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MECHANISMS OF APPLICATION INTEGRATED URBAN LAND REUSING APPROACH IN REDEVELOPING UNSAFE INFORMAL BROWNFIELD SITES (CASE STUDY: TELAL ZENHOUM– CAIRO GOVERNORATE)

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ABSTRACT: Many countries, such as the United States, Germany and England have reused the unexploited potentials areas inside the current cities as an attempt to meet the growing population needs within urban areas without creation new cities or spending high economic cost by the state. These potentials are varies from one country to another according to their characteristics which called brownfield, it includes contaminated or closed industrial zones, abandoned sites that are not exploited or developed before in an incompatible way with its economic value as well as degraded informal areas and empty lands. Brownfield informal sites are considered the most sites which need to be reused and developed for reducing their negative impact and achieving the goals of all development partners. Therefore, land reuse approach has been adopted at international and local levels for developing informal sites through some policies such as removal policy and evacuation for all population during the 1990s to suggest new land uses like (Gardens- tourism activities- services- investment uses) according to the relative advantage of each site, or resettlement policy in the late nineties to develop old land uses after determination new population needs. These policies faced some challenges such as (the refusal of residents to evacuate- the lack of optimal use for informal sites- high cost of development- the need to provide temporary or alternative sites for residents- the failure in achieving the goals of the state and the population), which made some international bodies (World bank in 2010 United states in 2019) concern about introducing new policies and mechanisms that achieve the balance in the process of land reuse to exploit the economic value of sites in better way, meet the needs of the population without transferring them as well as encourage the private sector for investment and access to the goals of the state at the lowest cost. Consequently, this paper tries to determine the mechanisms of land reuse approach for developing unsafe informal brownfield sites by reviewing past experiences and studies, recommendations of international reports, as well as the results of evaluating the case study of Telal zenhoum project as an example of removed unsafe informal sites project in Cairo Governorate to show its negative and positive aspects. These mechanisms support decision makers and planners to suggest suitable land uses for removed unsafe informal area in a sustainable way through the participation of all different partners (Government- private sector- population) with the lowest government expenditure and highest returns.

KEYWORDS: land reusing approach, Brownfield sites, unsafe informal areas, removal and resettlement policy, Telal Zenhoum area.

INTRODUCTION

Land reusing concept for brownfield sites development has grown over the last few decades as an attempt to reuse these sites for development purposes due to the dwindling of land availability inside urban areas, in addition to their social, environmental and economic effects

on surrounding areas because their privation from services and infrastructure networks, urban deterioration, besides not meeting of security, safety standards and planning requirements in them. (Ferber et al., 2006).

Therefore, land reuse is an important approach for making the greatest benefits from informal brownfield sites which feature by their proximity to services and jobs, in addition to their high economic values that need to be employed for meeting the requirements of all partners, achieving the social and environmental returns and reaching to the principles of sustainability by removing the deteriorating areas and putting development plans for them with the lowest possible cost.

Many countries, such as the United States, England and Germany, have applied this approach since the 1970s to reuse informal brownfield sites, vacant land, abandoned areas and contaminated activities through a comprehensive study for sites characteristics to formulate an appropriate vision and plan about the most suitable use for these sites. Moreover, these countries suggest land reuse plans which achieve a balance between the needs of all partners without moving the population or wasting the economic value of the site, besides applying the least government expenditures towards these projects through a set of mechanisms (United State Environmental protection agency, 1999; Denner and Lowe. 1999; British Columbia, 2014; Development Bureau, 2015).

Therefore, many international organizations such as World bank in 2010 and the United states Environmental protection agency in 2019 putted its report around the most important mechanisms which should be followed in developing these sites to achieve the development goals and help decision makers in putting more efficient plans at the lowest possible cost and the highest returns (World Bank, 2010; United State Environmental protection agency, 2019)

At the local level, the revision of Egyptian situation pointed to the absence of specific definition for brownfield uses, lack of responsible governmental entity for developing these types of uses or existence framework to deal with them for better exploitation. Further, unsafe informal brownfield in Egypt are treated as degraded areas that are removed and developed according to the existence of directed investment to them or not.

The development approaches for unsafe informal brownfield sites in Egypt are varies in their advantages and disadvantages, The first approach concerned with the development of degraded areas that has high economic values by transferring the population and sale the land to investors to implement investment uses as happened in mosalas maspero project, but this approach neglected the social dimension. While the second approach focused on the development of low economic value sites through urban removal, temporary transferring of population and providing alternative suitable residential areas for living such as Zenhoum project, but this approach omitted the economic value of the site. The third approach dealt with urban removal, total transfer of population and establishment new residential areas for different categories or other uses by government and its budget as shown in Torgoman project, Most of these approaches are characterized by high government spending, ignoring

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the social dimension and lack of balanced development for state, population and investors. (El khateeb and Abd Elrahman, 2012 ; El Maabady,2014)

Hence, this paper concerns with the identification of important mechanisms for application land reuse approach in developing unsafe informal brownfield sites. These mechanisms aim to meet the population needs which lie in adequate housing, employment opportunities and services, in addition to achieving the development goals of the state and motivating the investors to exploit available land in a profitable way without any conflict with the characteristics of population or place.

The formulation of these mechanisms comes through reviewing previous studies and international reports in this field, as well as the result of assessing the development plans of removed unsafe informal Brownfield sites in Egypt and especially in case study of Zenhoum project which is one of the projects that have been implemented with the existence of population and has some advantages and obstacles that should be addressed them in future projects.

Definition of land reusing for brownfield sites

The concept of Brownfield development has emerged in the late 1980s in many countries such as Hong Kong, the USA, England, Spain and Italy. This term has been used to deal with sites and urban elements that have not been exploited before, but they have opportunities to utilize them in localization several of new land uses. Many countries use these elements in meeting the needs of the communities within the current urban area without resorting to spread outside the urban boundary or spending high costs in development process (Environmental Protection Agency, 2016).

There is no specific definition for this term, which is different from one country to another according to the characteristics of its potentials, current land use, impact on surrounding areas, economic value of its location, the kind of owners and the ownership pattern.

