

## PART II B

### Vulnerability, Disasters and Poverty in Desakota Systems

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#### **1. Introduction: a working understanding of Desakota**

This contribution to the NERC-DFID Desakota project aims to review linkages between Desakota and vulnerability, disasters and poverty. These are such fundamental human conditions that approaching this task required work on the conceptualisation of Desakota. The outcomes of which are also summarised in this work.

Attention to Desakota phenomena is a recognition that the classical conceptual, policy and functional distinction between urban and rural cultural, livelihood and technological complexes is no longer valid for most parts of the world. With modernization, industrialization and urbanization, rural areas have indeed been getting more integrated into national and global economies. There is, however, an observed spatial variation in the extent to which mixed livelihood systems, technologies and institutional complexes traversing the urban/rural divide, have diffused outwards from economic core regions. Access to ecosystem services is typically mediated by formal (state regulation) and informal (customary behaviour) institutional mechanisms. Ecosystem services play an important role in the livelihoods and social lives of the poor in provisioning, supporting roles.

Social institutions being the locus of material relations can be changed (or from a normative standpoint –weakened/strengthened), to the detriment and benefit of specific individuals or social groups. This happens when the material conditions underlying institutional forms and giving them meaning undergo a transformation. It is this period of transformation that marks out Desakota systems, catalysed for example by migration, market penetration, the importation of new productive technology and/or transport and information connections.

The time-space contexts for Desakota produce a great variety of forms as well as in root causes for material and institutional change and outcomes for poverty, vulnerability and ecosystem integrity. They all though have a common starting point as a deviation from the surrounding rural economy under the influence of pressures (market conditions, planning decisions, capital investment and technological changes) emanating from urban core regions.

The challenge in understanding Desakota processes and places is to plot the trajectory of urban and rural influences as they are refracted by the factors outlined above. Ultimately the concern is with the degrees of transition along axes of change. The focus is on configurations of vulnerability and opportunity for the poor, insofar as the multifaceted transition impacts their access to water based ecosystem services, both directly in terms of provisioning of water for domestic use and irrigation and indirectly in terms of supporting other ecosystems for resilience against hazards.

The following discussion provides a framework for the analysis of interactions between development and disaster risk under Desakota conditions, this is then applied in detail across nine Desakota criteria, finally integrated case studies show how the Desakota criteria interact with each other. In conclusion we identify research gaps and challenges for understanding the influence of Desakota on vulnerability and poverty, with particular emphasis on the role played by ecosystem services.

## **2. Desakota, Poverty and Vulnerability**

Differential vulnerability of the poor to environmental stress has been documented extensively within the literature (e.g. see Wisner *et. al.* 2004). Many however, have cautioned against equating poverty with vulnerability—vulnerability can have many dimensions, e.g., gender, ethnicity, caste, institutions and even attitudes towards the environment (Adger 2006, Cutter 1996, Enarson and Morrow 1998, Fordham 1998, Mustafa 2005).

The specific configurations of vulnerability emerging as a result of social, economic, and technological transition encapsulated by the Desakota phenomena constitutes a major gap in our understanding of the emerging patterns of vulnerability.

Desakota flags a change in socio-ecological relationships with consequent shifts in the geographical and social distribution of risk and vulnerability. Such changes can reorganise rights and redistribute entitlements to ecosystem services. This has potential for progressive change – reducing risk for the vulnerable – but can also reinforce existing inequalities. For example when those with economic assets invest in water extraction from common pool resources for private benefit through energy generation or irrigation.

Because disruption in ecosystem services has downstream consequences action in one location can cause risk elsewhere (in time and space). In this way, Desakota can lead to the generation of local benefit and the export of ecosystem costs including disaster risk. Perhaps most iconic of this is deforestation, either in hillslope watersheds or of mangrove coasts leading to increased flood hazard. Over a longer time span slower changes can have equally significant impacts for human security. For example the cumulative abandonment of agricultural land, including those cases where the land is held for its investment market value undermining local livelihoods and food security.

### *2.1 Disaster and development processes*

Disaster risk includes a broad range of events differentiated by their triggering mechanism and scale, frequency and site of impact. This report is especially concerned with hydrometeorological events that are directly associated with climate change (pluvial and fluvial flooding, landslides, temperature shocks, fire), coastal hazards (storm surges, rainfall events associated with wind storms) and crises in the political economy that may be exacerbated climate variability (drought related food and water insecurity).

All events are seen as manifestations of failures in development policy – where decisions made by individual, local or central government, aid agencies and the private sector have not given due consideration to environmental stress and where economic poverty, social isolation or political marginalisation have generated vulnerability and constrained adaptive capacity and action. From this perspective

Desakota under climate change helps us to understand how it is that the geography and sociology of disaster risk is changing and how best to reduce risk through prevailing socio-economic, political and ecological changes as well as their resistance.

International data on disaster risk and loss is biased towards large events and specific population groups. The majority of events that are recorded as disasters are large in scale and human impact. It has been argued, however, that the cumulative impact of local events- each affecting only a small number of people (see Figure 1) may be greater, certainly as an erosive force on human development and also on ecological integrity. The majority of contemporary data collection, policy and academic debate has focussed the nexus of population and hazard for two principal cases: rural populations exposed to drought and food insecurity; and the populations of large urban areas exposed to geophysical hazards (especially earthquakes) and flooding. Neither adequately addresses the Desakota region in terms of the collection of basic data on risk, loss and recovery and an analysis of the underlying socio-ecological systems that produce observed patterns and can point to policy recommendations for risk reduction. We are left with a small literature and one that is often not flagged as Desakota but that is of sufficient weight to provide some insight into key mechanisms for risk generation and reduction pre- and post-disaster. These are presented below and then developed through existing empirical literature but remain at the level of hypotheses.

