**Original Article** **ISSN: 2788-8517 (online), 2788-9963 (Print)**

**Journal of Urban Development Studies**
**Vol. 2, Issue 1 (2022)** https://doi.org/10.3015/ecsujuds.v2i1.13

# Provisions for Sustainable Urban Agriculture in Addis Ababa: The Urban Planning Perspective

**Daniel Lirebo Sokido**

Associate Professor of Urban Design; College of Urban Develoment and Engineering, Ethiopian Civil Service University. Addis Ababa, Ethiopia

***Received: 03 May 2022, revised: 25 May 2022, Accepted: 29 May 2022***

**Abstract**

*Various researchers have identified urban planners, urban planning policy and the other elements of the planning policy context as posing serious problems for urban agriculture.* ***"Urbsan Planning reform"*** *has been suggested as a solution to common problems faced by urban farmers. Hence, the aim of this study is to investigate the role of urban agriculture for sustainable landscapes in the urban planning perspectives. Therefore, this study might help to reduce the misconceptions about the role of urban planners in envisioning and effecting community changes by describing what urban planning is and what urban planners do upon urban agriculture in order to make urban Agriculture as integral components of the land use planning in the City Structural Plan. The analysis of the study was based on both the primary data (by using various tools including interview, questionnaire Survey, observation, Focus group discussion) and secondary documents that were collected from the concerned agencies, and various institutes of urban administrations at sub-city and city level with respect to city structural plan in all case study sub-cities as well as Digital maps through GIS and Remote sensing. Furthermore, the analysis result also confirmed that less attention has been given to urban agriculture as integral parts of the land use planning. Thus, this research concludes that the there is laxity in promoting and enhancing urban agriculture for sustainable landscapes including balcony agriculture in different residential buildings like condominiums and apartments in urban planning perspective. Finally, this research recommends "Start Planning and Design with Urban Agriculture as an integral component of City Plan.*

**Key Words:** Urban Agriculture, Edible-Urbanism, Urban Planning, Structure Plan, Sustainability

## 1. INTRODUCTION

In recent years, there has been a tremendous upsurge of interest in growing food in urban environments of developing countries as an integral component of urban planning and design (UN-Habitat, 2020). This is because, people want better access to good life, healthy, and affordable food, and to enjoy cultivating beautiful green spaces and meeting local people in their own community through ***good urban design and planning.***

Thus, ***the urban planning and design strategies*** will be expected to aid in designing new urban agriculture landscapes so as to meet the rising demand and to look at the capacity to expand the idea of the sustainable city. Hence, cties require well ***designed and planned*** urban agriculture in city plans as ***an integral component*** to satisfy urban communities so as to mitigate the challenges of food security systems. Cities are inevitably called to spearhead the pathway towards a more just and sustainable world, Likewise, urban agriculture is emerging in different formats as ***a planning and design response,*** which often embraces practices of these latter alternative movements to the global food model. On the other hand, the municipal areas of Addis Ababa is estimated to have a total area of 540 km², of which 14.2 km² are considered rural area. Despite the fact that during the last ten years, sustainable urban agriculture and urban food systems have rapidly moved from being ***a 'fringe interest'*** to attracting the attention of ***policy makers and urban planners*** in many cities including Addis Ababa, both in developing and developed countries so as to install ***edible city solutions*** through ***edible urbanism principle.*** Feeding our urbanizing world has become an ***imperative, especially in light of food security, the climate emergency***, and city actors are increasingly responding to the challenge in the City Planning and design.

Urban agriculture is widely practiced as an informal economic sector across many African cities (Bryce son and Potts 2005). Even though it is a viable activity to complement food supplies from rural areas to cities, and is a means of income and food expenditure for many urban dwellers, particularly for the poor, its contribution has been ***underestimated*** (Mougeut, 2018). Urban Agriculture producers are also often discouraged and ignored by the society and in policy reforms. As (Deelstra and Girardet, 2004) put it, ***"urban designers and planners*** tend to think that urban food growing is messy business and have little understanding of peoples' need to grow food in cities being manifested on the 10th plan of Addis Ababa City Administration enacted in 2017. It has been given ***less attention*** in designing and planning this important ***land use*** category in the processes ***as an integral component***. Hence, ***the time has come for urban planners and designers to act as change agents*** and design for integration of urban agriculture with urban systems into city Ecosystem. Current urban design and planning is focused on the fragments rather than a cohesive whole. A new way toward designing integration is emerging through ***ecological-based urban agriculture***. This ***integrative process***, also known as ***integrated systems thinking***, focuses on solutions based on the interconnectedness of the systems as a whole unit, rather than separate units. An emphasis now must also be on how urban planners and designers are the ***change agents*** for this ***new edible green urbanism*** in today's cities like Addis Ababa. Hemce, this study has been illustrated how current situations and urban agriculture landscapes in the city were transforming our ideas on the integration of food into the city through the ***designing and planning of edible city solutions approach.***

Therefore, this research has been intended to fill the gaps related to the use, state and challenges for the ***planning and design of Urban Agriculture for the sustainable landscapes in the city administration*** in reference to the newly revised City Plan (2017-2027). Besides, the study would facilitate and pave the way to come up with proper solutions and strategies to plan and design quality urban agriculture landscapes in the city. The study aimed at investigation and evaluation of stark realities in the ***planning and design of Urban Agriculture*** for sustainable landscapes in realizing ***edible city solutions approach*** via the transformation from ***Petropolis to Agropolis*** landscapes in Addis Ababa. Specifically, the study aimed to evaluate the existing planning strategies of urban agriculture for sustainable landscapes in the City Administration, identify the determining

factors affecting spatial planning and design quality of urban agriculture for sustainable landscapes transformation of Petropolis to ecopolis/Agropolis, explore the development of edible city solutions through quality planning of Urban Agriculture in making sure sustainable livelihoods of cummunity through the transformation from Petropolis to ecopolis/Agropolis landscapes and assess the spatio-temporal variation in the extent to which urban agriculture is being practiced in Addis Ababa in the past two consecutive structural plans (2002-2017).

## 2. METHODS AND MATERIALS

The study with mixed approaches will employ the case study strategy. The case study approach advocates the use of multiple sources of data and methods of data collection, (Yin, 1994:55). The deductive approach to data collection was tried to employ both quantitative and qualitative sources as mixed imbedded and will be used concurrently, so as to enable 'triangulation'. The former uses open-ended questionnaire and measurements and the latter includes structured/unstructured interviews, FGDs, observations and analysis of documents including aerial photographs/digital map to examine the urban agriculture in relation to urban planning and design along with support of Google Earth, Arial Photograph or Digital Map, Landsats & GIS/Line/Nortek Maps at (plot, block) that clearly show the trend of spatial Expansion, key informant interview, visual observation/visual survey at all scales, FGD and secondary data (GIS maps, Google Images, Line maps, Nortek and Master Plan documents and Related Documents). Data analysis processes was also started by coding, re-coding, classifying. Statistical software as SPSS, GIS, AutoCAD, Archi-CAD and Excel will be utilized. Matrix rating technique in SPSS will be utilized to compare results from each case analysis in reference to identified urban agriculture planning and design situations. This is to identify the roles of urban planning and design on urban agriculture for sustainable landscapes in the City so as to make sure edible urbanism. In addition to the analysis of interviews and questionnaires; line maps, GIS, Nortek and digital maps, photographs, aerial photos and secondary written documents will be interpreted in relation to the key issues of the research questions and will be incorporated as part of the case reports.

## 3. Result and discussion

### 3.1. Desk review finding

#### 3.1.1 Agropolis as Edible City Solutions

Edible City Solutions (ECS) as Agropolis focus on urban productive landscapes including the wide range of different forms of urban farming, building integrated farming, agro-forestry, aquaculture, biomass production for energy, among other productive and ornamental purposes and services combined with closed loop systems for sustainable water, nutrient, and waste management, (Suhana E. Reddy etal, 2019) *(Figure 2.1)* above. The elements of this ***'Edible Green Infrastructure Concept'*** includes edible urban forests, edible urban greening, different gardens and parks, school gardens, allotment gardens, community and domestic gardens, edible green roofs and vegetable rain edible green walls and facades, but not intensive urban agricultural practices. Our ECS concept includes also these practices managed in a ***sustainable way such as commercial indoor farming.*** high-yield commercial gardening, biomass feedstock, aquaculture, and livestock and new innovative cropping techniques in urban areas, such as hydroponics or ***'organoponics'.*** Urban rooftops and vertical farming offer an untapped potential to systemically integrate farms into buildings and drive economic resilience of cities. Beyond the effects on social integration and environmental sustainability ECS present opportunities for significant improvements to food supply, zero-km food, and local economy, (Suhana E. Reddy etal, 2019).

### 3.1.2 The integration of Urban Agriculture into urban planning and its benefits

"The process of formulating and implementing land policies is not only politically and technically difficult, it can also be costly. Cities do not develop according to planners' wishes – to the contrary, in the present and past, cities have always shown their own dynamic of development. In many cases this has led to crowded, ill-ventilated, unplanned, unwieldy, unhealthy cities "ulcers on the very face of our beautiful island" as expressed by (Howard, 1902) for the situation in Britain (Howard Ebenezer, 1902). Howard's Garden City proposals addressed many aspects of the food system -production, distribution, collective preparation and consumption. In many reports on urban planning in developing countries the rapid urban development and population increase are highlighted which make the recent trend different from what happens in the western world. Rapid, largely unchecked, urbanization like for example in Kumasi, Ghana, has called an end to its claim of being the 'Garden City of West Africa'. As a result, land use patterns have become very complicated and no good concepts are in sight (Pender, Judith, 1998).

