

CLIMATE INDUCED AGRARIAN CRISIS AND RURAL COMMUNITIES OF NORTH-EAST INDIA: EVIDENCE AND LESSONS LEARNT

Falendra Kumar Sudan

*Professor, Department of Economics, University of Jammu, Jammu,
Jammu and Kashmir – 180 006. E-mail: fk_sud@rediffmail.com*

Received: 11 August 2020 Revised: 27 August 2020 Accepted: 13 October 2020 Publication: 15 November 2020

Abstract: The paper intends to examine the impact of climate induced agrarian crisis on rural communities at micro level, and to explore likely situation to evolve and ongoing responses and recommendations to mitigate sufferings and improve livelihood options in rural areas of district Mamit of Mizoram State in north-east India. The primary data and information was collected from a total of 625 households confined to 25 villages (25 households each) using structured interview schedules. Content analysis technique has been used to analyze data and information qualitatively and quantitatively (using descriptive statistics). The study reveals that the deterioration of households' economic situation is translating into poorer diet and decreased expenditure on children's health and education, more poverty and debt, and engagement into low-earning, informal income earning activities. Indebtedness remains high, absorbing one-tenth of households' expenditure. Thus, climate induced agrarian crisis are affecting adversely food security and nutritional status of poor households, who seek additional work opportunities and migrate to mitigate hardships and sufferings.

In 88% of poor Christian households, at least one person per family have resorted to migration as survival strategies and supplementing meager earnings. With recent economic crisis, most migrants consequently change their status from becoming providers of remittance incomes to their households, to becoming dependents of these households, even as these households face more fragile material circumstances than before. Many of these migrant workers, for obvious reasons, come from most depressed and backward villages, where there is currently little potential for productive income generation. Declining remittances of migrants and unemployment among returnees, especially in climate induced agrarian crisis and post-bamboo flowering crisis scenarios are important issues. It generated great controversy even before crisis, decline in migrant remittances and unemployment among returnees gained an even greater seriousness with advent of bamboo flowering crisis. Economic slowdown made local labour force view returnees as competitors for scarce jobs, whereas they once view their remittances as a fuel to local economy. However, issue of fall in remittances of migrants and rise in number of returnees, particularly after current slowdown, has more far-reaching implications on well-being of children in these households.

Furthermore, many of their coping strategies are either ineffective, or create harmful consequences, especially for children. Negative shock on income translates to lower

social spending and investments, in turn leading to worse child welfare outcomes. Households facing income shocks could also try to borrow money resulting in severe household debt problems. Poor households also tend to react to climate induced agrarian shocks by diminishing spending on items that contribute to human capital investment (education and health), thus contributing to their vulnerability in future. Therefore, needs for social protection assistance will increase, however, government budgetary capacity to expand existing programmes will decrease. Interventions in response to natural shocks should not only mitigate immediate effects on poor households but also continue to tackle basic causes of poverty and food insecurity, including improvement of services (health, water, sanitation, and education), infrastructures, agricultural productivity and access to credit.

Keywords: Climate change, agrarian crisis, rural communities, policy

JEL Codes: Q12, Q19, Q54, Q58

I. INTRODUCTION

About 10.7% of the world's population lived below poverty line (World Bank, 2013) and out of 46.1% of global rural population, 76% are extremely poor and dependent on agriculture (Castañeda *et al.*, 2016; World Bank and IMF, 2016). There is close relationship between rural poverty and agricultural dependence (Thirtle *et al.*, 2001; World Bank 2008; De Janvry and Sadoulet, 2009; Cervantes-Godoy and Dewbre, 2010; Christiaensen *et al.*, 2011). In recent past, the share of agriculture in total global gross domestic product (GDP) (FAO, 2006) and employment has declined (World Bank, 2010) due to low agricultural production (FAO, 2006). In India, agricultural employment and income has declined sharply in recent past (GOI Report, 2016). Agricultural productivity has been negatively influenced by climate change, extreme weather condition, and technological deficits (Reilly *et al.*, 2003; Ewert *et al.*, 2005; Battisti and Naylor, 2009; Gornall *et al.*, 2010). Climate sensitivity of agriculture and increasing crop vulnerability increases rural poverty and migration as a coping mechanism to smooth income through remittances and reduce rural poverty (World Bank, 2008). Remittances increase the land, livestock, and human capital base, improve rural well-being, and reduce rural inequality (Bhagat, 2014). Agricultural productivity can also be negatively affected by migration, while remittances help overcome production constraints (Miluka *et al.*, 2010; de Brauw, 2010; Damon, 2010). Earlier studies (Feng *et al.*, 2010 and 2012; Marchiori *et al.*, 2012) investigated the linkages between climate change, crop yield, migration, and rural-urban wage differentials.

Climate induced agrarian distress and recent food price increases have serious consequences for rural communities in developing countries. The rural poor households with high infant mortality rates and/or low female schooling are highly vulnerable to effects of climate induced agrarian and food crisis. Fall in rural household incomes is likely to further increase their livelihood vulnerability. While

men and women benefit equally from positive shocks in per capita GDP, negative shocks are much more harmful to women than to men (Baird *et al.*, 2007). Incidence of morbidity due to increasing malnutrition will increase, if crisis remains unaddressed (IMF, 2009). During crisis, increases in morbidity are also attributed to cuts in health and education budgets of government (Knowles *et al.*, 1999). Agrarian crisis led to reductions in school enrolment and drop-outs increased (Frankenburg *et al.*, 1999). Those children leaving education will frequently enter employment and probability of entering employment is high in poor households where main income earner became unemployed (Duryea *et al.*, 2007). Climate induced agrarian crisis often propels children from school into labour force or to shoulder household tasks (Woldehanna *et al.*, 2008). Children in poor households are subject to added risk of being trafficked or compelled to engage in hazardous tasks. There is increase in numbers of street children in abusive forms of work and girls in commercial sex work to assist their parents and pay for their siblings' education during economic shocks (Knowles *et al.*, 1999).

