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Rapporteur's Report on Rainfed Agriculture: Myriad of Issues

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I

INTRODUCTION

Development of rainfed areas has drawn the attention of agricultural economists for the last six decades and more than three times during the earlier discussions at the annual conferences and seminars of ISAE. Looking back at the issues discussed during those conferences and seminars one feels a little distraught about achievements. We are yet to cover significant ground on the issues raised in the debates earlier. The issues remain confined to providing protective irrigation, new varieties, watershed development, and designing specific programmes. The success or the failure of these programmes is well documented, and while the programmes have yielded some results they are far from satisfactory.

Recently, while addressing the National Development Council meeting the Prime Minister declared the constitution of National Authority for Sustainable Development of Rainfed Areas (NASDORA). Subsequently, after a gap of about 10 months the National Rainfed Area Authority (NRAA) was constituted. NRAA has quite a few challenges in terms of a design of a proper development strategy. Their task inter alia begins with pooling all the programmes on watershed development and rainfed agriculture under different names. NRAA is not under the direct control of the Prime Minister and therefore will be necessary to reiterate its administrative primacy in the existing structure. The body has not remained lean (as expected) and is anticipated to grow in future. The focus of NRAA is on the following objectives: (i) To prepare a perspective plan, outlining the national strategy and road map for holistic and sustainable development of rainfed farming areas. (ii) To evolve common guidelines for all schemes of different Ministries including Externally Aided Projects (EAPs) for development of rainfed/dry land farming systems. (iii) To coordinate and bring convergence within and among agricultural and wasteland development programmes being implemented in rainfed areas of the country". The focus is lucid and excellent but the strategies are blurred and hazy and hence need to be clearly delineated.

It is essential to realise that out of the 139.1 million ha of net cropped area (in TE ending 2003) 83.9 ha is under rainfed region. Thus, more than 60 per cent of our

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cultivated lands are still at the mercy of the monsoons and the associated climatic aberrations. It is unfortunate that even after five decades of development experience, we are still not far away from the proverbial statement that "Indian agriculture is a gamble with monsoon". Various programmes were experimented during the last six decades of planning and these included soil-conservation, dry-farming research stations, Drought-Prone Area Programmes (DPAP), different employment generating programmes, Watershed Development programmes under nine different guidelines, including the work in the voluntary sector. We have now come to terms that watershed development can be the flagship programme to develop the rainfed areas. Following the debate on the stagnation in agricultural sector, National Development Council had constituted a working group on rainfed farming. Under the watershed development programmes across the plans we have invested substantial amount, and unless this pace is stepped up, we may have to go up to XIII Plan to reach some respectable goal. This is a huge investment and the challenge is to find these resources. Further, the watershed investments need to be revisited since the life of one program can be no longer than 10 to 12 years.

TABLE 1. ESTIMATED INVESTMENT FOR WATERSHED DEVELOPMENT

Plan Period	Area Proposed Treatment for (million ha.) (2)	Per ha. cost (Rs. in thousand) (3)	Total cost of treatment (Rs. in crore) (4)
X Plan	12.00	7.50	9,000
XI Plan	15.00	11.00	16,500
XII Plan	15.00	15.00	22,500
XIII Plan	11.40	20.00	22,800
Total	63.40		75,800

Source: Draft Interim Report of Working Sub Group II on Watershed Plus Policies for the Development of Rainfed Areas, Ministry of Agriculture, Government of India, 2006.

RAINFED AGRICULTURE: TEETHING PROBLEMS

In the literature there is a common practice to use the terminologies dryland or rainfed agriculture loosely, representing arid and semi-arid agriculture. The semantics of the emergence of these terms is complex and therefore, it is in order that it isclarified at the beginning. According to the agro meteorologists, rainfed areas are those which are mainly dependent on rainfall for all its biotic activities. Efforts were made during the seventies to attempt a classification of similar type for the purpose of Irrigation Commission as well as the DPAP programme. It was agreed that the region receiving protective irrigation for more than 30 percent of its net sown area are excluded here (Government of India, 1976). Therefore, rainfed area should essentially include the areas which are termed as 'dryland' (bearing in mind that nothing grows on a dry land without the support of rainfall) as well as the areas which are vulnerable and therefore the arid and semi-arid zones of the country.

