Socio-Ecological Transformation from Rural into a Residential landscape in the Matadepera Village (Barcelona Metropolitan Region), 1956-2008

Gemma Estany, Anna Badia, Iago Otero, Martí Boada

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Mediterranean countries are experiencing the fastest rates of urban sprawl in Europe, and concern about potential negative environmental effects is increasing. This expansion is occurring in a context of declining rural activities, where highly diverse cultural landscapes are giving way to homogenous low-density housing developments and entirely new forms of human-nature relations. In the present study we offer an analysis of the socio-ecological transformation of Matadepera, a wealthy suburb of metropolitan Barcelona that evolved out of a rural village inhabited by poor peasants who farmed rain-fed cropland and managed the forest. By cross-checking data from land-cover maps, documentary sources and semi-structured interviews with elderly local peasants, we managed to gain a detailed understanding of the driving forces behind land cover transformation and give voice to perceptions of landscape change among a quite neglected social group. Our results indicate dramatic urban sprawl onto former fields and woods over the last decades, driven by a combination of different factors. They also show that oral sources can yield information on landscape changes not available from any other kind of source. Moreover, by recovering valuable and so far neglected personal memories we hope to provide further stimulus to policy actions aimed at charting a more balanced development path for the area.

Socio-ecological Transformation from Rural into a Residential Landscape in the Matadepera Village (Barcelona Metropolitan Region), 1985-2008

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Global land-use change is one of the main drivers of environmental change.[1] On the one hand, urbanisation is increasing worldwide as the share of global urban population rises.[2] In the process of global urbanisation, dispersed urbanisation, also known as "urban sprawl", has become especially prominent over the last decades.[3] Concomitantly,

while at the planetary scale cropland has been increasing over the last decades at the expense of woodland, developed countries have witnessed an increase in wooded areas and a decrease in cropland.[4] Agricultural intensification in favourable areas,[5] abandonment of marginal lands,[6] increased demands for nature conservation and recreation[7] and, more in general, economic growth,[8] have been recognized as the main driving forces of woodland recovery in these countries.

[*] By the will of the authors, in this article the names of the authors are not in alphabetical order.

[1] P.M. Vitousek, H.A. Mooney, J. Lubchenco, J.M. Melillo, "Human Domination of Earth's Ecosystems", in *Science*, 277, 5325, 1997, pp. 494-499.

[2] United Nations Population Division (UNPD), *World Population Prospects: The 2002 Revision. Highlights*, 2003, available at: http://www.un.org/esa/population/ (accessed August 2010). J.A. Foley, R. DeFries, G.P. Asner, C. Barford, G. Bonan, S.R. Carpenter, F.S. Chapin, M.T. Coe, G.C. Daily, H.K. Gibbs, J.H. Helkowski, T. Holloway, E.A. Howard, C.J. Kucharik, C. Monfreda, J.A. Patz, I.C. Prentice, N. Ramankutty, P.K. Snyder, "Global Consequences of Land Use", in *Science*, 309, 5734, 2005, pp. 570-574.

[3] R.M. Leichenko, W.D. Solecki, "Exporting the American Dream. The Globalization of Suburban Consumption Landscapes", in *Regional Studies*, 39, 2, 2005, pp. 241–253. European Environmental Agency (EEA), *Urban Sprawl in Europe. The Ignored Challenge. EEA Report 10*, 2006, available at: http://www.eea.europa.eu/publications/eea_report_2006_10 (accessed August 2010).

[4] N. Ramankutty, J.A. Foley, "Estimating Historical Changes in Global Land Cover: Croplands from 1700 to 1992, in *Global Biogeochemical Cycles*, 13, 4, 1999, pp. 997-1027.

[5] C. Stoate, N.D. Boatman, R.J. Borralho, C. Rio-Carvalho, G.R. de Snoo, P. Eden, "Ecological Impacts of Arable Intensification in Europe", in *Journal of Environmental Management*, 63, 4, 2001, pp. 337-365.

[6] D. MacDonald, J.R. Crabtree, G. Wiesinger, T. Dax, N. Stamou, P. Fleury, J.A. Gutiérrez-Lazpita, A. Gibon, "Agricultural Abandonment in Mountain Areas of Europe: Environmental Consequences and Policy Response", in *Journal of Environmental Management*, 59, 1, 2000, pp. 47-69.

[7] W. Vos, H. Meekes, "Trends in European Cultural Landscape Development: Perspectives for a Sustainable Future", in *Landscape and Urban Planning*, 46, 1-3, 1999, pp. 3-14. M. Antrop, "Why Landscapes of the Past are Important for the Future", in *Landscape and Urban Planning*, 70, 1-2, 2005, pp. 21-34.

[8] T.K. Rudel, O.T. Coomes, E. Moran, F. Achard, A. Angelsen, J. Xu, E. Lambin, "Forest Transitions: Towards a Global Understanding of Land Use Change", in *Global Environmental Change*, 15, 1, 2005, pp. 23-31.

Urbanisation, cropland abandonment and forest regrowth are simultaneous processes that interact in a complex way, especially in Mediterranean metropolitan areas. Mediterranean countries are experiencing the fastest rates of urban sprawl in Europe, and there are rising concerns about potential negative environmental effects[9] such as landscape fragmentation,[10] higher resource consumption,[11] introduction of alien species[12] and increased vulnerability of houses to wildfires.[13] Furthermore, urban dwellers who move out to the suburbs may be ignorant of the risks of living in close contact with nature – as in the case of the residents of some wildfire-prone sprawled areas in the United States -,[14] as they bring with them the

[9] EEA, *Urban Sprawl in Europe* cit.

[10] E.F. Lambin, B.L. Turner, H.J. Geist, S.B. Agbola, A. Angelsen, J.W. Bruce, O.T. Coomes, R. Dirzo, G. Fischer, C. Folke, P.S. George, K. Homewood, J. Imbernon, R. Leemans, X. Li, E.F. Moran, M. Mortimore, P.S. Ramakrishnan, J.F. Richards, H. Skanes, W. Steffen, G.D. Stone, U. Svedin, T.A. Veldkamp, C. Vogel, J. Xu, "The Causes of Land-Use and Land-Cover Change: Moving Beyond the Myths", in *Global Environmental Change*, 11, 4, 2001, pp. 261-269. V.C. Radeloff, R.B. Hammer, S.I. Stewart, "Rural and Suburban Sprawl in the U.S. Midwest from 1940 to 2000 and Its Relation to Forest Fragmentation", *Conservation Biology*, 19, 3, 2005, pp. 793-805.

[11] E. Domene, D. Saurí, "Urbanisation and Water Consumption: Influencing Factors in the Metropolitan Region of Barcelona", in *Urban Studies*, 43, 9, 2006, pp. 1605-1623. I. László Bart, "Urban Sprawl and Climate Change: A Statistical Exploration of Cause and Effect, with Policy Options for the EU", in *Land Use Policy*, 27, 2, 2010, pp. 283-292.

[12] M. Guirado, J. Pino, F. Rodà, "Understorey Plant Species Richness and Composition in Metropolitan Forest Archipelagos: Effects of Forest Size, Adjacent Land Use and Distance to the Edge", in *Global Ecology and Biogeography*, 15, 1, 2006, pp. 50-26.

[13] A. Badia-Perpinyà, M. Pallares-Barbera, "Spatial Distribution of Ignitions in Mediterranean Periurban and Rural Areas: the Case of Catalonia", in *International Journal of Wildland Fire*, 15, 2, 2006, pp. 187–196.

[14] K.C. Nelson, M.C. Monroe, J.F. Johnson, A. Bowers, "Living with Fire: Homeowner Assessment of Landscape Values and Defensible Space in Minnesota and Florida, USA", in *International Journal of Wildland Fire*, 13, 4, 2004, pp. 413-425. S. McCaffrey, "Thinking of Wildfire as a Natural Hazard", in *Society and Natural Resources*, 17, 2004, pp. 509–516.

