UNIVERSITI PUTRA MALAYSIA

APPLYING DATA ENVELOPMENT ANALYSIS TO EVALUATE THE EFFICIENCY OF FISHERMEN ASSOCIATIONS IN MALAYSIA

JAMILAH BINTI DIN

FEP 2006 7
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By

JAMILAH BINTI DIN

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia in Fulfilment of the Requirement for the Degree of Doctor of Philosophy

April 2006
Dedicated to my four children:

Liyana, Farhana, Kamalhasan and Ashavani.
Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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Chairman: Professor Zainal Abidin bin Mohamed, PhD
Faculty: Economics and Management

The fishermen association (FA) in Malaysia has a dual character, as it is both an enterprise and also an association. Hence the business and social performances have to be closely linked. The organization has to perform efficiently to sustain its existence in business and to function as a social organization to its members. With both aspects (economic and social) evaluated equally, it could be categorized as a good or poor performer society.

Currently, financial ratios are used to measure the overall financial soundness of the association and the quality of its management. However, due to the association’s dual nature (as it is both an enterprise and also an association) and its multipurpose activities, the overall performance evaluation is often a complicated process. As an alternative form of analysis of the many analytical tools that have been in existence, this study introduces the Data Envelopment Analysis (DEA) method, a non-parametric method to evaluating the performance
of the association. Applying DEA to the panel data of 68 FAs from 1994 to 2001, produces estimates of efficiency (the distance of inefficient FAs from the frontier) and the separation of technical efficiency from scale efficiency. Then the measurement of technical progress (the shifting of the best practice over time) allows Malmquist indices of total factor productivity (TFP) to be constructed from the efficiency and technical change measures without recourse to prices. The results are presented as chained indices, so that the rates and causes of TFP growth can be analysed. The Malmquist index is ideal for investigating this problem because it decomposes total factor productivity into technical progress, technical efficiency and scale efficiency measures.

Results from this empirical study have identified five “best-practice” FAs, which are located in three different “regions” in Malaysia. The derivation of the Malmquist productivity indices indicated a productivity growth in the socio-economic dimension of 1.033. The economic dimension efficiency showed a productivity growth with a TFP change of 1.015. In contrast, the social performance dimension was marked by a productivity regress with the TFP change score of 0.889. The productivity growth in the socio-economic and economic dimensions had been driven by positive technical change. With respect to the social dimension, the principal cause for the productivity regress was the efficiency change. Overall, the results showed that the FAs needed to improve in their efficiency to catch up with the best-practice frontier as much as by 3.9% in economic performance, 9% in social performance and 3.5% in socio-economic performance. Results indicated that the efficiencies in the economic
and social dimensions were determined neither by the length of time in operation and geographical location of the association nor by the amount of grant or subsidy allocated by the government.

In conclusion, for the FAs to be efficient with their dual-purpose objective, they need to achieve their optimum productivity in business and provide social benefits for their members, at the same time conforming to the values and practices of cooperative organizations.
Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

APPLIKASI “DATA ENVELOPMENT ANALISIS” UNTUK MENILAI KEEFISYENAN PERSATUAN NELAYAN DI MALAYSIA

Oleh
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Ketika ini, nisbah kewangan telah menjadi satu metod ukuran keseluruhan pencapaian kewangan dan kualiti pengurusannya. Walau bagaimanapun oleh kerana dwi ciri yang ada pada persatuan (sebagai sebuah badan perniagaan dan juga sebagai badan sosial) dan kapelbagaian aktiviti, maka penilaian keseluruhan percapaian organisasi ini kerap melalui proses yang rumit.
Sebagai alternatif kepada beberapa kaedah analisis yang sedia ada, kajian ini memperkenalkan “Data Envelopment Analysis” (DEA) suatu kaedah “non parametric” untuk penilaian. DEA ini dipakai dengan menggunakan data panel 68 PN dari tahun 1994 hingga tahun 2001 untuk menghasilkan anggaran keefisyenan (jarak diantara PN yang tidak efisyen dengan PN yang efisyen) dan pecahan keefisyenan teknikal daripada keefisyenan skel. Kemudian ukuran progress teknikal (anjakan praktik terbaik bagi tempoh masa) yang membolehkan indeks Malmquist total faktor produktiviti (TFP) dibentuk daripada perubahan kefisyenan dan perubahan teknikal tanpa memerlukan unsure kos. Hasilnya adalah dalam bentuk rangkaian indeks yang membolehkan penganalisaan seterusnya ke atas kadar dan penyebab perkembangan TFP. Indeks Malmquist index ini sesuai untuk penyiasatan masalah kerana ia dipecahkan kepada ukuran progres teknikal, efisyen teknikal dan efisyen skel.