Some definitions focus on the environmental approach to determine brownfield areas. The first one was in Hong Kong which refers to areas that have been exploited for long periods without any environmental consensus with the surrounding areas such as warehouses and polluted industries inside the residential areas which can be reused or developed to achieve sustainable environment. The United States applied this term in 1998 to deal with abandoned sites and polluted industrial areas that need to be redeveloped by re-using them for providing services, facilities, jobs and various activities through a specific legislative framework and tax base for development process. Furthermore, Canada and Italy followed the same term to express contaminated areas like Garbage collection and wastes areas that have environmental impact and cause pollution, besides the areas which have problems in the soil characteristics such as salinity and high level of ground water. (Environmental protection Agency,2008).

These areas must be changed into new land use for making positive returns, appropriate environmental protection and reducing pollution rates. Therefore, the most brownfield

<u>Published by European Centre for Research Training and Development UK (www.eajournals.org)</u> reusing projects in these countries depend on transforming polluted areas uses into green open spaces or services to improve the quality of life.

The other definitions concern with economic approach that define brownfield sites as areas of old activities such as (Industrial- Commercial- Crafts) that not worked fully or partially and are not compatible with the economies of the site. These activities need to be changed to new land uses to benefit from high economic value of sites as applied in Australia in 2000 (El khateeb and Abd Elrahman, 2012; British Columbia, 2014)

Some countries added social approach to identify these areas, which reflects the participation and the acceptance of the population to develop their properties and spaces. England adopted this approach in 2004 to reuse old homes for developing low income housing sector and providing new housing units in the same sites instead of creating new cities (Jackson, 2006).

Additionally, over the past decade, the concept of brownfield has expanded to be determined by *urban approach* which consists of all available unused land (vacant land with infrastructure) or building for development process as is common in England. Further, some countries like Poland, Slovenia, Germany, Spain and France have incorporated informal areas as brownfield which are characterized by deterioration in their physical condition and need to be removed and developed into same type of land use or new land use according to land value (Environmental Protection Agency, 2016).

The European CABERNET (Concerted Action on brownfield and Economic Regeneration Network) putted in 2007 a comprehensive concept for brownfield areas that includes the following characteristics (CABERNET, 2007):

- Have an adverse effect on the surrounding formal uses.
- Partially or fully unexploited
- Have a possibility to develop and reuse them.
- Require the lowest possible cost for reusing them
- Do not need high risk in development.
- There is acceptance of population and stakeholders to participate in development their properties.
- Have good potential and infrastructure for development.
- Its development achieves profits and returns in all aspects.

Finally, the concept of brownfield was developed in 2018 to include all properties (activities, buildings, parts of buildings, vacant land, degraded informal areas and military areas) that are not exploited before or cause pollution or negative impact on surrounding areas. These areas can be reused to cover the current and future needs of communities, whether they are public or private ownership. But this definition does not include agricultural land (Greenfield) which located around urban areas because it is one of the main determinants of urban growth (Svetlana and Arwyn, 2019).

The uses of brownfield areas vary between (industrial- commercial- service- entertainment-facilities) which can be redeveloped for achieving the basic pillars of sustainable

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development (socio- environmental- economic) in different National, regional and local levels through the clear identification for them and good coordination between all stakeholders to complete the development process (Ferber et al., 2006).

The following figure (1) illustrates evolution of brownfield sites re-using concept and figure (2) shows the main classifications of brownfield areas:



Figure 1. The evolution of brownfield sites re-using concept (Source: Author)



Figure 2. The main classifications of the brownfield areas. (Source: Author)

The returns and challenges of application land reusing approach in brownfield sites

The determination of returns and challenges of brownfield development are varies from one place to another according to its characteristics, the possibility for development, kind of current land use, the availability of investment and government support. In addition to the degree of achievement balanced development objectives for all partners (planners, population, government and private sector) which is represented in achieving the requirements of spatial development within the urban area without growing outside its borders, covering the population needs with creating suitable environments for their life, implementing the development projects with high profitability and lowest government funding. The following points illustrate the main returns and challenges for development the brownfield sites in urban areas (Certa, 1998; Denner and Lowe, 1999; De Sousa, 2000; American Planning Association, 2004; Silverthorne, 2006; Whitman, 2006; Breeding, 2012).

Main returns of land reusing in brownfield sites

Environmental returns

- Reduce the pollution rates of contaminated uses through removal, cleaning and development all components that are not compatible with the environment.
- Apply the environmental requirements and legislation for creation suitable environment for living.
- Improve the urban environment through removal process and localization the new uses or development the same uses but with better characteristics.
- Develop available resources and protect them from attrition whenever possible.
- Create public spaces and parks for residents.
- Provide new facilities and infrastructure for the population rather than traditional methods.
- Apply the principles of environmental sustainability in all urban elements within the site such as green approach in residential buildings design and transportation.

Social returns

- Meet the growing needs and requirements from housing, services and activities for population within the site.
- Incorporate participation of communities in redevelopment these types of sites.
- Provide adequate compensation in the case of purchasing the land for development.
- Secure tenure for residents after development process.
- Improve the quality of life.
- Better exploitation for the site to accommodate the population growth.
- Link the site with the rest areas of the city to achieve the overall vision of development and connect the residents with other service and employment sites.

Economic returns

- Increase the opportunities of investment through land reusing which achieves profit margin.
- Create new jobs and services in brownfield sites.
- Marketing the new residential units with larger areas and good construction.
- Reduce the economic cost for building different new urban elements through partnership between the state, private sector, population and owners.
- Improve the tax base for these sites.
- Encourage the private sector to participate in development projects and achieve an appropriate level of profitability.
- Benefit from various technical parties in development process.
- Reduce government funding and reduce the financial burden on the state in implementation the development projects.
- Receive the financial grants from international or private sectors to implement development projects.
- Build the database about the characteristics of the site and community to identify the suitable development approaches.
- Increase the economic value for the current ownership.

Main challenges of land reusing projects in brownfield sites

Land reusing approach in brownfield sites is facing some challenges compared to the development in new areas, due to their kind and the possibility of its exploitation, in addition to the role of different development partners in applying land reusing projects. These challenges are represented in (Alker et al., 2000; Silverthorne, 2006; Whitman, 2006).

