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Do Development Interventions Confer Adaptive Capacity? Insights from Rural India

UNMESH PATNAIK [a] and PRASUN KUMAR DAS [b,*]

[a] *Tata Institute of Social Sciences, Mumbai, India*
[b] *APRACA, FAO, Bangkok, Thailand*

Summary. — Risks due to the occurrence of climatic aberrations pose an impediment to the economic growth of the households in vulnerable regions. The frequency of these events is projected to increase in the foreseeable future, with developing countries being the worst sufferers. Dealing with this appears to be an additional burden on the resources of such countries, a large part of which is already devoted to providing better living standards for its inhabitants. Does this imply that developmental interventions should be discontinued? Is there a link between these programs and adaptation to environmental shocks? In an effort to answer such questions, the paper examines the impact of the developmental schemes on the livelihood of the households in Western Odisha, India and investigates whether they augment post disaster coping and adaptation as well. The results indicate that overall the programs have made an impact concerning their intended goals but the diffusion of benefits across beneficiary groups is heterogeneous. Additionally, the programs have contributed in post disaster coping, but only in the regions where either they performed well or their penetration was extensive. Activities promoting livelihood diversification, food security, and poverty reduction also tacitly facilitate improvements in the resilience of the individuals and communities thereby enhancing their capacity to deal with climatic risks. Policy implication advocates the continuation of developmental interventions. However, realigning their framework to incorporate actions intended toward disaster risk reduction and management would result in more inclusive impacts.

Key words — climatic aberration, impact evaluation, adaptation, disaster coping, India

1. INTRODUCTION

Risks arising out of climatic aberrations and extremes (like droughts, deficient rainfall spells, and floods) disrupt the livelihoods of people and pose a threat to their economic growth. The fifth assessment report of the International Governmental Panel on Climate Change (IPCC) has restored the findings of the earlier versions of the report that stated that the warming of the earth's climate system is unequivocal and, since the 1950s, several observed changes have been unprecedented over the millennium (IPCC, 2014). Additionally, the special report on extreme events stated that the frequency and severity of these events will increase in the future (IPCC, 2012), with developing countries being the worst affected in terms of damages suffered (IPCC, 2012; Botzen & Van den Bergh, 2009; Bouwer, Crompton, Faust, Hoppe, & Pielke, 2007; Mirza, 2003). Equivocation of impacts involve deployment of mitigation measures (address causes) or initiating adaptation processes or coping (tackle effects). While adaptation refers to the longer process of adjusting to experienced and expected change, coping denotes the response to endured impacts (shorter term). Coping capacity can be increased with adaptation measures whereas adaptive capacity incorporates possible adaptation in addition to coping and cannot be increased beyond a certain point. However, both adaptation and coping endeavor to build resilience [1] and reduce vulnerability to climate variability and extremes, and include actions that reduce or avoid the risk. The benefits of adaptation on local or regional scale not only include enhancement in capacity to cope with impacts of climatic aberrations and extremes but also potentially contributes toward providing better living standards for the population. This assumes importance particularly in the context of the developing countries where tackling the climatic impacts appears as an additional burden on the resources already committed to issues like poverty eradication, infant mortality reduction, rural development, provision of access to basic needs etc.

The paper examines the role of developmental interventions in reducing the vulnerability of the poor in a rural Indian setting. It empirically tests first, whether developmental interventions have resulted in income enhancement for beneficiaries, and, second, if this has also augmented the coping/adaptive capacity of the households to deal with the impacts of climatic variations. In doing so, the impact of the Western Orissa Rural Livelihoods Project (WORLP), a developmental inter-

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vention that was operational in four districts of western Odisha (prior to 2011, the state's name was spelled as Orissa [2]), India, is examined while controlling for benefits from other ongoing schemes. The results are with reference to the district of Bolangir [3] in Odisha, where the WORLP interventions were first introduced. This region is highly vulnerable to climate-induced natural disasters like droughts, deficient rainfall spells and flash floods.

The contribution of the paper is in demonstrating that interventions aimed at reducing poverty and income enhancement also tacitly enhance the capacity to deal with climatic risks (through building resilience and augmenting the ability to cope) and hence are mutually inclusive. The nature and extent of this symbiotic relationship has not received much attention in literature. On the policy front, the findings endorse the continuation of such interventions by emphasizing their role as strategies for pro-active risk management and means for increasing the resilience of human and natural systems by either diminishing and/or spreading the shocks due to climatic aberrations and extremes [4].

The remainder of this paper is organized as follows. Section 2 presents the anatomy of the outcome of developmental interventions and their role in facilitating adaptive/coping capacity of the households to deal with climatic shocks. The interventions under enquiry are described here, with the empirical strategy being conceptualized in the concluding part. While Section 3 depicts the study area and research design, Section 4 analyzes the impact of the interventions on household income, reasons for the same and outcome of these on adaptation/coping. Finally, Section 5 presents the summary and conclusions.

