
The Role and Significance of Field Management Committees to Improve Farm Level Performance: Evidence from Rice Growing Area in Assam

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ABSTRACT

The study is conducted to assess the farm level performance of both member and non-member of Field Management Committees (FMCs) based on primary data. Based on the estimated values of Farm Performance Index (FPI), the study found that the non-member farmers are constrained by low level of income, yield of rice and cropping intensity. Interestingly it is found that the FMC member farmers gained than the non-members but not substantially.

Apparently, FMC is a mega village institution serving the purpose of input delivery. With 26000 FMCs covering all the villages can lead the movement of rural transformation in Assam. The findings indicate that the collective activity as part of FMC group failed to generate individual effort optimally which resulted in less performance. Measures needed to make FMC effective and accountable and to understand the cause and effect relationship for inefficient FMCs.

Keywords: Agriculture, Technology package, Productivity, Performance score.

JEL: J24, Q12, Q16.

I

INTRODUCTION

In India the Government of the province of Assam during 1958 undertook an initiative to organise the cultivators field-wise by forming Field Management Committees (FMC), locally called *Pathar Parichalana Samiti*. FMC is an organisation of a group of farmers actively engaged in one or more land-based activities carried out on a contiguous plot of land (identified locally as *pathar*) whose organisation has been recognised and duly registered by the district agricultural officers. The average size of a holding is 80.3 hectares and the group consists of 70 to 80 farmers. The FMC function on the basis of the models of co-operative institution. The FMC is supported by funds primarily from the various programmes of the Government of Assam for development of agricultural activities (Roy and Bezbaruah, 2002). However, there was no serious effort in regard to the formation of FMC and implementation of governmental programmes through these groups till 1980s. Though the introduction of seed-water-fertiliser technology package in mid-1960s

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resulted in higher agricultural productivity in different parts of India, the state of Assam could not participate in this process of development for a long time (Bezbaruah, 1994). The agricultural productivity in the state is low compared to the average for the country as a whole. Considering the importance of agricultural sector in the economic development of the state (more than 70 per cent of the people dependent on agriculture), the Government of Assam took up the crash programme of revitalising FMC during 1987-88 and this seems to be fairly strong and firmly rooted now (Dutta, 2011).

The scheme of Integrated Farming System¹ was introduced on 4th May 1990 as a follow up of the clause 7 of the Assam Accord² for micro planning at the grassroots level and for development by involving farmers' organisations including the rural youth. The FMCs have a broader canvas in accommodating various developmental programmes of agriculture and allied sectors besides developing an interface with several government and corporate bodies (Barah, 2006). The main justification of co-operative farming in India is the contribution it makes to promote a viable and efficient farming management system on the pooled land of small cultivators. These organisations combine the incentive of the ownership of land with the economics of large-scale farming by enlarging the basic unit of cultivation and helping them to secure fuller utilisation of bullock power and manpower. It economises efforts and costs. It also improves the income of cultivator members and contributes to fuller and better employment opportunities in and outside the farms (Kumbhar, 1986). The concept of co-operative farming was also largely practiced in many countries including Japan and China. The conditions of north China appear to have been well-suited to co-operative farming and in fact various forms of co-operation were common (Myers, 1970). The neo-classical theory of co-operatives has been developed in the context of marketing co-operatives and it represents an important step in understanding co-operatives. Public policy concerning co-operatives generally has been supportive because of the notion that co-operatives are pro-competitive forces that improve the performance of markets and increase general economic welfare (Royer, 2014).

The emphasis on greater involvement of farmers' group organisation in the state of Assam in the last two decades appears to be governmental effort for an overall agricultural development with greater participation of farmers. In fact, FMCs in Assam have been a unique kind of organisation, an unparalleled group farming system in the country. These non-government organisations of rural people at the grass-root level earned the recognition as a village intermediary and a project delivery instrument.

The main objectives of the present study are: (1) To analyse the farm level agricultural performance of both members and non-members of FMC, (2) To investigate the role of farm size in increasing productivity of farmers and (3) To analyse the extent of contribution of agricultural inputs in increasing farm level performance.

The following research questions were taken for the study: (1) Whether there is any difference between members and non-members of FMC in farm-level performance, (2) Has the participation in FMC by farm households made small farm-size more productive? and (3) Is the productivity of key agricultural inputs really contributed in increasing farm level performance?