All this may result in a retreat into more subsistence modes of production, with negative implications for growth and higher levels of inequality. These effects are likely to be exacerbated for socially excluded groups, especially minorities' households. Reducing consumption – quantity and quality of food, expenditure on healthcare, investment in children's education, etc. – and/or drawing on household savings and selling assets, such as livestock, are common responses to agrarian shocks (Skoufias, 2003). Household economic shocks also escalate domestic violence (Hutson, 2003; Fiszbein *et al.*, 2003) and risky behaviours (such as risky sex and substance abuse) (Lee-Rife, 2007). Increase in child and teenage suicides are also closely related to family stress following economic crisis (Bauer *et al.*, 1998; Falkingham, 2000). Increased pressures on parents' working time reduce time available for nurture and care of children and their emotional well-being can be seriously undermined (Ruiz Casares and Heymann, 2009), which reflects a broader societal failure to respond to changing labour and family support patterns. Negative effects of climate induced agrarian crisis not only affect children well-being today but their future development too. For children whose education is hampered, benefits of higher levels of education in adult life are likely to be diminished. Child stunting owing to malnutrition is often irreversible, and they are likely to get less access to better jobs and are paid less (Grantham-McGregor *et al.*, 2007). Thus, there is need to protect poor rural communities from adverse impacts of climate induced agrarian crisis to mitigate their suffering and promote their future development, which is not costless.

II. OBJECTIVES AND METHODOLOGY

With above backdrop, an attempt has been made to examine the impact of climate induced agrarian crisis on rural communities at micro level, and to explore likely

situation to evolve and ongoing coping responses and recommendations to mitigate sufferings and improve livelihood options. The study has been confined to rural areas of district Mamit of Mizoram State in north-east India. The sample has been confined to 25 households each from 25 villages for detailed survey. Thus, primary data and information was collected from a total of 625 households. Team strategies including participatory rural appraisal technique have been used to collect data and information. Researcher, himself has assumed the role of participant observer/moderator (as the case may be) and has been assisted by local research assistants to collect data and information, to gain access to multiple perspectives. Both unfocused and focused observation techniques have been used. Unfocused initial observations have been used to become increasingly familiar with insider's world so as to refine and focus subsequent observation and data collection. All observations have been recorded on site and misunderstanding, if any, has been corrected thereof. In all focus-group observations, 10-12 stakeholders have been recruited from different settings. Highly formal interviews have been conducted using structured interview schedules. In-depth interviews have also been conducted to elicit opinion of stakeholders with extensive knowledge of the phenomenon under study. Content analysis technique has been used to analyze data and information qualitatively and quantitatively (using descriptive statistics). Content analysis technique has been supplemented by use of code and label field notes, sorting, shifting, constructing and reconstructing these materials.

III. PROFILE OF SAMPLE HOUSEHOLDS

In present survey, Christian is dominant population group (99.13%). Muslim and Hindu households are proportionately very small. Average household size is 5.26 persons, lowest for Muslim (4.94) and highest for Hindu (5.77). Overall dependency is 1.73, which is highest among Christian (1.74) followed by Hindu (1.46) and Muslim (0.95). Average sex ratio is significantly high (1033), which is comparatively high for Hindu (1276) and low for Muslim (656). High sex ratio in Hindu and Christian households reflects a comparatively better female status in these communities. More than one-fourth of population is in unproductive age group of below 15 years. This is more or less same in Christian community except Hindu and Muslim communities, wherein proportion of children is comparatively more and stood at 40% and 45% respectively. Therefore, educational and child health care needs of these communities are highest. Gender equity in child sex ratio is noticed except Hindu and Muslim households. About 23% of the population is in age group of 15-24 years. This implies that they supply more labour force and likely unemployment is more in these communities, given higher incidence of general unemployment and current trend of slowdown in economy. High concentration of population in child and youthful age groups, calls for rigorous educational, health care and manpower planning and opening of more technical

and vocational institutions as well as creation of more and more self-employment opportunities in agro-based industries and service sector given the stagnant public sector and shrinking private industrial sector due to slowdown.

IV. IMPACT OF CLIMATE INDUCED AGRARIAN CRISIS

Rural poor households experience first round impacts of climate induced agrarian crisis in the form of fall in income and rising food prices. Second round impacts of climate induced agrarian crisis are part of households coping strategies and result in women and children joining work force to help poor families weather drops in family income. Climate induced agrarian crisis has adversely impacted very vulnerable population groups such as smallholders. Deterioration of households' economic situation is translating into poorer diet and decreased expenditure on children's health and education, more poverty and debt, and engagement into low-earning, informal income earning activities.

(i) High Unemployment and Underemployment

Self-employment in agriculture and allied activities is dominant occupation (60.73% of households) followed by casual wage labour in agriculture (24.71% of households). Industry-wise distribution of main workers reveals that agriculture, forestry and fishing are dominant activities wherein 88.08% of households' members are engaged. More or less similar is situation across communities. Thus, a large proportion of population of Mamit district is driving their livelihoods from agriculture and allied activities, which is responsible for their poverty and deprivation. Unemployment and underemployment is quite alarming among communities and increasing since onset of climate induced agrarian crisis. As such, search of additional employment for augmenting households' income and status is very high. However, due to lack of trainings and skills, their employability is comparatively low outside agriculture. Impact of climate induced agrarian crisis on smallholder agriculture is much more severe than has been recognized. Smallholders in Mizo hills have already been through severe climate induced agrarian crisis. Problems of shifting cultivation (jhum) practiced in Mizoram are both deep and varied.

Following economic reforms since early 1990s onwards, public policies systematically reduced protection afforded to farmers and exposed them to competition and market volatility. Volatile crop prices also generated misleading price signals. Traditional staple crops were abandoned in favour of cash crops which require more irrigation and purchased inputs, and which have also faced major volatility in crop prices. Smallholders, who took on debt (often from informal credit sources at very high rates of interest) in order to pay for these cash inputs, then found themselves in real difficulty if crops failed or output prices remained low. Further, this dramatic volatility of output prices was associated with

continuously rising prices of inputs. This was especially marked because of government attempts to reduce fertilizer subsidies and progressive deregulation of supplies of inputs such as seeds and pesticides. Volatility of output prices remains a huge problem for smallholders.

