



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



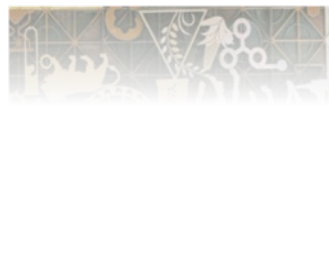
zef
Center for
Development Research
University of Bonn



Working Paper 184

ASHOK GULATI AND RITIKA JUNEJA

Agricultural Credit System in India: Evolution, Effectiveness and Innovations



ZEF Working Paper Series, ISSN 1864-6638
Center for Development Research, University of Bonn
Editors: Christian Borgemeister, Joachim von Braun, Manfred Denich, Till Stellmacher
and Eva Youkhana

Authors' addresses

Prof. Ashok Gulati
Infosys Chair Professor at ICRIER and Senior Fellow at ZEF
Indian Council for Research on International Economic Relations (ICRIER)
Core 6-A, 4th Floor, India Habitat Centre, Lodhi Road
New Delhi-110003, INDIA
Tel. +91-11 43112400
E-mail: agulati115@gmail.com; agulati@icrier.res.in
www.icrier.org

Ritika Juneja
Indian Council for Research on International Economic Relations (ICRIER)
Core 6-A, 4th Floor, India Habitat Centre, Lodhi Road
New Delhi-110003, INDIA
Tel. +91-11 43112400
E-mail: rjuneja@icrier.res.in; ritikajuneja93@gmail.com
www.icrier.org

Agricultural Credit System in India

Evolution, Effectiveness and Innovations

Ashok Gulati and Ritika Juneja

Abstract

Indian agriculture is dominated by smallholders. With an average holding size of just 1.08 ha (in 2015-16), and 86 percent of holdings being of less than 2 ha size, Indian agriculture produces sufficient food, feed, and fiber for India's large population of 1.35 billion, and in addition generates some net export surplus. This would not have been possible without the infusion of massive credit to farmers to buy modern inputs ranging from seeds, fertilizers, pesticides, farm machinery, etc. But how has this system of agri-credit evolved in India over time? What is its organizational structure, and how effective is it in terms of its reach, especially to smallholders? How efficiently can it deliver credit and what sorts of innovations are unfolding in this sector to make it more efficient, inclusive and sustainable? These are some of the key questions that are addressed in this paper.

Our analysis in this paper shows that the Indian agri-credit system has made commendable progress, with major policy changes, especially in 1969. The share of institutional credit to farming households in overall credit increased from about 10 percent in 1951 to 63 percent in 1981. But since then it has hovered around that level until 2013, the latest year for which this information is available from All India Debt and Investment Survey (AIDIS). However, total direct agri-credit (loans outstanding) from formal institutional sources as a percentage of AgGDP increased from about 16 percent in FY1982 to about 42 percent in FY2017; and direct short term institutional credit (loans outstanding) as a percentage of input requirements in agriculture increased from 22 percent in 1990-91 to 123 percent in 2015-16. This indicates that formal credit has been meeting all the requirements of inputs needed for modern agriculture. Also, in terms of inclusiveness, agri-credit institutions have played a major role. Small and marginal farmers, who operate on 47 percent of the operated area and account for 86 percent of the total operational holdings (number), get about 60 percent of institutional loans for agricultural purposes. This is a commendable achievement, although further improvements are always possible. Despite the mushrooming of several microfinance institutions and various innovations in banking, commercial banks remain the main source of formal finance to farmers, accounting for 75 percent of loans outstanding to farmers in 2017, followed by cooperatives at 13 percent and RRBs at 12 percent. Innovations in agri-credit policies (PSL/PSLC), credit instruments (KCC), organizations (MF institutions), business correspondents and micro-ATMs, are all helping to improve farmers' access to institutional finance. However, most of them focus on productive activities, which presumably push consumption credit to informal sources. The fact that the share of institutional credit in overall credit to agriculture has remained within a narrow range of around 60-65 percent for decades raises concerns as to whether the remaining part of agri-credit is for consumption purposes or whether it is being taken by tenants who find it difficult to borrow from institutional sources due to a lack of land titles as collaterals, or whether the banks do not find that segment of farmers 'bankable' due to low credit rating in the face of rising non-performing assets (NPAs) in agriculture. Whatever may be the reasons for this outcome, the study of Indian agri-credit still offers some important lessons for smallholder developing economies such as those in Sub-Saharan Africa, and South and Southeast Asia.

Keywords: Agricultural Credit Institutions, Efficiency, Inclusiveness, Sustainability

JEL classification: E58 I38 Q14 Q18

Contents

LIST OF FIGURES AND TABLES	V
LIST OF ABBREVIATIONS	VI
EXECUTIVE SUMMARY	VII
1 INTRODUCTION	1
2 LAY OF THE LAND: EVOLUTION OF AGRI-CREDIT POLICIES IN INDIA	3
3 ORGANIZATIONAL STRUCTURE OF THE AGRICULTURAL CREDIT INSTITUTION	7
3.1 Trends in Direct Agricultural Credit (1981 to 2017)	8
3.2 Performance of Institutions in Direct Agricultural Credit	10
4 AGRICULTURAL CREDIT POLICIES AND INSTITUTIONS: ASSESSING IMPACT	13
4.1 Assessing on the Efficiency Front	13
4.2 Assessing on the Inclusiveness Front	16
4.3 Assessing on the Sustainability Front	19
5 INNOVATIONS IN AGRI-CREDIT INSTITUTIONS	21
5.1 Priority Sector Lending, 1969	21
5.2 Self-Help Group Bank Linkage Programme, 1992	22
5.3 Kisan Credit Card, 1998	23
5.4 Business Correspondent/Facilitators Model, 2006	24
6 CONCLUDING REMARKS AND WAY FORWARD	27
7 REFERENCES	29

List of Figures and Tables

Figure 1: Key policy milestones in the institutional credit system.....	5
Figure 2: Institutional structure for agriculture credit in India	8
Figure 3: Direct outstanding institutional credit to agriculture and allied activities (short-term and long-term) as a proportion of AgGDP.....	9
Figure 4: Share of outstanding debt of agri-household from institutional and non-institutional sources (%)	10
Figure 5: Share of SCBs, cooperatives and RRBs in total direct credit (loans outstanding) to agriculture & allied activities (short-term and long-term)	11
Figure 6: Short-term direct credit (loans outstanding) to agriculture and allied sectors as share of input requirements	14
Figure 7: State-wise share of total short-term credit (loans outstanding) to agriculture and allied sectors as a proportion of input requirement	14
Figure 8: Share of short-term and long-term direct credit (outstanding) to agriculture and allied activities	15
Figure 9: Share of Public and Private Capital Formation in Total Capital Formation and Ratio of Gross Capital Formation in Agriculture to Agricultural GDP (at current prices)	16
Figure 10: Distribution of agricultural households (those who take any loan) by source of loan (%)	17
Figure 11: Distribution of loans according to sources for households that took a loan between July 2015 and June 2016	17
Figure 12: Total institutional credit taken for agricultural purposes by different size-groups, share of operated area and share of number of holdings	18
Figure 13: Share of outstanding loans for different size classes of land possessed (2012-13) and operational holding (2015-16)	19
Figure 14: Agriculture loans outstanding and NPAs in agriculture from SCBs (as on 31st March) .	20
Figure 15: No. of SHGs credit-linked with banks (during the year) and amount of loans disbursed	23
Figure 16: Micro-ATM	26
Table 1: Amount of loan waiver announced and allocated by various states in their budget since 2017-18	20

List of Abbreviations

AIDIS	All India Debt and Investment Survey
ADWDR	Agricultural Debt Waiver and Debt Relief
AgGDP	Agriculture Gross Domestic Product
ARC	Agricultural Refinance Corporation
AIRCS	All India Rural Credit Survey
BCs	Business Correspondents
BFs	Business Facilitators
BSBDAs	Basic Saving Bank Deposit Accounts
CSCs	Common Service Centres
DCCBs	District Central Co-operative Banks
GB	Grameen Bank
GCA	Gross Cropped Area
GCFA	Gross Capital Formation in Agriculture
GDP	Gross Domestic Product
Ha	Hectare
NABARD	National Bank for Agriculture and Rural Development
NAFIS	All India Rural Financial Inclusion Survey
NBFCs	Non-Banking Financial Companies
NGO	Non-Governmental Organizations
NPAs	Non-Performing Assets
NSSO	National Sample Survey Office
MFIs	Micro Finance Institutions
MSMEs	Micro, Small and Medium Enterprises
OTS	One Time Settlement
PACS	Primary Agricultural Credit Societies
PCARDBs	Primary Co-operative Agriculture and Rural Development Banks
PCO	Public Call Office
PMJDY	Pradhan Mantri Jan-Dhan Yojana
PSL	Priority Sector Lending
RBI	Reserve Bank of India
RIDF	Rural Infrastructure Development Fund
RFIs	Rural Financial Institutions
RRB	Regional Rural Bank
SACP	Special Agricultural Credit Plan
SBI	State Bank of India
SBLP	Self Help Groups Bank Linkage Programme
SCARDBs	State Co-operative Agriculture and Rural Development Banks
SCBs	Scheduled Commercial Banks
SHGs	Self-Help Groups
StCBs	State Co-operative Banks

Executive Summary

In smallholder agriculture, it remains a challenge to raise productivity and increase farmers' incomes through agri-operations. It requires 'end-to-end' solutions starting with easy access to modern inputs and then selling the produce in most remunerative markets. Institutional credit at reasonable cost all along the value chains is one such catalytic instrument that can facilitate this by converting many erstwhile subsistence farmers into vibrant commercial farmers. They can grow not only high value crops like fruits and vegetables, but also make deep inroads into dairy, poultry, fishery, honey bee-keeping, etc. that need comparatively less land but more capital. Some empirical studies suggest that output elasticity of farm credit is significant (about 0.3), meaning that with roughly every 1 percent increase in agricultural credit, agri-GDP can go up by 0.3 percent (Government of India, 2018). This study, therefore, focuses on the evolution of agricultural credit institutions in India, their effectiveness, and various innovations in policy and structures that can help agriculture in general and smallholders in particular.

The evolution of institutional credit for the Indian agriculture can be traced back to times even before independence, and broadly classified into three distinct phases – (1) 1904 to 1950s (predominance of co-operatives and setting up of RBI); (2) 1960s to 1980s (nationalization of commercial banks and setting up of Regional Rural Banks (RRBs) and of NABARD) and (3) from 1991 onwards, when economic reforms were set in motion in the country. The temporal trend in agri-credit reveals that over time, significant progress has been achieved in terms of the scale and outreach of institutional framework for agri-credit. The share of institutional credit, which was about 10 percent in 1951, increased manifold to 64 percent in 2013 (AIDIS). Further, as a percentage of AgGDP, institutional agri-credit went up from about 16 percent in early 1980s to 42 percent by 2017.

This study further examines the agricultural credit system in India from three angles: its efficiency, inclusiveness, and sustainability.

The **efficiency** of any credit system is to be judged by whether it can meet the demand of farmers to buy their agri-inputs, and at what cost it can provide credit to farmers. Judged on these parameters, at first glance, it appears that the Indian formal agri-credit system fully meets the requirements of farmers¹ for their inputs as institutional agri-credit² - as percentage of the input requirement³ - increased from mere 22 percent in 1990-91 to 123 percent in 2015-16 at the national level. This seems a remarkable success story. Yet digging further into disaggregated data at state level shows that for the TE 2016-17, in many states the short term agri-credit exceeded way beyond the value of inputs. For example, in Kerala it was 326 percent; in Andhra Pradesh 254 percent; in Tamil Nadu 245 percent; in Punjab 231 percent; and in Telangana 210 percent.⁴ This is perhaps indicative of the fact that so called short-term agri-credit is being diverted for non-agricultural purposes. This puts a damper on the "efficiency" of the agri-credit system. Our analysis shows that it may be happening as crop loans have been extended at concessional rates of interest (7 and 4 percent) under the interest subvention scheme (which was initiated in 2006), which is way below the interest rates (15 to 30 percent) that prevail in the informal credit market. On one hand, this low interest rate has helped farmers tremendously, but on the other, such low interests also open possibilities of arbitrage. Farmers can borrow short-term loans, say at 4 percent interest cost, and deposit it in a financial institution as fixed deposit earning 8.0 percent interest or re-lend it to marginal farmers or tenants/sharecroppers in the informal credit market at exorbitant rates. The state level data relating to input requirement and short-term credit disbursed, presented above, lends credence to this suspicion.

¹ Engaged in agriculture and allied sector (which includes crops, livestock, fishing, forestry and logging)

² Here, institutional agri-credit refers to short term direct credit outstanding to agriculture and allied sector

³ Input requirement is computed by subtracting gross value added (GVA) from gross value of output (GVO)

⁴ For Andhra Pradesh and Telangana, average is taken for 2015-16 and 2016-17 due to unavailability of segregated data for 2014-15

Inclusiveness: The All India Rural Financial Inclusion Survey (NAFIS) conducted by NABARD (2017) reveals that only 43.5 percent of agri-households took any type of loans during the agricultural year 2015-16 (July 1, 2015 to June 30, 2016). And interestingly, of these 43.5 percent of HHs, 60.5 percent sourced it exclusively from institutional sources, 9.2 percent took it from both institutional and non-institutional sources, and the remaining 30.3 percent sourced it only from non-institutional sources. This implies that effectively, only 30.3 percent of all agri-households [69.7 percent multiplied by 43.5 percent] availed credit from institutional sources. Further, the analysis also reveals that smallholder and marginal farmers (with a holding size of less than 2 ha) who operate on 47 percent of the area and account for 86 percent of the total operational holdings (number), get about 60 percent of institutional loans for agriculture purposes, which is commendable from an inclusiveness point of view. The plausible explanation could be that small and marginal farmers are mostly involved in producing high value products such as dairy, fruits and vegetables, aquaculture etc., which are both capital and input intensive and, hence, require more credit.

In addition, data from the Situation Assessment Survey (NSSO, 2013) reveal that marginal farmers (with a holding size of less than 1 ha) that constitute about 68.5 percent of operational holdings received roughly 49 percent of their total loans outstanding from institutional sources, whereas large-scale farmers (above the holding size of 10 ha) who account for only 0.6 percent of operational landholding (in number) had 79 percent of their loans outstanding coming from institutional sources. It only shows that marginal agri-HHs are more dependent on non-institutional sources compared to large-scale farmers. It may be because of consumption loans of marginal agri-HHs, which are not generally entertained by the formal credit institutions. Nevertheless, this only indicates that the formal credit system in India is yet to fully overcome the challenge of inclusiveness of small holders in their portfolio.

Sustainability: The prime factor that could threaten the sustainable nature of financial institutions dealing with rural credit is the political economy of loan waivers. Followed by the Agricultural Debt Waiver and Debt Relief (ADWDR) Scheme in 2008, several state governments namely Maharashtra, Uttar Pradesh, Andhra Pradesh, Karnataka, Punjab, and more recently Rajasthan, Madhya Pradesh and Chhattisgarh have announced farm loan waivers for farmers during elections, especially in the financial years 2017 and 2018. However, most experts believe, and our analysis in this paper shows, that debt relief schemes adversely impact the credit culture in the economy as it encourages defaults of future loans. Incidentally, this is quite evident from the data that post 2009-10, the non-performing assets (NPAs) in agriculture of scheduled commercial banks (in absolute as well as in percentage terms) rose sharply: from INR 71.5 billion to INR 832 billion between 2009 and 2018 in absolute terms, and NPAs as a percentage of outstanding agriculture loans increased from 2.1 percent to 8.1 percent between 2009-10 and 2017-18. This massive rise in NPAs is often attributed to 'moral hazard' in the repayment behaviour of farmers, which can undermine the whole institutional credit system for agriculture.

Keeping in mind the status and reach of institutional credit in the agricultural sector, a plausible diversion of agri-credit to non-agri purposes, and implications of generalised debt relief schemes, what is the way forward? We suggest the following: First, there is a need to strengthen innovative credit delivery channels such as through Kisan Credit Cards (KCCs) and Self-Help Group Bank Linkage Programme. Issuance of KCC should be expedited in remote villages to ensure financial inclusion of more farmers, and KCCs need to be integrated with Central Banking System as well as Aadhar number of farmers such that defaults in one bank's KCC is known to all others. This will ensure timely and affordable credit to the resource constrained farmers by overcoming the challenges of collateral stipulations, and also check on the possibilities of evasion in defaults from one bank loans to others. SHGs can also serve similar purpose although their focus is largely on non-farming activities in rural areas. To ensure financial inclusiveness of small and marginal farmers, banking system needs to adhere to the Priority Sector Lending (PSL) guidelines issued by the RBI which mandates that at least 8 percent of Adjusted Net Bank Credit (ANBC) or credit equivalent amount of off balance sheet exposure whichever is higher, for small and marginal farmers (out of 18 percent stipulated for the agricultural sector). Additionally, to provide efficient credit delivery, unfolding innovative business models such as

Bharat Banking model introduced by the IDFC Bank and Business Correspondent/Business Facilitator need scaling up. In addition, banks should be incentivised to extend loans to farmers organised under producers' organizations, marketing co-operatives and integrators. Assured market of farmer's produce and remunerative price will cover both the credit and market risks in the system.

1 Introduction

Indian agriculture is predominantly a smallholder agriculture with an average holding size of 1.08 ha (2015-16). Eighty-six (86) percent of all holdings are of less than 2 hectares, accounting for about 47 percent of operated area. Therefore, timely and adequate credit at a reasonable cost to agri-HHs is crucial in increasing agricultural production and farm incomes. Without it farmers cannot ensure optimal usage of inputs for farm operations (Gulati & Bathla, 2002). This, in combination with low levels of institutional credit flowing to agriculture in the pre-1969 era, led the government of India to the decision to nationalize commercial banks in 1969, and to prioritize agriculture for lending. Further, to ensure the reach of formal credit to the last mile, the National Bank for Agriculture and Rural Development (NABARD) was carved out of a department in the Reserve Bank of India in July 1982 into an apex agency to promote credit to agriculture and rural areas. NABARD initiated the Self Help Groups Bank Linkage Programme (SBLP) and introduced the concept of microfinance to the agricultural sector. Subsequently, the introduction of the Kisan Credit Card (KCC) in 1998 and the policy of doubling agriculture credit in 2004 stepped up efforts to increase the flow of institutional credit to agriculture significantly. All these policy measures led to rapid strides in formal institutional credit to agriculture. For example, total direct agri-credit (loans outstanding) as a percentage of agri-GDP went up from 16 percent in FY1982 to 42 percent in FY2016. Short-term direct agri-credit (loans outstanding) as a percentage of the agri-input requirement increased even faster, from 22 percent in 1990-91 to 123 percent in 2015-16. Yet, the All India Debt and Investment Survey (AIDIS) conducted by the National Sample Survey Office (NSSO) for 2012-13, revealed that non-institutional sources account for as much as 36 percent of total outstanding credit to farm families. Further, the NABARD All India Rural Financial Inclusion Survey conducted for 2015-16 also reported that institutional sources accounted for only 72 percent of the loans taken by an average farm household (HH), and the remaining 28 percent come from non-institutional sources (NABARD, 2018). It could be that non-institutional sources primarily cater to consumption loans of these farmers or they cater largely to tenants who find it difficult to secure loans from institutional sources due to their lack of land titles that could function as collaterals to banks. But the very fact that still a large chunk of the loans to agri-HHs is coming from non-institutional sources, and generally at relatively high rates of interest, speaks of the limitations of the formal credit system in meeting the overall credit needs of farming families. Another issue which has witnessed longstanding debate in the country is the share of long-term agriculture credit in total agricultural credit, which is declining overtime raising concerns about investments and capital formation in the agricultural sector.

