Promoting Socially Inclusive and Sustainable Agricultural Intensification in West Bengal and Bangladesh (SIAGI)

Socially Inclusive Sustainable Intensification of Agriculture in West Bengal, India: Policy and Institutional Approaches

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I Introduction

Sustainable agriculture intensification practices are fundamental for food security, migration, climate protection and biodiversity. Small and marginal farmers face increasing difficulties to achieve adequate production from their limited land to meet their cash and kind needs. This is more so in the context of unfavourable physical and institutional environment. This coupled with inadequate and inappropriate public policies are the causes that are driving the young and able out of agriculture and rural areas. It is argued that a "healthy public policy improves the conditions under which people live: secure, safe, adequate and sustainable livelihoods, lifestyles and environments, including, housing, education, nutrition, information exchange, child care, transportation, and necessary community and personal, social and health services." (Milio, 2001, p. 622). Public policies can address market and non-market distortions effectively. At the same time public policies need institutional backing to implement the policies efficiently and equitably. Institutions, formal as well as informal, are bridges between public policy and implementation. Institutional arrangements can help in making policies inclusive (socially and economically).

While policies are framed at the national and state levels, institutions are evolved at different levels viz., central, state and the community or village level. Policies coupled with the resource context determines the nature of institutions that can help improve community welfare. On the other hand, policies, existing or new, can strengthen or promote such institutions. The effectiveness of local (village) institutions is linked to the efficiency of state and central level institutions (Mansuri, et. al., 2013). The overall SIAGI objective of 'increasing household welfare in a socially inclusive and sustainable manner (including income, food and nutrition security)', matches with the national objective of doubling of farmer's income in the next 7 to 10 years (2022-23). Potential sources of such growth include: increasing land productivity; cropping intensity; resource use efficiency, crop diversification (high value crops), livelihood diversification., etc. Externally, improving terms of trade in favour of agriculture and shifting to non-farm activities could help enhancing farm incomes (Chand, 2017). Several policy and institutional strategies are being worked out at the national and state levels to enhance farm incomes through adoption and spread of sustainable and inclusive developmental and technological interventions or strategies.

Inclusive Sustainable Intensification

At the out-set it would help to spell out what inclusive sustainable agricultural intensification means in the context of SIAGI. Sustainable agricultural intensification (SAI) is defined as producing more output from the same area without adversely affecting the quality of land / soil and other environmental services, viz., water, food, etc. (Pretty, 2008; Royal Society, 2009; Conway and Waage, 2010; Godfray et al., 2010; Pretty, et.al., 2016). This in the long run would enhance natural capital and contribute to the flow of environmental services and make communities less vulnerable to shocks and stresses. SAI adopts a systems approach that makes the best of both crop and livestock technologies and their agro-ecological and agronomic management (Pretty, et.al., 2016).

While these technologies per se are not exclusive, they tend to be so due to the structural distortions in agrarian system. These distortions could be in the form of land distribution, access to resources like, water, credit, etc., and abilities such as human and social capitals. Experience from the past clearly showed that technologies associated with agricultural intensification (green revolution) are biased in favour of better endowed farmers, at least in the initial stages (Reddy, 1995). While technologies associated with sustainable intensification are no different, they are more dependent on human capital in the form of knowledge and capacity to adapt and innovate and social capital to resolve common landscape-scale problems (Pretty, et. al., 2016). Thus, there is an added bias in the form of human and social capital distortions, viz., social inequities and inequity in access to education and health. SIAGI aims to find ways and means to overcome these distortions and make the adoption more inclusive so that small and marginal farmers benefit.

Here an attempt is made to understand and assess the potential and constraints for these strategies in the context of inclusive sustainable agricultural intensification in the study region (Cooch Behar, West Bengal). Specific objectives include: i) assess the status and potential for developmental and technological options in the region, ii) assess the present policies and institutions and their relevance (strengths and weaknesses) for promoting sustainable and inclusive intensification, and iii) identifying the appropriate policy and institutional changes required to promote sustainable and inclusive agricultural intensification. Broadly, the study reviews the key policies relevant for SIAGI along with their strengths and weaknesses in promoting inclusive sustainable intensification. It also looks at the political economy factors in terms of linkages between national and state level policies (IFAD, 2017).

The study is based on the existing literature and evidence on the policies and institutions pertaining to agriculture and rural development in India and West Bengal. Secondary data pertaining to agriculture and rural development coupled with the primary data collected at the study sites are used. Qualitative information elicited through community engagement, focus group discussions, personal interviews, transect walks, etc., is used for deeper understanding of the local context.

II Institutions and Policies

A number of frameworks[1] have dealt with policy process. Though an ideal policy process is often associated with public interaction in the form of consult (one way), deliberate (iterative) and engage (doing together), very few of them explore the organic bonding between policies and institutions, especially at the local level. The institutional analysis and development (IAD) framework (Ostrom, 1990; 1994) has gained wider practical importance when compared to others due to its recognition of linkages between policies and institutions. While IAD focuses on how institutional rules influence the behaviour of the rational individuals motivated by material self-interest, it is the policy environment that facilitates the evolution of such institutions.

Public policy aims to enhance welfare through policy formulation, implementation and institutional evolution. Policies are designed at a broader level and targeted to achieve desired outcomes. Policies should be effective and equitable in their formulation. At the same time, they should be politically acceptable to ensure implementation. Implementation should be technically feasible and cost effective across target regions and groups. Institutions at the national, state and local level would facilitate smooth implementation. Higher level institutions (central and state bodies or departments) are designed to deal with the implementation, but they often are incapable of ensuring effective and equitable implementation outcomes. Local institutions, in this context play a critical role. Local institutions could be formal like Panchayat Raj Institutions (village level), Cooperatives, etc., or informal institutions like community based organisations (CBOs) or user groups (UGs). Functioning of local institutions depends on their acceptability across the socioeconomic strata, enforcement mechanisms of their rules and regulations and financial sustainability. Besides, the quality of higher level institutions also effects the functioning of the local institutions. Though participatory local institutions are argued to be more effective in service delivery there is no guarantee that they can be efficient and equitable (Mansuri, et.al., 2013).

Policy environment is vital for institutional innovation as well as its sustenance. Policies can lead to institutional innovations or the disintegration of existing ones. For instance, colonial policies of viewing natural resources (water, forests, etc.) as sources of profit led to the decline of age-old community management systems in south India (Reddy, 1990). Similarly, even in independent India centralised policies of not involving local people have not only led to breakdown of local institutions but also resulted in the degradation of resources (Reddy, 1996). On the other hand, policy support to involvement of local people in watershed development and forest management has resulted in the innovation of successful institutions like 'watershed committees' and 'forest protection committees' in India. These policies have provided incentives to the communities through providing usufruct rights of varying degrees on various benefit flows.

[1] Other frameworks include: Stages Heuristic Framework: Idealistic approach to policy process that divides the process into a series of stages. Multiple Streams Framework: Explains how policies are made under conditions of ambiguity, where there are many ways of thinking about the same phenomenon. Punctuated Equilibrium Framework: policy making is characterized by long periods of incremental change punctuated by brief period of major policy change. Advocacy Coalition Framework: Deals with challenging problems with substantial goal conflicts, important technical disputes and multiple actors from several levels of government.

However, there is little evidence that such policy induced / imposed institutions are inclusive and sustainable when compared to embedded / organic institutions. It is argued that most of the policies are biased against the poor and hence have excluded them from sharing the benefits. This is mainly because poor are not equipped to participate in the process and benefit from it though policies *per se* may not be biased. The poor produce less from their degraded natural resources and a substantial share of it is used for self-consumption, leaving little to sell in the market. Unless the poor join in collective efforts they can't benefit from improved product prices. Similarly, they are in a disadvantageous position to improve their access to resources like water as the technologies are capital intensive. Similarly, their scale of operation doesn't allow them to participate in the soil quality improvements (like watershed development). Consequently, they turn myopic and move towards low yielding livelihood strategies (Di Gregorio, et. al., 2004).