Humid, sub-humid and assured irrigated areas are excluded even though these may also be rainfed in the strict semantics of the term.

Rainfed area is broadly classified into different agro-climatic typologies and the heterogeneity of climatic as well as livelihood systems poses a challenge to researchers. The classification has to be essentially policy focused based on rainfall and irrigation as the first two parameters, and at the same time incorporate the biological capability (of soil, crop and other biological activities), available livelihood systems and feasibility of interventions in the programme design. The Agro Climatic Regional Planning Studies of the Planning Commission and regions/zones delineated under National Agricultural Research Programme will be of great help in bringing out the spatial and regional features of rainfed agriculture and in developing a policy framework.

There are five important issues that emerge when one considers the rainfed farming system. First, it is a well recognised fact that the rainfed areas have an innate weakness of the severe constraints on availability of natural resources coupled with the neglect of infrastructure development. One cannot consider the lack of infrastructural development as a deliberate neglect of policy, but it was more incidental as the fore-runner regions demanded and hence allotted the large share of investment. Even a back of the envelop computation will bear that large share of the public resources are absorbed by a few developed regions. Even with the best intentions, policy could not be sufficiently truncated in favour of the rainfed backward regions. Second, even under severe stress the rainfed regions had a historically developed livelihood system with diversification of crops and activities as the core philosophy of their risk mitigation strategy. With the advent of Green Revolution, the historical livelihood system was jolted and the new 'mantras' took prime place in their strategy. The farmers quickly changed from millets-pulsesoilseed crop pattern to more water intensive crops and water-fertilizer-pesticide based strategy for the rainfed crops. The better endowed farmers could take advantage of this but the others only lived with their ambitions to equate their peer. As a result, acute poverty and state dependence became hallmarks of the rainfed regions. Third and more crucial outcome of the ill conceived strategy was the disappearance of the alternative vocations and seasonal migration to urban areas as the device to escape the severity. Artisans' skills from Rajasthan and Gujarat are the best examples of the adjustment process in the event of the farm sector stress. But slowly these took a back seat under the force of new developmental initiatives. Forth, among the underdeveloped infrastructure, development of appropriate markets happens to be a crucial link leading to underdevelopment. The product market channels established historically disappeared and their place was taken by new institutions in product and factor markets, but more to the disadvantage of the products emerging from rainfed regions. Last, throughout our planning exercise various schemes and programmes were designed for rainfed regions. Initially, it started with the area development programmes (IADP, DDP and DPAP) and then the emphasis shifted to the beneficiary centered schemes. Once again we are tending to return to the area or group focused schemes. Individually, these schemes seem good and effective but soon to realize that the design failed the aspirations. As soon as the scheme gets completed the results wither away. Any mid course corrections in the strategy have also caused significant confusion and resource loss. One of the examples of this could be the various guidelines issued under watershed development programmes in a span of twenty years allowing on an average about two-three years for each set of guidelines to show performance. In addition to that we have a myriad of programmes in which strategies as well as tools are overlapping. As a cumulative effect, rainfed areas have become more state and scheme dependent.

Strategy for Rainfed Agriculture: Looking Back

Research on the technology of rainfed farming began in the country in the early thirties with the establishment of dry farming research stations at Solapur (1933), Bijapur (1933), Hagari (1934), Raichur (1934) and Rohtak (1935). Early research on dry farming confined to the conservation of soil moisture through bunding and understanding the rainfall behaviour in these regions (Kanitkar et al., 1960). Though the programme began with manifold objectives and started yielding some results, the work at most of these research stations stopped due to Second World War. The only exceptions were Solapur and Bijapur dry farming research stations. The work on these stations continued within the given framework but their research was directed more towards soil conservation. This was also remarked in the review taken in an official study of Planning Commission, (Government of India, 1986). The emphasis on soil conservation also yielded significant improvement in rainfed areas. The results of crop cutting experiments in Maharashtra, Karnataka and Tamil Nadu by mid-seventies showed 11 to 25 per cent increase in yields in the bunded fields (Jodha, 1979). Among the important constraints identified in the dry farming improvement programme with major emphasis on soil conservation programme are:

- (i) Over-emphasis on engineering components,
- (ii) Lack of biological components, and
- (iii) Neglect of institutional support for the work

(Jodha, 1979, p. 494).

