For most farmers, the RTCs are the main point of contact with commercial agricultural value chains. Apart from their primary functions, RTCs also offer small-scale financial services to farmers as well as basic social services. **(UNIDO,2014,p6)**



Figure 2: IAIP and RTC connections Source: (INTEGRATED AGRO-INDUSTRIAL PARKS IN ETHIOPIA, UNDO, 2014)

2.11The major components of AIP

2.11.1 The major components of RTCs include:

• Training and capacity-building for rural populations - Training opportunities for rural communities aimed at enhancing knowledge, skills and abilities to increase income-earning opportunities and, as a result, improve standards of living. Training will cover areas such as cultivation, post-harvest handling, packaging and branding, product performance and animal feed management. In addition to the proposed training centres, a network arrangement can be established with the existing farmer training centers within the catchment area of the RTCs.

• Market information centre - A one-stop information centre that combines information and services offered by various ministries and government agencies. The centre will provide information on agro-food business development, prices, market trends, and current market demand in terms of products and quality, among other services.

• Agriculture support services – These services will help rural communities to enhance productivity; produce premium vegetable, including high-demand vegetables such as capsicum; and cover areas such as dairy development, including raw milk marketing. These services will also target quality improvement by setting up agriculture input services, agriculture equipment support services, and agri-clinics, among others.

• Agro-food processing activities – Aims at developing food processing enterprises in rural areas, with an emphasis on improved agro-food product quality for local and overseas markets. This will support agro-industrial development through value added activities and generate additional income for farming communities.

• Agricultural produce supply chain management – These support services aim to improve the marketing of agricultural products through supply chain management from the farm to consumers. This will be achieved through better planning and appropriate quality control across the supply chain.

The primary feature of IAIPs and RTCs is the clustering of essential infrastructure, utilities and services required by businesses to operate and grow. Clustering allows for economies of scale that lower transaction and overhead costs. In addition, economies of scale in terms of raw material inputs allow processing firms to operate at full capacity. The clustering of firms also provides the critical mass needed for the efficient provision of services such as eco-friendly waste recycling and disposal, which is difficult to provide to widely dispersed firms. Furthermore, clustering allows it to better introduce and monitor targeted incentive regimes to promote agro-industrial growth.

Clustering also lowers the overall cost of production by reducing post-harvest losses, transportation and energy costs, as well as ensuring higher returns due to high quality outputs, off season availability, better traceability and enhanced productivity.

Another key feature of the IAIPs and RTCs is innovation diffusion. IAIPs facilitate vertical and horizontal links between resident enterprises, as well as between enterprises and facilitating organizations, such as government support institutions, development partners and research institutes.

By disseminating knowledge, skills and innovation, the IAIPs and RTCs will contribute to the overall upgrading of the agro-industry sector and allow firms to compete more successfully at the regional and global levels. The benefits also reach the farmer and small-scale processor level, ensuring higher product quality from farm to fork, and integrating larger portions of the population into commercial agricultural value chains.(UNIDO,2014,p)

2.11.2 Integrating agro-allied industry companies

As commercial value chains become more integrated, there are greater benefits from specialization and an increasingly important role for agro-allied industry companies. Examples of such companies include those specialized in sales, distribution and transport, input supply, and food catering. By offering incentives, such as modest plot lease fees, financial assistance and training, the IAIPs or RTCs promote specialization and growth, generating important off-farm employment.

Lack of capital is currently the biggest challenge for these companies. Financial services for small-scale food processors to innovate or expand are only beginning to emerge, and credit from specialized banks remains minimal. IAIPs will facilitate access to finance through the presence of on-site financial institutions offering financial solutions catered specifically to agro-allied industry companies. Large-scale firms present in the IAIPs (and sometimes RTCs) can advance funds and operational equipment to smaller-scale firms, offering another option for access to finance. .(UNIDO,2014,p)

Development of industrial ecosystems (IE) is an effective method for recycling, reuse and resource conservation (Garner and Keoleian, 1995; Jin and Arons, 2009). This mechanism converts the industrial process from a linear process to a cyclic process where the waste generated by one industry can be used as a resource by another industry (Ehrenfeld, 2004). Since the establishment of the agro-chemical ecosystem in Kalundborg and another countries, many industrial ecosystems have been established worldwide.Facing resource shortage as well as stringent energy saving and emission reduction targets. (Ding and Hua,2012)

2.11.3The major components of AIP

The major components of AIP depends on many factors but the basic needs in each one should include the facilities as infrastructure ,the storages,the types of food industry as described above, and below in this table 2 the many components will be described.

Table 2: Overall Landuse Pattern

S.No	Particulars		
1	Total site area		
	La		
	Particulars		
1	Livestock zone		
2	Milk, egg & honey zone		
З	Vegetables zone		
4	Cereals zone		
5	Storage facility		
6	Specialized infrastructure zone		
7	Amenities zone		
8	Utilities zone		
9	Roads		
10	Open space / greenery		
1.Livest	cock zone		
	Quarantine advisory cell		
	Inspection area		
	Receiving area		
	Preparation area		
2.Milk,	eggs, honey zone		
	Milk collection centre & testing area		
	Milk tank & milk pump		
	Honey & wax collection centre		
3.Veget	ables Zone		
	Receiving warehouse		
	Grading & sorting shed		
	Washing and drying		
	Sub total		
4.Cere	als Zone		
	Receiving warehouse		
	Grading & sorting shed		
	Washing and drying		
5.Stora	age Facility		
	Egg grading, sorting & storage		
	Bulk storage - Vegetables		
	Cold storage - Vegetables		
	Bulk storage - Cereals		