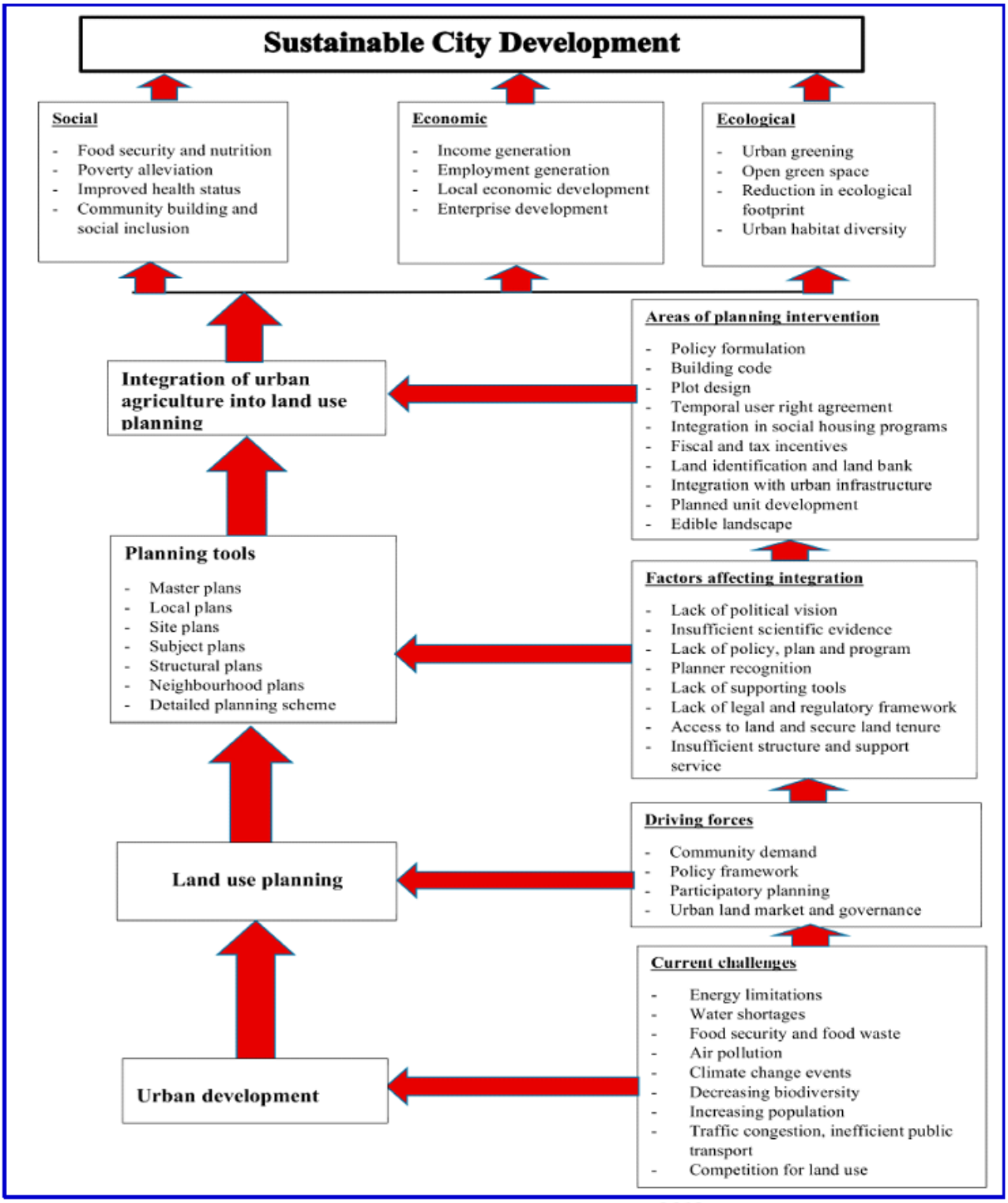
Furthermore, urban planners tend to exclude agriculture from their terms of reference. Finally, the challenge for urban planners is to integrate coping strategies of the urban poor, which are closely related to the informal land market in many countries into their planning strategies. This requires the definition of rules and standards but also ways to increase the supply of and access to land by the poor and implementation of land legislation to enable sustainable urban development. Furthermore, Urban agriculture has been practiced throughout the world for thousands of years and is an integrated urban form in many places. It is practiced in many areas that city planning is concerned with: on city streets, in public gardens, parks and in community gardens and offers many benefits to city life. Urban agriculture and the food system more broadly, is an integral part of the physical, economic, social well-being of places that planners care about (Balmer, 2005). The potential benefits of urban agriculture includes Urban agriculture as a means to food security, Urban agriculture as a means to a productive city, Urban agriculture as a means to an environmentally healthy city and Urban agriculture as a means of building resilient cities. (See Fig 2.10: sustainable Urban Agriculture Framework above)

Figure 2.5: Graphic Illustration of well-planned and designed Urban Agriculture (EDIBLE URBANISM) Scene from around the World
Source: Author's Compilation, 2020

### 3.1.3 Integrating Agriculture into Urban Planning and Design: A Framework for Edible Urbanism

A conceptual framework for integrating urban agriculture into planning and enhancing city sustainability is presented in *(Figure 2.10)* . It builds on the four pillars of the sustainability concept, namely, ***Spatial*** (represented by food security and nutrition, poverty alleviation, improved health status, social cohesion and community building), ***Social*** (represented by Cross-Generational and Cultural Integration, Physical Activity, Reducing Obesity, Creating Safe Places, and Building Social Capital), ***economic*** (represented by income and employment generation, local development and enterprise) and ***ecological*** (represented by

*Figure 2.10: Please See Conceptual Framework of Sustainable City Development, Edible Urbanism as Being Illustrated Below:*




*Source: Urban Science: Janet F. Bornman, 2019*

providing urban greens pace. This requires land use and planning to come together to address current sustainability challenges and respond to the factors that are already driving the presence of urban agriculture in the city through the principle of **Edible Urbanism.**

Therefore, the global experiences have addressed that urban agriculture should be integrated to the structural plan of the city so as to maintain food security and sufficiency by ***realizing the transformation from Petropolis to Agropolis/ecopolis.***

**Urban Agriculture farming characteristics**

**3.1.3.1 Farming constraints**

There are some issues that are mitigating against the activities of urban farmers. Some of the major constraints are: Pest and disease threats to crops, Inadequate access to credit, Marketing of produce, High cost of inputs (fertilizer, pesticides, farm implements, seeds), Limited access to land and tenure and Inadequate access to safe and cheap irrigation facilities (pumps). In Bole, Akaki and Nifas Silk Sub-Cities some pests which farmers are finding it difficult to identify are now attacking their lettuce, cabbage and spring onions. About 55, 63 and 47 percent of the farmers in Bole, Akaki and Nifas Silk have lost huge sums of money this season to this development even though they could not quantify their cost. Water and land is another major constraint in Nifas-Silk as compared to Akaki. All the farmers in Bole and Nifa-Silk have land as their topmost constraint.

**3.1.3.2 Urban expansion and loss of agricultural land in the study areas**

The urban agriculture area covers only some *7600 hectares* but, because of its objectives, the study deals with total area of ***19,393.29 hectares*** in 1999 declined to ***8,333.17 hectares*** in the three study sub-cities in 2018 as being illustrated on the maps below. This includes all the urban expansion that has taken place in different parts of the three sub city during the period in between 1999 and 2018. As shown in Table 4.1 below, it is clear that *land use* in the three sub-cities is not well planned. Over time, the older part of the city has become increasingly congested while the city has expanded outwards haphazardly covering agricultural land on the fringe area. ***Urban land use*** is dominated by residential areas, which occupy more than 70 per cent of the study area (and 55 per cent of the municipal area). Most of this residential area is unplanned; only 20 per cent is planned with open spaces and with relatively good basic infrastructure.

*Table 4.1: Land use land cover of urban green infrastructure in 1999, 2010, and 2018*

| | bole sub city | | | | Akaki sub city | | | | Nifas silk subcity | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| year | 1999 | 2010 | 2018 | year | 1999 | 2010 | 2018 | year | 1999 | 2010 | 2018 |
| class | Bole | Bole | Bole | class | Akaki | Akaki | Akaki | class | Nifas Silk | Nifas Silk | Nifas Silk |
| agriculture | 7495.65 | 6528.6 | 2063.77 | agriculture | 8252.1 | 8123.13 | 4481.24 | agriculture | 3645.54 | 2153.25 | 1788.16 |
| bareland | 3669.75 | 2642.4 | 4995.61 | bare land | 2758.32 | 1410.48 | 3318.55 | bare land | 2264.4 | 1810.8 | 2290.85 |
| builtup | 810.54 | 2149.02 | 4083.83 | built-up | 667.26 | 1625.04 | 3164.45 | built-up | 786.42 | 2169.09 | 2149.5 |
| forest | 63.63 | 715.86 | 822.407 | forest | 53.28 | 586.8 | 756.835 | forest | 136.08 | 673.47 | 546.195 |
| water body | 102.24 | 108 | 96.4376 | waterbody | 162.09 | 148.59 | 87.3919 | water body | 67.86 | 94.14 | 55.9425 |

*Source: INSA, Geospatial Data, 2018*

Bare-land covers 15 per cent of the land area, which is linked to the rapid economic transformation and emergence of secondary and tertiary activities. The main reason for this increase in bare land is that, initially, when industrialization (industrial parks) took place, there was a shortage of land for construction. This demand caused an increase in land values, and land-occupiers who had previously used their land for agriculture now offered it for construction, causing a large conversion of agricultural land into bare land. The demand subsided, resulting in an increase in vacant land

which is used neither for urban development nor for agriculture. The area under plantation (tree crops) covers 20 per cent of the study area. One reason for this is people protecting their land (in the city area) from encroachment by planting trees whilst they wait for increases in land values. Another reason is that plantation crops are quite remunerative and the city provides an assured market; these factors helped increase the area under plantation. It is also favoured

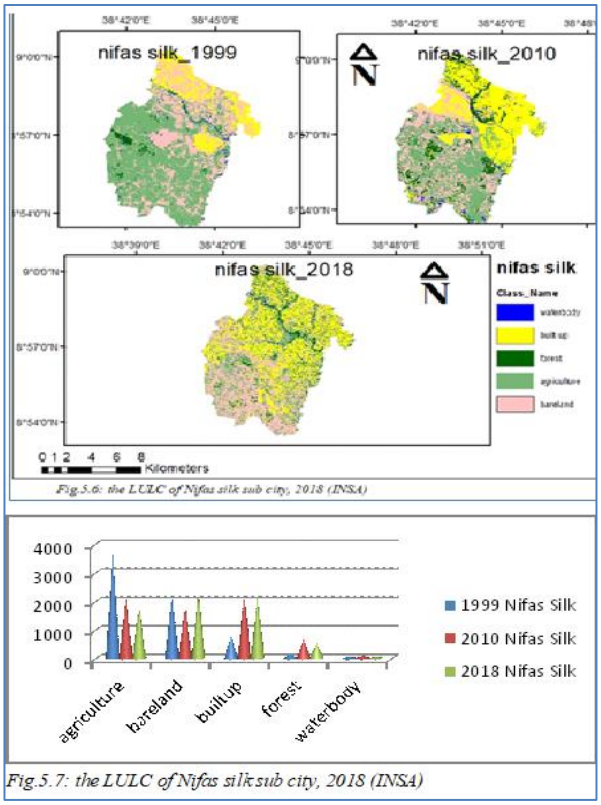


*Fig.5.6: the LULC of Nifas silk sub city, 2018 (INSA)*

*Fig.5.7: the LULC of Nifas silk sub city, 2018 (INSA)*

over crop cultivation in and around the city region because more care and protection are necessary. This is mainly in the central part of the city and along the major roads. Interestingly, the area used for recreational purposes, utilities and services (categorized as "other") is almost negligible in the study areas, which indicate that little attention is paid to these facilities despite the significant increase in population. The three Sub-cities have recorded a significant increase in the built-up area mainly due to population growth and development in the secondary and tertiary sectors. But this expansion has been haphazard and unplanned, and even the most recent residential areas are unplanned. This has contributed to severe road traffic congestion and overflowing drains. Significantly, despite the growth in population and the increase in the built-up area through the transformation of urban agricultures to build up areas, there has been little change in utilities and services in the city. It is evident from the table 5.5 that the city is expanding mainly to the north-east and south-east, where the study areas are located. The spatial analysis clearly demonstrates that Addis Ababa is among the fastest growing cities globally due to rapid population growth and rural-to-urban migration. Rapid urbanization which is often characterized by the expansion of urban areas into peri-urban areas leads to conversion of various land use and land cover (LULC) classes including agricultural land to urban uses. Figure 5.1 below unveils that the agricultural land has got abruptly transformed to built-up areas as the changes being illustrated on the map.

Furthermore, the consequence of the rapidly expanding urban systems is the urban encroachment into valuable agricultural and forest lands and therefore affecting the resilience of social-ecological systems. The loss of prime agricultural land to urbanization and associated urban growth can cause problems such as air pollution, competition for water, and conflicts over farm practices and the associated decline in agricultural productivity. Figures 5.2, 5.3, and 5.4 are clearly illustrating that the rate of urban expansion has been reported to be highest in Akaki, Bole and Nifas Silk Lafto respectively. With this regard, there is documented evidence that indicates the loss of agricultural lands to urban development in other parts of the City Administration. In Addis Ababa, the estimated extent of agricultural land lost to urban between 1999 and 2018 amounted to 8,333.17 hectares transformed to built-up areas. This is the manifestation that urban agriculture is not being considered as an integral component of structural planning and lands use planning as being illustrated on the maps below.