II

ORGANISATIONAL FRAMEWORK OF FMC

A Field Management Committee is an organisation of a group of farmers actively engaged in one or more land based activities carried out on a contiguous plot of land whose organisation has been recognised and duly registered by the District Agricultural Officers, Government of Assam. Thus the Field Management Committee (FMC) is a giant and unique organisation, which is unparalleled in the country. This non-government organisation (NGO) of rural people at the grassroot level, earned the recognition as a village intermediary and a project delivery instrument. Actually, the FMC is a bold step in reaching out to the farmers (target groups), as organised on sound theoretical principle of collective action. The FMC has broader canvas in accommodating various development programmes of agriculture and allied sectors including crop production, horticulture and forestry.

FMC has also entered in the field of infrastructure support services, which include rural infrastructure, rural roads, markets, agro-processing facilities and development of small scale irrigation to support overall growth of agriculture by interfacing with the concerned departments (Barah, 2006). As per the reports available from the Department of Agriculture, Government of Assam, as on March, 2016, there are about 26000 FMCs in the state of Assam having an estimated membership of 1.8 million farmers. Some of the important functions of FMC are: (i) to motivate and guide the members in increasing the productivity of crops grown by cultivation of improved varieties and scientific crop management practices. (ii) to motivate the members to increase the intensity of crop production, and not to allow the land to lie unutilised and to prepare annual production plan based on the available resources and its execution. (iii) to motivate and guide its member-farmers to undertake other technical feasible and economically viable schemes like fishery, veterinary, sericulture, etc., (iv) to arrange a forum for exchange of ideas, information and technology between the member-farmers, the officials of the line departments and the Assam Agricultural University and other research institutions. (v) to take steps to provide basic infrastructures to its members like godowns, cold storage marketing yard etc. (vi) to maintain and update record of the land holdings and the different crops grown on it by the member-farmers. (vii) to tap the available irrigation sources either surface or ground-water for increasing crop production.

Though the membership of FMC is voluntary, with the linking of delivery of extension service, their formation has become almost inevitable from administrative

point of view. Hence many FMCs came to be formed at the instance of personnel of Government extension agencies rather than on farmers' own initiative. Notwithstanding the presence of some successful FMC, by and large such organisations have failed to fulfill the expectations from them as envisaged in their initial conceptualisation (Roy and Bezbaruah, 2002). The sub-division wise and district wise distribution of FMCs in sample study locations is represented in Table 1. It is to be noted that the FMC is a lofty development schema and accordingly a huge institution was built up in the state of Assam with 26000 such committees. Any failings on the part of FMC would directly impinge upon the efficiency of governmental institution and that of leakages in development scheme meant for rural transformation.

TABLE 1. FIELD MANAGEMENT COMMITTEES IN BARAK VALLEY, ASSAM

District (1)	Agricultural sub-division (2)	Number of FMCs (3)
Karimganj	Karimganj	229
	Ramkrishnanagar	229
Cachar	Silchar	398
	Sonai	190
	Lakkipur	274
Hailakandi	Hailakandi	251
Total		1571

III

MATERIALS AND METHODS

3.1 *Context of Study*

The state of Assam consists of three physiographic divisions: Brahmaputra Valley, Barak valley and Hill range consisting of Karbi Anglong and North Cachar hills districts. The Brahmaputra Valley, which forms the northern part, is the largest comprising 71.7 per cent of total geographical area of the state. On the other hand, the Barak Valley region, which forms the southern part, is comparatively small. The two valleys derived their names from the respective main rivers, the Brahmaputra and the Barak, flowing from East to West in the Valleys. In both the valleys the agricultural practices are located mainly in the valley lands while in the hill districts cultivation practices are mainly confined to shifting or jhum practices. The agriculture in Assam is still characterised by traditional cropping pattern and dependency on rainfall. All the plain districts of Brahmaputra and Barak Valley in the state are flood prone. The use of modern technological inputs and implements recorded a very slow pace despite the fact that application of technology, agro-infrastructure and material inputs are the important governing factors for the choice of agricultural production activities and their sustainable progress. Though a majority of the people is engaged in agriculture and there is a huge scope for the utilisation of the Himalayan river water which flows through the state, only a small portion of the

available water resources has been used for the agricultural purposes (De and Bodosa, 2014). The importance of technological change in the context of growth and development of traditional agriculture has been emphasised since the 1960s (Schultz, 1964). At the national level, technological and institutional innovations play an important role behind the adoption of multiple cropping and the overall agricultural development. But no such transformation in agricultural sector is visible in the state of Assam.

