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**Enhancing the Flow of Credit and
Managing Risks in Agriculture**

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1 Introduction

Agriculture sector is a key component of the Indian Economy. Even though the contribution of Agriculture in overall GDP of the country has declined¹ from 44.5 per cent in 1970-71 to around 20.0 percent in 2005-06,² agriculture continues to be the principal source of livelihoods for around 62.0% of the country's population.³ In the last decade while the Indian economy has done quite well overall,⁴ achieving a Compounded Annual Growth Rate (CAGR) of over 6.0%, agriculture has remained sluggish with a CAGR of only 2.0%. Given the strong backward and forward linkages of agriculture with the overall Indian economy and its sheer scale, a strong growth in agriculture (at the rate of 4.0-5.0% per annum) has the potential to catapult the Indian economy to well past 10.0% growth trajectory.⁵ A stronger growth in agriculture would lead to higher income for farmers, generate more employment opportunities and sharply reduce poverty. It is our belief that for India, a rapid growth in the rural economy overall, and within that of agriculture, is highly feasible⁶ and may hold the key to addressing India's problems of growth and

¹During the 54 years of Planning between 1950-51 and 2004-05, the share of agriculture in GDP has fallen by more than half from 59 per cent to 24 per cent, whereas the share of industry has almost doubled from 13 per cent to 25 per cent and the share of services has increased from 28 per cent to 51 per cent. The steep fall in the share of agriculture in GDP is due to the fact that its growth rate at 2.7 per cent per annum has been less than half of the growth rates of 5.6 per cent per annum for industry and 5.7 per cent per annum for services (Source: <http://www.organiser.org/dynamic/>)

²Economic Survey 2004-05; and newspaper "The Pioneer", (March 19, 2006)

³Source: economy overview in <http://www.economywatch.com>

⁴India is the fourth largest economy as measured by purchasing power parity (PPP), with a GDP of US \$3.36 trillion. When measured in USD exchange-rate terms, it is the tenth largest in the world, with a GDP of US \$691.87 billion (2004). India was the second fastest growing major economy in the world, with a GDP growth rate of 8.1% at the end of the first quarter of 2005-2006. (Source: Economy of India from Wikipedia)

⁵"In two to three years, India should be targeting 10% growth if its savings rate improves, agricultural output increases, and infrastructure is substantially upgraded", Prime Minister Shri Manmohan Singh at the India Economic Summit (November, 2005). It may be noted that 1% growth in agriculture would translate to only 0.2% growth in overall economy as agriculture's share in overall economy is around 20%. In real senses even if agriculture grows at the rate of 4-5% from current level of less than 3% the impact on economy will not be more than additional 0.4-0.5% in overall economy growth. Therefore growth in agriculture has to be complemented with growth in infrastructure facilities, growth in savings rate besides higher growth in services and industries segment. However even a 1% additional growth in agriculture is desirable as it directly impacts the employment and poverty levels in the countryside. The spread effects of doubling of agricultural growth are greater due to the multiplier effect of agriculture in the overall economy. It has been estimated that one incremental percentage growth in agriculture leads to an additional income generation of Rs. 100.00 bn in the hands of the farmers thereby increasing their disposable income and ultimately, their purchasing power.

⁶On the one hand, India's position as a production base for most "dry" commodities such as wheat, rice and maize maybe unattractive because of small farm holdings, high volatility in rainfall patterns, low levels of mechanisation and the high levels of subsidies offered by international producing nations to their own farmers. Conversely, it is possible that horticulture in India could yield handsome returns. In fact, while overall growth of agricultural production has languished at below 2 %, horticulture already increased its contribution to 28 % of AGRI GDP and 54 % of the export share of agriculture, all from a cultivated area share of 8.5 % only (extracted from the PM's speech to the Agricultural Summit on April 9, 2005, at New Delhi). Traditionally, it has suffered primarily due to a lack of customer focus, outdated varieties and huge wastage of 25-30 % of output due to a poor supply chain of pre-cooling units, cold storage, refrigerated transport. However, this could be poised for a dramatic change. The growing popularity of tropical fruits, Organic farming and semi-processed (cleaned, pre-packed and pre-cut) fruits and vegetables could work in India's favour as they enable us to take advantage of a high labour component to become a competitive force. The willingness of the international customer to pay a premium for these offerings make investments in the required certification, irrigation and other infrastructure necessary for the development of both the fresh, as well as processed, fruits and vegetable

poverty eradication - unlike in the rest of the region where urbanisation and growth in manufacturing have been the principal drivers.⁷

However, for this to happen, key ingredients would be an adequate supply of credit and the availability of tools for the management of considerable risks that agriculture is exposed to. Repeated attempts have been made in the past to ensure this. In the area of credit this has been attempted by promoting rural co-operative banks, nationalisation of banks, rural-urban branch ratio restrictions along with a high priority sector requirement imposed on banks,⁸ promotion of regional rural banks and most recently the development of the Self-Help-Group (SHG)-Bank Linkage model. In the area of risk management the principal instruments have been a Minimum Support Price (MSP) program⁹ and a highly subsidised Crop Insurance program.¹⁰ While a few of these steps have experienced a measure of success for the most part these have failed to meet their objectives and the gap between what is required and what is available remains large.¹¹ For example, against a projected flow of Rs.7,365.70 billion of institutional credit to agriculture and allied activities for 2002-2007, in the first three years of the tenth plan the institutional credit

sector well worthwhile. For example, expensive oils such as Menthol and Patchouli have very manual processing requirements, which once again provide a source of competitive advantage to India.

⁷Jones (2006)

⁸Banks in the past have generally failed to meet the requirements of priority sector advances. Over the period from 1991/92 to 1996/97, the levels achieved by the public sector banks ranged between 30 percent and 35 percent - this despite the fact that the bulk of such lending is promptly re-discounted by NABARD, SIDBI, or one of the other DFIs. Even though priority sector advances situation has improved in the current context, the agriculture lending by banks continues to lag. For instance, as on March 2005, 13 banks out of 27 PSU banks achieved the 18% agriculture-lending target while only 1 out of 30 private sector banks met the 18% lending mark. However, when we analyze the priority sector lending (40% of NBC) targets then we find that only 2 banks out of total 27 PSU banks were unable to achieve the 40% benchmark while 11 private sector banks out of total 30 private sector banks failed to reach the 40% priority sector lending target milestone. (Source: RBI Statistics)

⁹The Agricultural Price Policy being followed in India from 1965 onwards is generally known as the minimum support price policy. Currently, the Union government fixes minimum support prices of as many as 24 agricultural commodities, based on the recommendations of the Commission for Agricultural Costs and Prices (CACP). The main objectives of the minimum support price policy are to provide incentive to the farmers for adopting improved technology and for developing a production pattern broadly in the light of national requirements - and also to ensure rational utilisation of land, water and other production resources.

Rajiv Panthary in "Enhancing Investment Credit in Agriculture (March 2005)" argues that controls and subsidies in the agriculture sector have failed to reach the targeted beneficiaries and at the same time have become heavy burden to the state economy. Minimum Support Price is another distortion that has led to over production of food grains despite burgeoning food grains stocks with FCI. It has also stifled diversification to other remunerative and market demanded crops with the result that we have even resorted to exports at a lower price. Right strategy could be to restrict the open procurement of food grains to the minimum required for food security purposes. Dismantling of the unlimited procurement or a balanced reduction would in itself lead to crop diversification besides huge savings for the public exchequer. The savings in turn could be utilized for creating targeted and better-managed safety net for the poor or for creation of infrastructure facilities such as provision of all weather roads, link roads from villages to markets, rural electrification etc.

¹⁰Skees, Hazell and Miranda (in New approaches to Public/Private Crop Yield Insurance, World Bank Publication), observe that the financial experience with publicly provided; multiple-peril crop insurance has been disastrous. In all cases, programs are heavily subsidized and governments not only pay part of the premium, but also most of the delivery and service costs, and they cover aggregate losses even when the losses exceed targeted levels over long periods of time.

¹¹RBI could play an important role here in encouraging management of banks to ensure that they focus on the availability of loans for the poor rather than on low interest rates that only result in the exclusion of the poor from the banking system (Source: The Role of Central Banks in Micro finance in Asia and the Pacific by Sanjay Sinha).

flow is estimated to be only Rs.2,500.60 billion.

It is our belief that in order to deliver on the promise of agriculture and to set it firmly on a longer term growth path, fundamentally different approaches from the ones that have been taken in the past are called for. In our view, merely changing ownership, imposing regulatory requirements, launching subsidised but poorly designed products, providing refinance at low rates of interest and exhorting financial services providers to do more in rural India is unlikely to achieve much if the preconditions for an orderly functioning of these markets are not put in place first. The creation of these preconditions is likely to take time but in our view offers the only way forward if one wants to place the entire rural credit and risk management system on a firm footing allowing it to become a strong partner in the delivery of the risk management products and services and credit required for the growth of agriculture.

In the following paragraphs we will attempt to list and describe a comprehensive set of interventions that in our view will create the necessary preconditions.

2 Development of a Comprehensive Rural Information System

The importance of developing a comprehensive rural information system cannot be overemphasised. Country after country (both rich and poor) in which well functioning credit delivery systems exist, are underpinned by such information systems. The development of such a system would require the following steps to be taken:

2.1 Smart Card

Introduction of a biometric (thumb-print) smart card for each and every individual farmer-borrower with a Unique Identification Number. The cost of issuance of this smart card is a one-time cost (ranging between Rs.50 to Rs.100 per farmer) that can be shared between banks, government (state or central) and the farmer himself. This smart card could be used to keep track of the farmer's: (a) lending records; (b) savings records; (c) production records; (d) insurance records; (e) health records; (f) ration card information and (g) land records (e) other similar applications.¹² Nigeria has recently completed the complete iden-

¹²In South Africa, fingerprint-based digital biometrics have been used in the delivery of pension benefits The system involved the prior digital registration of fingerprints which were then stored on a card bearing a magnetic

tification of its population of 60 million in a record time of 6 weeks and is in the process of issuance of such biometric smart cards. In Bolivia,¹³ Smart Automatic Teller Machines have been installed, which are serving 43,000 clients who live mostly in rural or semi-urban settings. These SATMs are unusual in that they incorporate fingerprint readers for client verification rather than use PIN technology. They also use voice instructions in three languages to assist illiterate or semi-literate users.

A new company Financial Innovations and Network Operations (FINO) which has been launched by a few former ICICI Bank executives with some financial support from ICICI Bank has developed a full capability to issue these smart cards and is in the process of issuing biometric e-pass books to ICICI Bank's 3 million rural customers in the next few months.¹⁴ If NABARD and a few other banks were to co-invest in FINO and participate in its governance, it would become possible for FINO to issue such cards to all the clients of all banks (including Regional Rural Banks and Co-operative Banks).¹⁵

2.2 Credit Bureau

In the rural context, getting borrowers' credit history information is very difficult, resulting in information asymmetries, which makes it difficult for the lending agencies to make accurate credit risk assessment. Development of a credit bureau for rural India, which makes use of the smart card and is able to return a credit score to any potential lender who is registered with the Bureau, can lead to accelerated growth of rural credit. FINO has the capacity to store and manage the data and could easily partner with a specialised credit-tracking organisation to develop this capability.¹⁶ If NABARD joins hands with FINO, this whole process could be further facilitated, since it enjoys the confidence of the entire rural finance industry and already has a significant amount of historic data

strip and on a central database. From 1999, multi-function smart card are being used through which instead of a direct cash payment, pensioners now receive a credit directly onto their smart card, which can then be used immediately to draw cash from an adjacent cash dispenser. (Source: Biometric Government in the New South Africa by Keith Breckenridge)

¹³Steve Whelan, with contributions from CGAP Staff and exchange, LLC in CGAP, Building financial Systems for the poor

¹⁴Annexure 1 has a full discussion of FINO and its current capabilities.

¹⁵Matthias M. Bekier and Sam Nickless in the McKinsey quarterly 1998 Number 1, suggest that governments can play an important role in influencing switching over to electronic forms of transactions. Government can rather drive the change by using electronic systems for their own transactions - by making social security payments through rechargeable smart cards, for example, or providing telephone banking facilities for community services. We feel that the application of the same in India will not only help control transaction costs but also usher higher efficiency and transparency in banking transactions. Government could consider paying wages to workers participating in anti-poverty programs, employment programs (recently launched 100 days assured employment scheme) through electronic means; this will offer banks sizable floats for recycling to farmers at low cost.

¹⁶We understand from FINO that there are a few agencies having credit information services for credit tracking in rural areas.

available to it. There is a great deal of academic work that suggests that the introduction of such a bureau could have a transformational effect.¹⁷ The Rural Credit Bureau would allow the entire branch networks of banks of all types to become fully active since a fairly mechanical lending process would then be adequate to deliver credit and even non-traditional lenders such as tractor, pesticide and fertilizer dealers could directly start to vend credit on the basis of this information as agents of commercial banks. The existence of this information would also allow a good assessment of the true extent of credit risk in rural lending and through a cross mapping of this with borrower profile and systemic developments (such as rainfall patterns), allow the development of rational pricing strategies and good risk management products.

3 Management and Recovery of Transaction Costs

High transaction and supervisory costs involved in rural lending is a major constraint in rural credit. The small size of seasonal agricultural credit, wide geographical spread, poor transport and communication infrastructure results in higher transaction costs for rural banking. The strategies suggested below could be employed to address the issue of high transaction and supervisory costs.