Hasil kajian empirikal ini telah mengenal pasti 5 PN “praktik terbaik” yang mana terletak di tiga daerah yang berlainan di Malaysia. Hasil indeks Malmquist menggambarkan perkembangan dalam dimensi sosio-ekonomik sebanyak 1.033. Dalam dimensi ekonomik, perkembangan produktiviti mempaparkan perubahan TFP sebanyak 1.015. Dalam sosial, sebaliknya dikesan pengecutan dengan perubahan TFP 0.889. Perkembangan produktiviti dalam dimensi sosio ekonomik dan dimensi ekonomik telah digerakkan perubahan positif teknikal. Manakala dimensi sosial asas utama pengecutan produktiviti ialah perubahan keefisyenan. Secara keseluruhan, PN perlu membaiki pencapaian keefisyenan prestasi ekonomik sebanyak 3.9%, keefisyenan prestasi sosial sebanyak 9%
dan keefisyenan prestasi sosio-ekonomik sebanyak 3.5% untuk setanding
dengan PN praktik terbaik. Keefisyenan dalam prestasi ekonomik dan prestasi
sosial tidak ditentukan oleh umur, lokasi geografi dan dengan jumlah bantuan
geran atau subsidi kerajaan.

Kesimpulannya, untuk PN efisyen sebagai sebuah badan dengan dwi matlamat
maka pencapaian produktiviti optima dalam perniagaan dan dalam memberi
manfaat kepada anggota adalah satu kemestian. Dalam masa yang sama
organisasi ini harus mendokong nilai-nilai dan praktis yang organisasi koperasi.
AKNOWLEDGEMENTS

First and foremost, all my thanks are due to Allah, the Most Gracious, the Most Merciful; His Grace and Guidance have brought this work to fruition.

I do not have enough words to thank my supervisor and committee members, Professor Dr. Zainal Abidin Mohamed (Faculty of Economics and Management), Associate Professor Dr. Zainal Abidin Hj. Mohamad (Faculty of Agriculture) and Associate Professor Dr. Mohd. Mansor Ismail (Faculty of Agriculture), who taught me that knowledge, has no boundary. Throughout the process, I have finally realized that the more I know, the more I realize I still know too little. I am fortunate to have had these gentlemen as my thesis committee members. I thank them for their assistance and guidance in performing this study.

My special appreciation is extended to my former supervisors, Professor Dato’ Dr. Abdul Aziz Abdul Rahman and Dr. Abu Hassan Md Isa, for their invaluable support and encouragement and their willingness to discuss and listen throughout the preparation of this study. They generously provided me with some welcome advices and comments even though for a short while. I hope they are always in good health wherever they are now.

To Mr. Allias Radam (lecturer of Universiti Putra Malaysia), I express my deepest gratitude. He was responsible for not letting me have nightmares about my thesis and not treating the thesis as one of those dreadful things everyone sees. His
insight and understanding during the initial part of problem definition and designing the methodology made my work run smoothly. Without his support, it would have been very difficult for me to come out with this thesis.

I owe a great debt to the Director General and staff of Lembaga Kemajuan Ikan Malaysia for granting me the accessibility to their data files, reports and working papers. Their willingness to share information eased my work to a large extent. Undoubtedly without their cooperation, I would not have been able to complete this study. I hope this piece of work would be of great relevance to their organization.

