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I.A.S.R.I.
STATISTICAL NEWSLETTER

INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE
(I. C. A. R.)
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Volume-X July-Sept., 1984 Number-3

भा० कृ० सां० अ० सं०
सांख्यिकीय सूचना-पत्र

I. A. S. R. I.
STATISTICAL NEWSLETTER

भारतीय कृषि सांख्यिकी अनुसंधान संस्थान
(भा० कृ० अ० प०)
लाइब्रेरी एवेन्यू, नई दिल्ली-110012
INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE
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प्राक्कथन

यह भारतीय कृषि साँख्यिकी अनुसंधान संस्थान, सूचना-पत्र खण्ड दस का तृतीय अंक है । इसमें इस संस्थान की जुलाई-सितम्बर, 1984 की तिमाही गतिविधियों से संबंधित जानकारी का विवरण दिया गया है ।

मुझे आशा है कि यह सूचना-पत्रकृषि अनुसंधान साँख्यकीविदों तथा अन्य प्रयोग्क्ताओं के लिए लाभदायक सिद्ध हो रहा है । इसके अगले अंकों में सुधार लाने हेतु किसी भी प्रकार की टिप्पणी और सुझावों का मैं आभार सहित स्वागत करूँगा ।

मैं संस्थान के उन सब अधिकारियों तथा उन सदस्यों का आभारी हूँ, जिन्हों ने भा०कृ०सां०अ०सं० साँख्यिकीय सूचना-पत्र के इस अंक के लिए अपेक्षित सामग्री प्रदान की है ।

मैं श्री सोमदत्त, श्री खेमदास गणपतराव देवले, श्री अनिल कुमार भल्ला और श्री रघुवर दत्त का भी आभारी हूँ, जिन्होंने इस सूचना-पत्र के संकलन एवं मुद्रण में अपना भरपूर सहयोग दिया है ।

प्रेम नारायण
निदेशक
भा०कृ०सां०अ०सं०, नई दिल्ली-110012

PREFACE

This is Vol. X, No. 3 issue of 'IASRI Statistical Newsletter' and covers the activities and allied information in respect of this Institute during the quarter July-Sept., 1984.

I hope this Newsletter has been proving useful to the Agricultural Research Statisticians and other users. I would welcome and appreciate any comments and suggestions for its improvement in the subsequent issues.

I am thankful to all officers and other members of the staff of the Institute who supplied the requisite material for this issue of the 'IASRI Statistical Newsletter'.

I am also thankful to S/Shri Som Dutt, K.G. Dewale, Anil Kumar Bhalla and Shri R. Datt for the help rendered in compilation and printing of this Newsletter.

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CONTENTS

1. LIMITATIONS OF CROSS-BREEDING PROGRAMMES IN SHEEP

Introduction:

By now, Cross-Breeding Programmes have become to mean, raising of a population of livestock by crossing a local breed of livestock with some superior e otic breed. The main advantages of these programmes are that the Genotypes can be improved at a faster pace and help the economy's upliftment, but are having limitations because of increase in mortality due to higher incidence of diseases and further in field conditions, some times farmers hesitate in going for cross-breeding programmes due to pre-conceived thoughts or may adopt in a limited way. In the present note, an attempt has been made to outline the limitations and history of Cross-Breeding programmes related to sheep.

History of Cross Breeding Programmes:

Cross-Breeding Programmes are in existence from many centuries in India, but, prior to Independence they used to be conducted without any proper planning.

Cross-Breeding Programmes were started in India in attempts to raise better horses by Ancient kings who initiated crossing of Indian and Arabian breeds, because in those days horses played a significant role in the battle. When British came to India, they tried to improve sheep livestock, because of two reasons, viz. since British used to like sheep mutton they wanted to improve sheep and secondly, they wanted to provide Raw-material for their Britain Centres.

Under the aegis of East India Company a number of trials were undertaken to improve sheep & wool in India with a view to provide the raw-material for manufacturing Centres in Britain. The indigenous wool was coarse, hairy and of mixed composition and attempts were made to improve the fiber fineness and reduce the medulation through crossing indigenous breeds with exotic fine wool breeds. A definite record as regards to the breeds or the number of sheep imported is not available except some of the details included in the report of Tomas Southey in his book "Colonial Wools" published in 1894 and by Watt in the dictionary of economic products in India published in 1893.