3.1 Automation

One of the important reasons for the failure of many providers of rural finance has been their inability to properly manage their operations in a cost effective manner. Automa-

¹⁷In their book, "Saving Capitalism from the Capitalists", Raghuram Rajan and Luigi Zingales emphasise the importance of credit information sharing in expanding access to finance, especially for those who are unable to provide collateral. They deduce that, Credit bureaus help the poor build credit histories that they can then use to shop around for the best and most appropriate financial services available, turning their reputation-defined in a formal credit history-into collateral to access financial services. As credit histories and credit bureaus develop, they facilitate other types of business transactions; for example, poor entrepreneurs can use their credit history as references for business relationships with suppliers and other business connections.

Robin Young, Senior Development Specialist, Development Alternatives Inc in the article Credit Bureaus in Latin America: Expanding Financial and Other Services to the Base of the Pyramid reveals that Financial institutions and other firms that use credit bureaus are reaching new markets that in many cases are more profitable than traditional client segments. Perhaps most important, poor people gain access to financial services at better terms and conditions than were previously made available to them.

In her comprehensive literature review for Credit Reporting Systems and the International Economy, Margaret Miller notes that "information sharing is associated with higher levels of lending in relation to GNP [gross national product] as well as lower default rates." Inessa Love and Nataliya Mylenko of the World Bank, in their empirical study of credit bureaus' impact on credit markets, found that the presence of private credit registries "is associated with lower financing constraints and higher share of bank financing. Small and medium firms tend to have higher share of bank financing in countries where private registries exist and stronger rule of law is associated with more effective private credit registries." They found that 49 percent of small firms report credit constraints in countries without a credit bureau, compared with only 27 percent in countries with one, and the probability of obtaining a loan improves from 27 percent in countries without a credit bureau to 40 percent in countries with one. The increasing numbers of bankers and other lenders buying private credit bureau reports as part of their credit appraisal process indicate that they are relevant for decision making among lenders.

tion through the creation of a Banking Platform that offers its services to co-operative banks, regional rural banks and scheduled commercial banks on an Application Services Provider (ASP) basis would be cost effective and will be well managed by professionals. While a few Rural Financial Institutions (RFIs) in India have grown to scale but individually, none of the RFIs have resources to invest in development of unique software or systems for their exclusive use, as this would involve high upfront costs, even if it were to scale its operations extensively.¹⁸ In the meanwhile, the lack of efficient systems acts as a deterrent to growth. Therefore, creation of a sectoral IT resource for RFIs presents itself as the most workable solution. Such a sectoral resource could be shared across RFIs, thereby improving their capacity to scale up in terms of reach and range. The common solution would provide RFIs with a ready platform to achieve reasonable size and scale without incurring heavy capital expenditure. A brief on shared technology platform has been put as Annexure 2.

There are a number of examples of banking systems adopting this approach so that a low cost and relatively rapid migration to high quality banking systems can take place.¹⁹ FINO has been built as a platform to provide exactly these services to Rural Financial Institutions (RFIs) and is currently in the process of being rolled out to three different types of RFIs including a co-operative bank, one scheduled commercial bank's rural operations and a non-bank finance company operating as a lender in rural India. The automation effort being undertaken by FINO combines the benefits of the card platform developed earlier in the form of a multi-account debit card and a number of new and existing Point-of-Sale (POS) terminals to ensure that card-holders are able to access a full suite of high

¹⁸An indicative quote for a single medium scale deployment is put at Rs. 95.0 million. This covers the cost of the hardware platform, network connectivity, setting up of the data centre, facilities management and managed IT services that come up to Rs. 65.0 million. The cost of the solution license, customisation and integration is estimated at Rs. 30.0 mn.

¹⁹Janine Firpo in "Banking the Unbanked: Technology's Role in Delivering Accessible Financial Services to the Poor", suggests that reaching out to the poor requires use of innovative technology. However, creating separate solution for each institution is neither sustainable nor scalable. She argues that shared infrastructures and common standards can significantly lower the costs of providing financial assistance to the rural populace. Such sharing is required to increase the number, and reduce the costs of access, points through which client can obtain financial services. Even in the urban context, Business models have changed to allow cooperation and competition to co-exist as financial actors are building shared infrastructures to reach a growing customer base. For example, initially, banks issued their own credit cards for use within exclusive merchant agent networks. This exclusive strategy, however, dampened any chance to get scale as it was proving unsustainable for the issuing banks. Bank of America finally broke this logjam when under the leader leadership of D ship Dee Hock, it developed the VISA model - a shared network owned now by more than 20,000,000 member banks from around the world. Within the VISA model, member banks agreed to establish a common architecture with standards adhered to by all members that would permit shared technologies to be developed that could settle financial transactions among a large number of merchants and banks.

In the US, banks share the costs of the infrastructure elements, including technology investments that are too expensive for any single player, yet they continue to compete on differentiated services. The breaking of walls between the banks in turn has permitted shared technologies to be built that could enable scaling up of the industry while also improving the services delivered to a rapidly growing customer base.

quality financial services even from very small RFIs.

Similarly, village based transaction point for servicing the financial needs of the poor could be created.²⁰ However, if this channel is set up primarily to deliver the financial services, the costs of serving the clients will be prohibitive. There is a need for a shared services network that can recover the servicing costs over multiple applications. Internet based kiosks can be one such transaction point. Such a channel can provide e-governance applications, agriculture extension services, Internet²¹ connectivity, telemedicine and health diagnostics lab, crop diagnostics, education and entertainment, recruitment/employment centre and financial services like life and health insurance. Through these one-stop shops consumers in even remote parts of the country can participate in the mainstream economic activity at low costs.

3.2 Recovery of Transaction Costs

High transactions costs coupled with tight interest rate restrictions imposed on Banks have, not surprisingly, led to a high degree of exclusion particularly of the small and marginal farmer for whom not only are the costs higher but the extent of problems imposed by adverse selection, moral hazard, high transaction intensity, low levels of equity and higher exposure to systemic risks such as failure of rainfall result in much higher levels loss levels from a bank's point of view. It is estimated that typically, for the aforesaid marginal farmer where the loan size would be below Rs 10,000, the basic transactions costs per farmer on the annual loans averages about Rs. 500-600 or higher. This is of course assuming about 50-60 number of interactions/transactions (if weekly collections) with farmer (typically involving stages such as, application, sanction, disbursement and collection). The above transaction costs includes service (comprising of sales /credit /sanction/ collection), stationery/documentation, stamp duty and other ancillary costs etc thus translating to a transaction cost of about 5.0%-6.0% or higher on an loan size of about Rs 10,000.²² If we account for an additional 6% of average risk charge for farmer loans, and a component of cost of funds of 10% for the bank, then even with a minimum spread the lending rate would need to be around 25% per annum. In our view, the

²⁰Source: Catalytic Funding to Scale Micro Finance in India by Rupalee Ruchismita.

²¹ITC's e-Choupal is a good example of how they can serve as procurement and purchase points and facilitate price discover mechanisms for the farmers, eliminating the need for middlemen. The ITC hub has now also become a distribution channel for its consumer goods division.

²²However such costs up to a certain level can be brought down in percentage terms to about 3%- 4%for non-marginal farmers, when the average loan size increases to Rs 15,000 to Rs 25,000.

imposition of interest rate caps at 10 to 12% has directly been responsible for the high degree of exclusion²³ that is observed because such interest rates make it viable to serve only the larger and richer borrowers.²⁴ While continuing efforts to research the drivers of these costs need to go on, the whole interest rate paradigm would need to be examined carefully to allow full recovery of the attendant risk charges and transaction costs.²⁵

3.3 Investments in POS and Digital Money Infrastructure

Investments in POS and Digital Money Infrastructure and Fiscal Incentives for Movement away from Cash and Cheque on a System Wide Basis

Research by McKinsey²⁶ suggests that it is not the number of people or the number of branches that are the drivers of high costs in a financial system. Movement away from cash towards digital money holds the key to sharply lowering the transactions costs associated with rural finance and also allows the improvement of information management. The current fiscal structure seeks to tax the use of cards thus making it more desirable to stay with cash as the principal means of exchanging value. If, instead, as in the case of South Korea strong incentives were provided on all transactions that take place without the use of cash, the savings on transactions costs would be quite large. As mentioned earlier, FINO has developed the capability to issue Biometric Debit Cards and Smart Cards but would need a national infrastructure of Point of Sale (POS) Terminals at various sales locations that can read these cards and transmit the information to FINO's central database. While FINO is attempting to develop commercially self-financing ways of putting these POS Terminals in place, if a consortium of banks, supported in part by a one-time subsidy from the Government, can allow FINO to roll these POS ter-

²³Priya Basu from World Bank in an article in Economic Times (March 20, 2006) writes that interest ceilings tend to reduce the supply of credit to the poorer section of society as formal lending gets concentrated towards less riskier or bigger farmers. Interest caps have also led to lack of transparency in the formal rural lending as in some cases various service charges, application fees are charged making the true cost of borrowing to be high than the stipulated rates. Priya argues that a far more effective way for government to ensure low interest rates for poor is by fostering healthy competition within the financial sector. Vikram Akula, CEO of SKS Micro finance in an article in Economic Times (March 20, 2006) also point towards a similar fact by stating that in countries like Columbia and Tunisia where interest caps are imposed the poor have actually received only a quarter of finance than did he poor in countries like Bolivia and Morocco with no interest caps.

²⁴Also refer article, "The Role of Central Banks in Micro finance in Asia and the Pacific" by Sanjay Sinha which argues how interest rate caps have led to the exclusion of poor by lending agencies.

²⁵C.K. Prahalad and Allen Hammond in "What Works: Serving The Poor, Profitably A Private Sector Strategy For Global Digital Opportunity", argue that the issue is not just cost, but also quality - the quality of water, the range and fairness of financial services, the variety and quality of food. The current informal system that serves poor communities is not only unorganized but also full of inefficiencies and intermediaries or middlemen who exploit those inefficiencies. Creating real markets among the poor - with adequate information, competition, and choice - can change the situation. Allowing the benefits of organization, logistics, information technology, and scale to bear upon the problem can lead to a "win-win" solution. If we can remove the inefficiencies of the unorganized sector, we will find an attractive market - for consumers and for firms.

²⁶Matthias M. Bekier and Sam Nickless in the MCKINSEY quarterly 1998 Number 1

minals out faster, it would allow a reduction in transactions costs and better information management that much sooner, directly resulting in a reduction in interest rates.

4 Creation of New Rural Financial Institutions

Creation of New Rural Financial Institutions and Financial Services Infrastructure

The existing rural financial services architecture suffers from several problems and has not been able to scale up to meet the challenges of rural finance and has particularly excluded the landless labourer and the small and marginal farmer from its service net. A few of the strategies suggested below can help address some of these issues and enable better access to financial services by all segments of population in the rural areas.

4.1 Creation of 200 New RFIs in the Private Sector

These would ideally be structured as Non Deposit Taking Micro Finance Non Bank Finance Companies (MF-NBFC-ND) and be regulated by the Reserve Bank of India. They would each have a minimum capital base of Rs.20 million and would be formally registered with the RBI. Each would seek to serve approximately 3 districts of the country and would have the capacity to serve about 0.5 million households and build an asset base of Rs.5.00 billion. Together these RFIs could therefore serve 100 million households and hold an asset base of Rs.1, 000.00 billion. Against a requirement of at least 200 MFIs, there are very few MFIs,²⁷ which have achieved a measure of scale-up and most, despite a very good track record of performance, have not been able to increase the size of their operations.²⁸

ICICI Bank, by March 2006, has built partnerships with 100 such RFIs, which it has helped promote / grow in size. In order to facilitate this, a number of the guidelines that are sought to be applied to investment in regular NBFCs (including from foreign sources) and loans to NBFCs would need to be relaxed for this class of NBFCs. For instance RFI could be allowed to access funding from foreign sources (donor agencies) routed through Micro finance investment funds like Aaviskaar and Lok Capital.

²⁷There are approximately 30 mature MFIs with a combined outreach of less than 3 million households.

²⁸The MFI sector has together cumulatively disbursed funds approximating Rs 3000-3500 million (USD 60-70 million). Bindu Ananth, Soju Annie George, "Scaling Up of Micro Financial Services: An Overview of Challenges and Opportunities", Working Paper Series, icicisocialinitiatives.org, August 2003.

4.2 Non-Deposit Taking RFIs

A critical design flaw in the current RFIs is the fact that they have been permitted to access deposits directly on their balance sheet from their clients because their mandate has been to be largely self-financing. The high risk environment, the concentrated asset exposure, high borrowing cost induced adverse selection of borrowers, have all inevitably led to the gradual failure of these self-financed institutions and has directly led to problems associated with depositor protection. All of ICICI Bank's current RFI partners (as well as a number of main-stream NBFCs such as TVS Finance, Sundaram Finance and Chola Mandalam Finance) use securitisation of assets both to generate resources for lending as well as to diversify the risks on their balance sheet. Since the securitised assets are bought by larger financial institutions and eventually by the capital markets, they serve to act as internal regulators of the RFIs ensuring that on an ongoing basis these RFIs are managed well. ICICI Bank supported the creation of FINO in large part to serve these new RFIs. RBI has also recently issued guidelines on securitisation²⁹ making it very feasible for this form of fund-raising to be scaled up even by smaller institutions. The suggestion therefore is to not to permit this new class of MF-NBFC-ND (referred to above) to mobilise deposits from the public but raise funds only from QIBs (Qualified Institutional Buyers.)

4.3 Full Service RFIs

While these RFIs (MF-NBFC-ND) will be able to freely offer loans from their balance sheets and act as credit agents of banks, through partnerships with Insurance Companies and Banks using the bancassurance model for insurance, the banking correspondent model for deposit taking and cash management services and Direct Business Catalyst³⁰ (DBC) model for investment services, these entities can offer the full suite of financial services to their clients. But since the insurance and deposit risks would now be taken on the balance sheets of much larger and well capitalised and more directly regulated financial intermediaries, the design flaw mentioned earlier would be largely absent.