Central question of huge burden of farm debt has really not been solved, despite the “loan waiver” for farmers. This is because most smallholders operate in informal credit market, and go to private sources who are typically either rural money lenders or input dealers. Smallholders still remain outside the ambit of institutional credit, and most farm debt is informal. Real problems of rural debt cannot be addressed without dealing with cases of both public and private debt and recapitalizing money lenders to alleviate problems of borrowers and keep private rural credit channels flowing.

Meanwhile, crop price volatility has become much worse in recent past, dramatically increasing difficulties of cash crop producers. Smallholder farmers producing cash crops are vulnerable to a decline in cash crop prices. Their plight is compounded by a climate induced natural disaster like flowering of bamboo in Mizoram. Factors responsible for this are still not clearly established. Bamboos flower only once and die after flowering to regenerate from seeds. Strange phenomenon of simultaneous flowering in bamboo clumps in vast areas causes ecological havoc. Bamboo clumps die after flowering and it takes a few years before bamboo plants produce seeds again, leaving bare, exposed soil which could be disastrous in mountainous regions. This would lead to food scarcity, since several animals depend on this plant. Second factor is that rats feed on flowers and seeds of dying bamboo tree. This activates a rapid birth rate among rodents, which leads to huge rat population feeding on agricultural crops in fields and granaries, thus leading to famine and wiping out of agricultural crops leading to sharp declines in food consumption in vulnerable households.

Smallholders also depend on collection of bamboo shoots to increase their meager income from agriculture and supplement households’ nutrition. Due to bamboo flowering crisis, volumes of bamboo shoots collection was very small and returns from their sales were lower even at higher prices. Thus, livelihoods of smallholders are very vulnerable due to falling income from agriculture, which is also hard hit by natural disaster resulting in wiping out food crops. Combined effects of shocks led to declines in food consumption sharply by some poor households. What began as a bamboo flowering crisis manifested itself into what was arguably one of most serious food crises that Mizoram and rest of north-east India have experienced in last few decades, with important food and nutritional security implications for rural children. Given the fact that Mizoram is a special category state, child rights issues that crisis raised are of particular significance. Initially, much of attention was focused on food and nutritional aspects of crisis.

However, as evidenced by situation in district Mamit, impact of crisis was also very pronounced in social sphere. Besides natural calamity of bamboo flowering, rising unemployment and inflation had a downward effect on real wages, while there was a rise in incidence of poverty. Even though short-term social problems were relatively mild in comparison, long-term implications of these problems are serious enough to warrant concern.

(ii) Fall in Remittances

Besides climate induced agrarian crisis, due to chronic poverty and non-availability of livelihood opportunities, in 88% of poor Christian households, at least one person per family have resorted to migration as survival strategies and supplementing meager earnings. Nearly 90% of them migrated for long term and rest on short term basis and 45.45% opt to migrate within district and 36.36% migrated within state. Migration outside state and country has been resorted by 9.09% each. Incidence of migration is dominant in Christian households and surprisingly, none of Hindu and Muslim households have opted for migration and preferred to stay in native villages, which may be due to non-possession of skill and training, greater affinity with kith and kins and comparatively better livelihood options locally.

With recent economic crisis, migrants consequently change from becoming providers of remittance incomes to their households, to becoming dependents of these households, even as these households face more fragile material circumstances than before. Many of these migrant workers, for obvious reasons, come from most depressed and backward regions like district Mamit, where there is currently little potential for productive income generation. These are often also regions of dry land subsistence agriculture influenced by natural calamities, where remittance incomes play a vital role in sheer survival of poor households. Unsurprisingly, they are also the regions in which extremists and insurgents' activities are widely prevalent, because of anger bred by persistent backwardness and rising inequalities.

Declining remittances of migrants and unemployment among returnees, especially in post-bamboo flowering crisis scenario are important issues. It generated great controversy even before crisis, decline in migrant remittances and unemployment among returnees gained an even greater seriousness with advent of bamboo flowering crisis. Economic slowdown made local labour force view returnees as competitors for scarce jobs, whereas they once view their remittances as a fuel to local economy. However, issue of fall in remittances of migrants and rise in number of returnees, particularly after current slowdown, has more far-reaching implications on well-being of children in these households.

Social issues that assumed primary importance in post-economic slowdown and bamboo crisis scenario are falling remittances, increasing returnees, rising unemployment, high food prices and poverty levels, as well as reduced access to

and quality of, education and health. To a large extent, economic slowdown also led to a condition of labour market disequilibrium with far-reaching implications for new entrants, unemployed and returnees. Given bamboo flowering crisis, for most rural poor households in Mamit, income received from remittances and wages earned from manual labour are main determinant of living conditions. Approximately three-fourth of income of poor rural households is derived from remittances, wages and salaries from casual employment or self-employment. Economic slowdown, which resulted in a contraction of local economy too, along with large scale returnees, changed tight employment situation that Mizoram economy had enjoyed previously. Following current economic slowdown, state GDP plummeted down and rate of unemployment rose sharply. Given sustained situation of tight employment in Mizoram economy over time, unemployment scenario worsens further with recent large scale returnees.

Total number of returnees was one-third. Main impact of climate induced agrarian crisis and economic slowdown on household poverty was through limitations it imposes on returnees' absorption and alternative income-earning opportunities. In addition, real household income was falling, especially given rise in food prices. Following climate induced agrarian crisis and recent economic crisis, a decline in remittances had begun in a majority of poor households where remittances are a significant portion of families' income. When we look at who would be most affected social groups in a society from declines in remittances, we observe first the households whose primary sources of income are remittances. Decline in remittances will also have troublesome implications for children's well-being.