In this study, we try to explore some of these issues and evaluate how effective the agricultural credit system is, in terms of meeting the production related (inputs) requirements of farmers, its reach, especially to smallholders of less than 2 ha, and how sustainable it is in the wake of political economy of loan waivers. Further, we also highlight various innovations that are unfolding in this sector to make it more efficient, inclusive and sustainable.

The paper is organized as follows: In Section 2 we present a brief review of literature on the policy developments in the formal agriculture credit institutions. Section 3 assesses the organizational structure and the progress in agriculture credit in India. Section 4 critically evaluates the agri-credit systems on the basic parameters of efficiency, inclusiveness, and sustainability. Some of the interesting innovations in the agricultural credit delivery system are taken up in Section 5; and Section 6 presents the concluding remarks and a way forward.

2 Lay of the Land: Evolution of Agri-Credit Policies in India

From 1904 to the 1950s

India's evolution of a formal agriculture credit system began during 1870s under the British colonial government, when institutional credit was extended to farmers especially during the drought years. In 1904, however, the government of India passed the Cooperative Societies Act to serve the credit needs of the country, especially of the rural sector (Mohan, 2004). The Maclagan Committee (1915) advocated for the establishment of provincial cooperative banks in all major provinces by 1930. The Royal Commission on Agriculture further examined the program of rural credit in 1926-27 (Mohan, 2004). In the wake of inadequacy of agriculture credit, the Reserve Bank of India (RBI) Act was passed in 1934 and special provisions were made to expand access of institutional credit to agriculture. Under section 54 and 17 of the RBI Act, the Agriculture Credit Department was created to coordinate agriculture credit functions of RBI and provide credit through state cooperative banks or any other banks engaged in the business of agriculture credit respectively (Mohan, 2004). Notwithstanding intense efforts undertaken by RBI and the government, it was recognised during 1936-1937 that "almost the entire finance required by farmers was supplied by moneylenders and that cooperatives and other agencies played a negligible part". Moreover, in a report submitted to the government of India by Sir Malcolm Darling (1935), it was found that in many provinces, credit overdues to cooperative institutions constituted 60 to 70 percent of the outstanding principal due (Mohan, 2004). Even the Cooperative Planning Committee, constituted in 1945, observed signs of sickness in India's cooperative movement and reported that a large number of cooperatives were "saddled with the problem of frozen assets because of heavy overdues in repayment" (Shah, Rao, & Shankar, 2007). With India attaining independence in 1947, RBI multiplied its efforts to build a strong cooperative credit structure. Despite that, in the All India Rural Credit Survey (AIRCS) commissioned by the RBI in 1954, it was concluded that "formal credit institutions provided less than 9 percent of rural credit needs in India". Moneylenders, traders and rich landlords provided more than 75 percent of rural credit (Shah, Rao, & Shankar, 2007). It was believed that "agricultural credit fell short of the right quantity, was not of the right type, did not serve the right purpose and often failed to go to the right people" (Mohan, 2004). Given that the cooperatives played a vital role in channelling credit to farmers, the committee recommended creating an efficient system of agricultural finance and the development of a sound cooperative credit structure. It was therefore, summed up that "Cooperation has failed, but Co-operation must succeed". The committee further suggested to increase the share of cooperatives and advised that at least one member of each household should be a member of a cooperative institution (Hoda & Terway, Agricultural Credit Subsidy in India, 2018). Lack of adequate credit to finance the rural sector continued to grab RBI's and the government's attention throughout the 1950s and 1960s. Besides revitalizing cooperatives as an exclusive agency for providing credit to agriculture, RBI focused to extend credit for agriculture through commercial banks for activities such as marketing, processing, storage and warehousing (Mohan, 2004). To extend commercial banking services to rural and semi-urban areas, the Imperial Bank of India was nationalised in 1955 and the new State Bank of India (SBI) was created in July 1955 (Shah, Rao, & Shankar, 2007).

From the 1960s to the 1980s

To support agriculture credit, RBI set up the Agricultural Refinance Corporation (ARC) in 1963 to provide funds by way of refinance. However, the share of banks in rural credit remained meagre (Shah, Rao, & Shankar, 2007). Indian agriculture was severely hit by back to back droughts in 1965 and 1966. But the ushering-in of the Green Revolution necessitated the availability of adequate credit that could enable farmers to purchase modern inputs. As a result, the All India Rural Credit Review Committee under the Chairmanship of Shri B. Venkatappiah was set up in July 1966⁵. The committee submitted

⁵ The Committee reviewed the progress made in the supply of credit for intensive agricultural production and marketing from all the institutional sources including commercial banks, working of the crop loans system,

its report in July 1969 and the major recommendation was the adoption of a multi-agency approach to meet the credit needs of agriculture and allied sectors. Also, the National Credit Council, which was formed in 1967 to assess credit priorities, recommended enhancing the role of commercial banks as complementary to cooperatives in the rural economy. As a result, in July 1969 the game changing policy decision of nationalising 14 major commercial banks (and of the remaining in 1980) with deposits of over INR 500 million was undertaken. This played a catalytic role in expanding agri-credit in India (Mohan, 2004). The year also witnessed two landmark policy innovations – the ‘Lead Bank Scheme’ and the ‘Priority Sector Lending’ that provided a real boost to the flow of institutional credit to agriculture.

In response to the observation of the National Credit Council that not even 1 percent of India's villages were served by commercial banks, RBI formulated its first "socially coercive" licensing criterion (1970). It mandated that ‘for every new branch in an already banked area (with one or more branches) each bank would have to open at least three branches in unbanked rural or semi-urban areas’. In 1977, RBI further increased the banked-unbanked license ratio to 1:4 (Shah, Rao, & Shankar, 2007). This policy spearheaded the flow of institutional credit to the rural sector in the country.

Following the recommendations of the Narasimham Working Group (1975), Regional Rural Banks (RRBs) were set up in 1976 to provide credit and other facilities, particularly to small and marginal farmers, agricultural labourers, artisans and small entrepreneurs. This added to the ‘multi-agency approach’ in India’s agriculture credit institution. Another major impetus to rural credit was provided by the establishment of the National Bank for Agriculture and Rural Development (NABARD) in 1982, which has played a catalytic role in expanding micro-credit through the conduit of Self-Help Groups (SHGs) in the rural economy.

From the 1990s to the present

Against the backdrop of economic reforms initiated in 1991 in the Indian economy, a committee on the financial system was commissioned by the Reserve Bank under the leadership of Shri M. Narasimham. The committee provided the blueprint for carrying out overall financial sector reforms during the 1990s, of which reforms in agricultural credit institution formed an integral part, covering various measures like deregulation of interest rates of cooperatives and RRBs, and of lending rates of commercial banks for loans above INR 200,000; recapitalisation of selected RRBs; introduction of prudential accounting norms and provisioning requirements for all rural credit agencies; increased refinance support from RBI and capital contribution to NABARD; and stipulation of interest rates not exceeding 9 percent for crop loans up to INR 50,000 extended by the public sector banks (Mohan, 2004). The period also witnessed the mushrooming of Self-Help Group (SHG) lending systems and the introduction of policies such as the Special Agricultural Credit Plan (SACP); the Kisan Credit Card (KCC, 1998)⁶; the doubling of agricultural credit in three years 2004-05 (Satish, 2012); the Interest Subvention Scheme (2006)⁷; and the Agricultural Debt Waiver and Debt Relief scheme⁸ (2008) etc.

progress of rural branches of commercial banks and coordination between different agencies involved in rural credit (Chakrabarty, 2005).

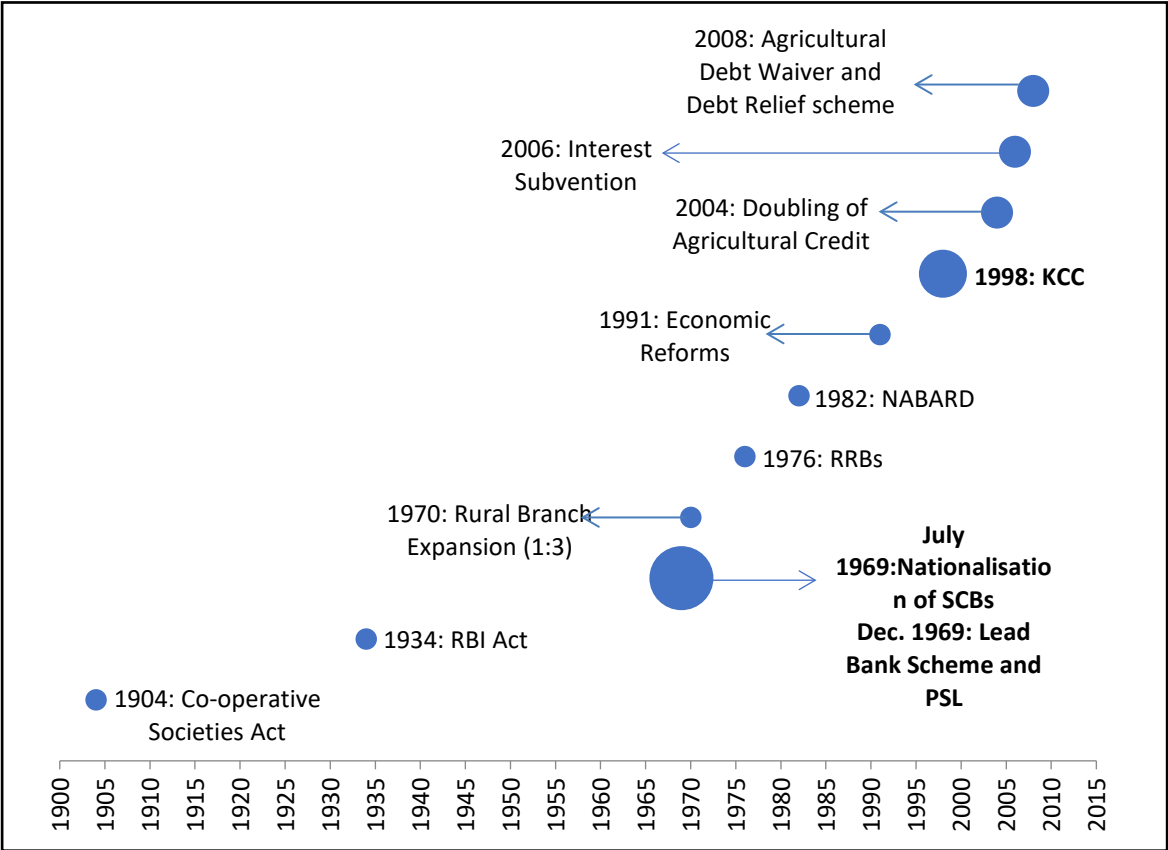
⁶ KCC was introduced in 1998 to extend easy and hassle free cash credit to farmers. The scope of KCC was further widened in 2004-05 to include credit needs for allied activities related to agriculture and for consumption purposes also along with entire production credit requirements of the farmer for a full year. The scope and status of these innovations are discussed in detail in section 5.

⁷ It provided interest subvention at 2 percent to banks for making crop loans available to farmers at 7 percent. Further in 2011-12, an additional subvention of 3 percent was introduced for farmers who repaid their loans on or before the due date. Thus, farmers who pay their dues on time receive a subvention of 5 percent and are charged an effective interest rate of 4 percent. Some states, like Madhya Pradesh, have even given loans at zero interest to farmers wherein the banks are required to first credit the subvention amount to the farmer’s account and then seek reimbursement from the RBI or the NABARD

⁸ ADWDR was introduced in 2008 to relieve long-indebted farmers (small and marginal) by writing off their overdue farm loans taken between 1997 and 2007. The scheme also offered a onetime settlement (OTS) of the

Recently in August 2014, the central government rolled out Pradhan Mantri Jan-Dhan Yojana (PMJDY), to accelerate the level of financial inclusion in a sustainable manner. The scheme has been implemented in two phases - Phase I (August 15, 2014 - August 14, 2015) aimed at providing universal access to banking facilities, basic banking accounts for saving and remittance, and RuPay Debit card with an in-built accident insurance cover of INR 100,000. While Phase II (August 15, 2015 - August 14, 2018) incorporated inter alia overdraft facilities of up to INR 5,000, the creation of a Credit Guarantee Fund for coverage of defaults in overdraft accounts, and micro-insurance and unorganized sector pension schemes like Swavalamban (Figure 1).

Figure 1: Key policy milestones in the institutional credit system



Note: The size of the circles illustrate major policy decisions that created substantial impact in the institutional credit system.

Source: Author's compilation

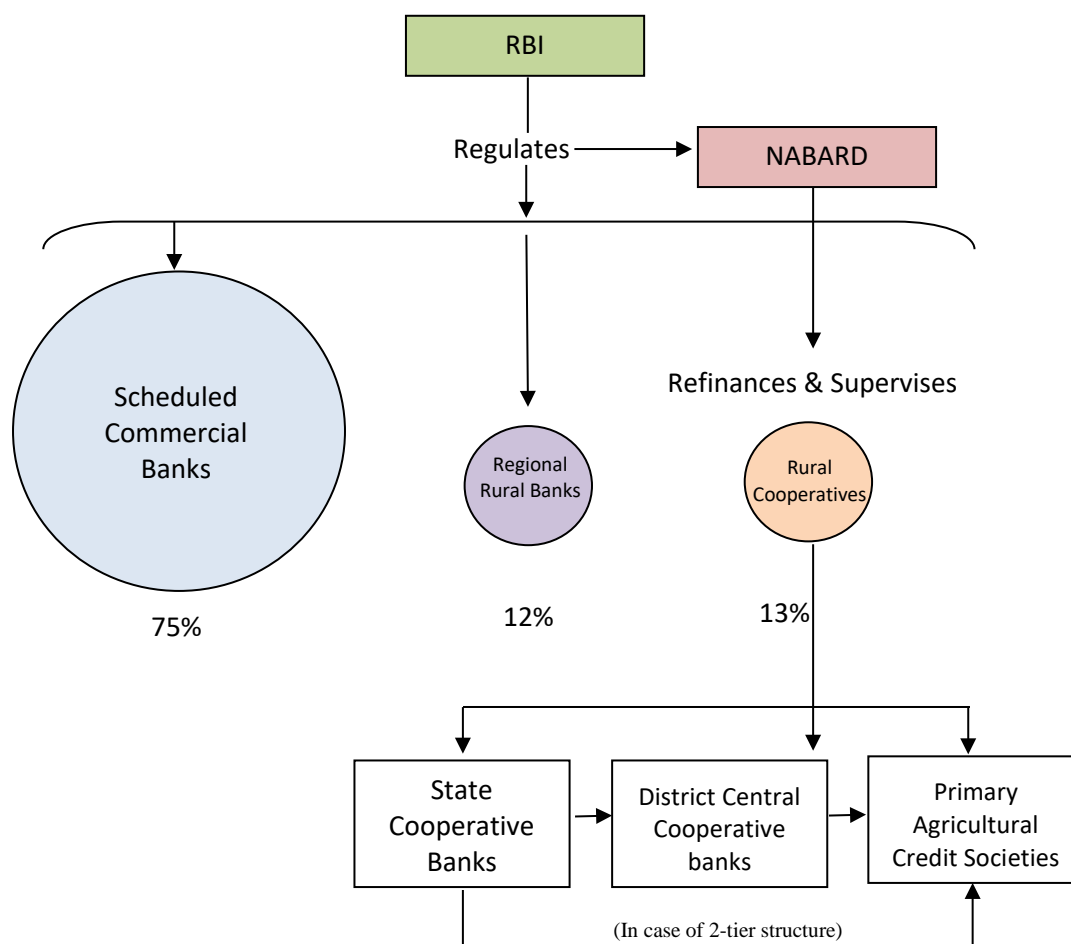
debt of other farmers with similar overdue loans through a 25 percent relief if the farmer repaid the balance of 75 percent (Satish, 2012).

3 Organizational Structure of the Agricultural Credit Institution

In India, a vast network of financial institutions exists, with co-existence of dual (institutional and non-institutional) financial systems operating in the rural credit market. A large number of institutional and non-institutional agencies lend money to farmers (directly or indirectly) for their short- and long-term needs. The institutional credit agencies include rural cooperatives, Regional Rural Banks (RRBs), Scheduled Commercial Banks (SCBs), NABARD, Non-Banking Financial Institutions (NBFIs), Microfinance Institutions (MFIs), Small Finance Banks (SFBs) and other government agencies. Of these, SCBs, RRBs and cooperatives are the three main rural financial institutions (RFIs) that provide credit to the agricultural sector at the village level by leveraging on their geographical and demographic outreach (Figure 2). On the other hand, the non-institutional sources comprise of moneylenders, friends, relatives, traders/commission agents, landlords, and others with varying shares in lending overtime. Within the multi-agency approach, the Rural Cooperative Institutions are mandated to address the 'last mile' problem associated with delivery of affordable credit to farmers. It can be broadly classified into short-term and long-term institutions, each with distinct mandates. The focus of short-term cooperatives, viz., state cooperative banks (StCBs), district central cooperative banks (DCCBs) and primary agricultural credit societies (PACS) has been primarily on providing crop loans and working capital loans to farmers and rural artisans. Long-term cooperatives such as state cooperative agriculture and rural development banks (SCARDBs) and primary cooperative agriculture and rural development banks (PCARDBs) dispense medium and long-term loans for a range of activities, including land development, farm mechanization, minor irrigation, rural industries and lately, housing.

What has been the impact of these policies and institutions on actual credit disbursed to farmers? The litmus test of policy changes and designs of various institutions ultimately depends on whether it has increased the flow of institutional credit to farmers not just in absolute numbers but in relation to the needs of farmers to buy agri-inputs, or more broadly, in relation to overall agri-GDP. This is taken up in the following section.