جار مسبق المسبع جار مربع مسبق المسبع جار الإدارة الخدمات مدخل رئيسي مسبق م

جار





أبعاد الرصيف حول صالات الإنتاح

Source:UNIDO,2014

5. Green	Space	
Gr	een buffer	
		مواسسير مسرف
6. Roads	3	• • • •
30)m wide road	• التعــــنغ
24	Im wide road	
18	3m wide road	
	Total processing area	الى شىبكة مىرف الأمطار
S.No	Particulars	شبكة صرف الأمطار بالمصنع
	Non Processing zone	Figure():Acts of industrial wastewater treatment
1. Reside	ential area	
3 8	Bedroom units - 64 numbers	Su i da su
28	Bedroom units - 48numbers	العمامة العمامة العمامة
		ا الم الم الم الم الم الم الم الم الم ال
2. Amen	ities	
Sc	hool	
Cr	èche	تطفية
Pla	aces of worship	الإنتساح
Re	tail space	
		مسقط افقت لوضع كل نوع من المخلفات الصلية في حاويات خاصة
3. Utilitie	S	
Su	bstation	_حدود قطعــة الأرض
4. Green	I space	منطقة محسولين النفايات الخطوة كما الم
Gr	een buffer, park and play ground	
5. Roads	3	منطقية
30)m wide road	الإنساج
24	Im wide road	⊥∕+
10)m wide road	
	Total non processing area	
	Grand total of IAIP area	

6.Specialized infrastructure zone

Rural market
Admin building
Market intelligence cell
Agri equipment centre
Agri input centre
Training centre
Women's self help group
QA & QC labs

7.Amenities

	interes .			
	Truck parking			
	Public parking space			
	Crèche, & nursing mothers area			
	Cafeteria & restroom			
8.Utiliti	es			
	Common effluent treatment plant & sewage treatment plant			
	Solid waste management			
	OHT - over head storage tank			

Substation

9.Roads

	15m wide road	
	10 m wide road	
10.0	pen Space/greenery	
	Open space / greenery	
		Sub total

Total area







Figure 3: The methodology of study case studies

3.1 international case study

the first case study:-Integrated Agro-Industrial Parks (IAIPs) in Ethiopia.

- Regional site of experience
- Components of the project
- Thought of experiment
- Urban planning development pattern
- Objective of the experiment
- Regional site of experience

An outline of the features of the four pilot IAIP sites in Central Eastern Oromia, Southwest Amhara, Eastern SNNP and Western Tigray follows.

Site selection process

The four pilot IAIPs were selected on the basis of six broad criteria as mentioned below: (UNIDO,2014,p12)

- 1. Agricultural production potential for strategic commodities.
- 2. Inter-industry linkages and triggering effect
- 3. Infrastructure facilities
- 4. Market potential
- 5. Access to commercial and support services
- 6. Concentration of enterprises and attractiveness for investors.



TIGRAY - WESTERN TIGRAY (BAEKER IAIP)



Figure(5): Regional location and key information for Integrated Agro-Industrial Parks (IAIPs) in Ethiopia.

-Components of the project This experiment depended on : -the transportation and other criteria site selection

3years

Payback period



Figure():location of Bulbula-Oromia IAIP.source



Figure(6): Components of IAIP in OROMIA

Nevground	and a state of the					
		and		(C)		
bedroom housing units		1. States	De	tal space	00m	
reche		-	-	Admin office	& R&D centre	
bedroom bousing units			and a second			
about the stand should be	IXXXX IIIIXX	24m-wate-road	A The de	Pla	ace of worship	
ichool	Selected and			and a second	100	1
xtension centre - meat & dairy, food everage & pharmaceutical institute raining centre				and the second second		Ababa
olyalinia	Overhead	IN PS.	S	Substation	and and a state of the	Pa
formation klosk & market	tank	CALL CALL		Pu	blic pack	P ²
telligence cell	Future road		-Bomwide Road		E	ntry & exit
egetable processing units					9	
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and the second second second					1.817 Ha	
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	33576	2.33 Ha	0.88 He 0.88 He	8 0.68 Ha 0.88 Ha	1	
legetable ancillary units			*	Las	LD5 He	
		233 Ha	0.88.H# 0.88.Hs	6 0.88 Ha 0.88 Ha		
ertification lab	3.43 нь	2,00,01,10	Tama	0007000	1.99 Ha	
as packing			0.93 Ha 0.93 Ha			
a parking	8	20214				
	100		0.93 Ha 0.93 Ha	0.93 Ha 0.93 Ha	2.05 Ha	
DC - Inschool of a start from the first	3 50 HS	0.49 LH	Lindow hards and	106		
ar - individual quick frozen facility in the second sec		E.H.S.P.U	K compressor		1.77 Ha	
ereals processing unit	Green buffer	Green buffer	Green buffer	Green buffer	Green buffer	
fulti chember cold storage	Substation	558H9		D EG Ha	208.04	9
PC - centralized processing			290			Tranch .
entre pulping, aseptic packaging, ottling, canning,common packing		238 Hz	+	0.93 Ha 0.93 Ha	2.23 Hz	retting
honey processing	aliste Ha	and the second	1 Million	0.92 Ha 0.92 Ha	And	The second
Greels anchor unit						
		238.Ha			2.29 Ha	
ereals ancillary unit			0.88 Ha 0.88 Ha	0.88 Ha 0.88 Ha	A DEPARTMENT	
1 8		20814		5	Summer	
Aalt plant/ brewery	6.21 Ha	ALC: NOT	0.88 Ha 0.88 Ha	0.88 Ha 0.88 Ha	storage tank	
			30m	wide-road		Entry & exit
egetables - finished goods storage	3	Deceale . P	reals - Cecasie	Vepetables-		
the oppling chambars	Sewage treatment plant	new material gradin storage	g, packing finished goods	rew meterial Voget otoroge grad	ables # B	E III
egetable preparation area	effluent treatment plant			piic S. let	king data	
Allk - value added dairy products						- ap
Alik & dairy plant	Green buffer	Green but	ter C	areen butter	Green buffe	in the second
oultry - egg storage unit	Solid weets management plant				Terrels low how	「
		1.79 Ha 2.92	Ha Paleks	8 36 Ko 236 Ho	fuel station &	dera
outry - egg processing unit		-			weigh bridge	1 A
3	Future road		30m	wide road		Entry & exit
leat - deep freeze cold storage						
leat processing units						E.L.
leat anchor unit	C4214.	3.08 Hp	316 Ha 3.24 Ha	3.33 Ha	401 He	ey6
feat rendering plant						alla alla
And the second of press to	9999999000000-					Bud
	and the second sec		99999999999	200000000000000000000000000000000000000		12 P