Outstanding work in crossing cape-Merino to the local sheep was undertaken for a number of years in the sheep breeding areas of Northern-Eastern part of Poona and a flock of four thousand to five thousand crossbred sheep was produced yielding four times more wool of superior quality than the indigenous sheep. The improved sheep did not coutinue more than ten years probably because of relaxation of continuing efforts. The trials undertaken on a large scale at the Amrit Mahal Farm in Mysore also met similar fate. However, the improved fine wool sheep in Nilgiri hills still continue. A number of sporadic trials were undertaken in the first half of the 19th century in Punjab, Bengal and Madras. South-Down rams were mated to Patna ewes and cape-Merino breed was utilized in other states. The general impression obtained was that the Merino Crosses thrive better than the progeny obtained from the British breeds. There is no record of any efforts of sheep improvement during the latter part of the 19th century. In the first decade of the 20th Century, Maintenance of sheep flocks with a view to study the possibility of their improvement was again initiated at various livestock agricultural farms established in different provinces. Programmes of Cross-Breeding the local and Bikaneri Breeds with Merino and Romney-March rams were undertaken at a number of places in Uttar-Pradesh both in plain and hill areas. The annual wool yield from Merino crosses averaged to 1.14. Kg. in first clip, 1.6 Kg.in second clip and 2.7 Kg. in adult sheep. It was anticipated that an average of 3-4 Kg of wool could be obtained in the cross breeds compared to only 1 Kg. in the natives. Although, grading of local and Bikaneri sheep with exotic rams continued upto the second generation, it appears that no consistent results were achieved and the experimental work was discontinued for want of financial provision and lack of organisation. Simultaneously the breeding of Bikaneri sheep with Merino was undertaken in Government livestock farm, Hissar and continued over a number of years resulting in the evolution of a new breed "Hissardale". Although, there is no authentic record regarding the level of Merino inheritance in the crossbreds interbred to create "Hissardale". It is believed that it was around 75 per cent. The breed still exists, though in very small numbers, at the Government livestock, farm, Hissar and is very.well adopted to the extreme heat and severe dry cold climate of North Indian Plains. Sporadic importation of Merino sheep was also made in the then Mysore state and rams were located among the flocks owned by sheep breeders association in Kolar. As long as the trials continued there was a marked improvement. The wool yield of Mysore area increased by 2.5 times and was almost of Merino quality.

The constitution of the Imperial (Now Indian) Council of Agricultural Research in the early 20th century for promoting Agricultural and Animal Husbandry research was the most important land mark in the development of agriculture in the country. A number of pilot experiments for breeding superior sheep were undertaken since 1938 and continued upto 1949 at Hissar and Poona. Simultaneously, experimental flocks were also maintained on livestock farms in Mysore and Madras states. The most significant achievement of this phase was that considerable importance was given to exotic breeds of sheep in Kashmir state and Dr. Bandey contributed much to Jammu & Kashmir state's sheep development programme.

However, with an initial experience, it was decided to improve indigenous breeds on the plains and that cross breeding should be restricted to temperate Himalyan region and the sheep rearing areas of the western part of Decan plateau. As a result, in 1952, Council formed a comprehensive plan for evolving sheep of superior breeds and full-fledged centres with three regions, viz. the temperate Himalyan region and dry Northern plains and the Southern region. This gave encourging results, as technical programmes and management standards were established.

A full fledged Institute named Central Sheep and Wool Research Institute was established at Malpura with United Nation's special fund and efforts were made and are being made not only to develop superior cross-breed by importing Merino, Remboulliet, Dorset, Suffolk and Karakul breeds for crossing with local breeds at experimental stations but also in field conditions.

In this regard, Dr. R.M. Achrya, Dr. C.L. Arora and Dr. A.K. Basuthakur's work gives highlights of the achievements. Farmers were helped and surveyed under extension and 'Lab to land' programmes but there were some constraints in adaption of technology (as surveys results suggests), which will be mentioned in the next part.

Constraints of Implementation:

Lack of Education:

This has an effect on implementation as in a survey conducted around Malpura area only 14.12% children were school going in 1980, although in 1981 survey the percentage was 53.1% but this affects implementations of programmes.