Figure 2: Institutional structure for agriculture credit in India



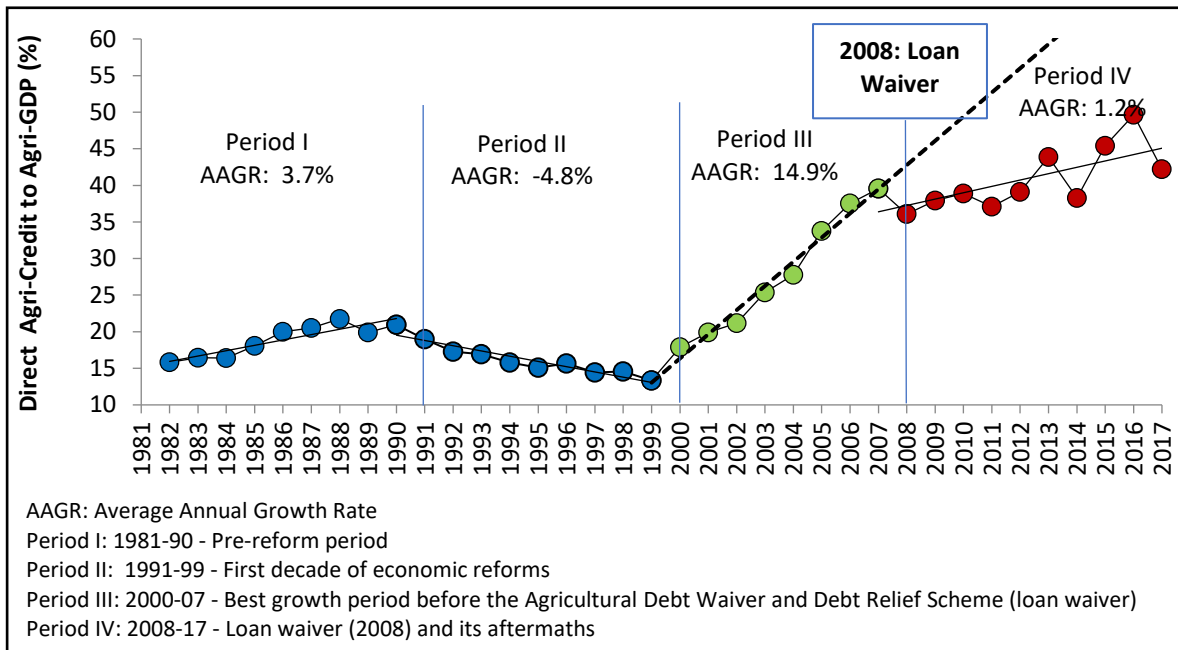
Notes: 1. Percentages show the share of agencies in the total direct credit outstanding to agriculture and allied sectors (in 2017-18). 2. Share of NBFIs, MFIs and SFBs are miniscule in total direct agri-credit. 3. Rural Cooperatives are also regulated by respective state governments.

Source: Author's compilation

3.1 Trends in Direct Agricultural Credit (1981 to 2017)

Figure 3 represents the evolution and changing trend in the direct institutional credit to the agricultural sector (loans outstanding) as a proportion of Agricultural GDP since 1981. In a way, this encompasses the impact of various policy changes and institutional designs as they evolved over time. The direct lending to farmers by institutional agencies (SCBs, Cooperative banks and RRBs) is either short-term (crop loans) or long-term (for investments). Overall, there has been a manifold increase (2.6 times) in the volume of direct agricultural credit (outstanding) as percent of agri-GDP from the institutional sources during 1981 to 2017. However, it may be noted that it has not been a smooth rise over all these years. In fact, it has witnessed quite dramatic variations.

Figure 3: Direct outstanding institutional credit to agriculture and allied activities (short-term and long-term) as a proportion of AgGDP



Notes: 1. The data since 1999-2000 covers PACS, SCARDBs and PCARDBs, while the earlier period (from 1980-81 to 1998-99) covers PACS only. 2. Data up to 1990-91 pertain to the period July-June and April-March thereafter. In case of SCBs, data for all the years pertain to July-June period. 3. From 1981-82 to 2012-13: Ag GDP at current prices and from 2013-14 to 2018-19: Ag GVA at current prices.

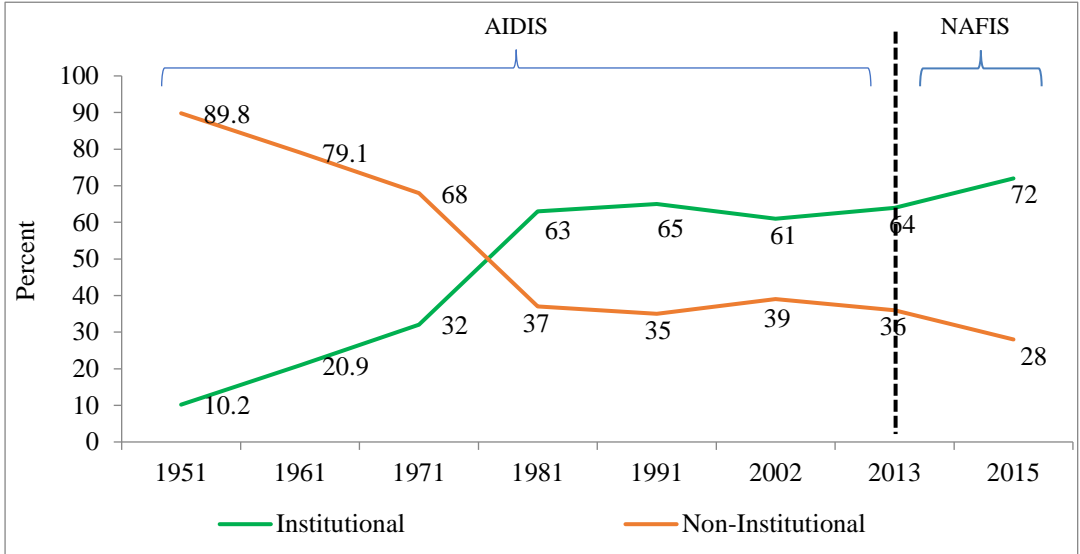
Source: Author's compilation using data from the Handbook of Statistics on Indian Economy (RBI, 2018) for direct Ag. Institutional credit (Short term and Long term); MOSPI (2018) for Ag GDP⁹

For example, during the pre-reform period (i.e. 1981-82 to 1989-90) direct agri-credit as percentage of agri-GDP increased at a modest average annual rate of 3.7 percent. However, soon after the economic reforms of 1991, the rate of growth not only decelerated but went into negative (-) 4.8 percent per annum. But thereafter, since 1999-2000 to 2006-07 it witnessed tremendous growth at 14.8 percent per annum (AAGR), only to fall back to just 1.2 percent per annum during 2008-17. There are several hypotheses that have been put forward by experts to explain this erratic behaviour in agri-credit as percentage of agri-GDP. For example, Mohan (2004) attributes a fall in this ratio in the post-reform period (1991-99) to a decline in the share of food grains in overall value of agri-produce. This does not seem very convincing as the share of food grains in overall value of agri-produce has been falling even after 1999, while the ratio of agri-credit to agri-GDP rose very fast from 2000-07. However, the slow down after 2008 appears to be due to a loan waiver scheme in 2008, which led bankers to be more conservative in lending to farmers for fear of increasing wilful defaults due to expected loan waivers in coming years. The government introduced the 'Agriculture Debt Waiver and Debt Relief Scheme (ADWDRS) in 2008, covering about 36.9 million small and marginal farmers and 6 million other farmers (Hoda & Terway, 2018). No wonder, the country witnessed its aftermaths in the form of a significantly reduced flow of agri-credit as percentage of agri-GDP. The bankers' concerns became reality as during 2012 -18, nine state governments viz. Uttar Pradesh, Maharashtra, Punjab, Telangana, Andhra Pradesh, Karnataka, Tamil Nadu, Chhattisgarh, and very recently Jammu & Kashmir and Union Territory of Puducherry, announced loan waivers for farmers, primarily to woo them for political votes. However, it needs more rigorous research to explain this extremely volatile behaviour in agri-credit in relation to agri-GDP. We do not undertake that in-depth exercise here, except flagging this issue.

⁹ <http://mospi.nic.in/data> and for GVA at current prices since 2016-17, PIB (http://mospi.nic.in/sites/default/files/press_release/Pressnote%20for%20first%20advance%20estimates%202018-19.pdf)

The other question worth exploring is whether the new set of policies and institutions reduced the overall role of moneylenders in agri-credit market. And the answer is ‘Yes, to a large extent’. Figure 4 presents the share of institutional credit vis-à-vis non-institutional sources from 1951-2013. According to the All India Debt & Investment Surveys (AIDIS), the institutional sources as a proportion of outstanding debt of cultivator households increased from 10.2 percent in 1951 to 32 percent in 1971, and then it increased dramatically to 63 percent in 1981, basically due to the nationalization of major commercial banks in 1969 and the policy of priority sector lending as well as expansion of bank branches in the rural areas as stipulated by RBI. But thereafter, the share of institutional credit in overall credit to farmers has remained relatively stagnant until 2013 (Figure 4).

Figure 4: Share of outstanding debt of agri-household from institutional and non-institutional sources (%)



Source: All India Debt and Investment Survey (AIDIS), (NSSO, 2013)

As AIDIS data is not available post 2013, taking into consideration the NABARD All India Rural Financial Inclusion Survey (NAFIS 2016-17), which reports that in respect to the average loan amount taken by agricultural household, the institutional sources contribute approximately 72 percent whereas non-institutional sources contribute approximately 28 percent¹⁰.

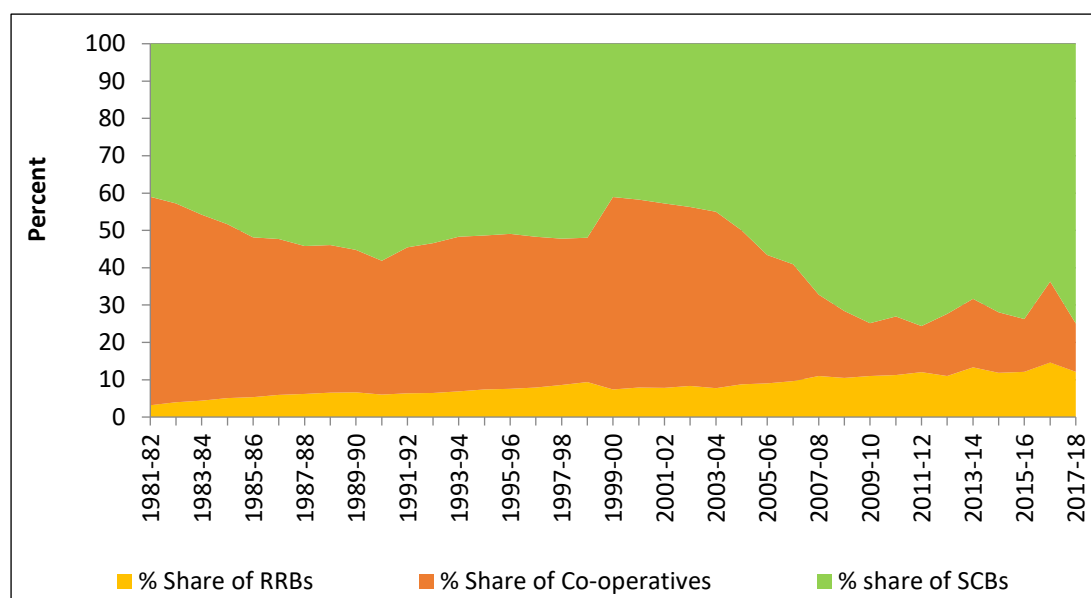
3.2 Performance of Institutions in Direct Agricultural Credit

In Figure 5, we present the changing share of different formal institutions, namely Scheduled Commercial Banks (SCBs), Cooperative and Regional Rural Banks (RRBs) in the overall institutional credit to agriculture. It is interesting to see that the SCBs have replaced the cooperative banks as the major source of direct institutional credit to farmers¹¹. The nationalization of commercial banks in 1969, the economic reforms in 1991 and the introduction of KCC (in 1998) followed by the doubling of agricultural credit (in 2004) led to a large-scale credit expansion with a view to creating a strong institutional base in rural areas (Mohan, 2004).

¹⁰ The data obtained from the AIDIS and NAFIS surveys are strictly not comparable, as the methodologies for both the surveys are different.

¹¹ Allied activities include forestry, fishing and livestock and contribute around 39 percent of the gross output in agriculture and allied activities (Reserve Bank of India, 2018)

Figure 5: Share of SCBs, cooperatives and RRBs in total direct credit (loans outstanding) to agriculture & allied activities (short-term and long-term)



Source: Author's compilation using data from the Handbook of Statistics on Indian Economy, RBI 2018

As a result, the share of SCBs in total direct institutional credit to agriculture increased sharply from 41 percent in 1981-82 to 75 percent by March 2017 and completely replaced cooperative banks' lending, with a corresponding fall in the share from 56 percent in 1981-82 to 13 percent in 2017. However, it is interesting to note that despite the diminishing share of cooperative bank credit as a proportion of total direct credit to agriculture (outstanding), they still have the largest outreach at the grassroots level and their exposure in the loan portfolio to small and marginal farmers is greater compared to that of commercial banks (Mehrotra, 2011). There is, therefore, a need to re-think whether the cooperatives are being fully utilized to tap their potential in reaching the last mile of extending institutional loans at an affordable cost to small-scale and marginal farmers, or whether they are being marginalized in the wake of a massive expansion of commercial banks in rural areas, equipped with modern IT services and other innovative business models.

4 Agricultural Credit Policies and Institutions: Assessing Impact

In order to assess the impact of agri-credit policies and of agri-credit institutions, this section examines them, first, with respect to their efficiency in terms of fulfilling the credit needs of the sector at affordable rates of interest, as well as ensuring investments and growth in the sector. Second, we assess them with respect to their inclusiveness quotient, that is, their reach and coverage among different classes of farmers (based on holding size); and third, we assess them with respect to the financial sustainability of the agri-credit institutions by looking at their NPAs and overall financial health.

4.1 Assessing on the Efficiency Front

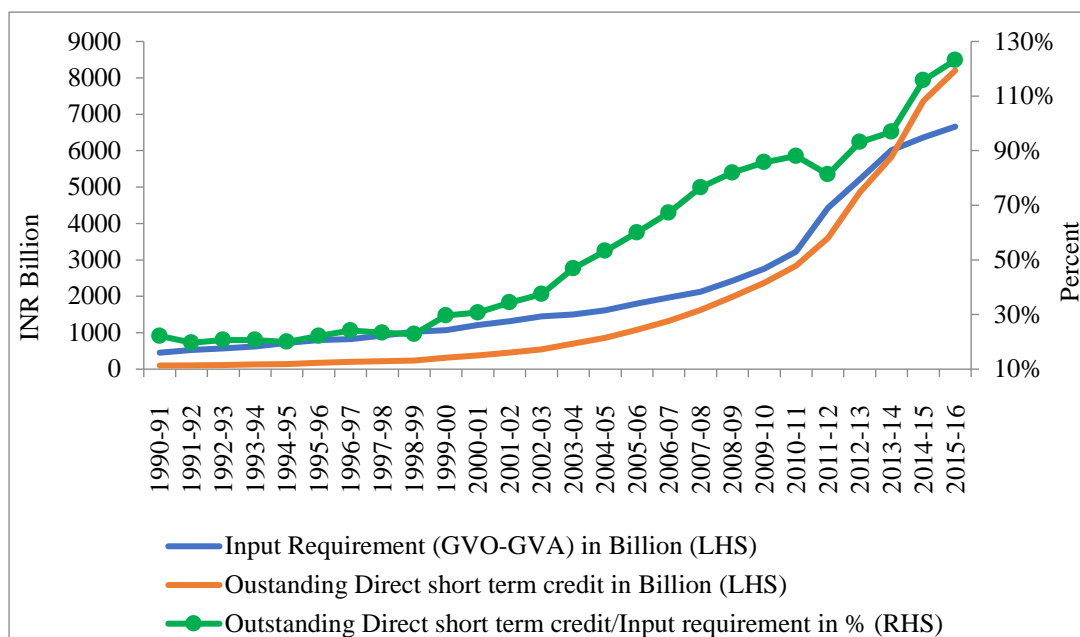
First and foremost, the way to assess the efficiency of the agri-credit credit system is to explore whether it is able to satisfy the demand for loans emanating from the agri-sector for its basic needs of buying inputs. The second parameter will be to look at the cost at which credit is supplied to agriculture. Basing our analysis of efficiency on these two parameters, we find that the Indian agri-credit system did meet the requirement of buying inputs. In fact, direct short-term credit (loans outstanding) to agriculture and allied sectors as a percentage of input requirement¹², which was hovering around 22-23 percent between 1990-91 and 1998-99, started increasing from 1999-2000 and touched 88 percent in 2010-11 and finally crossed 100 percent in 2014-15 (116 percent) and in 2015-16 (123 percent) (Figure 6). This is indeed a stupendous achievement in a relatively short period. However, a closer look at the state level reveals some puzzling findings (Figure 7). For example, for the TE 2016-17, total short-term credit (loans outstanding) to agriculture and allied sectors¹³ as a proportion of input requirement was substantially above 100 percent for many southern and northern states: Kerala (326 percent), Andhra Pradesh (254 percent), Tamil Nadu (245 percent), Punjab (231 percent), Telangana (210 percent) etc¹⁴. This is perhaps indicative of a plausible diversion of agri-credit to non-farm uses (Figure 6).

