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FEEDING THE CITIES THROUGH THE DEVELOPMENT OF URBAN FARMING

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ABSTRACT:

The recent extension of the Movement Control Order (MCO) may be effective in containing the spread of the pandemic, but it is expected to have a devastating financial impact on the market. Whilst some countries have been successful in containing the spread of the pandemic, new information on the nature of the virus is constantly being released. Therefore, the overall impact is still unpredictable although lockdown efforts seem to have reduced infection rates substantially. In response to these challenges, this study proposes the implementation of Urban farming towards a sustainable economy, establishing food security and creating the ability for the generation of household income for the B40 group. This study considers urban agriculture to be broadly progressive and capable of delivering a suite of environmental, economic, food security and social benefits. From this study a new policy with regards shall be prepared for use by various stakeholders such as District Offices, Land Offices, Pusat Zakat and MARDI so as to foment the development of urban agriculture systems as a sustainable means to alleviate poverty and augment national food security.

INTRODUCTION

The present Coronavirus outbreak, which originated in China, has infected tens of thousands of people globally. With over 153,648 confirmed cases across 146 countries, the World Health Organization (WHO) has officially declared it a pandemic (WHO,2019). Many fundamentals of economics still apply and are relevant, however, the crisis is definitely causing an unusual situation which changes the assumption and effectiveness of many usual economic policies and theories. It is changing not just economic policies, but

also the attitude of consumers and businesses. Whether it will lead to permanent changes in attitudes is still a matter of conjecture. However, it may accelerate trends towards considering economic welfare just as much as just GDP in the national economic agenda. Urban agriculture is broadly progressive and capable means of delivering a suite of environmental, economic, and social benefits. However, the most significant environmental issue for urban farms, is food safety.

Urban Agriculture (UA)

Urban Agriculture (UA) can be defined as the growing, processing, and distribution of food and other products through plant cultivation and occasionally livestock in and around cities for the purpose of feeding local populations. There is increased interest in urban agriculture in recent years that has arisen for a variety of reasons. Some of these are concerned with food security, sovereignty, and impacts of agriculture on the environment. Some see new business opportunities for urban food operations, utilizing new technologies such as hydroponics and high-efficiency lighting systems. Others see urban farms and community gardens as mechanisms for community building, or as a means of improving the nutritional security of vulnerable populations. In truth, urban agriculture is not at all a new idea. In the Northern Hemisphere, urban agriculture was vigorously promoted during the First and Second World Wars, and it provided considerable volumes of food at that time (Hallett et al., 2016).

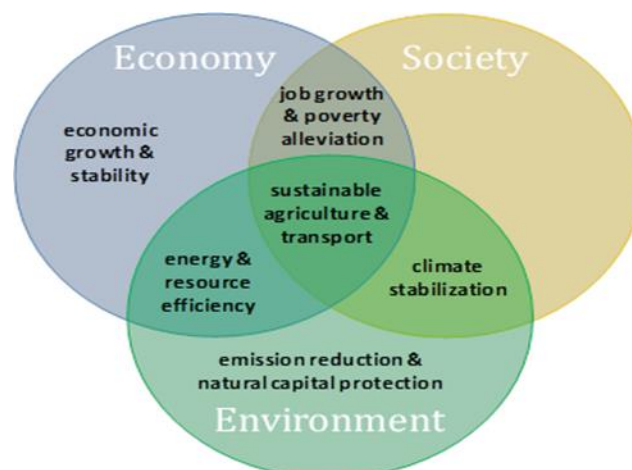


Figure 1: Framework of Urban Agriculture

The recent extension of the Movement Control Order (MCO) may be effective in containing the spread of the pandemic, but it is expected to have a devastating financial impact on the market. Whilst some countries have been successful in containing the spread of the pandemic, new information on the nature of the virus is constantly being released. Therefore, the overall impact remains unpredictable although lockdown efforts seem to have thwarted infection rates substantially. In response to these challenges, this study will look into the implementation of Urban farming as a means towards a sustainable economy which may provide a basis for developing a monitoring

framework for conserving a sustainable income, preserving the environment, and thus lead towards sustainable development and long-term economic growth for Malaysia. The relevant stakeholders for the implementation of urban farming in Malaysia include Land Office (to provide information and grant permission for use of vacant land under their purview), District Office (the same reason as with the Land Office), MARDI (to support farming activities) and Pusat Zakat (to provide information on target poverty groups).

