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## MFIs of North East India: a data envelopment analysis

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### Abstract

The main objective of the paper is to examine the level of efficiency of MFIs which are operating North Eastern Region of India and to compare the level of the efficiency among the MFIs by applying DEA method. The study is both empirical and analytical in nature and based on the secondary data collected from Mix market data base. The finding of the study shows that the MFIs of Assam are more efficient than the MFIs which are operating in other states of NER.

**Keywords:** DEA, Efficiency, MFIs.

### 1. Introduction

Efficiency, in economics, is generally defined as the property of society getting the maximum benefits from its scarce resources. In case of market efficiency, it is the property of a resource allocation of maximizing the total surplus received by all members of the society. (Mankiw, 2012) According to the OECD Development Assistance Committee, efficiency is defined in terms of transformation of inputs into results. Welfare economists also sometimes define efficiency based on the transformation of costs into benefits as measured, for example, by benefit-cost ratios. In both cases, transformation efficiency is measured by how economically inputs or costs are transformed into results or benefits (BMZ, 2011). Hence, sometimes efficiency is also described as a level of performance that describes a process which uses the lowest amount of inputs to create the greatest amount of outputs. Since, all the inputs (that is the resources) are scarce, efficiency is an important attribute. Being efficient simply we may mean reducing the amount of wasted inputs. Hence, efficiency analysis is an important analysis for the business organizations not only in order to allocate the resources properly to get the optimum output but also to create a space in the market. An efficient firm can not only able to expand but also sustain for a longer period of time in the highly competitive fee market.

It has long been argued that the formal commercial banks (both private and Public sector) have not provided for the credit needs of relatively poor people who are not in a condition to offer loan guarantees but who have feasible and promising investment ideas that can result in profitable ventures (Hollis and Sweetman 1998). Many reports clearly indicate that the developing countries like India more than half of the total population, particularly in rural area is financially excluded. The latest census report of India, 2011 showed that out of a total of 247 million, 102 million households in India are not covered by the formal banking system and 65 percent of these households are in rural areas. In order to provide financial services to this excluded group, a group of new financial institutions have arisen that are in touch with the local community, that can obtain information about the loan taker at low cost, and that often are not only interested in profit but also on the creation of jobs, women' employment, development, and green issues. These new financial intermediaries which are called as the MFIs, provide small loans to poor people who can offer little or no collateral assets. Thus, we may argue that microfinance programme has evolved in order to fill the gap created by formal banking sector. Microfinance Institutions (MFIs) tend not to operate in the same way as traditional banks, however, does not mean that they are not interested in profitability and efficiency. In developing countries, particularly in Asia, it is reported that Microfinance Institutions (MFIs) have emerged with huge opportunity to the poor people who do not have access to commercial banks and may be used an effective institution of

financial inclusion where there is absence of formal banking institutions. Though there are many failure stories of MFIs in India (Chanu, & Borman, 2009:72) and other parts of the world, there are many studies which recognise the contribution of Microfinance Institutions (MFIs) towards the poor and marginalized section of the society who did not have access to formal commercial banks. Here, it may be mentioned that there are two important objectives which MFIs have to achieve (1) outreach i.e. provide financial services to the poor and (2) sustainability i.e. cover its cost (Das 2014: 13). However, in order to achieve these objectives the MFIs have to face many challenges. It is well known that in the last few decades, MFIs have mushroomed in many parts of the country. But, only few are carrying out well. Hence, there arises to check the efficiency of the Institutions not only for outreach but also the sustainability of such institution. The paper is the attempt to examine the efficiency of MFIs operating in the North Eastern Region of India and to compare the efficiency among those MFIs which are operating in this region. The paper is divided into five parts; the first part gives and outline of the paper, the second part presents the methodology, the third part presents about the method of efficiency analysis which is used for this

study, the finding and concluding remarks are presented in fourth and fifth part respectively.

## 2. Objectives of the Study

1. To measure the level of efficiency of MFIs of the North East India; and
2. To compare the level of efficiency among the MFIs of the North East India.

## 3. Hypothesis

Ho= There is a same level of efficiency among MFIs in the North East India.