Figure():Sample masterplan - Oromia IAIP.(2014,UNIDO,p9)

Training centre	The restance in the second second			~ / · · · ·		
Polyalinia	Overhead		ST C	Substation		
Information kiosk & markst	tank	E BAB		P		
intelligence cell	Future road		30m wide road			
Vegetable processing units		1081				
	3.20.14	239 Ma 239	2 His 232 His	2.30 He 2.38 He		
Vegetable anchor units			24m wide road			
	3.35.05	2.33 He	0.68 He 0.88 He	0.69 H9 0.89 H		
Vegetable ancillary units						
		233 Ha	Coartie Coartie	& DBBHs DBBHs		
Certification lab	3,43,45		IEIT ONNO TELLO			
Car panking			0.93 Ha 0.93 H			
			093 Ha 093 H	a 0.93 Ha 0.93 Ha		
IQF - Individual quick frozen facility	3.50 +++	243 Ha	Utility - boiler, chile	e itar		
Cereals processing unit	Green buffer	Green buffer	Green butter	Green buffer		
Multi chember cold storage	Substation	8889149		0.63 Ha		
CPC - centralized processing centre pulping, aseptic packaging.			CPC.	0.93 Ha 0.93 Ha		
bottling, canning,common packing & honey processing	anetse en a	238 Hu	(Land	0.82 Ha 0.82 Ha		
QA & QC lab				USE Ha		
Gereals anchor unit		POR Ho	137	wide road		

Figure ():Part of Ormia Master Plan



Figure():Part 1 of Ormia Master Plan

Oromia – Central Eastern Oromia – Bulbula IAIP					
Location of IAIP		Bulbulla town in East Shewa administrative zone			
Size of IAIP		263 hectares considered for initial development			
RTCs Location		 Shashemene, Dodola, Robe, Bekoji, Eteya, Welenchiti, Meki & Biyo Biske 			
Agricultural potential and agri facilities		 Availability of two operational sugar plantations Concentration of fattening, dairy farms, abattoirs Fishery potential, Koka dam, rift valley lakes (Zeway, Langano Wheat, barley, haricot bean, fava bean, tomato, potato, fruit and vegetables, dairy, fish, poultry, honey and meat 			
	Energy	 Substation at Ziway town at a distance of approximately 17.5 kms 			
External infrastructure	Water	 Water source – River Bulbulla – it is proposed to provide infiltration well, collection well and pump house near the river basin at an approximate distance of 2 kms Concentration of lakes, surface water, water supply 			
	Road network	 The site abuts the federal highway connecting Addis Ababa & Awasa 			
	Railways, dry þort, airþort terminals	 Proximity to biggest airport terminal, dry port & Djibouti port Bole International airport, Addis Ababa – 180 kms 			
	Telecommunication	 Telecom – communication facilities available in Bulbulla town can be extended 			
	Raw materials required	859,354 MTPA			
	Growing area required	334,971 hectares			
	Total processing area	239.73 hectares			
	Total non-processing area	23.36 hectares			
IAIP Internal Infrastructure Details	Total area	263.09 hectares			
	Length of road	14.06 km			
	Total water demand	6,660 m³/day			
	Wastewater generation	4,504.77 m³/day			
	MSW generation	59.38 TPD			
	Power demand	45.951 MVA			

Table() :Features of the selected Oromia IAIP site

Source:(2014,UNIDO,p15)
DescriptionLocation - Western TigrayCropsSorghum and sesame, fruits and
vegetables, honey, dairy, meat and
other animal products
524,706 hectaresGrowing area available
Total area of IAIP524,706 hectares150.92 hectaresBaeker
ISO.92 he
Locatares

Figure():location of Beaker-Tigray IAIP.(2014,UNIDO,p6)



Figure():Comonents of Tigray IAIP.(2014,UNIDO,p6)



Figure():location of Bure-Amhara IAIP



Figure():The elements of Bure-Amhara IAIP.(2014,UNIDO,p7) Milk & dairy plant Honey processing unit Poultry egg storage unit Poultry egg processing unit Vegetable anchor unit Vegetable ancillary units IGF - Individual quick frozen facility Pre cooling chambers Sesame ancillary units t rendering plant QA & QC lab essing unit Sesame processing units unit Sesame anchor units Training loney processing unit Poultry egg storage unit Summer Poultry egg processing unit torage tank Vegetable anchor unit Boiler, chiller Vegetable ancillary units compressor IGF - Individual quick frozen facility Solid waste nanagement plant Pre cooling chambers Aeat deep freezing Sesame ancillary units Meat rendering plant cold storage QA & QC lab Vegetable processing unit Sesame processing unit Cereals anchor unit Malt plant Sesame / brewery ntermediatory Cereals processing units Multi chamber cold storage CPC - central processing centre **Certification** lab pulping, aseptic packaging, bottling, canning,common packing Sewage treatment plant Playground 3 bed housing unit 2 bed housing unit Place of work Creche Polyclinic School

Figure():



Figure():location of Bure-Amhara IAIP.(2014,UNIDO,p7)



Figure():Components of the Bure-Amhara IAIP project.(2014,UNIDO,p7)

-The theoretical ideology of the experience

-Urban planning development pattern

The IAIP had pattern of Semi-Grid and the Rural Transformation Centers (RTCs) had Rural transformation centres the Government of Ethiopia will establish rural transformation centres to serve as raw material

aggregation points in the catchment areas (100 km radius) of each IAIP.