Finally, my deepest thanks and appreciation go to the Malaysian Government and the Cooperative College of Malaysia, Petaling Jaya, for sponsoring and approving my leave to pursue this programme.
I certify that an Examination Committee has met on 5 April 2006 to conduct the final examination of Jamilah binti Din on her Doctor of Philosophy thesis entitled “Applying Data Envelopment Analysis to Evaluate the Efficiency of Fishermen Associations in Malaysia” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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Date:
DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

__________________
JAMILAH BINTI DIN

Date:
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION</td>
<td>ii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>vi</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>ix</td>
</tr>
<tr>
<td>APPROVALS</td>
<td>xi</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>xiii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xvii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xix</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xx</td>
</tr>
</tbody>
</table>

## CHAPTER

1. **INTRODUCTION**  
   1.1 Background  
   1.2 Problem Statement  
   1.3 Objectives of the Study  
   1.4 Significance of the Study  
   1.5 Scope of the Study  
     1.5.1 Definition of the Term Cooperative  
     1.5.2 Concept of Productive and Efficiency  
     1.5.3 Relative Efficiency of Cooperative  
   1.6 Limitations of the Study  
   1.7 Outline of the Study  

2. **THE COOPERATIVE AS AN ECONOMIC AND SOCIAL ORGANIZATION**  
   2.1 Cooperatives  
   2.2 Differences between Cooperative and Other Forms of Enterprise  
   2.3 Cooperative Features  
     2.3.1 Cooperative Principles  
     2.3.2 Cooperative Values  
   2.4 Ideologies and Schools of Thought  
     2.4.1 The Cooperative Commonwealth School  
     2.4.2 The School of Modified Capitalism  
     2.4.3 The Socialist School  
     2.4.4 The Cooperative Sector School  
   2.5 Men Behind Cooperative Ideology  
   2.6 An Overview of the Global Cooperative Movement  
     2.6.1 Fishermen Cooperative Movement in the World  
   2.7 General Scenario of the Cooperative Movement in Malaysia  
     2.7.1 Cooperative Legislation  
     2.7.2 Registrars of Cooperative Societies  
   2.8 Associations of Fishermen in Malaysia  

xiv
2.8.1 Fishermen Associations Act and Cooperative Society Act 2.26
2.9 Fishermen Associations 2.27
2.9.1 Structure of Fishermen Associations 2.28
2.9.2 Formation of Fishermen Units 2.30
2.9.3 Management Assistance in Fishermen Associations 2.31
2.9.4 Internal Source of Funds 2.32
2.9.5 Fishermen Economic Status 2.34
2.9.6 Business Activities of Fishermen Associations 2.36
2.9.7 Management of Fishermen Associations 2.40

3. LITERATURE REVIEW 3.1
3.1 Cooperative Theory 3.1
3.2 Cooperative in Economic Theory 3.4
3.2.1 Cooperative in Theory of the Firm 3.5
3.3 Productivity Measure in the Performance Analysis of Cooperatives 3.7
3.3.1 Productivity in Cooperative Business 3.7
3.3.2 Productivity in Social Aspects 3.10
3.3.3 Productivity in Socio-economic Dimension 3.12
3.4 Data Envelopment Analysis (DEA) 3.14
3.4.1 DEA Characteristics 3.17

4. METHODOLOGY 4.1
4.1 Data Envelopment Analysis 4.1
4.2 The DEA Malmquist Index of Productivity Change 4.6
4.3 Theoretical Framework in Evaluating Productivity of Cooperatives 4.11
4.3.1 Surplus/Profit 4.11
4.3.2 Members' Benefits 4.12
4.3.3 Business and Membership Benefits Objectives 4.14
4.3.4 Assumptions 4.16
4.4 Conceptual Framework 4.17
4.4.1 FAs by Region 4.18
4.4.2 Years of Operation 4.19
4.4.3 Size of Memberships 4.20
4.4.4 Productivity and Efficiency Analyses 4.21
4.4.5 Steps in the Analysis of FAs’ Productivity 4.24
4.4.6 Data 4.25
4.4.7 Selection of Input and Output Variables 4.26
4.4.8 Means and Standard Deviations of Output and Input Variables between 1994 and 2001 4.30
4.5 Measuring Productivity of FAs 4.32
4.5.1 Efficiency in Business Performance 4.35
4.5.2 Efficiency in Social Performance 4.37
4.5.3 Efficiency in Socio-Economic Performance 4.39
5. **RESULTS AND ANALYSIS**