Furthermore, the capacity for integration of different data sets brings the potential for comparison of community generated information alongside formal research survey data. For example, in exploring existing land uses and area boundaries by identifying areas of conflict and potential future land use development being transformed to built-up areas within 1999 to 2018. It describes how GIS has assisted in visualizing the spatial transformation from urban vegetable production areas to built-up areas in each sub-city in Addis Ababa as being illustrated on the LULC maps below, The above figure 5.4 above clearly demonstrates that the areas are unplanned and eaten by Urbanization. It also illustrates the spatial transformation of Urban Agriculture to built-up areas within 20 years period. This clearly unveils that less attention has been given for urban agriculture as an integral components of land use planning , in terms of urban planning perspective (see figure 5.5 above for more). As discussed above, in Addis Ababa urban population growth is exerting more pressure on the agricultural lands in the peripheries of the city administration, leading to accelerated land use change. This might also be due to the fact that the majority of rural migrant workers preferring to live in peri-urban areas to engage in farming for survival. Based on the fact that majority of the rural-to-urban migrants are poor, reports indicate that they likely to settle in peri-urban areas where the cost of living is lower and attainment of a home is much more quickly than in the completely urban areas. Peri-urban areas also attract low-income urban residents pushed out by increasingly high costs of living in urban centres and middle-class urban people seeking a more rural lifestyle or cheaper land to establish their residence. As a consequence, the rural-to-urban migration affects urban agriculture by increasing the population in the receiving areas, usually peri-urban areas, which could lead to the conversion of part of agricultural land to settlement and hence reduce food production. Unemployment rates are increasing over time

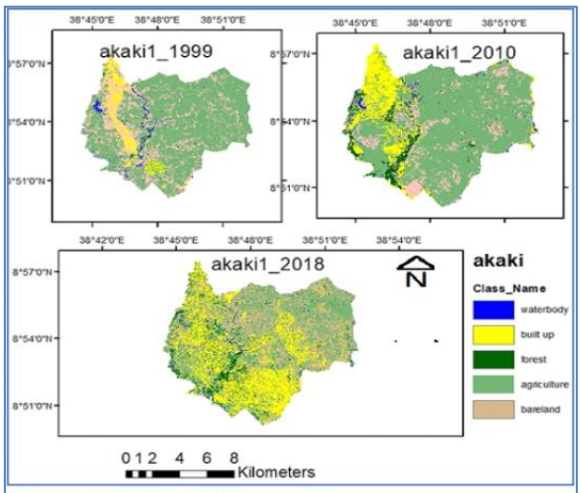



*Fig.5.9: the LULC of Akaki sub city*

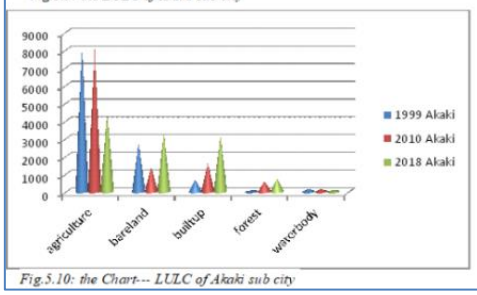



*Fig.5.10: the Chart--- LULC of Akaki sub city*

from 10 % in 2010, to 20% in 2021.

Therefore, the LULC change maps as indicate on figure 5.4, 5.6 and 5.7 that the unprecedented rate of urbanization and the sprawling pattern of development have resulted in the quick disappearance and/or total alteration of fertile agricultural lands in urban and peri-urban areas in the study areas, Akaki, Bole and Nifas Silk Lafto Respectively. It was estimated that approximately 19,000 hectares of land in the sub-cities would be converted into various land uses/development between 1999 and 2021. Such loss could be due to urban settlement and sprawling which result in the outward expansion of built-up areas beyond visible and invisible city borders into green areas mainly used for farming. Urbanization in Addis Ababa is altering traditional livelihood strategies and displacing agricultural land uses in many areas opined that population growth rate in both urban and rural areas is not commensurate with the quantity of land supply. Expansion of cities affects the areas surrounding them (i.e., the suburbs) by altering the natural resource base

and converting vegetal land cover to new uses, thus challenging the environment and dwellers' livelihoods.It is obvious that urban agriculture is inevitably linked to urban planning and management. Making cities pleasant, liveable places, where resources and the necessities of life are accessible to all citizens, are issues of concern to urban planning professionals. Because urban planners realize these aims through environmental control and the development of desirable land-use patterns, they can influence the availability, accessibility and usability of land (all key issues for Urban Agriculture). Conversely, that Urban Agriculture can provide solutions to some urban planning goals is becoming better recognized. The Urban Agriculture tide is on the rise, and cannot be forced back. Because of its inevitability, Urban Agriculture must be addressed by urban land-use planners and managers.

However, the existing situation vividly demonstrates that less attention has been given to urban agriculture as an integral component of the land use planning in the study areas (see figure 5.4, 5.6, and 5.7 respectively).

Another important feature of the city's land use change is the large increase in the amount of bare land. The northeastward and southeastward urban expansions are mainly residential and have caused losses to existing plantations, horticulture and crop production. Similarly, city growth towards the east has been curtailed by the restricted area. Recently, rapid urban expansion has been taking place along the route to Adama and Dessie road in a northeast and south-easterly direction, and some major industrial parks have developed. Some unplanned residential areas surround these industries and others have emerged in the south-east. Most of these developments have taken place on bare land. To the north-east, along Laga-Tafo road, ribbon-like urban development is taking place. This is marked by small industrial units and, in-between the built-up areas, bare land has developed. In the central part of the city, along the main roads, there has been a significant increase in the commercial area due to the conversion of unplanned residential areas into markets. Despite significant increases in the commercial and industrial land use classes; these still occupy only 7 and 9 per cent, respectively, of the total study area. The expansion of the residential area of almost 75 per cent between 1999 and 2018 was noted above. Another feature of urban land use distribution in Akaki is the 12 per cent land area lying bare for future urban construction. At present, this land is used neither for urban development nor for agricultural purposes as the landoccupiers await increases in land values.

However, there are opportunities for urban planners sympathetic to Urban Agriculture to help create circumstances that are more permissive for Urban Agriculture, and to identify and facilitate access and use of land resources. Traditionally, urban planners have based planning policy recommendations on studies of the urban geography, demographics, land use and economy. If Urban Agriculture is identified as a sector worthy of study, it can gain greater attention and response in policy and receive more resources. Land usable for Urban Agriculture may be identified through linking land data sets with available services and facilities. Identifying or freeing land that is available and accessible may be assisted by clarifying and formalizing land use and land tenure arrangements, or redistributing available lots to those in most need. Informally, planners can assist farmers by alerting them to urban land developments or alterations, or land availability, and promoting communication between land occupiers and urban farmers. However, planners can make the strongest formal contribution through policy reform, through presenting new ideas about the urban area and appropriate urban activities, and overcoming their own biases against Urban Agriculture to consider as integral parts of land use planning in City Structural Plan.

### 3.1.3.3 Urban Agricultural Land Transformation in the study areas

Land is in a continuous state of transformation as result of various natural and human-made processes. The study of land transformation requires a comprehensive understanding and monitoring of all the factors which cause it. During the study period, case study sub-cities not only expanded in size but there was also a significant interchange of land between land use classes. Table 5.3, which was prepared using GIS techniques, shows which kinds of land use changes were responsible for land transformation as indicated below. As being explained in the literature review and the analysis results unveil that Addis Ababa's, urbanization process goes along with increasing urban poverty and polluted environment, growing food insecurity and malnutrition, especially for children, pregnant and lactating women; and increasing unemployment. Urban agriculture represents an opportunity for improving food supply, health conditions, local economy, social integration, and environmental sustainability altogether. Urban agriculture is present throughout the world in a diversity of farming systems. Urban dwellers ranging 25–30 % are involved worldwide in the agro-food sector. No exception for Addis Ababa that facts and figure clearly indicate, urban agriculture will gain in recognition for its benefits and services because urban population and rural–urban migration are increasing in the City Administration.

On the other hand, Urban agriculture favors social improvement since the poor's spend up to 85 % of their income in food purchase and most urban farmers belong to poorest populations. Sociologically urban farming favors both social inclusion and reduction of gender inequalities, as 65 % of urban farmers are women globally, however not more than 14% of women are farmers in Addis Ababa. Urban agriculture has ecological benefits by reducing the city waste, improving urban biodiversity and air quality, and overall reducing the environmental impact related to both food transport and storage. However, the rate of urban morphological transformation of urban agriculture to other land use is very high from 2006 to 2011 as indicated table 4.6.below. The production of horticultural goods shows the main benefits of urban agriculture. Fruit and vegetable crops give high yields, a more efficient use of agricultural inputs, high added value, and rapidly perishable products that can easily substitute the rural production in the local market. Urban horticulture is the most competitive branch of urban farming due to the high cost of urban land and with the need of high water- and fertilizer-use efficiency. Traditional urban horticulture systems are classified in four types: allotment and family gardens, simplified extensive systems, shifting cultivation, and intensive systems. Author describes also innovative systems including organoponics and simplified soilless cultures.

| Primary UMTs | 2006 | | 2011 | | Change between 2006 & 2011(ha) | Rate of change (%) |
|---|---|---|---|---|---|---|
| | area (ha) | Area (%) | Area (ha) | Area (%) | | |
| Agriculture | 19,639.4 | 37.8 | 14,920.3 | 27.6 | -4719.1 | -24.0 |
| Vegetation | 7559.2 | 14.5 | 7616.1 | 14.1 | 56.9 | 0.8 |
| Minerals | 376.0 | 0.7 | 191.7 | 0.4 | -184.3 | -49.0 |
| Recreation & conservation | 131.9 | 0.3 | 181.4 | 0.3 | 49.5 | 37.5 |
| Transport | 1768.9 | 3.4 | 2426.9 | 4.5 | 658.0 | 37.2 |
| Utilities & Infrastructure | 317.9 | 0.6 | 349.4 | 0.6 | 31.5 | 9.9 |
| Residential | 16,568.5 | 31.9 | 17,978.1 | 33.3 | 1409.6 | 8.5 |
| Community Service | 858.4 | 1.7 | 759.9 | 1.4 | -98.5 | -11.5 |
| Retail | 180.0 | 0.3 | 261.2 | 0.5 | 81.2 | 45.1 |
| Industry & Business | 1866.8 | 3.6 | 2770.3 | 5.1 | 903.4 | 48.4 |
| Bare Land | 2695.0 | 5.2 | 4506.6 | 8.3 | 1811.6 | 67.2 |
| Total | 51,962 | 100 | 51,962 | 100 | | |

*Table 4.6: Changes in detailed level UMTs between 2006 and 2011: Worku', 2020*
*Source: Worku, 2020*

### 3.1.3.4 Land use land cover class (LULC) Changes and Urban Agriculture

The table below clearly indicates that the urban agriculture is spatially ***shrinking from 7176 ha*** in 2003 to ***996.1ha by 11.9%*** in the city administration. Therefore, this figures calls for ***re-planning the city*** by focusing urban agriculture as an integral component. One of the key informant Saida Bekri is also confident like her neighbor Shibeshi that she can benefit from the backyard farming activity. She says that the urban agriculture is not only an issue of food-security but it is also a matter of connecting with nature and the blissful spirit of her family's farming background.