²⁹RBI No. 2005-06/294 DBOD.NO.BP.BC.60 / 21.04.048/2005-06 dated February 1, 2006

³⁰DBC (Direct Business Catalyst) is a localized and personalized face of online trading portals (such as ICIDirect) to the customers. DBCs, as facilitators, provide investment convenience to customers who are not net savvy and need guidance from an expert to help them with their investments. Further, DBC acts as authorized person on behalf of the client and acts as sub broker to such online portals. (Source Internal note by ICICI Web Trade.)

4.4 Removal of Branch Licensing for Rural Branches of SCBs

In a country with over 600,000 villages, the number of financial service access points needs to increase very sharply. Each Scheduled Commercial Bank (SCB),³¹ as it seeks to roll out its rural finance strategy would be desirous of putting in place a hybrid channel strategy involving a combination of branches and agents. However, for this to proceed apace, it would be imperative to remove all branch licensing requirements³² for branch and ATM licensing (or putting it on automatic approval route) for branches and ATMs to be placed in designated non-urban centres (rural and semi-urban).

4.5 Permission to Cooperative Banks and Regional Rural Banks

Permission to Cooperative Banks and Regional Rural Banks to deal with the market and other banks

There are several formal and informal restrictions imposed upon the Co-operative Banks (Co-Op Banks) by the respective states in which they are registered and on the Regional Rural Banks (RRBs). Giving them a certain measure of operating freedom would, we feel, considerably enhance their effectiveness:

- Co-op banks / RRBs should also be permitted to purchase investment grade credit portfolios even if underlying assets are situated outside their jurisdiction. This will allow them to diversify their risks on the lending side - this would be imperative if they are to continue to be permitted to raise deposits from their own jurisdiction.
- The Co-op banks / RRBs should also be permitted to freely sell their assets to bring in liquidity and manage risks using assignment, securitisation and Inter-Bank Participation Certificates (IBPCs) as channels. This would help them increase exposure in their jurisdiction area by selling existing assets to other banks and using the funds thus generated to create more loans. The Co-op Banks and RRBs have strong loan origination capabilities in their command area but do necessarily have the lowest cost of funds or in some cases are liquidity constrained. The permission to sell

³¹Scheduled commercial Banks constitute those banks, which have been included in the Second Schedule of Reserve Bank of India (RBI) Act, 1934. RBI in turn includes only those banks in this schedule, which satisfy a few criteria laid down, vide section 42 (60) of the RBI Act. Being a part of the second schedule confers some benefits to the bank in terms of access to accommodation by RBI during the times of liquidity constraints. At the same time, however, this status also subjects the bank certain conditions and obligation towards the reserve regulations of RBI.

³²Section 23 of the Banking Regulation Act, 1949 requires banks to obtain the prior permission of the Reserve Bank of India to open any new branch or shift a branch to a location outside of the city, town or village where it is originally located. Accordingly banks can open new branches only after obtaining specific authorisation from the Reserve Bank of India.

/ securitize their assets would free them from these constraints and place them on par with the MF-NBFC–ND mentioned earlier.

5 Better Market Risk Management

Market risks are a result³³ of both variations in supply and demand for crops that are not subjected to binding price controls and from the inability of controlled markets to respond timely and efficiently to changes in the market conditions. Variation in the market price fetched by the farmers is a reflection of the market risk. Market risks may be due to factors affecting timely delivery of produce to markets or the quality of the produce (e.g. poor feeder roads and storage/ transport facilities in combination with perishable, bulky produce), as well as to changes in the demand or price (due to factors such as glut in the market at the time of harvest or lack of demand due to change in the consumption pattern). We discuss below a few strategies, which in our opinion will help address some of the market risk issues.

5.1 Warehouse Finance

Warehouse finance clearly represents an opportunity to give farmer access to cheap finance on a post-harvest basis as well as allow him the opportunity to not be subjected to distress sale situations. This has enormous benefits for the small farmer because the large farmer is often able to hoard the commodity in case he has higher price expectations. It is the small farmer that needs to sell as soon as the crop is harvested. The warehouse receipt needs to be made a negotiable instrument. In the current form, banks are reluctant to lend to the small farmer, and when they do, lend at high interest rates. However, if the goods are sold forward on a futures exchange such as NCDEX where the goods are deposited in a warehouse (an electronic warehouse receipt is issued) and graded appropriately. As the goods are certified, there is no question on the grade and quality of the good. As it is sold in the futures market, the value of the future proceeds is fixed. The bank now does not carry any risk on such loans and can lend at a lower interest rates. Clearly, the farmer's holding power now increases, as he does not have to resort to distress sale any longer. Annexure 3 contains a brief from NCMSL on the

³³Source: Financing Agricultural Term Investments by Frank Hollinger, Food and Agriculture Organization of the United Nations (FAO), Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) (January 2004)

current state of warehousing in India and pointers to the future direction for enhancing warehouse-based finance.

5.2 Improved Price Discovery

Improved Price Discovery through exchanges and automated auction markets

One key driver of value for farmers in general but specifically for improving access to finance is the development of national warehouse receipt / spot market for both dry and wet goods. An NCDEX type platform³⁴ for limit-order matching type trades and a SAFAL type platform for Dutch and English Auctions are essential for these markets. All of the Mandi's need to be electronically linked to these exchanges and prices made available to all the farmers. Through the whole Village Knowledge Centre proposal (and other similar internet based initiatives) trading platforms needs to be extended to the farthest corners of the country. In case of SAFAL, since there is need for a much larger market-yard infrastructure in other parts of the country as well, there is a need to promote the creation of a number of such markets but all with both physical and on-line auctioning capability (including from overseas) so that price discovery can happen on a local as well as national and global³⁵ basis.

5.3 Restructure the Minimum Support Price Mechanism

While there is no doubt that in the process of transition and in the face of enormous subsidies offered by other countries to their farmers there is a need for some form of subsidisation to the small farmer, it needs to be examined if the MSP is the best way to offer this. Putting in place a more transparent and effective mechanism of giving direct support to the farmer would serve the interest of the farmers more than the present system of MSP. For instance, weather futures³⁶ (temperature-related weather derivatives),

³⁴Futures exchanges, which already have the platform for efficient price discovery can actually also get into spot trading. Today the farmer has a bundled product in the mandi: price information, decision to sell, physical delivery and financial realization. Quite clearly he does not really have an option once he goes to the mandi where he has to sell the product at the offered price. But if we look at the NCDEX solution: the farmer views various spot prices (polled by NCDEX) in his village and decides where he has to sell his goods. He then goes to the terminal (there are over 8000 in the country today) and places the order. Once the order is placed, he moves to the mandi of his choice and delivers the goods. Financial realization is instantaneous once his commodity account is certified and the payment received from the buyer. For this the APMC laws need to be changed to permit futures exchanges to trade in commodities.

³⁵The concept of an offshore exchange similar to the offshore banking unit could be permitted so that global price discovery can happen right here in India. Then those entities that are permitted to access international exchanges can trade with these offshore exchanges, which are physically, located right here in India.

³⁶According to UNCTAD's global expert on commodity futures Lamon Rutten, weather futures are a good example of product innovation. "Weather futures are important and cheaper than crop insurance which is important to make the agriculture -sector cost-effective under the WTO regime".

could be seen as alternative to crop insurance and even MSP by way of option trading by farmers wherein government could think in terms of paying the options premium on behalf of the farmer. A few alternative mechanisms to MSP that could be administered through commodity exchanges have been discussed separately in Annexure 4.

5.4 Banks to be Permitted to Trade Agricultural Commodities

Since there is an expectation that banks will (a) provide large amounts of finance against crop risk and (b) extend outreach of financial services deep into rural India, it is imperative that they be permitted to trade these commodities directly on their own balance sheet (both domestically and cross-border) so that they can hedge out the risks that they already incur on their balance sheet, provide a larger proportion of current value as commodity finance to the small farmer and offer simpler financial products such as commodity forward contracts to those farmers that cannot afford to trade in the minimum lot sizes of the national exchanges - the current permissions make it impossible for the small and marginal farmer and the farmer without direct exports (but with similar price risks) to access these risk management instruments. In many situations buyers or sellers may need fixed price situations. Rather than attempt to engineer them through hard-to-enforce contract-farming frameworks it may be better to allow financial intermediaries to launch longer-term fixed-floating commodity swap markets. Banks can act as an aggregator here and represent the farmers on the exchanges on a fee basis. Farmers would thus be able to trade on the exchanges. Further, by covering the farmer, the banks are also able to ensure that the credit risk in lending to the farmers is mitigated by selling on futures exchanges.

6 Management of Rainfall Risk

The Indian farmer is more affected by weather than his counterparts in many parts of the world. Dependency on rainfall continues to be high. We discuss below two-pronged strategy of mitigating rainfall risk and of augmenting irrigation and water markets for higher efficiency in water use.

Weather futures were first traded on the Chicago Mercantile Exchange (CME) in the year 1999 and since then they have picked up significant volumes. It has also started trading in the Euronext-London International Financial Futures Exchange (LIFFE). NCDEX intends to launch this facility in the country soon.

6.1 Need for More Weather Stations

Weather insurance³⁷ contracts have already been launched in a limited way in the country. Along with Price Risk the risk of rainfall failure (or excess rainfall) is the biggest driver of systemic shocks for the farmer. While ICICI Lombard has worked hard to develop the basic contract design along with the Commodity Risk Management Group (CRMG) of the World Bank and now a few other insurance companies, notably, IFFCO-Tokyo and AIC have also launched a similar contract, the availability of high quality and automated rain gauges remains a substantial problem leaving the farmer who has bought this insurance contract very highly exposed to basis risk. Investment by government in setting up of weather stations³⁸ across the country would enable the farmers to protect themselves from the vagaries of nature. This would also enhance the flow of credit to agriculture as the basic crop risk is mitigated to a large extent. NCDEX through National Collateral Management Services limited (NCMSL) is setting up such weather stations in few parts of the country. As of now NCMSL has installed 88 weather stations in 10 states. The presence of these weather stations will also improve the quality of forecasts that the Meteorological Bureau is able to make. Annexure 5 gives a brief on the importance of weather stations and its utility in the weather insurance context.

6.2 Irrigation and Water Markets

There is an urgent need to develop local markets for water in which there is private interest in developing deep tube wells and irrigation projects. The Electricity Act has permitted wholesale purchase of electricity and resale by private entrepreneurs. In a similar manner if this is permitted for water it will become possible for banks to enter as financiers of irrigation projects in a manner that does not have recourse to the Government. A paper by Professor Mark Rosenzweig³⁹ and Professor Andrew Foster that suggests this

³⁷Weather insurance has multiplier effect on the economy as it enables access to factors of production. Adequate protection offered through the weather insurance product enhances the risk taking capacity of the farmers, banks, micro-finance lenders and agro-based industries. This in turn would result in boosting the entire rural economy. Further, as the product is developed on the foundation of universally acceptable parameters, it is easier to transfer the risk to international financial markets through reinsurance. This allows for global pooling of risk and thereby more competitive "portfolio adjusted" pricing for the insurer and ultimately for the farmers. (Source : Internal Paper by ICICI Lombard.)

³⁸By installing modern weather stations, data on various weather parameters can be collected e.g. Rainfall, Sunshine, Air temperature (Maximum and Minimum, Air pressure, Wind Speed, Relative Humidity and Dew Points this could be used for regular and timely weather data collection by expanding and strengthening network of weather stations to meet the requirements of not only weather insurance but also to provide real time data to the government and agriculture departments and the farming community.

³⁹Inequality and the Sustainability of Agricultural Productivity Growth: Groundwater and the Green Revolution in Rural India by Andrew Foster and Mark Rosenzweig (June 2005)

approach may also lead to better use of water and even to the private financing of watershed development work.⁴⁰ The current approach of the Government directly financing irrigation projects from its budget or through Special Purpose Vehicles does not lend itself to financing by banks and is therefore limited to the extent of resources that the state governments are able to deploy. While the experiments with Water User Associations using an SHG format have been noteworthy they have not yet been able to scale to the extent expected barring a few select pockets - it may be useful to carefully examine why this has happened. BASIX and PRADAN have been engaged in this task for a number of years and may be able to provide some useful inputs. Several countries, including parts of India have experimented with innovative approaches in water (including irrigation) segment, a few of which are discussed in Annex 6 and 7.

7 Creation of Complementary Infrastructure

The pace and pattern of agricultural development is largely conditioned by the growth of infrastructure facilities relating to roads, electricity etc.⁴¹ Thorsten Beck, Asli and Maria in a study on the banking sector spanning 99 countries find that better infrastructure reduces the cost of banking service delivery and makes the extension of bank outlets more cost-effective, thus increasing the use of banking services. Stephen Jones⁴² in a recent study points out that there is strong international evidence⁴³ to suggest that infrastructure investment is central both for accelerating growth and for reducing inequality and making growth patterns more pro-poor. The paper further highlights that in terms of direct impact on the poor, water and sanitation services (mainly through their impact in improving health outcomes), roads, Information and Communication Technologies (ICT), and electric power have greater significance. A FAO study points out that, lack of investment in rural infrastructure gradually shifts comparative advantage of an area back towards subsistence production at very low-income and little multiplier to the rural non-

⁴⁰An example of such a model is the work done by the NM Sadguru Development Foundation: www.nmsadguru.org. This is an NGO which has done some outstanding watershed work but on a limited scale as they do not have the resources to scale this. The challenge is to convert this into a corporate model, which can be financed by banks.