• Rural transformation centres include warehouses, input supply, sorting, grading, extension services, preprocessing activities and microfinance.

• Public and private partners support farmers to increase production and productivity to supply raw materials of required quantity and quality to the industries in the parks.

• Market information centres will provide information on business development, prices, market trends, and current market demand in terms of products and quality, among other services.



Figure(): (2014,UNIDO,p10)



Figure():Sample masterplan for rural transformation center – Bulbula IAIP, Oromia



Figure():Map of AIP INFRASTRUCTURE CONNECTIVITY

-Objective of the experiment

The development of IAIPs will produce an environment that is conducive to attracting investment in agrofood and allied sectors.

The IAIPs will:

- · Create world class supply-chain infrastructure needed for agro-industrial development;
- Increase total flows of investment in agro-industry both in terms of skills and capital to establish backward and forward linkages;
- Foster strong linkages between agriculture and agro-industry;
- Provide a close interface between research, extension mechanisms, industry and farmers in the agricultural sector;
- Increase value addition and reduce wastages, thereby increasing the income of farmers;
- Produce better quality products;
- Create rural employment, off-farm income opportunities and improve quality of life in rural areas;
- · Assist small-scale agro-industrial enterprises to remain competitive in global markets; and
- Facilitate commercialization of agriculture and increase exports of processed and value added agroproducts.



-Analysis of experience:- The use of certain components of the project and associative relationships between components in Integrated Agro-Industrial Parks (IAIPs) in Ethiopia will be used in my Proposed AIP(Agro-Industrial Park).

1.1 Arab case study

Experience of the

- Regional site of experience
- Components of the project
- Thought of experiment
- Urban planning development pattern
- Objective of the experiment
- Regional site of experience Aswan in Egypt



Figure():Aswan Location ,(2015,Aldeeb,p30)

-Components of the project

النسبة(%)	المساحة (فدان)	الاستخدام	الاستعمال
%±	٦··=:*١٥.	قري ريفية * ؛	سكني
%1,0 %٣	۲۰۰ فدن ۵۰ غدان	قرية مركزية خدمات اقليمية	خدمي
%91,0	. ۱۳۷۰فدان	اراضي استصلاح	زراعي
%١٠٠	۰۰۰ د افدان	مجمع قروي	الاجمالي

اجدول استعمالات الاراضي المقترح للمجمع القروي

Source(2015,Aldeeb,p41)



تعتمد فكرة الحل علي محور طولي يرتكز عليه الخدمات الرئيسية والصناعات الزراعية ويرتكز علي جانبية القري التابعه ويعتبر بمثابة محور تنموي للقري يمتاز بسهولة الوصول اليه لجميع القري



Figure(): (2015,Aldeeb,p36-40)

المخطط العام المقترح للمجمع القروي الزراعي الصناعي



Figure(): (2015,Aldeeb,p43)



فكرة الحل المقترحة لتجميع القري والقرية المركزية لخدمة المجمع الصناعي الزراعي



التصميم المعماري المقترح للمبني





جدول استعمالات الاراضي المقترح للقرية الريفية					
النسبة	المساحة	العدد	الاستعمال		الاستخدام
%33.3	50 فدان	670 منزل بالقرية	منزل ريفي مساحة 300 متر		سكني
%0.9	1.4فدان	(1)	مسجد		
%1	1.5فدان	(1)	وحدة صحية		
%1	1.5فدان	(1)	مدرسة ابتدائي		
%3.3	5فدان	(1)	وحدة بيطرية	ریئ	
%3.3	5فدان	(1)	جمعية زراعية	mï	
%2	3فدان	(18)	محلات تجارية	৾৾ঢ়	
%2.4	3.6فدان	(1)	سوق اسبوعي		
%4.7	7فدان	(1)	ترفيهي		خدمي
%18.6	28فدان			الاجمالي	
%0.65	2* 0.5فدان	(2)	مسجد		
%2	2* 1.5فدان	(2)	ملعب رياضي	ثانو	
%0.65	2* 0.5فدان	(2)	ملعب اطفال	وي	
%1.4	2* 1فدان	(2)	سوق صغير		
%4.7	7فدان			الاجمالي	
%4.7	2*3.5	(2)	معارض للمتجات الزراعية	اقليمي	
%4.7	7فدان			الاجمالي	
%28	42فدان				الاجمالي
%6.65	10فدان	(2)	الطرق		
%19.3	29فدان		ممرات المشاة		
%6.1	9فدان	(6)	ت الحركة الماكن الانتظار		خدمات الحركه
%6.65	10فدان	(1)	ہر (حرم طریق)	حزام اخظ	
%38.7	58فدان				الاجمالي
%100	150فدان	 الاجمالي			

-Objective of the experiment

-إشكالية المشروع: ۱-اقلیمیا:-١-زيادة نصيب الفرد من الاراضي الزراعيه ٢-تحسين الظروف المعيشية للفلاح الريف ٣-الاسغلال الامثل للصناعات الغذائية ٤-توفير الخدمات للقرى الزار اعية ١-مد محاور العمران الى الصحراء والمناطق التئمية الصجراء ۲-الاستغلال الامثل للصحراء التي تمثل ثلثي مساحة مصر. ٣-خلق بؤر لجذب السكان الى الصحراء ١- تخفيف المركزية في الدلتا على ضفاف النيل والاتجاه إلى الصحراء الدلتا

الاستفادة من هذه التجربة في مشروعي المقترح ربط مقومات المجمع الصناعي الزراعي مع القرى المحيطة ونسبة مساحته لهم وعلى ان تكون القرية الزراعية المركزية بقوانين خاصة أكثر من القرى المجاورة . وكيفية استصلاح الأراضي والاستفادة من الأراضي عالية القيمة الزراعية بصنع المواد الغذائية .