[15] P. Kareiva, S. Watts, R. McDonald, T. Boucher, "Domesticated Nature:

city residents' unawareness of the environmental impact of their consumption on the places where resources are produced.[15] In Mediterranean countries, urban sprawl occurs in the context of a decline of rural activities, notably agriculture, grazing and logging. Highly diverse cultural landscapes shaped by the coevolution of particular management practices and specific biophysical settings are rapidly deteriorating[16] and being replaced by the globalised low-density housing model[17] and entirely new forms of human-nature relationships. Therefore, not only do we need quantitative data on sprawling urban areas, but also an understanding of the underlying social dynamics and local people's perceptions of landscape changes.[18]

The Barcelona Metropolitan Region (BMR) is a paradigmatic example of the processes mentioned above. Over the past few decades, cropland has diminished, wooded land has increased and housing developments have sprawled as population from the city core migrated to the suburbs.[19] Small rural towns on the outskirts of Barcelona have been transformed into residential areas incorporated

Shaping Landscapes and Ecosystems for Human Welfare", in *Science*, 316, 5833, 2007, pp. 1866–1869. A. Glig, "Perceptions About Land Use", in *Land Use Policy*, 265, 2009, pp. 76-82.

[16] A. Farina, "The Cultural Landscape as a Model for the Integration of Ecology and Economics", in *Bioscience*, 50, 4, 2000, pp. 313-320. A. Farina, A.R. Johnson, S.J. Turner, A. Belgrano, "'Full' World Versus 'Empty' World Paradigm at the Time of Globalisation", in *Ecological Economics*, 45, 1, 2003, pp. 11-18.

[17] F. Muñoz, "Lock Living: Urban Sprawl in Mediterranean Cities", in *Cities*, 20, 6, 2003, pp. 381-385.

[18] M.S. Calvo-Iglesias, R. Crescente-Maseda, U. Fra-Paleo, "Exploring Farmer's Knowledge as a Source of Information on Past and Present Cultural Landscapes. A Case Study from NW Spain", in *Landscape and Urban Planning*, 78, 4, 2006, pp. 334-343. M.M. Wagner, P.H. Gobster, "Interpreting Landscape Change: Measured Biophysical Change and Surrounding Social Context", in *Landscape and Urban Planning*, 81, 2007, pp. 67-80.

[19] B. Catalán, D. Saurí, P. Serra, "Urban Sprawl in the Mediterranean? Patterns of Growth and Change in the Barcelona Metropolitan Region 1993-2000", in *Landscape and Urban Planning*, 85, 3-4, 2007, pp. 174-184.

[20] E. Tello, "La formación histórica de paisajes agrarios mediterráneos:

within the metropolitan system, mainly composed of low-density developments of single-family homes. Such is the case for Matadepera, a municipality lying 40 km North from Barcelona city, which appears as a good subject for a case-study of the urbanisation of a small rural settlement in a metropolitan setting. Here low-density developments for wealthy people kept expanding over former croplands and woods until the establishment of a natural park in 1982. In cases such as this, detailed quantitative information about land-cover changes is crucial for both town-planners and environmental technicians. How much cropland has been transformed into urban land and how much is left; what urbanisation pattern was chosen and why; what social processes are driving these changes: all this is essential information not only for local managers but also for whoever seeks to understand the broader process of metropolisation and gentrification. After a period of demographic stability (1930-1960), the population in Matadepera started to grow, increasing more than tenfold to almost 9000. The massive influx of new urban settlers completely altered the rural character of the village. Its oldest dwellers, mainly farmers and forest workers, witnessed a dramatic change in their livelihoods, until then largely dependent on the local availability of natural resources and the residents' knowledge of how to use them sustainably.[20] The question we asked ourselves was thus: what is these older residents' perception of the goods and bads of this landscape transformation? What role may their local knowledge play in one analysis of land-use changes? May their experience be useful for present landscape management?

To analyze the transformation of Matadepera from a rural to a residential landscape, we designed an interdisciplinary methodology combining quantitative and qualitative data, with the following objectives: 1) gaining a detailed understanding of land-cover changes;

Una aproximación coevolutiva", in *Historia agraria*, 19, 1999, pp. 195-212. J. Comasòlivas, *Les darreres vinyes del terme de Matadepera o allò que el "progrés" se'ns ha endut*, XXV Ronda Vallesana, Unió Excursionista de Sabadell, Sabadell 2004, pp. 47-69.

[21] V. Paül, M. Tonts, "Containing Urban Sprawl: Trends in Land Use and Spatial

2) shedding light on the driving forces and principal agents of these changes; 3) exploring perceptions of landscape change among old rural dwellers, especially peasants and forest workers.

The study area

Matadepera is a municipality in the second metropolitan ring of the BMR (Figure 1). The BMR is structured as a polycentric metropolitan system[21] including a compact centre (Barcelona city), 7 medium-sized towns with populations between 50,000 and 200,000, and 156 smaller municipalities. Today, nearly 5 million people live in the BMR.[22] Matadepera is well-connected by car to the city centre and to the nearest metropolitan subcentres, Terrassa and Sabadell, which are less than 10 km away and have around 200,000 inhabitants each. Matadepera extends over 2537 ha at the foot of the Sant Llorenç del Munt massif, in the Catalan pre-coastal mountain range. The mountain is mainly covered with holm oak (*Quercus ilex*) mixed with Aleppo pine (*Pinus halepensis*) on the lower ranges. The accumulation of biomass that followed the abandonment of forest management has led to an increase of wildfire risk in the area, which is now mainly covered by woodland.[23] The Catalan Government has hence designated Matadepera as a high wildfire risk area requiring special prevention management. Between 1970 and 2008, 28 wildfires occurred within the municipality, burning a total of ca. 34 hectares.[24] In 2003, a large wildfire broke out on the slopes of Sant

Planning in the Metropolitan Region of Barcelona", in *Journal of Environmental Planning and Management*, 48, 1, 2005, pp. 7-35.

[22] Institut d'Estadística de Catalunya (IDESCAT), http://www.idescat.cat (accessed August 2010).

[23] G. Scarascia-Mugnozza, H. Oswald, P. Piussi, K. Radoglou, "Forest of the Mediterranean Region: Gaps in Knowledge and Research Needs", in *Forest Ecology and Management*, 132, 1, 2000, pp. 97-109.

[24] Department of the Environment and Housing of Catalonia (DEHC), 2009, http://mediambient.gencat.cat/cat/el_medi/incendis/estadistiques_incendis.jsp (accessed August 2010).

[25] Diputació de Barcelona, *Parc Natural de Sant Llorenç del Munt i l'Obac.*

Llorenç del Munt, less than 10 km from Matadepera, destroying about 4500 ha of forest and killing five people.[25]

The climate is mild Mediterranean, with annual rainfall ranging between 675 mm in Matadepera (423 m a.s.l.) and 850 mm at the top of the mountain (1107 m a.s.l.). The area does not have a permanent stream, as its karstic geomorphology favours the seepage of water into the ground. The main water course is the Arenes, an irregular torrent flowing NO-SE. It is dry most of the year, but will occasionally flood, usually after intense rainfalls or when previous rainy spells have saturated the underground circulation system. The municipality is hence classified as being at high flood risk. One of the most dramatic incidents occurred in September 1962, when it rained 180-220 litres in 24 hours and hundreds of people died in the towns downstream of the Arenes. Further disastrous floods occurred in September 1971, August 1983 and October 1994.[26] Currently, 61% of the municipality is protected as a natural park, the Parc Natural de Sant Llorenç del Munt i l'Obac, which receives up to 200,000 visitors a year,[27] mainly metropolitan residents. The rest of the land is almost completely covered by low-density high-income housing developments forming an extensive Wildland-Urban Interface (or WUI, a designation used for any area where low-density housing runs into fuel-rich wildland).[28] Between 1985 and 2000, single-family houses accounted for more than 70% of new developments.[29] Matadepera has the highest per capita income

Memòria 2004. Diputació de Barcelona, 2004, available at: http://www.diba.es/parcsn/parcs/fitxers/pdf/p04d094.pdf (accessed August 2010).