- Existence of multiple ownership types within the same site such as (ownership and Leasing Systems).
- Refusing of some landlords to change the use of their land.
- Lack of effective systems for planning these types of sites.
- Absence of information bases about brownfield areas which led to choose inappropriate ways for dealing with them.
- Lack of funding systems to support land reusing projects.
- Lack of methods and tools to determine the most appropriate use for developing these sites and achieving maximum benefit from redevelopment projects.
- High cost and long time for development.
- Investors recede to invest in these areas due to the high risk for them.
- Absence of legislative framework to deal with these types of sites.
- Not implementing a clear strategy for site development in addition to the lack of the cooperation between institutions and government agencies to achieve development goals.
- There is no suitable incentive system to encourage the private sector for participation in development these sites.
- Conflict between stakeholders and there are difference between their objectives and interests.

Different approaches of land reuse for redeveloping unsafe informal brownfield sites

This paper focuses on unsafe informal brownfield sites as one classification of brownfield areas which include the most characteristics and problems of other brownfield uses. Hence, its study will help in determining the appropriate mechanisms for application land reusing approach in these types of areas.

The approaches for redeveloping removed unsafe informal brownfield sites are different according to a set of criteria such as (existence of population and their participation- the contribution of private sector in development process - the type of proposed use for these areas – the financial burden on the state for developing). The following table (1) shows these approaches with their advantages and disadvantages, in addition to figure (3) that displays land reusing approaches according to government expenditure and their returns as well as figure (4) determines the kind of land reusing approaches:

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Table 1. The different engressions for dealing with removed unsefs informal Drawnfield sit	
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Approaches	Descriptions Advantages Disad			
Approach 1 Removal With full transferring of population	 The government pays the compensation to the population or provides alternative housing for them. Redevelopment of unsafe informal sites through government funding to meet the needs from housing, services and jobs according to plans. 	 Remove the site without any obstacles. The government controls the use of site according to the urgent needs. Improve and develop the site instead of its old status. 	 The government bears high cost for developing these sites. Lack of participation for each population or private sector in development. The proposed land use does not fit with the economic value of the site. 	
Approach 2 Gradually removal with the existence of population	 The government provides temporary housing for residents until the development of the site is completed. The site is developed for the same social category but with the improvement in quality of life through the new site planning. 	 Participation of population in development process. Meeting the real needs of the population. Improve the quality of life in these sites. 	 Lack of effective participation of the private sector due to the insufficient profitability for them. The State bears the costs of development. Absence of exploitation for land value in proposing land uses. 	
Approach 3 Removal with full transferring of population for investment development	 The government pays the compensation to the population or provides alternative housing for them. Sell the land for investors. Develop different uses to correspond with the economic value of the land. 	 The private sector is responsible for development the site. Achieving a high level of profitability for investors. The state bears the lowest costs. Good exploitation for the land value. 	 There is no role for population in development process. Not taking the social dimensions in plans. Require high costs to carry out the projects of development. 	
Approach 4 Removal with the participation of population and private sector (balanced development for all partners	 The government bears part of the development costs. Sell some land plots for investors. Provide better housing for residents with services and job opportunities. 	 Achieve the goals of all partners in site development. Achieve a proper level of profitability for the private sector. Provide the population needs from housing, services and jobs. Less financial burden on the state. 	 need a specific approach for achievement the balancing in development. There is a conflict between the partners of development. 	

(Source: Author according to references of American Planning Association, 2004; Jackson, 2006; Whitman, 2006; Department for Communities and Local Government.2014; British Columbia, 2014)

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Cost of land reusing which the government bears



(
Approach 1	<u>Approach 2</u>	Approach 3	Approach 4			
Removal With full transferring of population	Gradually removal with the existence of population	Removal With full transferring of population for investment develonment	balanced development for all partners			
Land reusing for public projects by government only		Land reusing for another uses according to land value	Land reusing for (Investors - Residents – government)			

Figure 4.Kind of land reusing in each approach of redeveloping removed informal brownfield sites (Source: Author)

Mechanisms of application land reuse approach in redeveloping unsafe informal brownfield sites

Several international experiments such as (United kingdom and United states) in addition to some international reports such as (World bank in 2010 and United states Environmental protection agency in 2019 on brownfield development) put the important mechanisms which must be followed in land reusing process for developing the brownfield sites especially the informal ones. The following points illustrate these detailed mechanisms in all stages of development from the stage of brownfield determination to the stage of implementation and follow-up the project of land reuse (World Bank, 2010; United State EPA, 2019):

The stage of identifying suitable informal brownfield sites for land reusing

This stage aims at identifying the informal brownfield sites where the approach of land reusing is suitable for application according to the role of the state in finding the unexploited potentials for development through some mechanisms such as (Alker et al.,2000):

• Collect and record all detailed data to figure unexploited informal brownfield sites, including (vacant land locations- characteristics of urban structures- rate of urban

deterioration- ownership patterns- legal status of land ownership- the economic value of sites- the role of the site in urban area- economic activities- investment opportunities- population size- social categories .etc).

- Establish a specific government institution to register these data for the future development purposes.
- Participation between the local authorities and the population to build more accurate information base about the site.
- Evaluate the urban, environmental and economic status of informal brownfield sites.
- Assess the risk of these sites.
- Use geographic information systems in identification the boundaries of these areas and their characteristics.
- Classified for these sites according to their characteristics to select the most proper policies to deal with them.
- Involve the investment agencies in decision-making about the sites which have investment opportunities.
- Select the priority sites for application land reusing approach with the participation of population and private sector.

The stage of formulating general policies and strategies for development

The policies and strategies for dealing with informal brownfield sites depend on the collected database, where the policies vary between development without removal, removal with development for public services and facilities, removal with development for the same previous use, removal with development for different investment uses or removal with development for all needs of partners (population, private sector and local authorities). Therefore, the choice of suitable policy needs set of mechanisms such as (Amekudzi and Fomunung, 2004; Jackson, 2006):

- Explore stakeholder opinions about their willingness to take part in formulating the development plan and implementation process.
- Determine the opinion of population about their desire for participation and accommodation inside the site after development.
- Take the approval of owners to give their vacant land and building for development or sell them for government or private sector to carry out land reuse plan.
- Know the contribution ration of developers and investors in development plan.
- Measure the importance of the site to local authorities and its role in achieving their development goals.
- Identify available funding systems for development.
- Put the vision for informal site development according to previous mechanisms and the interconnection between the site and the surrounding areas. Furthermore Propose an integrated strategic plan for the site at national, regional and local levels which includes the social, economic and environmental sectors (Integrated spatial development policy).
- Formulate the law and regulatory framework for development.
- Coordinate between the roles of different government institutions and departments to meet effective land use planning for the site.