This study aims to determine the impact of the implementation of urban farming towards B40 communities/individuals and to provide a recommendation on policy to augment household income for urban poor which ultimately may lead to sustainable economic development and long-term economic growth for Malaysia.

Literature Review

Covid-19, a new strain of the coronavirus, has posed challenges to all economic sectors, especially agriculture. The Movement Control Order (MCO) initially caused some panic buying. With people staying indoors, cooking at home has been on the rise. This has led to high demand for fresh food items at local markets and supermarkets. At the same time, the lockdown to contain the coronavirus outbreak has been hurting the supply of labour and disrupting supply chains in the agriculture industry (Negin Vaghefi, 2020). While urban agriculture is not a viable solution to provide for all food needs of urban residents, shifting some food production within cities can help reduce pressure on current agricultural land and increase the access and availability of healthy foods, while also providing other benefits to the urban landscape (Clinton, 2018).

The populations living in cities are continuously increasing worldwide. In developing countries, this phenomenon is exacerbated by poverty, leading to tremendous problems in employment, migration from rural areas, transportation, food supply and environment protection. Simultaneously with the growth of cities, a new type of agriculture has emerged; namely, urban agriculture. Here, the main functions of urban agriculture are described: its social roles, the economic functions as part of its multi-functionality, the constraints, and the risks for human consumption and the living environment. Food security simply refers to availability and accessibility of sufficient amount of nutritious food in consistent manner. Due to decline in international trade, disturbance in food supply chain and food production, food insecurity may arise. FAO had mentioned that, small farmer and fisher may face difficulty in selling their product which in turn cause decrease in their income and purchasing capacity. Food insecurity raised due to COVID-19 will highly affect the poorest and the most vulnerable segments of the population (FAO, 2020).

Urban agriculture has been identified as an important element for a study on livelihoods, food and nutrition in Greater Accra. Different farming types were distinguished and analysed with regards to food security, household

economics, health ecology and gender. Farming was done for three main reasons, dependent on the farming type: cash income, food subsistence and strategic assets for emergencies. Men and women do have different roles in urban agriculture whereby women's activities tend to contribute more to household food security compared to men and women predominate in the marketing of crops. Urban agriculture improves food security in terms of availability and access. Crops are analysed to assess health risks and it was found that for rural and urban crops the main source of bacterial contamination was in the transportation of crops to market. The main issues for urban farmers are land, theft and marketing. Urban agriculture is still missing from municipal planning. The loss of agricultural land is a major reason for concern in urban areas.

Urban agriculture is carried out for four main reasons: subsistence, economics, recreation, and community building. People in the wealthiest nations tend to be involved in urban agriculture for purposes of recreation and community building more than economics or subsistence, whereas people in the poorest nations tend to grow food primarily for subsistence and sale. In parallel, historical examples show that wars and economic depressions draw people into urban agriculture for subsistence, whereas economic growth sees urban farms shuttered, built upon, or converted from farms to parks. (Hallett, 2016).

There are many opportunities to redevelop vacant land to enhance its ecological and social value, and many design professionals and scholars are becoming interested in finding new ways to exploit this potential, especially with regard to planning and design. A better appreciation of the public value of urban vacant land is an effort to identify alternative strategies to optimize the way these spaces are utilized for both short-term and long-term uses to support urban regeneration and renewal (Kim, 2016). For instance, If vacant land is managed appropriately, it can contribute both ecological and social benefit (Kim et al., 2015; Kim et al., 2016).

Trends in urban growth and the rise of urban farmers will affect productivity in agriculture by reducing the area of arable land, especially in regions of high population density. They will also influence environmental issues, such as reduced fallow time and multiple cropping cycles in one year (Keys and McConnel, 2005).

The importance of urban agriculture in supplying fresh, perishable products, while rural areas supply more bulky and easier-to-store products, is in line with Von Thunen's predictions in the first analysis of agricultural land use according to location done in 1826. According to Von Thunen's model, land is allocated according to the use which brings the highest rent, and can be sketched as concentric circles relative to the city center. The rent is defined as the share of the output by area after deduction of production and transport costs. The most profitable and intensive land use by unit area, and commodities with high value relative to transport costs are found near the city center (Huriot, 1994).