3.2 Agricultural Economy of Barak Valley

The sectoral composition of the economy among primary, secondary and tertiary sector confirms strong agricultural bias. Agriculture continues to employ about 70 per cent of the work force. Only 3.95 per cent workers are engaged in household industrial units as per 2011 census (Table 2).

TABLE 2. DISTRIBUTION OF WORKERS BY CATEGORIES OF ECONOMIC ACTIVITY, 2011
(per cent)

District (1)	Cultivators (2)	Agricultural labourers (3)	Household industry workers (4)	Others workers (5)
Cachar	19.79	11.29	4.02	64.89
Hailakandi	32.97	15.67	3.46	47.91
Karimganj	23.64	16.79	4.37	55.20
Barak valley*	25.47	14.58	3.95	56.00

Source: Census of India, 2011 * average of three districts.

The workers are categorised as cultivators, agricultural labourers, household industry workers and other workers. Other workers constitute those workers other than cultivators or agricultural labourers or household industry workers. As per Agricultural Census of 1990-91, there were 2,09,875 number of agricultural holdings in the Barak Valley, 53.09 per cent of which was in the size class of below one hectare. The average size of operational holding works out to be 1.62 hectares, which contains some amount of upward bias due to the large holdings of the tea estates. A striking feature of the cropping pattern of the Barak Valley region is the predominance of paddy. Other notable crops cultivated in the Barak Valley region are pulses, rape and mustard, potato and sugarcane. In Barak Valley, paddy is still grown almost entirely under rainfed conditions, the irrigation infrastructure is practically non-existent in the region. Only about 5 per cent of gross cropped area is under coverage of irrigation. Low level of technology is reflected in low yield of the principal crop (Roy, 2009).

The yield rate of Barak valley is substantially lower than that of national average in case of foodgrains, non-foodgrains. The Barak valley exhibits lower yield than the state average. Like foodgrains, the similar trend is also visible in case of non-food grains. Yield rates for cotton, jute, mesta and sugarcane in Barak valley lag far behind than the national average (Table 3). Rice is the major crop in Barak valley as it is the

staple food of the local population. It is the predominant crop and thus lacks cropping diversity. The yield of rice is lower compared to all India level during 2011-12 to 2014-15 but higher than all Assam yield rate (Table 4). In 2011-12, out of 0.26 million hectare of cultivable land in the Barak valley, 0.23 million hectare, i.e., 88 per cent was under rice cultivation. This shows lack of crop diversification among the cultivators in the valley. In Assam as a whole about 65 per cent area was under rice cultivation during the same period.

TABLE 3. AVERAGE YIELD IN 2010-11

Crop (1)	Average Yield (kg/ha)		
	India (2)	Assam (3)	Barak valley (4)
Foodgrains	1851	1763	1101
Non-foodgrains			
Cotton	440	89.89	62
Jute and mesta	2176	1744	1770
Sugarcane	68554	36196	35359

Source: Directorate of Economics and Statistics, Assam.

TABLE 4. YIELD OF RICE

Year (1)	Yield Rate (kg/ha)		
	India (2)	Assam (3)	Barak valley (4)
2001-02	2079	1519	2182
2005-06	2102	1619	1869
2010-11	2239	1983	2152
2014-15	2404	2119	2337

Source: Directorate of Economics and Statistics, Assam.

3.3 Data Collection

The micro-level analysis is mainly based on primary data collected by carrying out field survey. The field survey for the study has been confined to the Barak Valley region of the state, considering the paucity of time and resources. The main objective of the study is to assess the status of the functioning of the FMCs and not to find the aggregates only. Hence, it is decided that the field survey would be confined only in the Barak Valley region of the state. The Barak Valley region is situated between Longitude 92° 15' and 93° 15' East and Latitude 24° 8' and 25° 8' North, covering an area of 6922 sq. km. (Bhattacharjee, 1977).

