Effect of Mango Tree Cutting on Dependent Communities due to Real Estate Development: A Case Study of Multan

By

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(Fall 2019 - U&RP 00000320238)

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Urban and Regional Planning

Department of Urban & Regional Planning
School of Civil & Environmental Engineering (SCEE)
National University of Sciences & Technology
Islamabad, Pakistan
(2023)

This is to certify that the contents and form of

Thesis titled.

Effect of Mango Tree Cutting on Dependent Communities due to Real Estate Development:
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Has been accepted towards the partial fulfillment of the

requirements for the degree of

MS Urban and Regional Planning

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I hereby declare that the thesis "Effect of mango tree cutting dependent on communities due to real estate development: A case study of Multan". Submitted for the degree of Master's in Urban & Regional Planning is my ownwork except some secondary data and case studies which has been used are duly acknowledged. This thesis has not been accepted for any other degree and is not concurrently submitted for award of other degree.

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Acknowledgement

"وماتوفيقياالباهلل" (*Wamatawfiqiillabillah*) **"And my**

success comes only from God, only from God."

Dedication

This thesis is dedicated to my parents, who have been my unwavering pillars of support throughout my academic journey. Their belief in my abilities never wavered, even during moments of self-doubt. Their practical support was equally priceless. From assisting with data collection and analysis to proofreading countless drafts, they tirelessly lent a helping hand, always going above and beyond to ensure the sacrifices they have made to ensure my success. I dedicate this work to them, quality, and accuracy of my work. This thesis represents not only my academic achievements but also a testament to my parents' unwavering support and love. It is a tribute to their belief in me and with heartfelt gratitude and deep appreciation for everything they have done.

Abstract

Trees are an important asset to the environment, as they are air purifiers. Cutting down trees creates havoc on the environment as the pollution rate accelerates with an enhancement of temperature as well. Deforestation has always impacted the environment negatively. The major reason for deforestation is urban sprawl. Since urbanization is increasing gradually, the growth of the real estate business is enhancing consequently. In a city like Multan, where mango has been an asset to the city, the city's main export, its deforestation has not only squeezed mango production but also highly impacted the livelihood of the local community. In Multan, it has been observed that a lot of new housing societies have been established. This study aims to identify the influence on the local community created due to mango tree cutting. For that research, we surveyed 376 people. Socio-economic impacts were found on the local community through this survey. The cutting of agricultural areas for real estate business has become very common. Multan, which is the hub of mango production, the deforestation of mango trees on that huge scale has affected the thousands of people who were associated with the mango garden. The major drawback of this development is that the livelihood of the people of the local community has ended. They were forced to move from that area. The Government should take strict action against the emergence of real estate on agricultural land and allow this business to be flourished only on barren land.

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CHAPTER 1: INTRODUCTION

Urbanization is the manifestation of the fact that human society is evolving and moving towards betterment, whereas the degree of urbanization is eminent evidence of the level of social development in the country (Rafiq et al., 2016) (Mi et al., 2016), (He et al., 2016). It is anticipated that by the year 2050, approximately 70% of the global population will be living in urban regions on the account of accelerated urbanization (Brockerhoff & Nations, 1998). Fundamentally, in pursuance of accommodating the accelerated population size and on the account of the concern that real estate companies have more in the construction of residential buildings and land speculation (Abou-Korin, 2011). mega-residential projects have been perpetually projected and implemented in the cities (Al-Shihri, 2016). Throughout the latter half of the 20th century the execution of housing schemes has been a major cause of the cutting down of trees; and given the trends of global demographics, the transformation of agricultural land into urban uses is expected to persist (De Chant et al., 2010a). Among all South Asian countries, the pace of urbanization is the highest in Pakistan, while the annual growth rate of the urban population is 2.7% which brings about the demand of 0.35 million new urban housing units from different income groups, leading toward the construction of 0.15 million houses. The expansion of urban centers, without proper land-Use planning or implementation, is consuming valuable agricultural land and the ecology of the cities is being damaged. This is becoming the cause of temperature acceleration, floods, and heat island effects, especially in the informal settlements of the city territories. If the removal of forests due to real estate business is kept unchecked, these imperilments of the environment will intensify. To alleviate these impacts, new technology and new building design is need of the hour (Wachter, 2018).

In South Asia, the highest volume of urban population is residing in Pakistan. It is anticipated that 50 percent population of Pakistan will be residing in cities by the end of

2030. The piling up of masses particularly in Punjab has been out-spread as already predicted by theory. The significance of urbanization has been prioritized by the current government. Its Vision 2025 policy refers to constitutional amendments for business and commercialization, zoning, taxation, and advanced infrastructure for urban areas as endowment for higher rate growth of urbanization. The cities with higher population are also supported by the Punjab Growth Strategy 2018, to engage higher level of investment and enhance productivity (Nabi, 2010). Housing demands have been increased intensively due to accelerated urbanization. On the account of this increased growth, the real estate has become one of the most appealing businesses in Pakistan in the recent decades. Despite all that, various socio- economic factors have very strong connections with this business. The speedy growth of real estate curtails down the agricultural land promptly as the area of farmable land is being transformed into mega residential projects (Atiq-ur-Rehman, 2012). Urbanization and urban sprawl are the root causes of the change of land cover on the surface of the earth. Pakistan has the highest rate of urban growth in South Asia, rapid growth of population, accelerated socioeconomic activities, profound utilization of land resources and expansion of industrialization have enhanced the process of urbanization. Punjab the province of Pakistan has observed a highest rate of economic development and population growth in the last two decades, that has enhanced the urbanization process and have become a major cause of deforestation on a large scale and the transformation of agricultural land to constructed area, resulting into   deterioration of environment (A. Shah et al., 2021). During the latter half of the 20th century, the major reason for the cutting down trees is the setting up of real estate business and that has given trend of global demographic, the transformation of agriculture land to built-up areas will be expected to continue (De Chant et al., 2010b). The significant financial resources for the construction of urban infrastructure are being provided by the flourishing business of real estate, and migration of rural inhabitants to the cities has enhanced (Cai et al., 2020).

The green infrastructure ameliorates the climate adaptation by repressing the effects of acute temperature and rainfall. This encompasses water seizure & preservation, greater control of storm-water runoff, the halting of overflowed water and many more. (Foster et al., 2011).The structures which are based on soil and plant, and are capable of to hold, sustain water and stop the quick flow of water are known to be green infrastructure. The range of these structures may be small or large (Padowski, 2019). It is an interconnected system inside and among the towns, villages, and cities, consisting of blue and green spaces and natural elements which cater for atmospheric functions. Gardens, parks, trees, and urban forests are all constituents of Green Infrastructure. The appropriately designed green infrastructure is the amalgamation of environmentally friendly operations that not only assist human prosperity but also to the preservation of animals and plants settlement (Services et al., 2019).

The applications like water control & management, forest formation within the vicinity of cities and green roofs are old hats for government officials, using these as schemes to elevate life excellence and sustainability. These are also conceived as supreme efforts in climate adaptation. The green infrastructure prevails both in rural and urban territories, and this may be natural or man-made, incorporating parks, gardens, green roofs, wetlands, rivers, forests and many more. This system contributes numerous benefits to the ecosystem. It also provides the connection between biodiversity of plants and animals between rural and urban territories i.e., it keeps link between the animal and plant life of urban and rural areas. Besides all these benefits, GI also curtails down heat temperatures, providing dwellings to various species and halting the excessive run off water. Furthermore, while being used as urban forests, it not only increases the green space but also enhances the recreational areas for the inhabitants, causing the decrement in pollution also (Urbes project, 2014).

When rain falls on our roofs, streets, and parking lots, it fails to permeate the ground as it naturally should. Improper management of this water can result in detrimental consequences

like flooding, sewer overflows, and water pollution. In contrast to conventional gray infrastructure, which relies on pipes, storm drains, and treatment facilities for stormwater management, green infrastructure employs vegetation, soils, and natural landscapes to effectively address the impacts of wet weather. By adopting green infrastructure, we aim to create a sustainable and healthy environment for communities, green infrastructure encompasses various features, including rain gardens, bioswales, planter boxes, planting strips, urban tree canopies, natural areas like parks and wetlands, and permeable pavement. Additionally, it employs techniques to redirect, capture, and store rainwater for irrigation and other purposes, such as downspout disconnection, rain barrels, and cisterns. Integrating natural elements into the built environment not only facilitates stormwater management but also offers a range of other environmental, social, and economic benefits that are typically not provided by gray infrastructure.

Some of these benefits include increased exposure to the natural environment, reduced exposure to harmful substances and conditions, opportunities for recreation and physical activity, improved safety, promotion of community identity and well-being, and economic advantages at both the community and household levels. All these benefits have direct or indirect positive effects on public health. However, the extent to which these advantages are realized depends on various factors, such as the design, installation, and maintenance of the green infrastructure features (Epa, n.d).

Green infrastructure installations are deliberately designed to have a positive impact on the physical environment by reducing impervious surfaces and creating natural habitats and permeable areas. By incorporating open soil and permeable pavements, these installations increase the capacity for stormwater infiltration and storage. As a result, they effectively slow down and diminish stormwater runoff, mitigating issues such as pollutant loading, flooding, combined sewer overflow (CSO) events, and erosion, The reduction of stormwater-related impacts also translates to a decrease in individuals' exposure to water

pollution and health hazards associated with flooding. This includes waterborne illnesses, respiratory diseases, and asthma triggered by mold and bacteria, vector-borne diseases, stress, injuries, and potential fatalities.

Moreover, the inclusion of trees, bushes, and greenery in green infrastructure has several beneficial effects. They act as natural air purifiers, absorbing air pollutants and trapping airborne particulates on their leaves. Additionally, they contribute to reducing surface and air temperatures through shading and evapotranspiration, while also providing a physical barrier against traffic and street noise pollution, The positive health impacts of green infrastructure extend further. Exposure to air pollutants and particulates, which can exacerbate respiratory conditions like asthma and lead to cardiovascular disease, stroke, cancer, and premature death, can be mitigated. Furthermore, green infrastructure helps combat extreme heat events, which can cause heat-related illnesses and fatalities. Similarly, it plays a role in reducing noise pollution, which has been linked to hearing and cognitive impairment, hypertension, stress, and sleep disturbances. It is essential to note that these health impacts are especially critical for vulnerable groups, including children, the elderly, and those with preexisting health conditions. Additionally, green infrastructure installations contribute to creating natural habitats for birds and wildlife, as well as increasing green spaces, which have been associated with reduced anxiety and stress, improved mental health, enhanced cognitive function, better healing and recovery, and an overall sense of well-being and improved health (Epa, n.d).

In Pakistan there is no conventional organization which can organize and control the utilization of land area according to its capacity. For that reason, calculation, and evaluation of the use of land becomes a hard task. The conversion of land use and specific infrastructure development is not only causing desertification, but also the quality of land is also being downgraded. The adjoining land is also downgraded by the transformation of land cover from agriculture land to constructed area and removal of agriculture land after its conversion

to built-up area. Therefore, the land quality control in terms of its usage and transformation of land cover, is very significant so that land degradation may be avoided. To meet the increasing demand for urban infrastructure land, construction area is obtained by converting the agriculture land, wasteland, vegetation, which represents high pressure on natural resources (Dewan & Yamaguchi, 2009). In Pakistan very few studies have been carried out that would explain the LU & LC effect on the urban areas. A study has shown that farmable and construction area would extend in all sections of the urban areas of Pakistan and especially in Punjab (Samie et al., 2017). Because of the high rate of population growth, the province has observed an enhanced urbanization process. The private and public sectors are catering the exceeding demand of urban housing (Nabi, 2010). Several global issues have been developed, due to this enhanced land use for non-agricultural intentions, that require the attention of the global community. The native residents have the awareness of environmental hazards in their neighborhood, and several plans for betterment of environment have been started (Sekovski et al., 2012).

On the account of formalistic economic change, the province of Punjab is in the middle of utmost urban transformation. This province is evolving from a cultivated rural economy to a mass production, construction, and functional economy, heading towards massive urbanization. This conversion is just started and will persist over in the coming decades. The major cities of Punjab are required to assist the heightened urban growth and encourage economic development to fight against poverty and to promote viable economic growth. Housing markets and well-operational urban land are crucial elements for progress, which formulates the footing for both advancement of private sector and the capacity to cater the need of housing units to the population. Above one million urban population will be accumulated in five leading cities of Punjab that include Lahore, Rawalpindi, Multan, Faisalabad, and Gujranwala, according to Census Organization of Pakistan 1998 (Dowall & Ellis, 2009).

With the production of more than one million tons per year, Pakistan is the 5th largest mango producer in the world, upholding a share of 7.6% in the global market. Multan, which is the 6th largest city of Pakistan, is the central part of mango yield (Naz et al., 2014a). The city relates to the rest of the country through rail, road, and air. The Multan metro bus project has further redefined the urban status of the city. Ever growing importance of Multan in all fields of life has continuously attracted people from different parts of the country, which has increased its population, hence developing another industry, Real Estate. To date several housing schemes have been launched in and around Multan but nothing could bring in a qualitative change other than increasing the living space for the population (Broucher-in-Low.Pdf, n.d).

1.1 Problem Statement

Over the past few decades, climate change has had detrimental effects not only on natural and human systems across all continents but also throughout the oceans (Jarraud & Steiner, 2012). Extreme weather events (EWE) have amplified the potential for severe disasters. Over the last decade or so, there has been a noticeable rise in the occurrence of highly intense tropical cyclones, both inland and coastal flooding, landslides, droughts, increased aridity, water scarcity, air pollution, continuously rising sea levels, storm surges, and a growing menace of fatal heat waves worldwide (Leung et al., 2019); (UNEP, 2017); (Arshad et al., n.d); (A. A. Shah et al., 2019).

By employing a range of mitigation strategies like trees, cool materials, and green roofs, it is possible to enhance the thermal performance of buildings and decrease their cooling energy requirements (Aboelata, 2021).

In a city like Multan, where the climate is hot and dry, the cutting down of mango trees for the establishment of housing societies makes it more vulnerable in terms of social, economic, and environmental health of city. All these factors are critical to achieve a sustainable urban environment. Therefore, this study focuses on provision of green

infrastructure as an alternative to mitigate the effects of deforestation, especially cutting mango trees in Multan.

Mango trees in Multan are being cut down by the real estate projects, causing massive deforestation and environmental hazards. International research has been carried out on the implementation of green infrastructure in various housing and commercial projects. In case of Pakistan limited research exists, however, with respect to Multan, no research exists regarding to implementation of green infrastructure in housing societies.

1.2 Research Objectives

This study is going to identify socio economic effects of mango tree cutting on the local communities due to real estate development. Research questions that are being addressed in the study are:

I.   To identify the causes of mango tree cutting in study area.

II.   To find out land use and land cover changes occurred due to emergence of mega residential projects.

III.   To identify the social and economic impacts of deforestation on the local community.

IV.   To suggest a mitigating strategy for impacts of deforestation in urban areas.

1.3 Research Questions

The objective of this research is to identify the mango tree cutting in the local communities due to real estate development. The main objective of the study is following:

I.   What are the causes of mango tree cutting in the study area?

II.   How much land use and land cover changes occurred due to emergence of mega residential projects?

III.   What are the social and economic impacts of deforestation on the local community?

IV.   How to mitigate the impacts of deforestation in urban areas?

1.4 Study Area

Multan, spanning an area of 3720 square kilometers, stands as one of the ancient cities in the Asian subcontinent, boasting a rich history and cultural heritage dating back at least 2000 years, and possibly even founded around 5000 BC during the Indus Valley Civilization period. Located in the Southern Punjab Province at the heart of Pakistan, Multan has experienced significant urbanization in recent times, transforming it into a central hub surrounded by a vast hinterland comprising medium towns, large villages, and small clusters of shacks. (Torre, 2020)
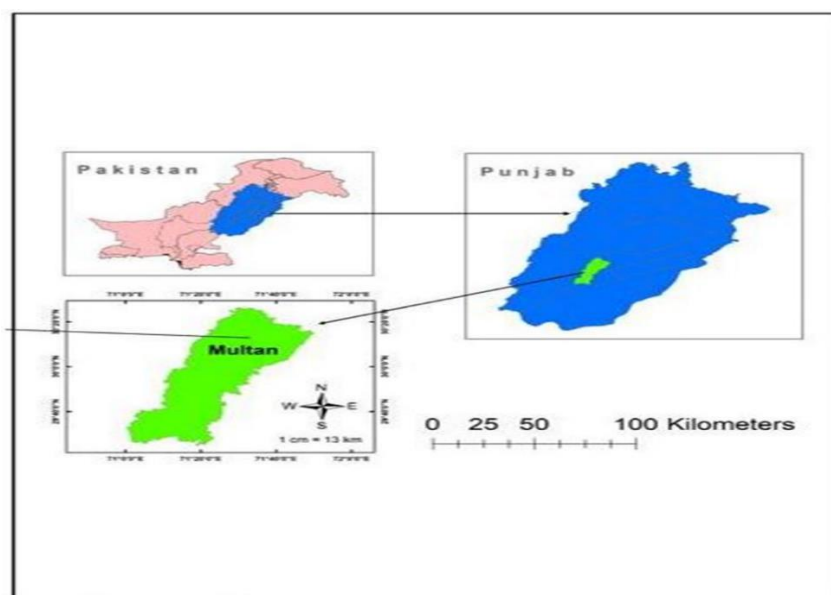
Figure 1: Location Map of Multan

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Multan is an arid city of Punjab, Pakistan, which is recognized for its mango trees. Since the trend of urbanization is increasing day by day, new housing societies are being established. Likewise, in Multan there are several new housing societies formed. The clusters of mango trees along the Bosan Road have disappeared in the past years, and residential colonies have been established there with the connivance of bureaucracy, which passes the site plans and maps of such schemes.

Most mega real estate schemes are being established without submitting the Environmental Impact Assessment reports, according to sources privy to the developments. The mango growers say the real estate tycoons have eaten up more than 4,000 acres of mango orchards across Bosan Road, Bahauddin Zakariya University, Matti Tal, Punjkoha, Shakk-e-Madina, Qadirpur Raan and several villages.

The real estate groups started purchasing orchard lands at nominal rates a few years back for establishing mega residential colonies when the real estate was at its boom. Then the city areas started converting into barren lands due to the flyover frenzy of the previous government and the ambitious metro project by the incumbent one.

Figure 2: Metropolitan Map of Multan

1.5 Scope and limitation

To understand the situation completely and perform a comprehensive study, it would have been better to study the whole Multan city with adjoining areas. However due to limited human and financial resources only a few housing societies projects and their surrounding areaswas selected. Sample size and the time of counting survey were also set as minimum due to limited resources and COVID-19 situation.

1.6 Thesis structure

A traditional structure was followed while writing this thesis. The study has been divided into sixfollowing chapters.

- Chapter 1 covers introduction including problem statement, Research Objectives, Research Questions, Area under study and Scope and limitation.
- The second chapter is the literature review regarding the research objective and research questions.
- The third chapter is about methodology followed for this research.
- Forth chapter includes all data collected and results
- The discussion of results with the analysis performed is included in the fifth chapter.
- The final chapter concludes the research with conclusion and recommendation.

CHAPTER 2: LITERATURE REVIEW

Land Use and Land Cover (LULC) changes have intense impacts on the (agro) ecosystems, and it has the capacity to alleviate global climate change (Gomes et al., 2020).

Land use is becoming a local environmental issue, especially in developing countries, and it is becoming a force of importance globally. Worldwide changes to the air, waterways farmland and forests are occurred due to the need to provide shelter, water, fiber air and food to more than 6 billion peoples. In the recent decade the global croplands, urban areas, plantations, and pastures have expanded, along with the considerable loss of biodiversity. Human-driven alterations in land use have facilitated the gradual acquisition of a larger portion of the Earth's resources. However, these changes carry the risk of compromising ecosystems' ability to support vital functions such as food production, preservation of freshwater and forests, climate regulation, air quality control, and disease mitigation. Balancing the immediate requirements of humanity with the preservation of the biosphere's long-term capacity to offer essential goods and services poses a significant challenge. (Foley et al., 2005).