⁴¹Source: Reaching out: Access to and use of banking services across countries By Thorsten Beck, Asli Demirguc-Kunt and Maria Soledad Martinez Peria (September 2005)

⁴²"Infrastructure Challenges in East and South Asia", by Stephen Jones (March 2006)

⁴³Cook (2003) summarising studies (as quoted in Stephens Jones paper) on China, India, Thailand and Indonesia on determinants of rural poverty reduction concludes that the consistent finding is that investment in roads and education have been the main drivers of rural poverty reduction (with agricultural research and development also important in those studies where it has been examined). The poverty impact of irrigation and power investments has been positive but significantly smaller.

farm sector. FAO study quotes from Winters⁴⁴ study that “the transaction costs of trade with remote villages are often so great that it can be cheaper for grain mills to buy from distant commercial growers than from small farmers located in the region.” However, improved infrastructure also lowers the final cost of imports in the producing areas.

We discuss below few possible approaches in building a strong, viable rural infrastructure network in select areas while Annexure 8 generally discusses several innovative ways in which Rural Infrastructure may be financed.

7.1 Power

There is clearly a need for more power to be made available to farmers.⁴⁵ While there is slow progress happening in both the expansion of the grid and national generation capacity it should be possible to develop local power plants using renewable energy⁴⁶ sources such as biomass⁴⁷ wind and solar energy. A brief note from TERI⁴⁸ on renewables

⁴⁴Winters, L. A. 2000. Trade liberalisation and poverty. Brighton: University of Sussex.

⁴⁵Presently, around 63 percent of the rural households in the country remain un-electrified. The estimated cost of connecting the remote villages alone by power is placed at around Rs 37.00 billion. An enabling provision has been made in the Electricity Bill 2001 permitting stand-alone systems (including those based on renewable sources of energy and other non-conventional sources of energy) for management of distribution of power in rural areas through Panchayati Raj institutions, users' associations, co-operatives and non-governmental organizations.

⁴⁶India's national electrification targets include providing electricity cover to all the villages by the year 2007 and to all the households by the year 2012. There is a special thrust on renewables for ushering last mile electricity connectivity in the country. Renewables also offer long-term ecological gains over conventional fossil fuels and compare favourably in per unit cost of production vis-à-vis conventional energy sources on a life cycle cost concept. The national targets therefore include 50,000 MW of the energy to be exploited by the year 2050 through renewable energy sources. There are around 18,000 villages in the country where grid supplies are not possible/ unviable and where renewables alone can be harnessed for providing electricity coverage. India has a large potential for renewable energy (RE), an estimated aggregate of over 100,000 MW. In addition, the scope for generating power and thermal applications using solar energy is huge. This provides ample opportunities to entrepreneurs, business associations at village level.

⁴⁷Decentralized Energy Systems India (DESI) Power, has launched an innovative program called EmPower Partnership Programme (EmPP). EmPower Partnership Programme, links employment and power for the sustainable development of the village and rural areas. DESI Power's business model involves building small scale (50 KW to 500 KW) biomass gasification based power plants in remote villages with direct association of local partners (NGO/ Panchayat /co-operative) who own and operate the plant while technical help is provided by DESI Power which also takes up small equity in the project. The village level biomass projects by Desi Power are of small scale and typical examples of distributed generation, transmission and distribution, which is being mooted for last mile village power connectivity. The projects set up by DESI power are need based where demand of power has emanated from the locals themselves (in view of either lack of grid connectivity or reliable/negligible grid supply) and particularly the local entrepreneurs/ farmers having own micro enterprises/using irrigation pump sets who can afford to pay reasonable cost for supply of reliable/quality power. Currently these local industries entrepreneurs (shop owners etc) and users of irrigation pump sets are using diesel based gensets - the supply from that is costing them Rs. 8-10/kwh (in addition to the capital investment) as against supply of power at Rs. 4.5-5.00/kwh from the pure gas based biomass projects of Desi Power. The replacement of fossil fuels power generation by small scale biomass gasification systems in these kind of projects also results in savings in Co2 emissions (unto 550 tons/year per 100 KW) leading to ecological gains besides creation of additional village level employment opportunities. The farmers are likely to benefit on account of assured buy back for biomass produced by them as also assured lower cost irrigation through pump sets powered by the biomass plant. Besides the same, supply of power in the villages is likely to trigger socio economic development in the near vicinity (for example in a biomass based project at Baharbari in Araria by Desi power a small village level market came up within months of setting up of power plant which is drawing power from the biomass power project.)

⁴⁸Please refer to website <http://www.teriin.org/> of The Energy Resources Institute (TERI)

and Decentralised Distributed generation (DDG) in India has been put in Annexure 9.

A pilot project done with NOIDA power (details enclosed in Annexure 10) suggests that if high quality supply of power is combined with a loan for the purchase of a high quality (backed by warranty) the farmer is prepared to pay for the power. ICICI Bank has recently also opened dialogue with companies like Tata BP Solar, Shell Solar for making available cheaper solar PV (Photo Voltaic) systems to rural clientele. There is also the possibility of using very small hydro projects (5 KW) that would enable them to have a reasonable power supply to dry organic mushrooms, berries, and other high-value exports.⁴⁹

7.2 Rural Roads

This is a clear need in rural India and there a strong role that banks can play in financing these roads. However, the whole process would be facilitated greatly if one could take a project finance approach towards the financing of these roads, identify potential bodies or organisations that may be willing to pay at least a part of the user charges that would be needed to pay for these roads. These could be organisations such as the local Mandi Board, a local dairy or even a local corporate. CRISIL has built a strong capability in this entire work and could be hired to develop these projects. There is also a need to develop a framework for prioritising the choice of roads in terms of which ones are more critical. Annexure 11 discusses the current status of rural roads and provides several examples of how rural roads may be financed.

7.3 Supply Chain Infrastructure

In the era of globalization, competition is no longer among firms, but among supply chain networks. The agriculture supply chain network in India is characterized by inefficiency and exploitation at different levels. To unblock real values of agriculture, the focus must be on the entire supply chain network and not just the production aspects.⁵⁰ Area specific commodity approach to fixing the complete chain is the most appropriate strategy whether it is mango in UP, litchi in Bihar, pineapple in Tripura, oranges in Nagpur, Apples in Himachal or poultry in Tamil Nadu. Typically the chain is broken or is weak in several

⁴⁹Suggested by Professor Jessica Wallack.

⁵⁰R. Balakrishnan, Executive Director, NABARD in a Business Line Article (April 7,2006) opines that an effective supply chain network calls for intensive collaboration among producers, processors, logistics providers, wholesalers and retailers to supply products demanded by the domestic and international customers in a cost effective manner. The same needs to be complimented with horizontal collaboration among policymakers, researchers, extension agencies, technology companies and financial institutions.

links, which could be related to production, technology or marketing aspects. Private participation, through contract farming and investment in infrastructure could be one of the strategies to overcome most of the supply chain lacunae.

For instance, analysis of supply chain of grapes in Nashik reveals lack of effective logistics infrastructure (which is customized to cater to the requirement of foreign markets) leading to lot of wastage, quality degradation and consequently lower price realization by the farmers. Private participation could be explored for setting up a dedicated state of the art air cargo⁵¹-handling unit at Nashik⁵² for the purpose of exporting fresh vegetables and fruits to the premium markets of EU. Himachal apples⁵³ is another case where integrated cold chains equipped with Controlled Atmosphere (“CA”) technology and an end-to-end supply chain (complete logistic and distribution network) could fetch better prices to the apples farmers in the domestic market segment.

7.4 Extension Services

Given the scale and size of rural India, location and demand specific innovations in extension delivery are called for effective dissemination of technology and for dissemination of real time market based information to the farmers. In a similar concept to the value chain approach, extension must be provided from an end-to-end perspective covering from pre-production⁵⁴ to production to the marketing stage. Some of the strategies could be crop /commodity specific extension, group based extension, private extension through input companies and extension in form of Public Private Partnership (PPP), extension through usage of ICT like interlinking of mandis. A few approaches in extension have been discussed separately in Annexure 12.

An effective extension system needs to have strong inter linkages with R&D. Invest-

⁵¹Kenya exports Rs.5.00 bn worth of fresh vegetables like peas, beans, okra to Europe every year by air.

⁵²Nashik provides suitable agro climatic conditions for the cultivation of a number of vegetables and fruits throughout the year. Since the nearest airport with air cargo facility is at Mumbai and considering the perishable nature of these products it becomes necessary for setting up such a unit at Nashik with cold storage facilities.

⁵³ICICI Bank in its endeavor to finance complete supply chain network is financing setting up of an integrated cold chain equipped with CA technology and an end-to-end supply chain project of Adani Agri Fresh Limited (AAFL) in Himachal. The Cold Chain project will be focused on apples, as apples can be stored in CA stores for up to an year and differential between price at the farm gate during the peak season and that at the end-consumer level during the off-season is very large (more than three times) leaving plenty of scope for greater value addition and sharing of efficiency gains between the consumer, the producer and the company. The company will also be providing its services to farmers, traders and agents for storage, logistics and marketing thereby reducing storage and commodity risks while improving asset utilization.

⁵⁴Pre-production extension to include information on right variety, right seed, right soil and planning of land mix etc. Production based extension to include right usage and timing of inputs and availability of credit while marketing extension to include right time to sell, information on storage options and warehouse receipts based funding, prevailing market prices including help to farmers in participating in commodity trading to receive better prices.

ment in creating need based and efficient R&D infrastructure needs to be an integral part of the extension paraphernalia. Even as new R&D centres are promoted on private mode, co-sharing of public R&D facilities with industry could be allowed to unlock higher values out of existing public infrastructure as well as to attract private participation in market based research activities.

8 Conclusion

The above note outlined several steps that can be taken relatively quickly in the following areas:

1. Development of a Comprehensive Rural Information System
2. Management and Recovery of Transaction Costs
3. Creation of New Rural Financial Institutions and Financial Services Infrastructure
4. Better Market Risk Management
5. Management of Rainfall Risk
6. Creation of Complementary Infrastructure

It is our view that these steps, particularly the first 5 are absolutely critical if the business of rural finance has to be put on a firm footing. If these steps are taken immediately then over the period of the next 5 years an orderly rural financial system would evolve providing a full range of financial services to rural audiences and leading to a reduction in interest rates without leading to high level of exclusion.

9 Annexures

9.1 Annexure 1

Financial Innovations and Network Operations (FINO)

Background to the Initiative

There is a distinct lack of access to financial services in the country for the poor people with some estimates putting the overall number of unbanked at over 500 million. While several initiatives have been taken on this front in the past including nationalization of banks, creation of Regional Rural Banks, etc, the situation has not improved on account of variety of reasons. Financial services delivery in the rural scenario is characterized by high cost of delivery, lack of banking infrastructure and poor communication facilities. High illiteracy levels and lack of financial awareness further compounds operational challenges in validating the customer and in the need to provide the customer with assisted banking. Technology while having transformed banking for the urban educated, its impact has been largely unfelt in case of the rural customer as well as the urban micro customer.

The micro finance institutions (MFIs) that are active in this market space often work with rudimentary technology systems which while useful in providing low cost solutions for their small requirements, are becoming an impediment in their growth since these do not provide scale in number of transactions, customers handled and product breadth, and also at the same time do not create a credible auditable transaction trail. High capital costs for new systems and inefficient operating models act as significant entry barriers for scaling MFI operations.

Additionally, the issue of uniquely identifying the end customer has remained a challenge in this market. Various card-based solutions that rely on PINs and connectivity have failed to show the desired impact. The need is for more robust solutions that provide foolproof customer identity, which are based on traits that an individual bears and are not based on customer's memory.

To increase reach and scale, it is essential to expand the transaction capture points out from the branches and into the field. Even though this has been managed to a large extent by manual processes performed by human agents, the need is to automate the last-mile transaction capturing to achieve greater operational efficiency.

ICICI Bank has, on the insistence of several MFIs and with support of a few sectoral players like CGAP (under the World Bank), Grameen Foundation USA and SIDBI, taken a lead to facilitate a robust IT & Services Backbone (backbone) for use by various MFIs and other players in the unbanked market-space.

The technology platform will be offered by a separate company on a utility model.

The backbone - built using the best-in-class solutions - is envisioned as a common sectoral resource and is positioned as a technology utility service that will be shared by any institution that forms a part of the initiative. The backbone would facilitate these entities to offer not only credit but also other financial services - liabilities and investments, where they may not be the principal, but only market these products. While the scoping of the system is being done for MFIs, the system would have capabilities to serve the requirements of other micro-agencies as well (co-operative banks, local agents, etc).

The Solution Offering

1. **Core product engine:** The core banking engines cover the entire life cycle of product activities on both the asset & liability sides required by the customers. While this system would have the complete functionalities of a large-scale banking set-up, it would be offered to these entities at an affordable cost. In order to address the connectivity issues of remotely located branches, the system has been designed to enable branch operations in off-line mode with periodic uploads into the central back-end engine whenever connectivity is available.
2. **Distribution channel:** Since the country does not have any national identification set-up and the customer segment in question, does not have requisite documentation for unique identification, biometrics provided the answer for uniquely identifying the customers. Since most of the customers are illiterate, biometrics would also help in validation without the use of signatures or PINs, which would be necessary for them to operate their accounts. Hence these customers are proposed to be issued smart cards for operating their accounts, which would also carry their biometric fingerprints, which would be used to authenticate them for the transactions. Further, the use of smart cards can make it possible to conduct financial transactions in the off-line mode thus obviating the need of relying on the uncertain always-available connectivity. The company would thus issue smart cards on behalf of the principal(s), set-up Points of Transactions (PoTs) and provide mobile devices

to enable last-mile transaction capabilities.

3. **Credit Bureau Services:** The availability of authorised customer identity and transaction data presents the requisite raw material to offer a comprehensive suite of credit bureau services that facilitate improved credit decision-making process. These services would be available to all the participating entities.
4. **Innovation:** Innovation - both in products and processes - is the underlying theme uniting the three service pillars that allows the backbone to remain in sync with developments worldwide and avoid obsolescence. The company would continue to work on and develop innovative solutions to serve this market more effectively.