These constraints however continue to dominate the developmental initiatives in rainfed farming even to this day.

Intensive Area Development Programme (IADP) and Drought-Prone-Area Development Programme (DPAP) were taken up for the development of rainfed areas to boost the adoption of technology and create employment. For this, fifty-four districts spread over 13 states were considered for DPAP programme. Nevertheless, the emphasis on civil works, seasonal employment generation and the top-down approach

constrained to gain a foothold as a rainfed farming policy intervention. These programmes had momentary influence on the status of rainfed farming. The impact of DPAP and DDP Programme have been analysed recently by a Committee of Planning Commission, headed by Prof. C.H. Hanumantha Rao. The Committee strongly recommended an approach based on watershed area development.

At institutional level, the all India coordinated Research Project for Dry Land Agriculture (AICRPDA) was established for R and D on drylands and dissemination of the results through testing the technology on pilot projects. The emphasis of AICRPDA was on the development of location specific technologies and testing them under field conditions (AICRPDA, 1982). Similarly, the contributions of International Crop Research Institute for Semi-Arid Tropics (ICRISAT) and Central Arid Zone Research Institute (CAZRI) have also been impressive on technological front. ICRISAT pioneered the development of rainfed agricultural technology in certain rainfed areas of Maharashtra and Andhra Pradesh (Walker and Ryan, 1990). The development of technology at CAZRI, involved research on agronomic practices, crop variety research, fodder and forest trees and so on. ICRISAT developed and disseminated the technology for drought tolerant varieties, and also gave a holistic package for semi-arid tropics including cultivation practices, treatment of pests and diseases, economics of rainfed farming, risk management and such other issues (Walker and Ryan, 1990).

An important mile-stone in the policy towards rainfed farming emerged from the beginning of the Sixth Plan. Rainfed farming was always considered as an important component of the agricultural sector in the plan documents. Before the sixth plan there were references stressing the need for a systematic approach to deal with rainfed agriculture. However, no holistic approach was adopted to understand and deal with the constraints of rainfed farming in the planning process. The sixth plan for the first time attempted to put the framework of rainfed farming in the watershed development approach to check the spread and deterioration by erosion of arable land and to encourage natural vegetative cover of non-arable land. Water harvesting and development of small watersheds of about 50 to 100 hectares was suggested as a strategy (Government of India, 1981). The policy was reinforced during the Seventh Plan and the National Watershed Development Project for Rainfed Agriculture (NWDPRA) was taken up with three fold objectives:

- (i) to harvest rain water,
- (ii) to conserve soil moisture,
- (iii) to extend cropping systems and farming practices for increasing production and mitigating risk

(Government of India, 1985, p. 3).

Watershed Development Programme

Watershed management as a development strategy for rainfed agriculture took shape by early eighties. Initially, it was the ICRISAT experiment followed by the State Agricultural Universities under Operational Research Projects as well as other experiments like Mittemari in Karnataka. Almost simultaneously there were attempts by various State Governments to initiate Watershed Development Programmes like Comprehensive Watershed Development Programme of Maharashtra and Dry-Land Development Board of Karnataka. At the same time, the World Bank aided projects of Manoli (Maharashtra), Maheswaram (Andhra Pradesh), Purua Nala (Madhya Pradesh) and Kabbalnala (Karnataka) were initiated. The designs were different as also the administrative mechanisms. In 1984, the Government of India initiated a Watershed Development Programme under the name National Watershed Development Programme (NWDP) and the nomenclatures as well as the guidelines were revised substantially by 1989. It was titled as National Watershed Development Programme for Rainfed Areas (NWDPRA). This was followed by an elaborate set of guidelines under the title WARASA (Watershed Areas Rainfed Agricultural Systems Approach). A Committee under the Chairmanship of Prof Hanumantha Rao was appointed to review the DPAP programme and the Committee came out with elaborate framework for Watershed Development (1994). Following this, a new set of guidelines to implement Watershed Development Programme was issued in 1994, and revised in 2001 by the Ministry of Rural Development, Government of India. The Rural Development Ministry again issued a new set of guidelines in 2003, under the name 'Hariyali Guidelines'.