Over the past five decades, developing countries have witnessed remarkable urban expansion, particularly in their urban centers. Impressively, out of the projected 2.5 billion global population growth by 2050, approximately 90% is estimated to occur in Asia and Africa alone. (United Nations. Department of Economic and Social Affairs., n.d.)

In recent years, cities worldwide have experienced an accelerated pace of growth, resulting in a global population that is now predominantly urban rather than rural. Developed countries have responded to this trend by expanding their urban areas into the peri-urban fringes, aiming to accommodate the housing and service needs of their population. While the loss of agricultural land in this process has often been attributed to market forces, there is a growing recognition of the significant influence of land use planning policies, systems,

and public actors in shaping these dynamics within specific contexts (Lawton & Morrison, 2022).

Throughout the latter half of the 20th century, urbanization has emerged as a major driver of deforestation. Considering the ongoing global demographic trends, the conversion of forested land into urban areas is expected to persist in the future (De Chant et al., 2010). In tropical forests, some of the most important environmental challenges are controlling and managing deforestation.

Currently, the production decline and export of Pakistani mango are causing significant concern (Naz et al., 2014b). Projections indicate that climate change will lead to a rise in the displacement of people (medium evidence, high agreement). Vulnerable populations lacking resources for planned migration will face greater exposure to extreme weather events, especially in low-income developing countries (Intergovernmental Panel on Climate Change, n.d).

Pakistan's significant rural sector relies primarily on agriculture for food production and as a source of employment for rural inhabitants (Jan et al., 2008). Throughout half of the 20th century urbanization has been a notable cause of deforestation. The conversion of forests and green lands to urban areas will likely continue, given the global demographic trends (De Chant et al., 2010d).

Over the past few eras, the city of Multan in Pakistan has experienced rapid urban evolution. The progression of socio-economic development and urban growth has led to swift urbanization, characterized by periods of both rapid and slower expansion, with high-speed growth spreading in all directions. Between 2008 and 2018, the built-up area increased significantly from 47.4 square kilometers to 70.3 square kilometers.

One notable consequence of this urbanization is the evident rise in the population growth rate. As urban areas expand, Multan has undergone extensive land use changes, resulting in

a shift away from agricultural activities. Despite being primarily an agricultural landscape, the district of Multan has witnessed a decline in agricultural land over the past decades. This loss of agricultural land has led to an increase in urban land area. In other words, the expansion of inhabited areas has come at the expense of reducing the agricultural land required to support the growing population's food needs.

The main causes of urban development are the causes of urban progress due to expanding population and interest in the job market. Effects of urbanization on the city Multan are common increment in population, movement to urban zones, absence of laws and guidelines to minimize extension of city which reduces the negative effects on agricultural land. The loss of developed land which is related to population development requires the anticipated new metropolitan advancement to be moved to locales which are less significant for food creation. The primary driver of urbanization is the quick population development (Nadeem, 2021a).

The tearing down of tropical and rain forest does not only affect the environment in tropical countries, but it also impacts on the world climate by increasing the greenhouses effect. Both Industrialized and tropical countries get affected by the destruction of tropical forests ecosystems. The major problems tropical countries face because of deforestation are microclimate, soil erosion and water depletion and these problems also affect agricultural productivity. Furthermore, the old people who are living in those areas for a very long time and are engaged in economic activities that does not affect ecosystem of rain forest they also had to move out of that area for their livelihood because of the deforestation. The anticipated rise in the greenhouse effect is likely to disrupt the global climate and result in fluctuations in climatic extremes, such as changes in wind patterns and temperature variations (Amelung, n.d).

Looking at the influence of urban growth on deforestation, it becomes imperative to

understand how urban areas are developing and the impacts of their development on the physical environment especially in terms of biodiversity and land degradation (Ibrahim Musa et al., 2017).

The combined impact of human activities and natural forces has led to widespread loss of native biodiversity and significant modifications in ecological processes and services within diverse ecosystems resulting in Land Use change. To comprehend the dynamics of land use changes, it becomes essential to analyze the prevailing trends and underlying factors driving such transformations. Accurate assessment and prediction of changes in agricultural production are crucial for effective land management and sustainable land use. As urbanization, deforestation, and industrialization continue to reshape the Earth's surface, land use is experiencing rapid and dynamic shifts (Sajid et al., 2020a).

A comprehensive study was conducted to analyze the urban growth and expansion of Multan city, focusing on the temporal and spatial characteristics of urban expansion and land use land cover change between 2008 and 2018. Multan, a city in Pakistan, has been experiencing rapid urban evolution in recent times due to the progress in socio-economic development and urban growth, leading to significant urbanization changes. Over this period, the urban expansion exhibited both rapid and slower growth stages, with high-speed growth spreading in all directions. The built-up area in 2008 covered 47.4 square kilometers, which increased rapidly to 70.3 square kilometers by 2018, Because of urban expansion, Multan has undergone extensive land use changes over the past decades. Despite being, predominantly an agricultural landscape, the district of Multan has seen a decline in agricultural land, leading to an increase in urban land area. In other words, the expansion of inhabited areas has come at the expense of reducing the agricultural land required to support the growing population's food needs (Nadeem, 2021).

Another Case Study has been Prepared on Multan City by the students at University of

Sargodha in which they have explained the impact of land use change of agricultural production of Multan District thoroughly.

The rapid changes in land use on the Earth's surface, driven by urbanization, deforestation, and industrialization, necessitate a thorough examination and prediction of agricultural production. The study incorporated various land-use classes, including dense vegetation/orchards, sparse vegetation/agriculture, built-up areas, soil/barren land, and water, to analyze the changes. Employing a supervised classification method, the analysis detected shifts in land use over time. The results indicated a decline in agricultural production within the dense vegetation/orchards land-use class between 2000 and 2016, while water, built-up areas, and sparse vegetation experienced an increase. The decrease in agricultural and barren land-use classes was likely due to their conversion into built-up areas. In particular, the built-up area in Multan expanded from covering 2.67% of the area in 2000 to 6.63% in 2016. Similarly, the dense vegetation land-use class decreased from 20.11% to 17.91% during the same period. While sparse vegetation agriculture initially decreased, it rebounded with a rise of 68.47% in 2016. Soil/barren land also experienced a notable decline from 10.59% to 3.85% by 2016. The water land-use class initially decreased but showed a slight increase by 2016. These land-use changes significantly impacted crop production, with cotton and wheat experiencing a decline, while rice production increased slightly. Sugarcane production remained relatively stable. The decline in agricultural productivity can be ascribed to the transformation of agricultural and unproductive land into built-up areas, fueled by population growth and human activities. Earlier research conducted in Multan District has also underscored the diminishing agricultural land and output, coupled with an expansion of built-up regions. The primary catalysts for shifts in land use within the district are human activities, further exacerbated by unplanned urban sprawl. This pattern has culminated in the depletion of agricultural land, loss of biodiversity, heightened

greenhouse gas emissions, and the adverse effects of urban heat islands. A distinct study scrutinized the interrelation between land cover attributes and the intensity of the urban heat island (UHI) phenomenon in Tianjin City. This inquiry unveiled the repercussions of alterations in land-use cover (LUCC) on green spaces and land surface temperature (LST). The growth of built-up areas coincided with a decline in agricultural zones. The average land surface temperature in the examined region escalated from 23.50 to 36.51 °C, signaling a shift toward elevated temperatures. Counteracting urban heat islands can be achieved through the preservation of forests and water bodies, while the development of vacant land should be averted to prevent degradation. The projected increase in land surface temperature is anticipated to reach 9.5 °C from 2020 to 2050, underscoring the escalating trend of urbanization and its associated repercussions (Sajid et al., 2020b).

Analyzing the LUCC distribution values for 2005, 2010, 2015, and 2020 reveals a consistent increase in the built-up area within urban centers. The built-up area expanded from 15.46% in 2005 to 17.80% in 2010, further growing to 19.56% in 2020, and projected to reach 22.72% by 2050. Initially, the study area encompassed 18.43% of lowlands in 2005, which subsequently decreased to 12.52% by 2010, 11.89% by 2015, and 10.21% by 2020. Arable land exhibited rapid growth from 26.10% in 2005 to 28.95% in 2020, while other land decreased from 26.47% to 26.10%. The influx of migration from rural to urban areas has led to an expansion of cultivated land outside prime locations, resulting in a decline of cultivated area from 10.72% in 2005 to 7.98% in 2020. Water coverage comprised 1.21% of the site in 2005, diminishing to 0.92% in 2010, 0.87% in 2015, and 0.68% in 2020. An evaluation of land use changes from 2005 to 2020 revealed the conversion of farmland in the northeastern study area into urban zones, primarily industrial areas. Over this period, built-up urban land and cropland increased by 15.45% and 1.64%, respectively, while lowland decreased by 13.73%. These outcomes underscore that around 11.45% of the

lowlands have been transformed into built-up areas. The study aimed to assess the influence of LUCC on land surface temperature (LST) within a sizable urban region of Tianjin. The research demonstrated that a 5.94% expansion in the built-up area led to a temperature increase of 1.5%. Conversely, a 10% increase in vegetation cover exhibited a negative correlation. Moreover, the study deduced that LUCC has a cooling effect of approximately 1.40°C in the city, and the average warming effect of LUCC on the urban heat island (UHI) amounts to about 0.5%. The research highlighted the necessity for further investigation into the impact of land use and land cover changes on the climate of cities and regions. As climate change continues to affect more areas, effective collaboration between government and the private sector is essential to devise efficient cooling strategies. Accessibility to environmental education should be prioritized to foster the development of ecological resources. Achieving this goal requires adept urban planning and implementation of green policies to address the mounting thermal stress (Ullah et al., 2023).

The studies provide the solutions to some of the challenges to maintain productive growth around the cities in those countries that are facing decline in urban population. In such cases, it is observed that most of the farmers convert their land into real estate, because they try to leave farming before the land prices drop, and that is the main reason of decrease in agricultural lands close to the large cities. On the other hand, in the developed countries many suburban farmers keep their agricultural lands growing and cultivate them, even after the land prices drops. The main cause of such behavior is that they wanted to remain in the suburbs of the cities, and keep their farming business, even after not getting a huge profit from that. In such instances, the agricultural revenue might be complemented by the proceeds from selling or renting out the land (Yagi & Garrod, 2018).

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter accentuates the strategies and methods that have been opted for this research on socio-economic repercussions of mango tree cutting on the local community. It additionally represents the methodologies employed for the assortment of information and analysis of data to accomplish the ideal objectives. The type of data collection, research design, various procedures involved for data analysis, and size of sample test have also been described in this chapter.

3.2 Research Design

For any research work a congruous research design is mandatory. This study centers around the financial and social impacts of mango garden cutting on the local community of Multan. With regards to Pakistan, it is a new subject for research. The mix method technique is exercised for this research paper. It ameliorates the dependability of exploration findings wielding both quantitative and subjective information data collection strategies to conclude the outcomes pertaining to research questions. Since the research is descriptive in nature, hybrid technique is being employed.

3.3 Data collection

Assemblage of data is the crucial part of any research studies, and it is considered as a spine of the review. Since it is already mentioned that hybrid research technique is employed, therefore both subjective and quantitative information is necessitated. Quantitative information is gathered by the means which are given beneath.

3.3.1 Secondary data

The absolute initial step of this research was to scrutinize some well written journals and

articles which were relevant to the topic. This scrutiny assisted in comprehension of numerous intricacies. The accessed secondary sources for assemblage of date are given beneath:

• Published work and Journals of Urban & Regional Planning.

• Articles, departmental reports, research reports.

 • Peri urban arrangement of region under the review

Various articles, research papers, official reports, the peri urban plan of the area was explored, analyzed, and scrutinized for apprehension of the impacts made by mango tree cutting on the local community. This study of literature helped to accomplish goals and objectives of this research by providing comprehension in various ways.
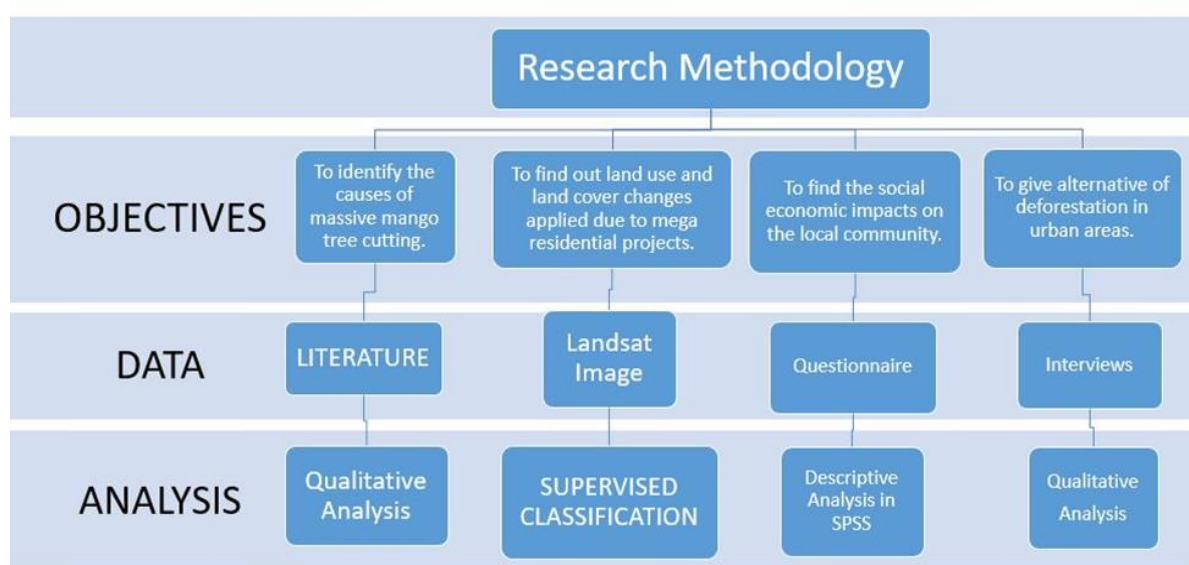

Figure 3: Methodology Framework

3.3.2 Primary data.

Primary data was collected through surveys, questionnaires, and structure interviews. The questionnaire survey was conducted in the selected study area to get information about Socio economic impacts of mango trees cutting on local communities & the people's livelihood due to development of real estate sector.

3.4 Questionnaire Survey

A questionnaire survey is a research method used to collect data and gather information from a group of individuals or a sample population. It involves the administration of a structured set of questions to respondents, aiming to obtain their opinions, attitudes, beliefs, behaviors, or demographic information. The questionnaire can be in various formats, including paper-based, online, or conducted through interviews.

It's important to note that ethical considerations, such as ensuring participant anonymity and informed consent, should be addressed throughout the survey process.

By conducting a questionnaire survey, researchers can gather valuable data and insights, make informed decisions, and contribute to the existing knowledge in their respective fields.

3.5 Data Analysis

The local community surrounding the real estate was chosen as the location of the survey. The sample size is 376, the number of total responses collected was 400. The SPSS software was used to evaluate and examine the data collected. In addition, the Composite Index Method, Pearson Chi Square test, and Microsoft Excel were used.

3.6 Ethical Requirements

In the data assembling procedure professional's remarks and opinions were kept confidential and were not disclosed to any extraneous authority or individual. The SOPs of Coronavirus were strictly adhered during data assemblage.

3.7 Study Area

With an area spanning 3720 square kilometers, Multan stands as one of the most ancient cities in the Asian subcontinent, boasting a profound history and cultural heritage that reaches back at least 2000 years. Its probable foundation dates to around 5000 BC, during the Indus Valley Civilization period. Situated within the Southern Punjab Province at the heart of Pakistan, Multan has become a focal point due to the ongoing process of urbanization. As a result, it serves as the nucleus of an extensive hinterland encompassing medium-sized towns, sizable villages, and compact clusters of makeshift dwellings (Torre, 2020)

Multan is an arid city of Punjab, Pakistan, which is recognized for its mango trees. Since the trend of urbanization is increasing day by day, new housing societies are being established. Likewise, in Multan there are several new housing societies formed. The clusters of mango trees along the Bosan Road have disappeared in the past years, and residential colonies have been established there with the connivance of bureaucracy, which passes the site plans and maps of such schemes.

Most mega real estate schemes are being established without submitting the Environmental Impact Assessment reports, according to sources privy to the developments. The mango growers say the real estate tycoons have eaten up more than 4,000 acres of mango orchards across Bosan Road, Bahauddin Zakariya University, Matti Tal, Punjkoha, Shakk-e-Madina, Qadirpur Raan and several villages.

The real estate groups started purchasing orchard lands at nominal rates a few years back for establishing mega residential colonies when the real estate was at its boom. Then the city areas started converting into barren lands due to the flyover frenzy of the previous government and the ambitious metro project by the incumbent one.

CHAPTER 4: RESULTS AND DISCUSSION

Land use and land cover change (LULCC) refers to the transformation and alteration of the Earth's surface due to human activities. It encompasses the conversion of natural landscapes, such as forests or agricultural areas, into urbanized and built-up areas. This study examines the case of Multan, a city renowned for its mango tree production, and explores the implications of land use and land cover change resulting from the transition from mango orchards to real estate development. Specifically, it delves into the historical context of Multan's mango tree production, the drivers of land conversion, the impacts on land use patterns, and the associated environmental and socio-economic consequences.

Multan, located in the Punjab province of Pakistan, has long been celebrated as the hub of mango tree production. The city's favorable climate and fertile soil have made it an ideal region for cultivating mango orchards. For decades, Multan's mangoes have been renowned for their superior quality and taste, attracting both domestic and international markets. The abundance of mango trees not only provided a source of income for local farmers but also contributed to the city's cultural identity and economic prosperity. Multan's status as the "City of Mangoes" was deeply rooted in the rich history and heritage associated with mango tree cultivation. The transition from mango orchards to real estate development in Multan was primarily driven by various socio-economic factors. After 2012, the demand for housing societies and urban infrastructure escalated due to population growth and rapid urbanization. As a result, developers sought land for construction projects, leading to the indiscriminate cutting down of mango trees. The profitability of real estate ventures outweighed the long-term benefits of preserving the mango tree ecosystem. The economic incentives associated with land conversion prompted the conversion of vast tracts of land previously occupied by mango orchards into residential areas.

The study began with a reconnaissance survey and field observations to define the specific area boundary for image acquisition. Satellite images for the years 2012 and 2022 were then

downloaded, focusing on the predetermined boundary. Short-range infrared and near red infrared bands were chosen for their suitability in capturing relevant land cover information. To facilitate analysis, colors were assigned to represent different land cover types. Vegetation was assigned green, mango trees were represented by red, barren land by blue, and built-up areas by yellow. The supervised classification model was applied using ArcGIS, enabling the assignment of land use and land cover classes based on their spectral signatures. The accuracy of the images was assessed by comparing them against the reconnaissance survey data, specifically evaluating whether the correct boundary line was captured. This step ensured the reliability of the subsequent analysis. To detect and analyze changes in land use and land cover between 2012 and 2022, a post-classification change detection model was applied. This modeling technique allowed for the identification of significant changes, trends, and patterns in the urban and natural landscapes of Multan.

The results and discussion section presents a detailed analysis of the LandSAT images, highlighting the observed changes in land use and land cover over the ten-year period. By comparing the images from 2012 and 2022, the study provides valuable insights into the transformations that have occurred in Multan's urban areas, vegetation cover, barren land, and built-up regions. The implications and significance of the study's findings are discussed, emphasizing the importance of monitoring land use and land cover changes for environmental and socio-economic purposes. The report also addresses policy implications for urban planning and resource management in Multan. However, it is important to acknowledge the limitations and challenges faced during the study. These include potential limitations of the methodology employed, such as the accuracy of the satellite images and the subjectivity involved in assigning land cover classes.