¹² Input requirement is computed by subtracting gross value added (GVA) from gross value of output (GVO) of agriculture and allied activities

¹³ Here, total short-term credit issued is considered for the state-wise analysis (data received from the FIDD division, RBI)

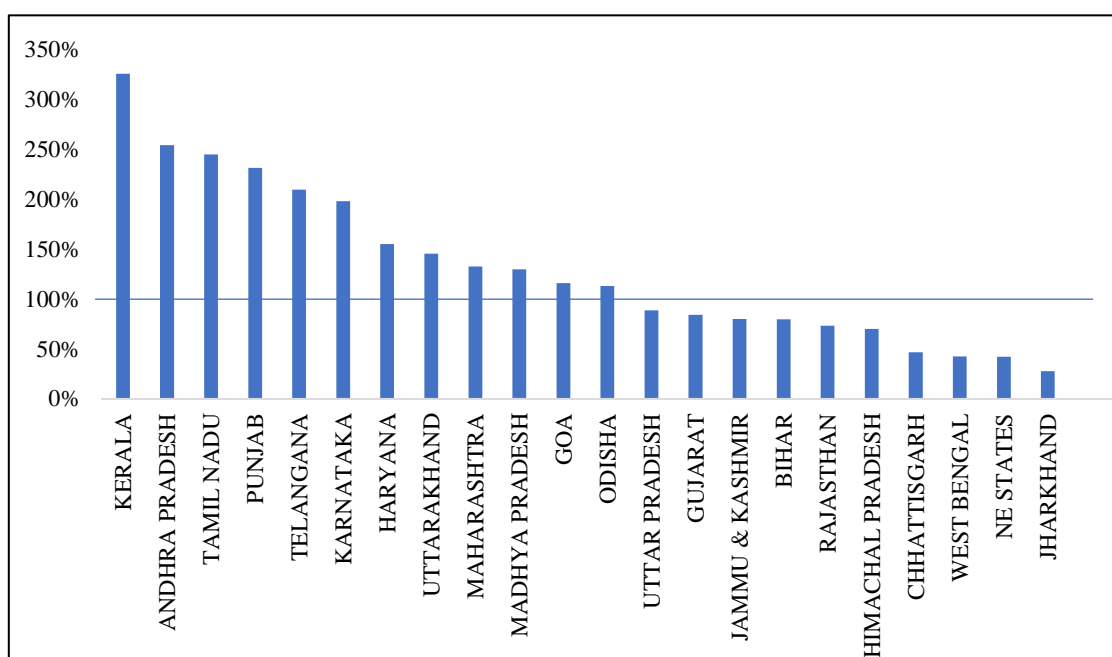
¹⁴ For Andhra Pradesh and Telangana, averages are taken for 2015-16 and 2016-17 due to unavailability of segregated data for 2014-15

Figure 6: Short-term direct credit (loans outstanding) to agriculture and allied sectors as share of input requirements



Source: Author's compilation using data from the Handbook of Statistics on Indian Economy, RBI 2018; National Accounts Statistics, various issues (2011 – back series, 2004, 2014, 2018)

Figure 7: State-wise share of total short-term credit (loans outstanding) to agriculture and allied sectors as a proportion of input requirement



Source: Reserve Bank of India, 2019¹⁵

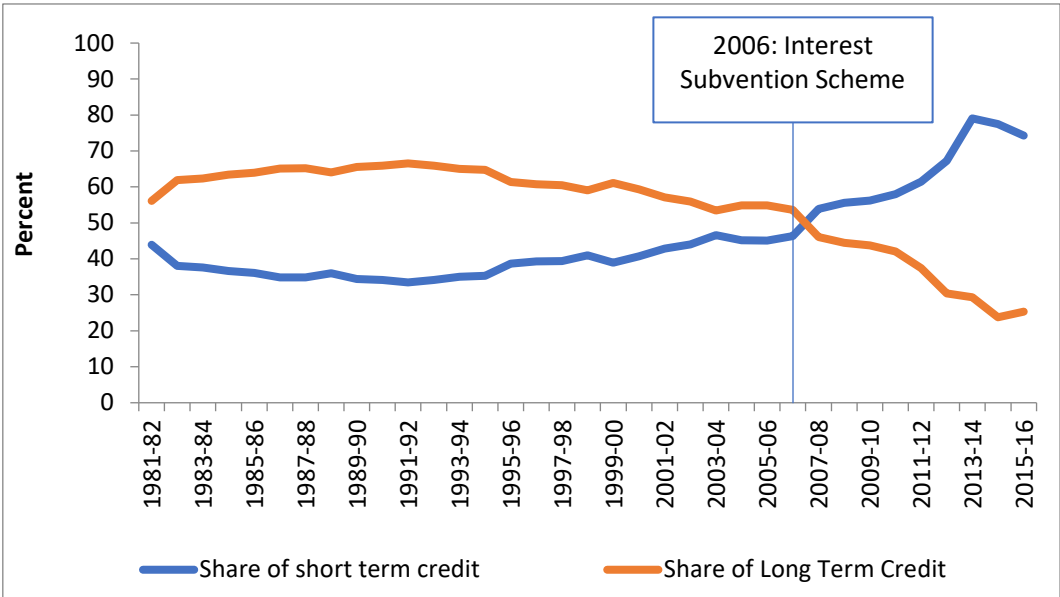
One of the possible explanations for this diversion of agri-credit to non-farm uses lies in low rates of interest being charged by agri-credit institutions under the interest subvention scheme. It is interesting to note that in the wake of the economic reforms of 1991, the banking system was deregulated and lending and deposit rates were liberalised. But during the food crisis that started in India from 2006-07 onwards - when India had to import about 6 million metric tonnes (MMT) of wheat -, the then-Prime Minister announced that short-term credit up to Rs. 300,000 would be provided to farmers at

¹⁵ Data for this graph is obtained directly from the FIDD division, RBI

an interest rate of 7 percent per annum against the prevailing 9 percent per annum, i.e. the Government provided an interest subvention of 2 percent on a short-term production credit¹⁶ (Hoda & Terway, 2015). Further, in 2009-10, in the wake of a drought year, the government introduced an additional interest subvention of 1 percent to farmers for loan repayment on or before the due date; interest rate subvention for timely repayment was raised to 2 percent in 2010-11 and subsequently to 3 percent in 2011- 2012, making the total subvention 5 percent. On one hand, it helped the farmers reduce their interest costs, but on the other this resulted in increasing fiscal burden on the exchequer from INR 1,700 crore in 2007-08 to INR 13,600 crore in 2016-17 (RE) (Hoda & Terway, 2018). But more importantly, granting loans at highly concessional rates of interest (4 percent) also opened the possibilities of arbitrage, wherein farmers could borrow crop loans at 4 percent and deposit it for a fixed period in a financial institution at 8 percent interest rate, or these borrowers became moneylenders in the informal market charging exorbitant rates to marginal farmers/landless labourers seeking loans for consumption purposes etc. It is this possibility of arbitrage that can be the reason for the ratio of short-term credit to value of inputs being much higher than 100 percent in some states, indicating a diversion of these agri-loans to non-farm purposes.

Another interesting feature to note is that in the total direct credit (outstanding) to agriculture and allied sectors, the share of short-term credit witnessed a significant jump from 44 percent in 1981-82 to 74.3 percent in 2015-16 (Figure 8) whereas, somewhat disquietingly, the share of long-term credit fell from 56.1 percent in 1981-82 to 25.3 percent in 2015-16. Since the long-term credit is basically for investments and capital formation in agriculture, this dramatic fall in the share of long-term credit does not auger well for the long-term improvements in farm productivity and overall growth of the agri-sector. One needs a deeper study to understand the causes behind this fall in the share of long-term credit vis-à-vis short-term credit. There are several hypotheses ranging from increasing fragmentation of land holdings and shrinking size of average holding; increasing informal and concealed tenancy, which discourages farmers to make long-term investments in farming. Also, it could be the government policy of incentivizing short-term credit through interest subvention, which is not available for long-term credit, etc.

Figure 8: Share of short-term and long-term direct credit (outstanding) to agriculture and allied activities

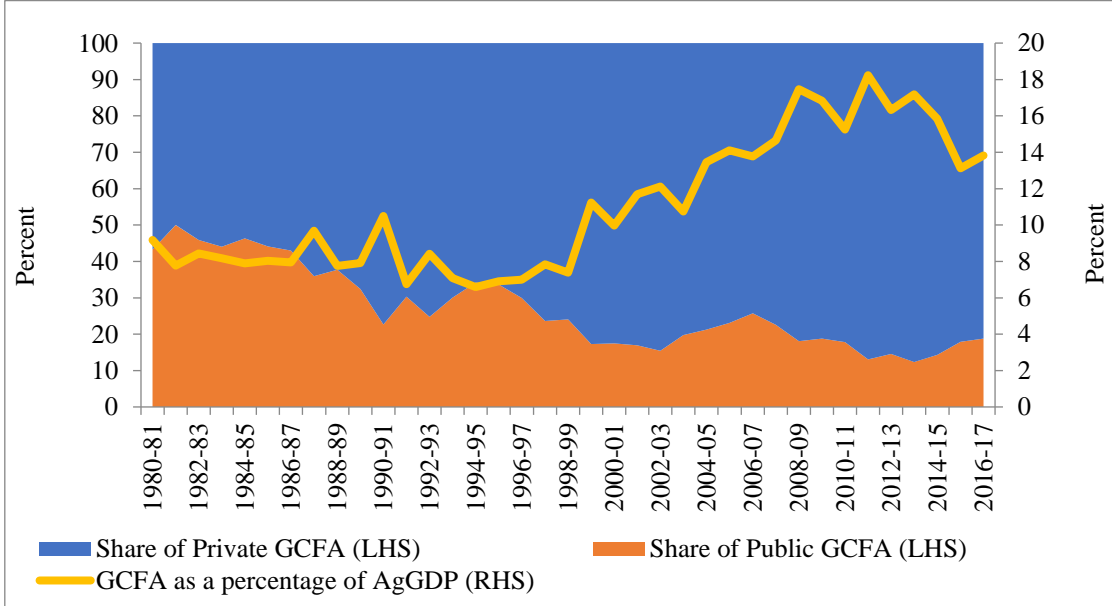


Source: Author’s compilation using data from the Handbook of Statistics on the Indian Economy (Reserve Bank of India, 2018)

¹⁶ To all public sector banks, RRBs and cooperative banks

Figure 9 shows the decomposition of capital formation in agriculture into public and private capital formation¹⁷. In addition, it shows the share of Gross Capital Formation (GCF) in agricultural sector as a percentage of agri-GDP, which rose significantly from 7.8 percent in 1981-82 to 18.2 percent in 2011-12. But thereafter, it fell to 13.8 percent in 2016-17, which raises doubts about a sustainable growth of 4 percent per annum in agri-GDP, given that the capital-output ratio in agriculture is about 4:1.

Figure 9: Share of Public and Private Capital Formation in Total Capital Formation and Ratio of Gross Capital Formation in Agriculture to Agricultural GDP (at current prices)



Source: National Accounts Statistics (Central Statistics Office, 2018)

Based on this empirical analysis, one can say that the policy of interest subvention should be restricted to small and marginal farmers only, and also should be extended to cover long-term credit as well so that capital formation in agriculture does not suffer in relative terms.

4.2 Assessing on the Inclusiveness Front

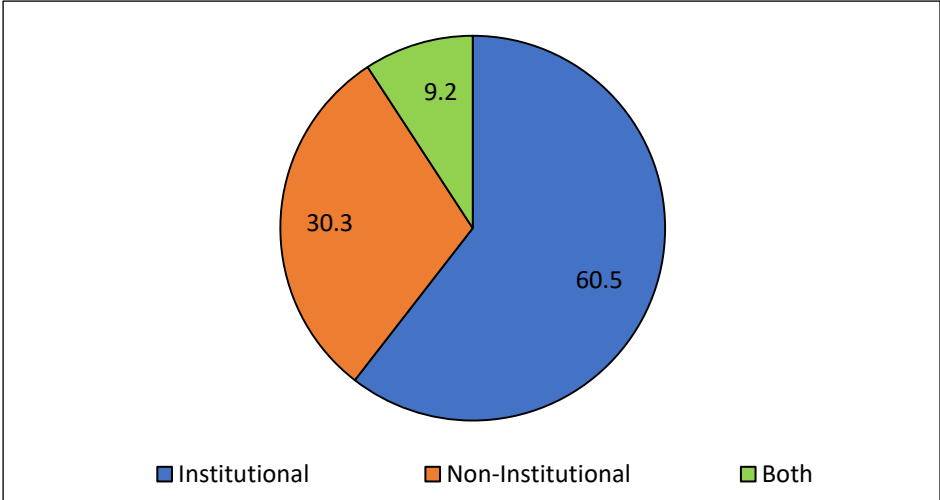
The question of inclusiveness is examined by looking at the reach of the agri-credit system to small and marginal farmers.

The All India Rural Financial Inclusion Survey (NAFIS) conducted by NABARD (2017) reveals that only 43.5 percent agri-households took any type of loan during the agricultural year 2015-16 (July 1, 2015 and June 30, 2016). Interestingly, of these 43.5 percent HHs, 60.5 percent sourced these loans exclusively from institutional sources, whereas 9.2 percent took it from both institutional and non-institutional sources, and the remaining 30.3 percent sourced it only from non-institutional sources (Figure 10). This implies that effectively, only 30.3 percent of all agri-households [69.7 percent multiplied by 43.5 percent] availed credit from institutional sources (Figure 10). Why the other 69.7 percent of agri-HHs did not avail credit from formal credit institutions is a matter of further study. It could be that they do not need credit as they could have financed the purchase of agri-inputs from

¹⁷ The government supports agricultural growth through two channels—subsidy and public investment in the form of capital formation. The Public capital formation in agriculture (Public GCFA) comprises government interventions in major, medium and minor irrigation scheme, and plantations in the forestry sector where major, medium and minor irrigation schemes contribute to almost 90 percent of the gross public capital formation in agriculture (Gulati & Bathla, 2002). On the other hand, private sector investments comprise investments in the corporate and household sector wherein household investment alone would account for over 90 percent share in private sector investment (Bisaliah, Dev, & Saifullah, 2013).

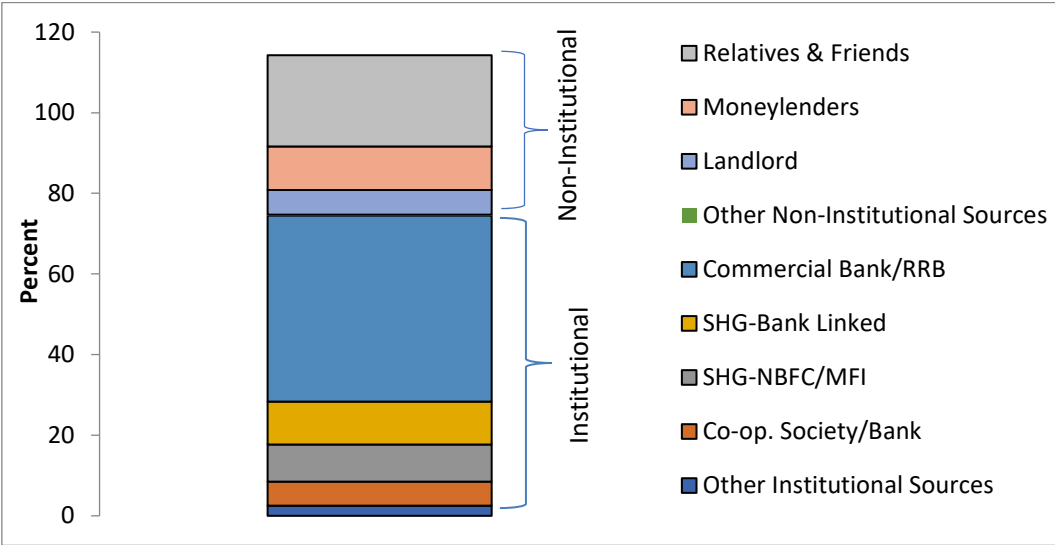
their own funds; or it could be that some of them are not 'bankable', or both. In fact, those who sourced loans only from non-formal institutions (friends, relatives, moneylenders, etc.) could be purely for consumption purposes - an area which formal institutions hesitate to tread. Nevertheless, it appears that the formal agri-system still has scope to improve its reach to marginal and smallholders, be it for production purposes or consumption/social needs. NAFIS data also shows that within institutional sources, the highest share of 46.2 percent, of agri-households reported to have taken loans from commercial banks including RRBs, followed by 20 percent from SHG-Banks and other Micro Finance Institutions (MFIs) and only 6 percent from cooperatives. On the other hand, of the non-institutional sources, dominance of friends/relatives is evident, for a sizeable proportion of households; 22.7 percent took loans from this source. In addition, moneylenders and landlords are the next most preferred sources of non-institutional credit (Figure 11).

Figure 10: Distribution of agricultural households (those who take any loan) by source of loan (%)



Source: All India Rural Financial Inclusion Survey (NAFIS) (NABARD, 2018)

Figure 11: Distribution of loans according to sources for households that took a loan between July 2015 and June 2016



Note: Totals exceed 100% as a household may have taken loan from more than one source.

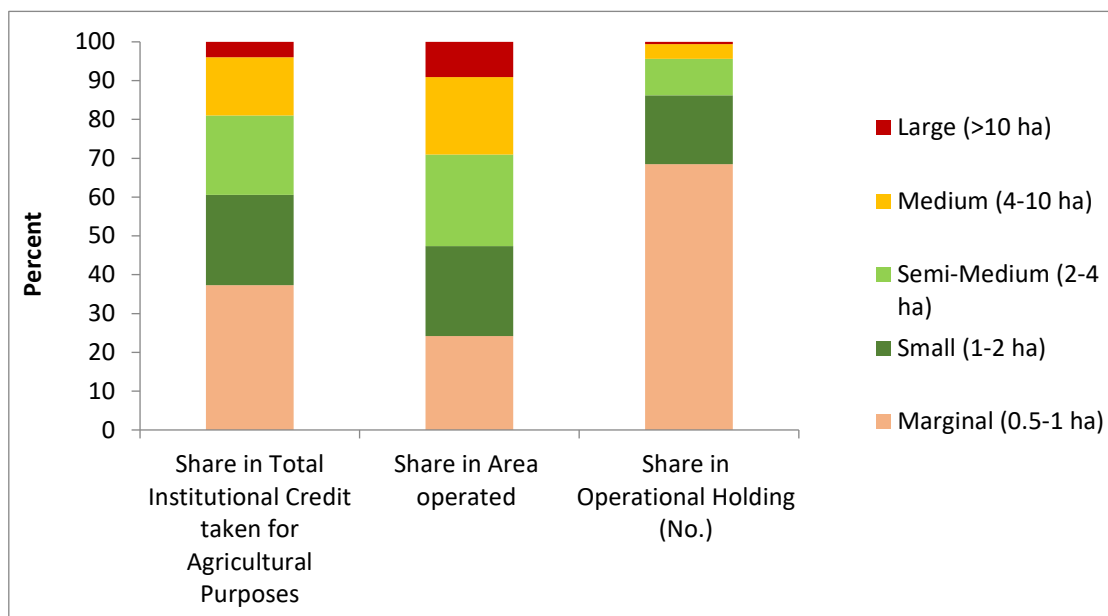
Source: All India Rural Financial Inclusion Survey (NAFIS) (NABARD, 2018)

The analysis also reveals that small and marginal farmers (of holding size of less than 2 ha) who operate on 47 percent of the operated area and account for 86 percent of the total operational holdings

(number), get about 60 percent of institutional loans for agriculture purposes (Figure 12). This is commendable inclusiveness. The plausible explanation is that the small and marginal farmers are mostly involved in producing high value products such as dairy, fruits and vegetables, aquaculture etc., which is less land demanding, but both capital and input intensive, and, hence, require more credit.