3.2 Local case study

Experience of Alnaqab Desert(Palestine)

- Regional site of experience
- Components of the project
- Thought of experiment
- Urban planning development pattern
- Objective of the experiment
- Regional site of experience



Figure:Location of AlNaqab of Palestine(2015,Aldeeb.P22) Al Naqab Desert of Palestine is Located in the southern region ,an area of 14,000 kilometers

The theoretical ideology of the experience

The exploitation of the desert and the establishment of residential communities through along the axes of longitudinal and cross on the sides the farms and residential buildings are located.

Urban planning development pattern

- Characterized by the shape of Urban
- Taking a circular shape
- And it is divided into three main rings
- Urban Fabric is Compact



Figure: Urban Pattern of Alnaqab case study

Components of the project

Table no():The basic components of the pattern schematic of the experiment

0 1		
Land Use	Percentage	×
residential areas	% 38	7,022.4
Service centers	% 29	5,359.2
Agricultural industrial uses	% 6	1,108.8
the road network	% 10	1,848.0
open Space	% 17	3,141.6

Source: (Aldeeb,2015,p23)





Fig():

Patterns of Israeli settlement (الموشاف Moshav) (الكيبوتز) Kibbutz It is one of the ideological forms It is Israeli settlements used by Israel in development and It is based on the work of agriculture can be defined as a group of And the ownership of the cooperation settlers or cooperative village is a type of Israeli town or settlement, farms. in particular a type of cooperative agricultural community of individual farms of the Moshav. Estimates of the number of families within Gatherings between 40-60 family. 11 () million () 15



Figure:





figure: ()



Figure: Kissufim AIP

Regional Analysis

Palestinian Industrial Estates and Free Zones Authority established four main industrial estates as show in this map:



Map():Palestinian Industrial Estates



Map():Location of industrial estates



Map():Description of JIE including location,MP



Map :



Map():

Jericho agro-industrial Park



Map():



Map(_):

حجم الاستثمار \$	حجم العمالة	المنتجات	الاسم	رقم
1,000,000	50	مكملات غذائية ومستخلصات عشبية	شركة بالوليا للمستخلصات العشبية	1
1,596,100	30	خضراوات مفرزة	شركة ريحانه للتجارة والاستثمار	2
1,556,000	30	اعلاف حيوانية، علف السمك	شربحة السوبر الزراعية	3
1,081,700	34	انتاج مسحوق التمر	شركة مملكة التمور	4
1,272,497	25	انتاج الورق الصحي	شركة بيبر بال للورق الصحي	5
747,753	14	منتجات بلاستيكية	للصناعات البلاستيكية FMH شركة	6
616,000	17	انتاج صابون	مصنع بيت الصابون الفلسطيني	7
1,257,200	26	تعبئة مياه معدنية	شركة الحوامدة للاستيراد والتصدير	8
1,264,500	12	تعبئة وتغليف التمور	شربحة وإد القمر	9
		1		
824,000	8	مياه معدنية	شركة امازون لتعبئة المياه	10
945,000	8	اعشاب طبية	شركة هولي لاند هيريس	11
1,200,000	14	اعلاف حيوانية، علف دجاج	شرکة مورا	12
925,000	15	تمور مغطاة بالشوكلاتا والمكسرات	شركة افاق للتمور	13
1,200,000	22	انظمة تدفئة باستخدام الطاقة الشمسية	شركة ايكو بال	14
2,000,000	37	منتجات بلاستيكية ومواد تغليف	شركة البيان	15
1,200,000	11	موبيليا	شركة ارتيستك	16
1,000,000	10	تعبئة وتغليف القهوة	شركة اوركيدا	17
1,900,000	25	ورق صحي، ورق صحي معطر	شركة تشويس	18
9,000,000	40	خدمات لوجستية	شركة اريحا للخدمات اللوجستية	19
1,550,000	28	عصائر ومشروبات طبيعية	شركة المسرى	20
1,350,000	27	مخلل بانواع مختلفة	شركة كولتي فود	21
650,000	20	مواد تجميل من منتجات البحر الميت	شرکة ديد سي سيکرت	22
1,280,000	8	حلويات عربية	شركة المحروم	23
1,200,000	25	برابيج ري ومنتجات بلاستيكية	شركة فياستق	24

Table():



map():Gaza IE





Map():



 $Map(): \mbox{Proximity of Governorate from International Land Crossing}$





Map():all criteria of crossing

N	Jenin	Governorate	Evaluation /3
	Tulkarm	Jenin	3
	Tubas	Tulkarem	3
	Qalqilya Nablus	Nablus	3
	Salfit	Qalqilia	2
	Ramallah and Albireh	Salfit	2
	laviusalam	Ramallah &Albireh	2
	Jericho	Bethlehem	1
	Bethlehem	Hebron	2
A &B area		Jerusalem	1
C area	Hebron	Jericho	1
		Tubas	2

Map():A high percentage of Palestinian Authority Area(A&B) according to area of province

1		Governorate	Evaluation
N State		Jenin	1
44	Jenin Jenin	Tulkarem	3
1	Tubas	Nablus	2
		Qalqilya	0
	Qalqiiya Nablus	Salfit	0
	Ramallah and Albireh	Ramallah and Albireh	1
	Jerusalem	Bethlehem	0
U university	Jericho	Hebron	1
	Bethlehem	Jerusalem	2
	Hebron	Jericho	0
1:200,000	A stall	Tubas	0

Map(): The existence of specialized university & colleges programs for industry and agriculture .