**Table 1: Disasters, small disasters and everyday risks**

<b>Nature of event</b>	<b>Disasters</b>	<b>Small disasters</b>	<b>Everyday risks</b>
Frequency	Generally infrequent	Frequent (often seasonal)	Every day
Scale	Large or potential to be large: 10+ killed, 100+ seriously injured	3–9 persons killed, 10+ injured	1–2 persons killed, 1–9 injured
Impact on all premature death and serious injury/illness	Can be catastrophic for specific places & times but low overall	Probably significant and under-estimated contribution	Main cause of premature death and serious injury
	VERY LARGE IMPACT	SMALL IMPACT	
	LOW	CONTINUUM OF RISK FREQUENCY	
			VERY HIGH

SOURCE: Bull-Kamanga et al (2003)

## 2.2 Vulnerability, Adaptation and Poverty

Vulnerability for our purposes is defined in line with the IPCC as having components of exposure to physical hazard, susceptibility to harm and capacity to adapt (IPCC, 2007). Adaptation can include short-term actions to reduce risk exposure or impact or longer-term measures to change socio-ecological relationships and mitigate risk. Adaptations can be reactive, concurrent or anticipatory, spontaneous or planned (Smit et al, 2000; Smithers and Smit, 1997), they can be short-term and tactical or longer-term and strategic (Smit et al, 1996). The importance of socio-economic context is not only in determining access to the resources to undertake adaptation but also in stimulating adaptation to non-climatic stimuli that nevertheless influence capacity to adapt to subsequent climate related stressors. From the natural disasters literature a number of categorisations exist for adaptations. For example, Burton et al (1993) distinguish between behaviours that: prevent loss, tolerate loss, spread loss socially, temporally or spatially, change use and activity and change location. Carter et al (1994) differentiate between intervention types: infrastructural, legal and legislative, institutional, administrative, organizational, regulatory, financial, research and development, market mechanisms and technological change. Other authors discuss

the ordering of adaptation, it may be for example that short-term reactive technological adaptations are followed sequentially by long-term, strategic administrative reforms (e.g., Smit et al, 1996), so that quick fixes and slow reform are not mutually exclusive.

Introducing resilience to discussions of adaptation allows a distinction to be made between conservative and potentially progressive forms of adaptation. The former includes those adaptive actions that reinforce existing organisational or system stability – adapting to protect dominant interests (such as a bureaucracy). The later aims to modify institutions to add resilience through flexibility (e.g. to a rural culture or livelihood) but not to the prevailing social system itself (e.g. a particular rural economic sector). A growing theoretical literature discusses the principal components of resilient adaptation: some degree of overproduction or excess capacity; overlapping functions; rapid flow of materials, investment and information; responsive decision-making at an appropriate subsidiary level; diversification of inputs and of the economic base; alleviation of absolute poverty; learning from past events; mobilising systems to redistribute costs including insurance; and, active experimentation and support for innovation (Wildavsky 1988; Barnett, 2001; Pelling, 2003). Here we hope to uncover the range of constraints and opportunities placed upon adaptation by Desakota processes.

If Desakota regions are hybrids of urban and rural systems how might this influence disaster risk? Table 2 identifies the features of disaster risk specific to rural and urban contexts, how Desakota regions fit into this is unknown. With the majority of the literature on urban risks being focussed on megacities of 5 million or more there is little empirical data on risk production and mitigation in small urban centres such as market towns which might provide a starting point for describing Desakota. This is despite more than 53% of the worlds urban population live in settlements of less than 500,000 (UN HABITAT 2007).

**Table 2: Disaster risk attributed to rural and urban contexts**

Rural Risk	Urban Risk
Limited access to emergency services	Concentrated population increases transmission of communicable disease
Logistical challenges for humanitarian aid	Impacts can be magnified as critical infrastructure is disrupted
Reliance on local production or market for food security	Natech events when technological hazards are released by natural disasters Commodification means money is required for recovery Social diversity can cause fragmentation and limit social support

Including adaptation (concrete acts to reduce risk) and resilience (systems fitness in the face of environmental and social change) in our analysis requires attention to underlying social processes that will in turn contribute towards individual and collective vulnerability to specific hazard risks. Consequently most of the detailed discussion to follow is generic and at the systems level allowing to emerge a more nuanced, intergrative account of vulnerability and poverty under Desakota.

### **3. Desakota Criteria, Vulnerability and Poverty**

Nine key Desakota criteria have been identified and these are examined below as pressures shaping pre-disaster vulnerability and risk reduction and post-disaster recovery and reconstruction.

**Figure 2: Desakota, local poverty alleviation and vulnerability to climatic extremes**

<b>Desakota criteria</b>	<b>Poverty and disaster risk reduction</b>		<b>Disaster response and reconstruction to development</b>	
	<b>+ive</b>	<b>-ive</b>	<b>+ive</b>	<b>-ive</b>
<i>1. Increased transport connectivity</i>	Greater diversity of livelihood options from new market access including remittances. Access to education and health care. Greater access and visibility to decision-makers.	A more integrated local economy, reliant upon transport links to reach market or to access goods and services, becomes more vulnerable to disruption. Exposure to new social risks e.g. alcoholism and traffic accidents.	Easier access to humanitarian aid.	Facilitates settlement relocation. Can encourage land expropriation to enable commercial development.
<i>2. Expansion of the local labour market and wage labour</i>	New livelihood opportunities, less need for long-term or long-distance economic migration.	Reliance on wage labour and production for the external economy increases dependence on the external economy and exposure to systemic shocks	Management and financial capacity of formal sector employers enable more effective risk management and access to insurance facilitating fast recovery of the local economy.	Footloose businesses can shift location if this is more const efficient than reconstruction, undermining the local economy.
<i>3. Active information exchange</i>	Connection to early warning systems. Greater capacity to hold decision makers to account. Marketing and coordinating business. Potential for extensive collective action.	Threats to community attachment and social capital as local social norms are challenged.	Facilitates coordination and local participation in reconstruction. Facilitates downward and upward accountability during relief and reconstruction.	Potential for the conceptualisation of reconstruction and development to shift from people to technology and from the local to systems functions. Both trends downplay the politics of development.
<i>4. Mixed household economies</i>	Adds resilience through diversity of income source	Can indicate local economies in crises and force local actors into exploitative economic relationships, undermining local ecological capital and allowing	Provides a broad base for spontaneous local economic recovery.	Humanitarians are better at supporting simple agricultural economies. Mixed economies may be distorted by reconstruction.