The impact of COVID-19 on food security has many channels. Due to the travel restrictions, which have been implemented in many countries throughout this crisis, both consumption and supply of food could be affected. On the one hand, as consumers, particularly in cities, have to stay at home, restaurants consumption is restricted, and shopping frequencies are minimized, in order to avoid infectious contraction. On the other hand, supply could be suppressed due to the breakdown or restrictions of the food supply chain, and even abandonment of production. A phenomenon of food crisis could be mirrored by skyrocketing food prices, which might undermine the welfare of the poor (Yu, 2018).

Lower-income and minority communities are disproportionately affected by lack of access to supermarkets and healthy food. Because of this, residents in these areas must often shop at convenience stores that have limited access to fresh produce, limited food selection, lower quality foods, higher prevalence of energy-dense foods, and often higher prices compared to large supermarkets; this has been shown to lead to unhealthy diets and increased levels of obesity for people living in these areas (Larson, 2009). Households with a participant in a community garden consumed more fruits and vegetables, more often, than those who did not (Alaimo, 2008). Urban agriculture is widespread in the developing world and has been shown to have a positive impact on food security, access, and nutrition, although data is sparse and more research in this area is desperately needed (Eriksen-Hamel, 2010). Improvements in personal nutrition, health, and wellbeing have also been documented for people involved in urban agriculture activities (Armstrong, 2000).

As the world's population becomes increasingly urbanised, with an estimated 68% of the global population living in urban areas by 2050, agricultural land will continue to be strained further to meet the nutritional needs of these densely populated areas (Eigenbrod and Gruda, 2015). Urban agriculture can be used as a strategy to increase the food self-sufficiency of a city, thereby increasing resilience to breakdowns in the national or global food supply chain which may be heightened with extreme weather events and political crises associated with climate change (Altieri, 1999). Urban agriculture has emerged as one way to potentially increase access to fresh and healthy foods in food desert areas. Indeed, a variety of community gardens, non-profit urban farms, and even for-profit urban farms have missions dedicated to increasing food access in food deserts (Block DR, 2012). For countries that are lacking in available urban space, an option could be the possible use of rooftop gardens, vertical farming, and indoor growing methods, which was not assessed in this mapping study and could circumvent the need for large amounts of land area for urban growing (Despommier, 2011). The current agri-food system is responsible for up to 30% of the world's greenhouse gas emissions (Vermeulen et al., 2012).

Contributions to Economy & Society

i. Promoting agriculture sector in place

Given the size of the growing and urbanizing human population and scale the idea of “urban agriculture” cannot feed the world. Urban agriculture has significant limitations, but it also has a wide range of roles, many of which can be expanded. For instance, it creates an agriculture sector in place and cater the need for the city that help to improved household income respectively. It has been proven by the previous literature that this approach has been used during World War I and II hence it remains applicable. Perhaps, in such a precarious position, and with such an uncertain future, we should be trying to get the best out of all forms of agriculture, including urban, and developing the most diverse portfolio of food systems that we can. The power of urban agriculture to expand its role as a significant provider of nutrition has been demonstrated in the past and we need to ensure that it will be able to do so again where and when it is needed.

ii. Increase social well-being & places for education

Community gardens can serve as important spaces where recreation and shared work can improve health and well-being in a number of ways, both to individuals within the local community, and to the cohesiveness of the community itself. They often frequently serve as places for education, and serve an important role in connecting people to the environment and food production systems.

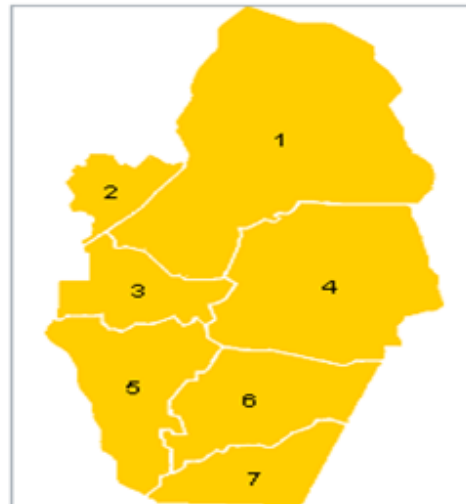
iii. Fully utilized the unused land in the urban community

There are many opportunities to redevelop vacant land to enhance its ecological and social value, to exploit this potential, especially with regard to planning and design. A better appreciation of the public value of urban vacant land is vital for any effort to identify alternative strategies to optimize the way these spaces are utilized for both short-term and long-term uses to support urban environment and economic growth.