The sample has been selected through a process of multi-stage sampling. There are three districts having six agricultural sub-divisions with 8 to 9 ADO (Agricultural Development Officer) circles in each sub-division in the Barak Valley in Assam. At the first stage from each agricultural sub-division in the district two ADO circles each have been selected as the field study locations. The district-wise sub-divisions are: (1) Cachar district (03 sub-divisions), (2) Karimganj district (02 sub- divisions), and (3) Hailakandi district (01 sub- division). A total of 12 ADO circles have been selected

randomly. At the second stage, three villages have been selected at random from each of the selected ADO circles. Thus, in all, 36 villages were selected for the sample study. From the selected villages, farming households have been divided into FMC members and non-FMC members. Finally, 20 and 10 households respectively of FMC and Non-FMC farms have been selected for survey. This gives the sample size equal to 1080 (consisting of FMC members – 720 and non-FMC members – 360). The field study was conducted during 2014. The required information from both member and non-member FMCs has been obtained by using schedules administered by personal interview, which has been finalised after pre-testing. The cropping pattern of the sample farms shows mono-cropping in which paddy constituted 97 per cent and 98 per cent of net sown area among member and non-member FMC respectively (Table 5). Based on climatic conditions and the harvesting seasons, distinctions are drawn between three different paddy crops, namely, autumn paddy, winter paddy and summer paddy. Winter paddy consists mainly of transplanted ‘Sali’ crop (locally known). It is transplanted from nursery beds in July and August and harvested in November and December (Roy, 2009). The sample farmers have been found to cultivate mainly winter paddy which is rainfed. Autumn and summer paddy is cultivated by only about 17 per cent of sample farms in which irrigation facilities are available. Similarly small area under vegetables is cultivated by the sample farms mainly during *rabi* season.

TABLE 5. CROPPING PATTERN IN SAMPLE FARMS

District	Member FMC		Total	Non-member FMC		Total
	Paddy	Vegetables		Paddy	Vegetables	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cachar	95.2	4.8	100	96.6	3.4	100
Karimganj	98.0	2.0	100	97.3	2.7	100
Hailakandi	98.8	1.2	100	98.8	1.2	100
Total	97.3	2.7	100	97.6	2.4	100

(per cent)

3.4 Methods

Using UNDP methodology, Farm Performance Index (FPI) has been constructed with three components (i) Per capita farm income (x_1) (ii) Yield of paddy per hectare (x_2) and (iii) Cropping intensity at household level (x_3). FPI has been chosen to represent overall performance of individual farm which depends on income, productivity of paddy and cropping intensity. It is observed from the sample data that paddy is a major crop in the cropping pattern of the sample farms. While farm income mostly depends on productivity, cropping intensity indicates intensive cultivation which mostly depends on the availability of irrigation and other agro infrastructure facilities. The sub-indices are calculated as follows:

$$\text{Dimension Index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}} \quad \dots(1)$$

The FPI is the geometric mean of the three dimension indices and value between 0 to 1:

$$I_{\text{farm income}}^{1/3} + I_{\text{paddyper hectare}}^{1/3} + I_{\text{cropping intensity}}^{1/3} \quad \dots(2)$$

Per capita farm income is measured in Indian currencies (Rs.), yield of paddy per hectare is measured in kg and cropping intensity indicates raising number of crops from the same field during one year. It is estimated as, cropping intensity = (Gross cropped area / Net sown area) x 100. Higher cropping intensity means that a higher portion of the net area is being cropped more than once during one agricultural year. This also implies higher productivity per unit of arable land during one agricultural year. In the present study as rice is the major crop covering up to 90 per cent of area, CI value will be uniformly small and this reflects pattern of agricultural transformation in the sample farms.

Classification of Score

The performance score has been classified into quintiles and calculated the mean performance score for each group.