Earlier, improvements in housing and small business development have been started with remittance money. With a decline in remittances, such developments are at risk. Furthermore, as retrenchment continues, migrants lose their jobs, return home, and put further pressure on rising joblessness and already depressed informal local economy. At this stage, it is still unclear as to how temporary these job losses, as opposed to more permanent. In domestic economy, these job losses have characterized unorganized or informal sector. A key characteristic of informal sector employment is lack of protective labour legislation, including social security. As of now, beyond social security provided by community or family, workers who have lost jobs because of growth downturn have no access to any social security. Indeed, only form of social security that exists so far is through the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), as more comprehensive social security scheme for unorganized sector workers has not yet got off the ground. Other than obvious negative effect on remittances and consumption expenditure, loss of jobs means a return flow of migrants. Returning migrants are not always classified as rural workers – a prerequisite for MGNREGS – and, in addition, there can be administrative delays in issuing the required MGNREGS job cards.

(iii) Food Insecurity and Malnutrition

Even though full effects of climate induced agrarian crisis are yet to unfold at macro level in India, it is clear that they will aggravate a pre-crisis situation of widespread chronic poverty, food insecurity and malnutrition at micro level. Climate induced agrarian crisis is most likely to affect food security of rural households with low income from agriculture or wage employment. Rural poor households are also affected by second-run effects on informal employment and depressed local economy. Due to fall in inflation rates to almost zero and more recently in negative zone, it is pointed out that this reflects declining rate of economic growth and could even lead to a deflation that is damaging for growth. But what is often not noted is that even within this overall stagnation in prices, food prices have continued to increase. Food prices have gone up most, by more than double digit in recent past. This cannot be blamed to higher procurement prices alone, since prices of pulses, which are not covered by public procurement, have also gone up just as much. Prices of fruits and vegetables and eggs, fish and meat have also increased, even if not by as much as for food grains. Only food category for which prices have fallen is edible oils, which reflects decline in oilseed prices as world prices have crashed. Other food articles' prices have increased by more than one-fifth.

This, obviously, affects household budgets, especially among poor for whom food still accounts for more than half of total household expenditure. Meanwhile, non-food primary product prices have hardly changed. Prices of fibres – mainly cotton, jute and silk – have barely increased at all. Oilseed prices have fallen by more than 5%. This, immediately, affects all producers of cash crops, who will be getting same or less for their products even as they pay significantly more for food. They are also paying more for fertilizer and pesticides, prices of which have increased by more than 5%. Another major item of essential consumption has also increased in price – that of drugs and medicines, up by 4.5%. This obviously impacts upon rural population, but especially poor households who may find it extremely difficult if not impossible to meet such expenditures in times of economic downturn. Agriculturalists who produce cash crops are facing falling prices and smallholders are severely affected due to natural calamity of bamboo flowering and rise in prices of essential items like food and medicines.

Dependence of high proportion of population in agriculture is also intrinsically linked to food security and provides a pathway out of hunger, malnutrition, and all the ills that accompany them. As prices of rice, wheat, maize, corn, and other staples skyrocketed; a food security crisis emerged as a major challenge in climate induced agrarian crisis, affecting thousands in district Mamit. Households' food insecurity is essentially a problem of economic access to food. Persistent high food prices have led to a change of food consumption basket, particularly a decreased intake of nutritional products. Decreased economic access to food is aggravated by lower incomes resulting from decreased remittances and timber based industries,

reduced agricultural labour due to decline in cropping activities with onset of bamboo flowering crisis and lower earnings from sales of agricultural products. Depressed local economy also translates into shutting down of small rural enterprises and credit squeeze by local businesses limiting access to food by vulnerable households in general and children in particular.

Due to climate induced agrarian crisis and more specifically the natural calamity of bamboo flowering and consequent severe destruction and losses to food crops by rats and rodents in Mizo hills, most affected group appear to be smallholders in north-east, who depends on bamboo shoots during lean season, as a buffer against seasonal food insecurity. A significant part of incomes of smallholders in Mizo hills come from bamboo plantations. Due to lower volumes and prices for bamboo shoots, poor households are increasing share of income spent on food, at the expense of children's health and education. In district Mamit, thousands of poor and among them, most vulnerable being children, continue to be malnourished. This makes them more susceptible to poor health and to enter a vicious cycle of poverty and illness. It also diminishes their capacity to participate effectively in economic and social development. One-third of children under age 5 are stunted, 4% are severely wasted and one-fifth of them are underweight.

Impact of rising food prices on poor and near-poor depend on various factors, including the extent to which they are net food consumers or producers, food items in their consumption basket, their ability to adjust by switching to other foodstuff and the effectiveness of government interventions if any. For those who are net food consumers, higher prices diminish their purchasing power and this could push people below the level of subsistence and into poverty. With recent increase of food prices, share of household's budget spent on food has increased sharply to 46.43%. As a result of increase of share of food expenditure, share of education and health expenses decreased respectively to 6.38% and 9.24%. Indebtedness remains high, absorbing one-tenth of households' expenditure. Thus, economic down-swing, high food prices and climate induced agrarian crisis are affecting adversely food security and nutritional status of children in poor households. Poor households seek additional work opportunities to mitigate hardships and sufferings.

V. HOUSEHOLD COPING STRATEGIES

Repercussions of climate induced agrarian crisis and post-bamboo flowering crisis on rural communities are severe and likely to worsen. Climate induced agrarian crisis combined with food and fuel price crises will increase poverty. Poverty is transferred through five key transmission channels that link macro-level shocks to rural communities: employment, prices, public and private transfers, assets and access to goods and services. How shocks are transmitted through these channels determines who is affected, how deeply, and for how long. Potential implications for rural poor households are staggering (Green, 2009).

Households' coping mechanisms aims to reduce fluctuations in income and consumption. For a variety of reasons, poor are often the least equipped to weather impact of climate induced agrarian crisis on their income. They have few assets which they could sell or use as a buffer, limited or no access to formal credit and insurance markets to help smooth income shocks over time, and often lack the education and marketable skills which are necessary for successful migration to other areas with economic opportunities (Agenor, 2004). In Mamit, 20.8% of the households are landless and landlessness is quite high among Muslims (36.36%). Besides landlessness, average size of landholding is also very small (4.48 acres). Utilization of necessary health care services may force households to catastrophic spending burdens that drive them deep into debt and destitution. Nearly 60.54% of households depend on government hospitals and 11.88% of households rely on private medical practitioners for health treatment. Due to poverty and fall in remittances, one-fifth of poor households are indebted to meet health related expenses.