9.2 Annexure 2

Shared Technology Platforms⁵⁵

Information systems as a tool for financial leverage

One of the key challenges to scaling up of existing MF operations and creating new entities is the existence of a robust technology platform. A good technology platform requires substantial investment and acts as a significant entry/ scale up barrier for most organisations. ICICI Bank, at the insistence of its partner MFIs, has taken an initiative to build a robust sectoral IT resource for micro finance sector to support the operations of MFIs. The technology platform will enable MFIs to become an aggregator of various financial services for its client base in a specified geography.

This would increase the load of data management on the MFI and would require systems capable of dealing with a very large number of transactions per day,⁵⁶ quick update and validation mechanisms, traceability, aggregation and drill down to the lowest level. Some of the key aspects where a strong technology platform will add value to the micro-finance operations are:

- Reduce transaction cost
- Data available in soft copy
- Facilitate thorough appraisal of MFIs for enhanced funding
- Capability to interface with multiple peripherals, including ATMs, PDA, mobile phones, use of POS terminals, etc.
- Better data management and reporting capacities
- Duplicate data available reducing possibility of loss of valuable data
- Standardisation of data for the sector, while continuing to provide flexibility at the front end.

This platform would address the long-term automation needs of the MFIs. The platform while being designed to be in line with the latest technologies will also be scalable and flexible for future modifications. This would be an end-to-end solution automating the entire chain of MFI activities.

⁵⁵Source: Catalytic Funding to Scale Micro Finance in India by Rupalee Ruchismita

⁵⁶Microfinance is associated with low value, high volume transactions.

A Centralized Core Banking backbone with connectivity to the MFI branches and branch level systems would form part of the systems level automation. This application would be hosted on shared hardware located at a centralised location. The data would have logical separation to prevent unauthorised use of data by any other individual/ entity. Since both the software and the hardware will be shared, the cost of the system per user will drop significantly. This high quality shared technology platform can be used by MFIs as well as by Cooperative Banks and Regional Rural Banks and could solve multiples problems that the financial institutions working for the sub-rime sector face.

Wipro,⁵⁷ Infosys,⁵⁸ I-Flex,⁵⁹ 3iInfotech⁶⁰ and others are in the process of developing such a platform at an estimated fixed cost of USD 23 million. Apart from initiating the project, an effort is underway to raise sufficient funding for the project, with a view to largely subsidize the cost of accessing the technology platform. While several sources would be needed to completely fund this, a contribution to such a platform could go a long way in helping the IT platform achieve financial closure. In addition, field automation can be achieved through provision of multi application smart cards; this could potentially be the same cards as discussed above, to the customers and access through handheld devices at the agent level/ POS devices at various other locations.

⁵⁷www.wipro.com

⁵⁸www.infosys.com

⁵⁹www.iflex.com

⁶⁰www.3i-infotech.com

9.3 Annexure 3

Warehousing in India and Future Pointers⁶¹

1. Current status

In the initial period, the approach of the Indian Government towards the warehousing sector in India was to provide the capacity required for buffer stock and operational stock of food grains to maintain the public distribution system and general warehousing. The approach was to provide scientific storage capacity and reduce dependence on the capacity under cover and plinth. Due to this reason and on account of the large investments needed in building of cold storages, the sector was dominated by the Central government and the State Government. The participation of the private sector was a miniscule percentage of the entire warehousing capacity of the country.

According to the latest FCI estimate Punjab has the highest storage capacity followed by Andhra Pradesh, Uttar Pradesh and Haryana, while Sikkim and the other NE states have the least storage capacity. The major player FCI has 24.33 million tonnes (owned & hired) of storage capacity in over 1451 godowns all over India.

There are three agencies in the public sector which are engaged in building large scale storage/warehousing capacity namely, Food Corporation of India (FCI), Central Warehousing Corporation (CWC) and 17 State Warehousing Corporations (SWCs). While the capacity available with FCI is used mainly for storage of foodgrains that with CWC and SWCs is used for storage of foodgrains as also certain other items. The position of storage/warehousing capacity available with the FCI/CWC/SWCs is given in the table below:

⁶¹Note by Praveen PA, NCMSL

	In Million Tonnes		
Storage Capacity	COVERED	CAP	TOTAL
Owned	12.82	2.21	15.03
Hired			
Central/State Agencies	0.73		0.73
Cwc/Swc	8.32		8.32
Others	1.8	1.36	3.16
Total	23.67	3.57	27.24
Storage Capacity Utilisation	COVERED		CAP
Range	35-68%		18-55%
At The End of The Year	50%		18%
(Source: FCI Annual Report; 2003-04)			

Significant unutilized capacity is mainly due to the increased off-take notably for export purpose.

With a view to encourage widespread distribution of the warehousing infrastructure across public and private sectors, the Central Government encouraged the construction/renovation of rural warehouses through a Capital Investment Subsidy Scheme, the Grameen Bhandaran Yojana in 2001-2002 which was administered by National Bank for Agricultural and Rural Development (NABARD). During the Tenth Five Year plan (2002-2007) the FCI and CWC propose to construct an additional storage capacity of 4.55 lakh MT and 9.37 lakh MT respectively.

2. Regulatory structure

The warehouses in India of the Central Warehousing Corporation (CWC) and State Warehousing Corporation (SWCs) are currently regulated under the Warehousing Corporations Act, 1962 and the respective State warehouse laws. As per the current laws, the warehouse receipts are not negotiable, but only transferable unless the transferability is restricted by warehouseman. However there are no prescribed standards for service quality, no uniform practice for quality verification and no accreditation body in warehousing sector. Due to this reason, the warehouses, except the government warehousing, are not relied upon by the banking sector for extending warehouse receipt finance.

3. Requirements for strengthening the warehousing sector

Some Pointers

- Action plan & implementation of Negotiable Warehouse Receipt System is in progress which would have credibility with both the trading community as well as the banking system
- To augment the limited infrastructure and resources available with the Save Grain Campaign and in order to cover larger number of farmers/villages, active collaboration and support both in terms of money and in kind was ensured from the State Governments, NGOs. Gram Panchayats, Corporate Houses like SAIL, TATA Steel, Joint Plant Committee (JPC) under the Ministry of Steel etc.
- At present, Indian Grain Storage Management and Research Institutes (IGMRI) situated at Hapur (UP) and its field stations at Ludhiana (Punjab), Hyderabad (AP), and Jorhat (Assam) are carrying out research and training activities in the field of post harvest grain management. These institutions are organizing various types of training programmes on all aspects of post harvest technology of foodgrains for the benefit of different stakeholders in the warehousing industry. The technology developed by these Institutes is transferred to the farming community by Save Grain Campaign and disseminated among farmers/farm women and also to the corporate level officers for adoption/introduction in scientific storage of foodgrain.
- In order to make available efficient human resource in this field the premier management institutes are running cold chain and warehouse management courses and imparting training to the existing manpower.
- Private sector is also constructing storage facilities but due to its capital intensive nature and gestation period they are still at a small scale. But with cheap credit, and other favourable environmental conditions more and more participation is expected. The enlarging commodity market is playing a strong stimulant in this way. It is estimated that about 20 million tonnes storage capacity is immediately required to fill up the vacant space (Agarwal, N.L). Uneven and inequitable distribution of storage facilities between States also need to be corrected soon.
- According to an estimate mere prevention of storage losses alone could feed 75

crores of people for a period of 11 months and 2 days. Existing storage capacity could only accommodate 31 percent of the total agricultural produce and barely 10 percent of the total fruits and vegetables (Puttamadiah, C).

- Doorstep storage facilities are required in the production-shed areas and also in the North Eastern states.

Keeping in view the requirements and future needs to encourage the confidence of the lenders in the credibility of the warehousing sector, the following steps should be undertaken:

- Technical standards should be established to encourage confidence in the warehousing infrastructure.
- The financial position of the warehousing company should satisfy certain minimum criteria to create stability of the warehouses.
- Managerial competence and good governance for credibility
- Technology usage for web connectivity, networking, electronic commodity balances and trading and for ensuring connectivity with other logistics players, lenders etc
- Stable and reliable power source
- Low cost and accessible grading and assaying facilities for ensuring that the goods accepted in the warehouses adhere to some minimum and objective criteria with respect to quality parameters.

9.4 Annexure 4

Alternatives to Minimum Support Price through Exchange mechanism⁶²

Minimum Support Price Mechanism

The MSP programme of the government is analogous to an “option” where the farmer has the right but not the obligation to sell the goods to the government at the MSP. At the time of harvest, the farmer can see the market price and then decide whether he can sell to the government (FCI) or not.

Alternative Possibilities through Commodity Exchanges like NCDEX

The MSP programme of the government is analogous to an “option” where the farmer has the right but not the obligation to sell the goods to the government at the MSP. At the time of harvest, the farmer can see the market price and then decide whether he wants to sell to the government (FCI) or not.

Within the realm of options, which are currently not permitted by the regulatory system, the commodity exchanges can provide a substitute for the same. Let us assume that the exchanges like NCDEX have a widespread warehousing reach so that all farmers have access to these exchanges. Alternatively all FCI warehouses become collection centres of the commodity exchange. Let us look at the various modalities.

The first issue is of course the one of quality. Farmers today do not pay attention to quality as they are assured of a good price by the government. Once they can trade on exchanges, then they can actually migrate to better quality of the crop, which can fetch a higher price. By growing this superior variety, they can then get into options trading and pay only an option premium. This premium can be paid by the FCI/government, which can eschew the cost of handling this entire set of food grains and still be better off as the subsidy element is reduced.

The second issue is where the FCI acts as an aggregator for the farmers and sells directly on the exchange for a better price and either does this gratis or charges a fee for the farmer where the farmer is willing to bear this cost because the price realized is higher than the MSP. In this case, the FCI warehouses would need to serve as the NCDEX warehouses and follow the same delivery processes as are prevalent on the exchange.

The third scenario is where the FCI decides to stop the open-ended procurement system where currently it is perforce compelled to pick up all the grains that are offered. Under the proposed dispensation, FCI will procure only that much as is required for PDS

⁶²Note from Madan Sabnavis, NCDEX (March 2006)

and food security (buffer stock). Subsequently all grains brought will be routed onto the exchange in the form of options. FCI will pay the premium and farmers can get a better deal. If the prices fall, then of course the FCI will take on the grains at the MSP.

In the last scenario, agencies like NCMSL can play a major role. Today a number of states are left out of the procurement process. NCMSL has procured rice for FCI this year in Orissa and MP. NCMSL can now be an aggregator and can get into options on the exchange directly and have FCI write these options and hence pay the premium. This way the operations of food procurement can be enlarged.

These are the various alternatives where commodity exchanges can fill in for the FCI.

9.5 Annexure 5

Weather Stations Infrastructure for Index based insurance⁶³

Weather insurance and need for accurate information

The Indian farmer is more affected by weather than his counterparts in many parts of the world. In the last couple of decades, crop insurance has started assuming significant importance in the rural economy. While crop success or failure depends upon many factors, weather is predominant among them. Insurance companies are now looking at weather insurance itself as a product, which is directly relatable, measurable and appeals to the insurer, insured and the lender as a product the market is ready for.

However, weather insurance products can be structured only around reliable and verifiable data and the implementation is also dependent on availability of properly handled data sourced from tamper proof weather stations. Since the weather data decides the quantum of claim, if any, payable under the weather insurance, the accuracy of the data and secured environment under which the data is reported is very critical for its success.

Shortcomings of IMD data

Till recently, all weather insurance contracts were written using IMD (Indian Meteorological Department) data, which has district level points of collection of weather data. However, it suffers from the following shortcomings:

1. Data recorded is not reported on time in many instances, which would result in delayed settlement of claims.
2. It has been noticed that there are huge gaps in reporting daily rainfall data even for major stations located at District Headquarters.
3. Weather stations are mostly located only at the District Headquarters and this data point is considered as the referral point for the whole district
4. Weather stations mostly are of vintage technology and do not have the capability to record and store data to ensure continuity of data.

Solution

Regular and timely weather data collection by expanding and strengthening network of weather stations to meet the requirements of not only weather insurance but also to

⁶³Internal note by Neha Agarwal, ICICI Lombard

provide real time data to the government and agriculture departments and the farming community.

By installing modern weather stations, data on various weather parameters can be collected e.g. Rainfall, Sunshine, Air temperature (Maximum and Minimum), Air pressure, Wind Speed, Wind Direction and Relative Humidity. ICICI Lombard is taking help of NCMSL in helping install such weather stations across the country. The current instrument that NCMSL uses for installation is 'Davis Instruments Cabled Vantage Pro2' which costs approximately Rs 1.25 - Rs 1.5 lakhs. NCMSL in turn charges Rs 4,800 per month from ICICI Lombard towards supply of weather data.

Till now NCMSL has already installed 88 weather stations in 10 states across the country where Indian Meteorological Department's stations are either not present or are not functional. Besides for weather insurance, data from these stations are also being used for various modeling purposes.

High accuracy weather data find use in various industries. To further the benefits of these weather stations, it is important that Government supports such service providers and come forward to intensify the existing network of stations so that many more numbers of players can access the data at lower costs.

9.6 Annexure 6

ICICI Bank pilot program for extending finance to organization supplying low cost drinking water facilities in rural areas

Introduction

More than 1.00 billion people lack access to safe drinking water. Impure drinking water causes about 400 deaths per hour of children (below age 5), and hurts economic development. Water security has major implications for economic growth and public health. Together with transportation and electricity, it constitutes one of the three weakest components of Indian infrastructure. Studies show that investment in water purification and sanitation can reduce water-borne diseases by up to 75%, many countries simply cannot spare the resources required to build capital-intensive, centralized water treatment facilities and distribution networks for their peri-urban and rural areas. India too is grappling with water related problems, which are more acute in rural areas where people rely on open wells, rivers, or lakes for their water supply. Studies have demonstrated the strong inter-linkages between health and water. Access to clean water can do away/ mitigate several water borne diseases and consequently decrease spend on health expenses.