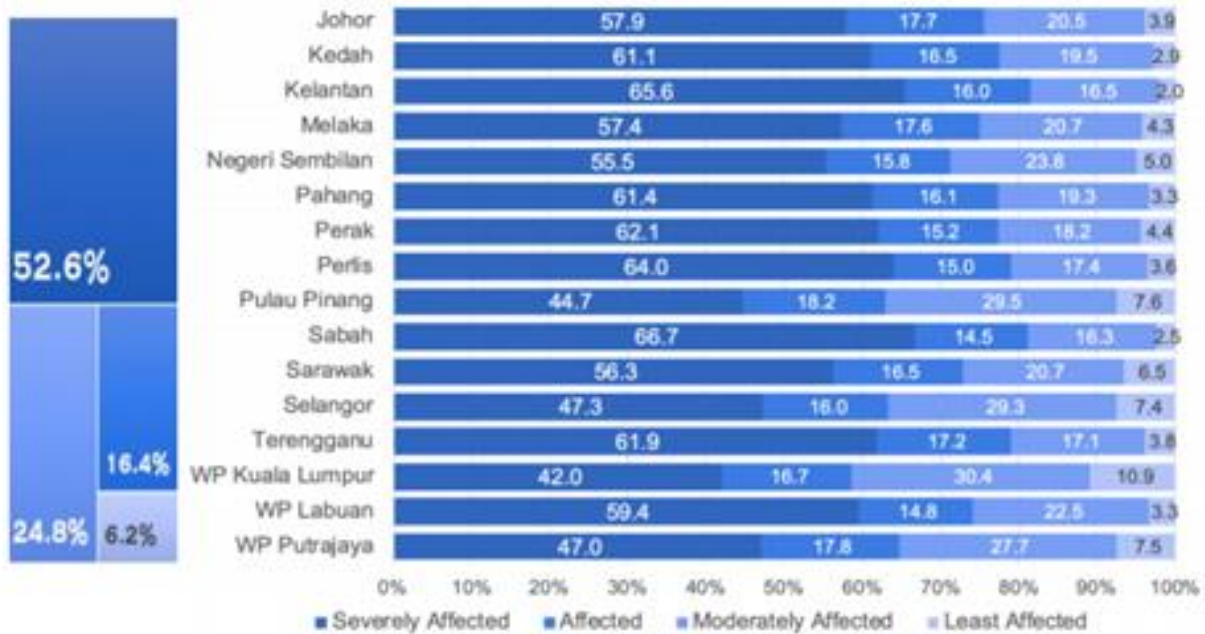
RESEARCH METHODOLOGY

This study employed a quantitative analysis using SPSS to investigate the causal study to gain familiarity with the phenomena in the situation before developing a model and setting up a rigorous design for comprehensive investigation (Sekaran & Bougie, 2011). The scopes of research for this study conducted in three from seven zone of Hulu Langat District namely Kajang, Semenyih and Beranang.

- 1. Hulu Langat
- 2. Ampang
- 3. Cheras
- 4. Hulu Semenyih
- 5. Kajang
- 6. Semenyih
- 7. Beranang



Hulu Langat District is divided into 7 zones
 Source: Portal Rasmi Pejabat Daerah Hulu Langat



Financial impact during movement control order
 Source: DOSM

RESEARCH FINDING

Pearson correlation was tested to see the relationship between the variables. The model design to explore the relationship between the implementation of urban farming (Y) and other variables that closely related with urban farming namely Generate Income (X₁), Household Food Supply (X₂) and Greenhouse Effect (X₃). The correlation and estimates of coefficients of the three Factor multiple linear regression Model of the variables displayed in Table 1 and Table 2.

Table 1. Correlation coefficient (r)

	Urban Farming		
	Significant Relationships	Correlation Coefficient (r)	P-value
Generates Income(X ₁)	Strong	0.825	0.000
Household Food Supply(X ₂)	Strong	0.716	0.820
Reduced Greenhouse Effect(X ₃)	Medium	0.814	0.000

Table 2: Coefficients of the Three Factor Multiple Linear Regression Model

Urban Farming (Y)	B (Unstandardized Coefficient)	Std. Error	Beta (Standardized Coefficients)	T	p-value
Constant	1.660	.147		11.259	.000
Generate Income (X ₁)	.295	.069	.482	4.264	.000
Household Food Supply (X ₂)	.013	.056	.023	.228	.820
Greenhouse Effect (X ₃)	.320	.044	.469	7.227	.000

** Correlation become significant at the 0.01 level; Bonferroni adjusted alpha ($\alpha_{adjusted}$) = 0.0125 (0.05/4).

*Notes: $R = 0.892^a$; $R^2 = 0.796$; $Adj. R^2 = 0.790$; $F (4, 97) = 121.252$, $P = 0.000$.

