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Empowering ecosystem services: a case study of socio-ecological assets in a developing urban context

Meri Juntti, Dr
Department of Law and Politics
Middlesex University, UK
M.Juntti@mdx.ac.uk

With the ecosystem services (ES) discourse increasingly influencing the design of urban space and the valuation of environmental features (e.g. TEEB 2011), it is important to understand how inhabitants appropriate urban areas in their everyday lives, potentially 'missing out on' some ecosystem services but perhaps accessing other, as yet unarticulated benefits and dis-benefits. This paper reports on research that engages in-depth interviews and a walking methodology employing a smart phone app to access the contingent and subjective nature of experienced value of any services or dis-services derived from the environment by humans in two case study areas in the region of Minas Gerais, Brazil. Both case study areas integrate formal and informal settlement, and constitute significant sources of water provision for metropolitan consumption. The paper responds to the following research questions:

What kind of ES are there in the case study areas and at what scale are the benefits from these experienced

- What positive and negative functions of the local environment do the local population identify (directly and indirectly)
- How do these compare with a scientific ES assessment conducted in the same area
- How do these scientifically identified and experienced ES relate to the inhabitants' overall quality of life and wellbeing
- What are the factors that enable or inhibit individuals from benefitting from the local ES and from appropriating these to contribute towards positive transformations.

The data consists of 15 accompanied app walks recording the participants' experiences of the positive and negative functions of the local environment and of 30 in-depth interviews of stakeholders and inhabitants. In one of the case study areas, the app walks were designed by asking respondents to indicate significant routes (for frequency of use but also for other reasons) and significant locations where the community or fractions of the community congregate, or where they themselves spend time, that were particularly useful for them and that hold symbolic meanings for them. In the other, the app walk route was designed to feature significant ES identified by scientific experts.

Much like Pacione (2003) suggests that environmental quality is experienced as a function of our everyday lives, the analysis of the app walk and interview data yielded a range of ES related benefits and dis-benefits experienced by the inhabitants in the case study areas. While many of the experienced benefits and dis-benefits derive from ecological features, they also hinge on a number of built and design related ones. Crucially, the social context is central to how these features are experienced. Therefore, the data demonstrates how experienced ES and benefits (ESB) are produced by ecological and built elements and assigned a meaning subjectively by residents. This ontology of co-construction (E.g. Murdoch 2001) is central to understanding experienced ES and is reflected in some literature as a distinction into material ES deriving from the ecological categories (provisioning, regulating and supporting) and non-material, cultural ESGB (e.g. Bieling 2014). The findings demonstrate how socio-economic polarisation combines with formal and informal appropriations of local ES which are appropriated into assets and services and engaged into strategies of coping and transformation that are conditioned by personal aspirations and agency and external opportunities. This demonstrates the dispersed operation of power in the developing urban context and highlights opportunities for urban planning and service provision to engage with existing socioecological assets to increase the wellbeing and transformational capacity of challenged urban neighbourhoods. The paper engages DeLanda's (2006) notion of assemblage to demonstrate how ES related benefits and dis-benefits serve a range of functions ranging from those derived by individuals such as health and mental wellbeing to social

benefits or dis benefits derived by communities or other broader groups of individuals or even socio-economic ones, that benefit the economic viability of businesses in a neighbourhood. For example, experienced ESB can be seen as contributing towards 'positive de-territorialisation' (DeLanda 2006) which refers to connections, physical and otherwise, that enable the neighbourhood to establish relations that strengthen and tap into these non-monetary values that contribute to its viability as a liveable urban neighbourhood (see also Woods 2015). However, ESB are also experienced as contributing to what DeLanda terms negative de-territorialisation, which fragments the community and generates feelings of exclusion among existing residents.

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