Pilot by ICICI Bank

Routine use of bottled water, or fuel to boil drinking water, is unaffordable for the rural people. A robust effective and affordable technology, implemented in a financially viable model is needed for the rural poor. In its quest for developing commercially viable rural infrastructure models, ICICI Bank intends to support organizations providing low cost drinking water facilities to the rural poor. A few organizations like Naandi, Water Health International, and Water Aid are involved in providing water and sanitation facilities to the rural poor approached ICICI Bank in developing a commercially viable model of supplying drinking water to the rural poor.

Water Health International (WHI) has developed an innovative low cost water purification system that kills disease-causing microorganisms using ultraviolet light. It draws from the village water resources and its success derives from being community managed, which ensures equitable and efficient distribution of water at a very nominal price. Community water system developed by WHI can provide a village of up to 3000 people 10 liters of safe water per person each day, adding up to an annual water bill of approximately \$2 per individual. The proceeds can cover the purchase of the UV system along with pumps,

tanks, valves, controllers, civil structures, and maintenance. WHI has already done a few pilots of the model across the globe including few in Andhra Pradesh in India. In the absence of any other viable model of drinking water supply in rural areas, ICICI Bank is supporting WHI for undertaking few projects of supplying water to rural communities by levy of water charges. These projects will be of small scale and pilot in nature. Once the pilots are found to be successful, ICICI Bank would roll out similar facilities for other organizations and propagate the model across the country.

About Water Health International's Projects in India

Water Health International is a health-focused developer and manufacturer of innovative water purification and disinfection technology. The company is focused on providing technology and systems to deliver safe drinking water to the poor people who currently lack access to safe drinking water throughout the world.

WHI's novel and award-winning UV-based water purification and disinfection technology platform is modular and can be scaled easily to provide high quality drinking water to a broad range of population groups. The company is currently focused on providing systems to deliver affordable water to urban populations, and rural communities that lack access to municipal water supplies. Water Health's products are currently deployed in many countries around the world, including the United States and the Philippines.

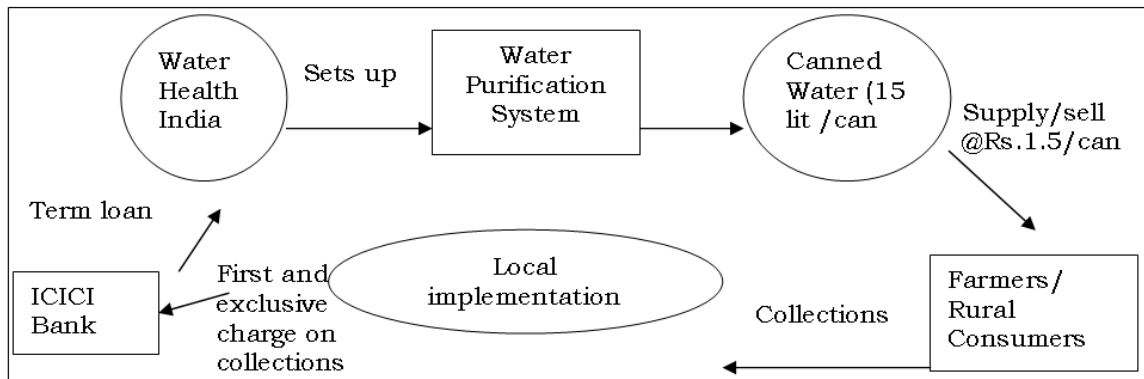
WHI's decentralized systems require low capital expenditures and can be implemented quickly to meet longstanding needs of underserved populations. Water Health is currently working with Reddy's Naandi Foundation to install the company's community water systems in rural areas of India's State of Andhra Pradesh. While WHI is involved in building the systems and training community members to manage the daily operations and maintenance; Naandi is mobilizing community interest in the program with education programs focused on safe water handling, sanitation, and hygiene to help communities fully realize the benefits of safe drinking water. WHI has formed a new company Water Health India that is solely dedicated to putting up community base water purification systems in different parts of the country.

Operational Structure

Water Health India will set up water purification facilities in different villages (basically the process will involve purification of water from available sources such as those from the local pond, lake. The capital cost of setting up purification facilities (one project) is estimated to be in the range of Rs. 2.0-2.3 million. The proposed funding will be limited

to Rs.1.5 million per project while the balance will be contributed by Water Health India.

Purified water shall be sold to the rural consumers in 15 litres can (capable of meeting a household daily requirement of water). Each can of Rs.15 litre will be priced at Rs. 1.50. Selling and collections will be done through a local agency, which shall be identified project wise, by Water Health India. The repayment of the loan will be through the project wise collections.



9.7 Annexure 7

Other Experiments in Water Markets

Tradable Water Rights and Resource Allocation - Chile's Experience

Chile has also been a pioneer in ushering tradable water rights. The concept of tradable water rights was introduced in Chile in 1981. Under the system, while existing users of waters were awarded property rights free of charge, the new property rights were sold through auction. The property rights covered under Chile's civil code can be freely traded in open market and have legal value. The property rights having economic value can also be offered as loan collateral. The introduction of tradability of property rights has resulted in realignment of the consumption and use pattern of water. This has prompted farmers to adopt efficient irrigation systems such that their water consumption is reduced and the rights of the saved water can be sold to the city at higher prices. This has resulted in multiple benefits such as efficient utilization of water, ecological gains from reduction in salinity due to excessive use of water. The tradable water rights has also resulted in better water management by the water utilities.

Enabling Water Users Associations - China and US

In Hunan China, has legalized Water User Associations so that they can buy water and contract for construction of infrastructure. Enabled by a water law, the states in China have introduced water extraction permit system; developed sanctions against water use violations at the local level and instituted procedures for mediating water disputes. The law makes it possible to establish measurable water rights that would facilitate allocation of water between sectors through buying and selling.

In US, WUAs have the power to deny water deliveries and voting rights and can eventually take over land ownership from farmers who do not pay the water fee. Districts transferred to water users generally operate according to transfer agreements with the USBR. These generally obligate districts to conduct O&M at certain standards, build a capital reserve fund, make construction repayments, have technical and financial audits (done with USBR), have election observers, and comply with other government regulations.

Flexible System of Payment - South Africa

Prior to 2001 in Cato Crest, Durban, South Africa a system of 'ground tanks' enabled the volume of water delivered to each household to be controlled by the local private

entrepreneur. This was coupled with a flexible system of prepayment for water supplied; up-front payment could be made in full or in instalments. The system was self-regulating in terms of payment because people were required to pay in advance for the month, in order to receive an agreed volume of water. They knew what they were getting and could budget the cash flow accordingly. In Dolphin coast, a new tariff structure was introduced for the PPP; this created a tiered system of service levels and tariffs, which includes a 'lifeline' tariff of 10 kiloliters for low-income households.

Water Communities by Sewa in Gujarat

In addition to regular savings efforts promoted by SEWA, water user committees in about 25 villages in rural Gujarat have started separate Village Water Funds to be used for operations and maintenance expenses. Individuals contribute up to Rs 5 per month to the Water Fund. The sum collected in these Funds amounts to well over Rs 1,00,000 in some villages.

Condominium Approach in Suez

Suez has utilized the "condominium approach" for some projects in order to reduce the cost of access to service. Under this approach, households in a neighbourhood organize and agree to work together, providing their labour for excavation and filling work, as well as maintenance of the system once it is complete. To keep costs down, "condominium" systems use smaller pipe diameters, and pipes are buried in shallow trenches run through household lots or under sidewalks. The cost of condominium water connections has been shown to be less than 1/3 compared to conventional costs.

Indonesian Experience for Funding Maintenance of Irrigation Projects

A typical problem that has been plaguing almost all the developing nations is creation of public assets, which after a point of time deteriorate due to lack of operations and maintenance leading to colossal wastage of public funds spent on the assets. One of the novel ways to address this problem is by adopting the Indonesian approach for maintenance of irrigation projects. In collaboration with the World Bank and the Government of the Netherlands, the Government of Indonesia (GOI) has instituted a irrigation improvement fund (KIIF). The fund is set up at district level using district and/or provincial funds and also loan funds/ grant funds for start up. The funds are allotted among irrigation systems to federated Water User Associations (WUAs) that submit proposals for undertaking operations and maintenance work. The proposal includes the investment plan by WUAs to undertake maintenance work. An minimum standard of maintenance and

quality provisions are stipulated and projects are allocated to the established WUA on the basis of criterion such as maintenance plan, WUA investment being put up, number of farm families to be benefited. We could also think in terms of adopting similar kind of model for ensuring up gradation and maintenance of our public assets by essentially involving private sector and the stakeholders/ locals.

Pani panchayat Model

Innovations have also been made to maintain equity in the availability of irrigation water, through Pani Panchayat model. Though the term refers to mobilisation of groups of farmers for the formulation and implementation of community irrigation projects, today it largely symbolises equitable distribution of water. The model, from the experiment of lift irrigation scheme in Naigaon in Maharashtra, is based on the fact that water is common - pool resource therefore all the members in the village irrespective of land ownership could gain access to the utilisation of water resource. Each member in the village was allocated water that would be sufficient to irrigate half an acre of area. These water rights were traded among the members for use. This enabled the landless to have equal rights over water and to enable to benefit from the common-pool resource.

9.8 Annexure 8

Some financing models for Rural Infrastructure Projects

Infrastructure Funds

Projects that involve long-lived assets with long payback periods require low-cost, long-term finance. This type of finance is available only to governments and rated corporations. The inability to access low-cost capital holds back investment in much needed infrastructure. An infrastructure development fund could be constituted which could borrow from the government at concessional rates. The fund's role would be to provide a mix of loans and guarantees for loans originated by private lenders to infrastructure development projects. The fund could pool and securitise its loans to redistribute its portfolio and lower its borrowing costs. A fund on similar lines has been created in Australia in form of environment development fund.

Market-based instruments

Market-based instruments (MBIs) are mechanisms for bringing a commercial focus and market-type disciplines to natural resource management. In Australia, MBIs are used in a number of policy settings including: greenhouse gas abatement, fishery management, salinity emissions, water entitlements and biodiversity enhancement. Two types of MBI with potential application to conveyance efficiency are environmental asset mechanisms and competitive tendering (auctions).

Environmental assets

This model involves the government providing a legislative and planning framework for the creation of marketable assets or rights in the environmental outcomes from production or consumption decisions. The Renewable Energy (Electricity) Act (2000) provides for the creation of a market in renewable energy credits (RECs). Under the Act, the production of renewable energy from sources such as wind and wave generation, and landfill gas, 'generates' RECs. RECs can be defined as negotiable instruments for acquitting obligations created in conventional energy production. Electrical energy retailers who operate in the Australian electricity market take on REC obligations when they sell retail electricity. Currently, retailers must offset 1% of their sales by purchasing RECs. This will rise to 5% by 2008. If retailers fail to acquit their REC obligations, they are 'fined' \$40 for every MWh of REC not acquitted. The principal advantage of an environmental asset scheme over traditional approaches is that it provides incentives to seek least-cost

solutions. It achieves this by creating a commercial focus and the market-discipline that comes with holding title to a valuable asset.

Apart from the renewable energy segment in India, environmental asset schemes would also seem to be technically feasible in the context of improving Water Use Efficiency (WUE) in irrigation conveyance systems. For example, government might place a cap on water losses in a defined geographic area such as a catchment. (This could be achieved by changing legislation or perhaps through water management plans and/or conditions on irrigation district water licences.) Each irrigation district in a catchment could be assigned a share of water losses under the cap.

If a district invested in work to reduce losses below the baseline, 'credits' or environmental assets would be created. These could then be sold to other market participants to offset any increase in their water losses, say due to expansion in the area irrigated.

Competitive-tendering (auction) mechanisms

Competitive tendering as a price discovery mechanism can be used to improve the effectiveness of markets. The principal advantage of an auction over traditional methods is the price discovery element. An auction process involves government seeking bids from parties to provide specified services or undertake specified projects. Pre determined base technical and other quality standards are stipulated and bid is awarded on the basis of least cost.

In UK Private rail franchisees rights have been accompanied by the provisions of public grant subsidies with the franchisee being awarded to the company requiring the lowest subsidy. At the same time strict quality and service obligations are put in place such that the infrastructure created is maintained in good working conditions. This has led to efficiencies in offering services to consumers with minimum and fixed drain on public resources.

FLDG based funding

Another strategy for funding of large infrastructure projects could be by use of First Loss Default Guarantee Funds (FLDGs) by the Government.

RIDF fund utilization⁶⁴

A strategic options study could be done in all the states for preparing master plan for rural road network and funds under RIDF could be made available to finance only the identified projects. RIDF could also finance one time cost of such study, which must

⁶⁴"Enhancing Investment Credit in Agriculture", by Rajiv Panthary (March 2005)

be done by experienced private consultants. The study could prioritize creation of such a network on the basis of its desirability, social benefits, economic value etc. Similar approach could be adopted for creation of other facilities such as value addition centers, cool chain facility. This would enable utilization of funds and creation of infrastructure in a systematic manner rather than in an ad hoc manner or under any influence from the vested forces.

