

LIVELIHOOD DIVERSIFICATION AND ENVIRONMENTAL CHANGE IN ARGENTINA'S RURAL DRYLANDS

Extended abstract

This article explores livelihoods diversification in the context of current discussions on adaptation in place and immobile and trapped populations related to environmental (including climate) change impacts. It addresses the case of rural and small urban areas of San Juan, and area in the Arid Diagonal of South America where irrigated farming and livestock are still traditional economic activities that are losing ground to public employment, social services and more recently mining and rural tourism (Adamo 2013). Climate variability, access to water resources, water stress and land degradation have historically had a decisive role in the distribution, mobility and welfare of the population, and in particular of farmers' livelihoods, who face a higher risk of being affected by environmental changes and extreme weather events.

The objective is to explore livelihoods diversification among farm and non-farm households as a factor in explaining adaptation in place in a changing dryland context. Chambers and Conway (1991:6) defined rural livelihood as "...the capabilities, assets (stores, resources, claims and access) and activities required for a means of living...". Households engage in a strategic management of the assets in order to secure their material and biological reproduction (Arguello 1981; Schmink 1984; Forni, Benencia and Neiman 1991; Hugo 1998). But as households live in specific contexts (social, economic, political and environmental), their options are shaped (facilitated and constrained) by a certain structure of opportunities (Moser 1998; González de la Rocha 2000; Chambers and Conway 1991). Consequently, households' strategies are closely related to their own structure and human capital composition but also to the dynamics of the local labor market (Schmink 1984; González de la Rocha 2000) and, in the case of those households engaged in primary activities, of the local environment. Common farm households' livelihood strategies in developing countries include agricultural extensification (more land) or intensification (more capital and labor), and diversification of income sources with off-farm and nonfarm activities in or outside the place of residence. These options do not need to be mutually exclusive, are usually combined in some fashion, and are also dynamic, depending on the household's life cycle and its labor force availability and skills at any given time (Scoones 1998; Reardon et al. 2001; Ellis 2000).

Land degradation and other forms of environmental change are powerful stressors in arid and semiarid agricultural areas because they affect, directly or indirectly, the economic basis of people's livelihoods (Blaikie 1994). Farm households would attempt to reduce risk and uncertainty by diversify the sources of income, reducing the number of consumers, or both (Blaikie et al. 1994; Hugo 1998; Ellis 1998; Schmink 1984). Here, diversification is key, as the degree of social vulnerability and the ownership and control of assets are inversely related (the larger the number of assets, the lower the degree of vulnerability) and higher diversification in strategies increases the resilience of households confronting stressful situations (Ellis 1998; Adger 2001; Moser 1998).

Drylands usually characterize by negative net migration (e.g. de Sherbinin et al. 2012) due to severe water stress, land degradation or both (Neumann et al. 2015), but large heterogeneity between and within countries, and across different settings (i.e. urban and rural) should be expected (e.g. Thiede et al. 2016). Recent increase of empirical research on environmental factors as drivers of population mobility includes a focus on those who do not migrate through the concepts of trapped and immobile populations, and adaptation in place (see for example, Black et al. 2011; Adams 2015; Hunter and Nawrotzki 2016)

The paper is based on the statistical analysis of secondary data, integrating socio-demographic, economic and environmental data complemented with a literature review. Microdata and area data from IPUMs International and IPUMs-Terra for the 1980, 1991, 2001 and 2010 population censuses (Minnesota Population Center 2015) are currently being integrated with data on climate characteristics and trends during the period of interest, historical series of river discharge for the Jáchal River, disasters occurrence, land cover data and vegetation indices from remote sensing sources, and information on socioeconomic conditions (local, regional and national) over the period of interest (for example, from agricultural censuses, historical series of crop production and prices, and historical irrigation series). Once the data integration is completed, exploratory data analysis (EDA) and exploratory spatial data analysis (ESDA) techniques will be used for this particular paper.

Very preliminary analysis of the census microdata indicates that some diversification took place between 1980 and 2001 (analysis of the 2010 microdata is pending), related to more household members in the labor force, notably women, in a labor market where the gender division of labor was quite pronounced. More in detail, in 1980, about 40% of the economically active population declared agriculture as first sector of employment, but by 2001 the proportion had declined to 23%. Conversely, over the same period the proportion of the labor force in public administration, education and health increased from 16% to 34%, and women's labor force participation went from 16% to 35% (table 1). Male labor force participation was higher among farm households (79% vs 50%), but female participation was higher among non-farm households (21% vs 14%). However, there is a caveat: most of women's work in agriculture takes place in the family farm and is very often not recorded as part of economic activities. While the labor force in the area went from 47% urban in 1980 to 61% urban in 2001, people working in agriculture were predominantly rural in both years (about 80%). Among farm-households, agriculture work continued to be almost the only economic sector for men (close to 90% in both years). The main difference between 1980 and 2001 was the decline of construction and the increase of public administration as sources of employment. Women's economic activities appeared more diversify between agriculture, education, and domestic and other services. By 2001, other miscellaneous activities represented almost 30% of women's employment, while more traditional activities such as teaching and domestic services had had a relative decline (table 2). In comparison, non-farm households were more diversified to begin with, but seemed to have reduced that diversification between 1980 and 2001, with significant declines in construction and to lesser extent in domestic services, and had concentrated more on public administration, social services and education, and small retail.

Table 1: Distribution (%) of active population by economic sector, year and sex

Economic sector	1980			2001		
	Male	Female	Total	Male	Female	Total
Agriculture, fishing,	46.87	6.93	40.17	31.43	3.86	23.05
Construction	14.91	0.66	12.52	8.65	0.48	6.17
Education, health and social services	3.26	40.92	9.58	9.28	43.48	19.67
Public administration	6.99	2.97	6.32	17.51	7.25	14.39
Wholesale and retail	4.99	7.59	5.43	11.39	15.46	12.63
Private household services	0.80	23.10	4.54	0.21	12.08	3.82
Other (including unknown)	22.17	17.82	21.44	21.53	17.4	20.26

Source: own elaboration based on data from Minnesota Population Center 2015

Table 2: Distribution (%) of active population by economic sector, year and sex: farm households (upper panel) and non-farm households (lower panel)

FARM HOUSEHOLDS						
Economic sector	1980			2001		
	Male	Female	Total	Male	Female	Total
Agriculture, fishing,	87.89	25.93	82.20	88.17	21.62	76.21
Construction	4.24	1.23	3.97	1.18	0.00	0.97
Education, health and social services	0.62	32.10	3.51	1.18	24.32	5.34
Private household services	0.00	20.99	1.93	0.59	16.22	3.40
Public administration	1.25	6.17	1.70	2.96	0.00	2.43
Wholesale and retail	0.50	3.70	0.79	1.18	8.11	2.43
Other (including unknown)	5.47	9.87	5.89	4.73	29.74	9.23

NON-FARM HOUSEHOLDS						
Economic sector	1980			2001		
	Male	Female	Total	Male	Female	Total
Construction	27.10	0.45	20.69	12.79	0.59	8.42
Education, health and social services	6.27	44.14	15.39	13.78	47.65	25.90
Public administration	13.55	1.80	10.73	25.57	8.82	19.58
Wholesale and retail	10.13	9.01	9.86	17.05	17.06	17.05
Private household services	1.71	23.87	7.04	0.00	11.18	4.00
Other (including unknown)	41.22	20.72	36.32	30.84	14.71	25.05

Source: own elaboration based on data from Minnesota Population Center 2015

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