The regression equation estimated for the analysis is

$$FPI_i = a_0 + a_1M_i + a_2FS_i + a_3Fer_i + a_4Fam_i + a_5Ir_i + a_6CDI_i + u_i \quad \dots(3)$$

where FPI stands for Farm Performance Index, the first explanatory variable, M is a dummy variable which takes value 1 if the i-th farmer is a FMC member and 0 for otherwise. FS refers to farm size, measured by net sown area of the farm in hectare. Fer indicates chemical fertiliser (N+P+K) used per hectare of land. Fam refers to family size of individual farm household measured by the number of persons in the farm family. IR refers to net irrigated area in hectare of the farm. It is to be mentioned that the irrigation is mainly river pumping system and sponsored the Department of Irrigation, Government of Assam. The irrigated area of the sample farms constituted only 3.1 per cent of the net sown area, which is much less than the data reported earlier from the Government sources. CDI stands for Cropping Diversity Index and represents the share of different types of crops in a particular plot of land. In the present study, Crop Diversity Index (CDI) has been formulated by following Kshirsagar *et al.* (1997). This is given as below:

$$CDI_i = 1 - \sum_{j=1}^n \left[\frac{a_{ij}}{A_i} \right]^2 \quad \dots(4)$$

where, CDI_i = crop diversity index, a_{ij} = area planted to the j -th crop in the i -th location and A_i = total area planted under all crops. The index is zero for a farm growing only one crop and approaches unity as the level of diversity increases.

IV

RESULTS AND DISCUSSION

The present study has been taken up with a view to examining how the farmers benefitted from the memberships of FMCs in Assam for performance in agriculture at farm level. The sample farms consist of both member and non-member of FMCs, irrespective of their land holding pattern. The FPI has been worked out and the descriptive statistical data are presented in Table.6 and Figure 1. It is seen that the mean value and the standard deviation work out to be 0 and 1.55 respectively. The mean value FPI is 0.43 and minimum and the maximum respectively 0.12 and 0.70 (Table 6).

The classification of farmers using estimated mean performance score by quintile is reported in Figure 1. The farm performance score is observed to be uneven differences in mean score between adjoining quintiles which indicate that the value of performance score is not uniformly distributed; rather it is skewed.

TABLE 6. DESCRIPTIVE STATISTICS OF THE FARM PERFORMANCE INDEX

Particulars (1)	Value (2)
Mean	0.43
Standard deviation	0.9
Maximum	0.70
Minimum	0.12

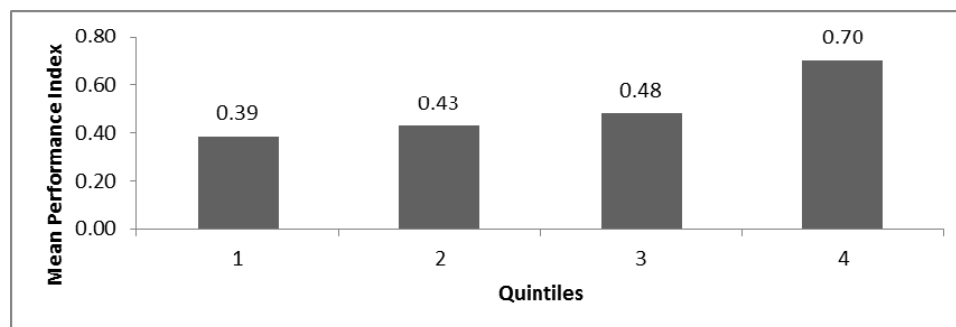


Figure 1. Mean Performance Score of Farm Household.

The average FPI value for member and non-member FMC has been used to test if there is any significant difference or not in the level of performance (Table 8). Since

the t value is statistically significant at 1 per cent level, there is evidence that this difference is considered to be extremely statistically significant. The performance of FPI value of member is significantly greater than non-member. This implies that the farm level performance of members is better than that of non-members (Table 7). This finding, however, should be interpreted very cautiously. One should not draw conclusion from this simple statistical test that the difference in performance arises because of participation to FMC. What, therefore, necessary is to conduct more sophisticated investigation by bringing in other control variables into the analysis. One such exercise is regression analysis, which is the main thrust of the next section of the paper.

TABLE 7. YIELD OF PADDY, FARM INCOME AND CROPPING INTENSITY OF SAMPLE FARMS

Farm household (1)	Yield of paddy (kg/ha) (2)	Mean farm income (Rs.) (3)	Cropping intensity (4)
Member FMC	3930	84336.33	161.13
Non- Member FMC	3300	66458.86	166.57

TABLE 8. AVERAGE FPI VALUE: MEMBER AND NON- MEMBER FMC

Member FMC (1)	Non-member FMC (2)
0.87	0.41
t-score : 82.12 *	

*Significant at 1 per cent level.