		the loss of social surplus.		
<i>5. Decline in local, informal institutions and collective action</i>	Can break down social barriers and be liberating for individuals.	Local institutions are less effective at regulating behaviour, liable to capture by vested local interests.	Can open opportunities for the building of more inclusive institutions as part of recovery	Slows down participatory reconstruction approaches through undermining the legitimacy and representativeness of leaders and the durability of local institutions.
<i>6. Modernisation of production and processing technology</i>	Can provide additional or higher paid work.	May reduce labour demand and increase immigration. Greater efficiency may reduce ecological costs. Greater capacity may increase ecological costs through raw material inputs and pollution.	Less dependent on local inputs, more scope for economic capital to catalyse recovery.	More dependent upon external technological assistance and energy in recovery
<i>7. Commodification of the local economy</i>	Greater potential for taxable assets can provide income for local government.	Commodification and privatisation of ecosystem services reduce entitlements amongst the poor increasing the size and depth of the vulnerable population.	Economic assets can be saved and protected from loss through natural disasters, and can be applied readily by households to ease recovery and reconstruction.	The requirement for money to obtain basic needs can drive the poor into deeper poverty and generate new groups of the vulnerable through debt.
<i>8. Changing land and resource rights, and administration</i>	A ready market for private land holdings.	Conflict between multiple users of land or resources.	Control over land and resources can be progressively re-distributed.	Control over land and resources can be captured by elite groups.
<i>9. Engagement with the global/external economy</i>	Innovation and new economic opportunities can help alleviate poverty. Compliance with international standards for labour and environmental protection could enhance sustainability.	Complex chains of responsibility and detachment from the local society make it difficult for local actors to lobby for improved working or environmental management practices. Profits are extracted to the global economy.	Can be a bridge for private sector aid and technological support in reconstruction. Increases international visibility of loss.	Local aspirations and the meeting of basic needs and human rights may become secondary to the needs of globally oriented business in reconstruction. Just-in-time production can lead to loss of markets as well as physical damage for local suppliers.

### 3.1. Transport Connectivity

Improved transport connectivity can increase opportunities for economic development through extending market access for locally produced goods, it can also facilitate the movement of local people in search of work over the short and long term. In Desakota regions transport infrastructure can be upgraded rapidly so that international as well as local movement may be possible.

Vulnerability to *local* hazard events is reduced as livelihoods are diversified. In particular diversification into the livelihoods that add economic value (i.e. moving from primary production to craft or food processing) or are spatially diversified (migrant labour). Both strategies for livelihood diversification can generate additional financial capital that can be invested to improve adaptive capacity (education, health, building security etc), migration also provides geographical diversity so that income sources received by the household through remittances will likely continue and may increase post disaster. These positive aspects of transport connectivity are not universally distributed. We need to ask: who has capacity to take advantage of the opportunities for diversification? Most likely it is those households with some surplus economic capital and with the right kind of human and social capital that can take advantage of new opportunities. This opens scope for policy interventions to accompany the Desakota frontier and prepare households for successful diversification.

Even when new income streams are made available to households there is no guarantee that this money will be spent on risk reduction. Social and cultural changes that accompany Desakota through exposure to new media and labour migration can have negative implications for household sustainability. Alcohol abuse can swallow income gains and even reverse household development as well as increase domestic violence against women and children.

Transport connectivity can also increase vulnerability through increasing the exposure of local economies to more *distanced* events. The local economy is more diversified but less self-reliant. Greater economic orientation to meet the demand of urban centres or externally oriented commercial enterprises can undermine self-reliance as economies are dependent upon getting goods to market, transporting migrant labour or receiving goods as inputs for processing.

The transition from local to integrated economy is a key challenge for the management of vulnerability and has been experienced in many diverse development contexts. Two strategies are followed at this moment: 1) rapid integration to maximise economic advantage with greater risk exposure but the potential for investment in risk reduction now or at a later date; 2) constrained integration, or a mixed economy, that protects a residual local economy but slows economic gain. The former strategy is predominant with economic gain taking precedence over economic security. This shift from basing economic decisions on risk reduction to profit maximisation is itself a feature of the Desakota moment as values associated with local rural economies are increasingly held in tension with more capital-intensive urban centred economies. The literature on climate change and disaster risk reduction argues that a more nuanced approach may better serve local development needs under climate change.



The principle of risk increasing with economic integration has been well demonstrated at the national level by Benson and Clay (2004). This work shows that, at the national level, there is a moment of increased vulnerability when local, subsistence oriented economies begin to diversify. Vulnerability increases because of the introduction of contagion between economic sectors (e.g. agricultural production and processing), which can magnify loss and is less easy to respond to through existing humanitarian aid mechanisms. As the scale of the national economy increases this moment of vulnerability is quickly resolved. However, in Desakota regions full integration may never be attained so that it is exactly here that risk is at its highest and most prolonged.

Post-disaster, transport connectivity can greatly enhance response and recovery through providing access to humanitarian aid and materials for rebuilding damaged infrastructure. But improved access also introduces new options for reconstruction that need to be carefully managed to avoid negative outcomes for social equality. Two options with high risks for social justice are relocation and redevelopment.

Spontaneous and planned resettlement post-disaster is facilitated by upgraded transport infrastructure which allows ease of movement for materials and people. Spontaneous relocation is rare, people preferring to rebuild in situ or migrate to join family rather than relocate en mass. Where this has been recorded it has been with the assistance of NGOs often as part of a participatory risk reduction programme built into reconstruction. Planned relocation driven by the state or non-state organisations may be an attractive option in Desakota regions where population growth has led to settlement of hazard prone locations or the degradation of local ecosystems and the loss of mitigation services (e.g. the deforestation of hill slopes of mangrove stands), or where upstream changes in hydrological regimes linked to loss of mitigation ecosystem services or changing hazards associated with climate change have generated new hazards such as flash flooding or exposure to coastal storm surges. Unfortunately few planned relocation programmes result in successful promotion of local economic development. The majority of evidence point to relocation leading to the breakdown of social capital and the erosion of the local asset base of the economy. This can also have a negative ecological impact as for example when new settlements concentrate villages into towns generating new demands on ecological services in particular for waste management and access to drinking water. Where there is competition for scarce resources such as agricultural land this can lead to social conflict between the relocated population and any pre-existing host populations.

Post-disaster reconstruction is a unique opportunity for re-planning and re-developing local physical infrastructure and even the underlying aims of development. The potential for reconstruction to improve the social and ecological outcomes of development in Desakota regions rests largely on political will. This in turn is framed by the institutions of reconstruction. The dynamism of the economy in Desakota regions pre-disaster provides scope for innovation, but at the same time the lack of strong local institutions opens this society to exploitative redevelopment from local elites or external actors. Without support from the state or strong advocacy from civil society market forces invariably lead to the capture of land and associated access to ecosystem services. In this way post-disaster reconstruction is a period of rapid transfer in control over ecosystem services from the poor majority to the rich minority or from local to external interests. There are many examples in coastal areas where

land settled or used by the local population has been transferred into the ownership of hotel and tourism development or for commercial agriculture or aquaculture. Indeed this is a process where rural populations can be brought into the Desakota region or for intensifying Desakota. Again, such changes are not of themselves negative for social justice or environmental integrity but the lack of government regulation and progressive civil institutions characteristic of Desakota regions reduces the likelihood of sustainable outcomes.