This provides a comprehensive analysis of LandSAT satellite images for Multan city in 2012 and 2022, focusing on land use and land cover changes. The research methodology, including reconnaissance surveys, image acquisition, color band assignment, supervised

classification, accuracy assessment, and post-classification change detection modeling, contributed to a thorough understanding of the changes that have occurred in Multan's landscape.
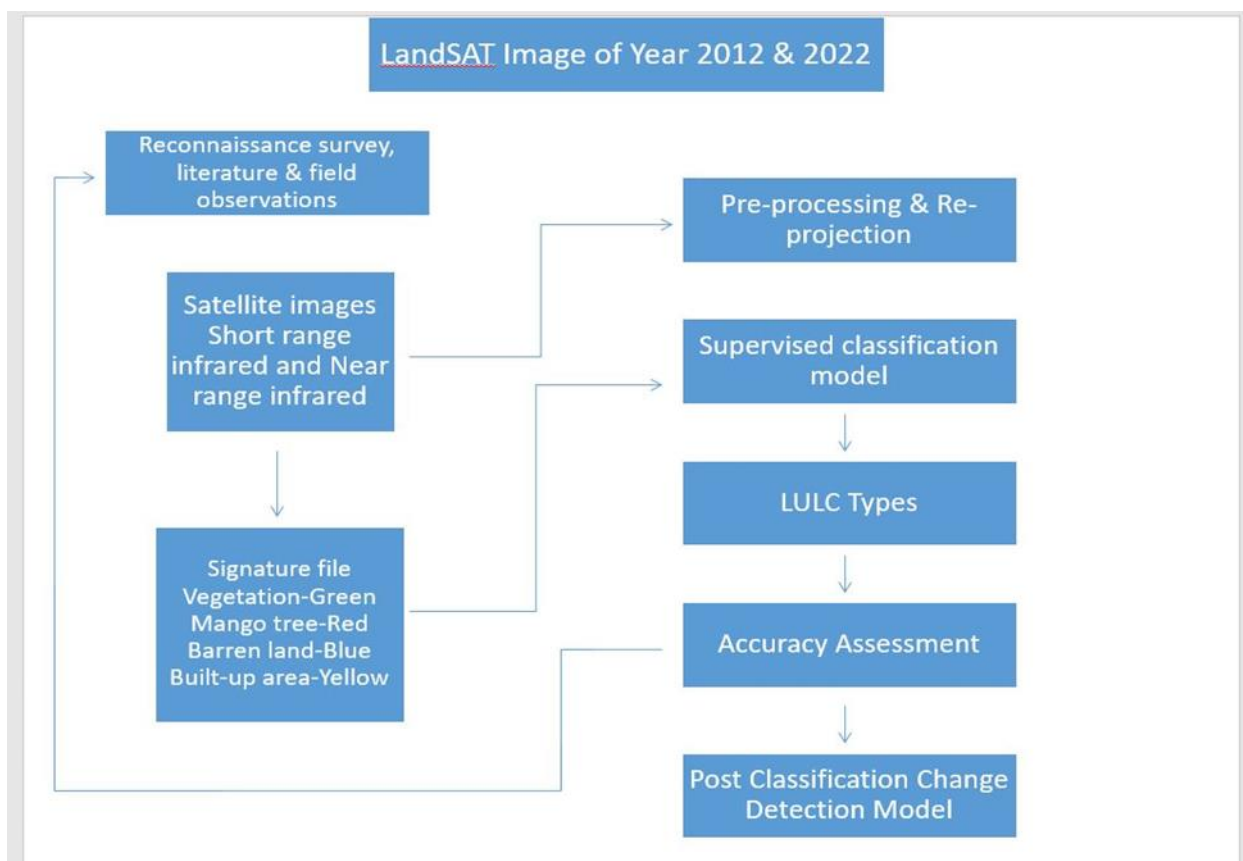
Figure 4: Land SAT Image of the Year 2012 & 2022

4.1 Impacts on Land use Pattern.

Land use patterns are essential in shaping the physical, environmental, and socio-economic landscapes of urban areas. The conversion of mango orchards to real estate development has had profound impacts on the land use patterns of Multan. Land that was once dedicated to mango tree cultivation has been transformed into housing societies, altering the urban fabric of the city. The shift in land use has resulted in a decrease in agricultural land, reducing the overall capacity for food production. This has implications for food security and the dependence on imported food sources. Additionally, the expansion of built-up areas has led to increased urban sprawl, resulting in fragmented landscapes and loss of open

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spaces. Such changes in land use patterns have far-reaching consequences for ecosystem services, biodiversity, and overall urban sustainability. The transition from mango orchards to real estate development in Multan was primarily driven by socio-economic factors. With rapid urbanization and population growth, the demand for housing societies and urban infrastructure escalated. Developers sought land for construction projects, leading to the indiscriminate cutting down of mango trees. The potential profitability of real estate ventures outweighed the long-term benefits of preserving the mango tree ecosystem. Economic incentives prompted the clearance of vast tracts of land previously occupied by mango orchards.

The conversion of mango orchards to real estate development in Multan has brought about significant changes in land use patterns. Lands that were once dedicated to mango tree cultivation have been transformed into residential and commercial areas. This expansion of built-up areas has resulted in increased urban sprawl, leading to fragmented landscapes and a loss of open spaces. The conversion of agricultural land into urban areas has reduced the overall capacity for food production, potentially impacting food security and increasing reliance on imported food sources. Moreover, the transformation of land use patterns has led to a decrease in green spaces and a shift towards a concrete-dominated urban environment.

LULC Map of 2012

Class Name
- Vegetation
- Mangoo Trees
- Barren Land
- Builtup Area
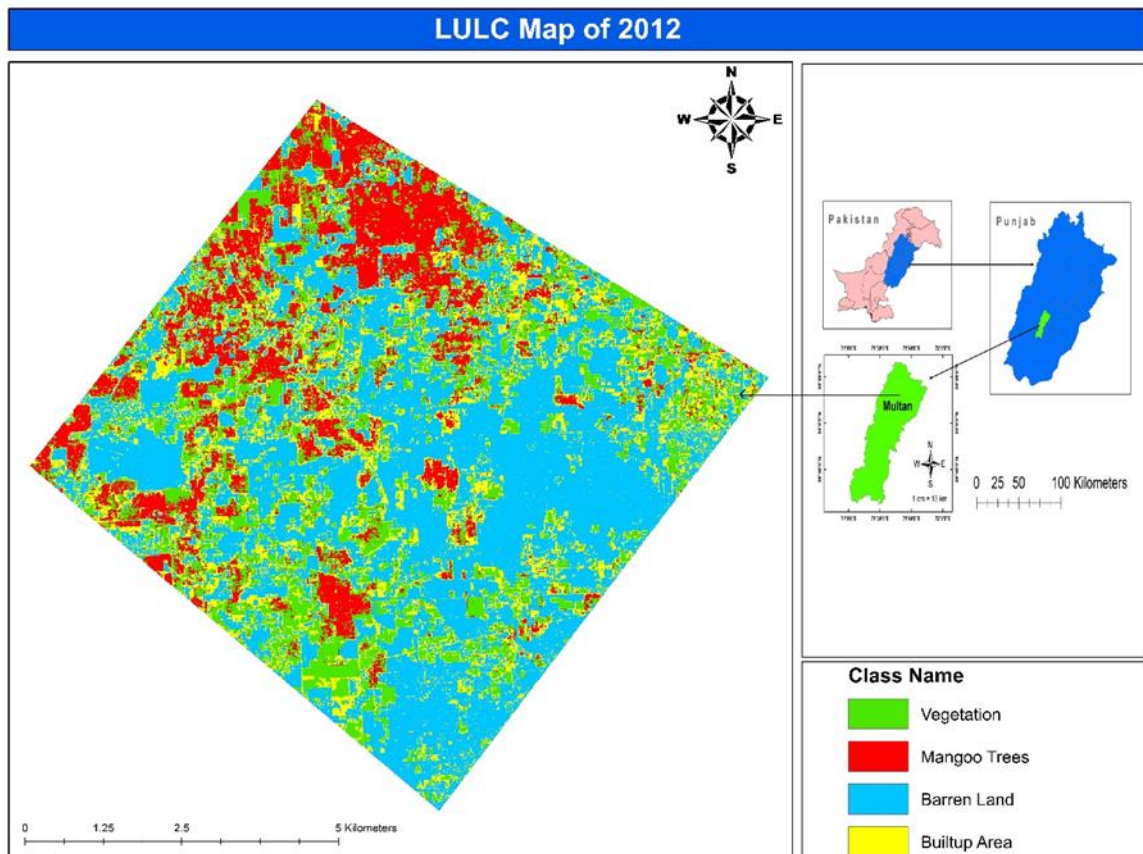
Figure 5: Land-Use Map of 2012

Till the year 2012, Multan boasted a thriving mango tree population, with millions of trees spread across the city. The region's favorable climate and fertile soil contributed to the abundance of mango orchards, making it a key player in mango tree production. The mango trees not only served as a significant source of income for local farmers but also held cultural and economic significance for the city. The landscape was characterized by vast stretches of mango orchards, creating a picturesque environment synonymous with Multan's reputation as the "City of Mangoes."

Following 2012, the landscape of Multan began to witness a rapid decline in its mango tree population due to the emergence and growth of the real estate business. The demand for land for housing societies and urban infrastructure prompted the cutting down of mango trees on an unprecedented scale. Millions of trees fell victim to this conversion, as the land they occupied was cleared for real estate development. The lure of economic gains and the

potential profitability of real estate ventures led to a disregard for the long-term benefits associated with preserving the mango tree ecosystem.
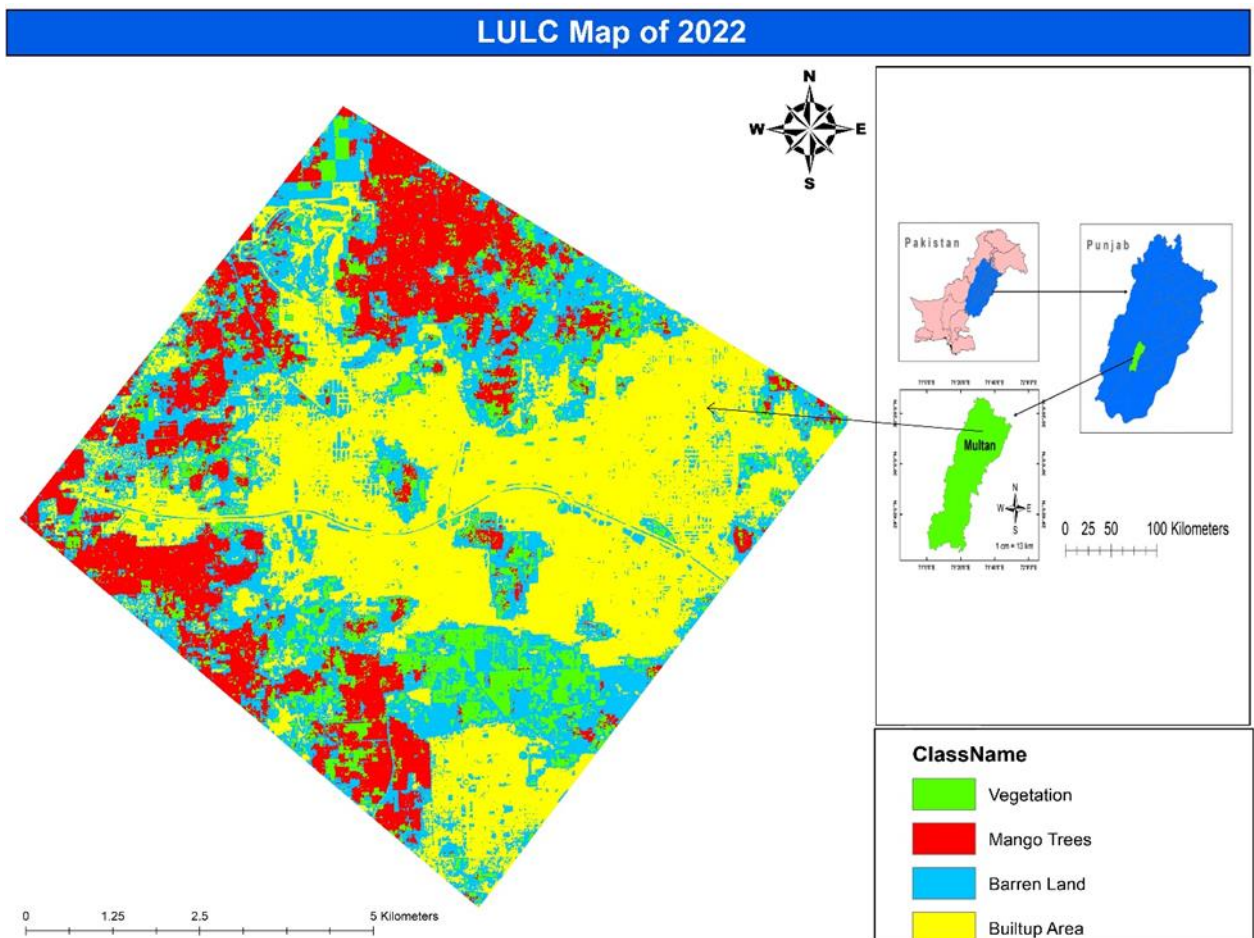
Figure 6: Land-Use Map of 2022

By 2022, the once flourishing mango tree population in Multan had undergone a dramatic transformation. The land that was once covered with mango orchards had been cleared and cleaned for real estate development. The extensive cutting of mango trees had left a noticeable impact on the landscape, as the previously verdant orchards were replaced by concrete structures and housing societies. The mango tree population had significantly dwindled, with only a fraction remaining compared to the numbers witnessed in 2012. The loss of this iconic vegetation altered the visual appeal of the city and had far-reaching implications for the environment and local communities.

The comparison between the mango tree population in 2012 and 2022 reveals a stark contrast in Multan's landscape. In 2012, the city was characterized by an abundance of

mango trees, with millions dotting the terrain. The presence of these trees not only contributed to the city's economic prosperity but also held cultural significance and contributed to the aesthetic appeal of the region. However, by 2022, the real estate development wave had taken its toll, resulting in the clearance of large tracts of land that were once home to thriving mango orchards. The land previously occupied by mango trees had been transformed into concrete jungles, housing societies, and other built-up areas.

The impact of this transformation extends beyond the visual landscape. The loss of millions of mango trees has resulted in the degradation of ecosystem services provided by these trees, such as carbon sequestration, soil conservation, and support for biodiversity. The removal of tree cover has also led to increased soil erosion and habitat loss for various species, contributing to a decline in local biodiversity. Furthermore, the conversion of agricultural land, including mango orchards, to real estate development has reduced the overall capacity for food production, potentially affecting food security and increasing reliance on imported food sources.

The rapid growth of the real estate business has led to the clearance of millions of mango trees, significantly altering the land use patterns and the overall environmental and socio-economic dynamics of the region. The loss of mango trees not only impacts the visual aesthetics of Multan but also has far-reaching consequences for the environment, biodiversity, and local communities. It is crucial to strike a balance between economic development and the preservation of natural resources to ensure the long-term sustainability and resilience of cities like Multan.

4.2 Land Use & Land Cover Comparison

In 2010, Multan had 298 hectares of tree cover, which accounted for 0.014% of its total land area. However, in 2012, the city experienced a significant loss as it saw a reduction of 333 million hectares of tree cover, resulting in the emission of approximately 111 tons of CO_2.

This sharp decline in tree cover raised concerns about the environmental impact and the need for urgent conservation efforts to mitigate further carbon emissions and preserve the city's greenery.

The images show Land use and Land Cover pattern of Multan city during different years.
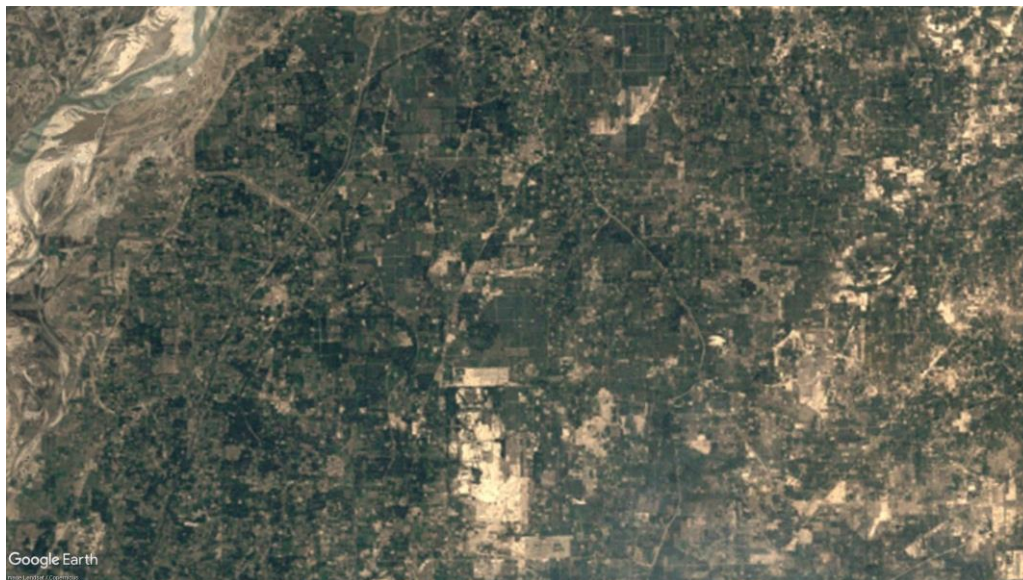

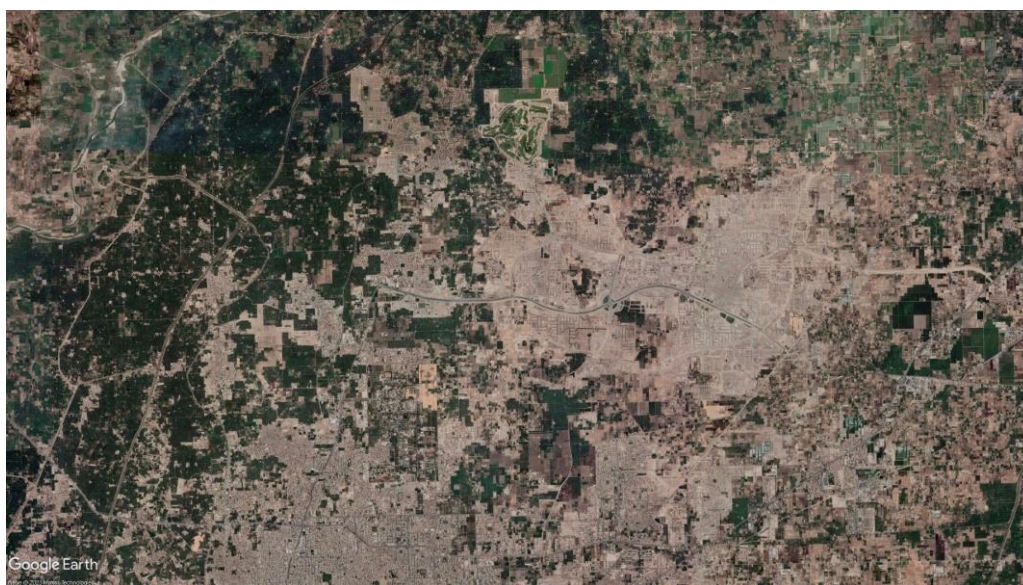*Figure 7: Land Use and Land Cover in year 2001*

Figure 8: Land Use & Land Cover in year 2023

Between 2001 and 2022, Multan experienced a loss of 3 hectares of tree cover, resulting in a noticeable 1.7% decrease compared to the tree cover in 2000. This unfortunate situation also led to the emission of a significant amount of greenhouse gases, with approximately

993 metric tons of CO_2 being released into the atmosphere. Such a reduction in tree cover and the subsequent increase in CO_2 emissions underscore the pressing need for effective environmental conservation measures in the region. Urgent steps must be taken to address these challenges and promote sustainable practices to preserve the city's natural greenery and combat climate change.