5.1 The Total Factor Productivity Change in the Business, Social and Socio-Economic Dimensions

5.2 Total Factor Productivity Change by Region

5.3 Best-Practice Fishermen Associations

5.4 Total Factor Productivity Change by Length of Operation (Years)

5.5 Total Factor Productivity Change by Government Grants

5.6 Summary of Results

5.6.1 The Total Factor Productivity Change (TFPCH)

5.6.2 Efficiency by Region

5.6.3 Total Factor Productivity (TFP) across Time (8 Years Period)

5.6.4 Best-Practice Frontier

5.7 Factors Affecting Productivity

5.7.1 Business with Non-members

5.7.2 Regional Analysis

5.7.3 The Best-Practice FAs

5.7.4 Pricing of Output

5.7.5 Price Efficiency

5.7.6 Cooperative Knowledge

5.7.7 Monopoly in Nature

5.7.8 Labour Cost

5.7.9 Incentives

5.7.10 Horizon Problem

5.7.11 Public Money

6. **INFECTION OF RESULTS, SUGGESTIONS AND CONCLUSION**

6.1 Summary of Results

6.2 Policy Recommendations

6.2.1 Government Supports

6.2.2 Efficiency Factors

6.3 Conclusion
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Fishermen Associations by Location and Year of Registration</td>
<td>2.28</td>
</tr>
<tr>
<td>2.2</td>
<td>Memberships and Share Capitals from 1980 to 2001</td>
<td>2.33</td>
</tr>
<tr>
<td>2.3</td>
<td>Development Grants and Loans: Allocations and Actual Expenditures of Respective Fishermen Associations</td>
<td>2.35</td>
</tr>
<tr>
<td>2.4</td>
<td>Aggregate Performance by Economic Project in the Year 2001</td>
<td>2.36</td>
</tr>
<tr>
<td>2.5</td>
<td>Fishermen Association Groupings from 1986 to 2000</td>
<td>2.39</td>
</tr>
<tr>
<td>3.1</td>
<td>Strengths and Limitations of DEA, AHP, GRA, BSC and FSA</td>
<td>3.17</td>
</tr>
<tr>
<td>4.1</td>
<td>Fishermen Associations by Region (1994-2001)</td>
<td>4.19</td>
</tr>
<tr>
<td>4.2</td>
<td>FAs in Malaysia: Years of Operation as at 2001</td>
<td>4.20</td>
</tr>
<tr>
<td>4.3</td>
<td>Size of Memberships (1997)</td>
<td>4.21</td>
</tr>
<tr>
<td>4.4</td>
<td>Variables and Definitions of Inputs and Outputs</td>
<td>4.29</td>
</tr>
<tr>
<td>4.5</td>
<td>Means and Standard Deviation of Input and Output Variables between 1994 and 2001</td>
<td>4.31</td>
</tr>
<tr>
<td>4.6</td>
<td>Members’ Benefits: Aim, Indicators and Measurement</td>
<td>4.38</td>
</tr>
<tr>
<td>5.1</td>
<td>Malmquist Index Summary of Firm Means by the Business Dimension</td>
<td>5.2</td>
</tr>
<tr>
<td>5.2</td>
<td>Malmquist Index Summary of Firm Means by the Social Dimension</td>
<td>5.3</td>
</tr>
<tr>
<td>5.3</td>
<td>Malmquist Index Summary of Firm Means by the Socio-Economic Dimension</td>
<td>5.4</td>
</tr>
<tr>
<td>5.5</td>
<td>Fishermen Associations Efficiency during the Three Economic Periods</td>
<td>5.8</td>
</tr>
<tr>
<td>5.6</td>
<td>Total Factor Productivity for West Region</td>
<td>5.12</td>
</tr>
<tr>
<td>5.7</td>
<td>Total Factor Productivity for East Region</td>
<td>5.13</td>
</tr>
<tr>
<td>5.8</td>
<td>Total Factor Productivity for Borneo Region</td>
<td>5.14</td>
</tr>