Decentralisation of governance is often argued to be more effective and efficient framework for delivering pro-poor programmes. (Manor, 1999; Seabright, 1996). It was observed that project costs are four times higher in centralised systems when compared to decentralised systems. Besides, asset maintenance is much better in the decentralised systems (Bardhan, 1996). However, it is cautioned that decentralisation is not effective or efficient under conditions of greater inequality due to political and elite captures and nexus formation between interest groups (Bardhan, 2002; Mansuri, et. al., 2013). While decentralised systems are found to be superior in terms of intra-regional targeting efficiency, their delivery systems target better in low poverty regions and worse in high poverty regions (Bardhan and Mookherjee, 2000).

Embedded / organic conditions pertain to the informal institutional arrangements existing in the village communities. These institutional arrangements and their functioning might have evolved historically in order to address specific problems faced by the community. These are embedded in / organic to the community because they are evolved from within the system with little or no external support. Embedded / organic institutions are found to be more robust and efficient when compared to the induced / imposed institutional arrangements (Reddy and Reddy, 2002). Important conditions that make the embedded / organic institutions vibrant and sustainable include: a) rules and regulations including operational rules, collective-choice rules and constitutional-choice rules as described by Ostrom (1990), b) equity, and c) quality of leadership.

Intensification Policies

Several policies drive agricultural intensification. Important policies include input policies (irrigation, fertilizers, pesticides, machinery, etc); credit policies; output policies (pricing, food, distribution, market, etc). These policies are mostly aimed to achieve certain goals at the national level and often targeted at certain regions, crops, farmer groups, etc., depending on the resource context. For instance, input subsidies during 1960s and 70s were targeted at irrigated areas with a focus on paddy and wheat. While these policies are not designed for specific areas, technological suitability constrained its expansion beyond irrigated regions. These policies were aimed at productivity increases through subsidised input prices for greater application of market inputs like fertilisers. Specific crops like oilseeds, pulses, etc., were promoted to increase production through area expansion and yield improving varieties. Agricultural credit policies were initiated to support farmers with their capital needs to purchase inputs. Agricultural machinery policies were initially designed to promote intensification and later to address labour shortages.

Irrigation subsidies aim to enhance productivity as well as crop intensities. On the other hand, conservation (soil and water) policies are aimed at improving intensification in the less endowed regions. In the case of irrigation subsidies, surface irrigation, especially canal, is levied at subsidised rates or free in some states, groundwater pumping is subsidised through subsidised or free electricity. It may be noted that no capital costs are borne by the farmers in the case of surface irrigation, while the entire capital costs are borne by

the farmers in the case of groundwater irrigation. This is a policy bias against groundwater dependent regions. Within the regions also the lumpy nature of investments make access to groundwater privy to rich farmers. While some of the subsides in the irrigated regions are aimed at benefiting small and marginal farmers, soil conservation programmes targeted at less irrigated regions are 100 percent subsidised. Small and marginal farmers often fail to take advantage of soil and water conservation (watershed) interventions as their plots are too small to accommodate the minimum area requirements of the schemes.

On the other hand, output policies are not directly linked to intensification. Output or food policies like minimum support price, public distribution system, etc., for various commodities are aimed at protecting farmers' income and to ensure food security and balance in cropping pattern. Market policies are often aimed at controlling food prices and protecting the interests of urban consumers and specific farm lobbies viz., sugarcane, wheat and paddy. Though price policies are meant to protect farmers' interests they ended up benefiting middlemen more than farmers in the absence of appropriate institutional backup at the local level and marketing infrastructure. Market reforms were introduced only during the 10th plan (2002-2007). And adoption of these reforms varies widely across the states.

It may be noted that all these policies are interlinked and influence one another rather than operating independently. Besides, a range of other policies influence agriculture, water and land. For instance, power tariff pricing (which greatly influence groundwater irrigation levels), the guaranteed purchasing scheme for rice & wheat and changes to agricultural subsidies and protection measures influence the ways in which the benefits (and especially the extra water available) are distributed and the response of communities to natural resource management programmes.

Water policies strive to improve the economic efficiency of water, while agricultural price policies tend to promote inefficient water use practices. The case in point is the policy intervention in paddy markets to hedge against the falling prices when there is glut in the market. The support price mechanism, especially for paddy and wheat, encourages the farmers to grow more of them, which are highly water intensive, through keeping their prices artificially high. This results in excessive and inefficient use of water resources. More value addition could be achieved through the reallocation of water to other crops. This would also facilitate more equitable distribution of the resource. This raises the notion of the need to better understand the water intensity of different patterns of water use in production. This is a concept that has been widely used in relation to energy for many years. Adapting the idea to reflect the dynamics of an even scarcer resource, water, would provide a basis for more informed decision-making on production choices and water allocations.

In the case of groundwater, the policy of subsidised power tariff structure for agriculture has resulted in the wide-spread degradation of the resources in the hard rock regions. At the same time lack of promotion of groundwater development or the access to electricity in alluvial terrains like EGP (Eastern Gangetic Plains) has stunted the irrigation growth and crop intensification. There are no policies, except for some regulatory ones linked with institutional credit, dealing with groundwater even though groundwater is the single largest source of irrigation. Groundwater is conspicuously missing in the water user association legislations across the states. Even in the context of other Natural Resources Management (NRM) programmes the stress is more on supply side, i. e., recharging the aquifers rather than managing the resources in a more efficient and equitous manner. These different policies are set and administered by different branches of government reflecting the problems that come from institutional fragmentation.

Inclusive Sustainability and Institutions

Almost all the policies are linearly focused on productivity and production through input intensification especially green revolution technologies. Only in 12th Five Year Plan of the Government of India (2012-2017) the approach has changed to sustainable intensification to minimise the impact of input intensification externalities in most regions, though some initiatives on soil health management were introduced during the 11th plan (2007-2012). These externalities are mostly associated with soil and water resource degradation. Soil quality has deteriorated at a faster rate during the post green revolution years due to chemical input intensification. Multiple soil nutrient deficiencies are widespread in most regions. Given the low carbon content in the soils, systematic and sustainable intensification practices are required to reverse this process. New soil health policies like soil health card, promotion of organic farming, etc., are being promoted.

Formal institutions were created at the central and state levels to promote input intensification policies. These institutions are not capable of ensuring equity in the distribution of benefits across socioeconomic groups. Community or village institutions were encouraged to fill this gap during the 9th plan (1997-2002). This coincided with recognition of benefits from participatory development at the global level and with the decentralisation initiatives in India. As a result, several rural institutions or community based organisations (CBO) came into being across the country. Quite a few of them are focused on natural resources management (NRM) viz., watershed management committees (WDCs), water user associations (WUAs), forest management committees (FMCs), etc. Evidence on the effectiveness of these institutions in ensuring equity is assessed later.

III Context for intensification

The context of this study is the existing conditions in the study region. The initial conditions can be grouped under internal, external and embedded. Internal conditions pertain to asset endowments of the local community (bio-physical and socioeconomic), external conditions are those that influence the internal conditions from outside the community (political and policy) and the embedded conditions are those that the community possesses traditionally and are difficult to alter in the short run (institutional). Embedded conditions are relevant in the context of existing institutional arrangements, especially informal.

Bio-physical context

Coochbehar falls under Terai region of West Bengal. Soils are mostly sandy to sandy loams, porous, low in base content, poor in available nutrients; acidic (pH 4.2 to 6.2); annual rainfall varies from 2000-3200 mm; high water table, low water holding capacity, high humidity, less sunshine hours during the monsoon months and marginality of lands in some parts limit crop productivity. The soils are chronically deficient in micronutrients, like Boron, Molybdenum and Zinc. Land resources are extremely scarce with the average farm size at 0.8 ha. per household. The study sites represent the regions bio-physical characters. The average rainfall in the study villages range between 3000-4000 mm. Soils are less fertile and acidic with water and input requirements. The region has high irrigation potential with shallow water table (3-6 mtrs). Groundwater (shallow tube wells) is the main source of irrigation in the study villages, though the density of tube wells or the proportion of area irrigated is low at around 50 percent of the sown area. However, there are differences in the discharge levels of wells in the two villages. As a result, crop intensity is also relatively low at 150 percent and 109 percent respectively when compared to the regional average (189 percent).