[26] V. Paül, L.M. Pérez, *Episodis extraordinaris de precipitació i ordenació territorial a Sant Llorenç del Munt i voltants*, V Trobada d'Estudiosos de Sant Llorenç del Munt i l'Obac, Diputació de Barcelona, Barcelona 2002.

[27] Diputació de Barcelona, *Parc Natural de Sant Llorenç del Munt i l'Obac. Memòria 2007*, Diputació de Barcelona, Barcelona 2007, available at: http://www.diba.es/parcsn/parcs/fitxers/pdf/p04d234.pdf (accessed August 2010).

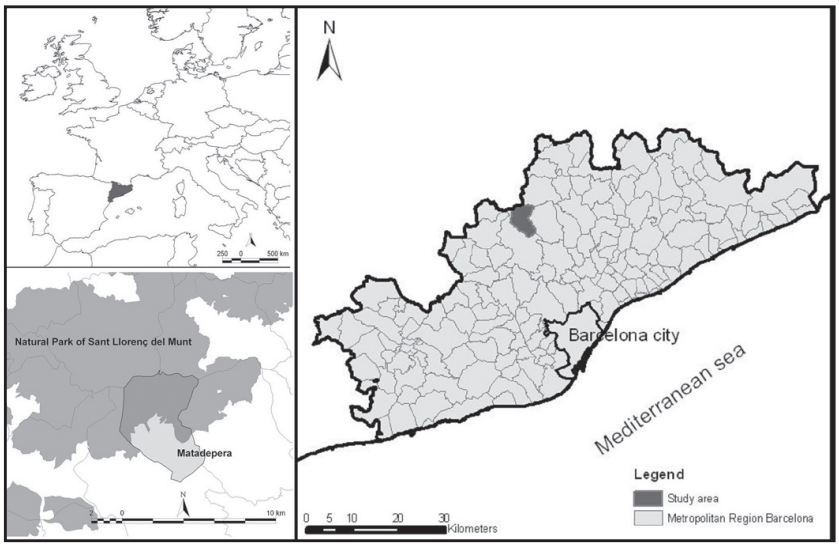
[28] See S.I. Stewart, V.C. Radeloff, R.B. Hammer, T.J. Hawbaker, "Defining the Wildland-Urban Interface", in *Journal of Forestry*, 105, 4, 2007, pp. 201-207.

[29] Muñoz, *Lock Living* cit.

[30] IDESCAT.

of all Catalan municipalities larger than 5000 inhabitants, 70% above the Catalan average.[30] The rich suburb evolved out of a small, compact town mainly inhabited by poor peasants growing cereal and grape on rain-fed cropland and exploiting the forest for charcoal and firewood: a process driven by the power of landowning elites to impose their particular socio-environmental project.[31]

Figure 1. Location of the study area in the European context and in the Metropolitan Region of Barcelona.



Methodology

Land-cover maps

To study land-cover changes in our study area, we used a set of aerial photographs from 1956 (approx. 1:33,000) and orthophotos

[31] I. Otero, G. Kallis, R. Aguilar, V. Ruiz, "Water Scarcity, Social Power and the Production of an Elite Suburb. The Political Ecology of Water in Matadepera, Catalonia", in *Ecological Economics*, Forthcoming.

from 1984 and 2004 (approx. 1:5000.). After scanning and rectifying the photographs, we carried out photointerpretation and fieldwork to draw up computerized images of land covers in the area in the years 1956, 1984 and 2004 in a Geographical Information System (GIS). For the year 2004, we used as a basis the Land Cover Map of Catalonia,[32] which we verified by checking it against direct data gathered in an extensive field survey. We classified the study area into 11 land cover types (Table 1) and analyzed land-cover changes by superimposing the three layers in the GIS.

Table 1. Land cover types and description.

Land cover types	Description
Bare land	Denuded land as a result of direct human action.
Bare rock	Areas constituted by rocks.
Dense forest	Forested land with a tree cover ≥ 20%.
Cropland	Rain-fed cropland and wasteland fields.
Leisure & municipal facilities	Leisure, sports and municipal facilities.
Mining	Bare land as a result of open-pit mining.
Road	Road.
Shrub land	Forested land with a shrub cover > 20% and a tree cover < 5%.
Sparse forest	Forested land with 5-20% of tree cover, usually over shrub land.
Stream	Stream course.
Urban land	Built area.

Oral sources

We held semi-structured interviews with ten locals born between 1913 and 1944 who had spent most of their lives in the municipality and whose livelihoods had once depended upon agriculture and the

[32] Centre for Ecological Research and Forestry Applications (CREAF), http://www.creaf.uab.es/MCSC/ (accessed August 2010).

forest, although they also combined these activities with work in the industry or services. The interviews were designed to cover the life history of the informants, from childhood to present,[33] focusing on their individual experiences and their perception of landscape change, and putting the whole conversation within the broader context of the key political, social, and economic events and processes of the history of Catalonia and Spain.[34] Thus, our aim was not to interview a representative sample of the inhabitants of Matadepera, but rather to collect quality information from a particular social group in the area that had received little attention up to then.[35] The interviews lasted between one and two hours. They were recorded with a video camera and/or a digital recorder and transcribed. We performed a content analysis to identify connections with the themes and processes highlighted by the GIS analysis, and grouped answers into different focus subjects, namely: experiences related to key processes of land-cover change; perception of landscape change; wildfire risk; gentrification; the natural park; and thoughts about the vanishing rural world and the rise of the urban one. Additionally, we conducted a photo-elicitation session with one of the interviewees, consisting in showing several landscape photographs taken in different years and discussing the changes they documented.[36] This scientific methodology was designed on the basis of countless hours

[33] R.L. Mille, *Researching Life Stories and Family Histories*, Sage, London 2000, p. 172.

[34] R. Aguilar, "*Del món rural al món urbà. El conflicte per la terra i l'aigua i la transformacie urbanistica de Matadepera, 1931-1983*", PhD Thesis, Universitat Autònoma de Barcelona, Bellaterra (Cerdanyola) 2010.

[35] I. Otero, L. Domènech, A. Escalona, *La dimensió ambiental del sector primari al Parc Natural de Sant Llorenç del Munt i l'Obac. El cas de l'explotació d'agricultura ecològica de Can Pèlacs (Matadepera)*, VI Trobada d'Estudiosos de Sant Llorenç del Munt i l'Obac, Diputació de Barcelona, Barcelona 2007. G. Estany, A. Badia, M. Boada, I. Otero, "Integració de fonts d'informació per l'anàlisi socioecològica dels canvis en el paisatge a Matadepera (Vallès Occidental) entre 1931 i 2007", in *Treballs de la Societat Catalana de Geografia*, 65, 2008, pp. 44-54.

[36] M. Clarck-Ibáñez, "Framing the Social World with Photo-Elicitation Interviews", in *American Behavioral Sciencist*, 47, 12, 2004, pp. 1507-1527.

of informal talks, excursions and knowledge sharing with local elders over more than six years, which also yielded a publication on local mushroom lore co-authored with one of them.[37]

Documentary sources

We collected documentary sources for almost the whole 20th century in the City Archives of Matadepera as part of an ongoing research project on environmental history.[38] We identified, photocopied and text-coded key documents, focusing especially on urban development plans and available cadastral information describing agricultural and forest land-uses. We performed a content analysis on all the selected documents to cross-check them against other sources. We also selected some of the available old landscape photographs covering the period 1920-1980 and took new photographs from exactly the same angle and distance[39] to allow qualitative interpretation of changes on 10 pairs of photographs representative of the whole municipality's landscape.