<tr>
<td>5.9</td>
<td>Sets of Best-Practice FAs differentiated through the Economic, Social and Socio-Economic Dimensions</td>
<td>5.16</td>
</tr>
<tr>
<td>5.10</td>
<td>FAs’ Efficiency According to the Number of Years of Operation</td>
<td>5.18</td>
</tr>
<tr>
<td>5.11</td>
<td>Total Factor Productivity Change Scores for the FAs with and without Grants from 1994 to 2001</td>
<td>5.20</td>
</tr>
</tbody>
</table>
5.12 Summary of Malmquist productivity indices for the Economic, Social and Socio-economic Dimensions 5.22
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Fishermen Associations’ Relationship with Related Organizations</td>
<td>2.30</td>
</tr>
<tr>
<td>4.1</td>
<td>Efficient Frontier from a Two-Output, One-Input DEA Model</td>
<td>4.3</td>
</tr>
<tr>
<td>4.2</td>
<td>Conceptual Framework for Analysis</td>
<td>4.18</td>
</tr>
</tbody>
</table>
### LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFA</td>
<td>Area Fishermen Association</td>
</tr>
<tr>
<td>AHP</td>
<td>Analytic Hierarchy Process</td>
</tr>
<tr>
<td>ANGKASA</td>
<td>Angkatan Koperasi Kebangsaan</td>
</tr>
<tr>
<td>BCC</td>
<td>Banker, Charnes, Cooper</td>
</tr>
<tr>
<td>BSC</td>
<td>Balance Score Card</td>
</tr>
<tr>
<td>CCR</td>
<td>Charnes, Cooper, Rhodes</td>
</tr>
<tr>
<td>CRS</td>
<td>Constant Return to Scale</td>
</tr>
<tr>
<td>DEA</td>
<td>Data Envelopment Analysis</td>
</tr>
<tr>
<td>DMU</td>
<td>Decision-Making Unit</td>
</tr>
<tr>
<td>EFFCH</td>
<td>Efficiency Change</td>
</tr>
<tr>
<td>FA</td>
<td>Fishermen Association</td>
</tr>
<tr>
<td>FAs</td>
<td>Fishermen Associations</td>
</tr>
<tr>
<td>FCS</td>
<td>Fishermen Cooperative Society</td>
</tr>
<tr>
<td>FSA</td>
<td>Financial Statement Analysis</td>
</tr>
<tr>
<td>GRA</td>
<td>Grey Relation Analysis</td>
</tr>
<tr>
<td>ICA</td>
<td>International Cooperative Alliance</td>
</tr>
<tr>
<td>LKIM</td>
<td>Lembaga Kemajuan Ikan Malaysia</td>
</tr>
<tr>
<td>LP</td>
<td>Linear Programme</td>
</tr>
<tr>
<td>LPP</td>
<td>Lembaga Pertubuhan Peladang</td>
</tr>
<tr>
<td>NEKMAT</td>
<td>National Fishermen Association</td>
</tr>
<tr>
<td>PECH</td>
<td>Pure Efficiency Change</td>
</tr>
<tr>
<td>SE</td>
<td>Scale Efficiency</td>
</tr>
<tr>
<td>SECH</td>
<td>Scale Efficiency Change</td>
</tr>
<tr>
<td>SFA</td>
<td>State Fishermen Association</td>
</tr>
<tr>
<td>TECH</td>
<td>Technical Efficiency Change</td>
</tr>
<tr>
<td>TFPCH</td>
<td>Total Factor of Productivity Change</td>
</tr>
<tr>
<td>VRS</td>
<td>Variable Return to Scale</td>
</tr>
</tbody>
</table>
CHAPTER 1
INTRODUCTION

1.1 Background

As reported in the 1992 International Cooperative Alliance (ICA) Congress in Tokyo, throughout the world the cooperative sector in economic terms had experienced rapid growth in the 1950s. In the 1960s the cooperative economy was relatively stable. During this period it was reported that cooperative members benefited from their membership and thus cooperatives played an important contribution to society economically.