In both these cases, careful management of reconstruction requires inclusive decision making and respect for the rights of all stakeholders – local residents with use or customary ownership rights that might not extend to formal legal tenure, as well as the rights of private capital to invest and contribute to economic development. As has been noted many times in this report Desakota regions are places where institutions are in flux or where the state and civil society have only limited capacity with market institutions having more influence. This makes inclusive governance that recognises and protects the human rights of all particularly challenging.

### *3.2. Expanded local labour market and access to wage labour*

The transition from subsistence and barter economies to those dominated by wage labour has mixed implications for poverty and vulnerability. Expansion of the local capitalist economy provides new livelihood opportunities. In some contexts these may be in conflict with existing livelihoods, especially when there is competition over scarce ecosystem services or goods. For example, when informal and peti-capitalist provision of drinking water or production of charcoal for urban consumption comes into competition with formal sector businesses. Capitalisation may bring formal contract work and a loss of livelihood flexibility for the employee but amongst the poor this may increase entitlements and reduce vulnerability, particularly to food insecurity. When capitalisation is accompanied by formal work structures these can undermine personal ecological responsibility as formal rules replace informal, culturally embedded sanctions on behaviour.

Where a greater range of local employment opportunities reduces the necessity for long-term economic migration this will help to maintain family cohesion and collective social stability. The social capital that accrues from the maintenance of local social ties is a core requisite of resilience to external shocks (Pelling and High, 2005). Where local employers take seriously disaster risk reduction or other social investments such as primary health care for employees there is a great opportunity for progressive development with the private sector as an active partner. There are few examples of this. In practice Desakota regions are attractive to new employers because of the pool of flexible, cheap labour and these employers are unlikely to invest in local social goods without a government policy framework. There is though little research on this topic. Enclaves of social responsibility are more often found where there are long-term capital investments, for example in plantation economies where primary schooling, primary health care, support for the elderly and community recreation facilities may be provided by the company when these are not available from the state (Pelling, 2003a). The social organisation provided by these enclaves is also a core resource for resilience against disaster risk providing a pre-existing organisation for leadership during local disaster response.

Local vulnerability to natural disaster and other shocks can increase in Desakota regions as households become increasingly reliant on wage labour and production for the external economy. In the same way that increased transport connectivity exposed the local economy to non-local events, so a local economy that is oriented towards external trade is reliant upon the health of the external market. Downturns in the external market, caused by disaster events, or by domestic or international economic and political cycles, will be felt locally through reduced demand for locally produced products or services. Perhaps most vulnerable are those local Desakota economies based on luxury consumption such as tourism or global commodity markets such as coffee, and least vulnerable are those providing basic needs such as water for city-region consumption.

Post-disaster recovery can be accelerated if emerging and enclave formal sector businesses have invested in disaster management and recovery planning and in particular have had access to insurance to guard against damage to property and business costs. Climate change insurance has recently been evaluated for primary production (Pelling, 2006) and this would have a direct benefit in Desakota regions. Problems with collective action in Desakota regions would possibly limit the social development value of such interventions, they would rely on market institutions (businesses) for operation. But this is also a key way through which to engage with the dominant market institutions of Desakota and potentially to leverage greater social responsibility from this sector in partnership with existing state and civil sector actors. Where there is no disaster planning and where businesses are footloose it may be more cost efficient to relocate so that the local economy is hit twice, by the disaster and then by loss of employment opportunities. It will be difficult for established, primary sector enclave businesses to relocate with most movement to be expected from the emerging private sector. In many ways this reflects the fluid nature of the Desakota economy with small, formal businesses emerging and disappearing in response to market stimulus with limited capacity for local social actors or planners to control such movements or regulate business behaviour.

### *3.3. Active information exchange*

Active information exchange is overwhelmingly positive for progressive development and building resilience of local livelihoods and communities to climate change. It has a more ambiguous relationship with the conservation of ecosystems services.

A key tool for reducing the impacts of extreme climatic events is early warning. Many technologies exist and there are few places worldwide not covered by at least one global, regional, national or local system. The challenges for early warning are: 1) how to reach local actors at risk and provide information on warning and advice on what to do once a warning is received; 2) how to integrate local with central hazard observation and early warning systems, while maintaining independence, and so build resilience and local relevance. Both challenges are met by active information exchange. There are for example a growing number of initiatives that use existing active communication networks (e.g. mobile phone providers) in early warning. Because these communication systems are active on an everyday basis there is no additional infrastructure cost and networks are maintained through everyday interaction.

This is a prime example of the interaction of technology, society and policy that is possible within Desakota systems to meet evolving security needs. It shows the positive contribution of technology and private sector led development when given direction by policy to provide a social service that can help to fill the gap in local social institutions for communicating early warning based on traditional knowledge and social capital that opens in Desakota systems.

Are there other applications for this progressive integration? There is evidence that mobile phone networks have allowed greater co-ordination of business activities and marketing in Desakota and rural areas. The potential for microcredit delivery through mobile phone banking has huge implications for small businesses particularly in dynamic economic contexts such as those being experienced in Desakota zones. Less clear is political potential – can decision-makers be held more to account and might downward accountability be enhanced through the personalised and direct targeting that mobile phone networks offer? Is there greater potential for collective organising and for the regulation of ecosystem services? Potentially mobile phone networks can facilitate fast and coordinated response to minimise unauthorised use or degradation of ecosystems and their services and can place control in the hands of local actors, the local state or privatised regulatory agencies. The same networks might be used to provide information and training updates and to maintain morale and a professional community, again meeting the challenge of Desakota systems where social capital and a sense of identity can be quickly eroded.

Active communication is a cornerstone of successful stakeholder participation in reconstruction and in generating progressive opportunities for development from disaster. Active communication gives voice to local actors so that local values and aspirations can be integrated into reconstruction planning. Too often reconstruction is planned from above with little regard for local cultural norms or livelihoods. The result is reconstruction that erodes local livelihoods and social capital and adds to local feelings of helplessness and victimisation. The ecological impacts of reconstruction include debris dumping leading to pollution of watercourses, a failure to re-use or re-cycle with consequent demands for resource extraction and carbon costs of transportation (UNEP, 2005).