The reason behind this kind of huge change in land use & land cover is the expansion of urban areas and development of real estate. Approximately, 11,000 acres of mangos orchards has been deforested for the development of real estate business, in which around 10,000 acres of land is beings utilize for the development of DHA and other land is being owned by the developers for the projects like Citi housing, Buch Villas & other housing schemes.

4.3 Respondent Details

There were three hundred and seventy-six respondents in total, and these respondents played an extraordinary role in finding results and exploring new discoveries. Many unexpected things came into the researcher's knowledge, which would otherwise never be known, if the survey was not conducted. The survey was conducted in a specific region, the areas adjacent to the mega housing societies. The local community was selected to be questioned to learn the responses to the queries developed for the study. It is a highly distinctive method of gathering the information which is necessitated. Unexpectedly the results were very shocking when people told their side of the story. The people are of the view that their livelihoods are ended by building these housing societies. They said that most of them were living here in the villages, working in the mango gardens and other agriculture farms. Before cutting this agriculture area for the construction of housing societies, they used to work in that agriculture land. They earn their livelihoods by working there. By the end of the day, when they left for their homes, their owners used to give them mangoes, kinos, wheat and

other agriculture for free. Furthermore, they had kept cattle with them, from which they got free milk and meat. When the project of these societies was announced, the agriculture land which was rich in mangoes, kinos, wheat and cotton, started to scale down. After being sold out, this land was bulldozed for construction work. The people were forced to leave their happy place. They had to migrate to other villages, all their social life was badly affected. They had to change their earning methods. And now they must buy each and everything for themselves, which was once free for them. Their living has become very tough after this agriculture land cutting. They are of the view that these house projects should be built on barren land, rather than on agriculture land.
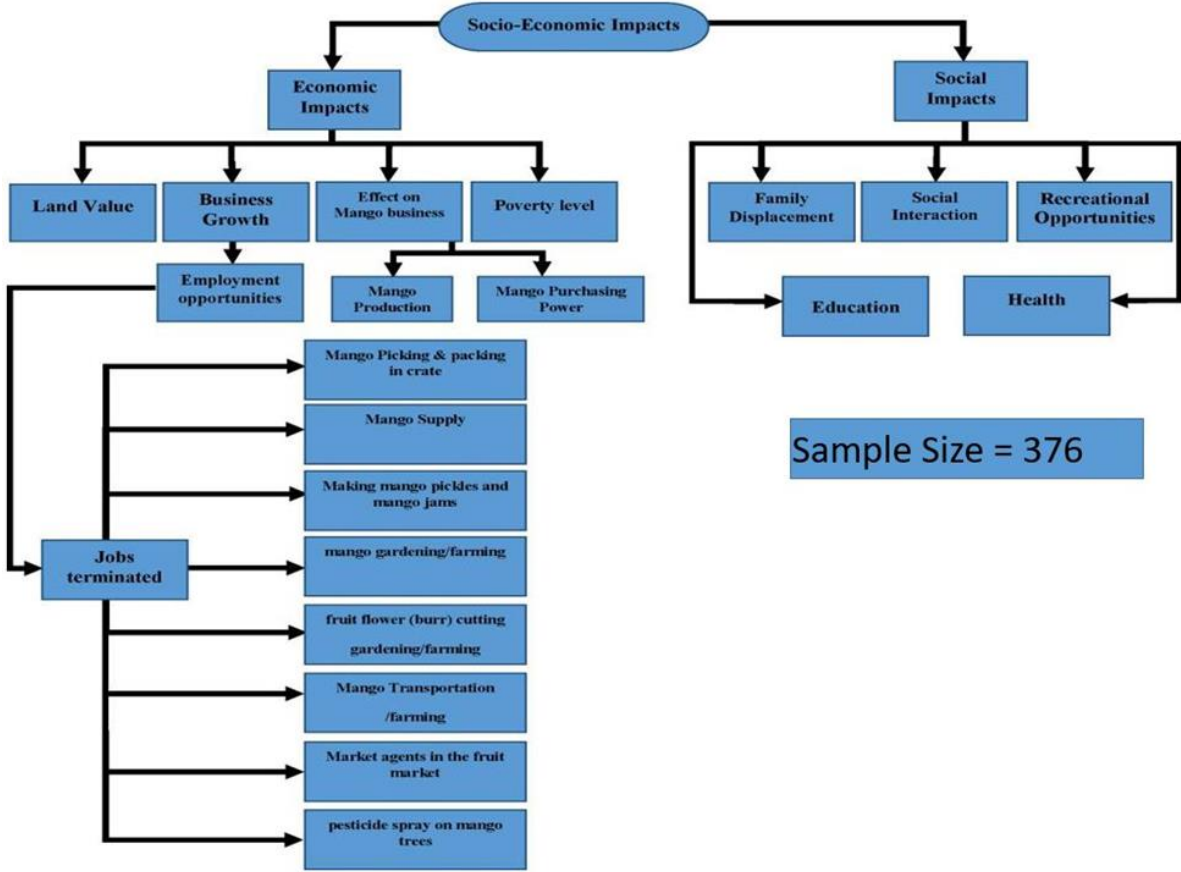

Figure 9: Socio-Economic Impacts

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4.4 Effects on Land Prices

When asked about the effect on land prices, whether these are increased or decreased. The answers were drastically shocking. Generally, it is thought that after the projects of DHA and CITI housing societies have been launched, the prices of that land have been increased. But 209 respondents out of 376, which is 56%, replied that their lands have been sold at very cheap rates. According to them their agriculture land was just like gold mine to them, it not only gave them food, but was also a source of earnings for them. The authorities gave very little amount to their life lasting earning. While 44% respondents replied that the price of land has increased after the launch of these housing societies.

The graph shows that the land prices have gone down. According to the survey, the majority of the people were of the view that their agriculture land was sold in very cheap prices. Their land was their source of earnings, source of livelihood and their shelter. Their land was like a gold mine for them since it gave them the earnings and was enough for their lifelong time and the generations to come. According to them, the selling of this land was forcibly imposed on them, otherwise they would never have sold their land. The graph reveals that after the emergence of housing societies.

Table 1: Effect on Land Prices

LAND PRICES	FREQUENCY	PERCENTAGE
INCRESED	166	44
DECREASED	205	54.5
NO CHANGE	5	0.13
PRICE PER MARLA		
50,000	209	55.6
70,000 - 80,000	14	3.7
100000	84	22.3
More Than 100,000	69	18.4
RENT OF HOUSE		
INCREASED	274	72.9
DECREASED	8	2.1

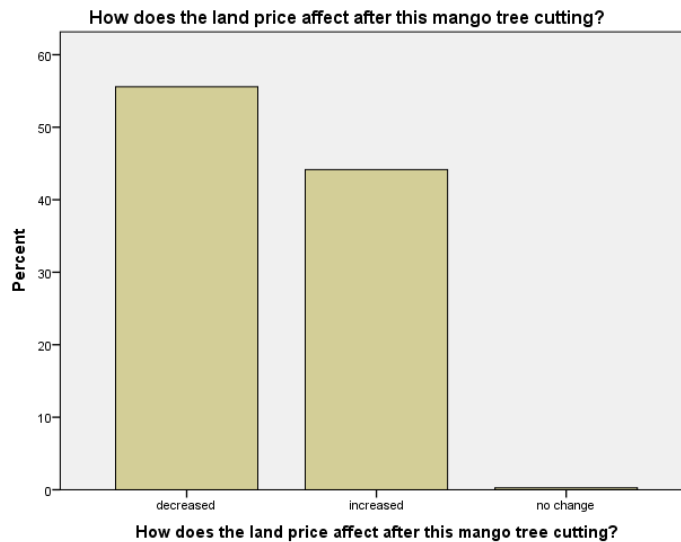How does the land price affect after this mango tree cutting?

Figure 10: Effect on Land Prices

4.5 Price Per Marla

When asked about the rise in per marla prices, 209 respondents out of 376, which becomes 56%, replied that only 50,000 price marla has been increased, 4% of the respondents replied to the raise in price was from 70,000 to 80,000, 22% responded that it was raise of one lac in per marla price, while only 18% replied that the raise was more than one lac. The majority was of the view that the authorities sold the land at very low prices, then the actual price of the land, so the major response was the raise of 50,000 per Marla. And the response for more than lac was very less.

The graph reveals that on average 50 thousand of the land prices were increased, after the emergence of these housing schemes. Before the emergence of these housing societies, the price per Marla was very low. After these housing societies came into existence, the per Marla prices increased naturally and it is increasing day by day. When people were asked about it, most of the people's opinion was that almost 50 thousand has increased on average. According to socioeconomic statistics, the price of rural land is usually less, and it was not only agriculture land, but it was also orchard land. Therefore, the land price increased by 50, 70 and 100 thousand. Generally, the price of plots in the city does not get increment this

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much. That's why we see so much variation in enhanced prices of plots per Marla.

4.6 Rent of Houses

When asked about how much rent of the houses has increased after this cutting of agriculture land. 73% respondents said that after they have been displaced from their locations for the start of the housing projects, the rents of the houses they are shifted to now have increased a lot. They had to pay for their house rents way more than they used to be. 25% of respondents replied that no change has taken place to the rent of the houses due to this cutting, because they did not have to shift anywhere. All the increase in prices is due to the rise in prices which is being done all over the country. The exception was 2%, who answered that the prices of the rent have been decreased, these were the people whose income was much higher, and they were not infected by the increase in rents.

The graph reveals that the rent of the houses has been increased after this mango orchard cutting. The reason being, these people were living in the villages, which were part of the agriculture land, that was replaced by new housing societies. They were forced to migrate from their place and get a new house for them. Most of the people when moved from their place were not able to buy a new house, so they had to live in rented houses. Even that some people said that they could have bought new houses, but due to inflation they could not afford to buy new houses. When the people moved from their places, their livelihood ended, they had to search out new sources of income for their living. Another problem was the number of families moving was higher, as compared to the number of houses present in that area, where they moved. Urbanization increased due to this migration. Due to this reason, the rent became higher in those new areas. The people who migrated had to search for only their source of earnings, but also their new shelter, and had to face the problem of paying higher rents.

4.7 Effect on Business

When asked about the question that how the business in your surrounding area has been affected after this mango tree cutting. 72% of respondents answered that their businesses have decreased, rather than ended. They were of the view that all their earnings have been ended due to this mango tree cutting. Before the agriculture land cutting, they used to work here on the farms. They were on different jobs like mango picking from the trees, mango packing in the crates, making mango jams, and making mango pickles, fruit flower or burr cutting, mango gardening and farming, supply of mango in markets, transportation of mangoes, market agents in the fruit market, pesticides spray on mango trees and rest of the agriculture. All these jobs ended after cutting their fertile land. They lost their source of earnings. They had to search for new sources of income, which was not easy. 13% of the respondents answered that business has increased after the start of these projects. These were the people who got better new jobs after the agriculture land cutting, the labors who got new job in the construction of the project, the shopkeepers who become shopkeeper after this start of new project and got their business very flourished. 16% of respondents said that there was no change in their job as they had already had their source of earnings as a shopkeeper, farmer or as a wage worker.

Almost 72% believe that their business has gone down after this removal of this agriculture land. This is mainly because most of the people were associated with the mango related business, which includes mango picking, packing of mangoes in crates, making mango jams and pickles, mango gardening/farming, fruit flower (burr) cutting, mango supply, mango transportation, market agents in fruit market, spraying on mango trees. As the orchard ended, all these businesses also ended. Females were also associated to these jobs. As in Punjab, Pakistan it is normal that females also perform different tasks in fields. The business for females entirely ended, as males in Pakistan can get other jobs easily, but females can

do some specific jobs only. So, all the females were deprived from their filed related job for good. They were associated with mango picking, making of mango jams and pickles etc. This ending of the earning source of one spouse, also aggravated the problems for newly migrated people. These people were forced to move from their rural area, since there was taken away from them. Not only their place was taken from them, but also the prices which were paid to them for their land were extremely low. The day by day rise of inflation caused problems for the people who migrated to start a new life.
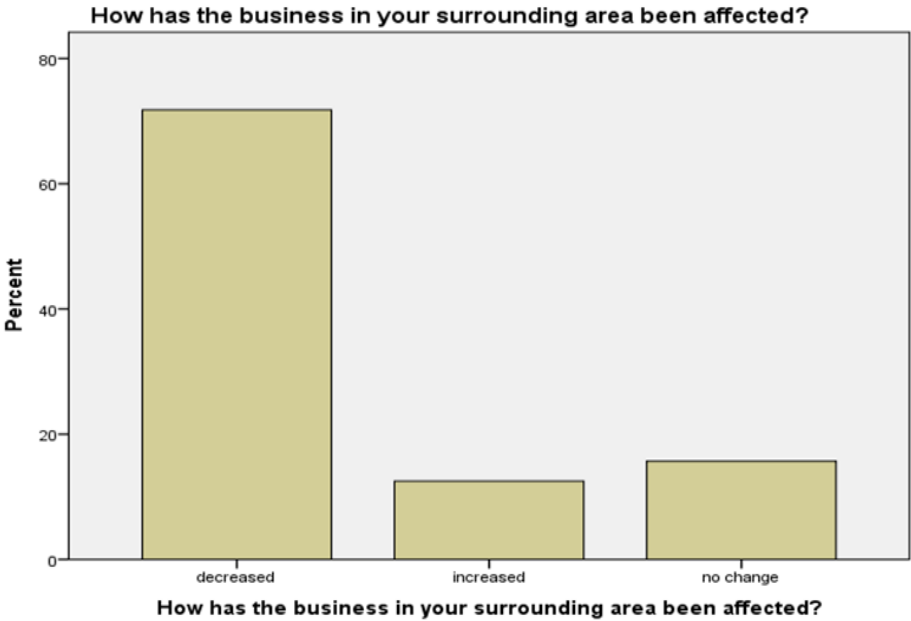
Figure 11: Effect on Business

4.8 Effect of Employment

The employment ratio has been decreased after the mango tree cutting, 71% people told that employment has been decreased, these were the people who were of the view that their employment ended with the removal of this orchard cutting. 18% said that employment has been increased, these were the people who had no job before the emergence of these housing societies, later they got the job as a labor and mason. 11% said that this removal of the orchard has not made any difference to their jobs. These were the people who were wage workers, and after cutting the orchard they were of same occupation.

Overall employment in that area has declined. Over 70% respondents claimed that they had lost their jobs due to this mango tree cutting. The people residing there were associated with mango orchard jobs. When the orchard vanished, all heir related jobs vanished as well. So, the employment rate intensively decreased. Although some people believed that it has increased the employment ratio. This enhanced employment ratio is due to increasing jobs in the construction sector. People getting jobs as laborers, masons in construction of these housing schemes. Some people who owned their businesses could not find new jobs, few of them also adopted job of labor and mason.
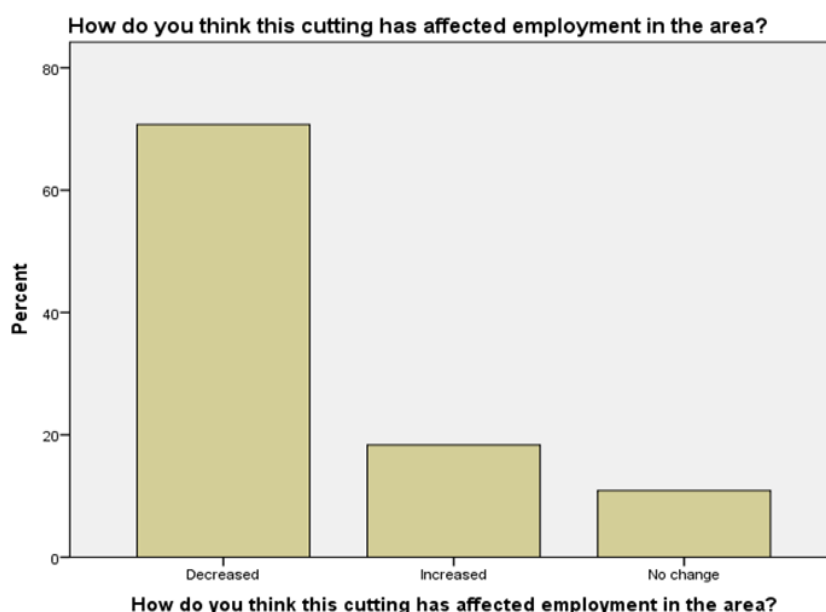
Figure 12: Effect on Employment

Table 2: Economic Responses

Business Growth Rate	Frequency	Percentage
Increased	47	12.5
Decreased	270	71.8
No Change	59	15.7
Employment Rate		
Increased	69	18.4
Decreased	266	70.7
No Change	41	10.9

Spray Shops Closure		
10	33	8.8
10-20	98	26.1
>30	223	59.3
No Change	22	5.9
General Store Closure		
10	45	12.0
20	83	22.1
30	215	57.2
No Change	33	8.8
Income		
Increased	71	18.9
Decreased	259	68.9
No Change	46	12.2
Jobs Associated With		
No Change	45	12.0
Mango Picking & Packing	95	25.3
Mango Supply	13	3.5
Making Mango Pickles & Jams	7	1.9
Mango Farming	96	25.5
Fruit Flower (Burr) Cutting	62	16.5
Mango Transportation	15	4.0
Making Agents in Fruit Markets	28	7.4
Pesticide Spray on Mango Trees	15	4.0
Other New Jobs Adopted		
Labor	51	13.6
Carpenter	49	13.0
Wage Worker	195	51.9
Shopkeeper	37	9.8
No change	44	11.7
Poverty Level		
Increased	287	76.3

Decreased	55	14.6
No Change	34	9.0
Prosperity		
No	247	65.7
Yes	50	13.3
No Change	79	21.0

4.9 Spray Shops Closure

When asked about the closure of spray shops, 39% of people were of the view that 10 to 20 shops have been closed in their respective areas. 23% of people are of the opinion that almost 10 spray shops have been closed from every area. 25% people told that, since the area was very large, so there were so many shops of sprays adjacent to the villages, which eventually ended due to the extinction of the rich agriculture land. Only 13% answered that, emergence of new housing societies made no difference on the business of spray shops. Due to agriculture land, the spray shops were near to their adjacent village. This made it easier for them to buy the spray bottles from the nearby areas. But as this agriculture land was removed for the construction of new housing societies, there was no more need of sprays then, because there was no more agriculture land to be sprayed on. So, all the spray shops owner had to end their businesses.

Approximately every person is saying that more than 30% spray shops have been closed in these areas. However, there are few people who believed there was no change, and that is mainly because the spray shops were less in those areas. When interviewed, people said that these were the kinds of sprays which were specifically used for mango fruit production. These were not used for any other crop. When all the orchards were vanished because of construction of new housing schemes, the need of these sprays ended. Subsequently, the spray shops had to be closed in those areas. The existing stock had to be sold at very cheap

rates and they had to start new businesses. Some people were of the perspective that they could not find job for more than 5 to 6 months. During this time, they spent the savings they had, but later they started their new businesses for their survival. Some of them said that they again opened spray shops, but these were in some other areas.

How many spray shops have been closed after mango cutting?

Figure 13: Spray Shops Clouser

4.10   General Shops Closure

When asked about how many karyana general stores have been closed after this orchard cutting. 21% people told that almost 10 karyana stores have been closed in every vicinity. 40% people told that 20% karyana stores have been closed in their areas. While 26% people told that almost 30 shops in each area have been closed. 14% told that it became no difference after or before the cutting of orchards. Since, on agriculture land, the people who were working over there, were also living in those places, karyana shops were available there. As this cutting down started, people begin to move out of their areas. The housing societies not only eradicated the agriculture land, but also finished the shops present over there.