Least Subsidy Model

In UK Private rail franchisees rights have been accompanied by the provisions of public grant subsidies with the franchisee being awarded to the company requiring the lowest subsidy. At the same time strict quality and service obligations are put in place such that the infrastructure created is maintained in good working conditions. This has led to efficiencies in offering services to consumers with minimum and fixed drain on public resources. Similar strategy could be adopted to fund infrastructure projects in India with private participation

Bundling of assets and services

Bundling of assets and services is another option, which can attract private participation. This would require giving a catchment area under the control of private sector such that he can draw his revenues from non irrigation activities as well-such as farming, setting up allied activities like processing unit, shops etc in the vicinity. This approach has been used in China and also is being used in the roads sector in India.

Using Bonds for raising Finance

Land Bank in South Africa and BAAC in Thailand are the two examples, which have used the bond route for undertaking infrastructure and term loan projects. Land Bank issues bonds in the national capital market that closely match the terms and maturities of its term loan portfolio. Despite lending exclusively to agriculture and related activities, Land Bank has a sound history as a financial institution. Three factors are responsible for its good rating in the capital market: the bulk of the portfolio is relatively low risk, since it is lent to established medium- and large-scale commercial farmers; most of the portfolio is secured by mortgages on real estate; and government ownership provides an implicit guarantee of solvency in case of major external shocks.

BAAC also refinances a part of its medium- and long-term loan portfolio through bonds. Government ownership has certainly supported BAAC's success in mobilizing commercial funds through deposits and bonds, though the Government has only stepped

in once during the recent financial crisis. However, compared with Land Bank, BAAC finances mainly small- and medium-scale farmers, and its term loan portfolio is secured only through collateral substitutes and mortgages on land titles issued under the agrarian reform, with limited market value. BAAC's success in accessing capital markets is mainly attributable to the following key factors:

- development of a highly efficient lending technology based on joint liability groups, and a gradual diversification of loan products into term loans;
- a quasi-monopolistic position as the formal financier of loans with more suitable conditions, so that farmers wish to maintain creditworthiness with BAAC;
- high standards of staff professionalism and the existence of a 'firewall' that has largely protected the bank's operational autonomy from political interference; and
- national scale, which facilitates pooling of systemic risks.

9.9 Annexure 9

Rural Electrification and Renewables⁶⁵

Rural energisation and electrification has played a major role the development of rural India (in enhancing agricultural productivity and provision of lighting services for rural households). Today the forces of globalization, free trade and instant connectivity provide new opportunities for the people living in rural India. However, to tap these opportunities and harness the potential of our resources (both manpower and natural resources), delivering quality infrastructure services has become essential and energy/ electricity services are amongst the most crucial of these services. However at present with a substantial increase in fossil fuel prices and the power situation in the country not being very encouraging, shortage in the delivery of energy/ electricity services has become critical. Growth in demand for power has outstripped supply with peak demand shortage being 12.2 percent in 2005. Many parts of the country receive electricity for only a few hours a day, the quality of which is poor (backed up by TERI's own experience at the ground level). Today the average annual per capita consumption of electricity is 600 kilowatt-hours (one of the lowest in the world) and in the rural India (which house over 70 percent of the population) uses just 13 percent of the available grid power.

To accelerate development of rural India, bring about greater energy security, inclusion of dispersed and remote communities in rural India as active members of the economy, there is a need for the provision of clean, high quality energy services. To achieve growth in the range of 8% GDP growth, new decentralised mechanisms for the delivery of energy and power services need to be tapped.

Why DDG (Decentralized Distributed Generation)

DDG is not a new concept with DDG projects being actively implemented by industry for quite some time. DDG as a strategic approach which the use of advocates the use of local natural resources for electricity generation. Through DDG growing energy demand can be met through a practical, affordable, safe, and environmentally responsible way. DDG has the advantage of lowering T&D losses as the source of generation is located near the actual point of consumption, delivering reliable and efficient services to customers, reducing environmental pollution (associated with centralized thermal power stations) and decreasing the investment burden. DDG also provides the utilities the advantage of not committing large financial resources. DDG projects can be added incrementally whenever

⁶⁵Note from TERI, New Delhi

and wherever required. At the same time DDG projects are more cost effective to develop (according to S Mushtaq Khan (Frost & Sullivan, India, February, 2006)) investments requirements go down by an estimated 50 percent for DDG projects as compared to similar centralized generation project.

DDG in India

For a large and dispersed rural country like India, decentralized power generation systems, where in electricity is generated at consumer end and there by avoiding transmission and distribution costs, offers a better solution. DDG has the potential to bring about a paradigm shift in the rural economy. The Gokak Committee had gone into details about the concept of decentralized generation to meet the needs of rural masses. The main recommendations of the Committee are as under:-

- The concept of Distributed Generation (D.G.) has been taken as decentralized generation and distribution of power especially in the rural areas. In India, the deregulation of the power sector has not made much headway but the problem of T&D losses, the unreliability of the grid and the problem of remote and inaccessible regions have provoked the debate on the subject.
- The D.G. technologies in India relate to turbines, micro turbines, wind turbines, biomass, and gasification of biomass, solar photovoltaics and hybrid systems. However, most of the decentralized plants are based on wind power, hydel power and biomass and biomass gasification. The technology of solar photo-voltaics is costly and fuel cells are yet to be commercialized.
- In so far as the 18,000 villages in remote and inaccessible areas are concerned, the extension of grid power is not going to be economical. Decentralized plants based on biomass, gasification of biomass, hydel power and solar thermal power and solar photo-voltaic's are the appropriate solution for these areas. A decision with regard to the available options will have to be taken depending on the feature of each site/village.
- To improve the quality of power in villages which are already electrified it is recommended that these villages be encouraged to go ahead with the DDG.
- Though India has made considerable progress in adopting technologies based on renewable sources of energy these are not yet capable of commercial application on

a large scale. However with the price of fossil fuel prices sky rocketing, maturing of RE technologies (enhanced reliability and decreased costs) many such projects are expected to come up in the future.

- DDG provides a very effective tool for meeting rural electrification targets, reducing energy dependence on imported oil and gas and tapping clean energy sources such as wind, solar, bio-fuels, fuel cells, micro-turbines and geothermal power. For example the National Thermal Power Corporation (NTPC) has already started development of decentralized distributed generation (DDG) projects for village electrification near their thermal power stations. In one such example NTPC in association with TERI set up a 10 kWe biomass gasifier system for electrification of Village Jemara, Chattisgarh. This DDG plant provides electricity to 82 households for lighting, provides electricity for street lighting, lighting of the school, Panchayat Ghar and Shops. The management of the DDG project at the village level is with a local cooperative society called “Mahamaya Urja Utpadan Sahkari Samiti Jemara”.

DDG technologies

The RET based power generation capacity in India is an estimated 50,000 MW capacity (200 billion kwh). India has a potential of about 100,000 MW of power generation from renewable energy sources and steps are underway to harness this potential and power generation from renewable sources is also increasing. The medium-term goal is to ensure electrification of 18,000 remote un-electrified villages, and achieve a minimum 10 per cent share, or around 10,000 MW, from renewable power in the overall power generation capacity to be added by 2012.

Over 4,000 MW of renewable power generation capacity has been set up in the country. Wind power generation alone accounts for around 2,000 MW, small hydro projects for another 1,530 MW and 640 MW from biomass resources. More than 10.5 lakh stand-alone PV systems aggregating to about 62 MW have been installed in the country. It is estimated that about Rs 12,000 crore have been invested in the non-conventional energy sector so far. The details of specific areas are given in the table below.

Total installed capacity of power generation from various non-conventional energy sources			
Source/Technologies	Units*	Cumulative Achievements**	India's Position in the World
Power Generation			
Wind Power	MW	1,870	Fifth
Small Hydro Power (up to 25 MW)	MW	1,519.28	Tenth
Biomass-based Power	MW	484	Fourth
Biomass Gasifiers	MW	53.17	First
Solar Photo-voltaics (Grid connected)	MW	2.50	-
Energy from Urban and Industrial Wastes	MWe	25.75	-
Total		3,954.70	-
* MW - MegaWatt ** As per the latest figures available Source: Ministry of Non Conventional Energy Sources, Government of India http://www.mnes.nic.in . Accessed on March 15, 2005			

Power from bagasse

One of India's biggest agriculture industries, sugar cane has the potential of generating 3000 MW's of electricity. Most sugar mills consume about 25% to 35% of their bagasse for internal power generation. The rest 75% can be burnt and the power generated can be sold to the SEB's. However the SEB's initially offered only 0.6 Rs per kWh which was insufficient for covering the capital investment to generate power with the remaining bagasse, However today, eleven state electricity boards in the sugar cane growing regions pay almost 2.25 Rs per Kwh and have entered into a 13 year contract for decentralized power from the sugar mills. The cane industry estimates that burning all of the bagasse in the 460 Indian sugar factories will add 3,000 megawatts of generation, equivalent to adding 5,000 megawatts of new central generation and 5,000 megawatts of new T&D wires. Full recycling of all of the bagasse will produce 5% of Indian power, reducing costs, emissions and greenhouse gases.

Conclusion

DDG can help in meeting dispersed demand efficiently through penetration of safe, proven, and low-cost technologies for local conditions. However, certain steps are still required for the programme to take off. The first is the need of a sustained research and development program which would aim at customizing these technologies based on local requirements and help in bring down their costs. At the same time policies relating to explicit pricing of power from these sites needs to be made clearer and at the same time awareness of the benefits of DDG need to be highlighted. Scaling up still remains a major challenge, the country has not been able to replicate globally successful models.

9.10 Annexure 10

Noida Power Company Ltd's (NPCL) project of reconfiguring its distribution network metering and demand side management - a typical case study⁶⁶

Summary abstract

The Noida Power Company Limited (NPCL) project involved upgradation of the distribution infrastructure, undertraking metering of unmetered consumers and demand side management (DSM) in Greater Noida to achieve significant energy savings and reduction in greenhouse gas (GHG) emissions. ICICI Bank provided financial assistance of Rs 29.0 million to meet a part of the cost of the project of Rs. 58.0 million through USAID's ECO Programme.

Energy audit studies had estimated an energy savings potential on account of losses of Rs 0.6 million KWh per year. Studies also estimated savings in terms of CO2 emissions of 600 tones per year, both of which have been achieved. The project has been successfully completed on 30.09.2004 and the company now proposes to replicate this project to other areas within its jurisdiction, to be financed out internal accruals/ other sources.

Situation prevailing earlier & major issues

NPCL belongs to the R.P.Goenka group and is a power utility. The utility distributes power in Greater Noida in state of Uttar Pradesh near Delhi. Greater Noida is one of the fastest growing industrial areas and therefore has a steady growth in demand for power. The source of revenue for NPCL is from sale of power to industrial, commercial, domestic and agricultural consumers. The company has a long term arrangement to buy power from the Uttarpradesh Power Corporation Limited, whereas the Uttarpradesh Regulatory Commission determines the cost of power. NPCL had been earlier sanctioned a rupee term loan of Rs. 100.0 million by ICICI for its capital expenditure. This loan is being repaid regularly.

Power transmission in India is typically associated with high distribution losses. The distribution losses of NPCL at 8.4% were lower as compared to those of other large power utilities in the country. The utility proposed to further reduce these transmission and distribution losses, stop pilferage and increase the speed of commercialisation of sale of power to all its consumers. The company therefore decided to upgrade its distribution infrastructure, undertake metering of unmetered consumers and demand side management measures to achieve significant energy savings.

⁶⁶Case study on NPCL by Product Technology team of ICICI Bank

Elements of the solution

The solution broadly included three main elements.

1. Reconfiguring the distribution network
2. Metering
3. Implementation of Demand Side Management (DSM)

Reconfiguring the distribution network: NCPL proposed the following to improve the distribution network so as to make load management efficient.

- Revamping of load management (by addition of HT transformers and feeders)
- Optimizing distribution infrastructure (by additional HT transmission lines)
- Replacement of LT transmission by HT transmission
- Reduction of line losses (by replacement of base conductors (LT) by insulated cables)

Metering: The company proposed to introduce metered supply to domestic consumers in rural areas and replace existing meters of high paying industrial and commercial consumers by tamper proof electronic meters. The company followed a two pronged strategy, to replace existing electromechanical type of meters with tamper proof electronic meters for high consuming customers and normal type for others. Also many households were unmetered and were paying a flat tariff. Therefore, the payment was not linked to the consumption. With the metering of these unmetered domestic households it was expected that NPCL would provide a guaranteed supply of uninterrupted quality power so that the benefits were perceived by consumers to opt for metered connections and pay commercial tariff. A total of 2696 meters were proposed to be installed for domestic consumers and an additional 50 meters for the energy efficient pump sets under this module.

Demand Side Management: The utility proposed to replace the entire existing pump sets used by farmers (about 50 nos) at its cost. The conventional pump sets used for agricultural operations of 5 HP rating equivalent to 3.75 KW would be replaced by 3 HP rating (equivalent to 2.25 KW) energy efficient pumps. Thus due to higher pumping capacity (water discharge rate is 19 litres/sec as against 15 litres/sec), the usage would reduce by 22%. The final connection would be through a pole mounted 11 KV/ 415 KV transformer with the transformer rating sufficient to feed only the pump installed. The

usage of energy efficient pumps was supposed to result in energy consumption savings of about 53%. It was estimated that the pumps consuming 8,388 units of power annually would consume 3,948 units after implementation of DSM measures. The residual power would be available to the grid for sale to the new consumers or takes care of the growth in the demand from existing consumers. Therefore the average realization from the use of distribution infrastructure would improve and also increase the asset turnover ratio. Alternatively, the power purchased from UPPCL would reduce to the extent of the savings and consequently reduce the power purchase cost, The company will thereby recover the capital cost incurred for replacing the pumps and at the same time increase revenue. Further, the supply would be metered and the HT supply would be near the pump site. It was expected that with the implementation of all the elements of this demonstration project, the overall reduction of losses (technical and commercial) in the module would be around 0.3% resulting in a saving of about 0.6 million units.

