Table of Contents

**Abstract**A

**Chapter 1. Introduction**1

1.1 Preface1

1.2 Research Aims2

1.3 Research Questions3

1.4 The Central Hypothesis of the Research3

1.5 The Importance and Scientific Contribution of the Research4

1.6 Structure of the Thesis5

**Chapter 2. Theoretical Background**6

2.1 Changes in Agriculture in the Shadow of Urbanization6

2.2 Ownership of Land in Arab Localities and its Transfer to State Ownership7

2.3 Determining Municipal Boundaries of Arab Local Councils in Israel8

2.4 Processes of Development of Arab Settlement in Israel and Subsequent Changes in Agriculture9

2.5 Patterns of Change in Arab Settlement in Israel, Their Reasons and Their Effects on Planning13

2.5.1 Expropriation of Arab localities as a policy in early modern Jewish settlement13

2.5.2 Urbanization under siege – a lack of master planning13

2.5.3 A limited change in trend and its reasons14

2.6 Characteristics of Arab Agriculture, the Soil Resource and Changes in Land Use16

2.6.1 Arab agriculture in the past16

2.6.2 Soil resources and their uses17

2.6.3 Land-use changes and Arabic agriculture today19

2.7 The Interface Between Agriculture and Urbanization22

2.8 Summary26

**Chapter 3. Research Methods**28

3.1 Characteristics of the Locality Sample and Their Adaptation to the Research28

3.2 Research Tools29

3.2.1 Land-use changes29

3.2.2 Survey of farmers and characteristics of their activities30

3.2.3 Survey of officials in local municipalities and the Ministry of Agriculture30

3.3 Data processing and statistical analysis31

**Chapter 4. Characteristics of the Studied Localities**32

4.1 The Triangle – Definition32

4.2 The City Baqa Al-Gharbiyye33

4.3 The Jat Local Council in the Triangle35

4.4 The Rural Locality Bir A-Sika37

4.5 Summary38

**Chapter 5. Land-Use Changes in the Studied Localities**39

5.1 Introduction39

5.2 Characteristics of the Population Distribution in the Studied Localities39

5.3 Mapping Land-Use Changes in Baqa Al-Gharbiyye During the Period 1944-201340

5.4 Mapping Land Use in Jat During the Period 1946-201344

5.5 Mapping Land Use in Bir A-Sika During the Period 1944-201347

5.6 Comparative Discussion of the Studied Localities50

5.7 Summary54

**Chapter 6. Perceptions and Opinions of Officials in Local Municipalities and Government Institutions**58

6.1 Introduction58

6.2 Method for Conducting Interviews60

6.3 Perceptions and Opinions of Officials Regarding Agricultural Activity in the Locality60

6.3.1 Sustainability of agricultural lands and their situation today60

6.3.2 Non-agricultural lands and agricultural land reserves61

6.3.3 Agricultural strategies of individual households65

6.3.4 The young generation and its continuation in agriculture67

6.3.5 Policies of local municipalities and the master plan67

6.4 Central Aspects of the Policies of Local Municipalities and of the Ministry of Agriculture and Rural Development70

6.4.1 Characteristics of the master plans of the studied localities70

6.4.2 Environmental hazards resulting from agricultural activity in urban areas76

6.4.3 Policies of the Ministry of Agriculture and Rural Development78

6.5 Summary80

**Chapter 7. Characterizing Agriculture and Farmers’ Activities**83

7.1 Introduction83

7.2 Surveying the Farmers83

7.3 Demographic Characteristics of the Agricultural Households84

7.4 Characteristics of Soil Resources87

7.5 Historical Parameters of Agricultural Farms95

7.6 Purchasing Inputs and Selling Outputs97

7.7 Work Investment in Agricultural Farms102

7.8 Sources of Funding for Agricultural Farms104

7.8.1 Introduction104

7.9 Summary and Conclusions107

7.9.1 Farmers’ characteristics107

7.9.2 Components of soil resource use108

7.9.3 Purchasing inputs and selling outputs109

**Chapter 8. The Interface Between Agriculture and Urbanization**111

8.1 Introduction111

8.2 Farmers’ Opinions Regarding the Interface Between Agriculture and Urbanization111

8.3 Officials’ Opinions Regarding the Survival of Agriculture and Farmers114

8.4 Farmers’ Opinions Regarding the Continued Survival of Agriculture Under Urbanization Pressure117

8.5 Alternative Strategies of Agricultural Households120

8.6 Summary124

**Chapter 9. Discussion and Summary**126

9.1 Introduction126

9.2.1 Operative questions of the study and answers that arose from the findings127

9.2.2 Conclusions130

9.3 Discussion133

9.3.1 Land-use changes in the studied localities133

9.3.2 Farmers’ survival strategies from the point of view of different officials 135

9.3.3 Characteristics of agriculture according to the farmers’ perspective138

9.3.4 The interface between urbanization and agriculture140

9.4 Summary of perspectives on the changing farm between urbanization and agricultural activity143

9.5 Recommendations148

9.6 Future Research Directions150

**List of References**151

**Appendices**163

**English Abstract**I

List of Tables

Table 1.1: Area of agricultural crops during the period 1970-2013 (thousands of dunams) across all agricultural sectors in Israel2