The stage of putting land reuses planning for the site

Formulation of land reuse plan depends on set of mechanisms such as collecting all information about the site, meeting with the different partners of development and determining the suitable land use plan without wasting the any resources or potentials,

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moreover achieving low-cost and high returns. The following points show the detailed stages and their mechanisms (Certa, 1998; American Planning Association, 2004; Ferber, 2006).

Analysis the characteristics and possibilities of the site

This stage is important to describe the current situation of the site through the analysis of (urban, social, economic and environmental) characteristics as shown in table (2) and find its potential, obstacles and risks. As well as contribute to draw the planning idea about land use distribution according the proposed vision (Canidian Real Estate Association, 2007)

Urban and physical characteristics	Social characteristics	Economic characteristics	Environmental characteristics
 Site boundary and its area. Land use patterns. Land use distribution. Number of land plots. Area of Land plots. Dimensions of land plots. Building area. Building heights. Building construction status. Densities. Housing unit area. Housing unit design. Vacant land area. Network of roads. 	 Population size Number of families Average of family size Social categories Social relationships. Social organizations. participation of Community Educational level. Professional level. Cultural level. Location of current services. Kind of services. 	 Acquisition systems (ownership- permanent rental- temporary rentetc). Land price. Land value. Housing unit's price. Economic activities types. Economic resources. Income levels. Available financing systems. Participants. 	 Natural Resources. Various sources of pollution. Facilities and infrastructure. Waste disposal systems. Energy resources. legal status of ownership. Legislation and controls. Environmental risk. Zones of values.

Table 2. The most important studied characteristics of the informal sites to formulate the development plan

(Source : Author according to references of Canidian Real Estate Association, 2007)

Identification the needs of stakeholders

The total needs (land use demand) are estimated through the results of site analysis and the continuous meetings with stakeholders to support the balanced development for the informal sites. The following figure (5) shows the different bodies and institutions which must be taken in consider for preparing the development plan of land reuse (De Sousa, 2000):



Figure 5. Classification of Stakeholders in informal Brownfield sites development (source : Author according to references of De Sousa, 2000; Environmental Protection Agency,2015)

Developing an appropriate plan for land reusing

The government plays an important role in formulation the alternatives of land reusing plans for development the informal site in partnership with stakeholders. These alternatives are evaluated according to a set of mechanisms that reflect the efficiency of chosen alternative for development as shown in the following points (Jackson, 2006):

- Suggestion projects for different sectors within the site.
- There is diversity of land use types in each project.
- Linking between land uses distribution and economic values within the site.
- Apply the requirements of planning and design to make sure that land use is efficient.
- Taking the environmental, social and economic criteria in consideration for achieving the sustainability.
- Assess the expected risks from new land use and put the solution about how to deal with them.
- Estimate the project costs during its stages.
- Establish a timetable for project implementation.
- Identify the funding bodies.
- Put a vision for supporting and stimulation the Stakeholders in all project stages whether by experience, financing or implementation.
- Define the roles of the participating partners and their integration with the others to carry out the project elements.
- Estimate the development revenues and their relationship with costs and risks.
- Preparation the detailed requirements map for land reuse (land plots- land use-areadimensions- building ratios- density- height of buildings- road network- road widthsroad directions- open areas and gardens- facilities and infrastructure...etc).

The stage of implementation, financing and follow-up

This stage aims to implement the proposed land reusing plan through some of other stages and mechanisms which are represented in (Svetlana and Arwyn, 2019):

The stage of site preparation for development

The process of site preparation depends on the current situation of the site which determines the size of necessary tasks for return the site to appropriate status for development through some mechanisms such as:

- Removal of degraded, polluted areas and any harmful elements to make the site safe for development.
- Retain some elements and uses in the site to reduce the cost of land reusing.
- Provide some more elements such as necessary facilities and infrastructure to prepare the site for development.

Activation the roles of partners in implementation process

Implementation of land reuse plan follows set of steps and mechanisms which associated with funding, regulations and roles of different bodies which as shown in following points:

- Use available funding according to the time and cost of each stage.
- Activate the role of local authorities in (determining the rules and regulations- issuing the building permits- facilitating of tax exemptions for private sector- improving in infrastructure and facilities- risk reduction).
- Implement suitable partnership contracts between the state and the private sector for housing, infrastructure or investment projects.

- Develop mechanisms to motivate owners for participation in development project through (selling land for development- allowing them to increase the number of housing and activities units in their possession- increasing the economic value of their land).
- Determines areas of land purchasing for public services and utilities in exchange for paying compensation to owners.
- Divide the roles between the state, private sector, population, owners and the financing partners.
- Implement the proposed land reuse plan which consists of allocation (land with high economic value for investment activities
 – small area for housing building with new heights to cover the same number of residents- land for providing economic activities which compatible with the population characteristics and the requirements of investors).
- Follow-up all stages of implementation to overcome the obstacles continuously.
- Continuous maintenance to make sure that the goals are achieved.

The stage of Advertising and Marketing

The important stage after implementation is the marketing of all elements of the project (residential units, shops and investment activities) through a set of mechanisms such as (Alker, 2000; International City/ County Management Association, 2004)

- Restoring the owners and residents to their land and new housing units.
- The announcement about (housing units- investment lands- economic activities.) by government agencies and institutions for sale or rent for temporary or permanent time.

The following figure (6) summarizes the stages of land reuse planning for development informal brownfield sites, besides table (3) shows the main roles of each partner in these stages.