Criteria of A high percentage of high value agricultural land

Governorate Criteria	Jenin	Tulkarem	Nablus	Qalqilia	Salfit	Ramallah	Bethlehem	Hebron	Jerusalem	Jericho	Tubas
Proximity of province from the nearest local commercial crossing	3	3		3		3	3	3	3	3	2
Proximity of Governorate from seaport Commercial international Crossing		2		2	1	2	2	3	2	1	1
Proximity of Governorate from International Land Crossing											
Proximity of Governorate from International Airport											
high percentage of Palestinian Authority Area(A&B)											
The existence of specialized university &colleges programs for industry and agriculture.											
A high percentage of high value agricultural land											
Total	15/21	16/21	12/21	11/21	8/21	14/21	10/21	14/21	13/21	/11 21	21/11

Table():Evaluation of all criteria

4.2 Site analysis

Criteria for Site Selection	in Tulkarem Governorate			
1-Land of low agricultural value	8-Slope of land should not be more than 5-7%			
2-Land is $200\ \text{meters}$ away from the master plans	9-Area should be more than 400 Donums			
3-Lands are far from settlements	10-The closest to the crossing and the University of Khadoori			
4-Proximity (near)to a regional or major street				
5-Infrastructure can be able exist				
6-Near to the land of high agricultural value for the get of local raw materials				
7–To be in the territory of the Palestinian Authority expires or border territory with the powers of authority so as not to be the whole perimeter Lands C				

Table():Criteria of Site Selection in Tulkarem Governorate


Map():Topography of Tulkarem Governorate

This map shows that hollow color that aerial photo represents low value of agriculture lands in Tulkarem Governorate, and the another area with colors in the legend shows the area of built up , high and mid agriculture lands that the industrial zone can not be located in these spaces.



Map():Lands of low agricultural value, scale 1:20,000

And then the intersect between low value of agriculture land and topography is implemented in below map to decide where the slope is smooth with area more than 400 dunums as that was mentioned before in criteria.







This map shows the best location depends on criteria as show purple polygon.



Fig():Aerial photo of proposal location



map():Proposal Location of AIP project



Map():Transportation map with proposal roads



Map():existing transportation sector



Fig():Al taybeh crossing northern path





map():Geopolitical Map



Map():Topography of Proposal Site with surrounding



Map():Topography of site



Map():Classification of Agricultural Land



Map():classification of agricultural land



map():Land Cover in proposal site of TAIP.



Map():Proposal AIP location with surround Kfr Allabad MP





map():location of existing source of water



Fig(): Sun path map

Wind Direction	
Western North	
Et al a second	

Fig():Wind Directio and Sun path,3D





Map():Demolition orders of building in area c in study area .





Map():Existing Factories in study area

SWOT Analysis

Strengths

- 1. Proximity to a regional road (Tulkarem-Nablus)
- 2. Land inclination suitable for the project (4%).
- 3. There is enough space for the project. (850donums)
- 4. The region's need for the presence of an industrial zone organized , planned agricultural ,support for the steadfastness of Palestinian farmers and encouragement of investment
- 5. Classification of the site as a high percentage of agricultural land with low agricultural value
- 6. Impressive access of electricity, water and other services
- 7. A border area with a Class A land and a proportion of the proposed land classification B
- 8. The existence of agricultural areas of high agricultural value west of the proposed area

9. Near to the Taybeh crossing 6 km

Challenges

- 1. The project is close to the settlements
- 2. There is a high proportion of C lands within the proposed site
- 3. A small proportion 15% of the land is a medium-value agricultural area







Map(): the boundary of extention in future of the nearest settlement colony



Swot Analysis

Strengths

- 1. Proximity to a regional road (Tulkarem-Nablus)
- 2. Land inclination suitable for the project (4%).
- 3. There is enough space for the project. (850donums)

- 4. The region's need for the presence of an industrial zone organized , planned agricultural ,support for the steadfastness of Palestinian farmers and encouragement of investment
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- 9. Near to the Taybeh crossing 6 km

Challenges

The project is close to the settlements

There is a high proportion of C lands within the proposed site

A small proportion 15% of the land is a medium-value agricultural area



Vision

A typical agro-industrial Park, with adequate services and infrastructure that achieves sustainability and safe investment environment

	200 Value	8/200 of A	ظة. 7 gricul	ب المحاف Iture F	بة حس rodu	الفلسطين iction 2007	الأراضي in the 7/2008	عي في Pales	ناج الزرا tinian	فيمة الانف Territ	tory b	y Go	vernor	ate,
Governe	orate		بوع To	المجا tal		اتي Livesto	لإثناج الحيو k Produ	uction	Pla	ج النبائي nt Proc	យវុរ luction		حافظة	الم
Tulkarm		-	1	23,275			20,3	310		10	2,965	_		طولكرم
Governo	orate		مجموع Tota	nemu अ	نبة Fi	حاصيل الحكا ield Croj	morate ps	e, 200 إوات Veget	الخضر tables	ہ Fr	جار الغاكو uit Tre	ائد es	ana,	المحا
Tulkarm			10	02,965		5,	049		65,845		32	,071		طولكرم
į	2008 Cultivated	2007 .a Area of	سب المحافظ Fruit Tr	فلسطينية حس ees, Veg	الأراضي ال etables	ل الحقلية في and Field	ات والمحاصير d Crops ir	والخضراو the Pa	نبجار الفاكهة Iestinian	لمزروعة بأ Territory	المساحة ا by Gov	ernorate	e, 2007/20	08
	المحمد ع العاد	Field Cro	ps it	المحاصيل الح	Vegetabl	es		الخضراوات	Fruit Trees				أشجار الفاتهة	
Governorate	Grand	المجموع	مروي	بعلي	المجموع	مروي محمي	مروي مكثوف	يعلي	المجموع	Unbearing	غیر مشر (Bearing	شر	المحافظة
	Total	Total	Irrigated	Rainfed	Total	Protected Irrigated	Open Irrigated	Rainfed	Total	مروي Irrigated	بعلي Rainfed	مروي Irrigated	بعلي Rainfed	
ulkarm	160,852	8,885	1,159	7,726	17,728	9,134	7145	1449	134,239	738	4,031	3,486	125,984	لكرم