The mean average is 30 in that area. The karyana stores, usually called general stores which

provide daily commodities to the local population at their doorsteps. These general stores are the nucleus of every community since they made the easy provision of basic entities to the community. When the population migrated due to mango tree cutting, on average 30 general stores were shut down and these were the small stores which people had opened in their own houses. When these people had to move out, they had to close these stores as well. Thus, on average 30 stores were closed. Since the whole area was wiped away when the land was sold. Those who were interviewed said that they did not have much quantity of material, so they used this material for their own household needs. Even when they were moving out from that area, they had to sell the rest of the material at very cheap rates, so that they could have some money for living in the new place. The material included flour, oil grains, and eatables of daily use. When they migrated from that place, it took 5 to 6 months to start a new job and new business. During this time, they spent all their savings. And most of them started new business other than general stores because they did not have certain amount to open new general stores.
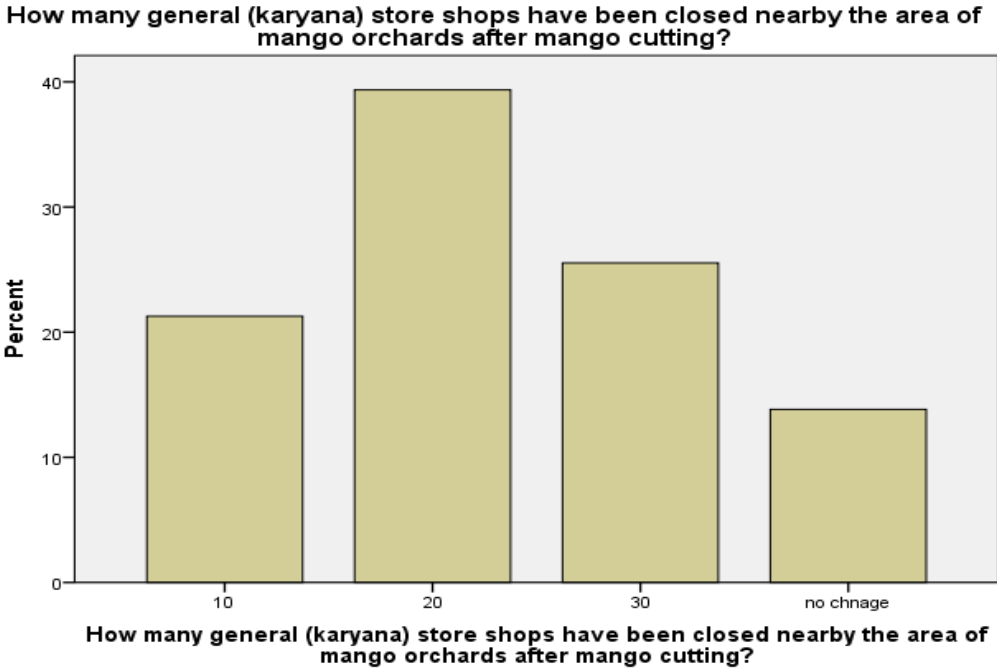

Figure 14: General (Karyana) Shops Closure

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4.11   Effect on Income

When asked about that how mango tree cutting has affected your income. 71% of people believed their income has decreased after the emergence of new housing societies. These were the people who were associated with the mango orchard jobs, after cutting down these orchards, their job ended, which lead to the end of their income. 18% of people were of the view that their income has increased. These are the people who had found new jobs related to construction business, like laborer, mason etc. or have opened new shops in area to facilitate them. 11% replied that it has made no difference to their income. These are the people who are wage workers or shopkeepers, who facilitate the population of passer byes there.

Based on the above two things, the overall income of respondents has also declined, and this is evident from this data that almost more than 70% of the respondents believe that their income has been gone down after the mango tree cutting down. Since, their livelihood was associated with activities related to the mango orchard. As this orchard was removed, their activities also ended, and their income automatically declined significantly. They claimed that before mango tree cutting, their income was 20 to 25 thousand on average, which was sufficient to run their livelihoods. But as the orchard was cut down, their income reduced to 10 to 12 thousand, not enough to run their families. It became very difficult to manage their livelihood and afterwards they had to finish their children's school, because they could not afford it anymore. They then made their children work in different small shops. Even their females started working in people home for household chores, to make their earning. They also mentioned that, not only their income has been reduced, but also their expenditures have been increased. Since, they used to get free wheat, mangoes, fodder for their cattle. But now they must purchase each and everything for themselves. This made their life even more miserable.
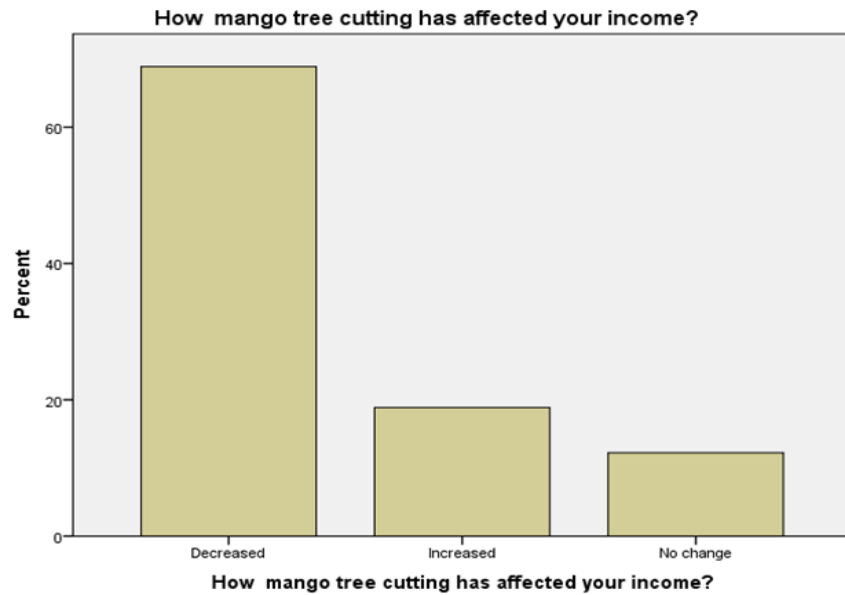
Figure 15: Effect on Income

4.12   Effect on Mango Related jobs

When asked with which job people were associated, when the orchard existed. 25% responded that they were associated with mango picking and mango packing job. 26% were involved in mango gardening and mango farming job. 17% were involved in flower (burr) cutting job. 7% were market agents of mango fruit in fruit market. 4% were associated with the job of mango transportation. 4% were related to the job of spraying on mango trees. 3% told that they were involved in mango supply, including fruit vendors. 2% told that they used to make mango pickles and mango jams and then sell it reasonable rates to make their earning. 12% told that no change in their job. These were the people who were already doing job of wage worker, that is fruit or juice vendors, or they had their own shops, so after the mango tree cutting, they still are doing their job as before.

Most of the people were engaged with mango gardening and farming, as about 25% told that people were involved with mango gardening and farming. Almost same percentage was involved in mango picking and packing them in crates. So, there were two major job activities that people were having when they were working in the mango orchard. Besides that, fruit flower cutting, which is also called burr cutting local language, transportation of

mangoes, market agents, mango supply, spraying on mango garden were the other jobs, people were associated with. When asked one of the persons who was involved in mango picking from the trees, when the mangoes are ripened and then pack them into crates. He said that he had no education. However, he was doing the job of mango picking and then pack them into the crates, for almost 15 years. But when the orchard was removed, his job ended as well, and he had no other skill set. The only job he could have adopted was to become a wage worker as a vendor of fruits. Most of the jobs which have been increased in that area were construction labor. But he had no experience of construction. Similarly, those people who were involved in pesticides spray on mango trees, their business also affected badly. They shifted their business to new places, since they had links with the pesticide's companies. These companies supported them to transfer their business to new places. Similarly, the people who were involved in mango gardening and farming, for them it was extremely hard and tough to survive, because their livelihood has ended. And they did not have sufficient money to survive. Some of the people told that, their whole family was involved in the jobs related to mango farming, and with the removal of these orchards, their whole family was deprived from their jobs.
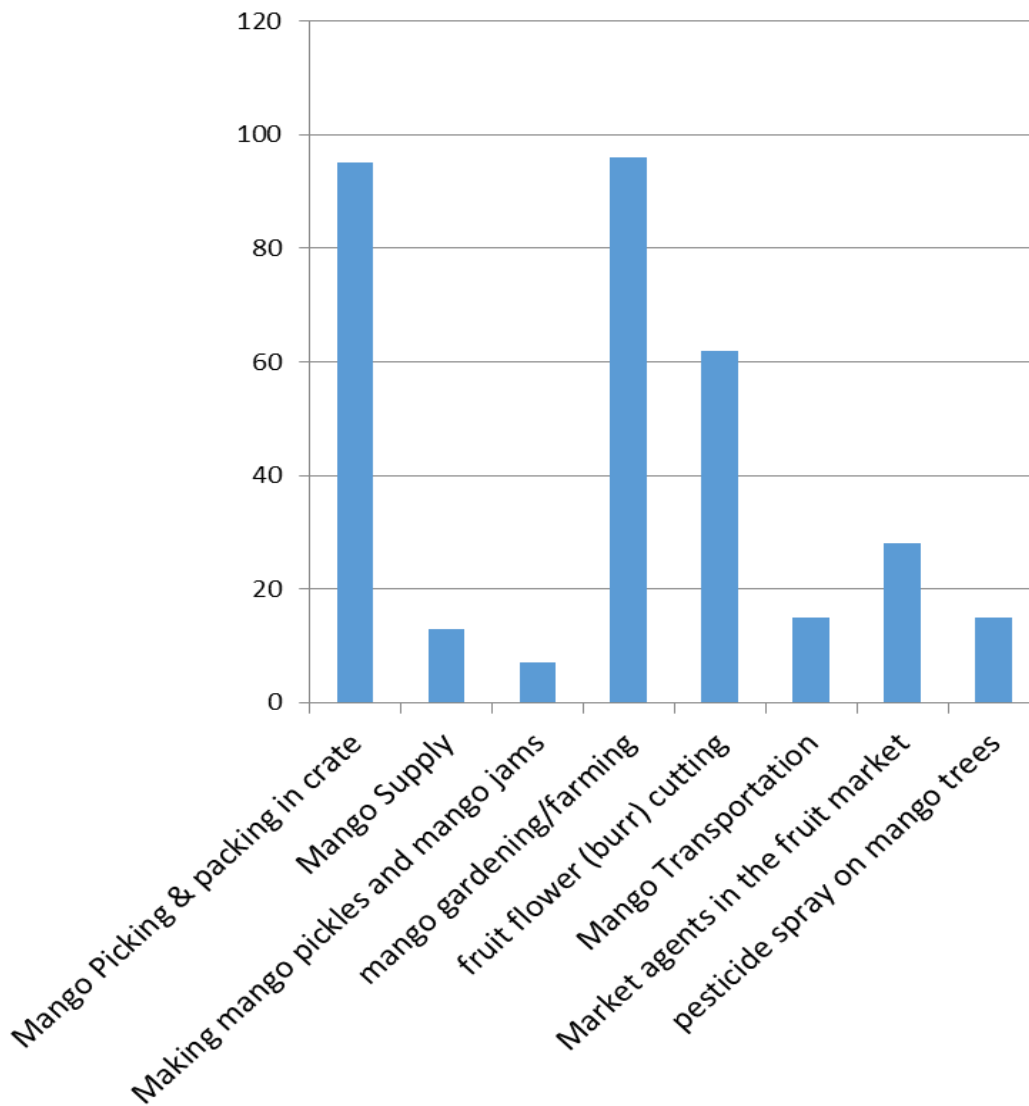
Figure 16:Effects on Mango Related Jobs

4.13   New Adopted Jobs

When asked what other new jobs people to have adopted after mango tree cutting? 52% responded that they adopted the job of wage worker, which involve fruit vendors, juice vendors, and local breakfast vendors. 14% said that they adopted job of labor. 13% told that they adopted the job of carpenter. 10% opinionated that they opened ne shops for their earning. Since by emergence of new housing schemes, there are a lot of people who move for making out these schemes, so they had a good earning because of these people. 12% said that they don't have to change their jobs even after the mango tree cutting. These were the people who were already wage workers, shopkeepers or skilled workers, whose job did

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not affect after mango tree cutting. 88% of people had to adopt new jobs after this mango tree cutting.

Most of the people said that they become wage workers or labors after their initial jobs ended. Because of their low educational level and lack of skill sets, they had no other option except for doing the job of wage worker or labor. Since they were involved in all the mango farming and gardening jobs, they did not have any new skill to start something new after when the orchard was removed, so they thought that it was easier to become a wage worker. Some of them also started working in construction sector as a labor. Somehow or other, the people who were involved in packing mangoes in the crates, also knew how to make the crates and the work of carpenter. They started working as carpenter and some people opened their new shops by taking some loans form others. It was not easy for them to start new jobs, since it took time to settle down for new jobs, to earn enough to run their families.
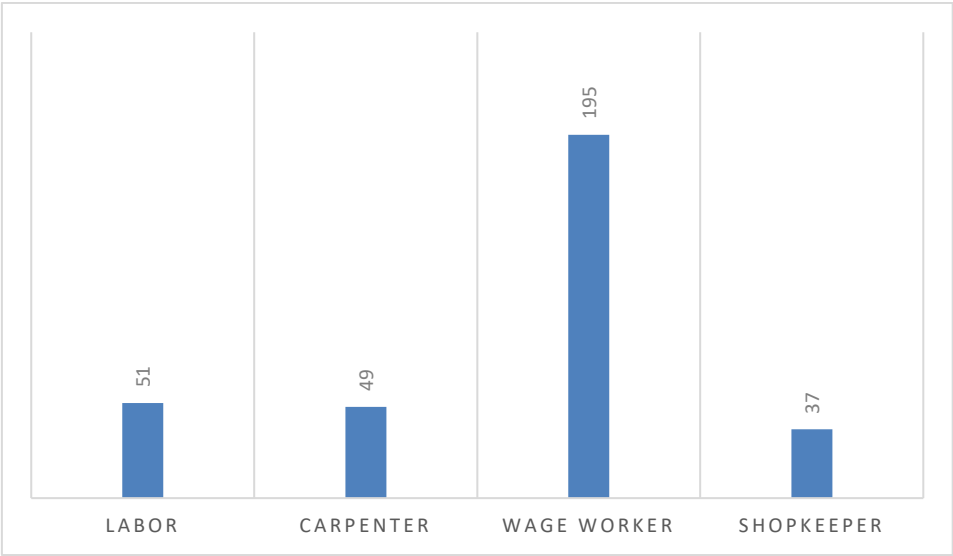

Figure 17: New Adopted Jobs

4.14   Poverty Level

When asked whether the poverty level has increased or decreased after the mango tree cutting. 76% replied that the poverty level has significantly enhanced. Before it, people were living in their homes, located in the villages of mango orchards, getting free wheat, milk,

mangoes for themselves. Everything was available on their doorsteps in cheap rates, they did not have to go city for any daily commodity. After the mango tree cutting, their earnings ended, they had to move other areas, became homeless, their expenditures increased, consequently increasing their poverty level.15% replied that poverty level has decreased. These were the people who got some better jobs after this mango tree cutting, got more earnings after that, so for those people poverty level has decreased. While 9% replied that the mango tree cutting didn't make any difference to the poverty level. The poverty level is the same as it was before mango tree cutting.

This question was generally asked to the locals of that area. There is a significant opinion that poverty level has increased, and the people believe that they fall in circle of poverty after this mango tree cutting. This is mainly because their jobs ended, their livelihood vanished.

Earlier they could have their all eatables for free because the orchard they used to work in, the owner of that land gave them wheat and mangoes for free. They got milk and meat from the cattle they had kept. After this cutting, they had to pay for everything, purchase everything at higher prices. Their income had already become low, because of their jobs finishing. The whole of this impacted on enhancing poverty level.
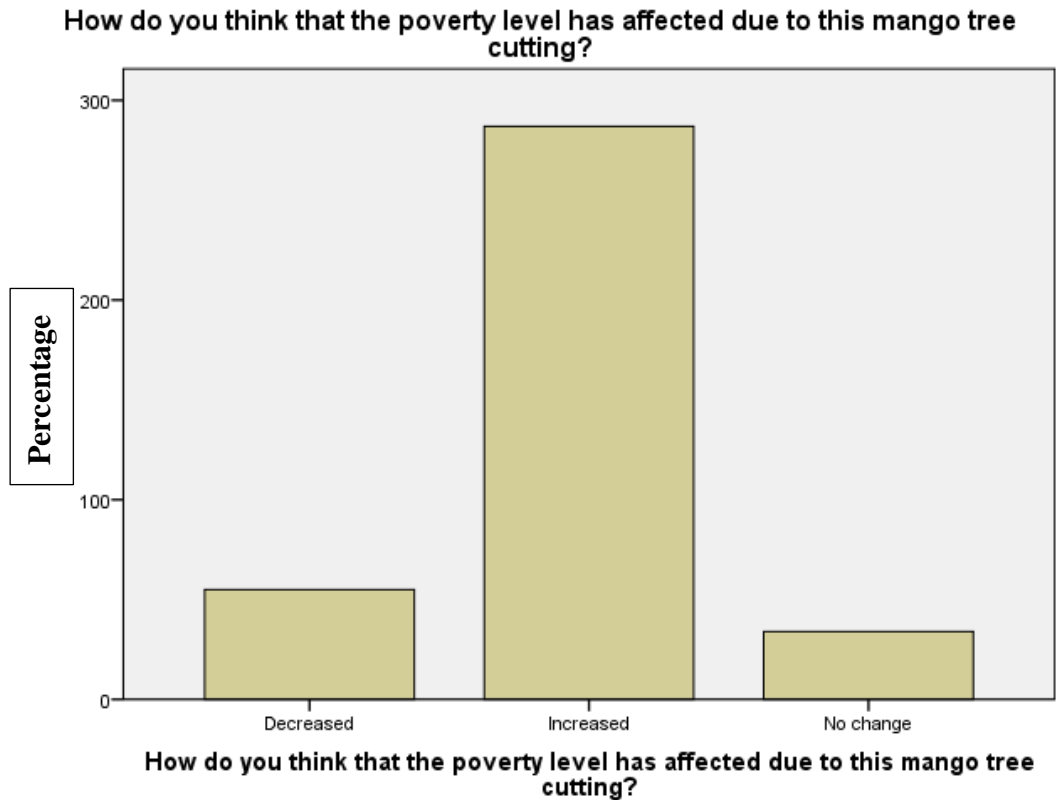
How do you think that the poverty level has affected due to this mango tree cutting?

Figure 18: Poverty Level

4.15   Prosperity Level

When asked about whether this mango tree cutting, and emergence of new housing societies has brought any prosperity 66% responded that it did not bring out any prosperity. 21% opinionated that it did not make any difference in prosperity of their area. 13% replied that this brought prosperity. These were the people whose earnings have been increased after tree cutting, so their prosperity level has been increased.