Furthermore, many of their coping strategies are either ineffective, or create harmful consequences for rural communities. Most of informal risk-coping arrangements and strategies of poor are limited in their effectiveness. For instance, buying and selling of livestock is typically used as a strategy in order to manage household assets and smooth consumption (Rosenzweig and Wolpin, 1993). In Mamit, 11.04% of poor households have opted for selling of livestock to meet consumption and other requirements. However, these negative coping mechanisms usually result in lower incomes and depress returns to assets (Dercon, 2005). Poor households are often unable to accomplish complete risk sharing, and often children bear brunt of adverse shocks, as reflected by their poorer nutrition (Dercon and Krishnan, 2000). Pre-and-post natal care services have been availed by 72.03% of poor households. Reliance on public health services is significantly high in post-crisis period. Even public schemes like integrated child development scheme (ICDS) is availed by 47.74% of households in rural areas. Out of 52.63% of BPL households, less than half of them had BPL ration cards and of them 85.86% is availing subsidised ration from public distribution system (PDS). All this reflects that universal targeting public services are also not functioning efficiently due to numerous problems: dishonesty in measurement (45.06%), bad quality (18.80%), insufficient quantity (14.46%) and irregular supply (12.53%) in case of PDS.

Not only do rural communities coping strategies tend to be ineffective, some of these could also be harmful, especially to children (Skoufias, 2003). Climate induced agrarian crisis significantly increases the probability that a child enters labour force, drops out of school, and fails to advance in school (Duryea *et al.*, 2007). In Mamit, school drop outs is nearly one-tenth during post-slowdown and more than one-half of them drop-outs due to economic reasons and enter labour market to supplement households' income. Effect of climate induced agrarian crisis

on schooling depends on whether substitution or income effect dominates. Declines in average wages tend to lower child wage rate and thus opportunity cost of schooling, while declines in overall income levels raise marginal utility of whatever child can contribute to family's budget today (Ferreira and Schady, 2008). Adverse education and health outcomes tend to be more pro-cyclical: climate induced agrarian crisis are followed by increases in infant mortality, and declines in school enrollment and nutrition. Government tends to be more cash-strapped, and there are many more households that live closer to subsistence and with less means to cope. Thus, any negative shock on income translates to lower social spending and investments, in turn leading to worse child welfare outcomes.

Households facing income shocks could also try to borrow money resulting in severe household debt problems. For example, 18.75% and 12.5% of households in Mamit are indebted to meet capital expenditure on farm and non-farm requirements and food expenses respectively in post-crisis period. Coping through the sale of assets could also deplete the households' already scant resources and further reduce their income-earning capacity and productivity. This has happened in Mamit in 20.8% of poor households in case of selling land. Similarly, 2.03% and 1.10% of households have sold gold and agricultural assets to smoothen the impact of shocks. Negative effects are certain if shocks are recurrent and characterized by protracted duration, providing little opportunity to re-build asset levels. Moreover, rationing food and eating less has been resorted by one-fourth of household members including children, which has serious consequences on their health and nutrition, with potentially long-lived effects. Nearly 7.4% of children are never enrolled and 79.75% of children are enrolled in government-run educational institutions, which put pressure on government spending. Expenses incurred by households on education and health have fallen sharply in post-crisis period and stood at 6.76% and 8.93% respectively. Thus, poor households also tend to react to agrarian shocks by diminishing spending on items that contribute to human capital investment (education and health), thus contributing to their vulnerability in future (Attanasio and Szekely, 2004). Many of these coping strategies ultimately result in adverse long-term consequences, notably for children.

VI. SITUATION LIKELY TO EVOLVE

It is highly unlikely that extreme poverty will decline in near future. Instead, poverty is likely to increase and will aggravate pre-crisis high poverty rates. In a negative scenario, rural communities in Mamit would be faced with a further decline in income from agriculture and sale of cash crops, which would feed into accelerating inflation, lower households' purchasing power, and escalating debt. Household food access will worsen due to discouragement of cultivation resulting from high cost of agricultural inputs and low producer prices. Higher food prices lead to lower caloric intake and an increase in malnutrition among children. This can have

additional negative effects. Current food crisis in post-bamboo flowering period and climate induced agrarian crisis may have a negative impact on human development in four ways: increasing poverty and inequality, worsening nutrition, reducing utilization of education and health services and depletion of productive assets of poor. Deterioration in any of these areas is difficult to reverse and may have implications for years, and in some cases generations, to come.

Agriculture improvements lead to relatively slow reductions in child under-nutrition rates, the converse is not true and impact of climate induced agrarian crisis on these outcomes may be very rapid. Girls are usually the last to benefit from increasing income, and among the first to be affected by deterioration in financial circumstances and food availability. This may have special consequences on rural women because of critical importance of maternal nutrition both for her health and well-being, as well as for survival, growth and development of dependent children. Food and climate induced agrarian crises have clear propensity to lead to significant deterioration of health and nutrition of children in rural communities in short term. These effects are marked among marginalized poor, especially landless who cannot resort to subsistence farming. Effects are also especially notable among women who act as buffers for children by bearing brunt of acute food shortages or price increase. However, this capacity is limited during acute food price and agrarian crisis. These can have significant impact on health and nutrition outcomes for both maternal and child outcomes. Recent food price and agrarian crisis has had fiscal impacts of comparable magnitudes. The economic turndown also indicates that development aid and assistance may also not be available at same level as before, thus making it likely that social sector spending and consequent health and nutrition outcomes may be significantly affected. If unaddressed agrarian crisis could increase rates of childhood anemia, stunting, and wasting further.