*Table 4.8: Land use land cover of urban green infrastructure in 2003 and 2016*

| **Urban green infrastructure and built-up area** | **2003** | | **2016** | | **Percentage of change** |
|---|---|---|---|---|---|
| | **Area/ha** | **LUP (%)** | **Area/ha** | **LUP (%)** | |
| Green | | | | | |
| Urban forest | 12,168 | 23.4 | 10,301.5 | 19.7 | −3.7 |
| River and river | 1144 | 2.2 | 4026.5 | 7.7 | +5.5 |
| **Urban** | **7176** | **13.8** | **996.1** | **1.9** | **−11.9** |
| Urban parks | 468 | 0.9 | 938.7 | 1.8 | +0.9 |
| Total | *20,956* | *40.3* | *16,262.8* | *31.1* | −9.2 |
| Built Up Area | 31,044 | 59.7 | 36,029.2 | 68.9 | +9.2 |
| Total Area | 52,000 | 100 | 52,292 | 100 | |

*Source: Azagew and Worku Environ Syst Res, 2020*

Therefore, the importance of transforming urban farming in our city as planning perspective is to combat our growing food demand as well as our on-going concerns around food scarcity due to recent droughts, and even the Covid-19 pandemic as a new normal, which limited production by delaying the recent harvest. On the other hand, the Ex-Deputy Mayor of Addis Ababa City Administration recently (2020) called on anyone with formal

education, or a passion for urban agriculture, to share ideas for urban farming. He promised to make land available to put these ideas into action. Most farmers in rural areas are unable to bring their perishable produce to the market because agents or middlemen are not picking them up due to fear of catching the virus. The disruption of the food chain has exposed the dependence of urban centers on food from rural areas, and the risk that this poses for increasing food insecurity ever. Hence, this could be taken as an opportunity to properly plan as integrated land use planning so as to maintain sustainability as urban agriculture in urban planning perspective. Therefore, to ensure that these emerging initiatives as a new normal are sustainable in the long run, it is important to link the government's efforts with experts in urban agriculture, as well, as farmers and the youth. If residents use the space they have to grow different edible vegetables it will ease the pressure to put food on the table in any difficult situations as edible city solution, edible urbanism principle.

#### 3.1.3.5 Drivers of Urban Agriculture in relation to Urban Planning

**Drivers in integrating Urban Agriculture in to Urban Planning**

The above ***analysis result (table 4.9 above)*** unveils that many changes were required to overcome the constraints that were in place. Against the identified constraints, the gardeners suggested solutions that might drive the development of Urban Agriculture. First, regarding the land access and tenure insecurity, possible solutions included the promotion of inter-communal partnership to provide cities with large areas for Urban Agriculture (50%), the enhancement of ***urban planning mainstreaming zoning*** (30%), and negotiating with public and private institutions to lease their open spaces for an extended period (20%). Regarding the lack of financial capital, farmers suggested to adapt loan access conditions (collateral and deferred period for reimbursements) to the agricultural sector (40%), to reduce the financial institutions' interest rates (30%), and encourage cooperative formation between the farmers to access loans (25%), and others such as the creation of an *agricultural bank* (6%) to be an integral component of the land use plan. Therefore, the analysis results and review unveil that urban planning is currently adopting different progressive approaches, such as ***e****cological models, new urbanism, collaborative and communicative models,* city perspectives and new life models. Each of these provides specific ways and connections that could facilitate and stimulate the integration of urban agriculture. Planning for urban agriculture needs to go through a three-step process as being explained in the review. 1st step is to ensure legal provision through policy formulation which delivers the planning policies, regulations and legislation as the framework to regulate and guide urban land use for agricultural activities. 2nd step is to establish an official body to reinforce polices programs, ***strategies and action plans***. The 3rd step is to identify, allocate and designate land according to availability and accessibility guidelines into structural plans and land-use zoning with provisions for ***ensuring tax incentives***, tariffs and promotion of urban agriculture.

The most important issue for urban food production is its official recognition as ***urban land use, security of tenure,*** as well as access to land and other resources as the drivers of Sustainable urban agriculture. ***Access to land*** is especially relevant for marginal and minority groups, and this could be mitigated by offering more publicly-owned open space for community gardens. As not all city areas are well-suited for growing food, availability of land based on ***biophysical factors*** for ***urban agriculture*** could be identified by developing land-use inventories and land suitability analyses using geographic information system (GIS) technologies. Access to sunlight is an important factor to be considered, particularly within the context of new construction and tree

growth. Water supply is also a consideration not only for crop production but also to clean and even process fruits and vegetables on site. Further considerations include resource availability, transportation systems, market connections and waste disposal systems. A conceptual framework for integrating urban agriculture into planning and enhancing city sustainability. It builds on the four pillars of the sustainability concept, namely, ***social, economic, ecological and spatial,*** allowing urban agriculture to flourish in the city. This requires ***land use and planning*** to come together to address current sustainability challenges, respond to the factors that are already driving the presence of ***urban agriculture in the city***.

**Understanding planning institutions, policy and decision making process**

In Bole Sub-City, almost all concerned Departments were involved in urban agriculture. Some of the Departments therefore have a representative who is part of the small scale enterprises on Urban and Peri Urban Agriculture in the outskirts. However, in Akaki, the main institutions are the associations, In the three sub-cities, there is no comprehensive plan or document on Urban Agriculture. It is however mentioned in part in the bye law of the Addis Ababa City Administration of 2019/20 which supports backyard farming. However, open-space farming requires permission from the City Administration Urban Agriculture Agency and Environment and Urban Forest Commission as well as health Bureau. This is to help ensure that the land is not polluted and prevent the consumption of contaminated food. The bye laws of the Addis Ababa City Administration do not support or prevent open space farming since its bye laws are not enforced. It is therefore clear that, the bye laws of AACA for instance is not to ban or promote urban agriculture but to ensure that they maintain good sanitary conditions in the City. Because it was not significant ***land use planning component in City structural Plan.*** The Laissez-faire ***style of urban planning*** is predominant in the City Administration. In Akaki, there is no bye law on urban agriculture. The AACA does not frown upon or encourage the practice of ***urban agriculture*** in the City as essential part of land use planning in the process of ***maintaining edible city solutions.***

**Recognizing and permitting urban agriculture**

Urban agriculture is considered only in as far as such urban planning includes some kind of 'green belt' concept as edible urbanism. Apart from earmarking such 'buffer' zones, urban planners tend to exclude agriculture from their terms of reference. Urban agriculture is not a distinct land use in the three sub-cities areas but considered as part of ill planned agriculture land use. Urban agriculture activities in the three sub-cities according to officials of Urban Agriculture Agency, and the City Administration Plan Commission are an informal‖ or illegal‖ activity. This is because it is not regulated by these institutions and monitored by them. The reality is that urban planners and other officials have no constructive ideas about agricultural activities within and around the city. Some of the officials think looking at the land value of lands in the urban centers and the waste water used it should not be allowed in and around the city center. They consider allotment vegetation and gardening as 'recreation', farms around the city as rural activities and officials who even recognize urban agriculture tend to see it as happening in future urban areas'.

**Locating urban agriculture activities**

Urban agriculture tends to be carried out on urban land that is not immediately needed or suitable for urban development. In Bole, Akaki and Nifas Silk sub-cities where major urban agriculture takes place are on undeveloped government lands. Other places include areas liable to (seasonal) flooding, areas zoned for public open space, road and railway reservations, speculative land (to fetch higher prices for urban development). It depends on the

determination of land Occupiers (including governments) to get the maximum surface areas for construction and to develop and maintain public open space (parks), whether little or much land remains for urban agriculture. Soils are not important as Urban Agriculture tends to generate 'man-made soils'. Almost by definition, markets are very near for Urban Agriculture.

**Understanding spatial land use planning practices for Urban Agriculture**

The main institution responsible for the preparation, implementation and monitoring of land use planning in the three Sub-Cities and the City as a whole is the City Administration Plan Commission and Urban Agriculture Commission. Land use (Layout) Plan or detailed planning scheme, zoning and site plans are the main tools used for spatial land use planning for urban agriculture. The Land use Plan indicates the various uses that the land can be put to. Zoning also gives the Sub-Cities the opportunity to determine the use of every land including urban agriculture. However, urban agriculture is not recognized as a land use category in the City Administration Structural Plan, categorized under environment in hided manner. It is supposed to be captured as part of the major land use which is agriculture. This is one major setback for integrating it into city development that has been recognized as poor side of Urban Planning perspective. Even though some form of guidelines exist guiding land development in the study areas, there is none on urban agriculture. The City Administration Plan Commission has provided some guidelines to be followed when developing a parcel of land for residential, commercial, industrial and education but this is silent on urban agriculture.

**Integrating urban agriculture into city development**

City development as conceptualized by the planning officer at the Bole and Akaki Sub-Cities refers to "a conscious effort to create harmony and cohesion between social, economic and environmental activities for sustainable living condition." The official also is perceived sustainable city development as "a city with vibrant economic activities, reliable infrastructural activities, clean environment and efficient social service delivery."

Interaction with the various institutions involved indicates that much education on the benefits and contribution of urban agriculture is needed. There is the need for research institutions and all concerned with Urban Agriculture to help sensitize policy makers, and all the institutions which can contribute to integrating urban agriculture into city development on its pivotal role. Although urban agriculture may be well known by policy-makers and planners, in many cases this knowledge does not automatically contribute in their recognizing urban agriculture as an important element of the city economy and land-use system. However, some city officials see urban agriculture as merely a left-over 'of rural habits, which is only temporary until the people accustom themselves to urban life, as a marginal activity with little economic importance, as a health risk and source of pollution that has to be removed. The trend analysis of urban Agriculture from 1999 to 2018 above have clearly unveils that the agricultural lands were occupied by building structure, and are manifestation of less attention for urban agriculture (See digital Maps for 1999, 2010 and 2018 as shown above.). For now, it will be difficult for city authorities in the three Sub-Cities to incorporate Urban Agriculture into its development agenda. The Land use plans or schemes that exist do not include urban agriculture as a land use category since it is still seen as a rural activity. Further, the Sub-Cities do not own lands that it can make available to the urban farmers to use. In Bole, Akaki and Nifas Silk all the major farm sites are undeveloped government lands which are not sustainable.

**Institutional Analysis for Urban Agriculture**

There are various institutions apart from the

City Plan Commission and Urban Agriculture Commission involved in urban agriculture in Bole, Akaki and Nifas Silk Sub-Cities in the City Administration. The key stakeholders that contributed immensely to the success of this study are the Plan Commission, Urban Agriculture Commission, Different Farmers Associations and Small Scale enterprises on Urban and Peri-Urban Agriculture, Federal of Job Creation and Urban Development Safety-Nets Agency. In AACA, different associations and Farmers, Federal of Job Creation and Urban Development Safety-Nets Agency and Urban Agriculture Commission on Urban and Peri-Urban Agriculture are the main institutions in charge of urban agriculture. It comprises of other Decentralized departments in each sub-cities, NGO(s), the media, research institutions and farmers among others.