Because active information exchange has a greater power to influence behaviour and shape norms than more passive information flows it also has the potential for more profound impacts on values and behaviour in Desakota regions. This is especially so when information exchange technologies are reinforced by new employment or transport connectivity that brings different social and economic relationships. Not all these changes are necessarily positive for human wellbeing and ecological integrity. Where active information exchange brings advantages to the individual or close nit social groups inequality can add to social tensions and fragmentation. Further threats to social cohesion and to core units of support such as the family come from exposure to new ideas especially when combined with new economic and social relations as noted above. These changes can be felt as a modernising influence and contribute to the erosion of customary values including those governing society-environment relations from resource exploitation to waste dumping. At a deeper level, there is a danger that a focus on seeing Desakota purely in terms of active communication runs the risk of framing development in technological terms. The real challenge of

Desakota is to understand how new technologies combine with the other aspects of change to re-shape demands on ecosystem services and their management.

#### *3.4. Mixed household economies*

We have already reviewed the implications of an expanded capitalised labour market (section 3.2). The discussion here focuses on the implications of this transitional period for household sustainability.

Mixed economies can add resilience to households through diversity of income source. Diversity increases the likelihood that access to resources or an income stream will be maintained even following extreme events or economic downturns. The degree of resilience conferred by a mixed household economy, compared to a specialised household economy, will be determined by economic context and the economic behaviour of the household. As noted in Section 3.2, an economically specialised household may have high resilience if in doing so it gains an economic surplus and invests this in human, social and physical capital. This will be less likely if any surplus is lost for example through excessive consumption of alcohol. Increased rates of alcoholism have been associated with capitalisation and increased population movement. It is the interaction of Desakota characteristics in combination that determines overall vulnerability.

Mixed economies can also be indicative of economic crisis and emergency diversification as formal sector or established informal sector livelihood options collapse. This can be triggered by competition from imported goods or services or by changing ecological conditions that impact on livelihoods. Local economies in crisis can be used to justify the abandonment of formal or informal institutions providing social and environmental protection and so lead to more exploitative economic relationships (formal and informal, legal and illegal) directed from capital to labour and from people to the environment. Both trajectories undermine capacity to cope with future economic and ecological changes, including those associated with the extreme impacts of climate change as they undermine local ecological capital and allow the unsustainable extraction and export of social surplus.

Loss of local economic surplus is felt as a contraction in the local economy as wealth is exported. But for those economies built on ecosystem services this also impacts on sustainability as it generates an incentive to intensify extraction of value from ecological assets. This can generate local economic wealth. But it can also be a response to increasing competition with external markets leading to reduced local prices for local goods and increased extraction to maintain the household economy. Implications for the sustainability of ecosystem services rest on the capacity of resource users to increase extraction without eroding the resource base. For renewable resources a mixed economy may provide an avenue for new technological investment in extraction or processing that adds value without increasing environmental stress. This is a unique opportunity for Desakota to provide a mechanism for poverty alleviation and protecting environmental integrity.

Understanding the ways in which different household economies function under the changing conditions of Desakota and the implications of this for managing ecosystem services is an important research gap.

At times of stress including recovery from disasters a mixed household economy can provide a broad base for spontaneous local economic recovery. This potential is enhanced when reconstruction builds on the local economy through skill training and supporting local decision-making. Unfortunately too often reconstruction is driven by a desire for a speedy conclusion. This is a function of the short-term limits on reconstruction funding imposed by Donors. Consequently external specialists and labour are recruited, this misses an opportunity to build the skill base of the local economy and leads to the re-cycling of reconstruction funds back out into the national or international economy. Thus reconstruction tends not only to miss the opportunity of building skills and expertise that can foster the formal elements of a mixed local economic system but it also fails to expand the local economy as a mechanism for kick starting spontaneous economic recovery.

This challenge is greater in Desakota than in rural or urban economies. On the one hand, humanitarians are well practiced in supporting the recovery of agriculture based rural economies, on the other larger and more varied urban economies are less affected by humanitarian practice. Most affected are emerging and mixed economies with limited local economic capacity – the hallmarks of the Desakota system.

### *3.5. Decline in local, informal institutions and collective action*

It is important to be clear about the meaning of informal/formal and local institutions. Combined, institutions make up the ‘rules of the game’ (North, 1990). The majority of social analysis and policy focuses on formal institutions – those sanctioned or imposed by the state e.g. legislation. Informal institutions are customary norms that lie outside of the state (Ostrom, 1999). Formal and informal institutions can reinforce or be contradictory to each other. Informal institutions can be recognised and become part of organised and state sanctioned ecosystem management systems. In extreme cases informal institutions can be co-opted by the state and de facto formalised. Formal institutions can break down under pressure from the informal, for example when corruption is rampant and takes over the logic of decision-making under a façade of formality (Pelling et al., 2007).

Local institutions are neither necessarily formal or informal. Local should not be conflated with informal. This said, the distance of the state from many Desakota (and other) places means that decisions made locally are often more regulated or influenced by informal than formal institutions. Informal institutions can also be large in scale – water management systems can encompass whole sub-national regions, being extra-local does not mean these systems are formal, they remain embedded in and are reproduced by social norms not state legislation.

The economic hybridity, technological penetration and social fragmentation that characterises Desakota can undermine the relevance and influence of local informal institutions governing collective action for ecosystem management. In a period of local environmental change forced by the combination of global environmental change and the Desakota trajectory changes in the institutional architecture shaping individual and collective action are of particular concern for ecological and household sustainability. To a large extent the winners and losers in Desakota will be shaped by the consequences of decline in local, informal institutions and the extent to which formal (state) or market institutions fill the gap. There is no right mix of market, state or social institutions or balance between local and external institutions.

In Desakota rapid change in the institutional architecture can result in rapid changes in socio-ecological systems. This can exceed the ability of governance systems to impose new institutions to regulate behaviour – for example by state policing of environmental resource extraction. Without social rules to sanction specific behaviour market rationalism – i.e. individual greed increasing ecological exploitation for short term gain– can have a more prominent role in social and socio-ecological relations.

New institutions are also needed to respond to emerging threats associated with increasing capital intensive and formalised economic investment. For example, through the polluting consequences of new forms of processing. Where new economic activities are in the formal sector these are at least visible to regulation by state agencies, if legislation and implementation are in place.

Where pre-existing informal institutions had resisted social mobility their erosion can open new opportunities for the alleviation of poverty or for well-being. This might happen as cast or religious differences become diluted. Elsewhere, a perceived threat to such systems of identity can provoke a backlash and reinforce differences leading to more entrenched social fragmentation in Desakota regions. Weaker local institutions can also mean there is less scope for collective or organised resistance to top down development planning. If participation in development planning is sought this is made more difficult, as there may be little readily available organisational hierarchy of representatives, but for the same reason provides an opportunity for network building and a more direct incorporation of local voices including those that may have been silenced by pre-existing informal organisation (for example low cast, women, youth or migrant groups). As with many other aspects of Desakota: context, history and the drivers for change determine the balance of progressive or regressive features experienced.