Government capacity to mitigate impacts of agrarian crisis will be further constrained by rising fiscal deficits. Decreased health expenditures will have further negative effects on children's nutritional status. Government will be constraint to expand water and sanitation services and improve quality of health care due to budgetary effects of climate induced agrarian crisis. There are interventions that can address child health and survival including prevention of micronutrient deficiencies, stunting and wasting. Impact of climate induced agrarian crisis and food price crisis could be minimized by recognizing risk of these issues, preparedness and institution of social safety nets with evidence based interventions targeting susceptible children.

In a positive scenario, MAMIT would continue to benefit from official social protection assistance flows in future, limiting deterioration of livelihood indicators at households' level and allowing government to maintain safety net assistance. Specific vulnerable groups would continue to require assistance. Government has a rather broad safety net system, which includes a targeted cash transfer programme,

mid-day meals (school feeding) and a MGNREGS. A scaling-up of interventions could take place should the situation require. Needs for social protection assistance will increase, however, government budgetary capacity to expand existing programmes will decrease. Government capacity to mitigate impacts of crisis will be further constrained and livelihoods of rural poor households would be undermined, leading to unsustainable coping strategies that could lead to higher rates of malnutrition among children.

VII. ONGOING RESPONSES

Keeping in view the climate induced agrarian crisis and gregarious bamboo-flowering crisis, the Government of Mizoram initiated formulation of a comprehensive programme of Bamboo Flowering and Famine Combat Scheme (BAFFACOS) for assistance of farmers to combat climate induced agrarian crisis and famine aiming to increase purchasing power among rural poor families. It was hoped that this will also supplement programmes to mitigate impact of economic slowdown on falling remittances and incomes from wages, labour, and agriculture and reduce poverty among farmers and surveillance of plague during famine period. Linkage of scheme under various line departments like Rural Development, Horticulture, Forest, Road and Transport, Power, etc. was explored for smooth implementation of the scheme.

To face impending climate induced agrarian crisis and famine following bamboo flowering, quantum of food procurement have been increased considerably. So, Central Government was requested to enhance existing allotment of food to State sufficient for distribution to poor households. Scheme was intended to minimize poverty among farmers during famine period and was implemented through adoption of intensified and diversified cropping system through mechanisation, post-harvest technology, connectivity of market linkage, water harvesting ponds, etc. Farmers were assisted to adopt a more profitable, sustainable and permanent system of farming.

Keeping in view mass mortality and destruction of bamboo forest, incurring rapid increase to rodent population due to gregarious bamboo flowering crisis, thereby causing famine, the Department of Horticulture selected four crops - Passion fruit, Grape, Potato and Turmeric (as these crops have short gestation period with good economic return) for plantation in jhumland, to provide alternative means of livelihood to rural population dependent on jhum cultivation. The Animal Husbandry and Veterinary Department have taken up livestock rearing as substitute to jhum farming. This was done to build up purchasing power of jhum farmers whose crops were devastated by rats. A comprehensive and sustainable scheme was formulated so that selected beneficiaries not only got temporary relief, but permanent solution to their livelihood by switching over completely or partially to livestock farming,

which is more ecologically friendly and more economically beneficial. The beneficiaries were trained with modern technology of fish farming by the Fishery Department, followed by issue of grants-in-aid for construction of new ponds/renovation of existing ponds and supplied with inputs like fish seeds, feeds etc. Similarly, the Health Department has initiated programmes to strengthen health infrastructure and sensitizing all concerned on surveillance, prevention, diagnosis, treatment, control and documentation of Mautam related diseases. Target group of above schemes were the families belonging to disadvantaged community who do not have sustainable income for their livelihood.

In Mizoram, specific interventions to address effects of climate induced agrarian crisis, price rise and growing food crisis are not clearly spelled out yet. However, safety net measures taken by Government of India could be usefully expanded in Mizoram in response to high food and fuel prices too. These include mid-day meal programme for school children, nutrition scheme for anganwadi (pre-school) centres and fair-price shops for basic foods in below poverty line (BPL) households. The “inclusive” Budget 2018-19 of Government of India does not include children, who are more than 40% of population. As always, the share of protection sector remains the lowest. Despite recognition of protection of children in the 11th Five Year Plan and reaffirmation for the 12th Plan, there is significant fall in allocation. Over half of India’s children are either not attending school or dropping out before class eight. It however still remains the most resourced sector in the recent budget. Gap between funds allocated and funds actually released on ground is never sharper in any other area than in case of child-focused schemes in education, health, protection and development. Even with huge allocation to elementary education, for instance, children’s share of education remains meager, which will not be able to fully implement the Right to Education.

In order to ensure food security, the poorest families are provided with subsidized wheat or rice every month at very low price through budgetary provisions. The latest budget contains several measures that will actually fan inflation. Not only this, the common citizen is paying for education of children and yet getting inadequate education quality and poor access. Children protection has received least attention in central budget. With designing of Integrated Child Protection Scheme, effort was to create a protective environment for children to address their needs so that they do not become vulnerable to exploitation and abuse. Protection should ideally be taken up on a war footing by policy-makers. India has highest number of working children in the world. Besides, India also has highest number of sexually abused children in world.

Overall, the recent budgets do not reflect the sentiments of children. Budget for Children (BfC) must be looked within the framework of overall economic scenario. Budget measures will lead to an all-round price rise, adding to current

high inflation. Worse, it has no concrete measure to counter seriously high food inflation with severe implications for nutrition of small children and new and would-be mothers. How then will we tackle growing malnutrition and hunger that children face? More importantly, out of every rupee spent in budget, nearly one-third is coming from borrowing even as nearly one-fifth is being spent on interest payment. Thus, even as growth has shrunk, fiscal deficit, or total new borrowing of government has dipped only a little. The high debt, described by economists as “a generational burden”, remains on India’s children who will keep paying cumulative interest burden and bear the burden of climate induced agrarian crisis, economic slowdown and price pressure.

VIII. LESSONS LEARNT

Climate induced rural migration takes place as an adaptation mechanism to overcome poverty in agrarian households with limited access to resources and livelihood opportunities, however, unplanned migration increases unskilled labour in urban informal sectors causing exploitation and insecurity of informal workers and increase in returnees, thereby putting heavy pressures on already depressed households’ resources and increasing rural indebtedness and agrarian crisis.