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Figure 6. Stages of land reuse project for development informal Brownfield sites (source :Author)

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The main	Sub- st	The roles of the different participated parties						
stages			Govern- ment	owners	population	Investors	NGOs	EXPE- RTS
Identify	Establish entity for	or development						
informal	Collect data ab	out the sites						
brownfield	Specify boundaries of these sites							
sites	Arrange their priority							
	Analysis of site characteristics							
Formulato	Formulate the preliminary vision							
nolicies and	Taking the opinions of development							
strategies	partners about the best use for sites							
strutegies	Identify available funding systems							
	Activation legislative frameworks							
Dut land rause	Analysis the characteristics of site							
nlan	Identification needs of stakeholders							
pian	Application legal requirements							
	Site preparation	Remove						
	for development	Clean and						
implementation		Add elements						
, financing and	Mechanisms of	Roles o						
follow up	implementation	partners						
		Commitment to						
		time and cost						
		Finance	1					
Maintenance and follow up								
Advertising - marketing								
Institutional and organizational rale			Advis	orv role				
	and organiz			51, 1010				
Par Par	rticipatory role		Financ	cial role				
(Source : Author)								

Table 3, the main roles of each partner in land reuse planning stages

(Source : Author)

Dealing with unsafe informal brownfield site in Egypt Main problems of unsafe informal area

Informal Settlement Development Facility (ISDF) and United Nations Human Settlements Program defined unsafe area in 2008 as areas which faces some dangers and have range of problems related to insecurity and inadequate living condition. These areas are classified according to the levels of severity to four main groups from the highest risk to the least risk as shown in the following points (Kipper and Fischer, 2009; El Maabady, 2014).

(First group): areas which threaten human life through natural hazards such as soil degradation, mountain collapse, and floods of seoul.

(*Second group*): areas which suffer from cracks and dilapidated buildings, in addition to lack of suitable living spaces in housing units.

(*Third group*): areas that suffer from lack of public health standards such as the privation from infrastructure like water, sanitation and electricity, besides the areas which affected by pollution sources.

(Fourth group): areas that lack of formal tenure and stability.

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Unsafe areas represented about 2% of the total urban areas in Egypt and had a density more than 500 people/feddan. Moreover, they occupied an area of about 4.5 thousand feddan with 203.3 thousand housing units which inhabited by about 813.2 thousand people according to the study of ISDF in 2014. The total number of unsafe sites were 422 areas in 2009 and the number dropped to 365 in 2014 as a result of some development projects (Sabry, 2009).

The number of unsafe areas in Egypt are distributed by the four level of severity to (26 life-threatening areas with 475.3 feddan and 10.2 thousand housing units-258 areas of dilapidated housing buildings with 2.3 thousand feddan and 118.4 thousand housing units- 61 unsuitable areas for public health with 1.1 thousand feddan and 47.6 thousand housing units-19 unstable tenure areas with 648.3 feddan and 27.1 thousand housing units). The following figure no (7) shows the percentage of unsafe areas in Egypt according to the level of risk (Sabry, 2009).

The number of unsafe areas differ from governorate to other as shown in figure (8) which show that Cairo governorate has the largest number of unsafe areas which reached to 112 areas in 2009 and decreased to 56 areas in 2014 after some development projects. These areas represented 15.4 % of the total number of unsafe areas in Egypt (Sabry,2009).









Figure 8. Number of unsafe areas in Egyptian governorates (source :Author)

Most land reusing projects for unsafe areas have been applied only in the second type of unsafe areas (areas with dilapidated buildings) because it is difficult to deal with first type due to its seriousness, while the third and fourth types have been developed without removing them through improving the environmental, social, economic and political aspects.

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Policies of developing Egyptian unsafe informal brownfield sites

There are various policies for dealing with removed unsafe informal areas in Egypt, The first one is *ignoring policy* as a result of unclear mechanisms and insufficient funding for development process. Then the Egyptian government followed the *removal policy* in late 1970s through transferring the population outside these sites and reusing the land in construction new residential areas for other social groups or converting these sites to gardens or services according the needs of nearly areas. This policy ignored the social dimension of which some population refused to move outside their residential areas and the other suffered from far distance to get jobs and services in new sites. Further, the state incurred high cost in this policy to offer alternative housing or pay compensation to population without any partnership with other partners (El Maabady, 2014).

During the 1990s The state had attempted to overcome the disadvantages of earlier policies through removing informal brownfield sites and temporary transferring for the population until development project was completed as shown in 20 % of development projects for informal areas in Egypt. This policy carried out the same kind of old land use with some services and activities to cover the population needs in partnership with civil society, private associations and donations from businessmen. Despite the positives of this policy, it was plagued by high cost compared to its revenues and the state also incurred this cost, in addition to the absence of economic aspect in the subtraction of new land uses and their relation with the economic value of the site (El Maabady, 2014). Therefore, after the year of 2000 the state tended to reduce its role in financing development projects and assigned that to the private sector through selection the removed sites which have high economic value for the investment. This policy depended on removing unsafe informal areas, compensation the population financially or by alternative housing units, bearing the development costs by private sector and suggestion new land uses which are suitable with site characteristics, but this policy omitted the social dimension and the balance between the objectives of development partners (Abdelhalim, 2010).

The unified building law No. 119 for 2008 identified the dealing with informal areas within two main categories (unsafe– unplanned) areas. The unsafe areas are treated according to the four degrees of severity which land reuse approach can be applied in the second degree only for residential, investment or service uses. The state has recently turned to introduce new policy that solve the obstacles of previous polices and take social, economic and environmental dimensions in consideration to apply the concept of sustainability through the participatory approach that meets the needs of population, private sector gains and state's goals for development at lowest cost and highest returns. The following figure no (9) illustrates the main policies of dealing with unsafe areas and their mechanisms to apply land reuse approach (Abdelhalim, 2010).

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Figure 9. Policies of dealing with unsafe areas and their mechanisms to apply land reuse approach. (Source : Author)

The governorate of Cairo is one of the most important governorates in which development projects for unsafe areas have been implemented through land reuse approach, the total number of land reuse projects in this governorate reached to 56 projects with different mechanisms as shown in following points (Sims et al., 2003; Kipper, 2009).

Land reuse projects for development unsafe brownfield sites in Cairo governorate

The projects of development unsafe sites in Cairo Governorate varied according to types and characteristics of unsafe areas– The gravity of those areas- the insistence of population for living inside the same site- the desire of private sector to invest in these sites). The finance of these projects based on budget of the state, self-efforts of population, in addition to the cooperation with international institutions, private associations, businessmen, investors, civil society and ministries to implement the requirements of development (Abdelhalim, 2010).