Irrigation facility:

In Rajasthan farmers rearing sheep were found to have only 20% of Irrigated area, which resulted in farmers to continue rearing only local live-stock which can survive on low fodder growing area.

Shrinkage of Fodder Area:

50% farmers reported in a survey conducted in 1981 that area under fodder was being reduced and as a result implementation of cross-breeding programmes suffered.

Migration of Farmers:

Nearly 50% of flocks are Migratory as a result, it becomes difficult for extension and 'lab to land' programmes staff to approach them, although attempts are being made to contact them.

Social Constraints:

In implementation of pelt production programmes, farmers hesitate from immediate slaughter of lambs because of social constraints and further, find difficulty in selling pelt. Although, Extension programmes of ICAR and state Government assure for purchase of pelt but karakul development suffered in field conditions due to these constraints.

Sale of Cross-Bred Wool:

Farmers felt (45% of cases) that they had difficulty in sale of cross-bred wool due to less amount of wool and traders attitude of purchasing it at a lower rate although state Governments provide facilities for marketing but situation has not improved.

Reflection of the above points:

As a result of these, the average wool produced (of sampled farmer) for a Ram, ewe and lamb in 1982 was 1.05 kg, 0.910 kg and 0.705 kg which increased only marginally from corresponding averages of 1975, which were 1.00 kg., 0.850kg and 0.620kg.

2. IMPACT OF MILK SUPPLY SCHEME ON RURAL ECONOMY IN MILK COLLECTION AREAS OF GREATER CALCUTTA MILK SUPPLY SCHEME, CALCUTTA (W.B.)

With a view to develop a suitable methodology for studying the impact of milk supply schemes on rural economy in milk collection areas of Greater Calcutta Milk supply Scheme, Calcutta (W.B.), the bench mark and repeat

surveys were conducted during 1976-77 and 1980-81 respectively, in the milk shed area of the scheme, covering 3 districts viz. Nadia, 24-Parganas and Hoogly. The later two districts taken together formed one zone under the study. A stratified two stage random sampling with clusters of villages as first stage units and households in a cluster as second stage units was adopted. Before selection of clusters of villages, the villages were classified into two agro-biologically similar areas, one comprising villages supplying milk to organised agencies and the other not supplying milk to the organised agencies. The two areas so formed are referred to as 'supplying' and 'non-supplying' areas respectively. The sample from the latter area serves as 'control'. The comparison of the changes over a period of time in the two areas provides estimates of indicators of impact of milk supply schemes free of that due to other general developmental activities in the area.

The salient results obtained in respect of some of the important indicators are as follows :

1. Milk Production and its Utilisation:

Over the two occasions, the average daily milk production of cows in the commercial household increased from 1.6 kg. to 1.8 kg. in the supplying area and from 1.4 kg. to 1.8 kg. in the non-supplying area. In case of buffaloes, on the other hand, the milk yield decreased from 3.2 kg. to 2.9 kg. in supplying area and from 5.4 kg. to 5.1 kg. in non-supplying area. The total daily milk production in the entire milk shed area including non-supplying area increased by about 15 percent over the two occasions. Contrary to expectation the increase in milk production occurred only in the non-supplying area. This implies that the contribution from the general developmental factors are more than the contribution from the milk scheme. In other words the milk supply schemes did not make any dent in enhancing the milk production.

The major proportion of the milk produced in the rural area was sold, keeping very little for home consumption. The per head consumption of milk at the time of bench mark survey was estimated as 45 gms. in the supplying area and 43 gms. in the non-supplying area. The corresponding figures at the time of repeat inquiry were of the order of 55 gms. and 65 gms. respectively. Further, it was observed at both the occasions that per head consumption of milk in non-commercial type of families was higher than the commercial type of families.

2. Employment :

The overall proportion of workers over the two occasions increased from 26 percent to 32 percent in supplying area and from 28 percent to 33 percent in non-supplying area. In both commercial and non-commercial families, the working force increased only marginally (6 percent to 7 percent) in both the areas. Further; the proportion of workers having agriculture as main occupation decreased by 4 percent and 2 percent in the supplying and non-supplying areas respectively. In supplying area, the proportion of workers engaged in milk production increased from 5 to 6 percent in cultivator families and from 6 to 9 percent in non-cultivator type of families. In non-supplying area, on the other hand, the proportion of workers engaged in milk production fell from 7 percent to 2 percent in cultivator families but in non-cultivator type of families, it increased from 14 to 17 percent. Despite operation of the milk supply scheme, dairying continued to be a subsidiary occupation with the farmers and the milk scheme had no favourable effect towards taking the milk production as main occupation in the area.

