Chapter 7

Conspectus
7.1 INTRODUCTION

The present study has attempted to assess the R&D activity and its output on Spices research in Asia for 35 years (1968-2002). Statistical analysis has been carried out adopting Correspondence Analysis using DTM software. The analysis has been directed towards the objective, and the hypotheses formulated based on the research problems. The major findings of this research are highlighted in this chapter in the sequence of analysis undertaken.

7.2 INFERENCES

7.2.1 Quantitative Analysis of R&D Output on Spices

- The total world's literature output on Spices is 45,455 records (1968-2002).

- The total output of Asia (36 countries) on the subject field under study is 17,918 records.

- Amongst the seven continents, Asia leads all through the three decades, followed by Europe.

- The top ten Asian countries in the field of Spices research include: India, Japan, China, Korea, Israel, Turkey, Taiwan, Indonesia, Pakistan, and OAC.

- India is found to be the predominant country as it tops the rank list amongst the 36 Asian countries.

- Japan and China rank second and third respectively in the list.

- Amongst the 5 spices categories, quantum of publications on ‘Major Spices’ is found to be the largest (9,300 records).
• Within the ‘Major Spices’, literature on Chilli is voluminous (3,518).

• ‘Major Spices’ is followed by ‘Other Spices’ with more articles in the Asian journals.

• Asian literature on Spices is distributed in both Oriental and European languages.

• Amongst the varied forms of literature, journals constitute to be the major carrier of Spices research communications.

• The quantum of journals on Spices has increased steadily over the study period – from 282 to 3,929 titles.

• Amongst the top 10 Asian countries, other than India, only Korea publishes journals in the field.

• Only one specific journal title, *Indian Journal of Agricultural Sciences* has occurred in every block period. Interestingly, this particular Indian journal has sustained the first rank all through the study period.

• The Indian Council of Agricultural Research, New Delhi, India, publishes the above journal. Since this journal has been identified as prime journal, which is continuous and steady, it can be said that this Institute is very active and contributing to the research on Spices.

• The *Journal of Spices and Aromatic Crops* published by Indian Institute of Spices Research, Calicut, India ranks highest with a contribution of 455 articles followed by *Indian Journal of Agricultural Sciences* with 375 articles. Out of 10 top journals only *Journal of the Korean Society for Horticultural Science*, published from Korea
appeared in the list at 7th position, the rest of the 9 being Indian journals.

- *Indian Cocoa Arecanut and Spices Journal, Plantation Crops, Indian Agronomy* and *Journal of Spices and Aromatic Crops* have been found to be dominant in the later period of study.

- *Madras Agricultural Journal, Agricultural Research Journal of Kerala, Pesticide, Indian Journal of Experimental Biology* are those journals which ceased their publication subsequently though they were dominant in the early period of study.

- Institutional contribution to the body of literature on Spices is very less quantitatively (388/15713) than that of individual authors.

- Amongst the Asian corporate authors, Indian institution ranks high followed by Malaysia and Taiwan respectively. They are: Central Plantation Crop Research Institute, India, Department of Agricultural Research Branch, Sarawak, Malaysia and Asian Vegetable Research and Development Centre, Taiwan.

- Amongst the individual authors, Indian authors rank high, followed by Israelis. The top Indian author is P. A. Sheriff and the top Israeli author is E. Putievsky.

- Analysis of the affiliation of the top Indian and Israeli authors (referred above) reveals that they are attached to Indian Institute of Spices Research, Kerala, India and Newe Yaar Experiment Station, Israel respectively.
7.2.2 Cross-National Analysis of Spices Research amongst the Asian Countries

- Amongst the Asian countries, in **West Asia**, Israel and Turkey, in **South Asia**, India and Pakistan, in **Far East**, China, Japan, Taiwan, and Korea and in **South East Asia**, Malaysia have been the major producers of R&D literature on Spices.