The utility first implemented the aforesaid measures in two modules (Udyog Kendra and Surajpur area spanning almost 50 sq.km.) and then progressively rolled out to the remaining areas based on the experience of this demonstration.

Results achieved

The utility installed 4170-metered domestic connections and 35-metered tube-well connections with energy-efficient pumps. A new 5MVA 33/11 KV substation has been commissioned and 4-nos. of 11KV feeders have been erected for domestic and agricultural consumers. The achieved power savings on account of reductions in technical and commercial losses were 1,728,000 kWh annually as against the estimated figure of 605,766 kWh. Savings in terms of CO₂ emissions were 1700 tones per year as against estimated 600 tones per year (assuming that 1 MW of grid power (thermal power plant) generally generates 7,000 tons of CO₂ in a year and that quantum of savings on account of reduction in distribution losses and using the basis of 1 kg CO₂/kWh for calculating the GHG emissions.) The overall losses of NPCL in FY 05 continue to be 8%, which is the lowest in India. Annual Saving due to assisted project was Rs. 20.2 million.

A brief comparison between the various realized vis-à-vis estimated progress parameters is as under:

Item	Estimated	Actual
No. of meters installed for domestic consumers (No)	2696	4170
No of EE pumpsets	50	35
5MVA 33/11 KV Substation	1	1
11 KV feeders (No)	4	4
11 Kv Lines (ckM)	36	34
LT lines with insulated wires	40	59
Unit consumed annually after implementation of DSM	3948	2763
Annual Saving on account of losses (KWh)	605766	1728000
Annual savings in terms of CO2 emissions (tonnes)	600	1700

Impact

NPCL's project is the first of its kind undertaken by utilities. This industry is characterized by high distribution losses and therefore based on the project's success the replication potential among other distribution companies is fairly high. The project not only promoted energy efficiency by upgrading the distribution infrastructure but also resulted in reduction in GHG emissions and reducing pilferage in addition to undertaking demand side management measures.

The perception of the farmers and residential property owners in rural areas regarding the impact of metering was that they will receive assured uninterrupted supply of power. This resulted in reduction in medical costs, better security, increase in rental incomes, improved lifestyles and an increase in small business opportunities. As a result of this project, farmers have confirmed an increase in rice yields due to the fact that they can now irrigate the crop three times as against once or at the most twice, prior to commissioning of this demonstration project. The awareness levels of the rural folk as regards the importance to conserve energy has gone up due to the work done by NGO's (through street plays etc.) who were hired by the utility. Besides the project has also promoted a cost-effective technology, which improves industry competitiveness.

9.11 Annexure 11

Financing of Rural Roads

Rural Roads Status

About 300,000 Indian habitations have no links to the outside world. Till date, out of 39,623 km of targeted rural roads only 35 per cent i.e. 10,748 km have been built. Rural roads, particularly rural feeder roads are considered basic to the whole process of rural development. Farm-to-market roads promote commercialization of agriculture, raise productive capacity and increase social mobility. For an effective farming system where a farmer can make a round trip to a market center, agriculture extension services, farm production and proper credit investment, feeder roads are crucial.

To date out of 39,623 km of targeted rural roads only 35 per cent i.e. 10748 km have been built. More than 0.2 million villages are unconnected and out of the 67 million habitations 40 percent have no link to the outside world. GoI is committed to providing accessibility to the remaining 40 percent of villages. The commitment, if fully realized, would involve upgrading/construction of about 1,100,000 km of rural roads at a cost of about Rs 1,100.00 billion. The current estimated value of the existing rural road network, based on the value of construction work, is about Rs 2,400.00 billion. The maintenance of the existing rural road network requires about Rs 50.00 billion per annum, out of which only 20-30 percent is available.

It is estimated by an independent study⁶⁷ that for every Rs 1.0 million invested in rural roads, 165 people would be lifted out of poverty. Many villages still rely on earth tracks that are unsuitable for motorized traffic due to poor riding quality, and which become practically impassable during the rainy season because of missing bridges and culverts. Much of the network is under-developed, of low standard and poor quality, structurally weak, poorly maintained, and extremely deteriorated. The lack of roads means that an estimated 20-30 percent of the agricultural, horticultural and forest produce gets wasted because of inability to transport the produce to marketing and processing centers. Financing rural roads through Diesel cess has been one of the good initiatives however is constrained by the pace of availability of funds for accelerated development

⁶⁷Kumar, Ashok, Zhi Liu, Piers Vickers (2002)

Possible approaches in funding and Rural Roads Construction

Using Mandi Cess:

Madhya Pradesh (MP) has made significant strides in the roads development under the PMGSY scheme. In addition to its share of PMGSY, which hovers around 9 percent of total PMGSY fund, MP is leveraging its mandi cess receivables from the State Mandi Board for borrowing from the banks and using the money raised for accelerated rural roads development. The state government has started levying a 1 per cent extra cess on food grains and other agricultural products traded in mandis of which 0.85 per cent is being spent on roads. In this manner, the MP Government has been able to generate Rs.1.00 billion additional funds every year. This additional source of revenue is being leveraged to borrow funds from banks for undertaking high cost projects and undertake road development in a systematic and planned fashion rather than in an ad-hoc manner. The MP example has proved that how simple innovations can effect big changes and can be easily replaced in the other states. Similarly leveraging on the mandi cess receivables could be employed as a strategy for construction of rural roads and also for modernization and up gradation of state mandis.⁶⁸ An effort in this direction has also been done by Punjab through Punjab Rural Development Board. Similarly Uttar Pradesh has established a road fund by diversion of the marginal revenue increase from rise in sales tax on transport fuels. Funds are applied to the entire state network, including maintenance of rural roads. Warana dairy is another organisation that volunteered to build rural roads along the milk route taking funding assistance form Government of Indian under road development scheme.

Bundling of assets and services

The challenge in most of these projects with large positive externalities is that it is difficult to find a way to get an entrepreneur to promote and a bank to fund the project unless a way is found to identify revenue generating components and designing comfort levels and risk mitigation strategies for facilitating Bank finance. A parallel could be drawn from the Bangalore-Mysore highway project wherein the private project promoter in addition to construction of road network was given the rights to develop real estate component in the real vicinity. This created incentive for the promoter to commit its funds to the project and also secure funding from banks on the basis of increase

⁶⁸Since the rural roads are most likely to benefit agriculture in the first instance and perhaps lead to increase in the amount of cess that mandis receive this may also be viewed as a long-term investment by the Mandi in its own interest.

in the market value of area because of construction of road. Similar models could be attempted in rural domain. In fact one such idea of constructing rural roads is being contemplated by an MFI Vivekananda Sewa Mandir Sishu Udyan (VSSU), based in 24 South Parganas, West Bengal. The village road with an estimated cost of Rs.7.5 million would be built through a special Infrastructure Special Purpose Vehicle formed which could involve multiple partners like VSSU, land owners around the road who will gain from the price rise. The model on similar lines with Bangalore-Mysore highway project intends to develop commercial properties in the vicinity of road and also charge for access to the road, which would be connecting village to the market. Such innovations especially in the rural context can go a long way in bridging the urban rural divide and enhance the economic status of rural population.

Community Participation in Rural Roads

In many countries, the costs of local access roads are shared between government and benefiting local communities. For instance private road cooperatives manage about 70 percent of the road network in Sweden, with subsidies ranging from 40 to 80 percent from government. In China, the model is such that government provides material, equipment, and technical assistance, while local communities provide voluntary labour for road construction. In Finland, 78 percent of the road network is privately owned and managed through road cooperatives, which receive funding support from central government, municipalities, and cooperative members. In Lesotho, government provides limited financial assistance and training in labour-based work methods to villagers who wish to construct rural roads and paths on a voluntary basis. In India, in Uttaranchal State and parts of Punjab, paths, tracks, and footbridges are being constructed on a cost-sharing basis with local communities located in remote and inaccessible areas (under the Integrated Watershed Management Project). These pilots must be scaled up such that there is increased stakeholders participation in construction of rural infrastructure.

Prioritization of roads construction

The funds for rural roads construction from the government funds have basically been driven by political considerations rather than any socio-economic criterion leading to uneconomic utilization of funds and unbalanced growth. A strategic options study could be done in all the states for preparing master plan for rural road network. The master plan must identify priority projects in each state/district and funds under Rural Infrastructure Development Fund of NABARD could be made available to finance only

the identified projects. The study could prioritize creation of such a network on the basis of desirability, social benefits, economic value etc. This would ensure planned and economic flow of funds rather than projects driven by vested interests.

9.12 Annexure 12

Agricultural Extension Services

There are some basic issues in agricultural extension:

1. It is very manpower intensive. For effective national coverage one will need approximately 100,000 people to be employed.
2. Farmers are already reasonably well informed and do not require guidance unlike what is generally believed. They require input for specific pest problems, soil deficiency solutions or if there is a change proposed in cropping pattern.
3. Today each state has an elaborate agricultural extension network which has fallen into various stages of disuse. There is also substantial physical infrastructure on the ground which is well spread out. Also all Agricultural Universities have an extension wing.
4. All agricultural input companies run a parallel extension network. Their focus is on their own products but also serve as advisors on cropping needs. As estimated 50,000 people would already be involved in this.
5. For extension services to be effective they need to be very location specific, factoring not only climatic and soil conditions but also farmer practices.
6. For all commercial crops there are consultants who offer advisory services at a price to farmers, for example in crops such as grapes, apples, tea, pomegranate, and tomatoes. These consultancy services are provided by a variety of trained individuals.

Given this reality, any routine approaches to this service may not serve a purpose and potentially completely different approaches may need to be developed.

- One approach would involve the identification of new initiatives and focus crops. For example use of drip irrigation in cotton in Rajasthan or switch to citrus fruits in Punjab or growing of medicinal plants in MP or increasing tomato yield in Karnataka from 10Ts/acre to 30 Ts/ acre through deep ploughing, etc. There are a number of such possibilities which could cover the entire country with the possible exceptions of the wheat and rice belts of North India and rice growing areas of coastal Andhra Pradesh.

- Setting up of technology demonstration farms at suitable locations using state-of-the-art techniques the world has to offer is another approach. Farmers, in order to be convinced would need a demonstration of its operational and commercial viability. Bring farmers and show them how it works. This can make a substantial difference.
- In terms of public extension infrastructure, mandis should be interlinked for dissemination of prices and market information and KVKs should be modified to better cater to needs of the rural poor by installation of modern Information and Communication Technology (ICT)⁶⁹ facilities and instilling the personnel with an attitude to serve more effectively.
- Public Private Partnership (PPP) in agriculture extension⁷⁰ could be utilised to derive better results. In an example of PPP in extension, The government extension officials including scientists from Punjab Agriculture University (PAU) have undertaken joint extension activities with Pepsi officials to promote introduction and commercialization of the new tomato varieties in the state. This strategy was found to be complementary with the public agency offering its network and reach and the private agency offering its technology edge for the betterment of the farmers.
- Commodity based group approaches in extension have been found to be effective in quite a number of cases. For instance, Kerala initiated the group approach to extension in rice farming in 1989, which was subsequently extended to other crops. This approach involved formation of commodity groups to improve productivity and reduce cost of cultivation through collective purchase of inputs and services. Extension efforts and delivery of subsidised inputs were routed through these farmers groups. Similarly, in Andhra Pradesh, farmer clubs have been formed at each village primarily to facilitate group extension. These clubs are involved in propagating developmental schemes and facilitating transfer of agricultural technology among farmers in the village.

⁶⁹The widespread availability and convergence of information and communication technologies (ICTs) - computers, digital networks, telecommunication, television etc in India in recent years have led to unprecedented capacity for dissemination of knowledge and information to the rural population. The village knowledge centres initiated by the MS Swaminathan Research Foundation (MSSRF) in Pondicherry aims at building a model for the use of ICTs in meeting the knowledge and information requirement of rural families. Value addition to the raw information, use of local language (Tamil) and multi-media (to facilitate illiterate user participation) and participation of local people from the beginning are the noteworthy features of the project.

⁷⁰Punjab Agro-Foodgrains Corporation (PAFC), a wholly owned subsidiary of the Punjab Agro Industries Corporation, has entered into agreement with private extension services providers such as Rallis and Mahindra Shubh Labh Services for contract farming in Punjab. These companies provide professional extension services to farmers, charging a nominal fee from farmers as well as PAFC.

Given the increasing importance of horticulture in the agricultural GDP and vast possibilities of value addition in horticulture, we feel that horticulture, would require special focus including a few of the suggested interventions below:

- Setting up of institutions to carry out ongoing Educational and Training programs on EurepGap/CODEX ALIMENTARIUS, HACCP and other certification processes. These are increasingly being demanded by all importers worldwide and compliance will ensure access to the most developed markets, with consequent better price realisations and may also help us beat competition from some African / Caribbean/ Latin American countries. Market discussions have revealed that while discipline is a prerequisite, compliance is not difficult and with some sustained encouragement can become widespread.
- Setting up of multiple testing and certification agencies who can carry out this certification on an on-going basis. These need to be geographically dispersed and available locally to farmers to ensure widespread utilization of their services. They also need to be recognised by, and accredited to international bodies.
- Systematic and sustained brand promotion activities for promoting Indian Agricultural produce like mangoes, grapes and bananas as successfully done by New Zealand for KIWI Fruit and as also being undertaken by South Africa.
- Strong encouragement to Organic cultivation and certification of produce. In India we are at an advantage since many areas have always used only organic cultivation methodologies and this gives us an edge over even domestic EU production, since they have integrated schemes for export promotion activities related to agricultural produce, instead of the current multiplicity through APEDA, NHB/ NHM, Ministry of Agriculture, Ministry of Food Processing, Tea Board, Coffee Board, etc. as is the case in India.

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