Has this development of new housing schemes brought any prosperity to your area or not? When asked, most of the people believed no prosperity has come after the emergence of new housing societies. It brought no prosperity for those people who were living in those villages, since their business and jobs ended, farmland ended, their homes were taken away from them. Their families had to scatter in some new areas, poverty increased, which all aggravated the lower level of prosperity. As it is generally considered that emergence of new housing scheme brings prosperity to that area, some positive socioeconomic impacts

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in that area. But 65% of people responded that it brought no prosperity, since the housing societies are gated communities, they have fixed their boundary walls. All resources are being used in their vicinity. The schools which are being constructed there are used by only the specific population residing there. Their fees are so high, that common man can't afford it. So, only the people who can buy homes in those areas can afford their children to send them to those schools. The parks which are made for recreational activities, the local people can't visit, because the ticket price is too high. The parks are gated too, people are being checked, whether they belong to these housing schemes or not. Also, for the job, they prefer people who are educated, while the people in these areas are mostly illiterate. The entrance of the local people into these societies is a major issue. Initially, when these colonies were being developed, the locals of this area had a thought, when there will be parks built in these areas, they along with their children will go for recreational purpose and enjoy there. But when those parks were built, the high ticketing price, could not make them visit those parks. Prosperity due to these housing schemes has only been for those people who has sold their land on higher prices and for those who can afford to live luxury lifestyle. The prosperity has also increased for them, who own the project of these housing societies and who have the construction related jobs in those societies. For the people who are involved in the business of real estate, for the contractors who are constructing buildings and infrastructure there. Prosperity about the city has been enhanced, but when it comes to locals, the prosperity level has decreased.
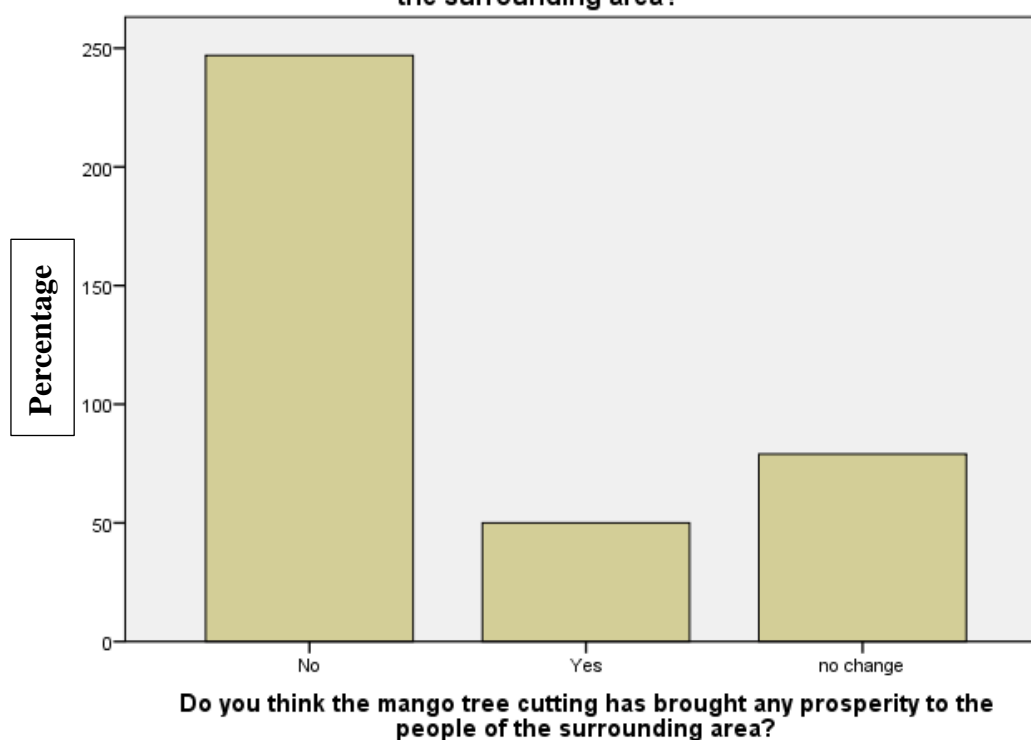
Figure 19: Prosperity Level

4.16   Economic Impacts of Real Estate Business on Mango Trees

Table 3: Effect of Real Estate Business on Mango Trees

Supply of Mangos	Frequency	Percentage
Decreased	328	87.2
Increased	5	1.3
No Change	43	11.4
Mango Purchasing Power		
Decreased	339	90.2
Increased	16	4.3
No Change	21	5.6
Type of Mango Affected		
Chaunsa	216	57.4
Anwar Ratol	98	26.1
Dussehri	62	16.5
Rate of Mango		
Decreased	12	3.2
Increased	325	86.4
No Change	39	10.4

4.16.1 Supply of Mangos

When asked about that whether the supply for mango fruit in the market has been affected after mango tree cutting or not. 87% replied that the supply has decreased, after the cutting of thousands of mango trees. An orchard of almost 40 thousand mango trees ended, and each tree carry mango on it. So, when that much production of mangoes ended, subsequently it affected on the supply of mangoes in market as well. 11% said that it did not make any difference to the mango supply in the market. These were the people who use to get mangoes from the market, so they think that mango tree cutting has made no impact on the mango supply in market. Only 1% responded that the supply has increased.

Real estate development has not only affected the people of this area only, but also have adversely affected the mango market business. Mango market vendors and the local people associated with the mango business; they said that mango business has been affected badly because more than one lac mango trees have been cut down. The number of mangoes has been dropped exceptionally due to this orchard cutting, which made a great break down of mango supply in the market. More than one lac trees were cut down to pave the way for DHA. So, when people were asked that how the mango supply has been affected after this mango tree cutting, majority replied that it has dropped down drastically.
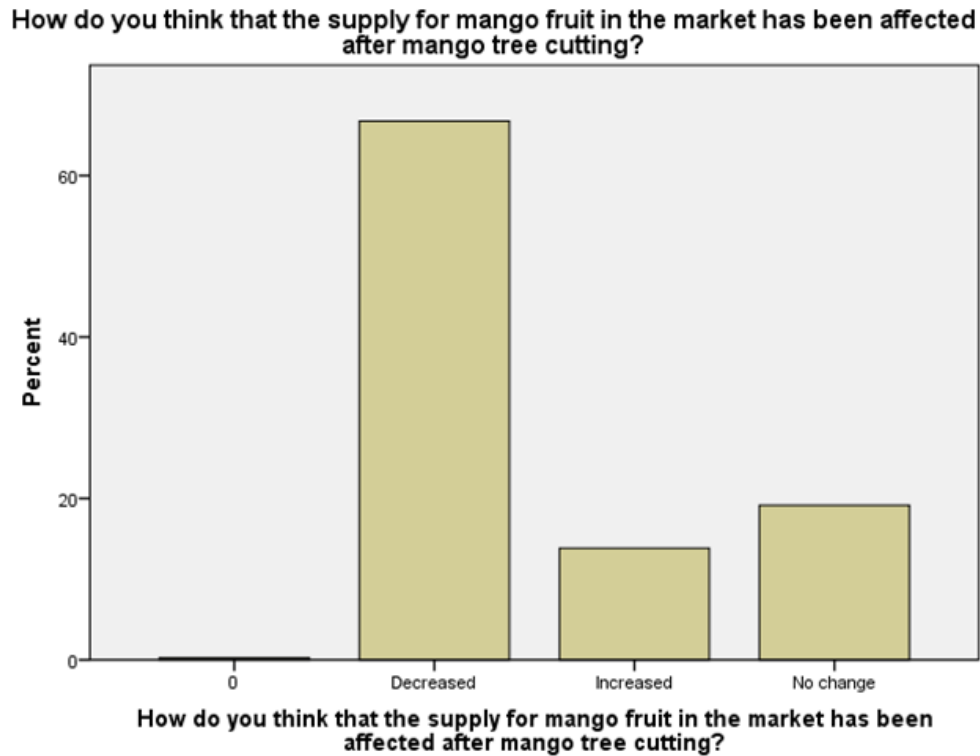
How do you think that the supply for mango fruit in the market has been affected after mango tree cutting?

Figure 20: Effect on Mango Supply

4.16.2 Purchasing Power

When asked about whether purchasing power of people of this area has been affected after this mango tree cutting or not? 90% replied that their purchasing power of mango has been decreased. They were of the view that earlier they used to get mangoes for free. They did not have to buy the mangoes from market. But now as the orchard has been cut down, they had to buy the mangoes form market, and must pay high price for mangoes. So, now they have left the mango purchasing because they had to manage their livelihood. Buying fruit, which was once freely available to them, is now have become a luxury. Furthermore, the rate of the mango has become high after this mango tree cutting, which also has added the decline in mango purchasing power of ordinary people. 6% told that mango tree cutting has made no difference on their purchasing power, because before this cutting, they used to buy mangoes themselves from market and after cutting, still they had to go to market to buy mangoes. So, it did not make any difference to their purchasing power. However, 4% replied

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that their purchasing power of buying mangoes has been increased. These were the people whose earning has been increased after this mango tree cutting.

The purchasing power of people buying mangoes was drastically affected as well. Earlier people used to get free mangoes. The supply of mango decreased in market after the cutting of mango orchard and the prices were increased, subsequently dropping down the purchasing power of local consumers. People said that, previously they used to eat mangoes endlessly, but now they don't even have mangoes to eat, as they cannot afford to buy it now. A family told that, they got so mangoes earlier, that they used to make pickle and jams of it, and then sell it too. But after this mango tree cutting, they were not able to make pickles and jams as they could not found sufficient mangoes to eat now. Only last year, people were able to get mango easily, because due to Covid 19, aerospace was closed and the mangoes were not exported, so the market prices could not raise that much.
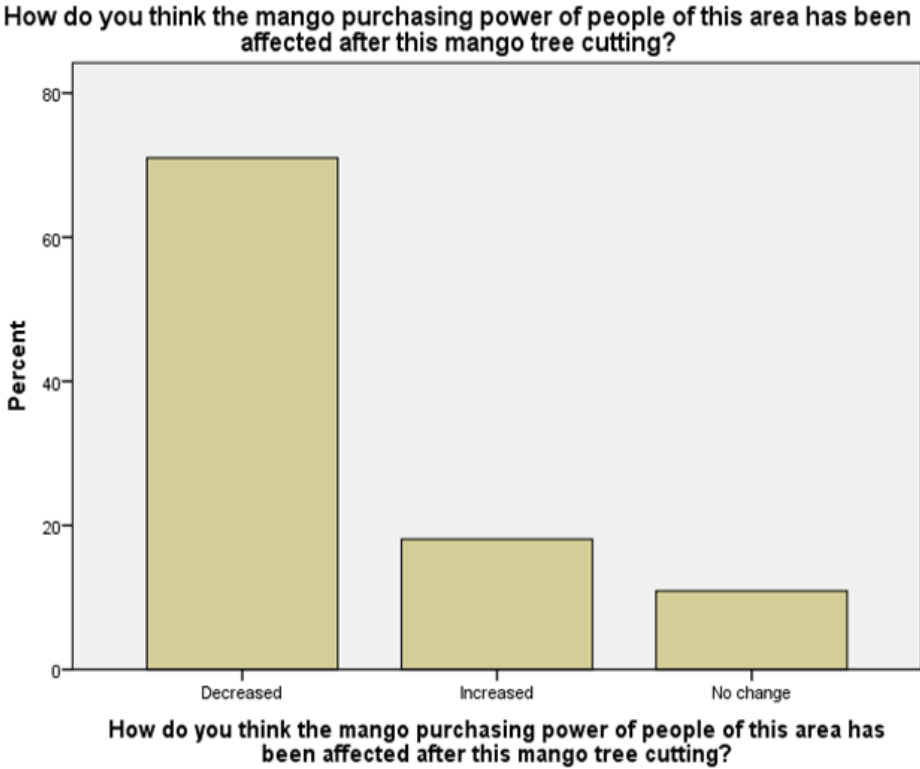

How do you think the mango purchasing power of people of this area has been affected after this mango tree cutting?

Figure 21: Purchasing Power

4.16.3 Types of Mangoes Affected

When asked about that which type of mango affected badly in this mango orchard cutting. 58% people told that in that area Chaunsa mango, which is very delicious in taste. There were thousands of trees of Chaunsa in that area, which were cut down for the construction of new housing societies. The people told that 26% was the production of Ritol mango in that area, and 17% was Dussehri, which has been affected due to this mango tree cutting. Chaunsa is the most expensive and tasty mango among all the mango types and is favorite among local as well as at international level. The demand of Chaunsa is very high in international market. This is the most exported mango from Pakistan. But after the cutting down trees, the supply of Chaunsa mango has been affected adversely. Since those gardens contain more of Chaunsa trees than any other type. The supply of Ritol and Dussehri has also been affected, but the most affected mango was Chaunsa.
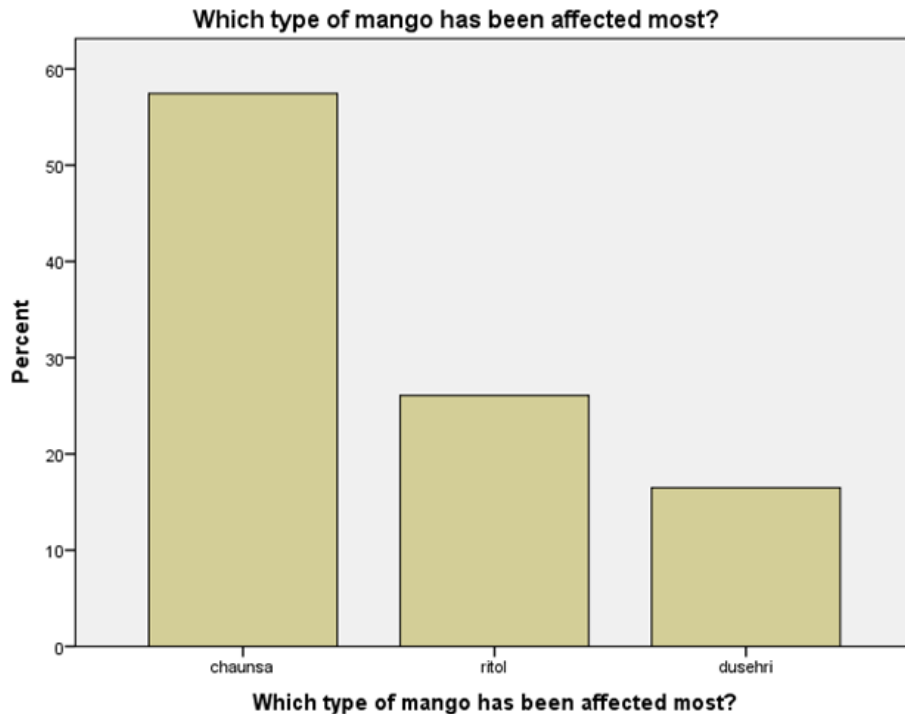

Figure 22: Types of mangoes Effected.

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4.16.4 Rate of Mangoes

When asked that how the rate of mango has affected after this mango tree cutting? 87% said that as the availability of mango has been vanished after this mango tree cutting, the rate of mango has become incredibly high. Since the supply of mango has become less and demand has been increased. 11% said that the mango tree cutting has brought no difference to rate of the mangoes in market, while 3% are of the view that the rate has been decreased. Since the supply of mango fruit has been declined at sharp rate, the demand in market has been increased, making its rate higher than before.
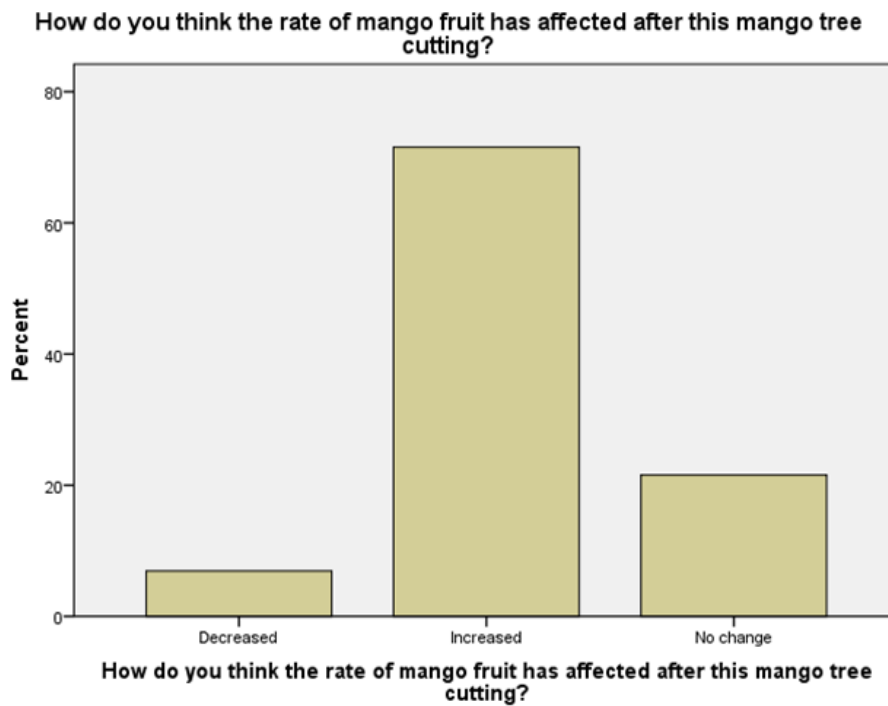

Figure 23: Rate of Mangoes

4.16.5   Impacts on Dairy Farms

Cutting of agricultural lands and mango orchards also effected the dairy farms products and their prices, the reason behind increase of prices was simple, the villagers who was living in those areas does not have to move to far areas for the feeds and fodder for the animals. They cultivate the fodder and feeds for the animals by themselves. And now that the agricultural lands been converted into the built-up areas now, they had to go to the nearest

markets and had to purchase the feed, also they had to meet the cost of fuel for the travelling to purchase the things, effected the prices of dairy products.

Table 4: Economic Impacts on Dairy Products

Farm Animals Displacement	Frequency	Percentage
Yes	14	3.7
No	362	96.3
Meat & Milk Prices		
Decreased	7	1.9
Increased	326	86.7
No Change	43	11.4
Fodder Prices		
Decreased	4	1.1
Increased	329	87.5
No Change	43	11.4
Other Crops		
Wheat	177	47.1
Kino	69	18.4
Falsa	41	10.9
Cotton	89	23.7

4.16.6 Effect on Farm Animals

When asked whether the farm animals displaced or not? 97% replied that yes. They were of the view that they had kept animals for their daily use. They got milk, meat, and eggs from them. So, by keeping these cattle with them they were getting free and pure milk meat and eggs from them. This pure food was a source of sound health for them. But after cutting of the mango orchard, they had to move with their cattle. Thousands of cattle were also displaced in this way. Some people must slaughter their cattle, as they were not able to move their cattle with them. So, they lost another source of their income and expanses too. Only 3% replied that they had no cattle with them. So, their cattle were not displaced.

We also observed in terms of livestock which were available in that area. When we asked the local community about the farm animals' displacement after the mango tree cutting, we

observed that majority of the people said that their animals were displaced from that locality. Those animals mostly included cows, buffaloes, goats and hens, the animals from which they can get meat and milk easily. Almost 96% people believed that farm animals were displaced, and this shows that not only humans but also animals were also got disturbed due to this mango tree cutting. A family said that they had three buffaloes, five goats and seven hens. From which they used to get their daily food meat, milk, and eggs. But after the mango tree cutting, it became very hard for them to make a survival for their animals. As some space is required to keep those animals, to tie them and bound them. Since there houses were very small, they could not place those animals with them anymore, so either they had to sell those animals at very cheap rates, or they had to slaughter them. The people whose animals survived, they had to shift such places, where they could place their animals safely.
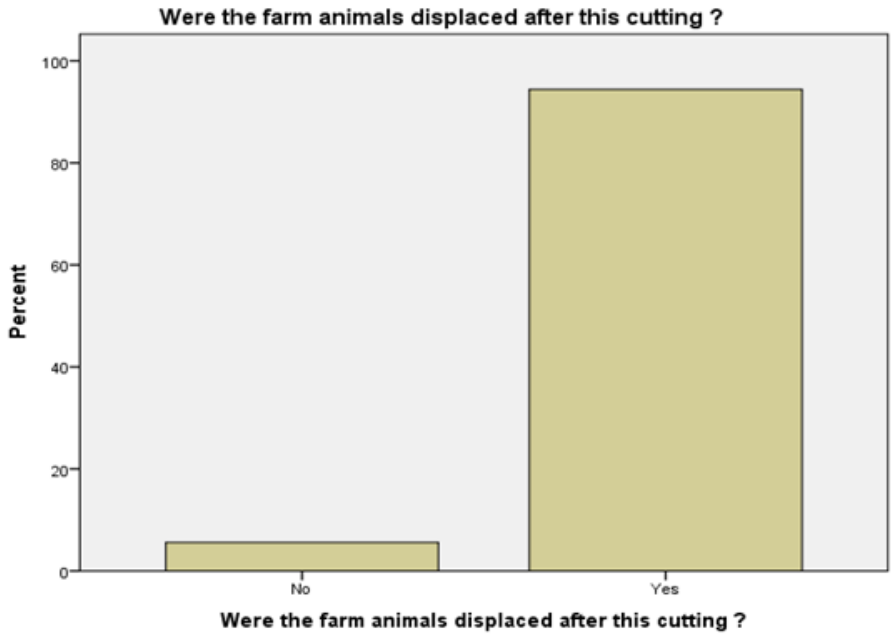

Figure 24: Displacement of Farm Animals

4.16.7 Prices of Dairy Products

When asked that the rate of milk and meat has been affected or not?