The regression model (3) as above has been estimated several times by including and excluding different variables (those supported by literature) before we arrive at the final specification. We report only one specification of the model (Table 9). Since all the coefficients turn out to be significant, the model considered to be best fit among others. It is found that the coefficients of M representing dummy for member and non-member FMC is highly significant. This indicates strong ground for undertaking the present study. The negative and significant value of FS implies that agricultural performance deteriorates as farm size rises. This may be due to economies of scale of small farm and large farms are unmanageable. As expected the use of fertiliser represented by Fer has been found to have positively contributed in farm performance and value is statistically significant. Large family sizes negatively affect farm performance as it might lead to disguised unemployment in the absence other avenues of employment. This is indicated by negative value of coefficient of Fam. The co-efficient of Ir also found to be positive as expected and highly statistically significant. Despite significant contribution of irrigation in farm performance It is observed that the farmers were constrained by the non- availability of irrigation facilities to a great extent in increasing productivity. From the secondary data it was found that only about 5 percent of gross cropped area is under irrigation facilities. The coefficient of CDI comes out to be positive and statistically found to be

significant. This indicates that diversity in cropping pattern leads to high level of farm performance.

TABLE 9. IMPACT OF AGRO-INPUTS AND FMC MEMBERSHIP ON FARM PERFORMANCE:

OLS RESULTS	
Dependent Variable: FPI_i	
Explanatory variable (1)	Coefficient (2)
Constant	-0.76* (-4.70)
M_i	0.45* (4.92)
FS_i	-0.41* (-4.09)
Fer_i	0.02* (4.35)
Fam_i	-0.13* (-5.87)
Ir_i	0.57* (2.58)
CDI_i	3.89* (19.77)
Adj R^2 =	0.30
F-stats	78.06*

Note: (a) t-Statistics are given in parentheses. (b) *indicate significant at 1 per cent level respectively. (c) The heteroscedasticity bias of standard errors has been corrected by using the White's estimator.

V

CONCLUSIONS

The study found that the farmers are constrained by low level of income, yield of rice and cropping intensity as indicated by farm performance index and its distributional pattern among members and non-member FMC. The Government of Assam with much enthusiasm revitalised the formation of FMC at village level across the state and channelised the implementation of many programmes of agricultural development through FMC. Interestingly, it is found that the farmers with large farm size failed to gain any desired output. Despite all operational weaknesses as observed during field study it is found from FPI value that farm level performance of FMC members is higher than the non-members. This finding indicates that the collective activity as part of the FMC group need to generate individual effort optimally. Thus it is suggested that measures need to be taken for participative management with individual accountability among members of FMC. As the FMC aimed to revamp agro-infrastructure and to ensure availability of agro-inputs among the members in the village, the study observed a grim performance in respect of availability of irrigation facilities and the use of fertilisers by the farmers. Though during the field study it was observed high enthusiasm among farmers to become member of FMC, the members have not benefitted from ensuring agro-infrastructure facilities mainly irrigation and fertiliser for their farms. Effective measures need to be undertaken to make the FMC accountable to all the members and farming community with proper

auditing of the agricultural programmes implemented through FMC. Measures also needed to empower the individual member of the FMC since in most of the cases during field survey it was observed that the office bearers took all the decisions on the activities of FMC. It will ensure good performance of the individual farmers since farming is not conducted at group level or in pooled land. It is necessary to understand cause and effect relationship for efficient FMC in the state.

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NOTES

1) For overall economic development of the farmers, the department of Agriculture, Government of Assam has given a new thrust to organise and develop FMC by integrating all farm systems like crop production, forestry, animal husbandry, minor irrigation, poultry, sericulture, fishery, horticulture, etc., into one coordinate system, thereby proposing to cover all the 22,500 villages of the State towards the end of the 8th five year plan (1992-1997).

2) The Assam Accord (1985) was a Memorandum of Settlement signed between representatives of the Government of India and the leaders of the Assam Movement on 15 August 1985. The Accord brought an end to the Assam Agitation. The Assam Movement (1979-1985) was a popular movement against illegal immigrants in Assam. The movement, led by All Assam Students Union (AASU) and the 'All Assam Gana Sangram Parishad' (AAGSP), developed a programme of protests and demonstration to compel the government to identify and expel illegal immigrants. Clause 7 of the accord provided that the Government take this opportunity to renew their commitment to the speedy all-round development of Assam so as to improve the standard of living of the people.

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