In 2005, the Ministry of Rural Development appointed another Committee under the guidance of Shri S. Parthasarthy to revisit the Watershed Development Programme. The Committee submitted its report and a new set of Guidelines have been issued to the States for implementation of the Watershed Development Programme (2007). In addition to these State led directions; various funding agencies have initiated the Watershed Development Programmes in India such as DANIDA, DFID, World Bank and many NGOs. After this long journey, we have now settled with the National Rainfed Area Authority (NRAA) which has onerous task ahead. Thus, without any contestation it can be mentioned that Watershed Development Strategy is one of the primary interventions needed for the rainfed areas and this spirit must come from below rather than imposed as a programme from above. Participants of this conference need to discuss on these tasks before the NRAA and help sharpen the technical and administration parts of the watershed development programme.

CONCERNS IN RAINFED AGRICULTURE

The papers received for this session, are grouped into six broad categories, though some authors have covered many issues under one theme. The first category of authors preferred to analyse the individual crops under rainfed conditions. These

papers include analysis of crops in terms of their yields, growth patterns, crop diversification, new technologies and economic analysis. Most of authors focused on the crops specifically grown in rainfed region. What is shown here is that the farmers' dependence on rain-fed agriculture is not totally hopeless, and if the product market supports they can still have a better net income. These authors deal with crops like pulses, oilseeds, cotton and maize for which the demand is likely to be buoyant. However, there is an appreciable yield gap between the yield obtained by farmers and the potential (demonstration plot) yield under rainfed conditions. Factor prices, technology as well as the product market seem to have failed to influence farmers from rainfed area.

The studies by B.C. Roy and Anjani Kumar, Lijo Thomas *et al*, Arun Pandit *et al.*, B.L. Sharma and R.N. Sharma, A.K. Koshta and M. Chandrakar, Dibakar Naik and Sushil Pandey took individual crops like mustard, pulses, oilseeds, potato and other few crops for the purpose of economic analysis. They made attempts to bring out the technological feasibility and considered possible solutions from the view point of the rainfed crops. They could have focused on the crop technology and analysed some of the other feasible alternatives. The paper by S.S. Kalamkar goes a little further as well the attempt by Usha Rani Ahuja *et al.*, analysing the yield gap analysis hinting at the story of constraints in technology adoption.

The structural characteristics of rainfed agriculture attracted attention of authors in the second category. These include agro-climatic features and impact on livelihood systems. The paper by T. Ponnarasi and K. Sita Devi is an attempt to explain the differential livelihood systems under rainfed conditions. While, their attempt towards explanations is praiseworthy, they are partial. The authors are more worried about the fit of the model than identifying the variables dictating the deprivation and the impact on livelihood. They could have focused on the variables more effectively. This leads us to an important issue about the differential livelihood status even within the rainfed areas. Rainfed agriculture is burdened with severe structural constraints which include climatic, infrastructural and institutional. All these have a combined impact on the livelihood systems. One can also look at these under natural and man-made constraints from a policy perspective. At least man made constraints could be really dealt with and to a large extent the natural constraints could be alleviated. R. Ramakrishna and D. Tata Rao in a descriptive analysis show the constraints and the policies. The paper has a lot of information packed in it, even though a lot of it is of common knowledge.

The third category of authors analyse the issues confronted by farmers of rainfed areas in different agro-climatic situations. Rainfed areas of the country are not homogenous in many respects and hence demand differential policy solutions. This fact is seldom recognised in the policy. The heterogeneity arises due to agro-climatic feature and due to differential responses to climatic aberrations. The livelihood systems and the reactions to failures are entirely different. Therefore, we have to another group of studies from a different perspective. The papers here include

Bhardwaj on diversification, A.K. Gauraha et al., and Hulas Pathak on Chhattisgarh, A.R. Verma, Sunil B. Nahatkar on Madhya Pradesh. Specifically the two papers analysing the situation in Bundelkhand by R.B. Singh and by Babu Singh et al. are worth noting. A few have taken a stand that livestock can also act as an effective diversification in some regions against calamities. A few authors argued about the relative economics of livestock enterprises as against other activities (Shalander Kumar and A.D. Upadhyay). All these papers indicate a variety of situations in rainfed regions and thus call for differential solutions. The best part of this group comes when we get at the paper analysing the rainfed situations in Assam, Orissa, Himachal Pradesh and West Bengal, the regions even a careless analyst will not include these among rainfed category. The real challenge in this regional analysis is to recognize the fine distinctions across the rainfed regions and distill the prescriptions keeping in view the needs and responses. All along our policy responsum was uniform across the country irrespective of the local situations and with guidelines emerging from a central ministry.