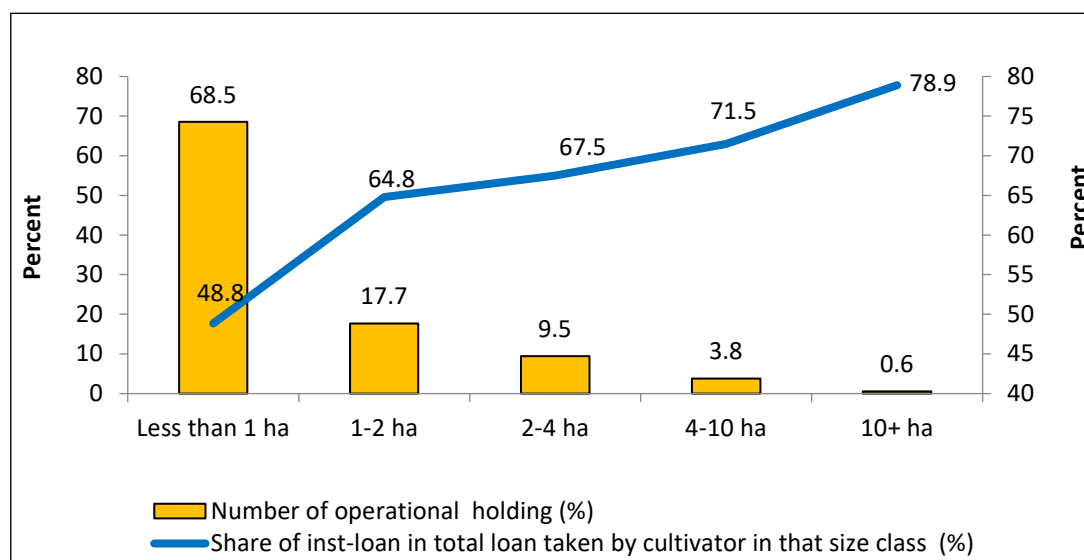
Further, Figure 13 reports that of the total loan availed by the marginal farmers (with a holding size of less than 1 ha) that constitute about 68.5 percent of operational holdings (number), about 49 percent is outstanding from institutional sources, whereas in the case of large farmers (above the holding size of 10 ha) who operate on only 0.6 percent of operational landholding (number) about 79 percent of their loans outstanding is from institutional sources (NSSO, 2013). It shows that marginal HHs are more dependent on non-institutional sources compared to large farmers. It may be because of consumption loans of marginal agri-HHs, which are not generally entertained by the formal credit institutions. Nevertheless, this only indicates that the formal credit system in India is yet to fully overcome the challenge of inclusiveness of smallholders in their portfolio. Therefore, it is a matter of further research that what percentage of loans outstanding from institutional sources is for agricultural activities and what is for consumption and other social purposes.

Figure 12: Total institutional credit taken for agricultural purposes by different size-groups, share of operated area and share of number of holdings



Source: Author's compilation using data from Agricultural Statistics at a Glance, 2017 (Input survey, 2011-12) and the Agriculture Census, 2015

Figure 13: Share of outstanding loans for different size classes of land possessed (2012-13) and operational holding (2015-16)



Source: Situation Assessment Survey of Agricultural Households in India, 70th Round (NSSO, 2013) and Agriculture Census 2015-16 (Government of India, 2018)

4.3 Assessing on the Sustainability Front

The prime factor that could threaten the sustainable nature of financial institutions dealing with rural credit is rising overdues or non-performing assets (NPAs) in the agricultural sector. Followed by the Agricultural Debt Waiver and Debt Relief (ADWDR) Scheme in 2008, several state governments namely Maharashtra, Uttar Pradesh, Andhra Pradesh, Karnataka, Punjab, and more recently Rajasthan, Madhya Pradesh and Chhattisgarh have announced farm loan waivers for farmers during elections, especially in the financial year (FY) 2018 and FY 2019 (Table 1).

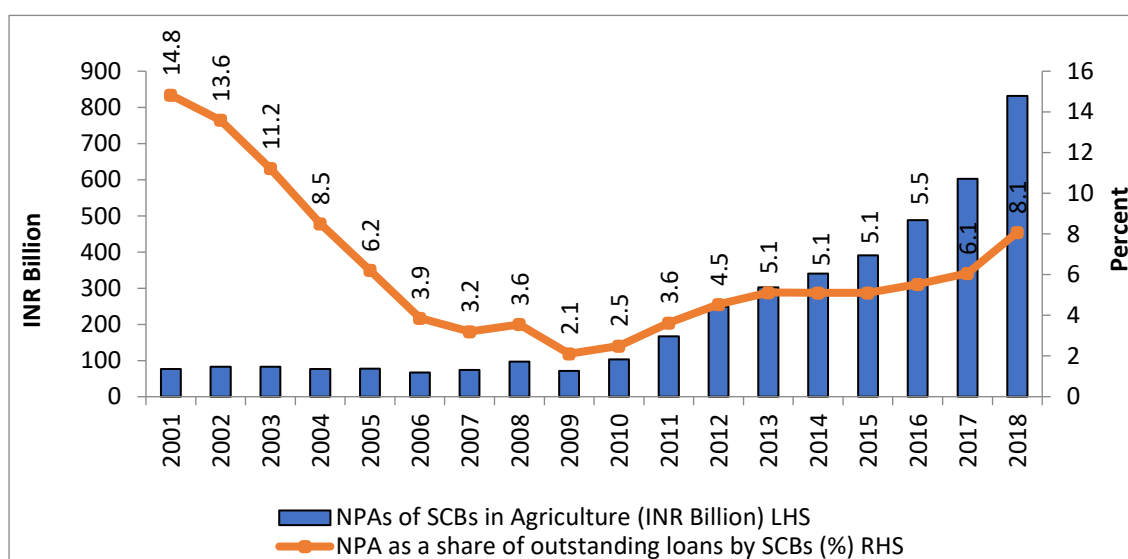
Many experts believe that debt relief schemes adversely impact the credit culture in the economy as it encourages defaults on future loans. The governor of RBI and the managing director of NABARD repeatedly issued a statement to this effect after such schemes were announced. Incidentally, this is also evident from the data (Figure 14), which shows that post 2009-10, the NPAs (in agriculture) of scheduled commercial banks rose sharply from INR 71.5 billion to INR 832 billion between 2009 and 2018 in absolute terms, and NPAs as a percentage of outstanding agriculture loans increased from 2.1 percent to 8.1 percent between 2009-10 and 2017-18 (Figure 14). This massive rise in NPAs is often attributed to moral hazard in the repayment behaviour of farmers, which can undermine the whole institutional credit system for agriculture.

Table 1: Amount of loan waiver announced and allocated by various states in their budget since 2017-18

	Fiscal Year of Loan Waiver	Loan Waiver Amount	2017-18 (RE)		2018-19 (BE)	
			Announced (INR crore)	Amount Budgeted (INR crore)	As percent of agri and irrigation budget*	Amount Budgeted (INR crore)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Maharashtra	2017-18	34000	16000	55.2	8820	30.4
Uttar Pradesh	2017-18	36000	25000	44.3	4000	7.1
Punjab	2017-18	10000	370	2.8	4250	31.7
Karnataka	2018-19	44000	3910	13.5	10420	36.1
Rajasthan	2018-19	18000	-	-	1860	17.2
Madhya Pradesh	2018-19	36500	-	-	-	-
Chhattisgarh	2018-19	6100	-	-	-	-
Total		184600				

Source: RBI, 2019

Figure 14: Agriculture loans outstanding and NPAs in agriculture from SCBs (as on 31st March)



Source: Report on Trend and Progress of Banking in India, various issues

5 Innovations in Agri-Credit Institutions

Innovation, in general, could be defined as a new idea, a new policy, a new process or a new product, which breaks into society and/or markets creating more value than the existing ways and products.

In this section, we are looking at game-changing innovations in policy, in credit instruments and in organizational structures of agri-credit institutions that have evolved overtime to extend credit to farmers, especially small and marginal ones, in a timely and effective manner and at affordable cost. First and foremost, is the policy innovation of Priority Sector Lending (1969) that substantially changed the landscape of agri-credit institutions in the country. Before the nationalization of commercial banks in 1969, the agri-credit system was dominated by cooperatives that fell short to fulfil the credit requirements of the peasantry. As a result, there was huge dependency of cultivators on non-institutional sources. In order to correct this market failure and support agri-credit needs, agriculture was made one of the few priority sectors and lending obligation was imposed on the banking system to extend agri-loans for production and allied activities. This ground-breaking policy changed the rules of the game and resulted in a massive expansion of credit to the sector. Second is the Self-Help Group Bank Linkage Programme, introduced in 1992, essentially to reach the unbanked rural population which is deprived of credit due to collateral stipulations. This innovation in organizational structure picked up quickly in rural areas, especially among women groups, and gave real boost to financial inclusion. However, according to the experts' opinion, only a miniscule share of SHGs credit goes to the crop sector. Here, one needs to dig deeper to understand the challenges and find ways to improve their contribution in agriculture. Third is the innovation in credit instrument, the Kisan Credit Card (KCC), introduced in 1998, that improved the reach of formal credit to the last mile significantly. This innovation simplified the procedures to avail loan for farmers (one-time documentation) and set a self-regulatory mechanism for repayment. One of the key highlights is the inclusion of tenant farmers, oral lessees and sharecroppers in the ambit of agri-credit. Fourth is the innovation in both organizational structure as well as technology through the Business Correspondent/Facilitator Model, introduced in 2006. This innovation overcame the challenge imposed by inflexibility of brick and mortar branch banking. Aided by advanced digital devices (such as point of service handheld devices, mobile phones, biometric scanners and micro-ATMs), the model provides efficient and cost-effective banking services in the un-banked and remote corners of the country. Below sub-sections discuss these innovations in detail with a view to highlight rapid strides in formal institutional credit and further scope of improvement as a way forward.

5.1 Priority Sector Lending, 1969

The policy innovation of Priority Sector Lending (PSL) changed the sectoral orientation of bank lending in the country. To ensure that commercial banks play a developmental role in the country, a certain proportion of the total net bank credit was mandated to be extended to priority areas including agriculture, allied activities and small-scale and cottage industries. Initially, a target of 33 percent was set (1975), which was raised to 40 percent (1979). Later in 1980, sub-targets were set and 16 percent of lending was targeted exclusively for agriculture and allied sectors (Shah, Rao, & Shankar, 2007) which was subsequently raised to 18 percent. Until 1993, only direct finances were considered as a part of priority sector lending for agriculture and allied activities. From 1993 onwards, direct and indirect finance was together considered for meeting the priority sector target. In 1994, loans up to INR 500,000 for financing distribution of inputs for allied activities in agriculture for cattle and poultry feed were also considered under indirect financing. Later, in 2004 it was revised to INR 4 million. From 1996 onwards, loans to dealers in drip irrigation, sprinkler irrigation and agriculture machinery were considered in indirect financing. From 2000 onwards, loans from banks to NBFCs (non-banking financial companies) for lending to agriculture were considered as indirect financing. From 2001, loans extended under the scheme for financing agri-clinics and agri-business centres came under the definition. In the same years, the subscription of bonds issued by the REC (rural electrification

corporation) for financing pump sets came under this definition (Hoda & Terway, 2018). However, this was discontinued later. In 2002, loans for the construction and running of storage facilities in the producing area and loans to cold storage facilities used for hiring or storing mainly agricultural produce were considered as indirect finance to agriculture (Hoda & Terway, 2018). However, from 2004 the location barrier was removed that was previously confined to rural area. From 2007, two-thirds of loans given to corporate, partnership firms for agriculture and allied activities in excess of INR 10 million was considered, but as per the master circular on priority lending released by RBI, this restriction of two-third of loans was removed and the limit of INR 10 million was raised to INR 20 million. Since 2014, banks could make investments in the Rural Infrastructure Development Fund (RIDF), which would be counted as a part of indirect lending under priority sector lending (Hoda & Terway, 2018). However, under the recent revised PSL guidelines of 2015, the distinction between direct and indirect agricultural lending has been dispensed and eligible activities include 'farm credit', 'agri-infrastructure' and 'ancillary activities' and within the 18 percent target towards agriculture, a sub-target of 8 percent of the ANBC for small and marginal farmers has been introduced¹⁸. This target-based approach has reaped benefits, as the credit outstanding to such farmers has shown an increase of 32 percent from 2016 to 2018. But overall, it may be noted that the definition of PSL to include indirect finance has expanded the scope of agri-credit. However, to keep our series of agri-credit comparable over years, we have restricted our analysis basically to direct credit to agriculture.

Innovation of Priority Sector Lending Certificates (PSLCs)

To ensure the efficient implementation of the priority sector lending mandate, allow the banks to leverage on their comparative strength (in respect to their sectoral domain expertise and geographical advantage) and to avoid the compulsion of distributing the energy and efforts on every sector/sub-sector under priority sectors, a new innovation in the form of Priority Sector Lending Certificates has been introduced to India in April 2016. Under this arrangement, the overachievers (who have exceeded the targeted amount of agricultural and other priority sector loans in their books) can sell excess priority sector obligations at a price to the underachievers (which fall short of their agriculture credit targets), with no transfer of risks or loan assets. These certificates are tradable among banks over the Reserve Bank's electronic platform, called e-Kuber. It helps rural banks earn an extra income for their sustainability. Four kinds of PSLCs, viz., PSLC – Agriculture (PSLC-A); PSLC – Small and Marginal Farmers (PSLCSM); PSLC – Micro Enterprises (PSLC-ME); and PSLC – General (PSLC-G), can be bought and sold via the platform in order to meet the applicable priority sector targets and sub-targets (Reserve Bank of India, 2018).

5.2 Self-Help Group Bank Linkage Programme, 1992

Launched by the National Bank for Agriculture and Rural Development (NABARD), the Self Help Group (SHG)-Bank Linkage Programme (SBLP) is an innovation in the organizational structure that harnessed the flexibility of the informal system with the strength and affordability of the formal system (NABARD, 2018). The idea of introducing the programme was conceived mainly from the successful experiences of the financial institutions viz. Grameen Bank (GB) in Bangladesh, Bank Rakyat Indonesia Unit Desa (BRI) and Badan Kredit Kecamatan (BKK) in Indonesia and Bank for Agriculture and Agricultural Credits (BAAC) in Thailand etc. (Gulati & Bathla, 2002).

Under the program, micro credit is extended collectively to SHGs, which are usually tied up with the savings of the members of the group, for lending within the group, without any collateral. The ratio of savings linked to loans varies from 1:1 to 1:4 and in case of matured groups, even loans of more than four times the savings are given. However, there is a set of by-laws such as rules for monthly savings, lending procedures, periodicity and timing of meetings, penalties for default, etc. which are devised and agreed by the members themselves. These SHGs could be merely savings and credit groups or additionally they can also be undertaking activities, such as joint farming, watershed development and

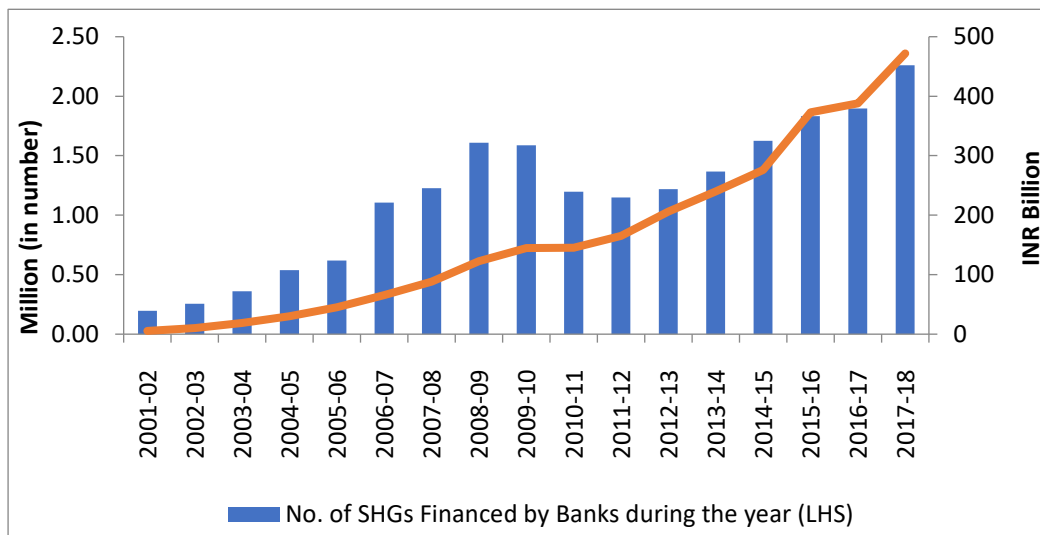
¹⁸ Applicable w.e.f. FY 2016

non-farm activities etc. Also, there are studies which report that women-run SHGs are better managed with much greater sense of responsibility and commitment (Pitt & Khandker, 1998).

The SHG-Bank Linkage Programme has expanded at a fast pace in India to evolve into the largest microfinance programme in the world (NABARD, 2018). Beginning as a pilot in 1992 with 500 SHGs, by March 2018, SBLP covered about 8.7 million SHGs (cumulatively) touching near 110 million households. Of 8.7 million SHGs, cumulatively 5.02 million SHGs have outstanding bank loans of INR 755.98 billion to the Banks. The total deposits of SHGs with banks were to the tune of INR 195.9 billion during 2017-18. There are more than 100 Scheduled Banks, 300 District Central Cooperative Banks, 27 State Rural livelihood Missions and over 5000 NGOs engaged in the Self Help Group Bank Linkage Programme (NABARD, 2018).

Figure 15 highlights the per annum increase in the number of SHGs credit linked with banks, increasing from 0.2 million in 2001-02 to 2.3 million in 2017-18. In addition, bank loan of INR 472 billion (including repeat loans) were disbursed to these SHGs during 2017-18 (at an average of INR 2, 09,000 per SHG), up from INR 5.45 billion in 2001-02.

Figure 15: No. of SHGs credit-linked with banks (during the year) and amount of loans disbursed



Source: Handbook of Statistics on the Indian Economy: 2017-18 (Reserve Bank of India, 2018)

However, according to the experts' opinion, only a very small share of SHGs credit goes to agriculture. They primarily cater to non-farm activities in rural areas. Therefore, one needs to dig deeper to understand the challenges and find ways to improve the contribution of bank linked SHGs in agriculture.