Table 3.1: The studied localities and their populations at different scales of urbanization28

Table 5.1: The area of land use in Baqa Al-Gharbiyye for selected years (dunams)41

Table 5.2: Trends in land use in Baqa Al-Gharbiyye for the years 1944-2013 (%)43

Table 5.3: The area of land use in Jat for selected years (dunams)46

Table 5.4: Land use in Jat during the years 1946-2013 (relationship between decades)46

Table 5.6: Land use in Bir A-Sika during the years 1944-2013 (relationship between decades)49

Table 6.1: Officials’ opinions regarding the sustainability of agricultural lands and their current state62

Table 6.2: Officials’ opinions regarding non-agricultural land use and agricultural land reserves64

Table 6.3: Officials’ opinions regarding agricultural strategies of households in the studied localities66

Table 6.4: Officials’ opinions regarding the young generation and its agricultural activity68

Table 6.5 Local master plans for the studied localities that were approved from 1990 and after 200071

Table 6.6: Council policy regarding the master plan72

Table 7.1: Distribution of survey respondents by age, level of education, addition occupation and level of income in the studied localities (%)85

Table 7.2: Pearson correlation between level of education and additional occupation of the farmer by construction area: N=15086

Table 7.3: Pearson correlation between level of income from agriculture and additional occupation of the farmer by locality86

Table 7.4: Pearson correlation between level of education and age (years) of the farmer by construction area87

Table 7.5: Distribution of type of ownership of the farm in the three studied localities (question 1 in Appendix 5)87

Table 7.6: Proportion and type of farm partnerships in the three studied localities (%) (question 2 in Appendix 5)88

Table 7.7: Distribution of changes in the extent of agricultural activity in recent years in the three studied localities (%) (question 3-7 in Appendix 5)88

Table 7.8: Proportion of farms in the studied localities (that responded) by soil resource characteristics (%)89

Table 7.9: Mean, standard deviation, F value and significance level for cultivated land area in open fields by locality size: N=15094

Table 7.10: Mean, standard deviation, F value and significance level for hothouse area by locality size94

Table 7.11: Proportion of farmers in the studied localities who owned part of a large plot in the previous generation (%) (question 5 in the Appendix)96

Table 7.12: Proportion of farmers in the studied localities who indicated belonging to an agricultural plot in the previous generation (%) (question 6-A in the Appendix)96

Table 7.13: Proportion of farmers in the studied localities who indicated the type of needs for which the land was sold (%) (question 8-E in the Appendix)96

Table 7.14: Estimate of the proportion of farms by area of agricultural land uses: open land (agricultural crop or plantation), hothouse and animal rearing by locality (%) 97

Table 7.15: Distribution of farmers who purchase inputs by locality and geographic region98

Table 7.16: Relationship between open land area and input purchases (Pearson correlation) by locality (N=50)99

Table 7.17: Relationship between hothouse area in dunams and input purchases (Pearson correlation)100

Table 7.18: Distribution of output sales by crop and geographical area of purchase of agricultural produce101

Table 7.19: Relationship between open land area in dunams and the extent of output sales by locality (Pearson correlation)102

Table 7.20: Proportion of working time invested by family members working in agriculture in private farms by locality, number of working days per week and number of hours per day (%)103

Table 7.21: Relationship between cultivated land area and time invested in agriculture by family members by locality (Pearson correlation): N=50 for each locality104

Table 7.22: Division of percentage of farmers by sources of funding invested in the farm by locality (%)105

Table 7.23: Division of percentage of farmers by area of open agricultural land in dunams106

Table 7.24: Distribution of agricultural land area in dunams with hothouses by sources of funding of farms106

Table 7.25: Relationship between area of open land or hothouses and sources of funding (Pearson correlation)107

Table 8.1: Means of farmers’ degree of agreement with questions about the interface between agriculture and urbanization112

Table 8.2: Means of farmers’ degree of agreement (low, intermediate, high, very high) with the possibility of changing land designation for construction in the three studied localities (question 29 in the Appendix)114