Socioeconomic context

The region and the study villages are characterised with high population density (832/km^2); higher proportion of Scheduled Caste/Scheduled Tribes (SC/ST) population (54 %), high poverty (55% below defined poverty line) and high migration (21 %). One of the study villages (UC) is predominantly tribal. Literacy levels are also low. More importantly, scope for higher education (employable) appears to be low given the poor economic status of the study villages. About 80 percent of the households fall in the category of poor and below income groups (Chiranjeevi, et. al., 2017). Agriculture is not the dominant occupation in both the villages, as less than

50 percent of the households depend on agricultural activities (Table 1). Between the villages, higher proportion (41 %) of households depend on agriculture and related activities in UC village[2].

In terms of income, agriculture dependent households earn less than half of the earnings of those dependent on other sources. Labour, including migration, is the single largest occupation, which also provides substantial earnings for the household. This matches with state aggregate sources of income i.e., agriculture and livestock contribute the lowest (41 %) when compared to other states like Bihar, Punjab and Haryana with agriculture contributing 50 to 70 percent of the household income (Kishore, et. al., 2017). On average, purely agriculture dependent households are mostly fall below poverty line. Dhoulaguri has more diversified livelihoods when compared to UC (Chiranjeevi, et. al., 2017).

Table 1: Composition of Livelihoods

Typology	Dhoulaguri	Uttar Chakwakheti	Avg. Income (Rs./HH)
Agriculture (agrl.+livestock income)	21	23	16343
Agrl.+wage Labour (rental income from Agri.assets)	8	18	15827
Labour (wage income-skilled + salaried)	51	40	39000
Business++ (income form micro enterprises)	12	5	46150
Job++ (Rental income from house, land and commercial estate)	8	14	49375

Source: IWMI data set.

The low contribution of agriculture in the state and the selected villages is mainly due to the inefficient production. For instance, West Bengal has the highest production costs, even in terms of per quintal costs despite reasonably good yields (Table 2). The share of wage expenditure is quite high, while the share of machine expenditure is less, when compared to other states. As a result, labour productivities are quite low. Even the share of animal labour is high. Therefore, the focus of improving intensification should be on efficient allocation of resources and how to improve agricultural income, in absolute as well as relative terms.

Table 2: Cost of Cultivation (Rs./ha) of Rce in 2012-13

Item	Bihar	West Bengal	Haryana	Punjab
Operational cost of Cultivation (Rs/ha)	18006	28731	28670	25781
Yield (Qtl/ha)	24	39	47	68
Human Labour use (person hours)	808	1116	522	381
Animal labour (pair hours)	28	63	1.2	0.6
Wage Expenditure (Rs. / ha)	14842	26641	17220	13320
Machine Expenditure (Rs. /ha)	2463	2355	4088	5098
Total Value of Production (Main & By) (Rs./ha)	27,718	48,898	85,811	91790
Cost of production (Rs/Qtl)	638	635	604	376

Source: Kishore, et. al (2017)

[2] Details are presented in Appendix table 1.

Political context

Political economy factors play a critical role in not only designing and promoting policies at macro level but also in evolving institutions and implementing the programmes at the micro (village) level. Originally both the villages were settled by British (UC with Tea estate labourers) or the ruler of Coochbehar (Dhaulaguri with immigrants from now Bangladesh). The small settlements have now grown into panchayat villages and are politically active. Reflecting the political scenario in West Bengal, the political equations keep changing at the village level. Cadre based politics has become the norm in West Bengal over the past three decades. The cadre of the ruling political party has a significant influence on the livelihood activities that are business oriented and also influence the accessing of public programmes. Though there are no apparent political conflicts in these villages, political influence can be seen in the case of sand mining, produce marketing, etc., in the form of syndicates. Overcoming the influence of these interest groups is not easy, especially when the propositions are against their interests.

Panchayat Raj Institutions (PRIs) in West Bengal are quite influential though the devolution of powers is still limited. West Bengal ranks low to medium in the ranking of absolute devolution and improvement ranking across the states (GoI, 2016). Political affiliations are common at the PRI level, though it is not constitutionally required. Political affiliations create problems in drawing benefits from programmes when ruling parties at the state and centre / state and PRI are different. Benefits transfer smoothly towards ruling party cadre. At the village level, PRI elections are likely to take place during the next 6 months (December 2017) in West Bengal. These elections might change the existing power dynamics, which could influence the local context.

Policy context

Most policies at the state level are guided by the Central Government policies, as states depend on Central Government programme funding. With the guidelines from the national agricultural policy West Bengal has a policy mandate with a vision "to achieve *sustainable* livelihood opportunities for the people through *eco-friendly, clean and value added Agriculture* and related activities" (NABARD, nd). SIAGI objectives align with this vision. The strategies of Government interventions are clearly spelled out for various sub-sectors (Table 3). Comprehensive district agriculture plans (CDAP) need to be prepared based on the Government of India guidelines. All these strategies, except watershed development, are relevant for Coochbehar district and our study sites. Some of these programmes like promotion of oilseeds and pulses are being initiated at the district level. Similarly, promotion of FPOs is also evident in the study region.

West Bengal has a water policy 2011 in the lines of national water policy, 2002. This needs to be updated in the lines of new national water policy of 2012. The State Water Policy 2011 has given high priority to the maintenance of water resources schemes with emphasis on participatory management (Bastakoti, 2017). The state has a groundwater act 2005, which was amended in 2011. According to the revised act farmers in 301 safe blocks with pumps of 5 horsepower (HP) or less and a discharge rate of 30 m^3/hour or less will no longer require prior permission from the State Water Investigation Directorate (SWID) to apply for an electricity connection. However, the implementation is lagging (Bastakoti, 2017). In 2011, the state has initiated 'Accelerated Development of Minor Irrigation' (ADMI) with support from the World Bank. It aims to develop and/or rehabilitate community-based minor irrigation systems to promote conjunctive use of surface and ground water and equitable distribution of water through farmer groups. The program intended to bring in 63, 555 ha of land under surface water irrigation and another 75, 346 ha of land under groundwater irrigation and promotes intensification and diversification of agricultural using effective advisory services coupled with a higher degree of market integration; capacity and institutional development (Bastakoti, 2017). These policies are very much in line with the initiatives of SIAGI and DS14MTF (ACIAR Projects).