Table():Crops in Tulkarem Governorate

		Liv	2008/200 estock Pro	للة والنوع. 7 oduction i	حسب المحافظ n the Pal	ي الفلسطينية . Iestinian T	انية في الأراضم Ferritory by	التُرودَ الحيو Governo ر	إنتاج prate and	Туре, 200	07/2008		
	سك	عسل	بيض (مليون)	Milk			حلبب	Meat				لحوم	
Governorate	Fish	Honey	Eggs	المجموع	ماعز	أغنام	أبقار	المجموع	دجاج لاهم	ماعز	أغتام	أبقار	المحافظة
			(Million)	Total	Goats	Sheep	Cows	Total	Broiler	Goats	Sheep	Cattle	
Tulkarm		17	81	5,542	565	1,712	3,265	1,572	566	139	697	170	طولكرم
تكاليف مستزمات الإنتاج الزراعي في الأراضي القاسطينية حسب المحافظة والنوع، 2008/2007 Costs of Agricultural Intermediate Consumption in the Palestinian Territory by Governorate and Type, 2007/2008													
	C	osts of A	2008/2007 gricultural l	افظة والنوع، 7 ntermediate	بنیهٔ حسب المح e Consumj	الأراضي القلسطي ption in the	إنتاج الزراعي في Palestinian 1	۔ مسترّضت الإ Territory b	म्राद्ध y Governoi	rate and Ty	rpe, 2007/	2008	
Governorate	C المجموع Total	osts of A أخرى Others	2008/2003 gricultural l السیِصان المُشَرَاة Purchased Chicks	افظة والنوع، 7 ntermediate الأدرية لليطرية Veterinary medicine	نية حسب المح Consum الأعلاف Feeds	الأراضي القلسطي ption in the الصيانة والتصليح Maintenance & Repair	إنتاج الزراعي في Palestinian T ون والشعوم والوقود Oil, Lubricatio & Fuel	ل مستقرّمات الإ Territory b منش الزير Malsh	کالیف y Governoi السیاه والکهریاه Water & Electricity	rate and Ty الیبیدات Pesticides	rpe, 2007/ الإسدة Fertilizers	2008 التفاوي والبذور Seeds	تحافقة



Fig();Fruit trees in Tulkarem Governorate







Fig(): Vegetable production in Tulkarem Governorate



Fig(): Field Crops in Tulkarem Governorate



Fig():Field Crops in Tulkarem Governorate

4.3Urban Design

Roads and Parking	Administrative facilities	Social facilities
<u>Main Road</u> : 24 wide road 20 m wide road <u>Collecter Road</u> 18 m wide road 16m wide Road	Management center Admin. Building	Meeting rooms and exhibition centers
Parking(Car Parking,Truck Lay,) 'parking lot	Security buildings	Electricity Room Fairgrounds
'CAR ENTERANCE' 'CAR EXIT'	Banks	Restaurants, COFFEE-SHOP' •Cafeterias
Filling station	stop office Concerning all about licenses and permissions.	Mosque
Weigh Bridge	Water Source Well,surface water 'CUSTOM CONTROL'	Clinic Entrance Day-care center
	Incoming Logistic Area	'SHOPPING CENTER'

Education facilities Amenities	Green Space	External infrastructure
	Green buffer	Water Source Well,surface water
'SCHOOL	Park	Elevated TanK
KINDERGARTEN	Playground	Electricity Room
creche		Photovoltaic Power

Support facilities				
'FUTURE WWTP AREA'	Transformer station			
PUMPING STATION ()'	Energy production facilities			
'SOLAR PANEL AREA ()'	Telecommunication facilities			
NATURAL GAS RMS' ()	Treatment facilities,			
WATER RESERVOIR ()	'STORAGE BUILDING Fire brigade			
Water Connection	Electricity			

