LOSING GROUND: THE INTERACTION BETWEEN DEMOGRAPHY, LAND-USE POLICY, ETHNIC CONFLICT AND ENVIRONMENT IN ISRAEL

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In this paper, we examine the role of ethnic conflict on the environment in Israel as it is mediated by demographics and land-use policy. By considering these relationships, we contextualize the impact of population growth on the environment – a relationship that, rather than being direct, is filtered through land-use policies. In Israel, these policies are influenced by ideological, security and political concerns – all of which have a strong ethnic/demographic dimension (Goldscheider 1996; Kellerman 1993). Land-use policy is used explicitly as a tool for spatial control in which the Jewish population is encouraged, through various incentives, to live in particular locals in low-density communities. Simultaneously, limits are placed on non-Jewish mobility within the country and on the physical expansion of non-Jewish communities. While these policies have been, in part, a response to perceived threats arising from local ethnic demographic imbalances, they are also drivers of ethnic conflict (Benstein 2003; Yiftachel 1997), which feeds back to policy formulation. By approaching the issue from an environmental perspective, we suggest that environmental quality is an unintended victim of this demographically driven "policy-ethnic tension" feedback loop (Fig. 1). This feedback loop influences the rates and spatial patterns of development and, by association, loss of open space.

For the past 55 years, Israel has attempted to reconcile its national identity as both a democratic and Jewish state (Goldscheider 1996; Sachar 1985). Aside from the theoretical challenges to bridging these potentially incongruous identities, the country's policy makers have had to incorporate ethnic minorities, primarily Arab Muslims, whose fertility rates are consistently higher than the country's Jewish population, into their planning frameworks. Land-use policy has been used to both rectify perceived local demographic imbalances between Jews and non-Jews and to secure border areas, thereby attempting to establish Jewish spatial control across the country (Falah 1991; Kellerman 1993; Yiftachel 1999).

Despite the centrality of collective agriculture in the founding philosophy of the state and an early anti-urban ethic in the predominant Labor Zionist identity, the Jewish population of Israel has traditionally preferred to live in high density urban communities in the country's geographic and demographic "core region" around Tel Aviv. Since 1948, following the founding of the state, ethnic minority populations have been concentrated in the peripheral north and south of the country. This demographic distribution was perceived by planners and policy makers as unacceptable, posing a security threat both along the country's borders and internally in the peripheral regions. This concern, coupled with concerns for economic development, influenced government policy that has consistently sought to encourage Jewish internal migration from the core region to the periphery. Such plans included the [Aryeh] Sharon Plan of the 1950s (Kellerman 1993; Tal 2002), Judaization of the Galilee in the 1970s and 80s (Falah 1991), the "Seven Stars" plan of the 1990s establishing new communities along the pre-1967 border in the central region, and current plans to create single-family Jewish ranches in the Negev (Rinat 2004; Yiftachel 1999). An unintended but profound outcome of these efforts, as documented in this research, has been the rapid loss of open space due to low-density development in the peripheral regions of the country.

Using a geographical information system framework, we documented land development in 41 local authorities in Israel from 1961 to 1995 based on historical maps (Orenstein, Albert and Hamburg 2004). These data were integrated with demographic data provided for each local authority in each census year (1961, 1972, 1983 and 1995). We found that at the aggregate national level, population growth and land development were closely correlated ($R^2 = 0.94$). However, our spatially explicit data show that the strength of this correlation varies among ethnicities (Jewish or non-Jewish), geographic areas (core or periphery), or socio-economic structure of communities (urban or rural). For example, we find evidence of two concurrent trends – one towards greater spatial extensification in Jewish development, and another towards greater spatial intensification in non-Jewish development. Further, by analyzing the strength of the correlations by inter-census periods using a regression model, we find that the strength of correlations between independent variables and land development change at different times in history (see Figs 2 and 3).