5.3 Kisan Credit Card, 1998

The Kisan Credit Card is an interesting innovation in credit instruments that improved the reach of formal credit significantly to the last mile, in a timely and effective manner. The idea behind the concept was to make easy, hassle free and timely disbursement of credit to farmers as well as give them flexibility to utilize loans for various purposes. One of the key highlights of the innovation is its inclusiveness in terms of covering smallholders (known as joint liability groups), tenant farmers, oral lessees and sharecroppers in the ambit of formal credit who otherwise would have never been able to avail institutional credit due to collateral stipulations. The scope of the scheme was enhanced in 2004 to include investment credit viz. allied and non-farm activities and some consumption requirement. KCC provides a self-regulatory mechanism and revolving cash credit facility that allows any number of withdrawals and repayment within the sanctioned credit limit by the farmers (Satish, 2012). Recently,

the government has digitally empowered farmers by replacing the passbook loan system with ATM-enabled debit cards with easy withdrawal and loan disbursement facilities. Also, the Department of Financial Services of the Government of India, has constituted a working group to review the KCC scheme with a view to make it a smart-cum-debit card. Since its inception, the KCC scheme has made rapid progress. The government documents (like Economic Survey) claim that the cumulative number of KCC issued has crossed 150 million. This should have taken care of almost the entire peasantry. But there are no detailed studies on their current use. In RBI's report on Trend and Progress of Banking in India, 2017-18, it is mentioned that only 69.21 million KCCs are operational as of March 2018. However, the NAFIS survey presented a somewhat puzzling figure that only about 10 percent of farmers have used KCC in the agricultural year 2015-16. One needs to dig deeper to understand the dynamics of this better, and find ways to strengthen their reach and use. This is a potent instrument to ensure not only financial inclusion of small and marginal farmers but also ensure timely and affordable credit to the resource-constrained farmers' groups by overcoming the challenges of collateral stipulations.

5.4 Business Correspondent/Facilitators Model, 2006

At the turn of the century, the expansion of brick-and-mortar branches was limited, so to improve the penetration of formal banking and bridge the last mile reach problem, the Reserve Bank of India issued guidelines in January 2006¹⁹ for a branchless banking initiative in the rural areas through the Business Correspondents (BCs) and Business Facilitators (BFs) Model²⁰. This innovation in the organizational structure as well as technology, enabled banks to reach the unbanked rural population using the services of intermediaries called BCs/BFs (Ujjawal, Champatiray, Sadhu, & Mendiratta, 2015). The model leveraged digital technology (point of service handled devices; bio-metric scanners; smart phones etc.) to extend financial services at the doorstep across the geographical landscape. Initially, RBI allowed only non-governmental organizations (NGOs), microfinance institutions, registered nonbanking financial companies, and post offices to function as BCs (Sarika & Kumar, 2017). Later, in order to scale up the financial inclusion drive in a sustainable manner, the list expanded to include individuals like: retired bank employees; retired teachers; retired government employees and ex-servicemen; individual owners of small neighbourhood retail stores (also referred to as kirana shops); individual owners of medical and fair price shops; individual Public Call Office (PCO) operators, agents of small savings schemes of the government of India/insurance companies; individuals who own petrol pumps; and authorized functionaries of well-run Self Help Groups (SHGs) which are linked to banks. Any other individual including those operating Common Service Centres (CSCs) are also allowed to act as BCs of banks²¹.

RBI in 2010 adopted a phase-wise approach to extend banking facilities in all the unbanked villages in the country (Reserve Bank of India, 2016). During phase-I (2010-13), all unbanked villages with a population greater than 2,000 were identified and allotted to various banks (public sector banks, private sector banks and regional rural banks) through State Level Bankers' Committees (SLBCs) for coverage through various modes – Branch or BC or other modes such as ATMs, mobile vans, etc. During phase-I, as reported by SLBCs, banking outlets were opened in 74,414 unbanked villages with a

¹⁹ Vide notification DBOD.No.BL.BC. 58/22.01.001/2005-2006
(https://rbi.org.in/scripts/BS_CircularIndexDisplay.aspx?id=2718)

²⁰ According to the RBI guidelines, while the BCs are permitted to carry out transactions on behalf of the bank as agents, the BFs can refer clients, pursue the clients' proposal and facilitate the bank to carry out its transactions, but cannot transact on behalf of the bank (CAGP, 2016).

²¹ The salient features of this model primarily include identifying the potential customers in rural areas; advising/counselling rural populace about appropriate financial products, services and transactions; assisting them in completing formalities that are needed to transact with banks; educating them about terms of sanction, repayment and recovery; conducting post-sanction monitoring; putting through/helping in putting through basic and small-value transactions of rural people etc. (Kolloju, 2014)." In India, the State Bank of India has largest number of BCs or Customer Service Points (CSPs)²¹ who are working under BC model (State Bank of India, 2016).

population greater than 2,000 out of which 69,589 outlets were opened through BCs; 2,493 through branches and 2,332 by other modes. Whereas, the second phase (2013-16) was rolled out to provide banking services in unbanked villages with populations smaller than 2000. About 4,90,298 unbanked villages with a population smaller than 2000 were identified and allotted to various banks (public sector banks, private sector banks and regional rural banks) to ensure its coverage under the financial network in a time bound manner. As of June 30, 2016, SLBCs reported that 452,151 more villages have been provided with banking services; out of which 14,976 through branches, 416,636 through BCs and 20,539 by other modes viz. ATMs, mobile vans, etc. thereby achieving 92.2 percent of the target (Reserve Bank of India, 2016).

As of 31st March, 2018, it is reported that, BCs are providing financial services in villages through 515,317 BC outlets compared to 34,174 BC outlets in March, 2010. Also, nearly 289 million basic saving bank deposit accounts (BSBDAs) have been opened through BCs. In addition, BC-ICT (information and communication technology) transactions recorded a considerable increase during these years, from 26.5 million transactions recorded for the quarter ended March 2010, it increased to 1,489 million in the quarter ended March 2018 (Reserve Bank of India, 2018)

Bharat Banking – An initiative by IDFC

On the lines of the BCs/BFs model, the Infrastructure Development Finance Company (IDFC) Bank has adopted a unique outreach banking services model called 'Bharat Banking' wherein the relationship officers provide credit and savings products/services to households in the remote villages around a branch location. Equipped with tabs with software systems customised for the rural customer segments, micro-ATMs, portable printers, biometric devices etc. the officers ensure doorstep banking services to the last mile in its truest sense. IDFC micro-ATM outlets are an extension of its branch network. Being the first interoperable system, it is an innovation in banking that can service a customer of any bank using the Aadhaar bio-metric authentication system or debit card interface. (IDFC, 2018). Today, IDFC Banks' network of micro-ATMs (Figure 16) is spread across 16 states in the country (IDFC, 2018). Under the Bharat Banking initiative, for financing the agriculture and allied sectors, a 'value chain relationship' approach is followed, where after identifying various segments of value chains of different livelihoods and understanding the financial and banking needs of each segment (including crops, revenue cycles and earning seasons), the bank caters to the varying needs with suitable products and services (IDFC, 2018). Thus, with an expansion in their deposit base, capital and product range, Bharat Banking has the potential for improving the financial outreach to the unbanked sections and populace in the country.

Figure 16: Micro-ATM



Source: IDFC Bank website²²

While all this holds potential, the experiences so far are mixed and there is a general consensus that the BC/BF scheme has not taken off in the way it was envisioned in 2006. Banks' lending activities through BCs are negligible. The activities of BCs are typically limited to opening new deposit accounts for a commission (Bhoi, 2017). Therefore, the BC/BF model has not yet been tapped properly to the extent possible. Thus, there is a strong need for banks as well as BCs to first of all construct industry-wide data pertaining to business viability of the BC channel to chart out a long-term plan for scalability and sustainability of the model. Secondly, to make the model demand-driven, investments in market research are required to assess what clients really want, how much they are willing to pay and reasons for not using the current products/services being offered. This will help banks to understand what sort of training is adequate for the BCs/BFs and how to tailor services to cater consumer needs. Moreover, all stakeholders (RBI as well as banks) should create awareness to promote the BC model among farmers in agriculture and allied activities.

²² <https://www.idfcbank.com/personal-banking/payments/micro-atms.html>

6 Concluding Remarks and Way Forward

This section brings out inferences derived from the analysis and a way forward to make the agri-credit institution more efficient, inclusive and sustainable:

In agricultural credit, one of the major concerns of the lending institutions is to cover credit risks involved in extending loans to the farmers. However, no provisions are in place to cover the market risks faced by the farmers. One of the possible ways out is to link Farmer Producer Organizations (FPOs), marketing cooperatives and integrators with banks, as exemplified by the SHG-bank linkage programme. These producer organizations and integrators can be potential channels for extending credit to the farmers across the entire value chain. Organizing farmers into groups will enable them to reap the benefits of economies of scale as well as of assured markets for their produce. The poultry industry in India, for instance, is majorly organized and commercial (80 percent). Poultry farmers (operating on different farm sizes) are linked with big integrators such as Venkateshwara Hatcheries, Suguna poultry farm etc. through contracts where farmers raise poultry birds of certain quantity and quality at pre-determined prices and integrators provide inputs, technical guidance and credit along with the commitment to buy back the fully grown birds. This is a win-win model which covers market risks of farmers and credit risks of integrators. Liberal lending by banks to such mature business models and FPOs can ensure guaranteed returns with relatively low risks and uncertainties. In addition to ensure inclusiveness, FPOs with greater percentage of small and marginal farmers can be categorised as a priority area for extending loans.

Next, Kisan Credit Cards (KCCs) and Self-Help Group Bank Linkage Programme are two such innovations that have credibly improved the reach of formal credit to the last mile. The government documents (such as the Economic Survey) claim that the cumulative number of KCC issued has reached 150 million as of March 2016. But as already highlighted in the analysis, the NAFIS survey presented a somewhat puzzling figure that only about 10 percent of farmers have used KCC in the agricultural year 2015-16. As there are no detailed studies on KCC's current use, further research is needed to understand its dynamics better, and to find ways to strengthen its reach and use. Issuance of KCC in remote villages should be expedited to ensure financial inclusion of more farmers, especially of small and marginal ones. This will ensure timely and affordable credit to the resource-constrained farmers' groups by overcoming the challenges of collateral stipulations. In addition, KCCs should be made Aadhaar enabled and a centralized database should be created across the states to track the number of KCCs issued, in operation, amount of loan availed, defaults at any bank etc. by a farmer. Such a robust mechanism will ensure credit monitoring, which is absent from the current system. Another benefit of KCC is that it can also cater to the consumption credit needs of farming families.

As it is learnt that SHGs credit lending is a very small part of the overall credit needs of the agricultural sector, it is a matter of further study to look at the challenges involved and to find ways to incentivize credit in agriculture and allied sector through SHGs.

Further, to ensure financial inclusion of small and marginal farmers, the banking system also needs to adhere to the Priority Sector Lending (PSL) guidelines issued by the RBI. They mandate that at least 8 percent of Adjusted Net Bank Credit (ANBC) or credit equivalent amount of off-balance sheet exposure, whichever is higher, be for small and marginal farmers (out of 18 percent stipulated for the agricultural sector). Tradable PSL certificates are a step in the right direction. However, the data for direct and indirect credit should continue to be captured separately for policy evaluation overtime and to ensure that the banks do not short-change farmers and lend proportionally more to activities that were previously included under indirect finances.

For efficiency and financial sustainability, the interest subvention scheme should focus on small and marginal farmers only and transactions should be tracked at the individual farmer level for transparency. As the ill effects of generalized debt waivers on financial health of the banking sector as well as on the credit culture are quite clear, such policy measures should be discontinued. Additionally,

to provide efficient credit delivery, unfolding innovative business models such as Bharat banking, Business Correspondent/Business Facilitator, and Joint Liability Group lending need scaling up.

Last, but not the least, the policy of interest subvention needs a serious review. A subvention of 5 percentage points, i.e., giving loans at 4 percent while the normal rate being 9 percent, seems to have led to significant diversion of agri-loans to non-agriculture purposes. As is shown in this paper, in some states, especially Kerala and some other southern states, agri-loans amount to substantially more than 100 percent of the value of agri-inputs. This is a clear indication that agri-loans are being used for other purposes. It is better to empower farmers by giving direct income support on per hectare basis rather than by hugely subsidising agriculture credit.

We hope with these improvements, the agri-credit system can serve the needs of the farming community even better, and it can also be a role model for many smallholder economies of Sub-Saharan Africa and South and Southeast Asia.

7 References

- Bhoi, B. K. (2017, December 25). Why financial inclusion has not taken off. *The Business Line*.
- Bisaliah, S., Dev, S. M., & Saifullah, S. (2013). *Investment in Indian Agriculture: Macro and*. Delhi: Academic Foundation.
- CAGP. (2016). *Business Correspondents and Facilitators: Pathway to Financial Inclusion?* Delhi: Access Development Services.
- Central Statistics Office. (2018). *National Accounts Statistics*. Delhi: Ministry of Statistics & Programme Implementation.
- Chakrabarty, T. K. (2005). *Rural Income: Some Evidence of Effect of Rural Credit During Last Three Decades*. New Delhi: Reserve Bank of India Publication.
- Chavan, P. (2013). *Credit and Capital Formation in Agriculture: A Growing Disconnect*. *Social Scientist*.
- Frost & Sullivan. (2009). "Bringing financial services to the masses: An NCR White Paper on Financial Inclusion. NCR Corporation.
- Ganguly, K., Gulati, A., & Braun, J. V. (2017). ZEF Working Paper 159: Innovations spearheading the next transformations in India's Agriculture. ZEF Centre for Development Research, University of Bonn.
- Government of India. (2018). *Agriculture Census 2015-16*. Delhi: Agriculture Census Division, Department of Agriculture, Co-operation & Farmers Welfare. Ministry of Agriculture & Farmers Welfare. Government of India.
- Government of India. (2018). *Doubling Farmers' Income (Volume VII): Input Management for Resource Use Efficiency*. New Delhi: Ministry of Agriculture & Farmers' Welfare.
- Gulati, A., & Bathla, S. (2002). *Capital Formation in Indian Agriculture: Trends, Composition and Implications for Growth*. Mumbai: NABARD.
- Gulati, A., & Bathla, S. (2002). *Institutional Credit to Indian Agriculture: Defaults and Policy Options*. Mumbai: National Bank for Agriculture and Rural Development (NABARD).
- Hoda, A., & Terway, P. (2018). *Agricultural Credit Subsidy in India*. In A. Gulati, M. Ferroni, & Y. Zhou, *Supporting Indian Farms the Smart Way* (pp. 215-254). Delhi: Academic Foundation.
- Hoda, A., & Terway, P. (2015). *Credit Policy for Agriculture in India - An Evaluation*. New Delhi: Indian Council for Research on International Economic Relations (Working Paper 302).
- IDFC. (2018). *Bharat Banking*. Retrieved February 21, 2019, from www.idfcbank.com: <https://www.idfcbank.com/personal-banking/payments.html>
- Khan, H. R. (2012, July 23). *Issues and Challenges in Financial Inclusion: Policies, Partnerships, Processes and Products*. *RBI Monthly Bulletin*, pp. 1447-57.
- Kolloju, N. (2014). *Business Correspondent Model vis-à-vis Financial Inclusion in India: New practice of Banking to the Poor*. *International Journal of Scientific and Research Publications*. Volume 4, Issue 1. ISSN 2250-3153 .
- Kumar, A., Mishra, A. K., Saroj, S., & Joshi, P. K. (2017). *Institutional versus Noninstitutional Credit to Agricultural Households in India: Evidence on Impact from a National Farmers' Survey*. South Asia Office: IFPRI Discussion Paper 01614.
- Mehrotra, N. (2011). *Agriculture Credit: The Truth behind the Aggregate Numbers*. *Economic and Political Weekly*, 46(42).
- Mohan, R. (2004). *Agricultural Credit in India: Status, Issues and Future Agenda*. Reserve Bank of India Bulletin.
- NABARD. (2018). *All India Rural Financial Inclusion Survey (NAFIS) 2016-17*. Mumbai: National Bank for Agriculture and Rural Development (NABARD).

- NABARD. (2018). Status of Microfinance in India: 2017-18. Mumbai: Micro Credit Innovations Department, National Bank for Agriculture and Rural Development (NABARD).
- NSSO. (2013). All India Debt and Investment Survey (AIDIS): 70th Round. Delhi: National Sample Survey Office (NSSO), Ministry of Statistics and Programme Implementation, Government of India.
- NSSO. (2013). Situation Assessment Survey of Agricultural Households in India, 70th Round. Delhi: National Sample Survey Office (NSSO), Ministry of Statistics and Programme Implementation.
- Pitt, M. M., & Khandker, S. R. (1998). The Impact of Group-based Credit Programmes on Poor Households in Bangladesh: Does the gender of participants matter? *Journal of Political Economy*, Vol 106, No 5.
- RBI. (2017). Handbook of Statistics on the Indian Economy. Mumbai: Reserve Bank of India.
- RBI. (2018). Handbook of Statistics on the Indian Economy. Mumbai: Reserve Bank of India.
- Reserve Bank of India. (2016, December 29). Financial Inclusion: Policy and Progress. Retrieved February 21, 2019, from www.rbi.org.in:
[https://www.rbi.org.in/scripts/PublicationsView.aspx?id=17412\](https://www.rbi.org.in/scripts/PublicationsView.aspx?id=17412)
- Reserve Bank of India. (2018). Annual Report 2017-18. Mumbai: Reserve Bank of India (RBI).
- Reserve Bank of India. (2018). Handbook of Statistics on the Indian Economy. Mumbai: Reserve Bank of India.
- Reserve Bank of India. (2018). Trend and Progress of Banking in India. Mumbai: Reserve Bank of India.
- Reserve of India. (2015, April 23). Master Direction: Priority Sector Lending - Targets and Classification. Retrieved February 21, 2019, from www.rbi.org.in:
<https://www.rbi.org.in/Scripts/NotificationUser.aspx?id=10497&Mode=0#AS1>
- Sarika, & Kumar, R. (2017). Business correspondent Model an innovative tool for Financial Inclusion. *International Journal of Research in Finance & Marketing*. Vol. 7, Issue 6, ISSN(o): 2231-5985 , 124-130.
- Satish, P. (2012). Innovations in Agricultural Credit Market – Rationalisation of Policy Response. *Indian Journal of Agricultural Economics*, Vol.67.
- Shah, M., Rao, R., & Shankar, P. V. (2007). Rural Credit in 20th Century India: Overview of History and Perspectives. *Economic and Political Weekly*, 1351-1364.
- State Bank of India. (2016). Business Correspondent (BC) Arrangement. Retrieved February 28, 2019, from www.sbi.co.in: <https://www.sbi.co.in/portal/web/agriculture-banking/business-correspondent-bc-arrangement>
- Ujjawal, A., Champatiray, A. K., Sadhu, S., & Mendiratta, T. (2015). Business Correspondent Model: An Analysis of the Financial Viability of Customer Service Providers and Client Satisfaction. IFMR Research: Centre for Microfinance.
- Vallasser, A. N. (2015). Trends and Patterns of Agricultural Credit in India during the post reform period. Kerala: Department of Applied Economics, Cochin University of Science and Technology.