## 4. Methodology

This Study is empirical and analytical in nature. It is conducted based on secondary data. The data was extracted from the financial statement provided by the Mix Market on 25-06-2014 is based on for the year 2011-12 for the ten MFIs operating in North Eastern Region of India. (According to the available data on MIX Market data base, there are only ten MFIs in this region). Table: 1 contains information about the MFIs of NER:

**Table 1:** List of MFIs in North East India

Sl. No.	MFIs	Parent State	Date of Establishment	Status	Product(s) Offered	Main Funding Source(s)
1	Asomi	Assam	1-1-2001	NBFI	Loan	Loan, Shareholders, Capital
2	Rgvn(Ne)	Assam	1-1-1996	NBFI	Loan	Grant, Loan & Savings
3	Grameen Sahara	Assam	1-1-2005	NGO	Loan	Grant
4	Nightangle	Assam	2-10-1997	NGO	Loan	Grant
5	Bandhan	West Bengal	11-4-2001	NBFI	Loan, Insurance	Loan, shareholders, capital
6	kanklata mahila urban co-operative	Assam	1999	Co-Operative	Loan	Grant
7	Chanura Microfinance Manipur (CMM)	Manipur	NA	NGO	Loan	Grant
8	Youth Volunteers' Union Microfinance (YMF)	Manipur	1970	NGO	Full scale financial Services, Health, Education, Loan	Loan, Shareholders, Grant
9	Youth Volunteers' Union Financial Services (YFS)	Manipur	9-7-1993	NBFI	Full scale financial Services, Health, Education, Loan	Loan, Shareholders, Grant
10	Weaker Section Development Society (WSDS)	Manipur	26-7-1989	NGO	Health, Education, Loan	Loan, Grant

**Source:** MIX Market data base.

## 5. Significance of the Study

The present study is an attempt to identify the efficient MFIs of North Eastern region of India. This study may also be helpful to financial institutions in improving their efficiency. Prospective savers will also be able to identify the efficient MFIs of this region.

## 6. Limitation of the Study

The present study is based on only DEA techniques and used few inputs and outputs. The change in the number of inputs and outputs may vary results of level of efficiency.

## 7. Studies on Efficiency Level of Mfis (A Review)

Any financial institutions may be judged by using the concept of economic efficiency (Masood, 2010). To evaluate the efficiency of firms relative to the best production, it is necessary to have a quantify standard. Some of the studies which examine the efficiency of MFIs are presented here. Das.,S. (2014) Efficiency measurement of MFIs Assam: A comparative Study of Asomi Vs. RGVN(NE), Masood, M. T. & Ahmed, I. Md. (2010) Technical Efficiency of Microfinance Institutions in India- A Stochastic Frontier Approach, Deb, J. (n.d.). Post-Reform bank efficiency in North-East India: a branch level analysis, Farrel, J., M. (1957) Measurement of Productive Efficiency, Debdata Paul. (2010). Measuring Technical Efficiency of Micro Finance Institutions in India, Qayyum, A., & Ahmed, M. (2006) Efficiency and Sustainability of Micro Finance. Gebremichael. Z., B. (2013) Efficiency, outreach and sustainability of Ethiopian microfinance institutions, Haq, M., Skully, M. & Pathan, S. (2007). Efficiency of Microfinance Institutions: A Data Envelopment Analysis.

## 8. Research Gap

Though there are number of studies on efficiency of MFIs, few studies on efficiency of MFIs of North East India are found in the existing literature. In addition, such studies are also related to Assam only. So, the present study is an attempt to fill up the existing research gap.

## 9. Efficiency Measurement

### 9.1 Input Oriented Measured

Input oriented measure addresses the question of 'by how much can input quantity be proportionally reduced without changing the output quantities produced' (Deb...: P...).

### 9.2 Output Oriented Measured

Output Oriented measures the question as to 'by how much can output quantity be proportionally expand without altering the input quantities used' (Ibib: 254-255). The output oriented measures can be explained focusing a change in output by using fixed level inputs

### 9.3 Mathematical Framework

DEA is a non-parametric method of measuring the efficiency of a Decision Making Units (DMUs) (Ray 2004:1). Here MFIs are called DMUs. In this technique, both Input oriented

measure and output oriented measure have been used for the comparison of efficiency score (Qayyum 2006: 13). DEA is a linear programming methodology to measure the relative performance and efficiency of multiple DMUs when it involves multiple inputs and outputs.

Advantages of DEA:

- Capable of handling multiple inputs and outputs.
- Capable of being used with any input- output measurement.
- The sources of inefficiency can be analysed and quantified for every evaluated unit.

In DEA, efficiency can be measured by an input oriented process, which focuses on reducing inputs to produce the same level of output and output oriented process which aims to maximize output from a given set of input (Gebremichael 2013:75). The DEA method is based on the common assumption of Constant Return to Scale (CRS) and the alternative assumption of Variable Return to Scale (VRS). DEA ranges between 0-1. Here 0 (zero) is the lowest efficient and 1 (one) is the highest efficient.