In the context of disaster risk reduction and reconstruction, local institutions shape who is included in decision-making and the capacity of local actors to generate local, collective solutions to mitigate emerging hazards or cope with new stresses. Where informal institutions for collective action are being lost and are not replaced by the state, risk is likely to increase. There are many pathways for this, including the loss of local early warning as changes in livelihood and social networks change leading to a loss in informal observations and a sense of co-responsibility

The greatest threat to ecological and social sustainability from decaying local institutions comes when this contributes to a loss in the sense of local interdependence. As household economies become less reliant on local social capital for access to resources or for the mediation of disputes and regulation of resource extraction, and more oriented towards capital markets (possibly at distance) so the power of social systems to sanction deviant behaviour is diminished. Without this power local actors are free to exploit local ecological resources for private gain at the expense of their neighbours and the integrity of the ecological resource.

### *3.6. Increased use of modern production and processing technology*

Economic investment in the Desakota region begins to transform the economic base through increased use of modern production and processing technology. This can help to diversify and expand the local economy and so alleviate poverty through the

provision of additional or higher paid work. Elsewhere, the production gains made through modern technology lead to unemployment and rapid and deep inequality and poverty. The Green Revolution of the 1960s-1980s brought tractorisation and the widespread use of chemical inputs to agriculture led to production gains but at the expense of local social-economies. Small farmers that could not afford technical inputs were made uncompetitive and forced out of business selling land to expanding landowners and joining the ranks of the landless and vulnerable.

The Green Revolution has also taught us to be wary of the social and environmental impacts of modern technology. Widespread use of chemical inputs has degraded vast quantities of agricultural and freshwater reserves. As nutrient access, pests and labour are removed as constraints on production access to water has become increasingly important. The long-term ecological (and cultural) implications of genetically modified (GM) crops are still being debated. In Desakota regions the take up of GM crops may be unequal with variable use from agricultural enclaves (plantations etc), large and small farmers. The potential for the politicisation of GM and for open debates on the environmental consequences – good and bad are reduced in those Desakota regions where informal local institutions are degraded, but may be enhanced where active communication networks are in place.

Local oversight for the ecological and social impacts of modernisation in processing industries are also likely to be limited in Desakota regions. This may act as a pull factor for the location of more polluting activities or for businesses that do not follow legal guidelines on site safety or emissions standards. Even where standards are met there needs to be an open debate on the costs of pollution or resource exploitation as modern technology means these externalities are felt at increasingly further distance from the site of production.

In disaster recovery and reconstruction, access to modern technology can make industry less dependent on local inputs which may be lost if a localised event. There may also be more scope for economic capital to catalyse recovery, particularly if the modern technology has been capital intensive and encouraged the purchase of insurance. The flip side of enhanced security from localised events is the potential for greater vulnerability from widespread disasters such as extensive flooding, or from the impacts of smaller events occurring at distance if these disrupt flows of inputs or information. Where modern industries require energy or other inputs sourced externally these will be particularly vulnerable to short-term impacts of disaster shocks as transport systems or electricity grids are damaged.

### *3.7. Commodification of the local economy*

In commodified economies money is required for households and other resource users to obtain basic needs including ecosystem services. Access to ecosystem services may additionally be constrained if open access resources have been privatised or enclosed by specific groups. Most often the movement is from a barter economy with open access towards a commodified economy in the wake of capitalist incursion, the introduction of wage labour and the penetration of market goods including the necessity to pay taxes in money. An increasing number of societies have also entered the uncertainty of a Desakota period following retrenchment from a commodified economy during or in recovery from conflict or natural disaster. The time spent under Desakota can be prolonged if this brings benefit to the local economic-political elite.



This is the case in conflict societies, although here many of the other aspects of Desakota systems are missing (transport connectivity, active information exchange, increasing economic investment) so that their status as Desakota should be taken on a case by case basis.

Commodification has the potential to contribute to the alleviation of poverty and reduce disaster risk through providing a tax base for local government. As commodification increases so the size of the tax base grows. The likelihood of successful tax collection and of budget expenditures that maximise pro-poor policy while protecting critical ecosystem services is a function of governance and the institutional architecture of the Desakota region and beyond.

Commodification can also generate vulnerability and slow down recovery from shocks including those associated with climatic extremes as money is required to obtain basic needs including drinking water, building materials, fuel, medicine, fodder and food. When highly commodified systems coincide with wage-based economies this may not be a concern. Assymetries in these economic relationships are however characteristic of Desakota systems. The result of such asymmetries is to create new groups of vulnerable populations, some of which may not become visible until post-disaster reconstruction. Here original construction of dwellings etc may have taken place before commodification so that the disaster is a double blow destroying physical assets that are now costly to replace. In a commodified economy this can lead to the deepening of poverty as households are forced to sell assets or accept debt to access basic needs.

### *3.8. Changing land and resource rights, and administration*

The changing economic base and demographic pressures of Desakota are reflected in changing land-use. Agricultural land may be taken out of productive use and held as a speculative investment or transferred into use for secondary industry. This can benefit those who hold land tenure as market values increase. This may benefit the locally wealthy or large private and state interests more than be a mechanisms for alleviating poverty. As prices increase this can even be a pressure for transferring communally owned or common open access lands and resources into private ownership, reducing the livelihood options of the poor.

Disaster reconstruction can provide an opportunity for transfer of land-ownership. There are many examples of collectively owned land or land long occupied or used by the poor being transferred into private ownership as part of reconstruction programmes. This process deepens local inequality.

### *3.9. Engagement with the global/external economy*

The implications of a mixed and wage labour economy have been discussed above. Here we focus on the specific implications of engagement with the global or national economy for local poverty, vulnerability and disaster recovery.

Where connection to external markets brings new technology, skills training and modes of management this can provide opportunities for local innovation and poverty alleviation. Compliance with international standards for labour and environmental protection can also enhance sustainability and exceed local or national norms. Where this does not happen the international distribution of responsibility for management

and limited local attachment make it difficult for local government or civil society actors to lobby for change. This is a real challenge for Desakota regions where local government and local civil society are characteristically weak compared to private sector actors.