3. Gross Income:

The share of cash income to the total gross income was about 80% and the rest was from farm products utilised at home. The cash income in these families over the two occasions increased by about 40 percent in non-supplying area but remained almost of the same order in suppl ying area. As regards, the cash income of commercial households, it increased by about 20 percent in the non-supplying area but a slight decreasing trend was observed in the supplying area. The reverse was the trend in the non-commercial household. While examining the annual gross income of commercial households over the two occasions, a marginal increase in the non-supplying area but a substantial decrease in the supplying area was found. Again in case of non-commercials, on the other hand, the trend was exactly the reverse. It was found that dairying did not make any dent in enhancing the income of the milk producing families.

4. Cropping pattern:

Main crop seasons in the area are Rabi and Kharif. In rabi season wheat and paddy were grown in about 40% and 25% in the cultivated area respectively. Other crops are mustard, pulses, potato and other vegetables. In kharif season paddy was predominant crop occupying about 50 to 95 percent of the total area under food and cash crops. Jute was the next popular corp in the area. In some areas pulses are also grown in kharif season. The

average yield of wheat varies from 25 to 35 quintal per hectare in different districts of the area where as the average yield of paddy was found from 15 to 35 q/ha.

The intensity of cropping in Nadia, 24-parganas and Hoogly districts was estimated as 132, 115 and 131 percent respectively. In kharif season the cultivators utilised almost entire area under their holdings wheaeas in rabi season the area utilised varied from 25 to 60 percent in different districts. This is mainly due to irrigation required in the rabi season.

5. Feeding pattern of animals:

Almost same feeding pattern and quantity of feeds were observed on both the occasions in the area. The animals were fed on individual as well as group basis. The feed given to the milch animals mainly consisted of 'dub grass' among greens 'paddy straw' among dry fodders and 'mustard oil cake' and 'wheat bran' among concentrates. The average daily feed per cow in milk in cultivator households comprised of about 2.5 kg. greens, 5.0 kg. dry fodder and 0.3 kg. concentrates. Non-cultivator households were giving more quantity of green fodders and almost same quantities of concentrates and dry fodders. Dry cows were given less quantity of fodder and concentrate and were mainly let out for grazing. The buffaloes in milk were fed on an average 4 kg. greens, 5 kg. dry-fodder and 0.750 kg. concentrates. Feeding trend of dry buffaloes was similar to dry cows.

3. TRAINING AND BASIC RESEARCH

3.1 Training Activities:

On the request of C.S.O., New Delhi, the arrangements for training in Project Work for Indian Statistical Services (ISS) Probationers from August, 1984, were made.

3.2 Basic Research in Statistics:

Some Characterizations of balanced row-column designs with two non-interacting sets of treatments have been obtained for the situations when row versus column classifications are orthogonal and non-orthogonal. Some methods of constructing designs possessing these characterizations have also been given.

Some general methods of constructing incomplete block designs, for asymmetrical parallel line assay have been given. These designs permit orthogonal estimation of all the important bio-assay contrasts. The analysis of these designs is very simple.

A special class of designs, known as C_3 designs for two-way elemination of heterogeneity have been defined .These designs are available for the situation when row versus column classification is orthogonal. Some series of designs have been constructed. These designs admit a simple analysis

Some methods of constructing orthogonal main-effect plans have been reported. These methods precisely exploit the properties of Hadamard matrices. Many of the plans hitherto known come out as particular cases of these methods. The tables of plans have also been revised and updated.

3.3 Hostel Activities:

Dr. P.V. Sukhatme, Maharashtra Association for the Cultivation of Science, Pune was greeted by the Hostel residents and presented with a token present on the occasion of his 73rd birth day on 27-7-84. He was a guest of honour at the dinner hosted by the students at the Hostel on the day and addressed the students.

Several sports, indoor games and athletic events were held in connection with the Hostel day celebrations scheduled in October, 1984.