For instance, the financial resources of Cairo governorate contributed in development some unsafe areas such as net of Turguman and Shiha playgrounds site. Moreover, there was cooperation between the governorate, charity associations and donations of businessmen in development Zenhoum, Arab al walada and Al nahda areas while the ministries had a role in development Sur Magyra Al Ayoun area. The following points show the most important projects for development unsafe areas in Cairo governorate according to their severity:

Projects of removing some areas in the first degree of severity (threatened life):

These areas faced the life-threatening risks which led to handle with them through the removal and relocation of residents to alternative housing units which owned by the ministry of housing or governorate. The government also resorted to provide financial compensation or land for self- build housing in the case of absence suitable alternative units for the population, there are examples of these projects are shown in (Stable antar– Alherfeen– Ezbet Khair Allah– Mansheyet Nasser- Mount Mokattam) (Cairo Governorate, 2010; Sejourne, 2009).

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Projects of removing some areas in the second degree of severity (areas of inadequate housing):

These areas were built by remnants of building materials or existed on solid waste landfills or included old and dilapidated housing. The government developed this type through gradual replacement of the site and building new housing units in the same site to create suitable community for population. The government tended also to transfer residents to alternative housing or compensate them financially in the case of absence appropriate funding for development or there is needing to reuse these areas in accordance way with economic value of the sites. The following points show the main projects of development this type of unsafe areas in Cairo governorate (Cairo Governorate,2010; GTZ Egypt, 2009; Kipper, 2009).

Projects of land reusing by the state after transferring the population:

The land has been reused in this case for public utilities and infrastructure such as:

- Land reusing the Nest of Ismailia canal to gardens and transferring the residents to Al Nahda and Alsalam areas.
- Development the Nesr of Mazloum in Sharabia to schools, gardens and new network of roads and transferring the residents to Al Nahda housing.
- Land reusing the refuge of Ain Shams and Eazbat Abu alnour to open gardens.
- Development Al Mawardi area through removal and reusing the site to collective transport stand.
- Land reusing Sahel area to set up new schools.

Projects of land reusing by investors after transferring the population:

The land has been reused to investment uses in areas of high economic values such a:

- Transformation the areas of Hakr Abu Duma and mousals Maspero to tourism and investment uses after removal and transferring their population.
- Development the area of Ezbet Abu Al Nur in Masr Al gadema in the field of tourism investment and benefit from the archaeological sites.

Projects of land reusing in the presence of population and participation of development partners:

The land has been reused for the population needs (housing- services- jobs) such as:

- Development the areas of Zenhoum and Al kabsh Castle through gradual replacement.
- Tal al aqareb project for building suitable new residential areas.

Projects of development some areas in the third degree of severity (not suitable for public health):

These areas lack from water or sanitation or suffer from pollution. Cairo Governorate proposes to deal with these areas through the national programs of concerned ministries such as ministries of Environment, Electricity and Energy to avoid the negative effects on public health without removal these areas (Kipper and Fischer,2009).

Projects of development some areas in the fourth degree of severity (unstable tenure areas):

These areas located on the property of state or endowments and need to deal with them through legalization of possession or building alternative housing units in the case of the desire of the state to recover these sites for different development purposes.(Al Nakhili, 2006).

Therefore, the paper selects *Zenhoum project* as a case study to find its main mechanisms for application land reusing approach, besides to get its advantages and disadvantage which

help and support decision makers and planners in this field. The following points show the main reasons of choice Zenhoum project as a case study:

- It is one of the largest slums in population size and area.
- Zenhoum project is almost completed project, thus it helps in measuring its performance.
- The project involved partnership between government, civil society and private sector to achieve the requirements of development.
- This project based on removal policy with land reusing approach to meet the needs of population in a different way with other projects that move the population to other sites and have negative social and economic effects on the family.
- The project needs more mechanisms to achieve the principles of sustainability.

Mechanisms of application land reuse approach in Telal Zenhoum project

Location and characteristics of Telal zenhoum site Telal Zenhoum is located in Al Sayeda Zeinab neighborhood south Cairo as shown in figure no (10), it is considered one of the largest informal area which has areas of 53 faddan. Zenhum area refers historically to Al Askar area which was built by Abbasids in 750 CE as their capital. This site has a historical important because it is surrounded by Amr ibn al Aas Mosque and Ibn Tulun Mosque at 250 m away from the north, Al-Sayeda Nafisah Square at 100 m from the east and Sour Magry Elyuoun from the south as shown in figure no (11). It was called Telal Zenhoum because it appeared in the past as hills of rocks and sand, then it turned to gardens in fifties so it called also Zenhoun Gardens (Tadamun, 2014).



Figure 11. The boundaries of Zenhoun area and its historical important (source :Author)

Figure 10. Location Zenhoum area in Al Sayeda Zeinab neighborhood (source: Afifi, 2007)

Zenhoum area had appeared during the seventies and eighties in the form of nest and stalls which had a deterioration in its characteristics. These nests were allocated by Cairo Governor as a temporary housing for people who came from destroyed areas such as Abu Rish. Then the urban area of Zenhoum was developed through the self-building of other houses by population with using traditional ways. As well as the total population reached to 20 thousand (4000 families) in 1998 (the year of development) (Afifi,2007; Hybh,2007).

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The old situation of Zenhoun area (before development process) had some environmental, social and economic characteristics such as:

- The area of residential use represented the predominant percentage of total land use area (80 %), while the proportion of services area reached to 20% from the total area.
- The residential use appeared in the form of nests and huts which not subjected to planning and design standards as shown in figure no (12).
- The residential housing contained some activities such as (shops, crafts and workshops) as shown in figure no (13).
- The site deprived of health, education and cultural services.