The authors analysing experiences in watershed management to overcome the constraints under rainfed agriculture form the fourth category of papers. There was no attempt to innovatively approach the issue and hence the only outcome out of the papers is that watershed development approach is the most viable alternative. One observation however could be made about the differential policy and outlook required across regions in India. Approach towards treatment of watershed in Terai region has to be totally different than that of Deccan Plateau. In that context the veracity of centralised guidelines also comes under scanner and calls for discussion.

Providing irrigation is usually considered as the first step towards alleviating the problems of rainfed areas. The fifth category of the papers deals with irrigation in the context of rainfed areas. Pace of expansion of area under irrigation was less than 1 per cent during the last decade and the productivity has stagnated across all the crops. We cannot whip the irrigation horse any longer to get further and hence development of rainfed areas occupies the centre stage. Both surface and groundwater resources are under stress and the externalities apparent and severe. Groundwater use and emerging water markets in rainfed regions is assuming a prominent place in the discussions. A bulky paper by B.C. Barah, et al., could not be accommodated due to its abnormal size, but they has discussed very important issues therein. Specifically they brought forth the issues of water-sharing system and water markets to increase the efficiency of groundwater irrigation. It is necessary to underscore the need for water sharing in the water stressed rainfed region to halt overdraft of groundwater and to improve technical efficiency. Water saving technologies is one of the important but neglected demand side interventions. A. Narayanamoorthy advocates drip irrigation for non-horticultural crops and demonstrates through economics of cotton in rainfed conditions with and without drip irrigation to drive home the point that drip irrigation not only saves resources but also augments income (drip irrigation cannot enhance employment). Others only stress the need for considering this approach as an alternative.

The sixth category includes papers on irrigation and insurance against vulnerability (A.K. Vitonde et al.,). One set deals with the policy issues in the irrigation sector and in the process of discussions of the existing policies, highlight a few innovative issues. Shifting towards drip/sprinkler irrigation in a groundwater irrigated area is one of the themes pursued by a few authors (Narayanamoorthy, Madhu Sharma et al., Manjeet Kaur et al.). The papers dealing with agricultural insurance under rainfed conditions show hardly any innovative thinking. We have recently come across Varsha or weather linked insurance, Reliance, Tata-AIG, Royal Sundaram, IFFCO-Tokyo, Bajaj-Allianze, ICICI-Lombard. The discussions on these alternatives will pave way for a fresh thinking on insurance. Raju and Ramesh Chand (2008, p. 55) write with dismay that "Despite various schemes launched from time to time in the country agriculture insurance has served very limited purpose. The coverage in terms of area, number of farmers and value of agricultural output is very small, payment of indemnity based on area approach miss affected farmers outside the compensated area, and most of the schemes are not viable. (Raju and Chand, 2008, p.55)". But the ides put forth by V.M. Rao some time back on an SHG model of crop insurance goes far ahead of all the currently available instruments in the insurance sector. V.M. Rao writes "Thus, the SHG model for farmer insurance could trigger innovative developments within farmer communities and, also, in catering to the insurance needs of the modernising agriculture and rural economy." (Rao, 2007). The papers submitted have not taken note of these and argued in the earlier style of making insurance effective and irrigation efficient as an old wine in an old bottle. There is a vast scope for increasing supplementary enterprises, especially dairy and rainfed horticulture.

ISSUES FOR DISCUSSION

First issue for discussion emerges from the current policy framework. Now that we have in place a special purpose vehicle in the form of NRAA for the policy towards rainfed agriculture, what should be the imperatives on the agenda of this agency? Have we really got into weaving the structure from down below up to the district as envisaged by the Parthasarthy Committee? What will be design of the programmes? It will be necessary for the participants to focus and sharpen the priorities for NRAA. Watershed approach for rainfed agriculture areas is not a panacea but that in itself has to be properly meditated. Now that NRAA is given the task of consolidating all the ongoing programmes under one umbrella, we may find a focused approach. There should be some definite time-frame for a reasonable level and as learning from the success stories is important, it is also essential to know the spots of failure. The later can be a better guide than the former. Promotion of high value crops and value addition in rainfed agriculture is one strategy but that finally requires investment which could be located elsewhere.