**Addis Ababa Multi-stakeholder Forum on Urban Agriculture**

crucial aspect to consider is the wide range of stakeholders encountered in urban settings. Urban agriculture is taking place in a multi-sectoral environment and it is easy to miss some key stakeholders in a participatory process. The identification and involvement of different stakeholders is often driven by the underlying objective of the study, which often lies within a specific sector. It is very unusual to find vertical integration of study objectives across different sectors in the existing array of Urban Agriculture case studies inn the city administration. Key informants interview reveals that in order to overcome this limitation, multi-sectoral teams are important when working in urban settings, with ***"Rapid Visual Appraisal"*** exercises in study sub-cities in Addis Ababa. The wide range of stakeholders also contributes to the presence of conflicting interests and tensions between different stakeholders. External interventions may be used by certain stakeholder groups to strengthen their position by capturing the benefit flow and denying participation to other groups. Alternatively they may negotiate compliance with their wishes as a condition of benefit. To avoid this, the author has to adopt a position of ***"critical neutrality",*** a term used by author in the description of the ***Rapid Visual Appraisal approach***. The research approach used successfully in such a complex context should produce information which is relevant to different stakeholder groups, it should be transparent and participatory and easy to assimilate in order to allow people with different educational backgrounds to engage. Therefore, the Multi-stakeholder Forum on Urban Peri-Urban Agriculture was held in 2021 to respond to the need of Urban and Peri-Urban Agriculture and seek ways of integrating it into ***urban policies and planning*** through stronger participation of key stakeholders. This was organized by the Urban Agriculture and Food Security Commission in collaboration with the City Administration

### 3.1.3.6 Integrating Agriculture into Urban Planning

The Analysis Results and literature review unveil that ***urban planning*** is currently adopting different progressive approaches, such as ecological models, new urbanism, collaborative and communicative models, city perspectives and new life models. Each of these provides specific ways and connections that could facilitate and stimulate the integration of urban agriculture. An ***urban Planning perspective*** for urban agriculture needs to go through a three-step process. *The first step is to ensure legal provision through policy formulation which delivers the planning policies, regulations and legislation as the framework to regulate and guide* ***urban land use for agricultural activities***. *A second step is to establish an official body to reinforce polices programs, strategies and action plans*. The third step is to identify, allocate and ***designate land according*** to availability and accessibility guidelines into ***city plans***, structural plans and land-use zoning with provisions for ensuring tax incentives, tariffs and promotion of urban

agriculture.

Tools such as site plans, structural plans, local plans, neighbourhood plans and subject plans all serve to guide public safety, movement and transportation, community and individual health, and the use of public land. However, they do not specifically address food security. The most important issue for urban food production is its official recognition as ***urban land use,*** security of tenure, as well as access to land and other resources. Access to land is especially relevant for marginal and minority groups, and this could be mitigated by offering more publicly-owned open space for community gardens. As not all city areas are well-suited for growing food, availability of land based on biophysical factors for urban agriculture could be identified by developing land-use inventories and land suitability analyses using ***geographic information system (GIS) technologies***. A conceptual framework for integrating urban agriculture into planning and enhancing city sustainability. This requires ***land use and planning*** to come together to address current sustainability challenges and respond to the factors that are already driving the presence of urban agriculture in the city as ***edible city solutions*** as ***edible urbanism principle***. Furthermore, observations and key informants interview witnessed that Urban and peri-urban agriculture can have negative effects (i.e., ecosystem disservices) to the city ecosystem. So, urbanists and landscape planners have promoted urban agriculture and food systems with ***little attention to ecosystem disservices***. Considering the Sustainable Development Goal of ending hunger and all forms of malnutrition by 2030 as being explained in the review, as well as the food revolution of feeding up to ten billion people, edible urbanism is a supportive component in reaching these goals. In this comment, ***edible urbanism*** via an ***edible green infrastructure*** (EGI) approach is examined against current urbanistic concepts that have common food production systems in Addis ***Edible urbanism integrates*** three main principles of sustainability by fulfilling ***food security, resilience and social inclusion.*** It links site-specific, best-practices by integrating (***edible green infrastructure)*** EGI-based governance with modernised food production techniques.

In accordance with ***Sustainable Development Goal*** to ***"end hunger, achieve food security, improve and promote sustainable agriculture,"*** As being explained in the literature, there is growing consensus by which this fundamental human need can be sustainably secured for all. Addis Ababa City Administration has started to implement initiatives to re-design food provisioning. ***Therefore, recommendations for future edible urbanism are established.*** See figure 4.13 above: ***Planning and Design Urban Agriculture for sustainable Landscapes. It is the*** *Conceptual framework Model for integrating urban agriculture into sustainable city landscapes.* On the other hand, Planting different ***Fruits and Vegetables at parcel or plot level*** and excercising ***Balcony agriculture*** at condominium and apartment builfdings are very essential to maintain food security***. This is typical example of tronsforming Petropolis to agroplis landscapes in the inner city.***

### 3.1.3.7 Design & Planning of Edible Landscapes

The focus group discussion and the interview results transcribed shows varieties of assessments for planning edible landscapers in the three sub-cities including ***Site Assessment****:* analyzing physical attributes such as site location & adjacencies; growing region, climate, & microclimate; and resource availability such as water, soil, and solar energy. ***Client/User Assessment***: understanding the needs/desires, the existing or intended patterns of use, and the maintenance capabilities of the client/users. And ***Programmatic Assessment***: recognizing the functions attributed to the landscape other than food-growing.

### 3.1.3.8 Land Constraints and Planning Factors that Perpetuate Constraints to Urban Agriculture

Understanding how urban planners effect community land-use changes, it is possible to understand how urban planners can specifically facilitate and support Urban Agriculture. The practice of farming in cities faces both inadvertent and deliberately-imposed constraints, specifically related to land. These constraints can be linked directly or indirectly to planning and management interventions in urban and peri-urban areas, and consequently fall within the jurisdiction of urban planners and managers. The planning institution, policy framework and cultural norms and attitudes of planners, politicians and the public each can impose or perpetuate these constraints. The presence or absence of these factors can collectively be described as the "degree of support" a city administration offers ***Urban Agriculture.***

### 3.1.3.9 Constraints to Urban Agriculture: Issues Pertaining to Land

Key informants and focus group discursions transcribed show, While not all urban agriculture activities require land (for example, land may not be of primary concern for zero-grazing livestock-keeping, mushroom farming and food-processing activities), land is a crucial factor for many ***Urban Agriculture*** horticultural and cropping activities. As it has been observed in the literature: *The existence, prevalence and growth, if it occurs, of food production in urban environments is seen as being predominantly about the use of space in densely settled locations... With the exception of small numbers of animals kept in buildings and backyard plots, land is the fundamental resource required for farming, and issues of zoning, access and tenure are seen as critical to the contributions it may be able to make to household food security and to the livelihood composition of the urban poor.* ***Key issues for urban farmers are the availability of, access to, and usability of land.***

### 3.1.4 Planning Factors that Impose or Perpetuate Land Constraints

What is the role of the planning policy context and players in imposing or perpetuating these land- related impediments to Urban Agriculture? It has been observed that Planners do not currently plan for urban land to be used for food production... Community-based projects such as gardens must be seen as viable alternatives to the current system that cannot ensure food quality, accessibility, or affordability. However, in order to develop effective and sustainable alternatives, there are a range of policies, plans and initiatives which Addis Ababa City governments must endorse and implement. Planners and the planning policy context can impose and perpetuate the identified land constraints in three main ways: First: Through the institution of planning, both the institutional structure (that is, the organization of and relationships between people who plan at local and regional levels of government) and the institutional capacity (resources and will) to effect changes, Second: Through the policy framework (that is, the products of planning: legislation, planning policy and by-laws); and Third: Through cultural norms and attitudes of the key players in the planning process: planners, decision makers, and the public.

### 3.1.5 Planning Institutions

#### 3.1.5.1 Responsibility for Urban agriculture

Without an agency or organization with specific responsibilities to regulate, aid, support, monitor and facilitate research on Urban agriculture, Urban agriculture "falls between the cracks" of typical municipal sectorally-organized government, or is subject to confused and conflicting jurisdiction. It has been asserted the need for adequate governance ("where 'governance' refers to the exercise and sharing of power") and institutional capacity to carry out effective environmental planning and management, and provide urban services, public education, and remain accountable to the public, an assertion that carries over to Urban

agriculture. Respondents from the survey of urban planning professionals illustrated the potential confused and conflicting responsibility for urban agriculture. In the surveyed sub-cities, a wide range of participating agencies from different levels of government share responsibility for different stages of urban agriculture. Of the sub-cities surveyed, most had 2 or more parties responsible for policy development, identifying appropriate locations, registering or permitting, or monitoring urban agriculture, or providing extension services for urban agriculture.

#### 3.1.5.2 Regulating and Supporting Urban agriculture

Different officials from the study sub-cities informed that the ability of and opportunity of the planning institution to effect changes in communities collectively may be considered "institutional capacity." How supportive the institutional capacity is of Urban agriculture may be measured by the human and other resources devoted to Urban Agriculture, for such things as enforcing policy (regulating Urban agriculture) and providing programs and extension services (supporting Urban agriculture) as determinant component of land plan of the city administration as the perspective of Urban Planning..

#### 3.1.5.3 Keeping Land and Agricultural Records and Statistics

Key informants interview and focus group dictation transcribed unveil that Land management in the study sub-cities is hampered by a lack of clear records of land ownership or land tenure. Such records can help planners distinguish clearly between public and privately occupied lands, determine property values and rents, and track who owns and who uses parcels of land. Without records, land transactions are difficult to control. In the sub-cities surveyed, statistics about urban agriculture are rarely collected. Addis Ababa keeps limited statistics and records; only in the peri-urban three sub-cities, did one respondent claim that statistics are kept on agriculture extension efforts, and of farmers associations and cooperatives. This lack of record-keeping implies that planners either have no access to information about Urban Agriculture in their community or do not use or seek out information on urban farming as a basis for developing planning policy. Record-keeping may be complicated by different understandings of what is meant by ownership, tenure and use. Ideas of distinct land ownership, and use with compensation (e.g., rents paid), may be foreign concepts to people who reach agreements about land use based on first use and continued occupancy.

#### 3.1.5.4 Providing Support, Services and Financing

The FGD Transcribed indicates that the provision of information services, agricultural inputs, and programs that lead to agricultural demonstration projects, or in other capacities, to providing credit and loans to urban farmers are all further demonstrations of institutional capacity to encourage and promote Urban Agriculture. Many of the survey respondents identified an absence of support, programs, services and financing and credit being offered to farmers as key constraints to why Urban Agriculture does not occur or to why it is not more prevalent. Certainly, although planners may not be in a position to offer or administer these services, they are in a position to identify the need for such services, and to rally support.

### 3.2 Synthesis of Planning-Factors: Categorizing City Support for urban agriculture

The literature review and informants interview show that the links between urban agriculture and urban planning need to be conceptualized, or made apparent, and that more thought needs to be given about the role of urban agriculture in sustainable communities. The author has offered here that a way to link the urban planning constraints and implications for the level of support that a city offers for sustainable urban agriculture. Determining this "level of support" is proposed for two reasons: 1) to assist community leaders and planners in

understanding constraints to urban agriculture in their own local areas, and 2) to assist in research on planning and urban agriculture, by providing researchers with a common way to talk about local challenges in terms of urban agriculture.