4. COMPUTER SCIENCE & NUMERICAL ANALYSIS

4.1 Data Processing:

The Division of Computer Science and Numerical Analysis continued to provide electronic data processing facilities to the scientists, students and research workers from various ICAR institutes, Central Agricultural Universilies and Colleges. Directorate of Economics & Statistics, Govt. of India and Department of Agriculture, U.P.

4.2 Computer Utilisation:

Burroughs B-4700 Computer System was run in two shifts from 8.00 AM to 8.00 PM and also the four interactive terminals were released for use by programmers, students of the Institute for program developments. The Burroughs B-4700 computer was aslo run during some night shifts for completing the weekly backlog. About 5540 jobs in different job streams were processed during the quarter.

4.3 Discontinuing old machines:

The IBM 1620 computer system and the IBM 407 (accounting machine) were taken out of maintenance from 1st July, 1984. A few ICL punching and verifying machines which were on rental were also discontinued from Sept. 1, 1984.

4.4 Programming facilities:

The officers of the Division attended to the data processing and programming requirements of 27 Ph.D., 39 M.Sc. and 19 other research workers.

To meet their programming requirements, a number of available programs were modified and a few new programs were developed, One of the new programs developed was analysis of $3^3 \times 2^2$ spilt plot with one control plot in main plots.

4.5 Data Base Application:

Up dating of AGRIS information system on receiving of Magnetic Tapes from Vienna and selective dissemination of information based on these data was continued.

4.6 M.T. Unit:

During the period under report approximately 2.25 lakhs of cards were punched and verified. These related to various sections of IASRI, ICAR Institutes, Agricultural Universities and their agencies.

Also 60 jobs were undertaken on unit record machines comprising of sorter, reproducing punch and listing machines.

4.7 Visitors:

About twenty participants of the second international course on sampling methods from CSO visited the computer centre on 3rd Sept., 1984 to get acquainted with the work of the computer centre of the Institute.

5. ADVISORY SERVICES

During the quarter under review, technical advice and guidance was rendered to research workers and students of the Research Institutes, Agricultural Universities and other Research Organisations in Planning of their experimental investigations and statistical analysis/computerisation of their research data as also in regard to research projects referred to the Institute by the ICAR and other organisations. Some details of the technical advice and guidance given by the Institute are given below in brief;

5.1 **Animal Sciences:**

Advice was given to Shri Sudershan Kumar, Dy. Director, Animal Husbandry Department, Punjab regarding initiation of cost of production of milk surveys.

5.2 **Crop Forecasting Methodology:**

Guidance was given to Sh. H.C. Sharma, Scientist (Statistics) and Sh. S.S. Misra, Scientist (Entomology), CPRI, Simla, H.P. for the technical programme and methodology to be followed for assessing the crop loss due to pests of potato crop.

Guidance was given to Shri M. Mallick, I.S.S. probationer from C.S.O. on his project report on problems in forecasting crop yields.

5.3 **Sample Survey Methodology:**

Advice was given to Director of Agriculture and Director for Horticulture (Punjab) on "Planning and formulation of survey for Fruits/vegetables & Minor crops" at New Delhi and at Chandigarh.

Advice was given to Director of Agriculture and Director for Horticulture (H.P.) on "Planning and formulation of Survey for Fruits/vegetables & Minor Crops" at Simla (H.P.).

5.4 **Training and Basic Research:**

Advice was given to Joint Director, Deptt. of Agriculture, Haryana regarding sample size for their study on adoption of improved practices by farmers with regard to project undertaken with the assisstance of World Bank.

6. FIELD SURVEY WORK

6.1 Field Training:

During the quarter under review, field training was imported in connection with the projects mentioned below at the places shown against them.

(i) Sample survey for cost of Cultivation, agronomic practices, area and yield rates of potatoes-Simla (H.P.)

(ii) A study of employment and income of small farmers and landless labourers in District Sultanpur (U.P.)-Delhi.

(iii) Pilot sample survey for estimating the energy requirement for different levels of adoption of modern technology in agriculture in Meerut district (U.P.)-Meerut and Baraut (U.P.)

(iv) Sample survey for transfer of improved Agril. technology under field conditions-Tamil Nadu, Kerala and Punjab.