The development trends revealed by the data reflect policy and personal taste. Historically, a majority of Jewish Israelis preferred to reside in the urban core area (Goldscheider 1996; Kellerman 1993). Government policy, however, has consistently encouraged Jewish population dispersal to the northern and southern peripheries. In order to encourage such internal migration, the government and associated quasi-governmental agencies promoted low-density, exurban settlement through the policies noted previously, among others. Concurrently, development in non-Jewish communities has been spatially confined (Falah 1991; Yiftachel 2004) – forcing population growth within these areas to be facilitated through increasing the density of previously developed regions. In addition, partially in response to exurban low-density settlement in the West Bank beginning in the 1970s, Jewish populations in the urban core increasingly sought "ground-attached" (single-family) housing within pre-1967 Israel, raising the demand for low density development in the core region (Kellerman 1993). This research provides quantitative support for theories of spatial dominance proposed by Falah (1991) and Yiftachel (2004), among others, who have claimed that a predominant theme in Israeli spatial planning is the use of low-density Jewish settlement to contain non-Jewish settlement and gain spatial control of the landscape.

We are currently integrating two additional demographic variables into our model, size of household and size of house (i.e. the number of people per household and the number of rooms in a house, respectively). Since 1978 (the first year for which statistics are available), household size in all sectors (Jewish/non-Jewish, urban/rural) have steadily declined. The number of rooms per house has grown. In other words, smaller families are living in larger houses.

Changes in agricultural land preservation policies may also have influenced the results of our analysis. Whereas agriculturally suitable land had been sacrosanct for protection, during the 1990s a steady erosion of the centrality of agriculture to the identity of the state, combined with increasing demand for developable land, has led to rapid development of land previously designated for agriculture. This trend is particularly strong in the center of the country, where demand for development is highest (Alterman 1999; Feitelson 1999).

Current trends in land-cover change, and in particular, policies that encourage low-density Jewish development in peripheral regions have become a flash-point for ethnic conflict in the region. Yiftachel (1997) traced the roots of ethnic protest among Arabs in the Galilee and found that land planning/policy issues to be as significant to motivating protests as national and socio-

economic issues. Considering that such policies continue and are even strengthened in light of these protests, we suggest a negative feedback in which increased protest actually sustain interest in continuing such policies. The Prime Minister, for example, is advocating the creation of 30 new Jewish communities in the Galilee and the Negev, the reasons for which are attributed to local demographic imbalances, spatial control and border security (Rinat 2003). Likewise, recent advocacy for single-family Jewish ranches in the Negev and Galilee have been justified in terms of preventing Bedouin development sprawl, which is perceived as a threat to national security (Rinat 2004; Yiftachel 2004).

We conclude that the loss of open space is an unintended consequence of the land-use policy/ethnic conflict feedback. The most environmentally significant policy decision is one that moves Jewish populations to low density communities in the peripheral regions. A second important policy trend affecting loss of open space is the weakening of farmland protection, which has served as a bulwark against open-space development in the center of the country. A final important trend is the increase in desire for single-family homes, even in the center of the country. This latter trend may explain why population becomes a significant variable in our regression model only during the 1990s (Fig. 3).

The results of this study support an emerging consensus among land-use/cover change (LUCC) scientists that posits that population growth is a less important driver of LUCC than previously assumed (Lambin 2001). Rather, it is political economy and specific policies that drive the movement of people that impact land cover. This research follows an investigation into the link between demography and LUCC in Israel (Orenstein, Albert and Hamburg 2004). This work and our previous work both support the aforementioned consensus, as well as suggesting qualifications. As the new consensus maintains, it was not population growth in Israel that related directly to the loss of open spaces, but rather policy decisions regarding the distribution of that population. However, the policy decisions discussed here both encouraged and responded to demographic changes. We see a cyclic relationship between demographic change, state policy responses to these changes, and the spatial/environmental impact of these policies.