Results and discussion

Land-cover changes (1956-2008)

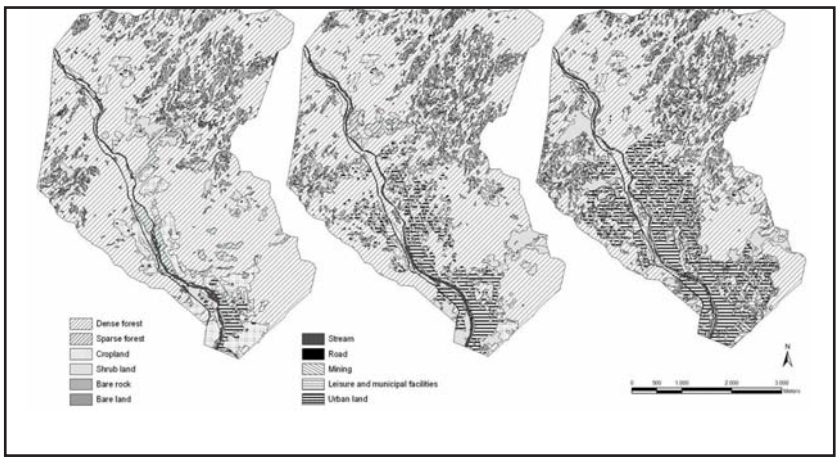
Figure 2 shows the dramatic urbanisation rate of Matadepera during the second half of the twentieth century. The land-cover map of 1956 describes a small and compact town lying in the plain in the south part of the municipality, surrounded by a ring of rain-fed cropland that separated the urban core from the forest. The crops

[37] A. Garcia, I. Otero, *Els bolets de Sant Llorenç del Munt i l'Obac. Visió d'un boletarie*, Farell Editors, Barcelona 2009.

[38] Aguilar, *Del món rural al món urbà* cit.

[39] M. Debussche, J. Lepart, A. Dervieux, "Mediterranean Landscape Change: Evidence from Old Postcards", in *Global Ecology and Biogeography*, 8, 1, 1999, pp. 3-15. M. Boada, *El Montseny. Cinquanta anys d'evolució dels paisatges*, Publicacions de l'Abadia de Montserrat, Barcelona 2002.

Figure 2. Land-cover maps of Matadepera (1956, 1984, and 2008)



(cereals, vines and olive trees) mostly occupied the alluvial terraces along the main water course, the Arenas. Small fields still remained around old farmhouses scattered over the forested area. The map of 1984 shows how by that date the rural landscape had almost disappeared under the pressure of the new urban land uses. Between 1956 and 1984, the urban area extended northward from the town centre over former fields and woods, and cropland decreased by 68%. The Wildland-Urban Interface kept expanding and becoming denser until 2008 as developable plots within the WUI were urbanised (Figure 2). Woods always accounted for most of the land-cover within the municipality and nowadays extend over ca. 75% of its surface (including in this calculation dense and sparse woodland and shrub land, Tables 1 and 2).

Detailed land-cover data throughout the study period indicates that it is urban cover that experienced the highest variation, increasing almost tenfold (from 37.6 to 359.5 ha, Table 2). It now extends in a scattered pattern over the territory of the municipality, forming an extensive WUI where urban land mixes with forest and shrub patches in gardens and undeveloped plots. Urban land grew at the expense of

former cropland (28% of current urban land, Table 3), especially in the first period, when flat cropland fields near the village were urbanised (60 ha from 1956 to 1984, and 44 ha from 1984 to 2008, Table 2). Above all, urban land grew at the expense of dense forest (51% of current urban land), particularly in the second period, when urban developments began to expand uphill (58 ha before 1984, and 132 ha from 1984 onward).

Another remarkable change in our study area was the decrease of cropland, which has shrunk by 71% and only survives around some farmhouses that were protected from urbanisation by their inclusion in the Natural Park. To give an order of magnitude, the current cropland (42 ha) occupies approximately the same area as the watered lawns of houses within the urban land-cover (37 ha).[40] More than 40% of the cropland existing in 1956 was developed and about one third was colonised either by forest or shrubs after its abandonment; by 2008 only about a sixth remained (Table 3).

Shrub land has increased, mainly as a consequence of wildfires in the south-eastern part of the municipality in 1977, 1979, and 1981, and in its north-western part in 1986,[41] as well as spontaneous colonization of abandoned fields (Table 3). A naked-eye comparison of aerial photographs shows an overall increase of the canopy cover and fuel accumulation in the forestland. Both phenomena can be interpreted as the result of the abandonment of traditional forestry practices such as coppicing holm oaks for firewood and charcoal, pruning and felling pines for firewood and timber, and slashing ground vegetation for firewood and fine charcoal.[42] This trend is reflected in our results, which show that more than half of the sparse forest of 1956 is now dense forest (Table 3, but see note 2 to Table 2).

Although dense forest is the largest land cover today, accounting for 62.5% of the municipal area, about 13% of it is distributed in

[40] Unpublished data from G. Estany, D. Saurí, 2008.

[41] DEHC, 2009.

[42] A. Badia, I. Otero, R. Maneja, G. Estany, M. Boada, "Canvi global i paisatge a la Costa del Tet-Mont-Rodon. Analitzar el passat per planificar el futur (1956-2006)", in *Documents d'Anàlisi Geogràfica*, 52, 2008, pp. 31-48.

Table 2. Land cover distribution in 1956, 1984, and 2008 and growth percentages from one period to the next.

Land cover[1]	1956 (ha)	1956 (%)	1984 (ha)	1984 (%)	2008 (ha)	2008 (%)	Relative growth 1956-1984 (%)	Relative growth 1984-2008 (%)	Relative growth 1956-2008 (%)
Dense forest	1845.1	72.7	1803.5	71.2	1584.9	62.5	-2.3	-12.1	-14.1
Sparse forest[2]	98.8	3.9	53.7	2.1	28.9	1.1	-45.6	-46.2	-70.7
Cropland	228.3	9.0	73.1	2.9	42.3	1.7	-68.0	-42.1	-81.5
Urban land	37.6	1.5	180.3	7.1	359.5	14.2	379.5	99.4	856.1
Road	6.8	0.3	6.7	0.3	7.3	0.3	-1.5	9.0	7.4
Shrub land[2]	91.0	3.6	206.9	8.1	294.0	11.6	127.4	42.1	223.1
Bare land	3.5	0.1	10.5	0.3	16.0	0.6	200.0	52.4	357.1
Stream	24.1	0.9	21.8	0.9	13.9	0.5	-9.5	-36.2	-42.3
Bare rock[3]	202.5	8.0	170.7	6.7	168.3	6.6	-15.7	-1.4	-16.9
Leisure and municipal facilities	0	0	10.5	0.4	22.2	0.9	-	111.4	111.4
Mining	0	0	0	0	0.3	0.0	-	-	-
Total	2537.7	100.0	2537.7	100.0	2537.7	100.0			

[1] Differences in scale caused different map resolutions that produced slight disparities in the comparative data.
[2] Sparse forest and shrub land area may be underestimated for 1956 and 1984 due to differences in scale and colour of the aerial photographs, which allowed a more accurate digitalisation for year 2008.
[3] The decline of bare rock, which should be constant over the period, is a consequence of the different resolutions of the aerial photographs as well as vegetation growth over the rock as a result of the end of forest management.

Table 3. Detailed land-cover changes in the study area from 1956 to 2008 (hectares).

2008 \ 1956	Sparse forest	Dense forest	Road	Crop land	Shrub land	Bare land	Stream	Bare rock	Urban land	Total (2008)
Sparse forest	0.8	18.6	0.0	5.8	2.7	0.1	0.3	0.5	0.1	28.9
Dense forest	55.3	1396.3	1.5	31.9	39.6	0.8	2.4	55.3	2.0	1584.9
Road	0.3	1.4	3.6	1.8	0.2	0.0	0.0	0.0	0.1	7.3
Cropland	0.3	2.1	0.8	37.6	0.6	0.5	0.0	0.3	0.2	42.3
Leisure and municipal facilites	0.5	7.7	0.2	12.4	0.2	0.0	1.1	0.0	0.1	22.2
Mining	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Shrub land	15.1	179.4	0.4	35.0	28.3	0.3	9.6	25.2	0.7	294.0
Bare land	0.8	9.0	0.0	3.3	1.2	0.6	0.5	0.2	0.4	16.0
Stream	0.8	3.8	0.0	0.0	0.8	0.0	8.4	0.1	0.0	13.9
Bare rock	0.8	43.2	0.0	0.7	4.0	0.0	0.0	119.5	0.0	168.3
Urban land	24.1	183.3	0.2	99.7	13.6	1.3	1.7	1.3	34.2	359.5
Total (1956)	98.8	1845.1	6.8	228.3	91.0	3.5	24.1	202.5	37.6	**2537.7**

patches smaller than 10 ha within the WUI, which may have very different ecological characteristics than larger patches.[43] In spite of the expansion of woodland over former cropland, between 1956 and 2008 forested land-cover categories (dense and sparse forest, and shrub land) decreased by 127.1 ha. Today, about one tenth of the dense and sparse forests of 1956 are urbanized and wildfires have turned another tenth into shrub land (Tables 2 and 3). The urbanisation process went hand in hand with the building of leisure and municipal facilities, notably sport clubs and a golf course. The Arenes stream was channelled and shrubs colonized its bed, reducing its area by 42%.