Table 8.3: Proportion of farmers in the studied localities who indicated presence of agriculture in the next generation (%) (question 32 in the Appendix)118

Table 8.4: Proportion of farmers in the studied localities who indicated support of the local municipality for agricultural activity (%) (question 33 in the Appendix)119

Table 8.5: Proportion of farmers in the studied localities who indicated appointing a project manager or agricultural committee for the continuation of agricultural activity (%) (question 37 in the Appendix)119

Table 8.6: Distribution of agricultural benefit in the three studied localities (%) (question 35 in the Appendix)120

Table 8.7: Distribution of agricultural benefit for the region in the three studied localities (%) (question 36 in the Appendix)120

Table 9.1: Summary of Arab farmers’ survival strategies in the face of impediments arising from urbanization142

List of Figures

Figure 5.1: Map of land-use changes in Baqa Al-Gharbiyye for the period 1944-201342

Figure 5.2: Distribution of land-use areas in Baqa Al-Gharbiyye for selected years (percentages)44

Figure 5.3: Map of land-use changes in Jat for the period 1946-201345

Figure 5.4: Distribution of land-use areas in Jat for selected years (percentages)47

Figure 5.5: Map of land-use changes in Bir A-Sika for the period 1944-201348

Figure 5.6: Distribution of land-used areas in Bir A-Sika for selected years (percentages)50

Figure 5.7: Trends of change in land use areas in Baqa Al-Gharbiyye during 1944-2013 (dunams)51

Figure 5.8: Trends of change in land use areas in Jat during 1946-2013 (dunams)51

Figure 5.9: Trends of change in land use areas in Bir A-Sika during 1944-2013 (dunams)52

Figure 5.10: Relationship between percent urban area and number of people in the studied localities52

Figure 5.11: Relationship between number of people per built-up dunam and number of people in the studied localities53

Figure 5.12: Relationship between municipal area in dunams and the locality’s population size 53

Figure 5.13: Percentage of agricultural land by population size of the studied localities54

Figure 6.1: Subject clusters after classification of questions as conducted in interviews of officials from local municipalities and instructors from the Ministry of Agriculture and Rural Development59

Figure 7.1: Rate of ownership of agricultural land up to 20 dunams with respect to population size in the studied localities92

Figure 7.2: Rate of ownership of agricultural land exceeding 20 dunams with respect to population size in the studied localities92

Figure 9.1: The time dimension in land-use change and the role of agriculture as a source of income136

Figure 9.2: Changes in the interface between agriculture and urbanization in Arab localities in different geographical and economic-social-organizational levels from the 1940s until 2013144

Figure 9.3: The process of Arab locality development in the shadow of urbanization and agricultural land-use changes from the 1940s until 2013146

List of Maps

Map 4.1: Aerial photograph of the studied localities: Baqa Al-Gharbiyye, Jat and Zemer in Israel 201633

Map 4.2: Location map of Baqa Al-Gharbiyye (map data, 2016)34

Map 4.3: Satellite photograph of Baqa Al-Gharbiyye (Israel Map Institute, 2007)35

Map 4.4: Satellite photograph of Jat Local Council (map data, 2016)36

Map 4.5: Satellite photograph of Bir A-Sika (map data, 2016)37

Map 7.1: Aerial photograph of Baqa Al-Gharbiyye, location of agricultural lands to the west and to the east of Route 690

List of Photographs

Photograph 8.1: Rural-ecological farm: the Abu Jamil farm in Baqa Al-Gharbiyye122

Photograph 8.2: Educational-ecological agricultural farm and operation of workshops for school children in Baqa Al-Gharbiyye122

Photograph 8.3: Albedoui farm – Alajawid restaurant in Bir A-Sika123

Photograph 8.4: Hothouses for research and development in an agricultural farm in Baqa Al-Gharbiyye123

Photograph 8.5: Nursery within an agricultural farm between Baqa Al-Gharbiyye and Moshav Maor124

List of Appendices

Appendix 1: Questionnaire for farm owners163

Appendix 2: Questions for correlation analysis in the three localities for the farm owners’ questionnaire174

Appendix 3: Interview with officials175

Appendix 4: Interview with Baqa Al-Gharbiyye local council engineer Mr. Zohir Makalda177

Appendix 5: Interview with Jat local council engineer Mr. Mahmad Abu Nasser185

Appendix 6: Interview with Bir A-Sika council engineer Mr. Hiri Ganem191

Appendix 7: Interview with Riad Hadija – Ministry of Agriculture - Hadera198

Appendix 8: Interview with Mahmad Abu Toameh – Ministry of Agriculture - Hadera201

Appendix 9: Results from the farmers’ survey 204

Appendix 10: Summary of farmers’ survey tables 228