Interventions in response to climate induced agrarian crisis should not only mitigate immediate effects on rural communities but also continue to tackle basic causes of poverty and food insecurity, including improvement of services (health, water, sanitation, and education), infrastructures, agricultural productivity and access to credit. This calls for introducing and strengthening innovative social protection mechanisms, which typically revolves around social insurance (such as health, life, and asset insurance, which may involve contributions from employers and/or beneficiaries), social assistance (mainly cash, food, vouchers, or subsidies) and services (such as maternal and child health and nutrition programmes).

In short-term, there is need to operate social protection programmes to mitigate impact of climate induced agrarian crisis on rural communities. There is urgent need to strengthen and expand mid-day meals programme for school children, scholarships schemes and cash transfer programme to save the children from educational hardships and drop outs. There is need to introduce a system of health card meant for free health check up and medical assistance to vulnerable households to avoid any health hardships. There is also need to expand social safety net measures to address a potential worsening situation among the rural poor households.

Many social protection programmes also do not have a clear mechanism to deal with “new poor” (remittances dependent poor pushed into poverty by aggregate shock). Policy adjustments in this regard are often made in an ad hoc fashion after the fact, suggesting that “vulnerable near poor” do not receive adequate social protection. Thus, there is need to design social protection systems *ex ante* (in

anticipation of shocks) in order to more effectively protect vulnerable households and children at the onset of a shock, thus blunting its worst effects. Indeed, periods of stability are exception rather than the rule in developing countries, so designing policies to protect vulnerable families and children from shocks should be central rather than ad hoc and ancillary in development strategies. Guaranteeing stable support in short-term may decrease the risks perceived by households, thereby reducing adoption of negative risk management and coping strategies and fostering more entrepreneurial behaviours and activities.

In addition to these efforts, there is an urgent need to expand and accelerate social protection programmes (e.g. cash for work) targeting households most affected such as female-headed households, agriculture and non-agriculture wage earners and casual labourers. There is need to accelerate investment in more in labour intensive income-generating-activities (e.g. basic infrastructure, water supply, sanitation, rural roads and electricity). There is also need to accelerate investment to increase productivity in agriculture sector to face the lack of arable land and counter production disincentives such as decrease of agricultural commodity prices. In medium-term, there is need to support smallholder farmers to reduce household vulnerability to natural calamities and market shocks and support local processing of primary products which would lessen vulnerability to price swings for commodities. Self-help group based micro credit scheme could be used effectively to initiate income generating activities for sustainable livelihoods.

Short-term shocks could generate adverse long-lived and potentially inter-generational effects, pushing households and next generation into a path of destitution. Therefore, in addition to enhancing social protection, longer-term economic growth and human development could be used to motivate policies to enhance the design of and strengthen social protection and social spending and investments. For poorest households and notably poor children, there is a strong case to be made to ensure that adequate investments are made at critical stage in their young lives. This is an essential element in strategies to prevent poverty traps from developing.

Besides above, agricultural training on climate resilient techniques, restoration of traditional seeds for farming, crop diversification, and horticulture practices could enhance rural income. Crop insurance can reduce financial vulnerability during natural hazards and agrarian crisis. Use of information and communication technologies (ICTs) can be an effective option for better economic returns. Flexible marketing strategies may enhance agricultural profitability. Rural poverty reduction may help reduce out-migration for livelihoods amelioration. Sustainable rural livelihoods should be holistic, dynamic, and eradicate poverty through enhanced human, social, natural, physical and financial capital. Self Help Groups need to be strength-ened via training programmes to reduce poverty through income generation.

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and Sustainable Rural Livelihood Mission (SRLM) might also prove to be effective measures to reduce economic poverty. Besides, Antyodaya Anna Yojana (for poorest of the poor) could be an effective measure to improve food security of Below Poverty Line (BPL) families.

References

- Agenor, P. R. (2004), Macroeconomic adjustment and the poor: Analytical issues and cross country evidence, *Journal of Economic Surveys*, 18(3):351-408.
- Attanasio, O. and M. Szekely (2004), Wage shocks and consumption variability in Mexico during the 1990s, *Journal of Development Economics*, 73(1):1-25.
- Baird, S., J. Friedman and N. Schady (2007), Aggregate Income Shocks and Infant Mortality in the Developing World, *Policy Research Working Paper 4346*, Washington, D.C: World Bank.
- Battisti, D. S. and Naylor, R. L. (2009), Historical warnings of future food insecurity with unprecedented seasonal heat, *Science*, 323(5911): 240-244.
- Bauer, A., N. Boschmann, D. Green and K. Kuehnast (1998), A Generation at Risk: Children in the Central Asian Republics of Kazakhstan and Kyrgyzstan, Manila: Asian Development Bank.
- Bhagat, R. B. (2014), 'Urban migration trends, challenges and opportunities in India', *World Migration Report, 2015*, Geneva: International Organization for Migration (IOM).
- Castañeda, A., Doan, D., Newhouse, D., Nguyen, M. C., Uematsu, H. and Azevedo, J. P. (2016), Who Are the Poor in the Developing World? *Policy Research Working Paper 7844*, Washington, D.C: World Bank Group.
- Cervantes-Godoy, D. and Dewbre, J. (2010), "Economic Importance of Agriculture for Poverty Reduction", *OECD Food, Agriculture and Fisheries Working Papers, No. 23*, France: OECD Publishing.
- Christiaensen, L., Demery, L. and Kuhl, J. (2011), The (evolving) role of agriculture in poverty reduction: An empirical perspective, *Journal of Development Economics*, 96(2): 239-254.
- Damon, A. (2010), Agricultural land use and asset accumulation in migrant households: The case of El Salvador, *Journal of Development Studies*, 46(1): 162-189.
- de Brauw, A. (2010), Seasonal migration and agricultural production in Vietnam, *Journal of Development Studies*, 46(1): 114-139.
- De Janvry, A. and Sadoulet, E. (2009), Agricultural growth and poverty reduction: Additional evidence, *The World Bank Research Observer*, 25(1): 1-20.
- Dercon, S. and P. Krishnan (2000), In sickness and in health: Risk sharing within households in rural Ethiopia, *Journal of Political Economy*, 108(4):688-727.
- Dercon, S. (ed.) (2005), *Insurance Against Poverty*, Oxford: Oxford University Press.
- Duryea, S., D. Lam and D. Levison (2007), Effects of economic shocks on children's employment and schooling in Brazil, *Journal of Development Economics*, 84(1):188-214.