The driving forces of landscape transformation: from local factors to global change

Back in the late 19th century, while still a rural village, Matadepera gained prominence as a summer resort for industrial bourgeois and intellectuals from the nearby towns attracted by its beautiful rural landscape and dry climate.[44] Some locals saw a business opportunity in this and invested in real estate for rich holiday-makers. The principal ruling factor in the first development waves was the power of landowning elites to control land and water, which became stronger after the defeat of Republican claims for land reform and water municipalisation following Franco's victory in the Spanish Civil War.[45]

One important factor to consider is that in Matadepera the distribution of land ownership was especially uneven. At the end of the 19th century, just two family estates owned half of the municipal territory, and just eleven owned more than 90% of it.[46] This unequal distribution was consolidated by the outcome of the civil war and the counter-revolutionary measures taken by the dictatorship.[47] But

[43] Guirado, Pino, Rodà, *Understorey Plant Species Richness and Composition* cit.

[44] C. Duran, *Pere Aldavert. Una vida al servei de l'ideal*, Publicacions de l'Abadia de Montserrat, Barcelona 2006.

[45] Otero, Kallis, Aguilar, Ruiz, *Water Scarcity* cit.

[46] Land tax, 1885-86, box 377, City Archives of Matadepera (CAM).

[47] We infer this from rustic taxes, which can be regarded as approximately reflecting actual land distribution, box 24 (2AA), CAM 1944. See also J. Tébar,

access to land was not the only prerequisite for housing development. In the first decades of the 20th century, in the lack of a permanent surface water source, the urbanisation process in Matadepera was highly dependent on access to groundwater. Thanks to its control of the groundwater supply of the town, the Arnau family was able to to build the first vacation homes next to the existing compact town in the 1920s.[48] The attempt to municipalize the water supply, set forth in the short-lived Republican period (1931-1939)[49] was rapidly reversed by the new local authorities that arose after the Civil War. In 1949, groundwater was not sufficient for the requirements of the new planned developments. Therefore, the developers organized as a committee and invested capital to have water conveyed from the Llobregat river through the infrastructure of Terrassa.[50] Subsequent waves of developers joined Aguas de Matadepera, the municipal water company, to gain control over water and the urbanisation process.[51]

The land-cover map of 1956 shows how the first developments occupied fields around the town core (Figure 2). A comparison of photographs from different periods clearly illustrates the process of cropland urbanisation followed by increases of forest and shrub land, eventually leading to the current wildland-urban interface with its complete interpenetration of urban and forest land (Figure 3). In 1951, Matadepera had 193 second homes out of 309 total dwellings.[52] The vision of the Francoist authorities for the future of Matadepera

"Guerra, revolució i contrarevolució al camp", in *Història agrària dels Països Catalans,* E. Giralt (ed.), Vol. 4, Universitats dels Països Catalans and Fundació Catalana per a la Recerca i la Innovació, Barcelona 2006, pp. 581–602.

[48] M. Ametller, *El procés hidràulic de Matadepera*, Fundació Mina Aigües de Terrassa, Matadepera 2002.

[49] Official Bulletin of the Province 11 April 1932. Council agreement, box 854, (CAM) 6 June 1932. The Mayor to Francisco Arnau, box 854, CAM 21 June 1932. Francisco Arnau to the Council, box 854, CAM 30 June 1932. Agreement of the Council plenary, box 1002, CAM 8 July 1933.

[50] List of stockholders, Comisión traída de aguas a Matadepera, box 854, CAM December 1947.

[51] Otero, Kallis, Aguilar, Ruiz, *Water Scarcity* cit.

[52] Plan de Ordenación de Tarrasa y Matadepera, box 540, CAM 1951, p. 225.

was very clearly set out in the Urban Plan of 1951: "Matadepera… given its geographical situation…is called to perform an important function as a rest and summer resort"; although the plan itself did not project the spectacular urban growth that was to come. The plan also contemplated a small industrial area next to the compact town, but the project to transform Matadepera into a residential town without industry prevailed. The real-estate business was facilitated by two factors. On the one hand, housing developments over rustic land could obtain easy approval under the permissive Spanish Land Law of 1956,[53] which allowed the urbanisation of 1 out of 5 m^2 of rustic land. On the other hand, the absence of democratic control during Franco's dictatorship facilitated corruption in public approval of housing developments plans. Bribes were a common practice. As some interviewees stated: "It was a matter of keeping on earning money building houses wherever landlords wished. I think the Council should have kept better watch when developments extended over a path. All they wanted is cash in hand" (Interview #4); "They greased the lawyers and everybody else" (Interview #3); "If they were from Franco's side they could do whatever they liked" (Interview #1). Landowners had great power and actually controlled the town council, as shown by a revealing letter from Barata, the largest landowner, where he asked the Mayor to consult him first before sending anything signed to the Treasury, and to "give as little information as possible".[54]

The housing developments in Matadepera were built to attract a very specific high-income demand. The developers sold expensive houses that only upper-class families could afford.[55] The urban sprawl of Matadepera is hence very different than in the rest of the BMR, which in the 1950s was experiencing an uncontrolled and unplanned explosion of cheap, mostly unauthorized second homes.[56] In Matadepera, the building of second homes had started much

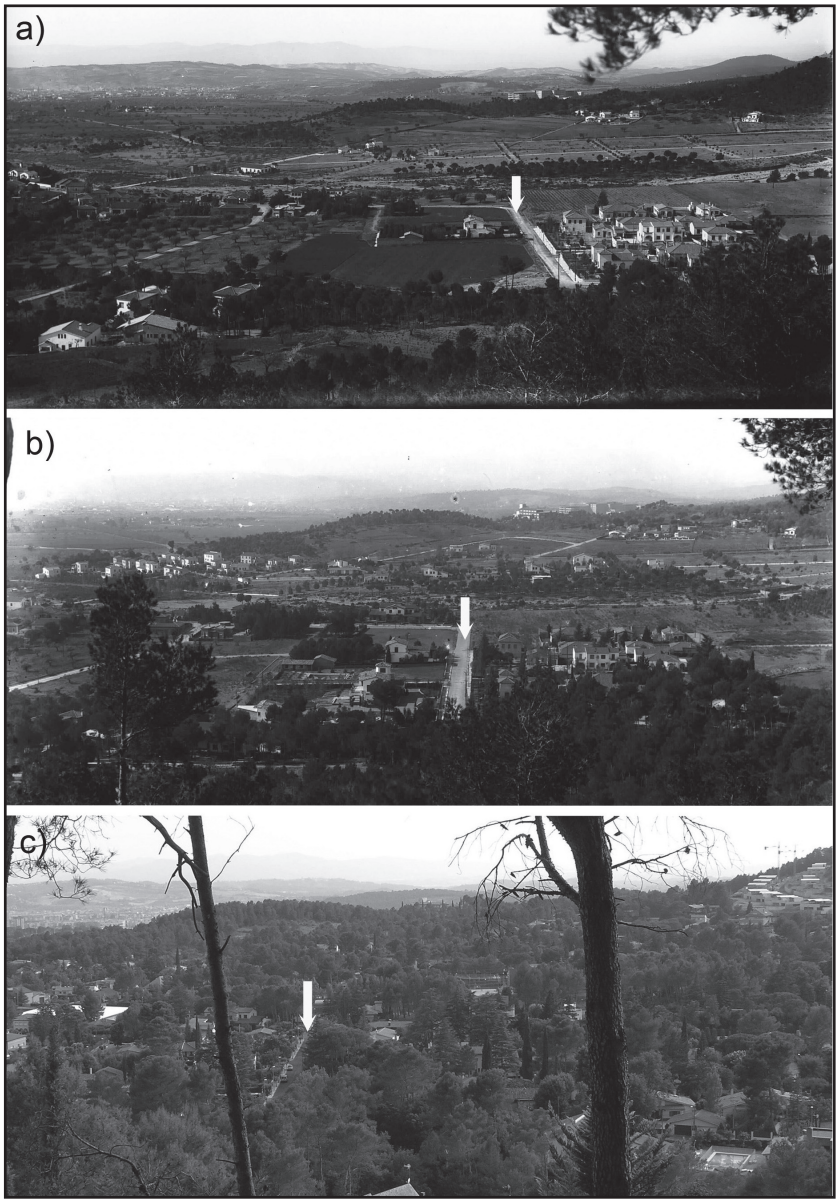
[53] Ley de 12 de mayo de 1956 sobre régimen del suelo y ordenación urbana. B.O.E. 14/5/1956.