1. Evers, Hans-Dieter and Solvay Gerke (2005). Closing the Digital Divide: Southeast Asia's Path Towards a Knowledge Society.
2. Bhuiyan, Shajahan and Hans-Dieter Evers (2005). Social Capital and Sustainable Development: Theories and Concepts.
3. Schetter, Conrad (2005). Ethnicity and the Political Reconstruction of Afghanistan.
4. Kassahun, Samson (2005). Social Capital and Community Efficacy. In Poor Localities of Addis Ababa Ethiopia.
5. Fuest, Veronika (2005). Policies, Practices and Outcomes of Demand-oriented Community Water Supply in Ghana: The National Community Water and Sanitation Programme 1994 – 2004.
6. Menkhoff, Thomas and Hans-Dieter Evers (2005). Strategic Groups in a Knowledge Society: Knowledge Elites as Drivers of Biotechnology Development in Singapore.
7. Mollinga, Peter P. (2005). The Water Resources Policy Process in India: Centralisation, Polarisation and New Demands on Governance.
8. Evers, Hans-Dieter (2005). Wissen ist Macht: Experten als Strategische Gruppe.
- 8.a Evers, Hans-Dieter and Solvay Gerke (2005). Knowledge is Power: Experts as Strategic Group.
9. Fuest, Veronika (2005). Partnerschaft, Patronage oder Paternalismus? Eine empirische Analyse der Praxis universitärer Forschungs Kooperation mit Entwicklungsländern.
10. Laube, Wolfram (2005). Promise and Perils of Water Reform: Perspectives from Northern Ghana.
11. Mollinga, Peter P. (2004). Sleeping with the Enemy: Dichotomies and Polarisation in Indian Policy Debates on the Environmental and Social Effects of Irrigation.
12. Wall, Caleb (2006). Knowledge for Development: Local and External Knowledge in Development Research.
13. Laube, Wolfram and Eva Youkhana (2006). Cultural, Socio-Economic and Political Constraints for Virtual Water Trade: Perspectives from the Volta Basin, West Africa.
14. Hornidge, Anna-Katharina (2006). Singapore: The Knowledge-Hub in the Straits of Malacca.
15. Evers, Hans-Dieter and Caleb Wall (2006). Knowledge Loss: Managing Local Knowledge in Rural Uzbekistan.
16. Youkhana, Eva; Lautze, J. and B. Barry (2006). Changing Interfaces in Volta Basin Water Management: Customary, National and Transboundary.
17. Evers, Hans-Dieter and Solvay Gerke (2006). The Strategic Importance of the Straits of Malacca for World Trade and Regional Development.
18. Hornidge, Anna-Katharina (2006). Defining Knowledge in Germany and Singapore: Do the Country-Specific Definitions of Knowledge Converge?
19. Mollinga, Peter M. (2007). Water Policy – Water Politics: Social Engineering and Strategic Action in Water Sector Reform.
20. Evers, Hans-Dieter and Anna-Katharina Hornidge (2007). Knowledge Hubs Along the Straits of Malacca.
21. Sultana, Nayeem (2007). Trans-National Identities, Modes of Networking and Integration in a Multi-Cultural Society. A Study of Migrant Bangladeshis in Peninsular Malaysia.
22. Yalcin, Resul and Peter M. Mollinga (2007). Institutional Transformation in Uzbekistan's Agricultural and Water Resources Administration: The Creation of a New Bureaucracy.
23. Menkhoff, T.; Loh, P. H. M.; Chua, S. B.; Evers, H.-D. and Chay Yue Wah (2007). Riau Vegetables for Singapore Consumers: A Collaborative Knowledge-Transfer Project Across the Straits of Malacca.
24. Evers, Hans-Dieter and Solvay Gerke (2007). Social and Cultural Dimensions of Market Expansion.
25. Obeng, G. Y.; Evers, H.-D.; Akuffo, F. O., Braimah, I. and A. Brew-Hammond (2007). Solar PV Rural Electrification and Energy-Poverty Assessment in Ghana: A Principal Component Analysis.

26. Eguavoen, Irit; E. Youkhana (2008). Small Towns Face Big Challenge. The Management of Piped Systems after the Water Sector Reform in Ghana.
27. Evers, Hans-Dieter (2008). Knowledge Hubs and Knowledge Clusters: Designing a Knowledge Architecture for Development
28. Ampomah, Ben Y.; Adjei, B. and E. Youkhana (2008). The Transboundary Water Resources Management Regime of the Volta Basin.
29. Saravanan.V.S.; McDonald, Geoffrey T. and Peter P. Mollinga (2008). Critical Review of Integrated Water Resources Management: Moving Beyond Polarised Discourse.
30. Laube, Wolfram; Awo, Martha and Benjamin Schraven (2008). Erratic Rains and Erratic Markets: Environmental change, economic globalisation and the expansion of shallow groundwater irrigation in West Africa.
31. Mollinga, Peter P. (2008). For a Political Sociology of Water Resources Management.
32. Hauck, Jennifer; Youkhana, Eva (2008). Histories of water and fisheries management in Northern Ghana.
33. Mollinga, Peter P. (2008). The Rational Organisation of Dissent. Boundary concepts, boundary objects and boundary settings in the interdisciplinary study of natural resources management.
34. Evers, Hans-Dieter; Gerke, Solvay (2009). Strategic Group Analysis.
35. Evers, Hans-Dieter; Benedikter, Simon (2009). Strategic Group Formation in the Mekong Delta - The Development of a Modern Hydraulic Society.
36. Obeng, George Yaw; Evers, Hans-Dieter (2009). Solar PV Rural Electrification and Energy-Poverty: A Review and Conceptual Framework With Reference to Ghana.
37. Scholtes, Fabian (2009). Analysing and explaining power in a capability perspective.
38. Eguavoen, Irit (2009). The Acquisition of Water Storage Facilities in the Abay River Basin, Ethiopia.
39. Hornidge, Anna-Katharina; Mehmood Ul Hassan; Mollinga, Peter P. (2009). 'Follow the Innovation' – A joint experimentation and learning approach to transdisciplinary innovation research.
40. Scholtes, Fabian (2009). How does moral knowledge matter in development practice, and how can it be researched?
41. Laube, Wolfram (2009). Creative Bureaucracy: Balancing power in irrigation administration in northern Ghana.
42. Laube, Wolfram (2009). Changing the Course of History? Implementing water reforms in Ghana and South Africa.
43. Scholtes, Fabian (2009). Status quo and prospects of smallholders in the Brazilian sugarcane and ethanol sector: Lessons for development and poverty reduction.
44. Evers, Hans-Dieter; Genschick, Sven; Schraven, Benjamin (2009). Constructing Epistemic Landscapes: Methods of GIS-Based Mapping.
45. Saravanan V.S. (2009). Integration of Policies in Framing Water Management Problem: Analysing Policy Processes using a Bayesian Network.
46. Saravanan V.S. (2009). Dancing to the Tune of Democracy: Agents Negotiating Power to Decentralise Water Management.
47. Huu, Pham Cong; Rhlers, Eckart; Saravanan, V. Subramanian (2009). Dyke System Planing: Theory and Practice in Can Tho City, Vietnam.
48. Evers, Hans-Dieter; Bauer, Tatjana (2009). Emerging Epistemic Landscapes: Knowledge Clusters in Ho Chi Minh City and the Mekong Delta.
49. Reis, Nadine; Mollinga, Peter P. (2009). Microcredit for Rural Water Supply and Sanitation in the Mekong Delta. Policy implementation between the needs for clean water and 'beautiful latrines'.
50. Gerke, Solvay; Ehlert, Judith (2009). Local Knowledge as Strategic Resource: Fishery in the Seasonal Floodplains of the Mekong Delta, Vietnam

51. Schraven, Benjamin; Eguavoen, Irit; Manske, Günther (2009). Doctoral degrees for capacity development: Results from a survey among African BiGS-DR alumni.
52. Nguyen, Loan (2010). Legal Framework of the Water Sector in Vietnam.
53. Nguyen, Loan (2010). Problems of Law Enforcement in Vietnam. The Case of Wastewater Management in Can Tho City.
54. Oberkircher, Lisa et al. (2010). Rethinking Water Management in Khorezm, Uzbekistan. Concepts and Recommendations.
55. Waibel, Gabi (2010). State Management in Transition: Understanding Water Resources Management in Vietnam.
56. Saravanan V.S.; Mollinga, Peter P. (2010). Water Pollution and Human Health. Transdisciplinary Research on Risk Governance in a Complex Society.
57. Vormoor, Klaus (2010). Water Engineering, Agricultural Development and Socio-Economic Trends in the Mekong Delta, Vietnam.
58. Hornidge, Anna-Katharina; Kurfürst, Sandra (2010). Envisioning the Future, Conceptualising Public Space. Hanoi and Singapore Negotiating Spaces for Negotiation.
59. Mollinga, Peter P. (2010). Transdisciplinary Method for Water Pollution and Human Health Research.
60. Youkhana, Eva (2010). Gender and the development of handicraft production in rural Yucatán/Mexico.
61. Naz, Farhat; Saravanan V. Subramanian (2010). Water Management across Space and Time in India.
62. Evers, Hans-Dieter; Nordin, Ramli, Nienkemoer, Pamela (2010). Knowledge Cluster Formation in Peninsular Malaysia: The Emergence of an Epistemic Landscape.
63. Mehmood Ul Hassan; Hornidge, Anna-Katharina (2010). 'Follow the Innovation' – The second year of a joint experimentation and learning approach to transdisciplinary research in Uzbekistan.
64. Mollinga, Peter P. (2010). Boundary concepts for interdisciplinary analysis of irrigation water management in South Asia.
65. Noelle-Karimi, Christine (2006). Village Institutions in the Perception of National and International Actors in Afghanistan. **(Amu Darya Project Working Paper No. 1)**
66. Kuzmits, Bernd (2006). Cross-bordering Water Management in Central Asia. **(Amu Darya Project Working Paper No. 2)**
67. Schetter, Conrad; Glassner, Rainer; Karokhail, Masood (2006). Understanding Local Violence. Security Arrangements in Kandahar, Kunduz and Paktia. **(Amu Darya Project Working Paper No. 3)**
68. Shah, Usman (2007). Livelihoods in the Asqalan and Sufi-Qarayateem Canal Irrigation Systems in the Kunduz River Basin. **(Amu Darya Project Working Paper No. 4)**
69. ter Steege, Bernie (2007). Infrastructure and Water Distribution in the Asqalan and Sufi-Qarayateem Canal Irrigation Systems in the Kunduz River Basin. **(Amu Darya Project Working Paper No. 5)**
70. Mielke, Katja (2007). On The Concept of 'Village' in Northeastern Afghanistan. Explorations from Kunduz Province. **(Amu Darya Project Working Paper No. 6)**
71. Mielke, Katja; Glassner, Rainer; Schetter, Conrad; Yarash, Nasratullah (2007). Local Governance in Warsaj and Farkhar Districts. **(Amu Darya Project Working Paper No. 7)**
72. Meininghaus, Esther (2007). Legal Pluralism in Afghanistan. **(Amu Darya Project Working Paper No. 8)**
73. Yarash, Nasratullah; Smith, Paul; Mielke, Katja (2010). The fuel economy of mountain villages in Ishkamish and Burka (Northeast Afghanistan). Rural subsistence and urban marketing patterns. **(Amu Darya Project Working Paper No. 9)**
74. Oberkircher, Lisa (2011). 'Stay – We Will Serve You Plov!'. Puzzles and pitfalls of water research in rural Uzbekistan.
75. Shtaltovna, Anastasiya; Hornidge, Anna-Katharina; Mollinga, Peter P. (2011). The Reinvention of Agricultural Service Organisations in Uzbekistan – a Machine-Tractor Park in the Khorezm Region.

76. Stellmacher, Till; Grote, Ulrike (2011). Forest Coffee Certification in Ethiopia: Economic Boon or Ecological Bane?
77. Gatzweiler, Franz W.; Baumüller, Heike; Ladenburger, Christine; von Braun, Joachim (2011). Marginality. Addressing the roots causes of extreme poverty.
78. Mielke, Katja; Schetter, Conrad; Wilde, Andreas (2011). Dimensions of Social Order: Empirical Fact, Analytical Framework and Boundary Concept.
79. Yarash, Nasratullah; Mielke, Katja (2011). The Social Order of the Bazaar: Socio-economic embedding of Retail and Trade in Kunduz and Imam Sahib
80. Baumüller, Heike; Ladenburger, Christine; von Braun, Joachim (2011). Innovative business approaches for the reduction of extreme poverty and marginality?
81. Ziai, Aram (2011). Some reflections on the concept of 'development'.
82. Saravanan V.S., Mollinga, Peter P. (2011). The Environment and Human Health - An Agenda for Research.
83. Eguavoen, Irit; Tesfai, Weyni (2011). Rebuilding livelihoods after dam-induced relocation in Koga, Blue Nile basin, Ethiopia.
84. Eguavoen, I., Sisay Demeku Derib et al. (2011). Digging, damming or diverting? Small-scale irrigation in the Blue Nile basin, Ethiopia.
85. Genschick, Sven (2011). Pangasius at risk - Governance in farming and processing, and the role of different capital.
86. Quy-Hanh Nguyen, Hans-Dieter Evers (2011). Farmers as knowledge brokers: Analysing three cases from Vietnam's Mekong Delta.
87. Poos, Wolf Henrik (2011). The local governance of social security in rural Surkhondarya, Uzbekistan. Post-Soviet community, state and social order.
88. Graw, Valerie; Ladenburger, Christine (2012). Mapping Marginality Hotspots. Geographical Targeting for Poverty Reduction.
89. Gerke, Solvay; Evers, Hans-Dieter (2012). Looking East, looking West: Penang as a Knowledge Hub.
90. Turaeva, Rano (2012). Innovation policies in Uzbekistan: Path taken by ZEFa project on innovations in the sphere of agriculture.
91. Gleisberg-Gerber, Katrin (2012). Livelihoods and land management in the Ioba Province in south-western Burkina Faso.
92. Hiemenz, Ulrich (2012). The Politics of the Fight Against Food Price Volatility – Where do we stand and where are we heading?
93. Baumüller, Heike (2012). Facilitating agricultural technology adoption among the poor: The role of service delivery through mobile phones.
94. Akpabio, Emmanuel M.; Saravanan V.S. (2012). Water Supply and Sanitation Practices in Nigeria: Applying Local Ecological Knowledge to Understand Complexity.
95. Evers, Hans-Dieter; Nordin, Ramli (2012). The Symbolic Universe of Cyberjaya, Malaysia.
96. Akpabio, Emmanuel M. (2012). Water Supply and Sanitation Services Sector in Nigeria: The Policy Trend and Practice Constraints.
97. Boboyorov, Hafiz (2012). Masters and Networks of Knowledge Production and Transfer in the Cotton Sector of Southern Tajikistan.
98. Van Assche, Kristof; Hornidge, Anna-Katharina (2012). Knowledge in rural transitions - formal and informal underpinnings of land governance in Khorezm.
99. Eguavoen, Irit (2012). Blessing and destruction. Climate change and trajectories of blame in Northern Ghana.
100. Callo-Concha, Daniel; Gaiser, Thomas and Ewert, Frank (2012). Farming and cropping systems in the West African Sudanian Savanna. WASCAL research area: Northern Ghana, Southwest Burkina Faso and Northern Benin.

101. Sow, Papa (2012). Uncertainties and conflicting environmental adaptation strategies in the region of the Pink Lake, Senegal.
102. Tan, Siwei (2012). Reconsidering the Vietnamese development vision of “industrialisation and modernisation by 2020”.
103. Ziai, Aram (2012). Postcolonial perspectives on ‘development’.
104. Kelboro, Girma; Stellmacher, Till (2012). Contesting the National Park theorem? Governance and land use in Nech Sar National Park, Ethiopia.
105. Kotsila, Panagiota (2012). “Health is gold”: Institutional structures and the realities of health access in the Mekong Delta, Vietnam.
106. Mandler, Andreas (2013). Knowledge and Governance Arrangements in Agricultural Production: Negotiating Access to Arable Land in Zarafshan Valley, Tajikistan.
107. Tsegai, Daniel; McBain, Florence; Tischbein, Bernhard (2013). Water, sanitation and hygiene: the missing link with agriculture.
108. Pangaribowo, Evita Hanie; Gerber, Nicolas; Torero, Maximo (2013). Food and Nutrition Security Indicators: A Review.
109. von Braun, Joachim; Gerber, Nicolas; Mirzabaev, Alisher; Nkonya Ephraim (2013). The Economics of Land Degradation.
110. Stellmacher, Till (2013). Local forest governance in Ethiopia: Between legal pluralism and livelihood realities.
111. Evers, Hans-Dieter; Purwaningrum, Farah (2013). Japanese Automobile Conglomerates in Indonesia: Knowledge Transfer within an Industrial Cluster in the Jakarta Metropolitan Area.
112. Waibel, Gabi; Benedikter, Simon (2013). The formation water user groups in a nexus of central directives and local administration in the Mekong Delta, Vietnam.
113. Ayaribilla Akudugu, Jonas; Laube, Wolfram (2013). Implementing Local Economic Development in Ghana: Multiple Actors and Rationalities.
114. Malek, Mohammad Abdul; Hossain, Md. Amzad; Saha, Ratnajit; Gatzweiler, Franz W. (2013). Mapping marginality hotspots and agricultural potentials in Bangladesh.
115. Siriwardane, Rapti; Winands, Sarah (2013). Between hope and hype: Traditional knowledge(s) held by marginal communities.
116. Nguyen, Thi Phuong Loan (2013). The Legal Framework of Vietnam’s Water Sector: Update 2013.
117. Shtaltovna, Anastasiya (2013). Knowledge gaps and rural development in Tajikistan. Agricultural advisory services as a panacea?
118. Van Assche, Kristof; Hornidge, Anna-Katharina; Shtaltovna, Anastasiya; Boboyorov, Hafiz (2013). Epistemic cultures, knowledge cultures and the transition of agricultural expertise. Rural development in Tajikistan, Uzbekistan and Georgia.
119. Schädler, Manuel; Gatzweiler, Franz W. (2013). Institutional Environments for Enabling Agricultural Technology Innovations: The role of Land Rights in Ethiopia, Ghana, India and Bangladesh.
120. Eguavo, Irit; Schulz, Karsten; de Wit, Sara; Weisser, Florian; Müller-Mahn, Detlef (2013). Political dimensions of climate change adaptation. Conceptual reflections and African examples.
121. Feuer, Hart Nadav; Hornidge, Anna-Katharina; Schetter, Conrad (2013). Rebuilding Knowledge. Opportunities and risks for higher education in post-conflict regions.
122. Dörendahl, Esther I. (2013). Boundary work and water resources. Towards improved management and research practice?
123. Baumüller, Heike (2013). Mobile Technology Trends and their Potential for Agricultural Development
124. Saravanan, V.S. (2013). “Blame it on the community, immunize the state and the international agencies.” An assessment of water supply and sanitation programs in India.