To identify the extent to which Generate Income, Household Food Supply and Greenhouse Effect to explain variations on Urban Farming, regression analysis methods were used. As stated in Table 3, the Generate Income variable with t value = 4.264 and Beta value = 0.482 is the most significant while Household Food Supply variable with t value = 0.228 and Beta value = 0.023 is the least significant. Thus, Generate Income is the most influential variables that support the proposed framework of urban farming. Table 2 depicted the estimated value of the coefficient of the three factors (B) for b₀ is 1.660, b₁ is 0.295, b₂ is 0.013, and for b₃ is 0.320. Below is the coefficients obtained, for the linear regression model.

$$Y = 1.660 + 0.293(X_1) + 0.295(X_2) + 0.013(X_3) + 0.320(X_4) + e$$

where

Y = Dependent variable (Urban Farming)

b₀ = Constant

b₁ = Regression coefficient for X₁

b₂ = Regression coefficient for X₂

b₃ = Regression coefficient for X₃

b₄ = Regression coefficient for X₄

X₁ = Independent variable 1 (Generate Income)

X₂ = Independent variable 2 (Household Food Supply)

X₃ = Independent variable 3 (Greenhouse Effect)

e = Error

ROLE OF GOVERNMENT AND STAKE HOLDER AND THE CHALLENGES

The roles of government in assisting urban farming is vital as urban farming are the concept of farming among the community. The stakeholder that involved Federal Agriculture Marketing Authority(FAMA), Malaysian Agricultural Research and Development Institute (MARDI), Pusat Zakat and Land office. The integration from the stakeholders is needed as household that involved in Urban agriculture should well equipped with farming and entrepreneurship skills and most importantly the role of District office is to identify land that potentially planted by farmers. In order to achieved this, the involvement of the stakeholders like FAMA, will help the farmer to disseminate the knowledge and information of plant and vegetables, provides market prices for vegetables, provides professional skills to grow plant (duration for the plant to harvest) and how to sell and position the products. MARDI is another stakeholder that played a key role in increasing the productivity of agriculture by ensuring crops and livestock have disease resistant traits and high fertility. The involvement of Pusat Zakat is to identify B40 categories and helping them from the aspect of financial to start the urban farming project to accomplish successfully. While Land office is an authority body that played an important role in getting the approval from the government to start the farming on the unused lots and make use of all the soil and dirt to plant the vegetables. The most challenging part of Urban Farming is to open the mind for B40 community on the concept of urban farming and to provides the confident on how this vegetable can generate a sustainable income. It is also difficult to convinced B40 to participate in farming as the income for planting is not immediately gain in a short term. The constraints include the time gap for the plants to grow before ready to be harvest and the method to establish an effective supply chain is crucial. The selection types of vegetables are essential to ensure the marketability of certain types of vegetables and to meet the domestic demand. Table 1 shows the vegetables prices in Malaysia. The listed vegetables are the most potential type of vegetables in the domestic market. The price of vegetables from October 2019 to July 2020. The graph shows that the price of chili fluctuated win July 2020. This is expected due to higher demand on chili-based foods during the Movement Control Order (MCO) where most household are cooking own dishes at home. A demand shock led to price fluctuations.