[54] Barata to Mayor, box 385, CAM 29 April 1971.

[55] Estany, Badia, Boada, Otero, *Integració de fonts d'informació* cit.

[56] Catalán, Saurí, Serra, *Urban Sprawl in the Mediterranean?* cit.

Figure 3. Diachronic analysis showing the transformation from rural landscape to WUI. A) 1950s; b) 1960s; c) 2006.



earlier, at the end of the 19th century, had always been oriented to upper-class holidaymakers, and had been legally approved under the Spanish Land Law. About 95% of the urban licenses processed between 1961 and 1980 were for single-family houses on lots with areas between 800-2000 m^2.[57]

As we were saying, profit-seeking by powerful landowners and developers controlling vital resources such as land and water was the main driving force of urbanisation in Matadepera. However, despite the particular character of the local urban growth pattern, in the mid 20th century there was a broader context of exogenous socio-economic driving forces that also eased the land-use transition. Agriculture at the regional and global scale started to relocate to more fertile and accessible areas, while in marginal lands like Matadepera the value of agricultural land dropped.[58] The same happened with woodland when the spread of fossil fuels put an end to traditional forest exploitation.[59] When the value of extensive rain-fed cropland and forest products in Matadepera dropped, urbanisation became an attractive alternative for landowners. At the same time, the industrialisation of the country in the mid 20th century was especially intense around urban poles such as the BMR, where many rural workers switched to industrial jobs.[60] In Matadepera, forest workers and landless peasants moved to the industry or other non-farming activities and often left for cities such as Terrassa in search of better work conditions. Magdalena Font, a farmer born in 1933, although she later also recounts how they were actually dispossessed of their lands, points out that "when working in a factory you had your wage guaranteed; however, when working

[57] Estany, Badia, Boada, Otero, *Integració de fonts d'informació* cit. Catalán, Saurí, Serra, *Urban Sprawl in the Mediterranean?* cit.

[58] Stoate, Boatman, Borralho, Rio-Carvalho, de Snoo, Eden, *Ecological Impacts of Arable Intensification in Europe* cit. MacDonald, Crabtree, Wiesinger, Dax, Stamou, Fleury, Gutiérrez-Lazpita, Gibon, *Agricultural Abandonment in Mountain Areas of Europe* cit.

[59] Boada, *El Montseny* cit.

[60] F. Collantes, "The Decline of Agrarian Societies in the European Countryside: A Case Study of the Twentieth Century", in *Agricultural History*, 81, 1, 2007, pp. 76-97.

on the land you did not (…) living from the land was like slavery". However, we want to emphasize that the broader context of cropland abandonment and rural-urban migration were not exclusively to account for peasants' abandonment of our study area. Rather, our oral sources clearly document a silenced process of dispossession of peasants by powerful landowners who coveted their lands for development purposes. Again, Magdalena resignedly reminisces that "only few owned the land and they sold the whole thing for second homes. We were all sharecroppers. We had nothing of our own and they forced us out of everywhere. That was about it." We will return to this aspect in the next section.

Between 1964 and 1976, ten housing development plans were approved, singling out a large area for development within the municipality; although this area was never fully urbanised because further building was eventually stopped by the creation of the Natural Park.[61] The first attempt to stop the urbanisation process to protect the emblematic massif of Sant Llorenç was made in 1972, by the regional government, Diputació de Barcelona. Initially, the plan protected 2655 ha of the highest and steepest central areas of the mountain, where urbanisation would not have been possible anyway, but still allowed housing developments in the buffer area around the Park, although setting explicit building restrictions to maintain their densities low:[62] the minimum plot surface in the buffer area was fixed at 2000 m^2 and urban density limited to a maximum of 5 houses or 19 inhabitants per hectare. Therefore, what seemed a first step towards landscape protection was actually a strategy to guarantee pleasant, low-density surroundings for the high-income owners of the second homes. This was denounced by a large number of citizens organized in an environmentalist movement that arose during the Transition period and was connected with Left-Wing parties – Franco died in 1975 and democratic town councils were elected in 1979. The new political atmosphere that emerged

[61] Estany, Badia, Boada, Otero, *Integració de fonts d'informació* cit.
[62] Aguilar, *Del món rural al món urbà* cit.

after Franco's death allowed further structural changes, such as the approval of a new Spanish Land Law (1976),[63] which did away with the clause allowing urbanisation of 1 out of 5 m^2 of non-developable land contained in the previous law. In 1979, environmentalist pressure and new democratic authorities managed to put a stop to housing development in Matadepera. In October 1979, a group who called themselves "Ecologistas Anónimos" separated from the mostly peaceful environmentalist movement[64] and set off six bombs in bulldozers at the construction sites. Finally, in 1982 a Special Plan for the institution of a park was approved by the Diputació, though the present Natural Park was officially proclaimed by the Catalan government only in 1987. Although the urbanisation process had been halted a few years before, by that time the roads for the new housing developments were already built. The new plan placed under protection 9600 ha of the massif, including 61% of the municipality's surface. The final limits of the Natural Park in Matadepera were set exactly where the roads for the housing developments ended, after a "tacit negotiation" between the environmentalists, the Council, the Regional government and the developers. Large areas where roads already stood were hence not included in the Park, although development had hardly even started in them.[65]

In 1981, the municipal census counted about 2000 permanent inhabitants and 5740 seasonal residents.[66] In the 1970s and especially from the 1980s onward, the number of inhabitants of the municipality grew at a spectacular rate (Figure 4). Matadepera was integrated into the BMR dynamics, receiving immigration of urban inhabitants from Barcelona and its nearest subcentres.[67] During this period, second homes became primary ones and the WUI matrix began to show a progressive increase of housing density. Only 4 of the 17 farmhouses listed in the

[63] Ley 19/1975, de 2 de mayo, de reforma de la ley sobre régimen del suelo y ordenación urbana. B.O.E. 107 de 5/5/1975.

[64] Aguilar, *Del món rural al món urbà* cit.

[65] Ibid.

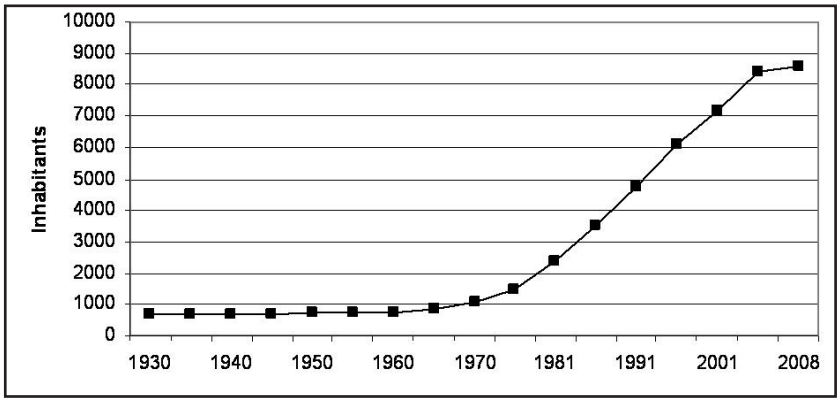
[66] Estany, Badia, Boada, Otero, *Integració de fonts d'informació* cit.