- The following is the Spices research pattern amongst the top ten Asian countries, as per the Cross-National Analysis:

1. China  - Herbal Spices
2. India  - Other Spices
3. Indonesia  - Tree Spices
4. Israel  - Herbal Spices
5. Japan  - Seed Spices
6. Korea  - Major Spices
7. OAC  - Herbal Spices
8. Pakistan  - Seed Spices
9. Taiwan  - Herbal Spices
10. Turkey  - Herbal Spices

- India being a rich country with natural resources and hailed as ‘The Land of Spices’ has more R&D output on ‘Other Spices’ that includes a wide range of Spices spread across the country.
- China, Israel, Taiwan, Turkey and OAC being popular for their native medicine and traditional practice seem to be more active on Herbal research and output.

- Japan and Pakistan seem to concentrate on ‘Seed Spices’ typical of their climate and culture.

- The individual block period analysis reveals that, the productivity pattern of publications of Spices research over the study period is as follows:

1. 1968-1972 - Major Spices
2. 1973-1977 - Major Spices
3. 1978-1982 - Seed Spices
4. 1983-1987 - Herbal Spices
5. 1988-1992 - Other Spices
6. 1993-1997 - Tree Spices
7. 1998-2002 - Tree Spices

- R&D activity and output on ‘Major Spices’ seems to be voluminous in 1970s and in the 1990s it has shifted to ‘Tree Spices’. However, in late 1970s, more literature is reported on ‘Seed Spices’; in early 1980s on ‘Herbal Spices’ and in late 1980s on ‘Other Spices’.

- This shift towards ‘Tree Spices’ may be attributed to the current trend in health and diet consciousness amongst the people across the world and their changes in cooking and eating habits.
It is also very clear that though country-wise analyses reveal that though most of the Asian countries focus on 'Herbal Spices', the quantum of literature on this category is comparatively less than that of 'Major Spices'. This is perhaps because of more of practice and less of R&D thrust and attention in Herbal and Traditional Medicinal Spices leading to less contribution to the literature on this category.

7.2.3 Cross National Analysis on Spices Research: A Subject Analysis

- An analysis of the subject focus amongst the Asian countries through these 7 block periods reveals Asian R&D priorities has been focused on Plant related studies.

- Table 32 (in the following page) presents the top 10 Asian countries versus the subject focus in the field of Spices research during the study period.

- Turkey, India and Pakistan seem to be fluctuating in their R&D focus on Spices research.

- Country-wise subject focus seems to be highly flexible.

- The subjects, Pollution, Geography and Human Nutrition were not found in 1970s. However, since the 1980s, these subjects have emerged amongst the 16 subject groupings in the field of Spices research amongst the Asian countries.
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7.3 TESTING OF HYPOTHESES

The 9 hypotheses were tested based on the analysis with appropriate statistical tests. Of the 9 hypotheses, 7 of them are proved, 2 are rejected which are as stated below:

7.3.1 Accepted Hypotheses

1. Asia leads in the world’s literary production on Spices.

2. India leads amongst the Asian countries in the R&D programmes and performances in the field of Spices.

3. There is a steady and single growth pattern of Spices literature / publication over the period.

4. Indian journals are the major carriers of Spices research literature in Asia.

5. Indian institutions lead in the R&D on Spices.

6. Amongst the Asian authors Indian authors constitute to be the major contributors to Spices literature.

7. R&D output is higher on ‘Herbal Spices’ category.

7.3.2 Rejected Hypotheses

8. The R&D priorities of Asian countries on Spices do not vary over the study period.

9. The R&D priorities over the subjects amongst the Asian countries over the study period do not focus on any specific subject area.
7.4 AREAS FOR FURTHER STUDY

This research led to identify and suggested that following studies could be undertaken:

- To analyze the world’s output on Spices research.

- To identify the factors contributing to the fluctuation in the Spices research amongst the Asian countries.

- To critically analyse the budget allocation and the R&D output in Spices programmes in India.

7.5 SUMMARY

This research is an outcome of the researcher being employed in the Indian Cardamom Research Institute (Spices Board, GOI) Idukki District, Kerala. Hence, this thesis on the chosen area of Spices and its R&D output will be brought to the attention and benefit of the Spices Board Authorities, Research Institutes and Industries to redefine their research policies, programmes and priorities.