Following disaster events, globally connected businesses can provide a bridge for private sector aid and technological support in reconstruction, though this tends not to extend beyond reconstruction of the business into the community (ProVention, 2006). Connected businesses can also improve reconstruction funding because of the additional international visibility they bring. It might be that this visibility does not easily extend beyond the need to protect the economic basis for global business so that the implications for local equality in reconstruction are less clear. For example in recovery from Hurricanes in Acapulco investment to secure international tourist accommodation was not matched by investment to improve the security of the homes and critical infrastructure of workers (UN-HABITAT, 2007). Businesses at the bottom of the supply chains – providing inputs for larger manufacturing or processing units - can find themselves suffering from loss of markets as well as physical damage for local suppliers as larger units look elsewhere for inputs as local businesses rebuild (Pelling, 2003).

#### **4. Case Studies: Vulnerability, Poverty and Ecosystem Services Under Desakota**

The following case studies each show how local institutions shape socio-ecological relations and subsequently determine who is vulnerable to hydrometeorological hazard. The first and second studies, both from Pakistan exemplify Desakota driven by endogenous development (Mustafa, 2002) and infrastructure investment (Mustafa, 2007) respectively, the third study from Guyana is an example of Desakota driven by crisis and decline in governance regimes (Pelling, 2003).

##### *4.1 Endogenous Desakota and flood risk in Pakistan*

The Indus basin of Pakistan has the largest bureaucratically managed surface irrigation system in the world, on the face of it the area would seem to be a quintessential example of a rural landscape. Yet closer examination shows local variations of Desakota based on differential rates of capitalisation and commodification in local economies. This interacts with ecosystem services and flood risk through the control of irrigation and groundwater services. Mustafa (2002) suggests that under Desakota, control of access to irrigation and groundwater, although governed by formal legal regulations is locally influenced by informal social relations.

Within a 20km radius, two types of local economy were identified determined by norms in property ownership. The first, more representative of a rural economy was indicated by large landowner dominated villages where production relations were largely feudal in nature. Large landowners enjoyed almost absolute economic, judicial and political control. In such villages the terms of exchange were still largely based on barter transactions where artisans rendered services to the farmers through the year and were compensated at harvest time in kind. The poor were disproportionately exposed to flood hazard and often reported appropriation of relief supplies by the large farmers. The second village type had produced Desakota characteristics. Here villages were dominated by small farmers exchange and was completely commodified with a concomitant increase in access to local wage labour. Although, the smaller farmers were more exposed to risks, including flood hazard, they could pressure local political elites by virtue of their voting power to deliver relief supplies, if not risk reduction.

Access to groundwater and surface irrigation water supplies was key to prosperity and resilience of the farmers in the study area. The more rural villages had a continuing but weakening moral economy where the large landowners allowed smaller farmers and poor tenants to gain access to fuelwood and fodder from their lands and even water from their tubewells. Poorer villagers out of favour with the large landowners could lose their access to water and other services. In addition, large landowners were able to appropriate the water share of the smaller landowners and tenants during drought resulting in a distortion of vulnerability and resilience. In the more Desakota region dominated by small farmers irrigation water, fuel and fodder were all market commodities. Amongst the smaller farmers water theft, although frequent, was immediately confronted, reported and addressed collectively or through legal means.

Although, both the areas were subject to formal legal controls on water distribution, a fixed time rotational system for water access was modified to a much greater degree in the rural, large landowner dominated areas, this was to the disadvantage of small farmers in these areas. In addition to legalised water access, the small farmer

dominated Desakota areas had illegal water markets. These resources and markets were demand driven and required the payment of rent (bribes) to irrigation department functionaries.

The overall conclusion of the research was that small farmers in the rural, large farmer dominated areas were much more vulnerable to flood hazard than the smaller farmers living in the Desakota small farm communities. Tenant farmers, surprisingly, were less vulnerable than small farmers, as they had continuing if weakening patron client relationships with the large landowners.

### *3.2 Technology led Desakota and drought risk in Balochistan, Pakistan*

In two separate studies Van Steenberg (1997) and Mustafa (2007) document rising inequality, a decline in social capital and increasing privatisation of water management as part of a Desakota process in Balochistan. Mustafa (2007) shows how this process of change generated new comparative vulnerability to rainfall drought hazard amongst poor farmers who continued to be reliant upon rainfall fed irrigation from ground water, while larger landowners were able to gain some temporary independence through tube well irrigation and to increase their profitability even during a period of rainfall drought. An example of infrastructure led Desakota.

In this case the effect of the drought on farmers was mediated by the transition in the agricultural sector from the traditional karez based irrigation to tubewell irrigation. Under an agricultural modernization program the government in Pakistan had been supporting the use of tubewells and the gradual phasing out of the karez irrigation. The program was very successful and as more and more larger farmers switched to tubewell irrigation and along with it towards more water demanding cash crops like apples and onions the water table was being drawn down and the traditional karez aqueducts going dry.

In the past during droughts the karez waters had been reduced but the social capital built around the karez system helped farmers collectively to cope with the effects of the drought. Poorer farmers could draw upon the reciprocal water sharing arrangements inherent in the karez system. Tubewell irrigation had the effect of privatising command over water entitlements. In this context, as groundwater levels dropped and the karez aqueducts dried out, the social capital that had developed around karezes started breaking down. Poorer farmers were the first ones to be dispossessed of their water rights and were pushed into pauperisation, even though the tubewells made it possible for overall agricultural production to go up, even during the drought.

### *3.3 Desakota driven by crisis and decline, Demerara Region, Guyana*

This study brings together data from a comparative analysis of local governance institutions and flood risk in an urban and a Desakota region in coastal Guyana (Pelling 2003b). The Desakota region was located 16 km east of the capital, Georgetown, where the urban study site was situated. The Desakota region has good transport links, a mixed local economy with good access to waged work including that in enclave sugar plantations. The chief barrier to development is the weakness of state and local, informal institutions – an example of chronic and deep rooted political crisis and decline in inclusive, representative and responsive governance in the Desakota region.

Both study sites were located on Guyana's Atlantic coast and are at frequent risk from fluvial, pluvial and coastal flooding (Pelling, 1996). The historical root causes of risk can be traced to Guyana's colonial experience and post-colonial modernisation projects which transformed the coastal environment, clearing and replacing coastal mangrove stands with a landscape of sea-walls, irrigation canals, plantations and human settlement. The vulnerability of the settled coast to flooding and the future impacts of climate change are explained by the failure of the contemporary political-economy of the coast to produce or access from external sources the inputs required for its maintenance. The influence of political structures and cultural norms on the social and spatial distribution of risk is explored in the case study. In particular the failure of Desakota informal and formal governance institutions to be representative, responsive or inclusive have increased vulnerability to flooding amongst the poor.