6.2 Field work Inspection/Supervision:

During the period under report the field work of the following schemes was inspected/supervised by the officers of the Institute at the places/areas mentioned against them:

(i) Statistical investigation on economic production-Ranchi (Bihar)

(ii) Sample survey for transfer of improved Agriculture Technology under field conditions.

(iii) Pilot sample survey for estimating the energy requirement for different levels of adoption of modern technology in agriculture in Meerut district (U.P.)

(iv) Development of suitable methodology to study the effects of housing conditions and other related factors on milk production under village conditions in Gurgaon district (Haryana).

(v) Statistical investigations on economics of pig production, in Ranchi area (Bihar)

(vi) Pilot study for estimation of birth and death rates in bovines in Tiruchirapalli district (Tamil Nadu)

(vii) Pilot sample survey to study the impact of National Demonstration trials on crop production in Rohtak district (Haryana).

7. LIBRARY

7.1 Books :

As a part of continous library practice 25 books on various subject fields of the Institute were added to the Library collection:

7.2 Reprints:

Following reprints of articles written by the scientists of our Institute and published in scientific journals were procurred by the library for free distribution among scientists working in the same field:

S.No.	Author	Title	Source
1.	Bhatnagar, K.G. and Banerji, A.K.	Optimum points of stratification for estimating yield of cereal crop.	Ind. Jr. Agri. Res. 17(3), 143-47, 1983.
2.	Prem Narain, Bhargava, P.N. and Asha Saxena	Statistical study on incidence of drought in relation of agricultural production.	MAUSAM 35(3), 391-96, 1984.
3.	Raheja, S.K.	Economics of balanced nutrition of field crops under intensive cropping.	Proc. FAI–NR Seminar held at Jaipur during March 30-31, 1984
4.	Prem Narain and Khosla, R.K.:	Estimation of Post harvest foodgrain losses.	Jr. of I.S.A.S., 36 (I), 1984
5.	Singh, H.P., Jain, J.P. and Saxena, B.C.	Estimation of impact due to milk supply schemes in a dynamic population.	–do–
6.	Agrawal, Ranjana, D. Singh and Padam Singh	Systematic sampling using varying probabilities.	–do–
7.	Nadkarni, U.G., Jain, T.B. and Agarwal, S.C.	Optimum flock size for pigs in a rural area of U.P.	Ind. Jr. Ani. Sci., 54(4), 360-62, 1984

7.3 Reports:

The library's report collection has been enriched with the addition of 58 reports procured from different organisations.

7.4 Reprography:

Reprographic unit of the library system has been strengthened with new equipment MODI-XEROX 1035 model in first week of September. It has attended 67 jobs covering 4360 pages sent by the scientific, technical and administrative community of the Institute since installation

7.5 Publications:

The library system has started following two Information Services:

1. New Additions to the Library (Books) } Monthly
2. New Additions to the Library (Reports) }

7.6 Issue & Return:

The changing and discharging of publications at the library counter has involved a transaction of approximately 4000 publications.

7.7 Visitors:

Approximately 3900 visitors visited library for consultation. An international group of students participating in C.S.O. training programme also visited library under Dr. C.S. Narang, Joint Director and informally talked the Librarian.

8. 'LAB TO LAND' PROGRAMME

After completion of Phase-II programme on 31-5-84 the selection of new village under Lab to Land Programme Phase III was under consideration. However, the compilation of data and preparation of prograssive reports had been completed during the period under report.

9. ABSTRACTS OF PAPERS PUBLISHED BY THE SCIENTISTS OF THIS INSTITUTE

9.1 AGRAWAL, RANJANA, JHA M.P. and SHUKLA, S.B.L.—*Sampling for Sugarcane Stalk Borer Incidence. Jour. Ind. Soc. Agri. Stat., Vol. XXXVI, No. 2, April, 1984.*

Attempts have been made to obtain suitable sampling unit, size and technique for recording stalkborer incidence in a field. Results indicated that stratified sampling performed the best followed by two stage sampling with systematic sampling for selection of first stage units. 2% sample taking the plots consisting of 3 or 4 rows each of one metre length as sampling units was found optimum.