VEGETABLES PRICES IN MALAYSIA

Sayuran/Tahun	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20
Bayam (Kg)	RM 4.49	RM 4.82	RM 4.83	RM 4.60	RM 4.46	RM 4.31	RM 4.51	RM 4.51	RM 4.56	RM 4.50
Bendi (Kg)	RM 7.04	RM 6.87	RM 7.27	RM 8.13	RM 8.58	RM 7.59	RM 7.62	RM 7.62	RM 7.27	RM 7.10
Petola (Kg)	RM 5.54	RM 5.62	RM 5.70	RM 5.66	RM 5.46	RM 5.28	RM 5.16	RM 5.30	RM 5.52	RM 5.54
Bawang Besar (Kg)	RM 4.61	RM 4.73	RM 5.60	RM 5.94	RM 5.99	RM 6.90	RM 6.94	RM 6.64	RM 4.58	RM 4.24
Cili Merah Kulai (Kg)	RM13.89	RM13.35	RM12.59	RM12.86	RM13.15	RM12.61	RM12.16	RM13.24	RM13.65	RM16.95
Cili Merah Minyak (Kg)	RM12.68	RM12.58	RM11.95	RM12.04	RM12.07	RM11.11	RM11.13	RM11.95	RM12.00	RM15.97
Kacang Panjang (Kg)	RM 5.95	RM 5.50	RM 6.19	RM 6.82	RM 7.34	RM 6.52	RM 6.39	RM 6.59	RM 6.45	RM 6.09
Kacang Buncis (Kg)	RM 9.09	RM 9.33	RM 9.56	RM 9.55	RM 9.92	RM 9.26	RM 9.09	RM 9.74	RM10.01	RM 8.56
Kobis Bulat (Kg)	RM 3.73	RM 3.65	RM 3.65	RM 4.12	RM 4.14	RM 4.01	RM 4.13	RM 4.07	RM 4.19	RM 4.27
Kobis Bunga (Kg)	RM 7.91	RM 7.63	RM 7.99	RM 8.61	RM 8.45	RM 8.24	RM 8.30	RM 8.44	RM 8.20	RM 8.74
Lobak Merah (Kg)	RM 4.14	RM 4.09	RM 4.12	RM 4.09	RM 4.11	RM 4.11	RM 4.40	RM 4.28	RM 4.38	RM 4.38
Sawi Bunga (Kg)	RM 6.60	RM 6.92	RM 7.12	RM 7.23	RM 6.88	RM 6.86	RM 6.89	RM 7.07	RM 7.08	RM 6.79
Tomato (Kg)	RM 4.78	RM 4.62	RM 5.19	RM 5.19	RM 5.94	RM 4.98	RM 4.88	RM 5.40	RM 5.57	RM 7.24
Terung (Kg)	RM 6.12	RM 6.25	RM 6.62	RM 7.41	RM 7.22	RM 6.87	RM 6.87	RM 6.90	RM 6.98	RM 6.88
Timun (Kg)	RM 3.29	RM 3.41	RM 3.46	RM 3.08	RM 2.91	RM 2.97	RM 2.95	RM 3.09	RM 4.30	RM 3.73

Source: Department of Statistics Malaysia

CONCLUSION

The empirical findings in this study concluded that urban farming are significantly contributes to household income and provides a sufficient food supply and reduced greenhouse effect. Given the size of the growing and urbanizing human population and scale the idea of “urban agriculture” cannot feed the world. Urban agriculture has significant limitations, but it also has a wide range of roles, many of which can be expanded. For instance, it creates an agriculture sector in place and cater the need for the city that help to improved household income respectively. Urban agriculture can play a significant role in the creation of safe places that people value and are worth improving. During MCO period, all people must follow the lockdown and restriction in movement. By following the idea of the urban farming and food security, it can help the community-based group. To secure the food supply during MCO period, food banks are a good means for securing food, supplied or donated by different actors. Urban farms and gardens can create an atmosphere for social and economic investment. Urban areas with community gardens are less likely to support crime or vandalism. Community gardens can serve as a place where community trust is built, and places where explicit community-development strategies can be developed. It has been proven by the previous literature that this approach has been used during World War I and II hence it remains applicable. Perhaps, in such a precarious position, and with such an uncertain future, we should be trying to get the best out of all forms of agriculture, including urban, and developing the most diverse portfolio of food systems that we can. The power of urban agriculture to expand its role as a significant provider of nutrition has been demonstrated in the past and we need to ensure that it will be able to do so again where and when it is needed. Community gardens can serve as important spaces where recreation and shared work can improve health and well-being in a number of ways, both to individuals within the local community, and to the cohesiveness of the community itself. There are many opportunities to redevelop vacant land to enhance its ecological and social value, to exploit this potential, especially with regard to planning and design. A better appreciation of the public value of urban vacant land is vital for any effort to identify alternative strategies to optimize the way these spaces are utilized for both short-term and

long-term uses to support urban environment and economic sustainable growth.

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