### 3.2.1 Determinants for the sustainability of Urban Agriculture in the Perspective of Urban Planning

The sustainability phenomenon is regarded as an important aspect of life. In the urban agriculture domain, sustainability and farmers productivity in particular, plays fundamental role in determining the perceived success of urban agriculture. Identifying and satisfying the needs of urban farmers is critical for the existence and competitiveness of the food security and sufficiency in the study sub-cities of Addis Ababa City Administration. It has been added greater impetus to the importance of urban farmers' good feeling, perceptions and satisfaction, to the effect, that it is now essential for the efficient production of crops and vegetables in terms of sustainable agriculture in urban planning perspective. In urban agriculture, farmers as producer's satisfaction has remained an elusive and challenging issue for some considerable time. The study results unveil somewhat surprisingly it is an aspect of food production that until now has been given little priority. Unsustainability is widely experienced by farmers in agriculture sector and may be caused by many aspects but is largely attributable to overrunning input costs, delayed completion, inferior quality and less commitment of government authorities in assisting farmers. The study results also revealed that farmers' strategic decisions may also have an impact on their own productivity levels. Decisions such as choosing an appropriate inputs, access to clean and reliable water, access to farm land and tenure security, lack of considering farms land in ***city structural plan*** can result in poor farming performance and ultimately lead to ***unsustainability of urban agriculture.*** It has also been argued that, although urban agriculture is unique in some aspects, there were 13 broad dimensions of sustainable urban agriculture that are applicable universally, which include: *farm land as integral component of Land use Plan, Public Authorities commitment, Land access and tenure Security, Planning enforcement for Urban Agriculture, Official support for city planning, Technical support service for UA, Access to Clean and Reliable water supply, Financing Opportunities, Access for agricultural inputs, Access to Power generation, Reliable market access, Balcony agriculture* and *strong Institutional setup.*

### 3.2.2 Logistic Regression Result on the Determinants of Sustainable Urban Agriculture in Urban Planning Perspectives

#### 3.2.2.1 Tests of Associations

From the result of binary logistic regression model the following interpretations are clearly demonstrates that -.013, -.009, -0.049 and -.010 are the decrease in log odds of internal customers in relation to *farm land-Land use Plan in the city plan, Public Authorities commitment, Land access and tenure Security, Planning enforcement for Urban Agriculture* respectively with respect to those of who feel sustainable, neither feel sustainable nor unsustainable, farmers overall feeling sustainability in the reliable farmers productivity; the odds ratio 0.989, 0.992, 0.979 and 0.99 means that the odds ratio of *farm land-Land use Plan in the city plan, Public Authorities commitment, Land access and tenure Security, Planning enforcement for Urban Agriculture* have decreased by factors of 0.989, 0.992, 0.979 and 0.99 respectively with respect to those of who have felt sustainable, neither felt sustainable nor sustainable, Farmers who have felt sustainable compared to those who are feeling sustainable with Reliable productivity ensuring system responsive to ever changing farmers' requirements and expectations by keeping other variables constant.

0.0095, 0.092, 0.3423, 0.053, 0.0386, 0.0511, 0.03, 0.0423 and 0.107 are the increase in log odds of farmers as producers with respect to those of who medium and high on farmers overall feeling of sustainability in relation to Reliable production ensuring system responsive to ever changing farmers' requirements and expectations with respect to *Official support for city planning, Technical Land support service for UA, Access to Clean and Reliable water supply, Financing Opportunities, Access for agricultural inputs, Access to Power generation, Reliable market access*, respectively; the odds ratio 1.0115, 1.0983, 1.411, 1.066, 1.0456, 1.031, 1.047, and 1.112 means that the odds of Farmers feeling of sustainability in relation *Official support for city planning, Technical Land support service for UA, Access to Clean and Reliable water supply, Financing Opportunities, Access for agricultural inputs, Access to Power generation, Reliable market access* respectively have increased by factors of 1.0115, 1.0983, 1.411, 1.066, 1.0456, 1.031, 1.047, and 1.112 respectively with respect to those of farmers overall feeling sustainability of food security and production who were medium and high level farmers with Reliable productivity ensuring system responsive to ever changing farmers' requirements and expectations. -.013, -.009, -0.049 and -0.010 are the decreased in log odds of professionals as external customers with respect to those of who are facing weak *farm land-Land use Plan in the city plan, Public Authorities commitment, Land access and tenure Security, Planning enforcement for Urban Agriculture* respectively; the odds ratio 0.989, 0.992, 0.979 and 0.99 means that the odds of urban farmers good feeling and perception have decreased by factors of 0.989, 0.992, 0.979 and 0.99 with respect to those of who were weak *farm land-Land use Plan in the city plan, Public Authorities commitment, Land access and tenure Security, Planning enforcement for Urban Agriculture* keeping other variables constant.

0.0095, 0.092, 0.3423, 0.053, 0.0386, 0.0511, 0.03, 0.0423 and 0.107 are the increase in log odds of farmers as producers of crops and vegetation with respect to those of who medium and high on Reliable farming performance ensuring system responsive to ever changing farmers' requirements and expectations; the odds ratio 1.0115, 1.0983, 1.411, 1.066, 1.0456, 1.031, 1.047, and 1.112 means that the odds of farmers as producing agents feeling sustainable have increased by factors of 1.0115, 1.0983, 1.411, 1.066, 1.0456, 1.031, 1.047, and 1.112 with respect to those of who were medium and high on *official support for city planning, Technical Land support service for UA, Access to Clean and Reliable water supply, Financing Opportunities, Access for agricultural inputs, Access to Power generation, Reliable market access* respectively compared to those who are low on urban farmers feeling of sustainability for keeping other variables constant.

| **Predictory Variables/Determinants** | **B Av** | **Wald** | **Sig.** | **Exp(B) Average** |
|---|---|---|---|---|
| Farm land as integral component Land use Plan | .0095 | 0.666 | 0.4265 | 1.0115 |
| Public Authorities commitment | -.013 | 0.453 | 0.567 | .989 |
| Tenure Security | .092 | 1.544 | 0.410 | 1.0983 |
| Land access | .3423 | 17.8 | 0.000 | 1.411 |
| Planning enforcement | .053 | 16.087 | 0.050 | 1.066 |
| support for city planning | .0386 | 1.9342 | 0.2748 | 1.0456 |
| Technical support | .0511 | 0.953 | 0.430 | 1.0456 |
| water supply | 0.03 | 0.285 | 0.694 | 1.031 |

| Predictory Variables/Determinants | B Av | Wald | Sig. | Exp(B) Average |
|---|---|---|---|---|
| Financing Opportunities | -.009 | 0.345 | 0.630 | 0.992 |
| Access to inputs | -.049 | 4.652 | 0.021 | 0.979 |
| Access to Power | .0423 | 1.134 | 0.301 | 1.047 |
| Market access | .107 | 1.543 | 0.021 | 1.112 |
| Balcony agriculture technique | -.010 | 0.023 | 0.910 | 0.99 |
| Constant | -5.623 | 212.037 | 0.000 | .004 |

*Table 4.11: Logistic Regression Analysis Results*
Notes: (3) *** Level of significance at p<0.05,
Source: Logistic Regression analysis result, SPSS, 2021

Increasingly, the regression result is also interpreted that table 5.3 above displays the odds ratios derived from the logistic regression's coefficients. The odds ratios can be interpreted as the probability of the dependent variable occurring (Farmers expectations and sustainability upon reliable production of ensuring farmers performance) or farmers overall feeling of sustainability) due to the increase in one unit of the corresponding independent variable. Based on the odds ratio result, it is also predicted that if Public Authorities commitment in planning increases by one unit, farmers level of productivity in urban agriculture are 1.0115 times more likely to be produced at level of significance (p>0.05). If ***financing opportunities*** increases by one unit, farmers good feeling and urban agriculture sustainability's are 1.411 times more likely to be increased at level of significance (p <0.05). If land access and tenure security increase by one unit, the sustainability of urban agriculture is 1.047 times more likely to be sustainable at level of significance (p >0.05). If access to water supply for irrigation increase by one unit, farmers overall feeling of sustainability are 1.112 times more likely to be increased but not statistically significant. The determinants of sustainable urban agriculture in relation to planning perspectives in their order of importance based on the odds ratio result from the most important to the less important is as shown in the table 5.3 above. Order of importance for professionals satisfaction as external customers based on odds result from most important to less important is *farm land-Land use Plan in the city plan, Public Authorities commitment, Land access and tenure Security, Planning enforcement for Urban Agriculture, official support for city planning, Technical Land support service for UA, Access to Clean and Reliable water supply, Financing Opportunities, Access for agricultural inputs, Access to Power generation, Reliable market access*

Furthermore, the Logistic regression analysis result confirmed that the probability of getting better feeling of sustainability as farmers efficient utilization production is being revealed by increasing contributory factors or dimensions of sustainability of urban agriculture as ***edible city solutions*** including *farm land-Land use Plan in the city plan, Public Authorities commitment, Land access and tenure Security, Planning enforcement for Urban Agriculture, official support for city planning, Technical Land support service for UA, Access to Clean and Reliable water supply, Financing Opportunities, Access for agricultural inputs, Access to Power generation, Reliable market access* as well**.**

Therefore, improvement in each dimension of urban agriculture sustainability will improve the farmers level of production food security of

the city administration as ***edible city solutions.*** Please look at the relationship between the response variable (dependent) and predictory variables (independent) in the ***derived model below:***

$$\theta = \ln\left(\frac{P}{1-P}\right) = \frac{e^{-5.623+.0095X_1+.092X_2+.3423X_3+.053X_4+.0386X_5+.0511X_6+.03X_7+.0423X_8+.107X_9}}{1+e^{-5.623+.0095X_1+.092X_2+.3423X_3+.053X_4+.0386X_5+.0511X_6+.03X_7+.0423X_8+.107X_9}}$$

$\Theta=\ln(P/1-P)=$
$5.623+0.0095X_1+0.092X_2+0.3423X_3+0.053X_4$
$+0.0386X_5+.0511X_6+.03X_7+$
$0.0423X_8+0.107X_9\Theta =$

Probability of the farmers agrees that are felt sustainable in the agricultural production improvements, also could be taken farmers overall feeling of sustainability in terms of Reliable food security as ensuring system from the logistic regression analysis result. So, changes in each of the predictory variables (Xs) might change the other variables, or their P-values are greater than the common alpha level of 0.05, which indicates that they are not statistically significant to the model. This doesn't mean that they are not correlated with response variable; hence, this is for only statistical model relationship. So, all the variables including *farm land-Land use Plan in the city plan, Public Authorities commitment, Land access and tenure Security, planning enforcement for Urban Agriculture, official support for city planning, Technical Land support service for UA, Access to Clean and Reliable water supply, Financing Opportunities, Access for agricultural inputs, Access to Power generation, Reliable market access* are found to be significant. Therefore, the changes in *official support for city planning and Technical support service for UA* might change farmers' overall perception of sustainability and the likes in the edible city solutions of the city administration.