## 9.4 Selection of Inputs and Outputs for Efficiency

There are three approaches: Production Approach, Intermediation Approach and Assets Approach which are used to define inputs and outputs and relationship between inputs and outputs of financial institutions. The present study is conducted under the production approach. Inputs and outputs are selected based on the dual objectives i.e. outreach and sustainability and production approach of MFIs.

For the study, used two outputs viz.:

- Gross Loan Portfolio ( $Y_1$ ); and
- No. of loan outstanding ( $Y_2$ ).

Two main inputs viz.:

- Total No. of employees( $X_1$ ); and
- Operating Expenses( $X_2$ ).

(The selection of inputs and outputs in the model is based on Yaron's (1994) outreach and sustainability framework. The gross loan portfolio and number of loans outstanding (as output) have been selected as measures of outreach, number of employees and operating expenses (as inputs) selected as measures of sustainability.)

## 10. Results

The inputs and outputs of the MFIs (DMUs) are presented in the following table.

**Table 2:** List of MFIs and the value of inputs and outputs for the session 2011-2012.

MFIs (DMUs)	Total No. of Employee( $X_1$ )	Operating Expenses ( $X_2$ )	Gross Loan Portfolio ( $Y_1$ )	No. of Loan outstanding( $Y_2$ )
Asomi	242	45,135,482	319126672	85329
Rgvn(Ne)	496	82,256,148	1,022,342,428	141,420
Grameen Sahara	76	10,871,535	139,138,792	17,846
Nightangle	42	7,772,323	113,654,198	16,370
Bandhan	14	1,478,437	14,514,839	572
Kanklata Mahila Urban Co-Operative	9548	1,648,586,459	37,302,079,487	3,617,641
Chanura Microfinance Manipur (CMM)	56	9,794,915	27,546,916	5,409
Youth Volunteers' Union Microfinance (YMF)	77	14,934,999	115,706,587	9,186
Youth Volunteers' Union Financial Services (YFS)	21	5,397,521	26,171,284	2,919
Weaker Section Development Society (WSDS)	23	2,151,878	33,212,519	2,928

Source: Mix Market data base

In this study, level of efficiency for the ten MFIs are calculated under constant return to scale (CRS) and variable return to scale (VRS) measure by using the DEA programme. Efficiency MFIs are those which are able to expand their poverty outreach (output oriented) and able to achieve operational sustainability (input oriented) (Haq. *et.al.*

2007). For, the study we have adopted three models to calculate the DEA scores and to assess the relative efficiency/inefficiency level of the MFIs. The Table: 2 shows the input oriented and output oriented measurement of MFIs of North Eastern India for the year 2011-2012

**Table 3:** the input oriented and output oriented measurement of MFIs of NER for the 2011-2012

MFIs	Input Oriented				Output Oriented			
	TE or CRS	PTE or VRS	SE	RTS	TE or CRS	PTE or VRS	SE	RTS
Asomi	0.9047	0.9257	0.9772	DRS	0.9047	0.9261	0.9768	DRS
Rgvn(Ne)	0.7835	0.7871	0.9953	IRS	0.7835	0.7863	0.9964	IRS
Grameen Sahara	0.7481	0.7849	0.9530	IRS	0.7481	0.7701	0.9713	IRS
Nightangle	1.0000	1.0000	1.0000	CRS	1.0000	1.0000	1.0000	CRS
Kanklata Mahila Urban Co-Operative	0.4339	1.0000	0.4339	IRS	0.4339	1.0000	0.4339	IRS
Bandhan	1.0000	1.0000	1.0000	CRS	1.0000	1.0000	1.0000	CRS
CMM	0.2536	0.4031	0.6292	IRS	0.2536	0.2599	0.9757	IRS
YMF	0.3846	0.5178	0.7428	IRS	0.3846	0.4435	0.8673	IRS
YFS	0.3628	0.8648	0.4195	IRS	0.3628	0.6621	0.5479	IRS
WSDS	0.6821	1.0000	0.6821	IRS	0.6821	1.0000	0.6821	IRS
Average	<b>0.6553</b>	<b>0.8283</b>	<b>0.7833</b>		<b>0.6553</b>	<b>0.7848</b>	<b>0.8451</b>	
Maximum	<b>1.0000</b>	<b>1.0000</b>	<b>1.0000</b>		<b>1.0000</b>	<b>1.0000</b>	<b>1.0000</b>	
Minimum	<b>0.2536</b>	<b>0.4031</b>	<b>0.4195</b>		<b>0.2536</b>	<b>0.2599</b>	<b>0.4339</b>	
SD	<b>0.277844</b>	<b>0.21331</b>	<b>0.234607</b>		<b>0.2778438</b>	<b>0.26087</b>	<b>0.21231</b>	