Connection

Urban Design



✓requirements for Factories ✓Services Facilities

Define optical configuration controls

Define Public and private Land uses in Master Plan

Fig():Description of main land use in industrial city, proposal Tulkarem AIP







olated Green areas open gardens nrow waste area	The average percentage of area from green area 50° 40° 10° 10°	of 25 % % % %
		Each additional 1m height = 1.5 dB(A) additional attenuation 1m 1m 1m 1m 1m 1m 1m Line of sight blockage = 5dB(A)
Services		
Services ervices landuses(min 5%) om area of IE	The average percentage of area from servicesn area	of Administrative, social and education facilities
Services ervices landuses(min 5%) om area of IE ndustrial Services	The average percentage of area from servicesn area	of as Administrative, social and education facilities •Management center, •Apprenticeship school.
Services ervices landuses(min 5%) om area of IE ndustrial Services ocial Services	The average percentage of area from servicesn area 40% 30%	of as Administrative, social and education facilities •Management center, •Apprenticeship school, •Technical high school,
Services ervices landuses(min 5%) om area of IE adustrial Services ocial Services eneral & Various Services	The average percentage of area from servicesn area 40% 30% 30% 30%	of as Administrative, social and education facilities • Management center, • Apprenticeship school, • Technical high school, • Union building • Meeting rooms and exhibition
Services ervices landuses(min 5%) om area of IE adustrial Services ocial Services eeneral & Various Services	The average percentage of area from servicesn area from servicesn area area area area area area area are	of as Administrative, social and education facilities • Management center, • Apprenticeship school, • Technical high school, • Union building • Meeting rooms and exhibition centers,
Services ervices landuses(min 5%) om area of IE adustrial Services ocial Services eeneral & Various Services	The average percentage of area from services area area from services area area area area area area area ar	of as Administrative, social and education facilities • Management center, • Apprenticeship school, • Technical high school, • Union building • Meeting rooms and exhibition centers, • Fairgrounds, • Restaurants,
Services ervices landuses(min 5%) om area of IE adustrial Services ocial Services seneral & Various Services	The average percentage of area from services narea 40% 30% 30% 100%	Administrative, social and education facilities •Management center, •Apprenticeship school, •Technical high school, •Union building •Meeting rooms and exhibition centers, •Fairgrounds, •Restaurants, •Cafeterias,
Services ervices landuses(min 5%) om area of IE adustrial Services ocial Services eeneral & Various Services	The average percentage of area from services area f	of as Administrative, social and education facilities • Management center, • Apprenticeship school, • Technical high school, • Union building • Meeting rooms and exhibition centers, • Fairgrounds, • Restaurants, • Cafeterias, • Mosque, • Security buildinas,
Services ervices landuses(min 5%) om area of IE adustrial Services ocial Services eneral & Various Services	The average percentage of area from services area of a 30% 30% 100%	Administrative, social and education facilities •Management center, •Apprenticeship school, •Technical high school, •Union building •Meeting rooms and exhibition centers, •Fairgrounds, •Restaurants, •Cafeterias, •Mosque, •Security buildings, •Banks
Services ervices landuses(min 5%) om area of IE ndustrial Services ocial Services eeneral & Various Services	The average percentage of area from services narea 40% 30% 30% 100%	Administrative, social and education facilities •Management center, •Apprenticeship school, •Technical high school, •Union building •Meeting rooms and exhibition centers, •Fairgrounds, •Restaurants, •Cafeterias, •Mosque, •Security buildings, •Banks •Sport centers,
Services ervices landuses(min 5%) om area of IE adustrial Services pocial Services eneral & Various Services	The average percentage of area from services area of a 30% 30% 100%	Administrative, social and education facilities • Management center, • Apprenticeship school, • Technical high school, • Union building • Meeting rooms and exhibition centers, • Fairgrounds, • Restaurants, • Cafeterias, • Mosque, • Security buildings, • Banks • Sport centers, • Day-care centers, • Filling stations etc.

Number of PV Cells1200cells to produce175K VASubtransformation Building2Monitoring Building with workshop center10%Security Building100%Storehouse1	PV)	
Subtransformation Building2Monitoring Building with workshop center10%Security Building100%Storehouse1	Number of PV Cells	1200cells to produce175K VA
Monitoring Building with workshop center10%Security Building100%Storehouse1	Subtransformation Building	2
Security Building 100% Storehouse 1	Monitoring Building with workshop center	10%
Storehouse 1	Security Building	100%
	Storehouse	1

Photovoltaics (PV) is a method of generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photovoltaic effect

Area equipped by PV array:

After calculations ; and I have the area aof each PV-panel (2 m * 1 m)

And there is 7 modules , then the area of the panels = $7^*(2^*1) = 14 m^2$

And to avoid air pressure and heat between modules it's preferred to let (30 cm) between each 2 modules , so $\begin{bmatrix} 6 * 20cm = 120cm = 1.2 m \end{bmatrix}$ is to be added to the area of array , so

. I took into account the house load needed to decide number of modules and the batteries, in order to get the optimum system, the solar irradiation, tilt and azimuth angle values are introduced.

The load is to be calculated by taking the most important loads in the house which is : (Lighting, Refrigerator, TV, PC, Washing machine, Iron and Heater). taking into consideration the wattage, and the daily working hours of each appliance to find the total consumption in (Wh/day) which is very important in determining the whole component of the system



	FUIKING
Parking(5% from area of IE)	Value
factory	1 park to 1-3 Employees 1 to 30-50 m2 from all area of floors
Health center	10 cars
Administrative Building	1 to 40-60m2 for all area of floors
Bank	1 park to 25-30m2 from all area of floors
Storehouse	1

Darking

Parking should be in front of the building and not on the road







population	7000 worker
Internal Rate of Return	13 years
Payback period	3 years

the benefits of **water** harvesting

techniques through the establishment of eight rain water collection systems, which will be a source of irrigation for 50 dunams of land



Map(): water harvesting in kfr al labad; source:<u>Arab Group For The Protection Of nature</u>
<u>Land Research Center – LRC</u>



افتتاح خزان مياه لري المحاصيل الزراعية في كفر اللبد

ndustries for Devel



تقرير ايهاب ضميري طولكرم زراعة أشجار مثمرة في أراضي كفر اللبد لحمايتها من مستوطنة عناب 17 -2- 201

opment...Carlos






يية الفياة المصلوبة متواع الصلاعات ع الصناعات	المتحسبين	نوعية المياه المطلوبة للصناعة	كمية المياه المطلوبة للصناعة
- بيناعات الغذائية Food & Beverages	50	مىلە شرب بنسبة 100 %	مرااباتها/باتهاا/بامم 100

معدل استخدام الطاقة الكهربائية (ك.ف.أ / م²) النشاط الصناعي صناعة المواد الغذائية

2/ 50 م²

5 References

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[2] Wa'el Wajeeh Reda AL –Buzz:Determinants of Establishing the Industrial Estates in Nablus Governorate and their Impacts on the Environment, Society and Industrial Education, 2004.

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