Figure 13. The main activities in Zenhoum area before development



Figure 12. The nests and huts in Zengoum area before development

(source: Al Nakhili, 2006)

- High population density (over 400 people /faddan).
- Narrow internal streets and roads (less than 6 meters).
- Small housing unit area (less than 60 meters) and it disproportionate with family size which ranged between 4 and 6 persons per each family.
- Lack of disposal systems, facilities and infrastructure in Zenhoum area.
- Lack of parks and public spaces.
- High unemployment rate (over 23%) from the total population in workforce.
- Low level of education and high percentage of illiteracy which reached to 35%.
- High land value for the site as a result of its historical importance and its location on the path of archaeological tourism.

Stages of land reuse project in Telal zenhoum

The project of development Zenhoum area started in 1998 through the initiative of Suzanne Mubarak and the cooperation between Cairo governorate and Egyptian Red Crescent Society, as well as the involvement of businessmen in financing the construction process to resettle the population after development. This project aimed to achieve set of goals including (urban upgrading for Zenhoum area- putting applicable model for development other unsafe areas-improve the social and economic condition of population– creation of an institutional framework based on the partnership between the state, private sector and civil societies).

The project consisted of some stages from the planning to implementation stage which are illustrated in the following points and figure no (14) (Al Nakhili, 2006; Hybh, 2007; Afifi, 2007; Khadr and Bulbul, 2011).

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Stage (1) collection the information about the site and population

The Red Crescent society played an important role in asking the population about their opinions and needs, moreover studying the characteristics of population and sites to decide the priority areas for development which were divided into three zones as shown in below.

Stage (2) identify the partners of development

The project based on the partnership between some partners such as (government entities represented in Cairo governorate– Red Crescent Society– private associations– civil society organization–charity institutionsdonations from businessmen and contractors– population–consultants and engineering offices).



Figure 14. The main stages of land reusing project in Zenhoum area (source :Author)

Stage (3) Put the development plan for land reuse

The government putted the development plan for Zenhoum area according to (the characteristics of population and site- the main needs of population- the results of meetings with different partners). This plan depended on two main elements: the first one is total removal of nests and dilapidated buildings for providing new residential area with achieving environmental, social, economic standards. while the second element is developing the population in all aspects to merge with the new urban environment.

Land reusing plan for Zenhoum area proposed new land uses that cover the needs of population from (housing-services-spaces-roads). But didn't take the historical, economic value of the site in consider, therefore it didn't achieve the ideal exploitation for the site. The following points show the main components of the development plan:

The residential use is divided into three stages with total 181 buildings as shown in the figures no (15), (16), (17) and (18), beside the table no (4). Each building includes 12 residential units that are distributed to three floors and four units in each floor in stage one and two, While the height of the residential building in the third stage is 4 floors. The average area of residential unit is about 67 m2 with internal design of (two bed rooms, reception, kitchen and bathroom) as shown in figure (19).

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Figure 15.Land use plan for Zenhoum area and its stages (source: Khadr and Bulbul, 2011)

T	Table 4. The residential use in each stage of project					
	Stages	Area (faddan)	Number of R building	Number of R units		
	Stage 1	12.5	29	348		
	Stage 2	19.5	81	972		
	Stage 3	21	71	1136		
	Total	53	181	2456		

(source: Author)



Figure 19. Internal design of residential unit in Zenhoum project (Al Nakhili, 2006)



Figure 16. The first stage of Zenhoum project (source: Khadr and Bulbul, 2011)



Figure 17. The second stage of Zenhoum project (source: Khadr and Bulbul, 2011)



Figure 18. The third stage of Zenhoum project (source: Khadr and Bulbul, 2011)

- *The first stage of the project* is located between the Red Crescent headquarters and Talaat Harb library with an area of the 12.5 faddan. It was inhabited by 645 families before development process and the plan suggests implementation of (29 residential building with 348 residential units) during the period from 1999 to 2000.
- *The second stage included of* the eastern area of reservoir, it was a residential area with an area of 19.5 faddan and inhabited by 1456 families before the

Stage 3

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development process and the plan proposes to set up (81 residential buildings with 972 housing units) in it.

• *The third stage* is the slums of Alkabsh area with an area of 21 faddan. It is inhabited by 2400 families and the plan suggests 71 residential buildings with 1136 housing units in it.

The following figure no (20) shows residential buildings in each stages of development:



 Stage 1
 Stage 2

 Figure 20. residential buildings in each stages of development (source : Hybh, 2007)

The proposed services in development plan includes educational services such as (schools, literacy classes and nurseries), health services such as (hospital, pharmacies), cultural centers for the population represented in (social cultural center and library), training centers for (handicrafts), sports services such as the (development of youth center of Zainham), administrative and security service as well as commercial services which represented in main commercial market. The following figure no (21) shows kind and location of these services in Zenhoum project.





Figure 20. kind and location of services in Zenhoum project (source: Khadr and Bulbul, 2011)

- *The green areas*, roads, public roads and services occupies about 40% of total area.
- *Land use plan proposes new road networks* with a width of more than 15 meters for emergency and private cars.
- The percentage of building don't exceed 30% from the total area of site.

Stage (4) Implementation, financing and follow-up

The implementation stage consists of three basic steps which are (preparation of the site for development- funding and allocation the roles of each development partner–implementation process- follow-up and maintenance) to ensure that the project achieves its goals. The following points explain these steps:

A. Site preparation

The role of the government through Cairo Governorate was clear in removing the dilapidated buildings, cleaning the site, preparing the site for construction process and supplying the site with necessary infrastructure and facilities. The governorate also transferred the inhabitants of each stage to the temporary housing areas in Al- Nahda or Al, Mousals area in Helwan and Mokattam until the development has been completed, then the government returned the population again to the site.

B. Funding and implementation

Many partners have roles in development process especially in funding to complete the implementation stage on time. The project costed about 200 million pounds for all stages through different sources of funding from (government agencies– private associations– contractors– businessmen– engineering offices). The following points illustrate the roles of development partners and their contribution in funding:

- *Cairo Governorate*: costed about 46 million pounds for (removal the slums- cleaning the site for the project- land which owned by state– provision temporary places outside the site for residents– elaboration the plan and designs- extending infrastructure and roads networks inside the site).
- *The Egyptian Red Crescent* Society: (responsible for social development of population, implementation the residential and services uses, renovation of existing buildings surrounding the site, project management and collection the necessary donations from businessmen and private associations). The total donations amounted to 154 million pounds of which 8 million pounds for services and the rest for construction the residential buildings.
- *Businessmen:* Contribute in the project by donating for construction the residential buildings and services.
- Advisory Office (United Consultants office): contributes in planning and design the project without any charge.
- *Social and Criminal Research Center*: studied the necessary social elements in the site for development the community.
- *Population:* communicates with different partners during the all stages of project.
- *Charity institutions* such as (the Evangelical Authority for social services) which contributes in providing toilets, drinking water taps, some temporary services and facilities during project implementation.

c. Follow-up and maintenance

After implementation stage, the residents were returned to the site again and the residential units are distributed to them under the temporary tenancy system for five years in exchange of 55 LE per month. The lease contract is renewed as long as there are no infringements or violations, beside to the commitment of population to preserve the residential unit and other urban elements in the site.