[67] Catalán, Saurí, Serra, *Urban Sprawl in the Mediterranean?* cit.

[68] Apeo de todas las fincas y heredades del término de Matadepera arreglado a

cadastral survey of 1768[68] have maintained their agricultural activity to the present day, with the support of subsidies. The rest are now surrounded by housing and have been abandoned or turned into restaurants. Today, the developable land of the municipality is almost exhausted and urban growth, including houses for young people, is restricted to the WUI, where about 30% of the available land still remains to be developed. The new Town Planning Scheme (approved 2009)[69] foresees a slight densification of the WUI without expansion onto developable land, with a theoretical limit of 14,000 inhabitants.

Figure 4. Population growth in Matadepera (1930-2008)



Peasants and metropolisation: "In just a few years Matadepera experienced a trauma"

As we have seen in the previous section, forcing farmers out of the land they were cultivating was an indispensable step for developing it. While this process left no documentary evidence - most sharecropping contracts were oral and the Francoist authorities

la canación del año 1768, box 372, CAM.

[69] Pla d'Ordenació Urbana de Matadepera 2009.

had no interest in leaving proof of dispossession -, it remains in the memory of those who were involved in it; hence the importance of using oral sources. Magdalena's husband, Mingo Comasòlivas, talks about his experience being thrown out of the Gorina estate, where he lived with his family before getting married: "Yes, we had done nothing and they kicked us out of our home (…) the landowner told my father 'It does not matter whether you have a contract, it will be no use'. The owner was the town mayor and he said 'houses are houses', those are the very words he used" (meaning that houses were just business and nothing else mattered). Another interviewee remembers: "My father had the contract with the estate and then, when they wanted to urbanise, they told him 'Joan, you will be the security guard and will get a salary'. They had already taken the whole garden, and then my father died of a heart attack." (Interview #2). As yet another interviewee put it: "You owned the grapevine but the land belonged to the landowner and if he sold the place to build houses you were fired" (Interview #1).

The process of gentrification was also perceived in a distinctive way by our oral sources. In the 1940s, rich holidaymakers used to spend the whole summer at the village. During this period the village strongly felt the contrast between their lifestyle and economic means and those of the urban newcomers. "In the winter, the town was a cemetery… [but] in the summer months the gentlemen of Sabadell, Terrassa and Barcelona came for their vacation. They had very good years. We didn't.… The worker had to work many hours to survive. The bourgeois, the rich of that time, yes, they had very good years" (Interview #1). The sense of belonging to two wholly different social classes was sharply felt: "One year the holidaymakers had their own summer-party (…) they did not want to mix with smelly, sweaty people like us" (Interview #1); "We used to go to Can Torres, where there was Roser, the landowner's daughter, and Maria Teresa from Cal Roc, but we could never get close to them because we were locals! We looked like shit next to them." (Interview #2). These differences aroused jealousies between the two groups: "The foreigners' kids were very boastful. They would ride their bicycles around and say to people 'Hey, you are from the village!', but then

the locals would throw such a volley of stones at them that they would have to run and hide. Because the villagers, they were terrible! The holidaymakers had a lot of money and bicycles but were… cowards" (Interview #7).

These interviews indicate that the massive influx of new inhabitants eroded local social life, and that urbanisation was perceived as far too excessive. Some of the interviewees stated their preference for their former life in the rural village, although they were aware of the many advantages of modernity, while others just liked the old village better: "The village is more beautiful nowadays than in the past, but for me it was more beautiful in those years because it was a real village. Now it is not. (…) It has the same name but there is nothing left" (Interview #1). This feeling is echoed by another interviewee: "Now it is not a village, now it's a piece of shit, speaking bluntly" (Interview #4). All interviewees agreed that social relations within the village had changed and complained that many people did not participate in the economic or social life and only used Matadepera as a dormitory town: "The new inhabitants go shopping in Terrassa, they even buy their everyday bread at the petrol station coming into town. Life in town is dead." (Interview #8). However, the interviewees perceive these changes as unstoppable: "I don't like the way many things have changed but I have to put up with them because I have to fit in" (Interview #8).

It is not our intent to wax nostalgic and offer a romantic view of the rural past. In the old days, most of the local population lived in poverty and misery. Our point is rather that conversations with old peasants reveal that landscape changes and "progress" may be seen as better or worse depending on the evaluation criteria employed. We went to Magdalena and Mingo's place to ask them directly if they would be willing to go back to old times. In front of the fire, Magdalena told us that she would never have gone back to the past. Mingo, however, was of a totally different opinion. He would have readily gone back to the world of his childhood.

The expanding holidaymaking economy increased the demand for services, building workers, carpenters, painters, gardeners and domestic cleaners. Many peasants also left the land because they saw

better life conditions in the new jobs compared to low-yield rain-fed cropland farming: "Thanks to the change of Matadepera, and I say it has changed too much, my children have a painting business, and there are other businesses such as carpenters, electricians… This village has become lively" (Interview #5).

As we have seen, one of the main impacts of the abandonment of primary activities and the expansion of the WUI in Matadepera was increased human and forest vulnerability to fire hazard[70]. Our oral sources perceive this as an obvious outcome of urban expansion over the mountainside. The inhabitants of the old rural community, especially forest workers, showed special awareness of and concern for wildfire risk: "…It is beautiful in the evening (…) I go out on my little terrace and look out, I see the whole mountain full of lights, all of it. If a fire breaks out, I just think, if a fire breaks out, how all those people will run!" (Interview #3); "In just a few years Matadepera experienced a trauma… when I see those houses up along the slope in Les Pedritxes and Cavall Bernat it makes me tremble, it makes me tremble!" (Interview #2).

Biomass accumulation following the abandonment of forest management increases wildfire risk.[71] All our interviewees were well aware of this. Old forest workers referred to the current accumulation of biomass in forests as "dirt", while past managed forests were "clean". Pau Soler used to work in the forests of Matadepera slashing ground vegetation and felling pines and oaks. He states the differences in these terms: "Compared with the woods we had before, today's woods make one want to cry. Because the trees are old and the forest is dirty so the day a fire breaks out nothing will survive. In the old times, the

[70] Scarascia-Mugnozza, Oswald, Piussi, Radoglou, *Forest of the Mediterranean Region* cit. Stewart, Radeloff, Hammer, Hawbaker, *Defining the Wildland-Urban Interface* cit. N. Mira, A. Badia, "La vulnerabilitat de les zones d'interfase urbana-forestal davant els incendis: estudi de cas de l'incendi de Mont-Roig del Camp", in *Treballs de la Societat Catalana de Geografia*, 66, 2008, pp. 29-51.

[71] F. Moreira, F.C. Rego, P.G. Ferreira, "Temporal (1958–1995) Pattern of Change in a Cultural Landscape of Northwestern Portugal: Implications for Fire Occurrence", in *Landscape Ecology*, 16, 6, 2001, pp. 557–567.

forest was cleaned, pines were cut down, the bad ones were removed while the good ones were left standing; nowadays, however, the good trees are cut down and the bad ones are left standing. Moreover, tree cutting is done when the forest is dirty and therefore saplings are lost and everything is crushed". Soler appears to regard fire as a regular ecosystem disturbance. As some forest workers stressed, there were more or less the same number of wildfires in the past as nowadays, but in the past it was easier to put them out and they used to burn smaller areas because combustibility was lower. According to Joan Orriols, another forest worker, "When I see abandoned forests I think this is a big mistake. I think we are enough people, however little is done, when with some work forests could look as nice as gardens." Orriols thus sees forest, not as pristine nature, but as something that needs to be managed to become like a "garden".