87% of people said that the rate has been increased after this mango tree cutting. Before this

cutting, people had their cattle in the villages of mangoes, so they used to get free meat and milk from their cattle. After the mango tree cutting, they had to sell out their cattle, and had to buy meat and milk from market, which was expansive to them. 11% of people said that it does not make any difference, these were the people whose income was not dependent on the mango orchard. While 2% responded that the prices have been decreased. These are the people whose earning increased after mango tree cutting.

Since the number of animals was decreased, as the animals were slaughtered and moved out of that area. The availability of milk, meat, and eggs. The demand for these things became high because eggs, milk and meat were a part of their daily meal. So, the prices increased. Moreover, now the residents over there had to go too far places to buy meat, eggs, and milk, which costs very expensive to them, including the price of fuel.
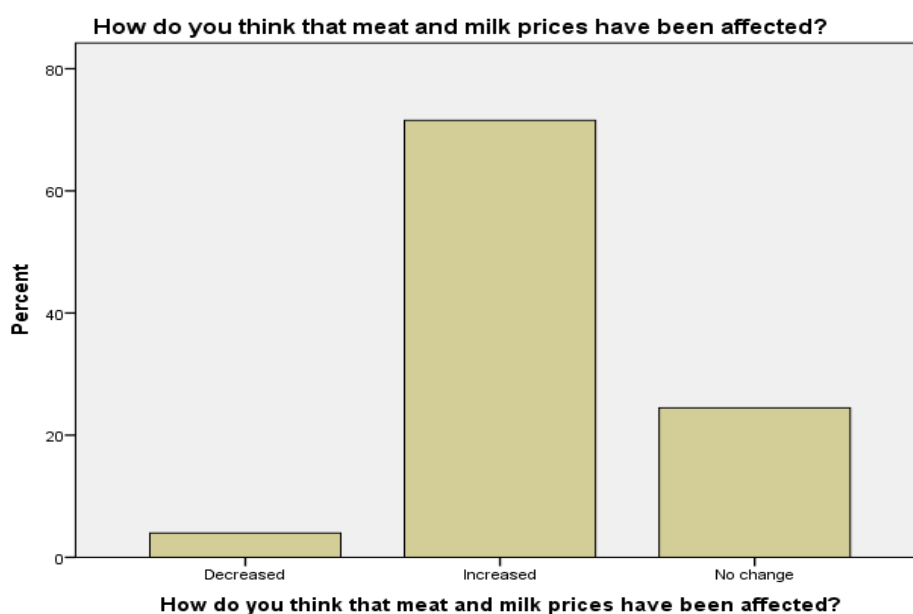

Figure 25: Prices of Dairy Products

4.16.8 Effect on Fodder Prices

When asked about whether the fodder prices have been also increased or not? 87% people responded that earlier people used to get fodder for free for their cattle, which they have kept in their houses or on lands. But as the orchards ended, the fodder also vanished, now

they had to buy the fodder from outside. They had to ride very far away for the purchasing of fodder for their cattle, where they buy fodder on higher rates. 12% replied that it made no difference on fodder price. These were the people who had not kept cattle with them, that is why it did not make any difference for them whether the fodder prices increased or not. Only 1% replied that the prices of fodder have been decreased, these were the people who don't have to travel much to buy fodder and get it from the nearby places.

Majority of people said that fodder prices have also increased tremendously after this mango tree cutting. Since the feed for animals the grass, herbs and shrubs were grown along with those trees in that agriculture area. They don't have to buy the fodder for their animals, as they used to get it free. Now they had to go too far away areas to buy the fodder for their animals. Not only does it take very high on the fuel price, but the fodder itself also costs very high. So, it has become very hard now to feed their animals too.

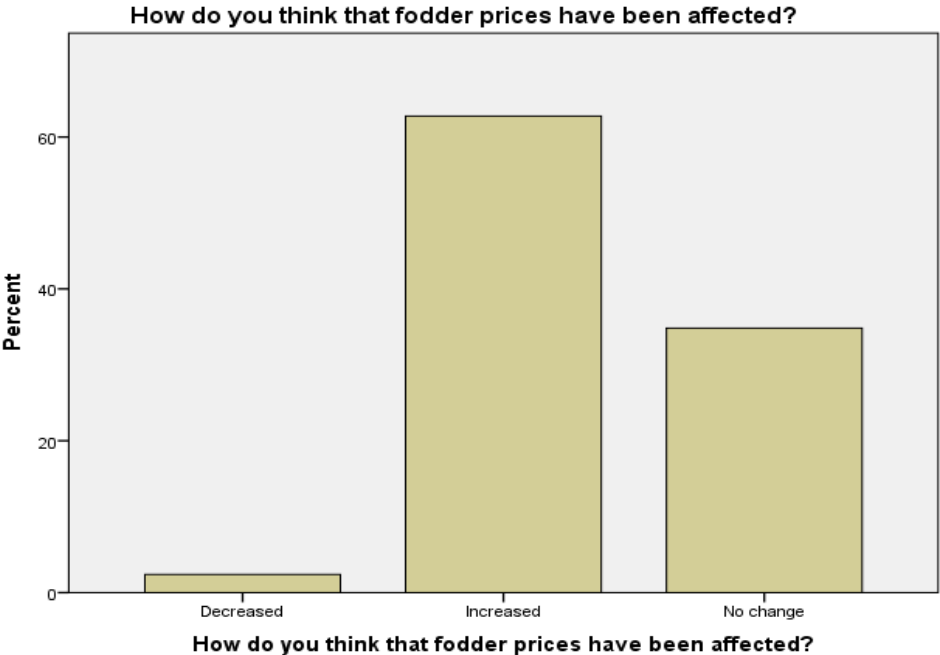*Figure 26: Effect on Fodder Prices*

4.16.9   Crops other than Mangos

The people were of the view mango was not the only fruit or eatable which was produced on this agriculture land, which has been wiped away for the construction of new colonies.

There were several other crops yield on that land. 47% replied that wheat was also grown there, which was a major source of their edible food and they used to get it for free. 18% said that there were also kino trees, which give fruit in winter, and they used to eat and sell in winter. 11% said that falsa and leechi were also grown there. 24% said that cotton, which is a cash crop, was also produced in that area, it was also a source of great money for them. But as this agriculture land was wiped away, all these crops and business related to them also ended.

These are the crops other than mango, which were grown in that area. Wheat was the major crop, and people were able to get free wheat for their meal too. Now they had to buy it from the market. Similarly, cotton was produced, which is an expensive crop and used to make clothes. The herbs grown along with cotton are major source of fodder for the cattle of those areas.
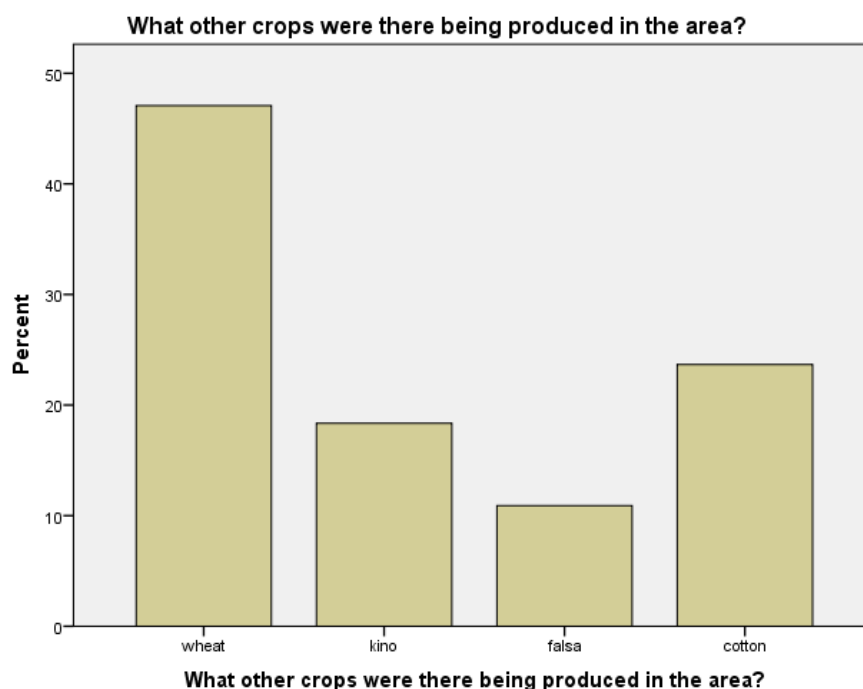

Figure 27: Crops Other than Mangoes.

4.17   Social Impact

We also identified the factors like the social interaction of people, social sequestration, displacement, education, and health were affected by this mango tree cutting or not. Normally, when any mega project starts, whether it is of dam project, road project or residential project, it has prominent effect on local people residing there. They had to displace from their place, their social is affected badly. The health and education of their family also affects badly.

Table 5: Social Impact on Communities

Family Displacement	Frequency	Percentage
Yes	311	82.7
No	65	17.3
No. of Person Displaced		
0	53	14.1
5	69	18.4
10	111	29.5
15	143	38.0
Social Interaction		
Decreased	312	83.0
Increased	21	5.6
No Change	43	11.4
Recreational Activities		
Decreased	318	84.6
Increased	7	1.9
No Change	51	13.6
Education		
Decreased	269	71.5
Increased	7	1.9
No Change	100	26.6

4.17.1 Displacement of People

When asked that have you, your family or relatives have been displaced due to this mango tree cutting or not? 83% replied that yes, they and their relatives have been displaced due to this mango tree cutting. They were forced to migrate from their places. Because the mango trees were being cutting down. Their purpose of living there was also being ended. Furthermore, the housing schemes needed the land for their project, so they were erasing and flatting down the whole area for this purpose. So, the people were forcefully evacuated their ancestor's home. They had to move to far away areas. 17% told that they did not have to leave their homes. These were the people, who mostly were coming from different areas as a wage worker.

First, we have seen that, where there is development, there is displacement of local community. In the development of new housing schemes in Multan, same thing happened, when local area was converted into housing project, the local population was dislocated forcefully. Most people who were residing here were tenants, they were working on the agriculture land of their landlord, and they were provided by the residence by their landlords, so that they don't have to move from far flung areas for their working. They were earning their livelihoods through it, getting food and shelter as well. Some families were living there since 60 to 70 years, since two to three generation on the same place. Since, most of them were tenants there, living on the land provided by their landlords. They didn't have the affordability to buy new home after they were dislocated. The removal of trees created a very big challenge for these people when they had to migrate. Almost 83% had to displaced from the area, which is a huge strength, these people were forced to move from that area. The families which did not move, they were away from the boundary line. Either their home was not sold, or they refused to sale out their homes. Those who refused to sale their houses, the housing authorities made their livings very hard. They created the

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boundaries around their land and home, which created problem for them to move out. These problems were created, so that they themselves leave that area.

Since, most of the families living on that were tenants, as soon as their landlord sold the land, they had to leave that area, since they were left with no choice. They had to find so many hardships while searching for new shelter, exploring where to go and where to shift. They were not getting home in cheaper rates nearby. They were forcefully dislocated from their village to another village.
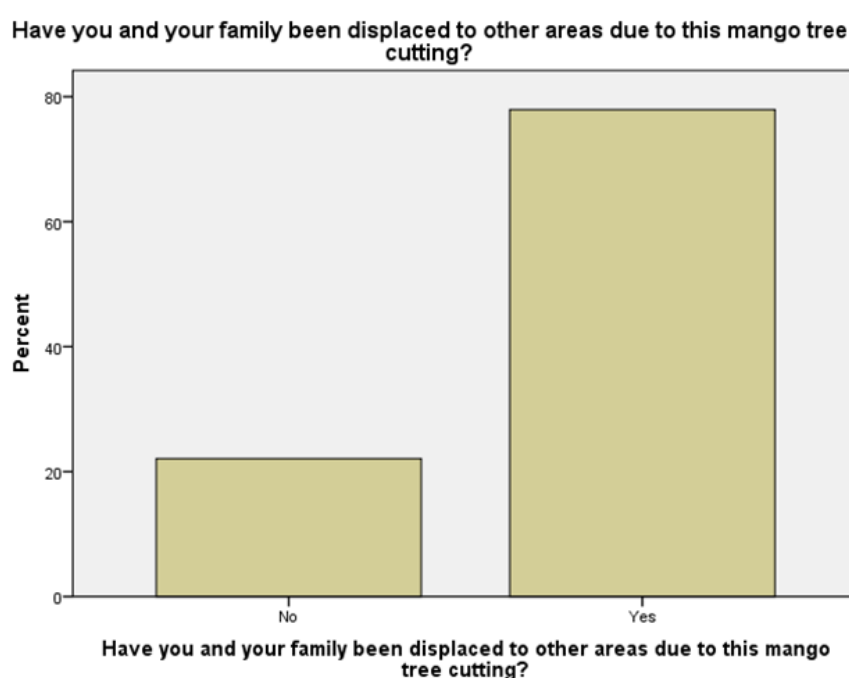

Figure 28: Displacement of Peoples

4.17.2 No. of Persons Displaced

According to the survey, 38% people told that about 15 persons of every family had to move or migrate due to this migration. 30% told that about 10 persons of every family had to move out. 18% replied that almost 5 people of every people had to be displaced due to this migration. Only 14% replied that none of their family had to move out due to this mango tree cutting.

Majority of the people were living joint family system. The whole family was living with all their siblings, and with the family of their siblings. There were living two to three

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generation there, that's y their household size was very large. There were so many families involved whose which had fifteen to twenty or more than twenty members in total, including children and senile people all included in them.

How many persons have been displaced due to this mango cutting?

Figure 29: No. of Person Displaced

4.17.3 Effect on Social Interaction

When asked about, how the social interaction and social interaction after this mango tree cutting has been affected 83% respondents replied that it almost ended. Before the mango tree cutting many of the families used to live together. They were always there for them in every event of happiness or dismal. They had passed their time by standing with each other through thick and thin. But as this cutting started, they all scattered in different areas. Now they can't reach out to each other in their time of happiness or dismal. All their interactions have been lost; their social life has been ended. 12% respondents were of the view that it does not make any difference to their social life, because they did not have to move out. 5% replied that their social interaction has been increased after this mango tree cutting. These were the people, whose work or business had been increased after this mango tree cutting.

The people who got jobs or established their businesses after the emergence of these housing societies.

The migration and shifting had very serious consequences on social interaction and social networking. Social interaction and social networking have been drastically affected after this shifting. The social interaction of people has been decreased after the migration, because now they have moved from one village to another village. They become separated from their families. They were already facing financial crisis due to migration; they had to spend a lot of money to visit their friends and relatives. This has made them socially isolated. Social isolation in older adults causes serious public health risks. It badly affects a significant number of people and puts them at risk for dementia and other serious medical conditions. A lady told that when her mother got ill, she could not go to meet her, because she could not afford to spend that much money to travel. Her family was already facing crisis due to new financial pressure in new places. Nobody was to take care of her mother there, but she couldn't go either. Earlier, whether it was the wedding of someone, birth, or death of someone, all the family members used to get together at the occasion. They used to celebrate all the events together. But now since all the family members have been scattered. All their get together have also ended. All this happened due to the dislocation of people. Whenever family displaces, all this happens. People can't get together at their important events.
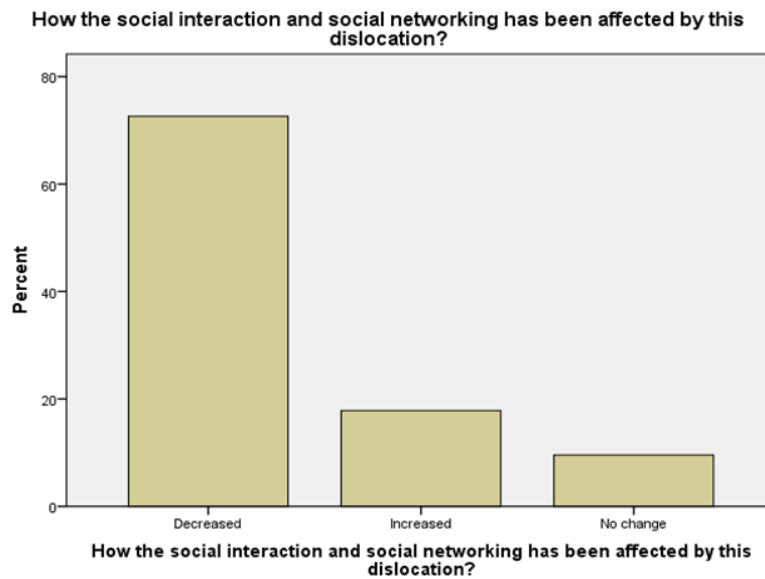
Figure 30: Effects on Social Interaction

4.17.4   Recreational Opportunities

When asked whether the recreational opportunities have been increased or decreased after this mango tree cutting. 82% replied that their recreational opportunities have been decreased. Before it, people used to come in those orchards for picnic, to have mango party, to take bath in the tube wells. But all this ended when these mango orchards were removed. 14% replied that the recreational opportunities have been increased. Since the parks have been developed in the housing schemes, so people use to go there, so these people were of the view that recreational opportunities for them has been increased after the emergence of these housing societies. 4% people responded that it made no difference on their recreational opportunities.

There used to be many festivals in the village. People used to do mango parties and go to tube wells for taking bath in summers. All these mango parties and tube well parties were a source of enjoyment, not only for those who were residing there, but also the people who were living in the outskirts of that agriculture area. The mango tree cutting ended all these recreational activities for them as well.
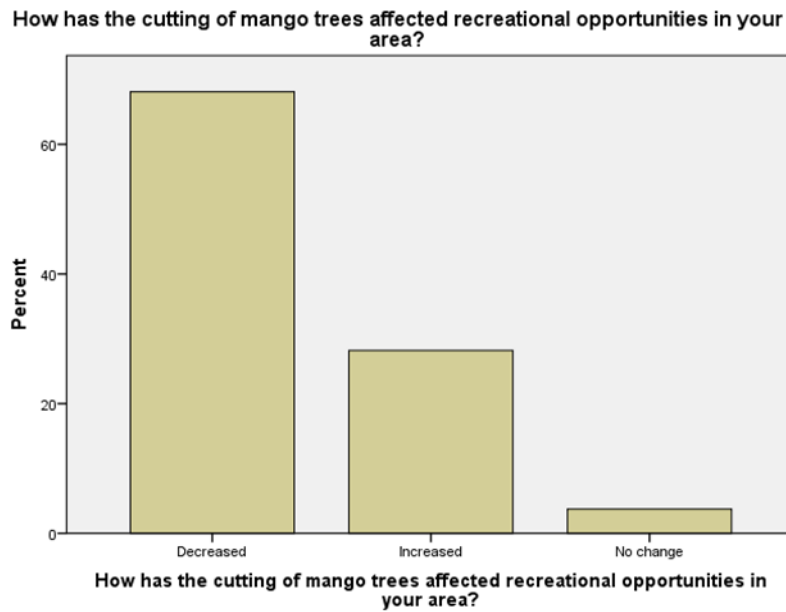
How has the cutting of mango trees affected recreational opportunities in your area?

Figure 31: Effects on Recreational Opportunities

4.17.5   Effect on Health

When asked about does this mango tree cutting has also affected the health of the people living in those areas? 85% replied that people health has been lost. Since, before this mango tree cutting, people used to get pure food and pure milk. Furthermore, the atmosphere was clean and pure, so the health of people was also very good. But as the villages and mango orchards were removed, all these pure things gone away too, which affected people health very badly. 13% people said that it made no difference to their health. It was as it was before. 2% said that their health has been increased.