Table 3: Proposed Policy Strategies for Agricultural Intensification in West Bengal

Sector	Policy Strategy
Agriculture	- Strengthening Soil testing infrastructure at district & block - Soil health card based Integrated Nutrient Management - Promotion of organic input production - Technologies for rice and potato and alternate cropping patterns - Seed production infrastructure through public-private partnership and development of seed villages involving progressive farmers' societies - Promotion of *oil seeds, pulses and vegetables* especially in areas where upland rice cultivation is predominant.
Agriculture Extension	- Expansion of extension infrastructure - Enhance training and capacity building of all the stake holders - Promote informal extension channel like Farmers' Clubs, Farmers' Interest Groups
Irrigation	- Identification of low water intensive location specific crops and cropping sequences - Emphasis on vegetables, pulses, oilseeds where water productivity is high compared rice. - Introduction of water saving technologies like SRI - Sustainable exploitation of ground water resources - Effective participatory irrigation management with awareness, training and capacity building of water user groups. - Promote and propagate drip irrigation system in the dry and water scarce areas - Promotion of Rain water harvesting
Watershed Development	- Promotion of Rain water harvesting especially in high/intense rainfall regions.
Farm Mechanisation	- Promotion of *"Farm Machinery Hub" especially for* small agricultural holdings.
Horticulture	- Production of *quality planting materials* under NHMD - Development of *progeny orchard* in each district - Promotion of *private nurseries*
Animal Husbandry	- Breed Improvement through supply of quality animals & calf rearing - Promotions green fodder and maize cultivation - Promotion milk processing and marketing cooperatives - Promotion of low input poultry / duckery technologies - Increase 'pranibandhus' at least one per each panchayat
Fisheries	- Development of derelict tanks through NREGS - Increase productivity of Fish ponds - Setting up hatcheries for fresh water prawn, mud crab, ornamental fishes under both public/ or private sector - awareness creation among hatchery operators to follow breeding protocol - Establishment of diagnostic centres - Improved credit access through SHGs, etc. - Coordinated development of crop, animal husbandry and fisheries through integrated farming for sustainable farming - Promotion of attractive insurance scheme
Forestry	- Protection of forest by empowering local community through Joint forest management

Agriculture Marketing	- Strengthening of storage infrastructure for perishable and non-perishable through private or PPP mode. - Improve organized marketing infrastructure facilities. - Replication of "Producer – Consumer Markets" like Raithu Bazars in AP - Amendments to APMC Act to facilitate private sector participation and facilitate promotion of contract farming.

Source: NABARD (nd.)

Institutional context

Number of formal institutions are being promoted at the state level to support the implementation of various programmes in different subsectors and some of these institutions do exist in the study villages as well (Table 4). While some of the policies at the state level are clear about institutional requirements such as the case of groundwater management, the institutions are yet to evolve. However, there are some informal institutions functioning in the study villages that address some of the issues. For instance, both Dhoulaguri and UC have farmers' clubs that were established before 2012 and Dhoulaguri has a pond management committee for the last 30 years and a shallow tube well user committee since 2011. In UC, there is Bandan Micro finance institution. On the other hand, there are induced (externally promoted by state or NGOs) institutions like SHGs and FPO as part of state and central government initiatives.

Table 4: Institutional Context

Sector / Sub-sector	State / Regional	Study Villages*
Agriculture	FIGs; FPOs; etc	Farmer Clubs
Water- Surface - Groundwater	WUAs NO	PMC STWUC
Soil Management	WSA	No
Forest	FPC	FPC
Livestock	PBGSBS; Milk producers' federation; animal & poultry development corporations	No.
Farm Mechanisation	Custom Hiring centres	No
Agricultural Produce Marketing	Principal Markets yards, Sub-market yards, Regulated Markets and rural haats.	No
Farm Credit	CBs / RRBs/ Coops / MF	BMF
Food & Nutrition	INM; AWCs; ICDS, etc	No
Women Welfare	SHGs	SHGs

*This information is based on Bastakoti (2017) and Field visits by the author along with the Team.

Note: FIG= Farmer Interest Groups; FPOs= Farmer Producer Organisations; WUAs= Water User Associations; WSA= Watershed Associations; FPC= Forest Protection Committees; PBGSBS= Paschim Banga Go Sampad Bikash Sanstha; CB= Commercial banks; RRBs= Regional Rural Banks; Coops= Cooperative banks; MF= Micro finance; INM= Integrated Nutrient Management; AWCs= Anganwadi centres; ICDS= Integrated Child Development Society; SHGs= Self-help groups; PMC= Pond Management Committee; STWUC= Swallow Tubewell user committee; BMF= Bandhan Micro Finance.

Some of these institutions are functioning while others are defunct. There are 20-25 SHGs, but only some of them are active. In Dhoulaguri SHGs are involved in group farming initiated under ACIAR project DS14MTF.

In the case of some institutions like farmers clubs the groups are trying to revive of late. These farmers' clubs have limited mandate of promoting SHGs. Moreover, both the villages are trying to register FPOs under the new National Bank for Agriculture and rural Development (NABARD) initiative. The Shallow Tube Well User Committee (STWUC) in Dhoulaguri is involved in group sharing of water and sells water for profit (Bastakoti, 2017). Apart from these institutions, farmer groups are being promoted under ACIAR project DS14MTF. Under the project 3 farmer groups in each village have been formed with a membership of 10-12 farmers. These groups are supported by group wells and provided with new crop varieties and technologies. They are at early stages of evolution. But, there is clear evidence that these villages are tuned to collective efforts and institutions, formal or informal, which promote agricultural intensification.

IV Policies for Sustainable Intensification: Critical Review

This section attempts a critical review of the existing policies at the sector and sub-sector levels that are relevant for SIAGI. Strengths and weaknesses of the policies and their components in the context of sustainable inclusive intensification in the study region. Agricultural policy reforms or policy environment has not changed much even after two and half decades of economic reforms. At the best agricultural policies are partial and patchy in nature. Though some of the policies like licensing requirements for storage and movement of food grains; milk processing; futures trading and agricultural marketing were introduced as early 2000s; they are not effectively implemented at the state level. Besides, restrictions on land leasing, harvesting of forest plantation, etc., continue.

Agricultural

Land reforms: West Bengal is among the most successful land distribution policies in India. Land reforms were carried out in the state during 1970s and 1980s and were successful in providing access to land to most farmers in the state. Apart from improving the distribution, land reforms have also led to a jump in agricultural productivity during 1980s and 1990s. While land reforms in West Bengal is the most inclusive policy in the history of Indian land reforms, its sustainability in terms of supporting household livelihoods can be questioned in the light of recent evidence. As discussed earlier, agriculture is neither viable nor able to contribute much to the household income which is attributed to small size of holdings. The small holdings could increase the productivity but not profitability of agriculture, especially with rising input and labour costs. Group farming is being promoted in the study villages to overcome the smallholder constraints, though they still seem to be constrained by their small scale of operations. The efficiency aspects of such group farming need to be studied in detail, as the evidence at the international level is rather mixed (for an excellent review see Liu, et. al., 2017).

Tenancy (leasing-in and out) as an institution is quite widespread in the study region and villages. Most of the households lease out lands during winter and summer seasons. Different forms of tenancy exist in the study villages in terms of sharing inputs / out puts (share cropping) and cash based. Though there are no written contracts between the farmers, the forms of tenancies are well established and successfully executed informally. But there is no explicit policy support for strengthening these arrangements. For instance, tenants are not eligible for bank loans or input subsidies. While some states like Andhra Pradesh are bringing reforms by making tenant farmers eligible for getting crop loans, tenant farmers face considerable risks in the case of crop failure. And these risks are likely to increase due to climate change. While there are number of studies evaluating various forms of tenancy in various parts of the country (including West Bengal), it would be useful to assess the tenancy arrangements in the study villages from the sustainability and inclusive aspects. Such an assessment would help in identifying policy gaps.

Number of policy strategies are identified to promote sustainable intensification in terms of improving soil quality, integrated nutrient management, promoting organic farming, contract farming, strengthening extension network, promoting farmer producer organisations, improving irrigation infrastructure and efficiency, improving quality of livestock, promoting horticulture, etc. Most of these policy strategies are directed towards sustainable intensification, there is little focus on improving viability of agriculture which could be possible by reducing costs mainly. While the provision of ***soil health cards*** and ***farm machinery*** are expected to reduce costs, they are yet to capture farmers' attention due to implementation constraints. For instance, the soil testing procedures are neither comprehensive nor scientific. The recommendations are not provided in time and there is no linkage between the recommendations and availability of recommended inputs in the market. Similarly, custom hiring centres or hubs are promoted but their viability is limited to few regions due to the small holdings and lack of uniformity in crops or crop calendar.