All interviewees expressed a certain dislike for the concept of protecting nature via the Natural Park. They did not like the prohibitions that came with the park: "We thought it was a bit strange to ban lighting fires in the forest, because we have never set fire to the forest; the same goes for collecting thyme or hunting a bird" (Interview #5). In spite of this, they agreed that the creation of the park had been a good thing, being the only way to prevent what they saw as an otherwise unstoppable process of urbanisation: "If the Natural Park hadn't been made, maybe more would had been destroyed, because they had already started to destroy it, but when the Park was officially protected, they had to stop selling the land. (…) I am only grateful to the Park because it stopped the urbanisation. Sadly, it was started too late" (Interview #1).

Conclusions

The poor rural village of the early decades of the 20th century is now an elite suburb of the Barcelona Metropolitan Region. Our study provides detailed quantitative information on the land-cover changes experienced during this transition. Cartographic photointerpretation and analysis were used to reconstruct the local landscape's physical appearance in three different years - 1956, 1984, and 2008 - and the

sprawling of urban land over former fields and forests. Map overlays allowed us to quantitatively assess the transformation of land-cover. This new information will be useful for municipal architects and environmental technicians, who have so far relied on raw data from town-planning and development schemes. Furthermore, it helps our understanding of the broader process of metropolisation and rural gentrification as a whole by revealing the socioecological dynamics behind such changes as well as its driving and ruling forces.[72]

As it is highlighted in *Water Scarcity*, "Matadepera was not ineluctably destined to become a holiday resort for the rich; it became such as the result of intense political and social struggles. There was an alternative vision of progress and that Matadepera's present state as an exclusive elite suburb was not inevitable",[73] a combination of factors at different temporal and spatial scales seems to account for the dramatic transformation of the area's landscape. First of all, there were the local geographical and ecological features: a dry climate, a beautiful and quiet landscape, and closeness to growing industrial towns. External socioeconomic driving forces such as fast industrialization and urbanisation, the intensification of agriculture and forest exploitation, and land abandonment in steep marginal lands provided the context for the change in land-use. Land rent also played a role in the conversion of rural land to low-density housing, as the profitability of urbanisation increased and that of agriculture and forest exploitation went down. However, the main ruling factor in land-use changes in Matadepera was the power of landowning elites to control land and water to create an elite suburb. This was possible thanks to the particular institutional and legislative context of the Francoist dictatorship, which empowered wealthy landowners against the interests of poor peasants, who were forced to change their occupation or leave the village for the suburbs.

Little changed in the democratic period, which began in the late 1970s, as the basic decisional context had already been defined

[72] E.F. Lambin, P. Meyfroidt, "Land Use Transitions: Socio-Ecological Feedback *versus* Socio-Economic Change", in *Land Use Policy*, 27, 2010, pp. 108-118.

[73] Otero, Kallis, Aguilar, Ruiz, *Water Scarcity* cit., p. 11.

through its violent imposition in the Francoist period.[74] By that time, reversing the area's trend towards urbanisation had become very hard, in spite of increased social demands for nature conservation in an increasingly democratized Spain.

Albeit with local differences, similar processes are under way in other metropolises in developed countries,[75] where suburbanisation is displacing rural activities and inducing land-use changes. Gentrification usually occurs concomitantly with this process,[76] as in our study area. The migration of middle/upper or service households into villages caused the displacement of local peasants and working class groups. By shedding light on the urbanisation of the traditional agroforestal mosaic - an indispensable landscape structure for the conservation of the ecological quality of non-built-up metropolitan land-,[77] our study wants to contribute to its protection and improvement. Furthermore, the land-cover changes we have illustrated, principally consisting of the expansion of urban land at the expense of forest land and cropland, may have implications for the capacity of the landscape to host certain species or ecological processes.[78]

The agroforestal mosaic still existing in Matadepera in the mid 20th century was the result of a long-period process of interaction between a specific biophysical environment and specific farming, animal husbandry and forest management practices. Thus,

[74] Ibid.

[75] Ramankutty, Foley, *Estimating Historical Changes in Global Land Cover* cit. EEA, *Urban Sprawl in Europe* cit.

[76] M. Phillips, S. Page, E. Saratsi, K. Tansey, K. Moore, "Diversity, Scale and Green Landscapes in the Gentrification Process: Traversing Ecological and Social Science Perspectives", in *Applied Geography*, 28, 1, 2008, pp. 54-76. M. Kingle, "Changing Spaces: Nature, Property, and Power in Seattle, 1880-1945", in *Journal of Urban History*, 32, 2, 2006, pp. 197-230.

[77] J. Marull, J. Pino, E. Tello, M.J. Cordobilla, "Social Metabolism, Landscape Change and Land-Use Planning in the Barcelona Metropolitan Region", in *Land Use Policy*, 27, 2, 2010, pp. 497-510.

[78] J. Marull, J. Pino, E. Tello, "The Loss of Landscape Efficiency: An Analysis of Land-Use Changes in Western Mediterranean Agriculture (Vallès county, Catalonia, 1853-2004)", in *Global Environment*, 3, 2008, pp. 113-150. Guirado, Pino, Rodà, *Understorey Plant Species Richness and Composition* cit.

throughout history this landscape was shaped by the work of thousands of men and women. By approaching some of the last peasants and forest workers from Matadepera, our study has given voice to their silenced memories, which reveal unique information that could not be collected from any other source, namely, (i) the dispossession of peasants by real-estate developers; (ii) peasants' individual perceptions of gentrification; (iii) their perceptions of the environmental effects of landscape change; and (iv) their opinion on the good and the bad of "progress". Maps provide very detailed and relevant information on land-cover change, but may leave in the dark major injustices deliberately erased by official history.[79] Our integration of maps with oral sources and detailed documentary information from local archives has resulted in a more intense account of the social conflicts behind landscape changes.[80]

Listening to these counter-memories and recovering erased personal narratives[81] may help to point out alternative development paths and reinforce action towards a more sustainable future.[82] The narrative we have provided here was actually used to empower the local environmentalist movement in its struggle to stop further expansion of housing[83] and protect the forest from wildfires,[84] in a

[79] Otero, Kallis, Aguilar, Ruiz, *Water Scarcity* cit.

[80] P.H. Herlihy, G. Knapp, "Maps of, by, and for the Peoples of Latin America", in *Human Organization*, 62, 4, 2003, pp. 303-314. Wagner, Gobster, *Interpreting Landscape Change* cit., pp. 67-80.

[81] V.D. Nazarea, "Local Knowledge and Memory in Biodiversity Conservation", in *Annual Review of Anthropology*, 35, 2006, pp. 317-35.

[82] M. Patel, K. Kok, D.S. Rothman, "Participatory Scenario Construction in Land Use Analysis: An Insight into the Experiences Created by Stakeholder Involvement in the Northern Mediterranean", in *Land Use Policy*, 24, 3, 2007, pp. 546-561.

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situation where, between the urbanised area and the border of the Natural Park, 239 ha of low forested hills (almost 10% of the whole municipality) remained unprotected from development.[85]

The authors of the present article are engaged in grassroots conservationist movements, including the Local Environmental Council of Matadepera, and three of them are members of the local community. In these capacities, they actively participated in a process of citizenship involvement to protect the area. Some of the elders joined the movement: "We want to set the borders of the Park almost touching the houses to stop the destruction of more forestland. There are already enough houses, enough asphalt, enough streetlights, enough cars and enough curbs and everything" (Interview #5). More than 1300 signatures and 18 local and regional bodies petitioned the Town Council to protect the area from new developments, a proposal unanimously approved by the plenary.[86] The area was placed under protection and is now being managed to enhance its natural and cultural heritage.

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[85] Badia, Otero, Maneja, Estany, Boada, *Canvi global i paisatge a la Costa del Tet-Mont-Rodon* cit.

[86] Agreement of the Council plenary, 14 May 2007.