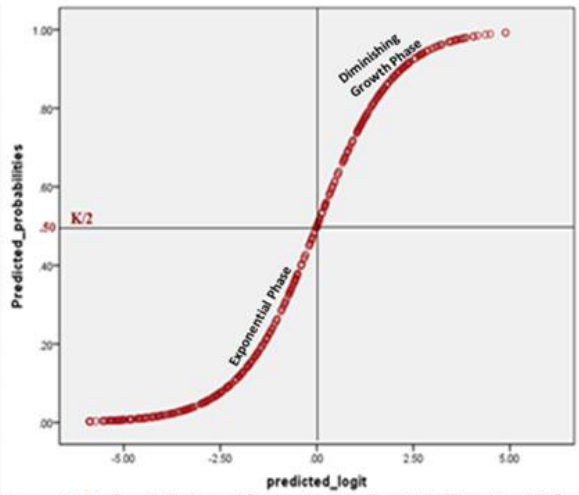



*Figure 5.18: logistic sigmoid function-or Logistic Function S-Curve*

responsive to ever changing farmers' requirements and expectations (probability / sustainable **(yes)** = 1, unsustainable **(no)**=0) as edible city solutions. The assessment on the other hand found main 13 variables including Farm land as integral component Land use Plan(X1), Tenure Security(X2), Land access(X3), Planning Enforcement for UA(X4), Market access (X5) access(X6), Access to Water Supply(X7),, support for city planning(X8), and technical support service(X9), are variables that are statistically significant at level of significance P-value (P<0,05)

### 3.2.2.2 Logistic Function Curves (Probit and Logit)

On the other hand, The logistic regression analysis result has also unveiled that a logistic growth curve is an S-shaped (sigmoid) curve (Predicted Probabilities against predicted Logit) (see figure 6.3) that can be used to model functions that increase gradually at first, more rapidly in the middle growth period and slowly at the end, leveling off at a maximum value after some period of time in relation to better feeling of sustainable urban agriculture. The initial part of the curve is exponential; the rate of increasing the probability of better farmers overall feeling and good perceptions accelerates as it approaches the midpoint of the curve. At the midpoint (K/2), the increasing rate begins to

decelerate but continues to grow until it reaches an asymptote equal or less than 1, K which is called the ***"Carrying Capacity"*** for the farmers overall feeling sustainability for urban agriculture in city administration. This type of curve is frequently used to model the quality of farming and surplus food productions' so as to make sure the sustainability of urban agriculture where there is an initial exponential growth period followed by a leveling off as more of the sustainability reaching its maximum capacity is as the contributory factors or some other factor limits further development in to farmers effective and efficient food productions in the agriculture sector. This S-shaped (sigmoid) curve has also shown the relationship between response variable and predictory variables that exhibit a progression of improvement for sustainability from small beginnings that accelerates and approaches a climax over time.

#### 3.2.2.3 Relative Weight Factors Affecting Farmers Perceptions in Their Order of Importance

Table 6.5 below provides a logistic regression analysis for relative weight factors comprising 12 main variables including age, access to credit, farm land size, income, experience in farming, gender, economically active members, education, Capacity Building, awareness of UA, extension visits, feeling of farmers, in relation to farmers perception of ensuring system and sustainability of urban agriculture. This result clearly shows the order of importance to improve the urban agriculture as edible city solutions/edible urbanism. So, it is illustrating that farming and other characteristics that influencing the perceptions of farmers that are supposed to be used to adopt new agricultural technologies to install sustainability.

*Table 4.11: Logistic Regression Analysis Results for Farmers Perception in Relation to Relative Weight Factors*

| **Relative Weight Factors of farmers perception** | **B** | **Wald** | **Sig.** | **Exp(B) Average** |
|---|---|---|---|---|
| Farmers Age | 0.01675 | 1.573 | 0.028 | 1.0185 |
| Access to Credit | 0.055 | 1.59 | 0.320 | 1.2772 |
| Farm Land size | -0.113 | 0.74 | 0.621 | .9900 |
| Income | 0.0065 | 1.0815 | 0.4315 | 1.010 |
| Experience in Farming | -0.0175 | 0.3655 | 0.654 | 0.983 |
| Gender | -0.0003 | 0.400 | 0.562 | 1.000 |
| Economically active members | .004 | 005 | 0.943 | 1.004 |
| Education | 0.059 | 0.634 | 0.165 | 1.491 |
| Capacity Building/***Received training*** | 0.0735 | 2.634 | 0.050 | 1.0773 |
| Awareness | 0.085 | 3.35 | 0.047 | 1.0903 |
| Extension visits | 0.1025 | 4.38225 | 0.028 | 1.1085 |
| Attitudes of the farmers towards the risk | 0.1205 | 7.9355 | 0.047 | 1.131 |
| Land occupation | -0.0375 | 0.5655 | 0.754 | 0.9983 |
| Constant | -6.748 | 294.440 | .000 | .001 |

*Notes: (3) *** Level of significance at p<0.05,*

*Source: Computed from survey data, 2021*

*Table 4.11* displays the odds ratios derived from the logistic regression's coefficients. The odds ratios can be interpreted as the probability of the dependent variable occurring (overall farmer's perceptions) due to the increase in one unit of the corresponding independent variable. The result shows that if training as capacity building increases by one unit, farmers perceptions are 1.131 times more likely to be more important to be perceived and this is significant at p <0.05. If the income of the farmers (this variable strives to determine whether income of the farmer

increases by one unit, farmers perceptions are 1.0903 times more likely to be improved, which shows the level of importance and this is significant at p <0.05. The farmers' age is significantly influences on the decision for adoption of new agricultural technology. In this study, the result used to confirm whether farmers' age is statistically significant in influence on the decision for adoption of new agricultural technology. If farmers age increases by one unit, farmers perceptions are 1.1085 times more likely to be important to be improved and this is significant at p <0.05, which clearly demonstrates the order of importance. Age of the farmer either male or female had strong positively influence on the adoption of innovative technologies in farm land cultivation. Since in the study area most of them are in the middle age farmers and they tend to be more innovative and more apt to adopt new technology due to their longer planning and lower risk aversion characteristics. As being explained above, Coefficient of age has statistically significant. as age increases, the farmers have more likely to adopt new techniques in their cultivation and follow and increase the perspectives of urban planning for sustainable urban agriculture.

Similarly, education also statistically significant indicates that the farmers who have more educated encourage them to adopt new farming techniques in the urban agriculture sector. Because of the higher educated farmers can easily understand the applications of new machines and other inputs like new varieties of seeds, fertilizers and chemicals. If Capacity Building/training increases by one unit, farmers perceptions are 1.07725 times more likely to be important to improve and this is significant at p >0.05. If access to credit increases by one unit, farmers perceptions are 1.2772 times more likely to be important to be satisfied and demonstrates it level of importance to increase good perception, however this is significant at p >0.05. It is also obvious that farm size has significantly influences on the decision for adoption of new agricultural technology. In this study, the hypothesis used to confirm whether farm size is statistically significant influence on the decision for adoption of new agricultural technology. If farmers age increases by one unit, farmers perceptions are 1.1085 times more likely to be important to be improved and this is significant at p <0.05, which clearly demonstrates the order of importance.

Therefore, urban agriculture in the land use planning of the city structural planning integrates multiple functions in densely populated areas offering an ***alternative land use***. In addition to food production, urban agriculture also offers a wide range of other functions such as energy conservation, waste management, biodiversity, nutrient cycling, microclimate control, ***urban greening, economic revitalization***, community ***socialization, human health, preservation of cultural heritage, and education***. On the other hand, analysis result also uneils that it does not specifically address food security. The most important issue for urban food production is its official recognition as ***urban land use, security of tenure,*** as well as access to land and other resources as the drivers of Sustainable urban agriculture. ***Access to land*** is especially relevant for marginal and minority groups, and this could be mitigated by offering more publicly-owned open space for community gardens. As not all city areas are well-suited for growing food, availability of land based on ***biophysical factors*** for ***urban agriculture*** could be identified by developing land-use inventories and land suitability analyses using geographic information system (GIS) technologies. A conceptual model for integrating urban agriculture into planning and enhancing city sustainability is presented in ***figure 5.13 below***. It builds on the four pillars of the sustainability concept, namely, ***social, economic, ecological and spatial,*** allowing urban agriculture to flourish in the city. This requires ***land use and planning*** to come together to address current sustainability challenges and respond to the

factors that are already driving the presence of ***urban agriculture in the city***.

### 3.3 Main Findings

The analysis results unveil that "the process of formulating and implementing land policies is not only politically and technically difficult, it can also be costly. Sub-Cities in Addis Ababa City Administration did not develop according to planners' wishes; to the contrary, in the present and past, trends have always shown their own dynamic of development of ill planned urban forms in relation to urban agriculture. Howard's Garden City proposals addressed many aspects of the food system - production, distribution, collective preparation and consumption, and waste recycling- as integral to the city, an idea that only now is recovering again. As being explained in the contextual backgrounds and the analysis results show that on urban planning in Addis Ababa, the rapid urban development and population increase are highlighted which make the recent trend different from what happens in the other world. Addis Ababa's infrastructure, for example, has been unable to cope with this influx of people in terms of food security.

Therefore, urban planning instruments need to be adapted to the relatively new situation instead of using out-dated, old-fashioned, Modern planning instruments, which are not even used anymore in the each sub-city. Urban poverty and food security, the urban land market and Issues related to sustainable urban development. A basic question is: how to increase access to land for the poor or how to integrate the urban poor into the urban land market? The study result vividly indicates that The dilemma is: recognition of and interest in urban and per urban agricultural production (UPA) is generally low among planners and politicians. Thus, a consistent approach to Urban and Peri-Urban Agriculture is rarely found. Little co-operation in the field of land legislation is happening and innovative approaches from City Administration are missing. There is a lack of both National comparative studies on land legislation as well as City level knowledgeable advisers in ***the perspectives of Urban Planning.***

Although public awareness for farming activities in sub-cities is slowly increasing, agriculture is still in many cases "by definition" not practiced in broadly, and is often seen as "economically unimportant" or "a temporary phenomenon". The terms "agriculture" and "urban planning" seem to be incompatible. Agricultural activities tend to be shifted to outskirts of cities, far away from markets and infrastructure without analyzing economic, environmental and interrelation with other sectors. ***Urban agriculture is often informal.*** For one or another of these reasons, ***urban planners tend*** to exclude ***agriculture from their terms of reference***. Nevertheless, leaving the ***urban farming sector*** out of ***planning activities creates*** many problems in the sub-cities of the City Administration. The analyses results on the other hand demonstrates that the challenge for ***urban planners*** is to ***integrate coping strategies of the urban poor***, which are closely related to the ***informal land market*** in the three sub-cities the Addis Ababa City Administration into their ***urban planning strategies***. Recently, gender aspects have entered into the discussion of planning and agriculture in the City Government. Women, as major players on all levels of the urban food system, in production, marketing, processing and street food vending have a basic interest in being considered as an important interest group for urban planners as one of the ***edible city solution*** strategies and ***edible urbanism principle***.

The analysis results show that Interaction with the various institutions involved indicates that much education on the benefits and contribution of ***urban agriculture*** is needed. There is the need for research institutions and all concerned with ***Urban Agriculture*** to help sensitize policy makers, and all the institutions which can contribute to ***integrating urban agriculture into city development on its pivotal role.*** Although

urban agriculture may be well known by ***policy-makers and planners,*** in many cases this knowledge does not automatically contribute in their recognizing urban agriculture as an important element of ***the city economy and land-use system***. However, some city officials see urban agriculture as merely ***a left-over 'of rural habits***, which is only temporary until the people accustom themselves to urban life, as a marginal activity with little economic importance, as a health risk and source of pollution that has to be removed. The trend analysis of urban Agriculture from ***1999 to 2018*** above have clearly unveils that the agricultural lands were occupied by building structure, and are manifestation of less attention for urban agriculture *(digital Maps for 1999, 2010 and 2018 above.).*

Finally, the study results unveil; it will be difficult for city authorities in the three Sub-Cities to incorporate Urban Agriculture into its development agenda. The ***Land use plans*** or schemes that exist do not include urban agriculture as a land use category since it is still seen as a ***rural activity***. Further, the Sub-Cities do not own lands that it can make available to the urban farmers to use. In Bole, Akaki and Nifas Silk all the major farm sites are undeveloped government lands which are not sustainable. Whenever the institutions involved want to expand and develop this parcel of land, the farmers will be ejected making it difficult for others to invest in the sector. Farmers ejected from ***Koye-Fache areas*** in Akaki Sub-City are typical example in cutting down the livelihoods of the residents without creating other options of sustainable urban economy. It is also important to note that taking the highly complex urban-rural linkages into consideration, it is important to direct future development efforts towards improved urban food security through strengthening the ***rural-urban network.*** This principle is becoming more and more important in the ongoing City administration Urban agriculture initiates as components avoiding food insecurity. The City Administration should have to give emphasis to make it as an integral part of the land use planning.