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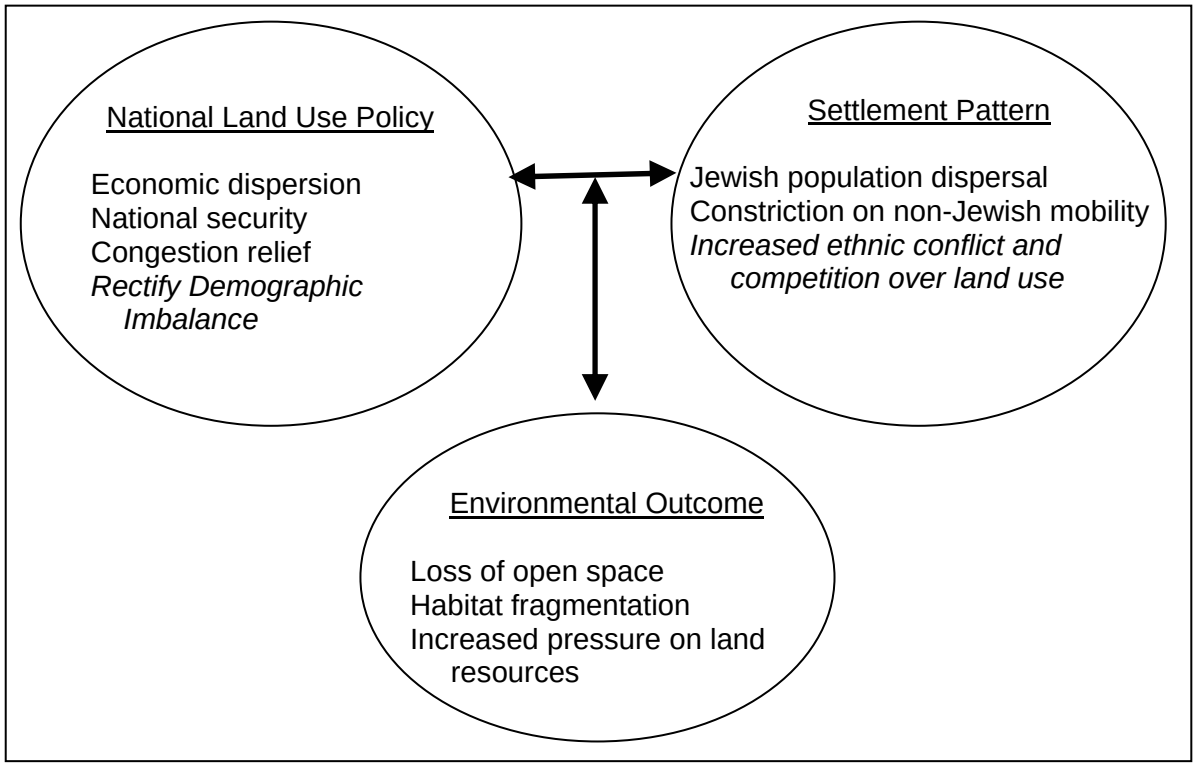

Figure 1: Diagram of inter-relationships and feedbacks between Israeli land-use policy and settlement patterns. Note that while environmental considerations play an increasingly important role in land-use planning, we posit that ultimately it is the interplay between land-use policy, with its demographic and political considerations, and settlement pattern that produces environmental outcomes.

Aggregate	Period 1 (1961-1972)	Period 2 (1972-1983)	Period 3 (1983-1995)	Full Period (1961-1995)
North	68	47	50	53
Center (n)	7	10	4	7
Center (s)	16	2	10	10
South	23	29	36	30
Non-Jewish	62	24	29	32
Jewish	16	11	18	16
Urban	14	8	15	12
Rural	398	275	135	215

Figure 2: Land developed (ha) per additional 1000 people according to various aggregations of 41 municipalities in Israel

	1961-1972 ($R^2 = 0.33$)	1972-1983 ($R^2 = 0.67$)	1983-1995 ($R^2 = 0.89$)	1961-1995 ($R^2 = 0.76$)
$population_{\Delta}$	-0.003	0.004	0.015**	0.013**
$open\ space_{t1}$	0.024*	0.036**	0.052**	0.110**
$population_{t1}$	0.009	-0.001	-0.001	-0.020*
urban (rural)	-17	10	-35	-43
Jewish (non-Jewish)	42	120**	78*	220*
center (south)	110	-90.0*	-160**	-160
north (south)	22	47	-6.5	53
Intercept	13	-30	-71	67

n = 32 * = $p < 0.1$ ** = $p < 0.01$

Figure 3: Results from multivariate linear regression with dependent variable "hectares of developed land" – Coeffecients for independent variables (hypothesized drivers of land development) analyzed by periods between censuses.