Organic farming is being promoted through *Paramparagath Krishi Vikas Yojana* (PKVY) at the national level in all states through farmer groups. But, in the absence of backward and forward linkages, viz., input availability and output markets, viability is becoming a problem. It is argued that organic farming is suitable only for horticultural crops, given the poor soil conditions (in terms of corban content) in India. Even in the case of horticultural crops organic farming is constrained by the limited availability of inputs. This requires an integrated approach of putting together various components like livestock, fodder, feed, composting, marketing, crop promotion, etc., to strengthen forward and backward linkages. Such an approach is being tried in a NABARD promoted programme (umbrella programme on natural resource management – UPNRM). The study sites have high potential for group based horticultural crops and organic farming and programmes like UPNRM could help in strengthening these initiatives. Evidence is also growing in support of **precision farming** which could be a middle path between organic and chemical input farming i. e., residue free produce without compromising on productivity. Precision farming has potential to increase production as well as farmers' income (Chand, 2017).

In the case of ***irrigation*** water, number of strategies have been identified for sustainable water management. Specific initiatives for underdeveloped groundwater regions of the state include promotion of group shallow and deep tube wells, though they are not popular in the study regions due to lack of awareness, even though one of the study villages has shallow tube-well user group (Bastkoti, 2017). Given the experience of group farming, the requirement of 6 ha and 20 ha. for getting the subsidy for shallow and deep tube wells respectively is too high to organise farmers in these villages. Many other efforts are underway to improve the irrigation facility in West Bengal. Accelerated development of minor irrigation (ADMI), the recent State Government programme covers Coochbehar district with 262 Surface water schemes irrigating 5, 880 ha; and 459 groundwater schemes irrigating 15, 670 ha of the cultivable land. The uptake of these programmes, however, is slow due to the absence of institutional arrangements and lack of coordination between politicians and local administration (Bastakoti, 2017).

The groundwater rich study regions are constrained not only by small holdings but also due to lack of reliable supply of electricity for small and marginal farmers, who depend either on expensive irrigation using diesel pumps or on water purchased from rich well owners (Kumar, et. al., 2014; Scott & Sharma, 2009). To overcome the energy constraints solar irrigation pumps are being promoted, but they are beyond the reach of small and marginal farmers even at 75 percent subsidy. Even with credit support farmers will not be able to repay loans, given the limited surplus generated from agriculture (Kumar, et.al., 2012). The economic analysis, even after including environmental costs, doesn't support promoting solar pumps at the individual level (Bassi, 2017). On the other hand, energy policies should invest in installing grid-connected mega solar power projects (being done in some of the states like Gujarat, Telangana and Andhra Pradesh), which would be more competitive and viable[3] (KPMG, 1999). Given the low crop intensities (well below the district average) in the study villages, improving access to irrigation is of immediate concern for increasing intensification as well as agricultural incomes.

Institutional credit is crucial for agricultural intensification. The linkages between the two are evident over the years- green revolution is fuelled by the promotion of institutional credit through bank nationalisation

[3] Andhra Pradesh, within two years of investing heavily on large scale solar power plants, is talking about falling energy prices in the state (Statement by Chief Minister-The Hindu, 7th June 2017).

and lead bank schemes for agriculture and the recent farmer distress across the states is attributed mainly to the weak institutional credit systems. No specific policy strategies are evident in the long list of strategies. Household level credit data from the study villages clearly shows the poor presence of institutional credit, which could again be attributed to the small size of holdings (collateral). More than 70 percent of the households borrow from non-institutional sources, especially micro finance, paying high interest rates (Table 5). There is need for improving the access to institutional credit in the context of small and marginal holdings by adopting innovative approaches like group lending or expanding cooperative lending institutions. Besides, micro finance institutions should be brought under a policy frame that protects the small and marginal from their extractive methods of finance viz., high interest rates and repayment and recovery mechanisms.

Table 5: Access to and Cost of Credit in the Study Villages

Source	Access / cost	Dhoulaguri	Uttar Chakwakheti
Institutional (bank; Coops; SHGs)	HHs availing (% of HH)	42 (28)	31 (28)
	Rate of Interest (%)	3-7	3-9
Micro Credit	HHs Availing (% of HH)	103 (69)	72 (65)
	Rate of interest (%)	11	54
Money Lenders	HHs availing (% of HH)	8 (03)	8 (07)
	Rate of Interest (%)	9	6

Source: Calculated from Data set provided by DS14MTF.

Market Reforms

Increasing agricultural incomes is more linked to market reforms than any other technological solutions, as most of the regions have reached saturation in terms of land productivity. Though there are exceptions like eastern and north eastern regions of India including West Bengal? where potential for productivity gains exists, market constraints seem to be the main limiting factor for technology penetration. Agriculture marketing reforms were introduced under the Agriculture Produce Marketing Committees (APMC) Act way back in 2003, most of the provisions are adopted in a diluted form (Chand, 2016). Some new market policies of 100 % foreign direct investment in domestic trading of processed foods and establishment of e-national agriculture market were introduced during 2016 (Rao, et. al., 2017). These reforms are proving to be effective in improving the price realisation of farmers in a short span (Chand, 20017). In the absence of market reforms the initial benefits like favourable terms of trade (during late 1990s) from the economic reforms of 1990s are reversed during the last decade.

West Bengal is lagging in adopting market reforms. For instance, it had adopted only three of seven marketing reforms at the end of 2016 viz., establishing private market yards; direct purchase of agriculture produce and establishment of farmers / consumers' markets (direct sale by producers). And it is yet to adopt contract farming, e-trading, single point levy of market fee and single trading licence across the state (Rao, et. al., 2017). West Bengal is below the halfway mark in "Agricultural Marketing and Farmer Friendly Reforms Index" developed by NITI Ayog (NITI Ayog, 2016; http://pib.nic.in/newsite/PrintRelease. aspx?relid=153145 1/3). Market reforms appear to be key for agriculture intensification in the study regions. The challenge is choosing the appropriate initiatives that suit the local context. There are a range of start-up initiatives like direct marketing, e-marketing, contract farming, etc., to choose from.

V Institutional Approaches: Strengths and Weaknesses

Though all communities are endowed with social capital it needs to be harnessed and tuned to the needs of the local communities. Some communities have the experience of organic or embedded institutions due to historical and cultural reasons others need to be engaged in promoting community based natural resource management through external agencies. In some cases, more serious and sustained engagement is required to build local capacity. It is observed that such induced participatory interventions work best when there is responsive state or even better when state is involved in promoting such institutions (Mansuri, 2013). In most cases, local level institutions falter on inclusive functions due to elite capture. This is more so when higher level of formal institutions are inefficient. This calls for a synergy between democratic institutions, induced participatory institutions at the local level and the administrative institutions at the higher level.

Democratic Institutions (PRIs)

Panchayati Raj Institutions (PRIs) or *Gram (village) Panchayat* is the lowest level administrative unit of the government. PRI is a constitutional and democratically elected body with a council of members and a president. All the villages are part of the panchayat system[4]. All households of the village are included as member of Gram Parishad (Village Council). The 11th Schedule of the constitution has given the responsibilities of 29 functions to PRIs supported by funds and functionaries to implement as part of decentralisation process. These 29 functions can be broadly divided into three major areas namely, core/Basic functions, welfare functions and natural resource management (NRM) functions. The core/basic functions are: drinking water supply, health, sanitation including primary health centres and dispensaries, education including primary and secondary, roads, bridges and other amenities, etc. Welfare functions include: poverty alleviation programmes, women and child development, social welfare of weaker sections such as SC / ST and physically challenged persons and other functions (rural housing and managing public distribution system). And NRM activities include: water, watersheds, forests, common pool resources, agriculture, etc.

Critics point out that PRIs do not have enough capacities to handle all the 29 responsibilities bestowed on them. Only the basic functions that have been given mandate from the inception of PRIs can be handled by them (Reddy, et.al., 2009). Besides, being a political body, political interests may over take service delivery interests. Based on these views some states have gone ahead with creating parallel institutions or community based organisations or user groups to deal with the welfare and NRM functions. As a result, number of CBOs have been created to manage education, health, women development, water, watersheds, forests, etc.