However, in the middle of the 70s, there was a decline in the economic growth of cooperatives. The situation became worse in the early 80s. Cooperatives were not to be able to offer satisfactory economic benefit to their members. This led to various critical reports and some blamed the leaderships for their inability to adapt to the changing environment.

The ideological climate in the 70s was another factor that restricted the participation of professional management to join cooperatives. Moreover, cooperatives were also markedly slow in the decision-making process. The structure of cooperative societies was also seen to contribute to the problem. However, some observers, mainly researchers, consider such problems as just symptoms of an ageing organization.
Towards the end of the 80s and the beginning of the 90s the world cooperative sector started to recover from the shock of the radical changes. However, the cooperatives had lost one basic economic advantage, the comparatively low cost of transformation. Members then needed more to be persuaded of their benefits than before because their confidence had disappeared.

Generally, cooperative economic systems are built upon members’ scarce savings, often those of low income people. Thus cooperatives are shouldered with a special responsibility to use these resources to provide the best possible return.

The responsibility is much heavier if cooperatives are established with public financing. Unlike many other kinds of development project, cooperatives are expected to function normally over an unlimited period of time. Furthermore, they also function as a socio-economic organization and are expected to promote the interest of their members who are the owners and at the same time beneficiaries of their services (Dulfer, 1976).

Because of the positive role towards development shown by well-run cooperatives, the governments of various developing countries actively promote their establishment and development. By regarding them as “instruments” or agents for the achievement of national socio-economic development goals, they often allocate considerable human and financial resources to the establishment and development of cooperatives.
The fishermen associations (FAs) in Malaysia are among the many examples in which the government assists in developing and promoting the organizations. The involvement of the government in this “top-down” type of cooperative aims to address the socio-economic problems in the country as fishermen are found to be the poorest in the national economy. Within the fishermen community, the percentage of the lowest income category (poor) as reported in the socio-economic research, 1995, by the Lembaga Kemajuan Ikan Malaysia (LKIM) was 18.7%.

The supports given by the government to the FAs are numerous and varied. The FAs are often assigned projects to conduct programmes to induce innovation and promote social and economic changes for their members. The government thus expects the FAs to contribute to the achievement of national development goals. Being the donor, and the ultimate decision-maker on cooperative-related national development policies, it plans and implements strategies, programmes and policies for the cooperatives.

However, the government has been quite disappointed with the increasing poor performance of these supported organizations (details are in Chapter 2). Dulfer (1976) pointed out two major reasons for this disappointment in many countries. These can be summarized as: i) too high an expectation was formed from the cooperative performance in a relatively short period, and ii) inappropriate and/or insufficient strategies, actions and appraisal measures were applied by the government to monitor the establishment and the development of the
cooperatives. Therefore an adequate/appropriate evaluation of the cooperatives on their different activities is needed.

1.2 Problem Statement

Most FAs have been receiving financial and institutional assistance from the government since their establishment. The assistance has continued for the last 25 years, but with the ultimate aim to develop them into strong and dynamic FAs that can stand on their own one day, as support and assistance have some limits. For monitoring, the LKIM uses profit as the key performance index of the association. The FAs are grouped as “successful”, “moderate” or “poor” based on their profit scores as identified by the LKIM (details of the score are given in Chapter 2, para 2.9.6).

In 1986, about 3% of the FAs were considered “successful” (categories A1 and A2), 22% as “moderate” (categories B1 and B2) and 65% were “poor” (categories C1 and C2). In 1990, the figures showed some improvement. The “successful” and the “moderate” categories had risen to 17% and 38% respectively whereas the “poor” had dropped to 45% (LKIM, 1990). This trend was not sustained long as in the year 2000, the percentage of “poor” category dominated the overall performance of the FAs. Fifty-four percent of the FAs were grouped in the “poor” category where 40% of the FAs were not profitable. The “moderate” category had dropped to 28% and the “successful” decreased to 18%.