Source: Authors' calculation

In the table :2, under Input Oriented Measured, mean PTE of MFIs in North East India is 82.82% and standard deviation is 23.46%. It means there is a large dispersion in terms of PTE among the MFIs. Under the Output oriented measured, average PTE in North East India 78.48% and standard deviation is 26.08%. It also means that there is a large dispersion in terms of PTE among the MFIs.

The results show that two MFIs are on efficient frontier when CRS is assumed, at the same time four MFIs are on PTE frontier in the case when VRS is assumed. The MFIs that remains TE under CRS and VRS assumption are Nightangel and Bandhan. It means both the MFIs fully engaged in microfinance related activities. Interestingly, both the MFIs are for Assam.

Under the Input Oriented Measured also, Nightangle and Bandhan are the most technical efficient; and Nighangle, Kanaklata Mahila Urban Co-operative, bandhan (operating in Assam) and WSDS (Manipur) are the most PTE. Thus, it may be assumed that these MFIs had used minimum input without changing the output quantities produced. In other way, these had been achieved to operational sustainability. Findings also show that CMM, the lowest TE under CRS and VRS score only 40.31% under CRS and 25.36% (VRS). So, CMM could have reduced inputs 59.5% without reducing the outputs. In other sense, CMM was least sustainability. Mean TE of North East India institute is 82.83% which shows the moderate efficiency level of North East India. This implies that 82% of potential input is being utilized by the MFIs of this region.

The average input oriented measured, TE, PTE & SE are 65.535%, 82.83% and 78.33% respectively. It is concluded

that 17.17% of inputs can be decreased without affecting the existing output level that is the proportion of Gross Loan Portfolio and No. of loan outstanding of MFIs.

Under the Output Oriented Measured, Nightangle and Bandhan MFIs are the most technical efficient and Nighangle, Kanaklata Mahila Urban Co-operative, Bandhan and WSDS are the most PTE. Thus, these MFIs had produced maximum output without introducing the additional input quantities. In other way, these had been able to expand their poverty outreach. CMM is the least efficient MFIs under output oriented measure.

From the analysis, it is also found that, 10% MFIs are showing DRS and 70% MFIs showing IRS under the Input Oriented Measured. While under Output Oriented Measured there are 10% MFIs which show DRS and 70% MFIs as IRS.

### 11. Comparing the Level of Efficiency among Mfis of Ner

As mentioned, for the present study, ten MFIs have been taken into consideration; out of these six are from Assam and four MFIs from Manipur. In Table: 1, under input oriented measured four MFIs which are fully PTE, are from Assam and whereas only one MFI is from Manipur and the lowest efficient MFI is also from Manipur.

In case of the output oriented measure, the MFIs which have the highest score in TE are also from Assam. In case of PTE, three MFIs are from Assam and only one is from Manipur.

It clearly indicates that there is no same level of efficiency among MFIs of North East India. Hence, the hypothesis for the study "There is a same level of efficiency among MFIs in the North East India" is rejected. Further it is also found that Assam has more number of efficient MFIs than Manipur.

## 12. Conclusion

As mentioned, to investigate the level of efficiency of MFIs which are operating in North East India, the Data Envelopment Analysis has been used.

Our findings show that, under Input oriented Measured, mean efficiency of MFIs of North East India is 82.83% PTE. It indicates that MFIs can decrease 17.17% of their input without effecting their output (i.e. inputs are total no. of employees and operating expenses could have reduced 17.17% proportionately). Thus, MFIs could be able to achieve operational sustainability by reducing 17.17% inputs. Under output oriented measure, mean efficiency of MFIs is 78.48% PTE. It indicates that MFIs can increase their output level by 17.52% by the same amount of inputs (i.e. outputs are no. of loan outstanding and gross loan portfolio could have increased 17.52% proportionately). Thus, MFIs could be able to expand 17.52% more poverty outreach. The study also shows that the MFIs of Assam are more efficient than the MFIs of Manipur in the year 2011-2012. Since the level of efficiency is calculated by using DEA, however, it is suggested that other models may also be used to find out the level of efficiency of the MFIs that are operating in the North East Region of India.

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