Under this pretext most of the states have managed to avoid decentralisation mandated by the 73rd constitutional amendment. The political economy aspects of decentralisation are well documented (Manor, 1999). No political party at the state level is interested in making village institutions more powerful. However, there are exceptions to this viz., Kerala is the only state that has adopted the decentralisation in word and spirit. And states like Karnataka and Maharashtra have also reformed to some extent. Unlike Kerala, West Bengal which was also run by the communist party (CPM) led government for an unprecedented tenure, could not progress much in this regard. The latest report on decentralisation has observed that West Bengal

[4] Depending on the size of the village it will have independent panchayat or part of panchayat. Size of the council (members) also depends on the population and one of the members is elected as president. The president and the council are supported by a paid secretary. Constitution of India has provided reservations for socially disadvantaged groups and women.

ranks 9 among 15 major states in devolution of core functions to the PRIs and remained same in terms of improvement over the years (GoI, 2016). In this scenario, the role of PRIs is very limited in delivering welfare and NRM services. Nevertheless, its political mandate helps in bridging the gap between district administration and village needs.

Induced Institutions (CBOs)

Though a plethora of CBOs exist across the states of India, some of them have gained prominence due to their scale and performance. Some of these institutions like forest management committees and water user associations were backed by legislative and policy support at the state and central levels. Here, some of these CBOs that relevant in the context of SIAGI are considered. Some of the new initiatives like farmer producer organisations (FPOs) are also reviewed. All these institutions are existing in the study villages in one form or the other.

The advent of ***Water User Associations*** (WUAs) is expected to have a direct bearing on the water availability and crop production. Many states including West Bengal have introduced WUAs to improve the performance of surface water systems under water sector reforms during the last two decades. In most cases these reforms were externally supported. In the event of positive impact on water availability and crop production there is possibility of secondary impacts like employment, income, and human resource development. The experience has been mixed across space (states) and time. In most cases, performance is better in the case of canal systems when compared to tank systems, as the modalities of the WUAs don't suit the requirements of tank systems (Reddy and Reddy, 2005). But, in none of the states the effectiveness of these institutions is sustained over the years. Another drawback of WUAs is that they are partial in their approach as groundwater management, the single largest source of irrigation, is not brought under the preview of WUAs. One of the study villages (Dhoulaguri) has a pond management committee and a shallow tube well user committee. Both are informal in nature and not supported externally.

To ensure better livelihood opportunities to the forest dependent poor, ***participatory forest management*** (PFM) or ***joint forest management*** (JFM) programme was introduced in all the states under the forest department during the 1990s. In fact, JFM was inspired by the success of participatory forest management (PFM) practices in West Bengal. PFM is not focused on livelihoods, as its objective was forest regeneration. Income gains from forest related activities are not substantial in most cases. The positive impacts of PFM / JFM were observed in number of states during the initial years. These include improvement in wage employment, reduction in migration, social cohesion and cooperation within the villages and between forest officials and village communities, status of women, etc. However, social cohesion between the villages has declined due to boundary conflicts arising over demarcation of land. But, these gains could not be sustained in the long run as they could not generate enough income or employment beyond the programme period. One of our study villages (UC) continue to have the forest protection committee (FPC) started under JFM in 1990.

Self-help groups (SHGs) have played a significant role in women empowerment across the country over the last two decades. They helped in reducing the dependency on money-lenders in rural areas, though there are variations across the states. SHGs have performed better in some states like Andhra Pradesh with substantial support from the state governments. Credit has enabled the women to undertake production oriented economic activities related to agriculture, animal husbandry, and industry service and business (ISB) sectors. One reason could be that a large proportion of women from traditional artisan families have become members of the groups to further strengthen and expand their ongoing economic activities. In fact, such groups are observed to be more successful (BASIX, 1999). Net result is number of women become self-employed and financially independent, as they can get credit to invest and meet other needs. Additional

income from SHG activities has contributed to considerable improvement in the incomes of the poorest of the poor and enabled the near poor to cross the poverty line. But targeting of the poor households is quite low. This has brought changes in the quality of consumption that might have led to the enhancement of the nutritional status of children, pregnant and lactating mothers among the member families (YFA, 1996). Similarly, part of the income gained is also spent on the health care of the family (Kanchanya, 1998). Women could improve their access to health care and educational institutions to some extent.

In some cases, SHGs facilitated women to take up tasks like marketing and non-traditional enterprises. For, instance, the government of Andhra Pradesh is involving SHGs on number of services like management of sand. This indicates that 'power within' dimension of empowerment is impacted due to participation in SHGs to some extent. However, the absence of the collective initiatives of women members to negotiate their gender, caste, class and other interests vis-à-vis institutions of the market, the State, the community and family reveals limited empowerment in dealing with external world.

How widespread and sustainable this process is a moot point. The grading of groups according to their functioning by the Government of Andhra Pradesh has revealed that only 18 percent of the groups are functioning very well. It is observed that "…. can probably be called a successful scheme as it has helped to empower women in the sense of making them more self-confident and financially stronger and more independent". However, "the weakness of the programme is that it has proved to be very difficult to generate sustainable and profitable self-employment for women". And, the age-old tradition of patriarchy is not questioned in the programme. Important issues such as literacy and family planning are taken up – and quite successfully in some districts but other strategic gender needs such as child marriages and dowry are not addressed at all (Mooij, 2002). The experience of SHGs in the study region is not very different, as very few of them are functional and effective, while some of them are doing well. Continued state support is a prerequisite for sustaining these groups. SHGs need to expand their activities to processing, marketing, etc., as they are already participating in group farming. They can fill the credit gap of Farmer Groups and Farmer Producer Organisations (FPOs), which are operational in these villages. The potential for such initiatives need to be studied prior to suggesting policy interventions.

The evidence clearly shows that the CBOs are not very effective in improving conditions of the village communities, especially the poor. This is more so when state support is not forth coming. More importantly, there is no evidence to suggest that these institutions are completely apolitical and devoid of elite capture. For instance, in Andhra Pradesh, water user associations and watershed associations have become political breeding grounds with rampant nexus between office bearers and line departments. In number of cases WUA presidents have turned contractors to take up canal maintenance.

Most of the formal and informal institutions in the study villages are characterised with good operational rules like equal contribution and benefit sharing (Bastakti, 2017). Though the effectiveness of these institutions is very limited, their presence indicates the potential for collective institutions. Main problem appears to be lack of awareness and capacities apart from the limited financial return from such initiatives in the present context. This is observed even in the case of farmer groups formed recently.

Farmer Groups are formed under ACIAR project (DS14MTF) to increase intensification through providing water and crop technologies to groups. Given the socioeconomic context the group farming can address number of issues like size of holding, access to water, markets, etc. Three groups in each village are formed with a membership of about 10 farmers and covering area of 10-13 bhiga (<2 ha). These groups are provided

with a group well with an electric or solar powered pump. Though they have constitutional and operational rules along with technology support from the local agricultural university their scale appears to be too small to be viable. Their scale is much below the prescribed norm for providing subsidy for shallow tube well (6 ha.) and a deep tube well (20 ha.) in West Bengal. These initiatives are in their initial stages and efforts are on to strengthen them and make them viable. Apart from increasing the membership and scale, shifting to high value crops and creating markets and value chains could improve their viability.

Farmer Producer Organisations (FPOs) is a government of India initiative during the 12th Plan with an objective of increasing agricultural income, especially of small farmers, through better access to resources and markets. FPOs are funded through NABARD with a grant and loan components (NABARD, 2015). The grant is provided to organize and register the FPOs and the loan is for starting the business. The loan amount is about INR 0. 9 million. The activities could range from input procurement to export of produce, raw or processed. Till March 2014, 302 FPOs were registered across the country and the target is to promote another 2000 FPOs by 2017. West Bengal has a small share in this (7 FPO registered till March 2014). One of the study villages (Dhoulaguri) has registered an FPO recently. There are no systematic evaluation studies available yet, but number of case studies are available highlighting the benefits from FPOs in various activities including organic farming, produce processing, marketing, etc (GoI, 2013). Though it is too early to assess the impacts, they seem to have lot of potential to change the agricultural scenario. This depends on how comprehensive and integrated are the business models put up by the FPOs. Such a programme is being implemented by NABARD with technical support from GIZ and financial support from KfW, Germany.

