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Environmental Change and Population Mobility in Rural Areas of Developing Countries

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The purpose of this statement is to add to Adamo's background paper some insights about the complex relationship between population mobility and environmental implications of human land use (particularly agricultural systems) in rural areas of developing countries. In order to address this relationship, two main issues arise: a) the limitations in traditional theories, particularly those linking demographic dynamics and livelihood strategies, and b) methodological issues in empirical studies.

Regarding the first issue, theoretical approaches investigating population mobility – particularly in rural contexts - have usually considered the role of "environmental amenities" as a simplistic way of understanding the role of the environment in shaping mobility decisions (see, e.g., Lee, 1966 and approaches inspired by the neoclassical economics). Shebernin et al (2007) reviewed the "livelihood approach" in studies on demographic dynamics and the environment and concluded that the literature does not elucidate adequately the relationships among household demography, household capital, and the environment. The authors suggest that the capability of farm households to deal with environmental constrains depends basically of the combination of five types of assets: *Natural Capital* (the natural resource stock, or local environmental endowment), *Social Capital, Human Capital, Physical Capital and Financial Capital.* One of the key findings is that this limitation in the literature is due to the difficulty in integrating the distinct scales and levels of analysis, particularly those related to the context where mobility decisions (by individuals or households) are made – including institutional, cultural, economic factors and global changes. The key issue here is how to relate mobility decisions driven by environmental change as an individual decision conditioned by household structure and composition and mediated by contextual factors (see examples in Barbieri, 2006).

In a revision of Davis (1963)´s "theory of the multiphasic response", Bilsborrow et al (1987) consider the intensification of agriculture and the extension of the agricultural land area – a proxy for deforestation – as potential household responses to perceived changes in living standards. Subdivision of farms typically involves both, as additional families on the land will tend to lead to further clearing of forests to increase the agricultural land area to meet their needs, while the creation of smaller plots will also tend to stimulate intensification of agriculture, that is, increase the value of output per unit of land area by increasing inputs of labor and related inputs per land unit (Barbieri et al, 2005). On the other hand, "household life cycle" approaches hypothesize that change in household size and age composition over time lead to changes in land use and household labor allocation (on and off farm), thus establishing an endogenous relationship between them.

A shortcoming in the approaches discussed above is the limited ability to fully capture the recursive linkages in the relationship between environmental change and population mobility. Previous studies on the Brazilian and Ecuadorian Amazon have shown that population mobility, as a strategy of risk minimization, may be a key mechanism not only to reduce dependence on dwindling forest or land resources, but also a mechanism which reinforce land use practices deleterious to the environment.

Another important shortcoming is the inadequate assessment of the impacts of contextual factors. Barbieri (2006), for example, discusses evidences of a potential positive impact, on population mobility in the Ecuadorian Amazon, of the expansion of the oil industry and its consequences on soil and water resources. The same study in Ecuador, plus Barbieri et al (2005), show that land use life cycles and household life cycles may be independent, what may redirect the predominant discussion in the literature about i) *absolute* land scarcity (a measure of shortage of natural capital) and ii) an *endogenous* perspective on household and farm lifecycles as key drivers of mobility in rural settings, to a perspective which increasingly leverage i and ii by incorporating the role of mediating factors on farm and demographic dynamics. Shebernin et al (2007) also suggest that "ultimately, the focus of research into household lifecycles and environment must expand to cover varied social and cultural contexts, which clearly modify the relationships between household lifecycle stage, household composition and environmental impact".

In order to further illustrate this point, Barbieri et al (2008) show that the current pattern of urbanization in the Amazon (named *protourbanization* in the case of Ecuador, and *extended urbanization* in the case of Brazil) challenges not only the traditional dichotomy between "rural' or "urban", or between "city" and "countryside" in developing countries, but also engenders an important momentum in population mobility which is relatively independent of household and farm life cycles. In this vein, it is important to disentangle the impacts of the context on what has been purely seen as the impact of environment change on population dynamics in studies focusing at the *micro level* (individuals, families, households and/or communities).

The discussion in the preceding paragraphs illustrates some of the challenges ahead in Population – Environment studies focusing on rural areas of developing countries. In this regard, Barbieri (2003) statement in a former PERN cyberseminar[1] suggests that a combination of longitudinal, multilevel analytical approaches and spatial analysis may lead to a better understanding of the key linkages between demographic dynamics and environmental change and how the context mediate this relationship. This has an important implication in terms of better informing policy and planning in developing countries, particularly when the focus is on poverty or vulnerability alleviation and improvement of adaptive capacity. For example, Barbieri (2006) and Barbieri and Carr (2005) suggest the existence of a "vicious cycle" of poverty and mobility as an outcome of the population – environment interaction in rural areas of the Amazon: pressure over land leads to deforestation in most or all farm forest areas and reduces possibilities of agricultural extensification; out-migration occurs to other rural or forest areas in the Amazon; and, giving continuing population pressures in the new settled areas, new pressures will engender further out-migration and unabated deforestation. These cycles, which make explicit critical linkages between environmental change, population dynamics and poverty,

[1] Population and Environment Research Network (PERN)'s cyberseminar on "Population and Deforestation", 2003.

are decisively mediated by several types of institutional failures, as well as other characteristics of the context.

In conclusion, I believe that Adamo's background paper makes an excellent point when it remember us of the importance of improvements in theory and methodology to investigate the linkages between environmental change and population displacement. This is particularly relevant in rural areas of developing countries, where these linkages are more critical due to the components of vulnerability, poverty and institutional failures. Theory and methodology should, of course, be developed together, and recent studies in the last years suggest that we are in a promising way.

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