125. Ariff, Syamimi; Evers, Hans-Dieter; Ndah, Anthony Banyouko; Purwaningrum, Farah (2014). Governing Knowledge for Development: Knowledge Clusters in Brunei Darussalam and Malaysia.
126. Bao, Chao; Jia, Lili (2014). Residential fresh water demand in China. A panel data analysis.
127. Siriwardane, Rapti (2014). War, Migration and Modernity: The Micro-politics of the Hijab in Northeastern Sri Lanka.
128. Kirui, Oliver Kiptoo; Mirzabaev, Alisher (2014). Economics of Land Degradation in Eastern Africa.
129. Evers, Hans-Dieter (2014). Governing Maritime Space: The South China Sea as a Mediterranean Cultural Area.
130. Saravanan, V. S.; Mavalankar, D.; Kulkarni, S.; Nussbaum, S.; Weigelt, M. (2014). Metabolized-water breeding diseases in urban India: Socio-spatiality of water problems and health burden in Ahmedabad.
131. Zulfiqar, Ali; Mujeri, Mustafa K.; Badrun Nessa, Ahmed (2014). Extreme Poverty and Marginality in Bangladesh: Review of Extreme Poverty Focused Innovative Programmes.
132. Schwachula, Anna; Vila Seoane, Maximiliano; Hornidge, Anna-Katharina (2014). Science, technology and innovation in the context of development. An overview of concepts and corresponding policies recommended by international organizations.
133. Callo-Concha, Daniel (2014). Approaches to managing disturbance and change: Resilience, vulnerability and adaptability.
134. Mc Bain, Florence (2014). Health insurance and health environment: India's subsidized health insurance in a context of limited water and sanitation services.
135. Mirzabaev, Alisher; Guta, Dawit; Goedecke, Jann; Gaur, Varun; Börner, Jan; Virchow, Detlef; Denich, Manfred; von Braun, Joachim (2014). Bioenergy, Food Security and Poverty Reduction: Mitigating tradeoffs and promoting synergies along the Water-Energy-Food Security Nexus.
136. Iskandar, Deden Dinar; Gatzweiler, Franz (2014). An optimization model for technology adoption of marginalized smallholders: Theoretical support for matching technological and institutional innovations.
137. Bühler, Dorothee; Grote, Ulrike; Hartje, Rebecca; Ker, Bopha; Lam, Do Truong; Nguyen, Loc Duc; Nguyen, Trung Thanh; Tong, Kimsun (2015). Rural Livelihood Strategies in Cambodia: Evidence from a household survey in Stung Treng.
138. Amankwah, Kwadwo; Shtaltovna, Anastasiya; Kelboro, Girma; Hornidge, Anna-Katharina (2015). A Critical Review of the Follow-the-Innovation Approach: Stakeholder collaboration and agricultural innovation development.
139. Wiesmann, Doris; Biesalski, Hans Konrad; von Grebmer, Klaus; Bernstein, Jill (2015). Methodological review and revision of the Global Hunger Index.
140. Eguavo, Irit; Wahren, Julia (2015). Climate change adaptation in Burkina Faso: aid dependency and obstacles to political participation. Adaptation au changement climatique au Burkina Faso: la dépendance à l'aide et les obstacles à la participation politique.
141. Youkhana, Eva. Postponed to 2016 (147).
142. Von Braun, Joachim; Kalkuhl, Matthias (2015). International Science and Policy Interaction for Improved Food and Nutrition Security: toward an International Panel on Food and Nutrition (IPFN).
143. Mohr, Anna; Beuchelt, Tina; Schneider, Rafaël; Virchow, Detlef (2015). A rights-based food security principle for biomass sustainability standards and certification systems.
144. Husmann, Christine; von Braun, Joachim; Badiane, Ousmane; Akinbamijo, Yemi; Fatunbi, Oluwole Abiodun; Virchow, Detlef (2015). Tapping Potentials of Innovation for Food Security and Sustainable Agricultural Growth: An Africa-Wide Perspective.
145. Laube, Wolfram (2015). Changing Aspirations, Cultural Models of Success, and Social Mobility in Northern Ghana.
146. Narayanan, Sudha; Gerber, Nicolas (2016). Social Safety Nets for Food and Nutritional Security in India.

147. Youkhana, Eva (2016). Migrants' religious spaces and the power of Christian Saints – the Latin American Virgin of Cisne in Spain.
148. Grote, Ulrike; Neubacher, Frank (2016). Rural Crime in Developing Countries: Theoretical Framework, Empirical Findings, Research Needs.
149. Sharma, Rasadhika; Nguyen, Thanh Tung; Grote, Ulrike; Nguyen, Trung Thanh. Changing Livelihoods in Rural Cambodia: Evidence from panel household data in Stung Treng.
150. Kavegue, Afi; Eguavoen, Irit (2016). The experience and impact of urban floods and pollution in Ebo Town, Greater Banjul Area, in The Gambia.
151. Mbaye, Linguère Mously; Zimmermann, Klaus F. (2016). Natural Disasters and Human Mobility.
152. Gulati, Ashok; Manchanda, Stuti; Kacker, Rakesh (2016). Harvesting Solar Power in India.
153. Laube, Wolfram; Awo, Martha; Derbile, Emmanuel (2017). Smallholder Integration into the Global Shea Nut Commodity Chain in Northern Ghana. Promoting poverty reduction or continuing exploitation?
154. Attemene, Pauline; Eguavoen, Irit (2017). Effects of sustainability communication on environments and rural livelihoods.
155. Von Braun, Joachim; Kofol, Chiara (2017). Expanding Youth Employment in the Arab Region and Africa.
156. Beuchelt, Tina (2017). Buying green and social from abroad: Are biomass-focused voluntary sustainability standards useful for European public procurement?
157. Bekchanov, Maksud (2017). Potentials of Waste and Wastewater Resources Recovery and Re-use (RRR) Options for Improving Water, Energy and Nutrition Security.
158. Leta, Gerba; Kelboro, Girma; Stellmacher, Till; Hornidge, Anna-Katharina (2017). The agricultural extension system in Ethiopia: operational setup, challenges and opportunities.
159. Ganguly, Kavery; Gulati, Ashok; von Braun, Joachim (2017). Innovations spearheading the next transformations in India's agriculture.
160. Gebreselassie, Samuel; Haile Mekbib G.; Kalkuhl, Matthias (2017). The Wheat Sector in Ethiopia: Current Status and Key Challenges for Future Value Chain Development.
161. Jemal, Omarsherif Mohammed, Callo-Concha, Daniel (2017). Potential of Agroforestry for Food and Nutrition Security of Small-scale Farming Households.
162. Berga, Helen; Ringler, Claudia; Bryan, Elizabeth; El Didi, Hagar; Elnasikh Sara (2017). Addressing Transboundary Cooperation in the Eastern Nile through the Water-Energy-Food Nexus. Insights from an E-survey and Key Informant Interviews.
163. Bekchanov, Maksud (2017). Enabling Environment for Waste and Wastewater Recycling and Reuse Options in South Asia: the case of Sri Lanka.
164. Kirui, Oliver Kiptoo; Kozicka, Martha (2018). Vocational Education and Training for Farmers and Other Actors in the Agri-Food Value Chain in Africa.
165. Christinck, Anja; Rattunde, Fred; Kergna, Alpha; Mulinge, Wellington; Weltzien, Eva (2018). Identifying Options for the Development of Sustainable Seed Systems - Insights from Kenya and Mali.
166. Tambo, Justice A. (2018). Recognizing and rewarding farmers' creativity through contests: experiences and insights from four African countries.
167. von Braun, Joachim (2018). Innovations to Overcome the Increasingly Complex Problems of Hunger.
168. Bechanov, Maksud; Evia, Pablo (2018). Resources Recovery and Reuse in Sanitation and Wastewater Systems: Options and Investment Climate in South and Southeast Asian Countries.
169. Kirui, Oliver K.; von Braun, Joachim (2018). Mechanization in African Agriculture: A Continental Overview on Patterns and Dynamics.
170. Beuchelt, Tina; Sarah Nischalke (2018). Adding a gender lens in quantitative development research on food and non-food biomass production: A guide for sex-disaggregated data collection

- 171.** Daum, Thomas (2018). Of Bulls and Bulbs: Aspirations and perceptions of rural youth in Zambia.
- 172.** Salvatierra-Rojas, Ana; Torres-Toledo, Victor; Mrabet, Farah; Müller, Joachim (2018). Improving milk value chains through solar milk cooling.
- 173.** Desalegn, Gashaw; Ali, Seid Nuru (2018). Review of the Impact of Productive Safety Net Program (PSNP) on Rural Welfare in Ethiopia.
- 174.** Muli, Celestine; Gerber, Nicolas; Sakketa, Tekalign Gutu; Mirzabaev, Alisher (2018). Ecosystem tipping points due to variable water availability and cascading effects on food security in Sub-Saharan Africa.
- 175.** Njiraini, Georgina; Ngigi, Marther; Baraké, Evelyn (2018). Women in African Agriculture: Integrating Women into Value Chains to Build a Stronger Sector.
- 176.** Bekchanov, Maksud; Evia, Pablo; Hasan, Mohammad Monirul; Adhikari, Narayan; Gondhalekar, Daphne (2018). Institutional framework and financial arrangements for supporting the adoption of Resource Recovery Reuse technologies in South Asia.
- 177.** Mirzabaev, Alisher; Njiraini, Georgina Wambui; Gebremariam, Gebrelibanos; Jourdain, Damien; Magaia, Emílio; Julio, Felita; Mosse, Gerivásia; Mutondo, João; Mungatana, Eric (2019). Transboundary Water Resources for People and Nature: Challenges and Opportunities in the Olifants River Basin.
- 178.** Gupta, Anil; Shinde, Chintan; Dey, Anamika; Patel, Ramesh; Patel, Chetan; Kumar, Vipin; Patel, Mahesh (2019). Honey Bee Network in Africa: Co-creating a Grassroots Innovation Ecosystem in Africa.
- 179.** Kabran, Estelle Gnankon; Eguavoén, Irit (2019). Ferry transportation in Abidjan: Establishment, operation and sustainability of a paratransit system.
- 180.** Sakketa, Tekalign Gutu; von Braun, Joachim (2019). Labor-intensive public works programs in sub-Saharan Africa: Experiences and implications for employment policies.
- 181.** Legesse, Ermias Engida; Srivastava, Amit; Kuhn, Arnim; Gaiser, Thomas (2019). Household income implications of improved fertilizer accessibility and lower use inefficiency: Long-term scenarios for Ethiopia.
- 182.** Daum, Thomas; Capezzone, Filippo; Birner, Regina (2019). The forgotten agriculture-nutrition link: Estimating the energy requirements of different farming technologies in rural Zambia with time-use data.
- 183.** Ganguly, Kavery; Gulati, Ashok; von Braun, Joachim (2019). Skill Development in the Indian Agriculture and Food Sector: A Scoping Exercise.
- 184.** Gulati, Ashok; Juneja, Ritika (2019). Agricultural Credit System in India: Evolution, Effectiveness and Innovations.

ZEF Development Studies

edited by
Solvay Gerke and Hans-Dieter Evers

Center for Development Research (ZEF),
University of Bonn

Shahjahan H. Bhuiyan

Benefits of Social Capital. Urban Solid Waste Management in Bangladesh

Vol. 1, 2005, 288 p., 19.90 EUR, br. ISBN 3-8258-8382-5

Veronika Fuest

Demand-oriented Community Water Supply in Ghana. Policies, Practices and Outcomes

Vol. 2, 2006, 160 p., 19.90 EUR, br. ISBN 3-8258-9669-2

Anna-Katharina Hornidge

Knowledge Society. Vision and Social Construction of Reality in Germany and Singapore

Vol. 3, 2007, 200 p., 19.90 EUR, br. ISBN 978-3-8258-0701-6

Wolfram Laube

Changing Natural Resource Regimes in Northern Ghana. Actors, Structures and Institutions

Vol. 4, 2007, 392 p., 34.90 EUR, br. ISBN 978-3-8258-0641-5

Lirong Liu

Wirtschaftliche Freiheit und Wachstum. Eine internationale vergleichende Studie

Vol. 5, 2007, 200 p., 19.90 EUR, br. ISBN 978-3-8258-0701-6

Phuc Xuan To

Forest Property in the Vietnamese Uplands. An Ethnography of Forest Relations in Three Dao Villages

Vol. 6, 2007, 296 p., 29.90 EUR, br. ISBN 978-3-8258-0773-3

Caleb R.L. Wall, Peter P. Mollinga (Eds.)

Fieldwork in Difficult Environments.

Methodology as Boundary Work in Development Research

Vol. 7, 2008, 192 p., 19.90 EUR, br. ISBN 978-3-8258-1383-3

Solvay Gerke, Hans-Dieter Evers, Anna-K. Hornidge (Eds.)

The Straits of Malacca. Knowledge and Diversity

Vol. 8, 2008, 240 p., 29.90 EUR, br. ISBN 978-3-8258-1383-3

Caleb Wall

Argorods of Western Uzbekistan. Knowledge Control and Agriculture in Khorezm

Vol. 9, 2008, 384 p., 29.90 EUR, br. ISBN 978-3-8258-1426-7

Irit Eguavoen

The Political Ecology of Household Water in Northern Ghana

Vol. 10, 2008, 328 p., 34.90 EUR, br. ISBN 978-3-8258-1613-1

Charlotte van der Schaaf

Institutional Change and Irrigation Management in Burkina Faso. Flowing Structures and Concrete Struggles

Vol. 11, 2009, 344 p., 34.90 EUR, br. ISBN 978-3-8258-1624-7

Nayeem Sultana

The Bangladeshi Diaspora in Peninsular Malaysia. Organizational Structure, Survival Strategies and Networks

Vol. 12, 2009, 368 p., 34.90 EUR, br. ISBN 978-3-8258-1629-2

Peter P. Mollinga, Anjali Bhat, Saravanan V.S. (Eds.)

When Policy Meets Reality. Political Dynamics and the Practice of Integration in Water Resources Management Reform

Vol. 13, 2010, 216 p., 29.90 EUR, br., ISBN 978-3-643-10672-8

Irit Eguavoan, Wolfram Laube (Eds.)
Negotiating Local Governance. Natural Resources Management at the Interface of Communities and the State
Vol. 14, 2010, 248 p., 29.90 EUR, br., ISBN 978-3-643-10673-5

William Tsuma
Gold Mining in Ghana. Actors, Alliances and Power
Vol. 15, 2010, 256 p., 29.90 EUR, br., ISBN 978-3-643-10811-1

Thim Ly
Planning the Lower Mekong Basin: Social Intervention in the Se San River
Vol. 16, 2010, 240 p., 29.90 EUR, br., ISBN 978-3-643-10834-0

Tatjana Bauer
The Challenge of Knowledge Sharing - Practices of the Vietnamese Science Community in Ho Chi Minh City and the Mekong Delta
Vol. 17, 2011, 304 p., 29.90 EUR, br., ISBN 978-3-643-90121-7

Pham Cong Huu
Floods and Farmers - Politics, Economics and Environmental Impacts of Dyke Construction in the Mekong Delta / Vietnam
Vol. 18, 2012, 200 p., 29.90 EUR, br., ISBN 978-3-643-90167-5

Judith Ehlert
Beautiful Floods - Environmental Knowledge and Agrarian Change in the Mekong Delta, Vietnam
Vol. 19, 2012, 256 S., 29,90 EUR, br, ISBN 978-3-643-90195-8

Nadine Reis
Tracing and Making the State - Policy practices and domestic water supply in the Mekong Delta, Vietnam
Vol. 20, 2012, 272 S., 29.90 EUR, br., ISBN 978-3-643-90196-5

Martha A. Awo
Marketing and Market Queens - A study of tomato farmers in the Upper East region of Ghana
Vol. 21, 2012, 192 S., 29.90 EUR, br., ISBN 978-3-643-90234-4

Asghar Tahmasebi
Pastoral Vulnerability to Socio-political and Climate Stresses - The Shahsevan of North Iran
Vol. 22, 2013, 192 S., 29.90 EUR, br., ISBN 978-3-643-90357-0

Anastasiya Shtaltovna
Servicing Transformation - Agricultural Service Organisations and Agrarian Change in Post-Soviet Uzbekistan
Vol. 23, 2013, 216 S., 29.90 EUR, br., ISBN 978-3-643-90358-7

Hafiz Boboyorov
Collective Identities and Patronage Networks in Southern Tajikistan
Vol. 24, 2013, 304 S., 34.90 EUR, br., ISBN 978-3-643-90382-2

Simon Benedikter
The Vietnamese Hydrocracy and the Mekong Delta. Water Resources Development from State Socialism to Bureaucratic Capitalism
Vol. 25, 2014, 330 S., 39.90 EUR, br., ISBN 978-3-643-90437-9

Sven Genschick
Aqua-`culture`. Socio-cultural peculiarities, practical senses, and missing sustainability in Pangasius aquaculture in the Mekong Delta, Vietnam.
Vol. 26, 2014, 262 S., 29.90 EUR, br., ISBN 978-3-643-90485-0

Farah Purwaningrum
Knowledge Governance in an Industrial Cluster. The Collaboration between Academia-Industry-Government in Indonesia.
Vol. 27, 2014, 296 S., 39.90 EUR, br., ISBN 978-3-643-90508-6

Panagiota Kotsila
*Socio-political and Cultural Determinants of
Diarrheal Disease in the Mekong Delta.
From Discourse to Incidence*
Vol. 28, 2014, 376 S., 39.90 EUR, br., ISBN 978-
3-643-90562-8

Huynh Thi Phuong Linh
*State-Society Interaction in Vietnam.
The Everyday Dialogue of Local Irrigation
Management in the Mekong Delta*
Vol. 29, 2016, 304 S., 39.90 EUR, br., ISBN 978-
3-643-90719-6

Siwei Tan
*Space and Environment in the Industrialising
Mekong Delta.
A socio-spatial analysis of wastewater
management in Vietnam*
Vol. 30, 2016, 240 S., 29.90 EUR, br., ISBN 978-
3-643-90746-2

<http://www.lit-verlag.de/reihe/zef>



zef

Center for
Development Research
University of Bonn

Working Paper Series

Authors: Ashok Gulati, Ritika Juneja
Contacts: agulati115@gmail.com; agulati@icrier.res.in; rjuneja@icrier.res.in
Photo: Shweta Saini, Ashok Gulati, NABARD, IDFC

Published by:
Zentrum für Entwicklungsforschung (ZEF)
Center for Development Research
Genscherallee 3
D – 53113 Bonn
Germany
Phone: +49-228-73-1861
Fax: +49-228-73-1869
E-Mail: presse.zef@uni-bonn.de
www.zef.de