Umbrella Programme for Natural Resource Management (UPNRM) is very close the FPO model as it supports loan-based NRM activities. The programme objective is to contribute to holistic, participatory and financially sustainable natural resource based livelihood policies and financial instruments (NABARD, nd.). Business models have been introduced in rural areas to reduce poverty by creating livelihood opportunities, increasing farm incomes, strengthening agricultural value chains and conserving natural resources. Activities covered include, soil and water conservation, climate adaptation, renewable energy, livelihood activities, processing and marketing, etc. UPNRM also supports information and knowledge management, viz., proposal development, planning, capacity building, knowledge management systems, etc.

Financial Assistance is provided through loans and bundled small grants. Long term investment loans are provided for NRM measures, livelihood activities, infrastructure, plant & machinery, storage, marketing chains, etc. Working capital loans are also provided. Whereas, proposal development, capacity building, community mobilisation, cost of expertise, project management are covered under grants. Implementing agencies are NGOs, cooperatives, producer organizations, private and public limited companies, banks, micro-finance institutions, community based organizations and public sector agencies in rural areas across India; other allied organizations are consulting companies and agencies that provide capacity building, information and knowledge management services. NABARD is now proposing to extend the programme to all the villages in India by linking it up with commercial Banks. There is a window of opportunity to develop a business model on sustainable intensification.

Community engagement and institutional strengthening

There is clear institutional potential at the village level and the communities are proactive to the initiatives introduced through the ACIAR projects. At the same time, they are constrained by low awareness and capacities. As a result, the participation is limited to the few 'knowledge elite' or 'political elite'. 'Ethical

community engagement approach' acknowledges and respects famers wisdom and stength as a core value and treats farmers as equal research partners (Ray, et. al., 2017). The community engagement process adopted in SIAGI has the potential to bridge this gap and expand community participation. The engagement is proving to be highly beneficial to the communities. Apart from initiating group farming in both the villages, the process helped the communities to approach the administration and get land titles in one of the villages (UC) and register an FPO in another. The recent capacity workshop with the communities has paved the way for new learnings and capacities where farmers clearly identified capacity development to manage institutions (book keeping) as high priority followed by FPOs and proposal development (Ray, et. al., 2017). This process in the light of existing institutions and possibilities for expanding them, can help communities to proactively access the support systems and move towards sustainable intensification. Institutional strengthening through 'ethical community engagement' can create win-win strategies.

VI Policy and Institutional Framework for Inclusive and Sustainable Intensification

Given the overall objective of the study and the contextual review of the study region four important interventions are identified. These interventions are neither exhaustive nor enough to deal with various issues that need to be addressed. They are 'low hanging fruits' with high potential for achieving in the context of institutional strengths in both the villages and the broader policy environment in the state. The potential for these interventions are assessed based on the relative situation in the study villages and the existing gap between district and state level position on one hand and the relative position of state in the regional context. A policy matrix of required policies, existing programmes that can be leveraged and constraints for achieving the objectives is presented in table 7. Inclusiveness is not made explicit here as it is implicit to all interventions given the fact that 95 percent of the farmers are small and marginal.

Table 7: Policy Matrix of SIAGI

Areas of Intervention	Potential	Policy Requirement	Existing programmes	Constraints
Sustainable Intensification	High	Awareness building; Policies to support Integrated Nutrient Management, Integrated Pest Management, etc.	Soil-health card; Organic farming; Contract farming.	Lack of incentives, promotional policies, markets and institutions.
Intensification/ Diversification	High	Promote FGs / FPOs; Contract Farming; Strengthen Institutional credit. Extension services.	Water management programmes; National Horticulture Mission; Pulses & Oilseeds programme, NABARD-FPO; Doubling of farm Income	Low total factor productivity, Scale, Water, Credit. State support and initiative.
Market Reforms	High	Adopt market reforms	No. of new initiatives including e-trading, direct marketing, etc., NABARD-FPOs	State is slow in market reforms.
Access to Livelihood Capitals	High	Strengthen SHGs and support & expand their activities. Support education beyond schooling. Strengthen public health infrastructure at the local level.	Primary & Secondary education; Anganwadi, CCDS, primary health programmes	Low awareness, lack capacities. No CBOs for education or health.

There is little evidence that the study region is in any way moving towards sustainable intensification in the real sense of the term, though the present level of intensification can't be termed as unsustainable. But, lack of awareness and myopic profit motives are driving farmers towards unsustainable practices. The main constraint is that there are no incentives to adopt sustainable farm practices. This is not unique to the study region or the state. There is no comprehensive policy frame to promote sustainable agriculture though there are individual programmes and policies. While there are programmes to promote organic farming, subsidy

policies are in favour of promoting chemical fertilisers rather than organic inputs. Cropping intensities and input intensities are low in the study villages when compared to other parts of district. Similarly crop diversification is also low as paddy and potato are the main crops.

There is high potential for improving crop intensity, crop yields and sustainability. Policy requirements are mostly adopting the national level initiatives and taking advantage of the programmes that are already in operation. Poor allocative efficiency is adversely affecting returns to agriculture and farm incomes. Improving total factor productivity coupled with shifting to high value crops could improve the farm incomes. The study region appears to have high potential for high value horticultural crops that require less water. Supporting and promoting contract farming could bring out the potential of vegetable crops in the region. Contract farming is also more sustainable as it adheres to residue free products, which is mandatory for processed exports. Similarly, promotion of farmer groups and FPOs could address number of constraints like size of land holding, access to water, access to credit, etc.

Market reforms are *sine quo none* for agricultural intensification. Absence of market policies and infrastructure is pushing farmers into distress. Market distortions are widespread across the states and West Bengal is one of the more affected in comparison with other major states. The state needs to be proactive in adopting some of the new initiatives like e-trading, direct marketing, etc. E-trading has increased farmers' income by 17 percent during the first year of operation in Karnataka (Chand, 2017). Similarly, linking farmers directly with the retail chains like reliance fresh has also improved the farm incomes significantly. While FPOs are in formative stages in the study villages, they need proper grooming and capacities to identify appropriate initiatives and access funding that can enhance farm incomes in a sustainable manner.

Improved access to livelihood capitals like human and social could enhance household incomes substantially. Education and nutrition are the main target areas. Nutritional deficiencies appear to be more serious problem than income or calorie based poverty (Chiranjeevi, et.al., 2017). Though there are number of nutritional programmes, low awareness and capacities at the village level constrain the communities to access sufficiently. Affordability of higher education (beyond schooling) is quite low in the study villages. There appears to be no government support for higher education in West Bengal state. Though there are number of SHGs operational, they are not economically productive. There is need to identify innovative approaches of marketing and business models like making food products, handy crafts, etc., that can improve incomes[5]. Learnings from states like Andhra Pradesh, Gujarat, Maharashtra, etc., could help identify potential activities that suit the specific context.