- Ewert, F., Rounsevell, M. D. A., Reginster, I., Metzger, M. J. and Leemans, R. (2005), Future scenarios of European agricultural land use I. Estimating changes in crop productivity, *Agriculture, Ecosystems and Environment*, 107: 101-116.
- Falkingham, J. (2000), From Security to Uncertainty: The Impact of Economic Change on Child Welfare in Central Asia, *Innocenti Working Paper 76*, 1-41 (30-31), Florence: UNICEF.
- FAO (2006), *World Agriculture: Towards 2030/2050*, Rome: Food and Agriculture Organization.
- Feng, S., Krueger, A. B. and Oppenheimer, M. (2010), 'Linkages among climate change, crop yields and Mexico-US cross-border migration', *Proceedings of the National Academy of Science* 107(32): 14257-14262.
- Feng, S., Oppenheimer, M. and Schlenker, W. (2012), 'Climate change, crop yields, and internal migration in the United States', *NBER Working Paper No. 17734*, Cambridge: National Bureau of Economic Research (NBER).
- Ferreira, F. H. G. and N. Schady (2008), Aggregate Economic Shocks, Child Schooling and Child Health, *World Bank Policy Research Working Paper 4701*, Washington, D.C: World Bank.
- Frankenberg, E., D. Thomas and K. Beegle (1999), The Real Cost of Indonesia's Economic Crisis: Preliminary Findings from the Indonesia Family Life Surveys, *Labour and Population Working Paper 99-04*, Santa Monica, CA: Rand.
- Fiszbei, A., P. Giovagnoli, and I. Adúriz (2003), The Argentine Crisis and Its Impact on Household Welfare, *CEPAL Review 79*, Washington, D.C: World Bank.
- GOI Report (2016), *State of Indian Agriculture 2015-16*, Ministry of Agriculture & Farmers Welfare, Department of Agriculture, Cooperation & Farm-ers Welfare, Directorate of Economics and Statistics, New Delhi: Government of India.
- Gornall, J., Betts, R., Burke, E., Clark, R., Camp, J., Willett, K. and Wiltshire, A. (2010), Implications of climate change for agricultural productivity in the early twenty-first century, *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 365(1554): 2973-2989.
- Grantham-McGregor, S., Y. Cheung, S. Cueto, P. Glewwe, L. Richter and B. Strupp (2007), Developmental potential in the first 5 years for children in developing countries, *The Lancet*, 69(9555): 60-70.
- Green, D. (2009), *Latin America and the Global Economic Storm*, Oxford: Oxfam International.
- Hutson, R. G. (2003), *A Vision for Eliminating Poverty and Family Violence*, Washington, D.C: Centre for Law and Social Policy.
- International Monetary Fund (2009), *Global Economic Crisis: Economic Crisis Starts to Hit World's Poorest Countries*, Washington, D.C: International Monetary Fund.
- Knowles, J., E. Pernia and M. Racelis (1999), Social Consequences of the Financial Crisis, *Economic Staff Paper 60*, Manila: Asian Development Bank.
- Lee-Rife, M. (2007,) *The Effects of Household Disruption on the Risk-Taking Behaviours of South African Young People*, Princeton, NJ: University of Michigan.

- Marchiori, L., Maystadt, J. F. and Schumacher, I. (2012), The impact of weather anomalies on migration in Sub-Saharan Africa, *Journal of Environmental Economics and Management*, 63(3): 355-374.
- Miluka, J., Carletto, G., Davis, B. and Zezza, A. (2010), The vanishing farms? The impact of international migration on Albanian family farming, *The Journal of Development Studies*, 46(1): 140-161.
- Reilly, J., Tubiello, F., McCarl, B., Abler, D., Darwin, R., Fuglie, K., Hollinger, S., Izaurralde, C., Jagtap, S., Jones, J. and Mearns, L. (2003), US agriculture and climate change: New results, *Climatic Change*, 57(1-2): 43-67.
- Rosenzweig, M. and K. Wolpin (1993), Credit market constraints, consumption smoothing, and the accumulation of durable production assets in low-income countries: Investments in bullocks in India, *Journal of Political Economy*, 101(2):223-244.
- Ruiz-Casares, M. and J. Heymann (2009), Children Home Alone Unsupervised: Modeling Parental Decisions and Associated Factors in Botswana, Mexico, and Vietnam, Montreal: Institute for Health and Social Policy (IHSP).
- Skoufias, E. (2003), Economic crises and natural disasters: Coping strategies and policy implications, *World Development*, 31(7):1087-1103.
- Thirtle, C., Irz, X., Lin, L., McKenzie-Hill, V. and Wiggins, S. (2001), Relationship between changes in agricultural productivity and the incidence of poverty in developing countries, London: Department for International Development.
- Woldehanna, T., N. Jones and B. Tefera (2008), Childhood poverty and evidence-based policy engagement in Ethiopia, *Development in Practice*, 18(3): 371-384.
- World Bank (2008), *Agriculture for Development, World Development Report 2008*, Washington, D.C: World Bank.
- World Bank (2010), *World Development Indicators, Employment in Agriculture*, Washington, D.C: World Bank.
- World Bank (2013), *World Development Indicators, Poverty Headcount Ratio*, Washington, D.C: World Bank.
- World Bank and IMF (2016), *Global Monitoring Report 2015/2016: Development Goals in an Era of Demographic Change*, Washington, D.C: World Bank; International Monetary Fund.