2. COPING WITH CLIMATIC ABERRATIONS AND EXTREMES AND DEVELOPMENTAL INTERVENTIONS

In India, approximately 70% of the population resides in the rural areas. The direct impacts of climate-induced aberration and extreme events aggravate the vulnerability of existing livelihoods [5] due to: (i) higher dependence for income on climate sensitive sectors like agriculture and (ii) climatic aberrations and extremes being the principal source of risk to agriculture (Mall, Singh, Gupta, Srinivasan, & Rathore, 2006; Sathaye, Shukla, & Ravindranath, 2006; NATCOM, 2004). Simultaneously, the soaring population, higher incidence of poverty, large economic inequality, and rudimentary state of infrastructure amplify exposure and vulnerability (Patnaik, Das, & Bahinipati 2013; Patnaik & Narayanan, 2005). Among the vulnerable, the poorer sections bear the greatest risk of detrimental impacts due to their limited coping capacities and less favorable economic, social and institutional conditions (De Haen & Hemrich, 2007; Benson & Clay, 2004; Wisner *et al.*, 1994). The indirect effects (a consequence of the primary random shocks) are of longer term, with additional implications on livelihoods, and, yet again, the poorest struggle most with the outcomes that can trap them in an impoverished state from which they cannot escape (Carter, Little, Mogues, & Negatu, 2007; Carter & May, 1999; Dercon, 2004). Although the risks faced by the households due to these events are covariate over smaller geographical regions like blocks, (administrative division within districts) the consequences differ across households and are determined by their ability and capacity to withstand these shocks and hence are related to their resilience (Arouri, Nguyen, & Youssef, 2015; Briguglio, Cordina, Farrugia, & Vella, 2009; Cannon, 2008; Rose, 2004; Perrings, 2001; Holling, 1973). For instance, a drought may result in an immediate reduction in income and consumption for some, increases in food insecurity for others and longer term impacts (like falling into poverty traps) for a few. Likewise, the idea of securing livelihood includes the notion of coping with and recovery from external stresses so as to maintain or enhance existing capabilities and assets (Agrawal & Perrin, 2009). Dercon (2002) observes that risks faced by the households are crucial in determining the level of assets and endowments maintained by them while resilience is conditional upon the past and current exposure level and the socio-economic and institutional set-up witnessed by them. Important sources for increasing the resilience of the households to shocks include interventions for improving assets, providing alternative livelihood mechanisms, access to credit and public transfers (Davies, Béné, Arnall, Tanner, Newsham, & Coirolo, 2013; Bruneau *et al.*, 2003). In the light of this, the role of developmental interventions assumes significance as the focus of these in India are on issues like poverty eradication, infant mortality reduction, rural development, provision of access to basic needs etc. that are drivers of both resilience and coping capacity.

A key developmental intervention in the state of Odisha, India was the WORLP that was funded by the United Kingdom's Department for International Development (DFID) and implemented over a period of ten years (2000–10) by the Odisha Watershed Development Mission (OWDM), an autonomous agency of the Government of Odisha (GoO). The overall goal was to reduce poverty in rain-fed areas while the intermediate objective was to provide and promote sustainable livelihoods for the poorest in the pre-selected districts where human development indicators are very low and comparable to sub-Saharan Africa (WORLP, 1999). The total project outlay was Rs. 2.3 billion spread over the ten year period (2000–10) and designed to cover 1,180 villages over 677 watersheds [6] spread across four districts of western Odisha (Bolangir, Nuapada, Bargarh and Kalahandi). On the upper slopes, communities planted orchards and other trees to reduce run-off. At the bottom of the slopes, ponds and embankments were dug to slow the water rushing off the hills. On the lower lands, watershed groups dug water storage ponds and irrigation channels to irrigate crops at the end of the monsoon and other crops in the summer. Sometimes, small concrete structures like sluice gates were also built here.

The watersheds were selected through a three-stage selection process, beginning with short listing of watersheds using primary and secondary information. Subsequently, these got ranked as per the parameters developed by the OWDM, encompassing central and state government guidelines and suggestions of consultants associated with watershed development. In the second stage, quick assessments were conducted for examining attributes like unity of the villages, ability of the community to participate and availability of traditional institutions like the Pani Panchayat, Vana Surakhshya Samiti, Village Development Committee etc. Villages exhibiting these traits moved to stage three which was a probation of six months for demonstrating the creation of community institution-building work, worth Rs. 50,000 through people's contribution in labor or cash and with the help of a Project Implementing Agency (PIA) assigned to the village (for more details see WORLP, 1999). Although an identical institutional structure was followed in the implementation across all watersheds and regions, the project impacts varied across different watersheds depending on the types of activities chosen, management practices followed and the vision of the PIA (Routray, 2015; ICAI, 2013; CRD, 2010).

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