**Integrating urban agriculture into city development**

The Land use plans or schemes that exist do not include ***urban agriculture*** as a land use category since it is still seen as a rural activity. Further, the City Administration plan Commission do not own lands that it can make available to the urban farmers to use. In Bole, Akaki and Nifas-Silk all the major farm sites are government lands which are ill planned and not sustainable. *(See Figure 6.1 above).* Although urban agriculture may be well known by ***policymakers and planners***, in many cases this knowledge does not automatically in their recognizing urban agriculture as an important element of the city economy and land-use system, as one of the pressing changes that imped city development.

**Gender and urban agriculture:** The analysis results unveil that Women have limited access to agricultural land and only 13 percent participated in Urban Agriculture. When provided with adequate land, however, women were more efficient producers than men, which agree with them, who commented that women's role in agriculture covers all the production stages, which include acquisition, processing and preparation. Urban Agriculture in Addis Ababa is dominated by men and high-income people who are able to invest and undertake ***Urban Agriculture as a 'luxury' livelihood strategy***, and are able to access information, private and expensive agricultural consultants/experts and agro-input.

**Petropolis to Agropolis-Edible Urbanism**

The abnalysis results and review clearly shows that Commercial urban agriculture is typically restricted to agriculture land use, green or open spaces, or under-utilized or undeveloped land in the city. As urbanizing city face the double threats of urban food insecurity and land scarcity, multi-functional urban land uses that

integrate rather than separate agriculture from other land uses could be a critical adaptation for the sustainability of future city development. This would be taken as exemplar for ***integrating urban agriculture as component of Land Use Planning*** as being addressed above. Hence, the highlights of Urban Agriculture are: Urban land uses integrating agriculture with other land uses could be a critical adaptation for future city sustainability, urban agriculture policy is improved by collaboration across government agencies and sectors, policies support integrated urban food production through high-tech intensification, Development of Agri-food Innovation Park can house actors across the food ecosystem. The analysis results also shows, the ***City Administration*** should have to decide that the structural ***plan*** of the city should envisage farming spaces where each residential plot must allocate at least ***20% of the surface to farming activities.*** The City Government also should unveil a five to ten year agriculture strategic plan that seeks to support the city's 's efforts to achieve food and nutrition security. The City Administration will focus more on investing in expanded agricultural research, ensuring farmers' access to the market economy and improved infrastructure, implementing sustainable agriculture, and improving food security. Therefore, the global experiences have addressed that urban agriculture should be integrated to the structural plan of the city so as to maintain food security and sufficiency by ***realizing the transformation from Petropolis to Agropolis/ecopolis.***

## 4. Conclusion

The study has demonstrated that urban and peri-urban agriculture creates opportunities for poor people to generate income and improve livelihood security; at the same time, these activities can adversely affect existing livelihoods, particularly on the very poor. In fact, while access to water is a crucial requirement for year-round vegetable production, the marginal water quality affects people and the official perception and

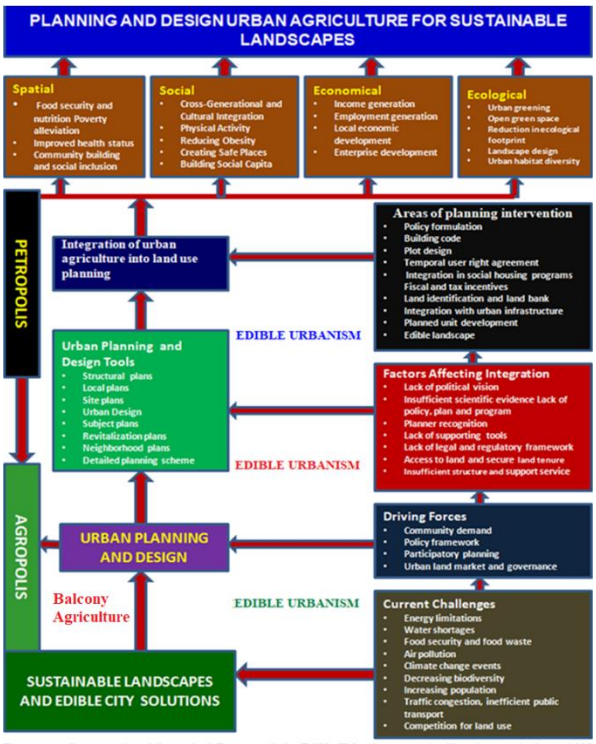



*Figure 6.2 :Conceptual and theoretical Framework for Edible Urbanism , sustainable urban agriculture, 2021*

sustainability of informal irrigation in urban and peri- urban areas. Urban Agriculture should be incorporated into the planning process at an early stage. It is therefore clear from the study that adoption of polices by Urban Planners is key to the realization of urban food security and sustainable city development. In order to realize the full potential of urban agriculture, there is need to develop a policy and institutional framework for the sector. This would enable urban farmers unlock critical technical and financial support services. Also, urban agriculture would be carried out in designated and safe places. The study also concludes that it aims to learn how to use land inventories to identify city land with the potential for urban agriculture in order to plan for more sustainable communities through edible urbanism and edible city solutions. It enables the integration of urban agriculture into planning and policymaking as well as advances both ecological and social dimensions of local sustainability agendas. The City administration local governments may consider the use of a land inventory should contemplate: (1) using

the inventory process itself as a way to increase institutional awareness and political support for urban agriculture; (2) aligning urban agriculture with related sustainability goals; (3) ensuring public involvement by creating participatory mechanisms in the design and implementation of the planning for urban agriculture; (4) drawing on the expertise of institutional partners including universities industry linkages Finally, it has been concluded that Commercial urban agriculture is typically restricted to agriculture land use, green or open spaces, or under-utilized or undeveloped land in the city. As urbanizing city face the double threats of urban food insecurity and land scarcity, multi-functional urban land uses that integrate rather than separate agriculture from other land uses could be a critical adaptation for the sustainability of future city development. This would be taken as exemplar for integrating urban agriculture as component of Land Use Planning as being addressed aboveThe study also has concluded that besides providing essential food for a balanced diet of the family, the City Administration should develop a real commercial activity providing, according to certain sources, more jobs than in any other sector of the informal or formal economy..Therefore, the farmers' field school has been adopted as a training and extension methodology to ensure disseminate Good Agriculture Practices, product safety and environment preservation through proper urban planning and design Agriculture for sustainable landscapes.

## 5. Recommendations

### 5.1 Regulating Urban Agriculture in the Structural Plan

A commonly cited barrier to urban agriculture has been its absence from, if not prohibition by, local Land Use Ordinances.

### 5.2 Understanding planning institutions, policy and decision making process

Policy makers should be aware of the benefits of Urban Agriculture and should encourage (1) collaboration between practitioners and researchers, and (2) support to urban farmers to continue producing safe and nutrient-rich products for both home consumption and city markets.

#### 5.2.1 Understanding spatial land use planning practices

City planners should need to focus attention on strategies to promote physical activity. residents also need to be encouraged to exercise.

#### 5.2.2 *Urban Agriculture should be integrated as an integral component of Land Use Planning, :*

- *Urban Agriculture* ***which*** is quite essential for sustaiable urban landscapes in the city structural plan. Hence, Urban land use should integrate urban agricuture with other land uses could be a critical adaptation for future city sustainability

#### 5.2.3 Transformining inner City Petropolis to Agropolis (Edible Urbanism)

- Urban Agriculture as integral components of ***Land Use Planning*** in city plan.
- The global experiences have addressed that urban agriculture should be integrated to the structural plan of the city so as to maintain food security and sufficiency by ***realizing the transformation from Petropolis to Agropolis/ecopolis.***
- The most important issue for urban food production is its official recognition as ***urban land use, security of tenure***
- A conceptual Model for integrating urban agriculture into planning and enhancing city sustainability is presented in ***fig 6.2.*** It builds on the four pillars of the sustainability concept, namely, ***social, economic, ecological and spatial***, allowing urban agriculture to flourish in the city. ***Please look at Figure 6.2 above. The Edible Urbanism Model: Urban Agriculture for sustainabler landscapes in Urban Planning Perspective***

- Planning and Design urban Agriculture contributes to urban sustainable landscapes in the city development, mean landscapes where "spatial, social, ecology, economy, well-being are balanced and strengthen each other".
- Planting different ***Fruits and Vegetables at parcel or plot level*** and excercising ***Balcony agriculture*** at condominium and apartment builfdings are very essential to maintain food security**.** ***This is typical example of tronsforming Petropolis to agroplis landscapes in the inner city.***

**REFERENCES**


***AACPPO (2017)*** *Structural Plan of Addis Ababa*

**Parrot ( 2008)**. *This paper makes the following assertions about the future of urban agriculture:*

***Orsini F, Mezzetti M, Fecondini M, Gianquinto G (2013)*** *Simplified substrate soilless culture for vegetable production in Trujillo, Peru. Acta Hort 881:163–168*

***Angotti, Tom (2015)*** *"The marketing of 'best practices' in Latin America: capitalizing on cities and planning." Paper presented at the Congress of the Latin American Studies Association, San Juan, Puerto Rico, May 27.*

***Yonas Alem and Gunnar Kohlin (2013)*** *The Impact of Food Price Inflation on Subjective Well-being: Evidence*

***Thomas P. Z. Mpofu (2013****) an evaluation of the performance of urban agriculture in Addis-Ababa City, Ethiopia*

***(Mkwambisi et al, (2011)*** *urban agriculture and poverty reduction: Evaluating how food production in cities contributes to food security, employment and income in Malawi*

***Demissie G., Alemayehu Taye G., Azeb W. (2014), Building Urban Resilience****: Assessing Urban and Peri-urban Agriculture in Addis Ababa, Ethiopia*

***A Crane, L Viswanathan, G Whitelaw (2013).*** *Local Environment, Intervening with agriculture: a participatory action case study of guerrilla .18 (1), 71-90, 2013. 52..*

***Taylor, J. R., & Lovell, S. T. (2014)****, urban home food gardens in the Global North: Research traditions and future directions. Agriculture and Human Values*

***Daftary-Steel, S. (2015),*** *growing young leaders in East New York: Lessons from the East New York Farms! Youth Internship Program. Brooklyn, New York: East New York Farms! Retrieved from http://fooddignity. org/wp/wp-content/uploads/2015/04/ENYF-1504-28-report-Growing-Young-Leaders.pdf*

***Havens and Antonio Roman-Alcalá (2016), Land*** *for Food Justice? AB 551 and Structural Change*

***Sanchez, G.G. (2013). Integrating and Implementing Urban Agriculture in Public Space into Land Use Planning: Sustainable Assessment, Cape Town, South Africa. Master's Thesis, Technische Universitat Berlin, Berlin, Germany,***

***Ching Sian Sia (2020)*** *Feeding cities: Singapore's approach to land use planning for urban agriculture*

***Lenny Martenez (2015)*** *towards a sustainable Public Food Service in Copenhagen*

***Arif H. Sarker, Janet F. Bornman (2019), (****A Framework for Integrating Agriculture in Urban Sustainability in Australia*

***Mougeut LJA (2005)*** *Urban agriculture and the millennium development goals.*