The 1990s saw the promotion of top-down participatory or community sponsored development programmes across Africa, Asia and Latin America. There is, however, considerable doubt over the meaningfulness of the participation associated with this paradigm of development in Guyana and worldwide. Notwithstanding superficial decentralisation in decision-making, deeper structures of political patronage and information asymmetries continue to influence the distribution of resources between and within communities and so to affect the production and social and spatial distribution of vulnerability to flood hazard (Pelling, 1998).

In both settlements the aims of local leaders dominated local development and the community advocate role of leaders was often left unfulfilled. A prime example of this conflict of interest is seen in one leader in the Desakota settlement whose first local development project was to re-surface an access road to his property and workplace. That this was not openly challenged by local actors indicates the depth of leadership dominance and the weakness of informal local institutions to hold leaders to account in this example of Desakota.

In peri-urban neighbourhoods with formally recognised community organisations, vulnerable individuals (low-income householders, renters, petty-agriculturalists, female headed households, the young and old) were excluded from decision-making, which was the domain of house owning businessmen with relatively high socio-economic status. The most vulnerable communities were not served by this system. Neither the self-help nor the empowerment that might have provided bases for social development and the strengthening of local social capital as precursors for more representative community organisation were apparent, and consequently an effective mechanism for the distribution of development resources to reduce vulnerability was lost. The contradictory relationship between leaders and community is shown with one leader responding to low community participation rates by suggesting local environmental rehabilitation schemes would be made more effective if the requirement for active community support for projects was dropped from funding agency requirements. There was little resistance to this style of leadership with most residents choosing instead to simply withdraw from community action and retreat into private flood risk adaptation measures within the household or family. Preference for household centred adaptation (raising yards or modifying dwellings) over communal action (drain cleaning, garbage collection) was commonplace, despite the potentially greater security gains to be made from communal action.

## 4. Conclusion

### 4.1 Conceptualising Desakota

Analysing through the lens of poverty and vulnerability to disaster risk shows that there is no single ideal model for a Desakota system. The nine characteristics identified in Table 2 are internally complex and can result in contradictions between individual Desakota systems – for example between a mixed economy and one dominated by capitalisation and wage labour. More than anything this flags the breath of root causes and subsequent local expressions of Desakota.

Local expressions can sometimes be closely linked to specific root causes such as the application of new technologies. Elsewhere causality is less clear for example when mixed economies emerge as a combination of public policy, local enterprise or direct investment from external sources. Understanding why it is that certain Desakota systems result in ecological degradation and others maintain sustainability requires an analysis of both local conditions and root causes. Both levels are amenable to policy intervention.

Insufficient empirical data in the preceding discussion prevents a comprehensive listing of Desakota root causes. However, the range of potential Desakota types and associated root causes might include those below. At the core each is a catalyst for institutional change:

- **Parachute investment:** external capital inserted, for example through the establishment of a capital-intensive production or processing industry.
- **Endogenous change:** driven by local development processes such as the local institutional consequences for land redistribution or increases in land value.
- **Infrastructure connections:** new connectivity following public sector (e.g. transport) or private sector (e.g. communication technology) investment.
- **Technological revolution:** the socio-economic impacts of technological change such as tractorisation.
- **Crisis and decline:** Formal governance and economic systems in crisis during or following natural disaster, political or economic shocks.

The centrality of institutional analysis in any assessment of Desakota and its relationship to the social and spatial distribution of poverty and vulnerability was emphasised by the three case studies presented in this chapter where change was driven by endogenous change, technological change and crisis and decline.

### 4.2 Research gaps

The most fundamental research gap is the need for an empirically grounded and theoretically rigorous conceptualisation of Desakota – as a description of a place (a hybrid of urban and rural) and also as a social system experiencing institutional change.

Globally, the Desakota space is huge – but largely invisible to science and policy makers stuck in a dualistic vision of the world split into urban and rural spaces. This represents a significant strategic gap in our understanding of development processes. With most research and policy oriented towards the rural or urban ideals of development the empirical reality of hybrid socio-economic systems and their relations to ecosystem services including subsequent vulnerability to hydrometeorological hazards has been left behind.

Continuing market expansion, demographic change and cultural/institutional changes indicate that not only is Desakota here but that it is set to expand. If this is the case then there is an even more urgent need to understand the socio-ecological relationships and underlying processes that can shape pathways for human wellbeing including the sustainable and equitable management of ecosystem services under Desakota.

The Desakota approach opens a new ( as well as contributing to a more complete) lens onto existing development challenges. Not least is vulnerability and adaptation to global environmental change. Here for example the holistic scope of Desakota science requires an integrated approach to studying and acting to manage risk – one that encompasses economic, social and political as well as environmental hazards. The need for multiple-risk analysis has been recognised in urban risk studies for some time but is yet to become mainstream and could learn from Desakota work providing value added for research undertaken on Desakota.

From a hazards perspective the interaction of local Desakota processes with more distant environmental and social change is little understood and should form a core research focus – opening analysis onto the time-space separation of development and disaster risk and the implications of this for justice in adaptation to/living with climate change.

Desakota regions may have some specific characteristics that make it especially vulnerable to the impacts of natural hazards. If it is agreed that Desakota represents a large and growing proportion of humanity yet is largely unrecognised this is a worrying reality. Mixed economies like those found in Desakota are perhaps the most vulnerable to disaster impacts with production chain linkages that allow contagion but without the depth and diversity that generate security. The institutional gap that in many ways is the clearest indicator of a Desakota region is also perhaps the greatest challenge for safety and development. This is not a new observation but its coincidence with Desakota introduces new variables to the analysis of causes and consequences of a civil society, state, market institutions on development and security.

In the context of natural disaster management two key strategies for recovery – relocation and in-situ redevelopment - both require strong and inclusive local civil society working in partnership with the state and private sector. More work is needed to understand the barriers to sustainable recovery along both pathways and to find way around challenges. The challenge of recovery is greater in Desakota than in rural or urban economies. On the one hand, humanitarians are well practiced in supporting the recovery of agriculture based rural economies, on the other larger and more varied urban economies are less affected by humanitarian practice. Most affected are

emerging and mixed economies with limited local economic capacity – the hallmarks of the Desakota system.

Desakota draws attention to development when the state and civil society are minority actors and the private sector is dominant. Two decades of support for civil society has not led to the building of inclusive and accountable governance systems, in many places it has also contributed to an undermining of the state. In this way Desakota highlights a global challenge for governance in development.

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