Second, we have noted that rainfed areas in the country are heterogeneous and thus can not be handled with uniform policy tools. There are variations from Assam to Kutchh and Bundelkhand to Ramanagaram (Tamil Nadu). Each situation requires a different policy mix even though the theme of the policy may stay the same, the details will differ. Questions like: What are the requirements of the policy in some of these regions? Are we satisfied with an uniform solution of getting at the same tools of treatment as we have done for the last five decades?;

Third, many analysts feel that providing irrigation is the only panacea to deal with the problems of rainfed agriculture. Even the NRAA also has Water Resource specialist as the first expert on their multi-disciplinary team. Can we really have such an expansion of irrigation and in which regions and at what cost? Should we not consider the water-saving technologies like drip or sprinkler irrigation? It will be necessary to discuss the limitations of these technologies. At the same time we have to recognise the contours of rainfed agriculture when the irrigation potential is fully exploited. What is the likely situation over the next two or three decades across different agro-climatic regions. Can we achieve the goal of getting the rainfed areas in the mainstream development with the policy tools used in seventies and eighties? Do we need to think afresh in the market oriented economy?

Fourth, research and technology have always bypassed the rainfed agriculture. It is not so much for the dearth of technology that becomes an issue here but it is the appropriateness of the technology which is quite disturbing. Despite having the existence of dry-farming research centres for decades, the technologies developed at the research centres could not be effectively adopted even in the close vicinity of these research stations. As a result the technology was unable to help the rainfed farmers to reach to a respectable livelihood level. Research resource allocation has also been more in favour of well endowed regions and that left the rainfed agriculture vying for research resources (S.K. Jha and Arvind Kumar, 2006). Technology remained more supply driven with least respect to the demand side. This system needs to change to provide a demand driven technology.

Fifth, the livelihood system under rainfed agriculture is under stress, and like the adage goes that the devil takes hindmost, weaker sections and women are worst placed in the rainfed areas. The issue of relative deprivation was touched by a few but not in depth. It is a fact that density of poor is quite high in the rainfed regions and this bears an inverse relationship with the diversification of livelihood systems. As Jodha has argued way back in late eighties, the population from drought prone areas has over generations developed their own adjustment mechanisms (Jodha, 1978). This was stressed by many authors but rarely taken up as a concerted strategy by the policy makers.

Sixth, rainfed areas spread across the country have myriad situations not only in terms of natural resources but also in terms of the reaction of its population to the development stimuli. It is therefore necessary to get the planning for development initiated from the local level. Over years we have argued for local-cum-district level

planning in different plans and some attempts were made earlier. Now the Article 243 of the Constitution of India empowers local bodies to plan for themselves keeping in view the strengths and weaknesses as observed at the ground level. This is also taken as an important intervention in the eleventh plan.

Seventh, the social and economic change in rainfed communities has a number of lessons in store. As mentioned elsewhere, poverty is densely located in the rainfed areas and not incidentally but more due to the failure of policies to recognise the vulnerability of these communities. Casualisation of labour is quite common so also seasonal migration of labour. Initially the migration takes place without alienation from the land and the agriculture as the basic livelihood, but soon the migrated family prefers to settle down in urban slum with a new identity. Certainly, this underscores the labour mobility but not economic or social upward mobility.

Last, we need to ponder over the policy commitments during plan period in an historical perspective. More than finding the successes we have to understand the reasons for failures. There is an increased state dependence as also centralisation of the design of the programmes. Therefore, we have success stories of the schemes but failures of the strategies. Participation does not come by incorporating in the instructions but that needs to emerge from the necessities. How this should be achieved under different rainfed situations, is question that demands thinking here. I could not find more appropriate descriptions about our policies towards rainfed agriculture than what Professor V.M. Rao described to me. I quote, "An intriguing feature of our strategies and policies is that they are implemented through a wide range of schemes undertaken by different departments without any coordination. Looking back at the initial benchmarks, schemes report progress and achieve targets, but the final development goal remains as distant as ever. After over two decades and several rounds of innovative approaches, we do not seem to have a single watershed project surviving beyond the hand holding phase to achieve sustained development through local initiatives and participatory institutions"

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