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The Red Crescent Society has a role in management the project and follow-up the efficiency of educational, health and cultural services, while the state is responsible for maintenance and follow-up the new residential area through rental values that are collected form population by Urban Development agency, which uses the values of rents in the maintenance, collection of waste and taking care of gardens by contracting with private companies.

The following figure no (21) shows the main steps and stages of land reuse project in Zenhoum, in addition to the roles of different partners in project.



Figure 21. Main steps and stages of land reuse project in Zenhoum (Source :Author)

10.Main challenges of land reuse project in Zenhoum

Zenhoum development project faced number of challenges during the project stages, which are shown in the following table no (5) (Hybh, 2007; Afifi, 2007; Khadr and Bulbul, 2011).

stages	Main Challenges			
Stage (1)	• The land reuse plan based on the study and analysis the characteristics of the			
Collect information	site without taking the interrelationship between the site and the surrounding			
about the site and	areas in consider which is necessary to build good development vision.			
population	• The project concerned with social studies compared with the economic studies of the normalitien and site			
	studies of the population and site.			
	• The views of the population was not taken in consider to identify the suitable			
	kinds of the land use in the site.			
Stage (2)	• Dependence on the donations from businessmen and charities without			
	involving them as investment agents to develop land uses.			
identify the partners				
of development				

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Stage (3)	• the Environmental characteristics of the site imposed of not increase the	
	height of buildings from 3 floors because the soil is fragile.	
Put the development	• The new residential and services uses in the area are not different from the	
plan for land reuse	earlier situation of land use , therefore there is no land reuse in a manner	
	consistent with the potential of site and the characteristics of the population.	
	• Provide large spaces between buildings that exceed the needs of the	
	population.	
	• The design of housing unit not achieves the requirements and needs of	
	population, in addition to its incompatibility with the size of the family.	
	• Network of roads is designed with width of more than 15 meters which	
	excess the needs of proposed land uses.	
	• Focus on suggestion services compared to economic activities that reduce	
	unemployment rates among the population.	
	• Propose a large proportion of roads that allocated to cars despite low	
	ownership of cars in the site.	
	• Absence of economic activities which represent the most needs of the	
	population because most of them work in commercial and crafts activities.	
Stage (4)	 Dependence on donations and low funding from the state. 	
	• Non-participation of population in implementation or maintenance which is	
Implementation,	carried out through the state and Red Crescent Society.	
financing and follow-	• Use unsuitable building methods and materials that led to the deterioration	
up	of building in first stage despite its modernity as shown in figure no (22).	
-	• The project didn't achieve a margin of profitability due to lack of	
	investment activities and non-participation of investors.	
	 Appearance of activities in informal way such as groceries as shown : 	
	figure no (23).	
	 Residents make adjustments in residential unit design to meet their needs. 	
	• Decrease in financial resources which led to emergence some problems	
	such as deterioration of gardens and roads as shown in figure no (24) .	
	• The total families didn't receive housing units because the number of	
	implemented residential units less than the actual number of families that	
	exceed 4000 families.	
	• The tasks of the Urban Development Authority shifted to management of	
	the district, which neglected the maintenance and follow-up for the project.	
	• The lack of tenure for some residents due to temporary leases which not	
	renewed after five years.	
	• The population sales their units for about 150 thousand pounds or rents	
	them for 600 pounds per month because these housing units are not suitable	
	for their needs.	
	1	

(source: Author according to references of Hybh, 2007; Afifi, 2007; Khadr and Bulbul, 2011).

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Figure 22. Deterioration of building in first stage area (source: Hybh ,2007)



Figure 23. Informal activities after development (source: Hybh ,2007)



Figure 24. Deterioration in gardens and roads (source: Tadamun, 2014)

CONCLUSION AND RECOMMENDATION

The paper discusses the main mechanisms for application land reusing approach in developing unsafe areas, These mechanisms appear through different development stages from the stage of identification suitable unsafe area to the stage of implementation shown below in the following points:

Stage 1 : Selection the sites to apply land reusing approach by collection the information about these sites, classifying and arranging them according to their (characteristics– economic value– roles in the city), in addition to the degree of population desire to stay in the same site.

Stage 2: Determination the suitable policy and view to deal with unsafe brownfield sites where the land can be reused according to (the characteristics of site– views of population and investors– the appropriate funding systems). These policies vary from (removal with total transferring of population by the state for the public services uses - gradually removal with the existence of population for the same previous uses– removal with total transferring of population by investors for investment uses– removal for balanced development through all partners).

Stage 3: Developing land reuse plan according to (main characteristics and possibilities of the site– total needs of development partners – legislative frameworks of land reuse).

Stage 4: Implementation, financing and follow-up through (preparing the site for development– distribution the roles between involved partners – maintenance and follow-up). *Stage 5:* advertising, marketing and distribution of development returns.

The paper recommends some elements that must be taken in consider for development Egyptian unsafe brownfield sites, these elements are (establishment responsible government institution for development brownfield sites especially the unsafe sites- develop a vision that reflects the role and characteristics of the site– involving the population in all project stages– inclusion of private sector and investors in development– meeting the needs of population from housing, activities and services– providing a number of residential units equal to the number of families– choosing the kinds of land use that are compatible with land value – introducing suitable economic activities for investors which consider job opportunities for residents– reducing the government funding and relying on the contributions of private sector under partnership contracts– guaranteeing the tenure for population through temporary or

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permanent contracts- trying to achieve the balance between all requirement of development partners).

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