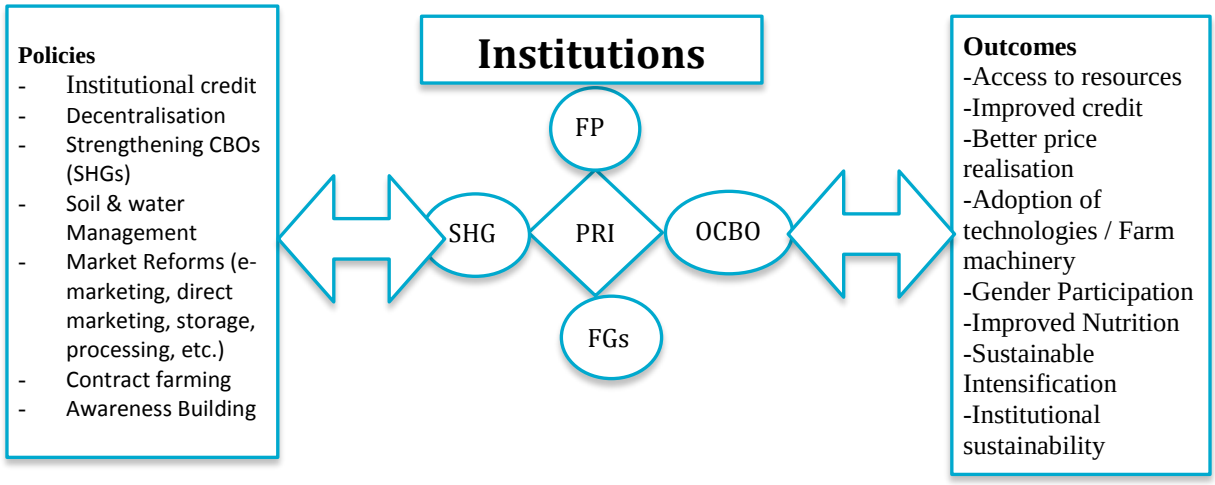
Institutional Frame: Need for Synergy

Effective implementation of the policies and programmes need appropriate institutions. Most of the institutions that are identified already exist in the study villages in one form or the other. But, their capacities are low and need to be strengthened in terms of accessing the available programmes and implementing them. These institutions include Farmer Producer Organisations (FPOs); Farmer Groups (FGs); Self-help Groups (SHGs) and other community based organisations (OCBOs). Of these, FPOs, which operate as a business model, could be central to all the other institutional activities. FPOs are involved in input supplies, machine hiring centres, output processing, marketing, etc. FGs can be part of FPOs which can mutually

[5] SHGs in some villages are already making food products and selling in markets with the support of CDHI. They need further support in packaging and expanding their market (even outside the district and state).

support in input supply and output marketing. FPOs can support the SHG activities like agro processing and marketing their products. When all these institutions are inter-linked, their mutual benefits would multiply. Such a synergy can be achieved with the involvement of Panchayati Raj Institution (PRI) in a more effective manner i.e., PRI should play a proactive role in the activities of these induced institutions (Fig. 1). For, in the study villages PRIs are not only a formal member but also very supportive of these institutions, though this is more like a formality rather than a formal bonding, which needs a state level policy.

Figure 1: Institutional Frame for SIAGI



The argument has always been how to bring these induced institutions under the purview of PRIs. These linkages are expected to increase the accountability of participatory institutions. According to one study which looked in to legal aspects of PRIs involvement in NRM in the three Indian States namely Maharashtra, Madhya Pradesh and Rajasthan, the existing legal framework provides the requisite room for interrelationship of the Panchayats with the user groups. The advantages of the user groups as smaller and specialized entities can be explored within the Panchayat Raj framework by the mechanism of committees. However, the efficacy of the Panchayat Raj institutions and the associated user-groups can be assessed with relation to their conduciveness in realization of the rights at the local level. This is particularly important when widespread emphasis is being attached to the rights of the local people in the discourse of participatory natural resource management (Upadhya, 2005).

Decentralization is being actively considered by interfacing between the PRIs and induced institutions. The multiplication of induced institutions and parallel structures has weakened the panchayats. It has created confusion and resulted in conflict/s. The interface is expected to help make the induced institutions become more effective, sustainable and strengthen the PRIs. A word of caution here is to accept that the inter-linkages have limited role and effect in the process of decentralization and good governance unless definitive measures are taken up by the Government to devolve functions, funds and functionaries to the PRIs, ensuring decentralized planning and convergence. The divide is likely to widen with FPOs, who are like business entities with more money and power than the PRIs. Hence, empowering the PRIs would necessitate the higher authorities to disempower themselves. Devolution of power and authority from the State Government to the three-tiered PRIs would create space and opportunity to ensure closer measures of accountability.

Interface between the PRIs and the induced institutions would usher in better mechanisms of accountability. Linkages are necessary to sustain and strengthen the CBOs and make them accountable to “all” the

stakeholders at the Gram Sabha. The linkages already created and established by the various Acts and other mechanisms have helped in creating only a token representation to the PRI members. The non-voting powers bestowed on the ward members and the presidents has diluted their presence and participation. Also, the Gram Sabha's are used, if at all, for beneficiary selection. Gram Sabha should become an important forum in micro-planning where the different stakeholders meet to plan for the resources that are available to achieve convergence. Convergence cannot take place through a government order (Sitaram, 2002). In the present case, the community engagement process could help easing these tensions and build a healthy synergy.

Next Steps

- Assessing various forms of tenancy for a more targeted policy approach.
- Ways to improve allocative efficiency (bio-economic modelling).
- Optimum scale of operation for farmer groups (Bio-economic modelling)
- Assessing the functioning of Farmer Groups
- Assessing the functioning of SHGs
- Assessing the potential for supply chain vs value chain (value chain)
- Develop more targeted policy matrix.
- Develop more targeted institutional framework.
- Stakeholder engagement to focus on:
    - Promoting & Strengthening FPOs and UPNRM by taking NABARD support.
    - Initiatives in horticultural crops, contract farming and organic farming in the state by leveraging central programme.
    - Initiate past paced market reforms.
    - Policies for group initiatives.

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Appendix

Table A1: Socioeconomic Features of the Study Region

Indicator	Units	India	West Bengal	Coochbehar
Area	Million Hectares (%)	329	8.9 (2.7)	0.34
Population (2011)	Millions. (% rural)	1210 (69)	91 (68)	2.8
Density (2011)	Persons/Sq.Km	382	1030	832
SC / ST Population-Rural (2011)	%	30	35	54
Rural Literacy (2011)	% Average / Female	58 / 50	63 / 57	73 / 66
Rural Labour Participation (2011)	% to pop (Female)	41 (25)	40 (19)	40 (21)
Average Rainfall (2012-13)	MM	1083	1750	4136
Average Farm Size (2005-06)	Ha.	1.1	0.8	0.8
Extent of Marginal holdings (2005-06)	%	70	89	92
Net Area sown (2012-13)	Million Ha. (% of reporting area)	141 (43)	5.3 (61)	0.25 (74)
Gross Area Irrigated (2012-13)	Million Hectares (%)	86.4 (45)	5.5 (57)	0.30 (64)
Average yield rates (2011-12): i) Rice ii) Wheat iii) Potato	Kgs / Ha.	 2,203 2,785 ---	 2,573 2,602 25,641	 2,198 2,445 30,291
Crop Intensity (2012-13)	%	138	184	189
Extent of Land Degradation	% of Total Area	40	28	---
Rural Livestock Population (2007)	Millions	492	29	1.8
Consumption of fertilizers (2007-08)	Kgs/Ha. (pesticides)	135	169 (0.4)	104
Area under HYV (2007-08)	% of Rice and Wheat	45	92	---
Access to Insti. Credit (2014)	% farm households	20	26	---
Institutional Credit (2014)	Rs. / Ha.	15936	14025	---
Farm Mechanisation (2016)	KW/Ha.	0.93	1.2	---
Share of Agrl. (2012)	(% of SGDP)	15	24	19
Nutritional Status (2010)	RDA Gap in Kcal/day (Man/ Woman)	730 / 492	---	---
Spread of Regulated Agrl. Markets (2016)	No./ Sq. Km (no.)	(7189)	1/130 (685)	(165)
Extent of migration (R-U) (2001-02)	% Inter-state (intra-state)	39 (16)	50 (13)	21
Per Capita Income (2013-14)	Rs.	74,380	69,413	45, 235
Extent of Rural Poverty (2015)	% of Pop	25.7	22.5	55.6