The health of people affected most drastically among all these social aspects. The displacement of population from one rural area to another rural area increased the physical and mental health issues.
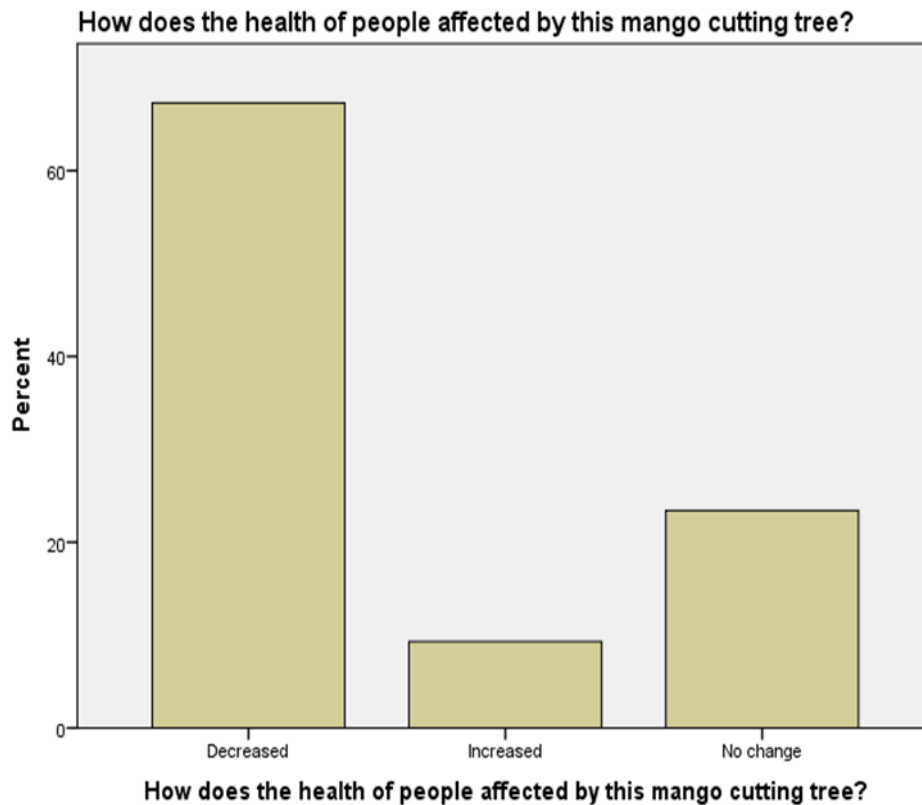
How does the health of people affected by this mango cutting tree?

Figure 32: Effects on Health

4.17.6 Effect on Education

When asked about whether the education of their children has been affected after this mango tree cutting or not? 71% told that the schooling of their children has been ended, after this mango tree cutting. They said that there were schools in the villages they were living, as the villages vanished, the schools with them also wiped away and their children were thus deprived of the education they were getting. The new place they were settled, the schools they can't afford now. So, the mango tree cutting has not only affected the health of people, but also the schooling and education of people. 27% told that the mango tree cutting made no difference to the education of their children, because even after before the cutting of mango tree cutting, they don't send their children to school. Their children used to help in the mango gardening jobs to which they were related. And now when the orchard has

vanished, their children help them in wage worker job. Only 2% people responded that education of their children has been increased after this mango tree cutting. These were the people whose income has been increases after the mango tree cutting, or who are sending their children to the schools opened in the newly emerged colonies.

In villages there were schools, which closed after this eradication of agriculture land. There were many schools, people had built in their homes. All these schools ended because of removal of villages. The education decreased due to this migration. Many people after shifting to other villages, could not afford schools anymore, because of financial crisis they had to deal with due to shifting. So, they shifted their children to do jobs, instead of sending them school. Now they need more earning hands for their livelihood.
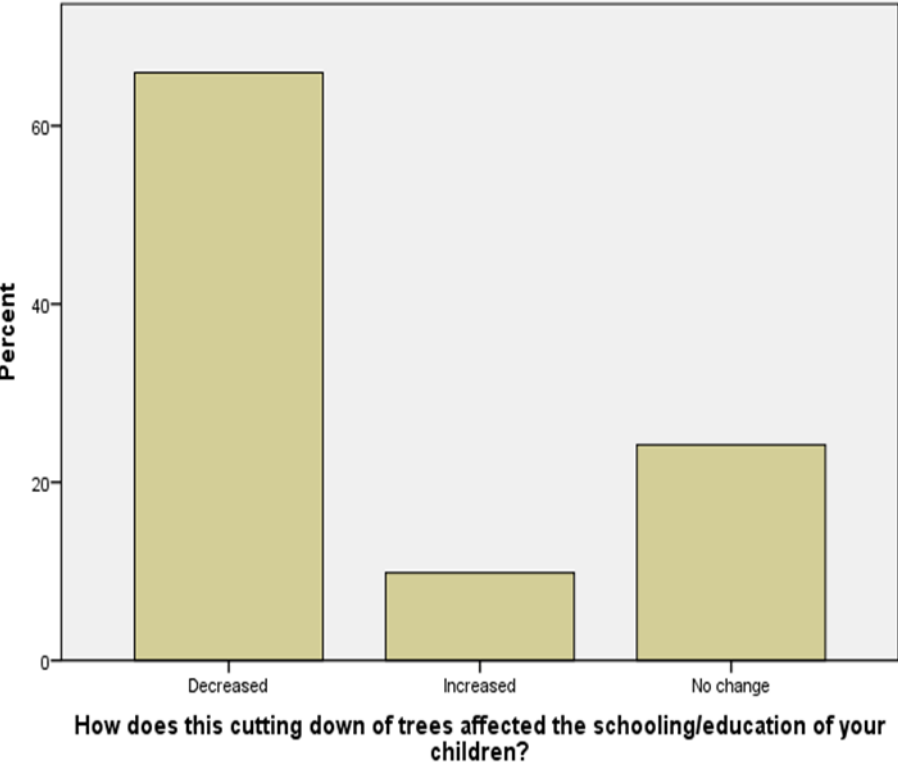

Figure 33: Effects on Education

4.18   Socio-Economic Impacts
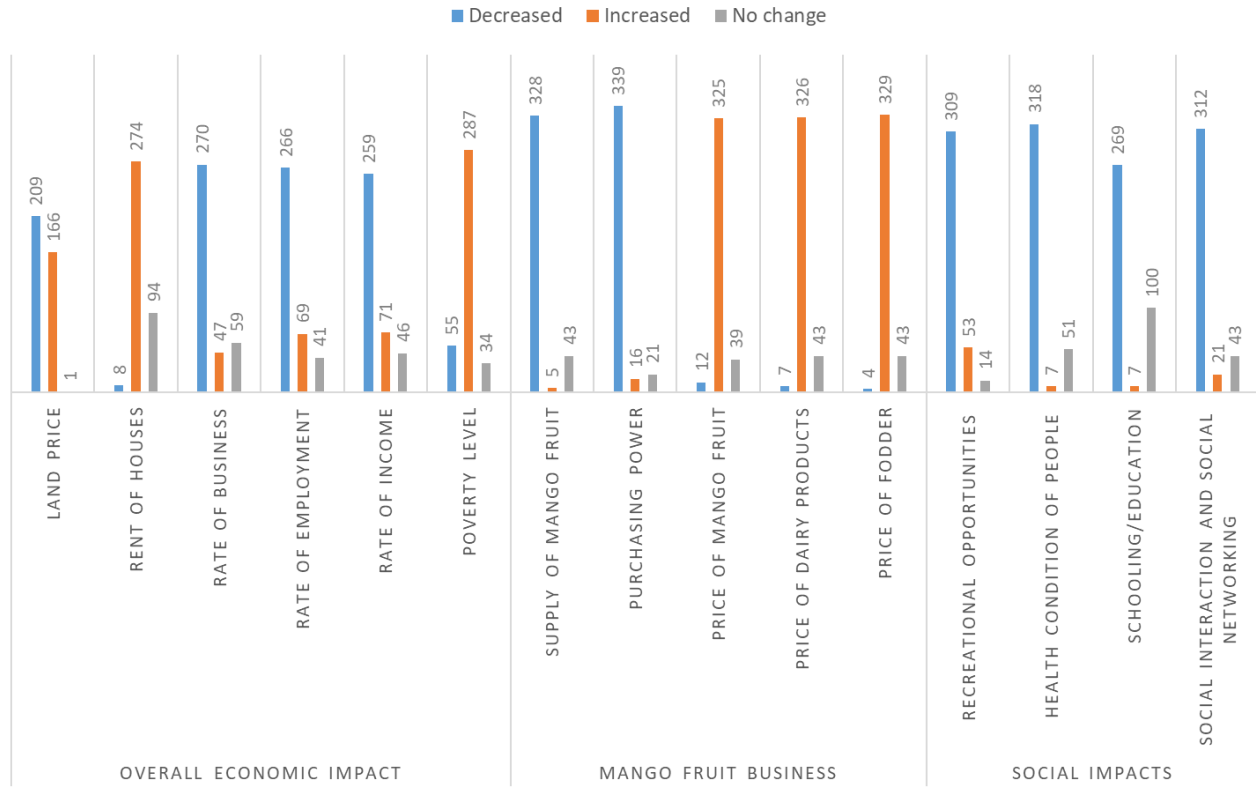

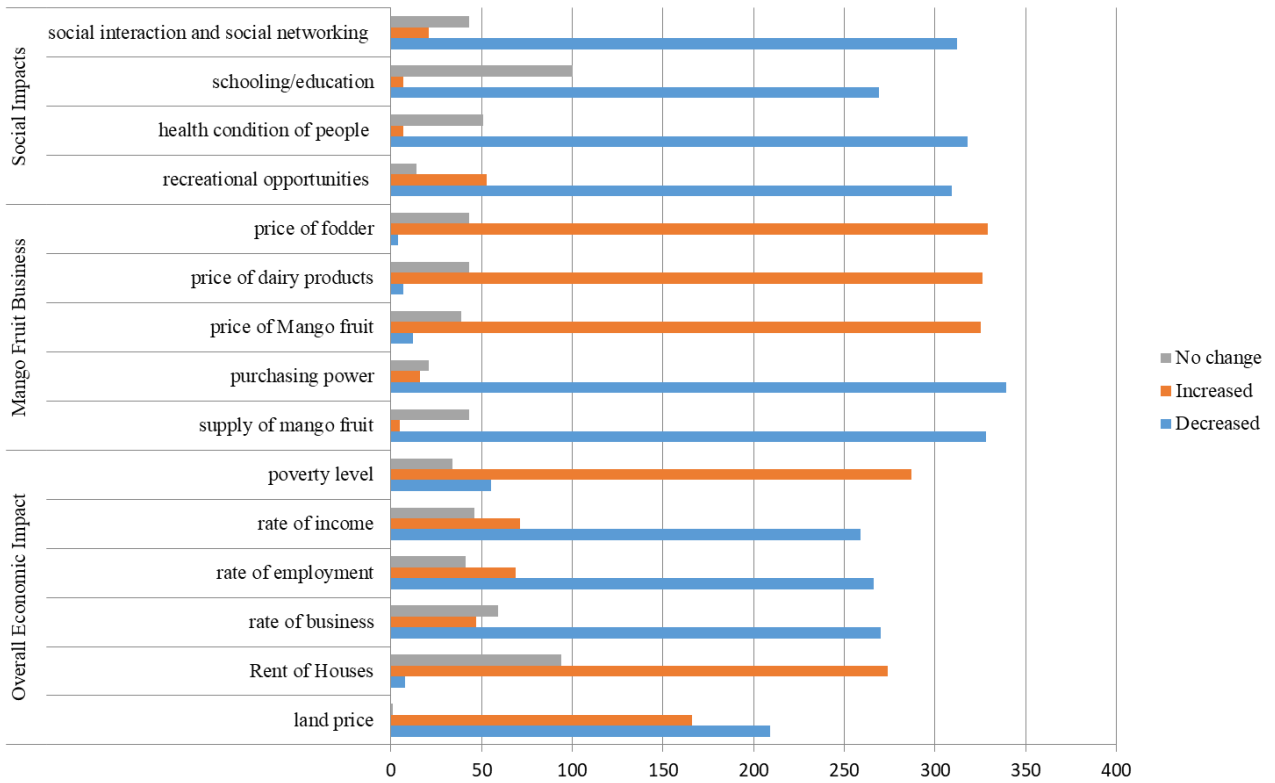*Figure 34: Socio-Economic Impacts*

Figure 35: Socio-Economic Impacts

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CHAPTER 5: CONCLUSION & RECOMMENDATIONS

5.1   Conclusion

This study has critically examined the socio-economic impacts of deforestation of agricultural land on the local community of Multan. Interviews were done with the local community to ask their views. Around 11,000 acres have been deforested for the development of real estate business. According to the survey, thousands of villages have perished for this purpose. Since the major motive for this development was to make room for new construction, all existing villages were demolished which not only created a financial constraint to the villager's life but also affected their social structure and social life. The process of deforestation was considered without keeping in view the consequences that which local community had to face. An added result of the real estate development was the significant decline in local crop yield and fruit yield with an emphasis on mango production. According to the survey conducted, the number of trees cut down, most of them were mango trees. Around one lac mango trees were cut down. Mango orchard was a source of livelihood for many families, most of the population that was displaced was also related to the mango garden business. This massive scale cutting of trees caused high unemployment in the local labor force, which was previously employed in the mango business. This forced the labor force to either relocate or change their profession. This ended their social life as their family had to scatter to different villages. This has also drastically affected mango yield production and a huge decline in Pakistani mango export as well.

From the above discussion, it is concluded that cutting agricultural land is not in the favor of the local community. Because of this deforestation high unemployment rate, high-scale displacement of the local labor force, and cut down of export material occurs. As mango export is one of the key exports of Pakistan, severe action should be taken for its preservation. The government authorities who grant unlawful permission for agricultural

land cutting should be held accountable and real estate businesses should be developed on barren land instead of agricultural land.

5.2   Respondent's Suggestion

When asked about the respondent's suggestion that how these cutting of mango trees can be stopped? 49% people responded that the new housing colonies should be constructed on barren land rather than on agriculture land. They were of the view there was a large area of barren land which was slightly flung from Multan. DHA can be constructed over there since that land is of no use. 35% responded that Government can stop this cutting, by not allowing army to purchase the agriculture land for housing schemes. They thought it was the Government who allowed this emergence of housing scheme on their agriculture land. 14% responded that land selling should be stopped for the emergence of new housing colonies. They were of the view that land selling should be stopped for these kinds of projects, so that the agriculture land may not get affected.

 2% said that they have no idea how to save this agriculture land cutting.

Lastly, we asked the people that how this mango tree cutting can be stopped, how the mango deforestation can be reduced, how the agriculture land cutting can be stopped. How the situation can be improved or what kind of actions must be taken to stop such devastating impacts on community as well as environmental impacts. People gave multiple answers and most of the answers were related to three key areas.

First was that colonies should be made on barren land. According to them there is land available in different areas. Since this barren land is unproductive, it should be reserved for construction of housing societies. They were of the view that there was a lack of planning as well. The institutes should plan first that which area to be allocated for residential planning schemes and then should allow the authorities for such massive construction. Usually, rich agriculture land is near to the city, while barren land is far away from the city.

The cost of infrastructure is much higher for the construction in barren land. Since the authorities had to pave the roads and infrastructure. The housing authorities prefer these agriculture land because these are near to city, there already exist some housing society. Market already exists near to it. For this purpose, Government should make master plan and these master plan should allow the construction of residential and commercial buildings only on barren land rather than on agriculture land.

Secondly, Government should take strict action to stop deforestation of agriculture land and to protect natural habitat. They said that Government is not playing its role to stop this cutting of agriculture land. Instead, Government is also involved in it and supporting it by giving them permission to develop these housing schemes.

Thirdly, land selling should stop.

Selling, purchasing of agriculture and orchard land should be banned. Mostly what happens, people are selling their agriculture lands, because they are being offered higher prices than market value. For example, if the market value of the land is one lac, the authorities are giving them five lacs for it. Majority of the small farmers and local orchard owners are in greed. Therefore, they sell their land. So, there should be ban from institutions, that nobody should be allowed to sell their land which has some kind of fruitful vegetation.

Table 6: Respondent's Suggestion

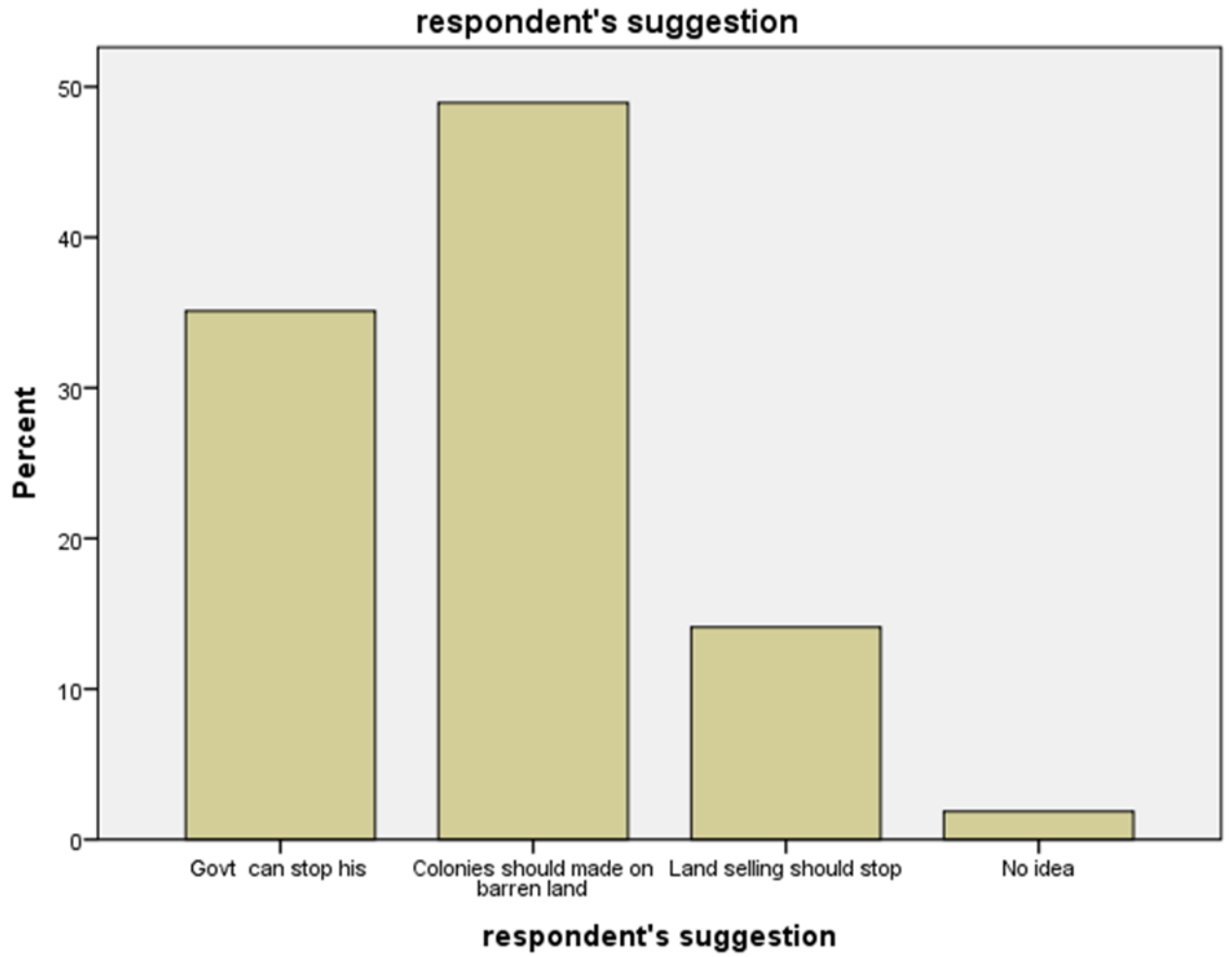| Suggestion	Frequency	Percentage
Govt can Stop this	132	35.1
Colonies should Develop on Barren Lands	184	48.9
Land Selling Should Stop	53	14.1
No Idea	7	1.9

Figure 36: Respondent's Suggestion

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