9.2 JAIN, J.P., NARAIN, P. & JAIN, R.K.—Rates of Genetic Improvement by Progeny Testing in Dairy Herds of Various Sizes. *Ind, J. Anim, Sci. Vol. 54, pp. 721-730, 1984.*

Rates of annual genetic improvement under progeny testing for alternative combinations of tested and untested sires in use each cycle have been competed for herds of 600, 300, 200 and 150 breedable females separately for indigenous purebred cattle, crossbred cattle and buffaloes. For comparison the rates expected unde no-progeny testing have also been given. The procedure used for estimating genetic gain included an adjustment for the loss in

production due to inbreeding as a result of the restricted size of the breeding population, and a slight refinement in the pattern of selection among females and manner of computing selection intensities under the constraints of stability in the herd strength from generation to generation.

The peak progress is achived when the selection intensity of bull sires is the top 2 or 3 out of the progeny tested bulls in each batch according to the amount of depression caused by inbreeding is mild or significant. In smaller sized herds of 150 breedable females, although progeny testing is seen superior to no-progeny testing, but in view of the small gains and heavy cost involved in its operation its use may not be warranted.

9.3 NARAIN, P.—'On Contributions of P.V. Sukhatme in the field of Nutrition'. P.V. Sukhatme Felicitation Volume entitled '*Impact of P.V. Sukhatme on Agricultural Statistics and Nutrition*', *pp. 24-45, July, 1984.*

The contributions of Dr. P.V. Sukhatme in the field of nutrition has been briefly described in this paper. The most important outcome of Dr. Sukhatme's deliberations in this field during the last over 20 years is the demonstration how the science of statistics can be of great assistance in understanding the nutritional concepts and in helping thereby to tackle serious and important issues like malnutrition, undernutrition and health. The paper reviews his work under seven sub-heads viz. (1) Introduction, (2) The World's Hunger and Future Needs in Food Supplies, (3) Protein Malnutrition, (4) Measurement of Undernutrition and Poverty, (5) Models for Protein Deficiency, (6) Genetic Interpretation of Intra-individual Variation, and (7) Newer Concepts in Nutrition.

9.4 NARAIN, P., BHARGAVA, P.N. and SAKSENA, ASHA—A Statistical Study on incidence of drought in relation to agricultural production. *Mausam, Vol. 35, No. 3, pp. 391-396, 1984.*

Assessment of drought is of great significance for crop planning. In the present paper an attempt has been made to characterize drought in the three districts Jalgaon, Jamnagar and Surendranagar falling in semi-arid and arid regions of western India. Data on yield of Jowar and rainfall for various periods was examined to work out threshold values beyond which rainfall becomes relatively ineffective indetermining the yield. It was found that if there is no rain for two consecutive weeks at any stage of the crop growth it does not result in moisture deficiency for the crop but, if the minimum amount of rainfall is less than 3, 3 and 20 mm in three consecutive week in Surendra

Nagar, Jamnagar and Jalgaon respectively, there is significant reduction in yield. Similar drought base values for various durations of drought were worked out alongwith their chances of occurence. It was found that a drought of 9 weeks duration between 3rd July and 5th August is expected to occur once in 4, 5 and 10 years in Surendra Nagar, Jamnagar and Jalgaon respectively.

9.5 NARAIN, P., PANDEY, R.K. and SARUP, SHANTI—Perspective for foodgrains production in 2000 AD. *Commerce, Vol. 148, No. 3813, June, 30, 1984.*

The study is based on secondary data for the years 1968-69 to 1978-79. It covers crops such as Rice, Wheat, Maize, Jowar, Bajara and pulses, The study revealed that foodgrains production would reach a level of 225 millions tonnes in 2000 AD, if the inputs such as nutrient consumption, cropped area, area under HYV and irrigated area would grow at their current level of growth, This would be adequate to meet the demand for foodgrains as predicted by the National Commission on Agriculture and by Sanderson and Roy. The higher output level of 251 million tonnes would be achieved by raising the use of these inputs by 20% above their predicted use in 2000 AD. The input needed for this purpose would be 142 million hectares of gross cropped area, 9.7 million tonnes of nutrient and 97.2 million hectares of area under high yielding varieties and 60.4 million hectare of irrigated land.

9.6 NARAIN, P., JAIN, J.P. and JAIN, R.K.—Increase in Inbreeding Coefficient in a Progeny Testing Programme. *Ind. J. Anim. Sci., Vol. 54, pp. 810-812, 1984.*

In this paper the expression for the amount of inevitable inbreeding which accrues under a progeny testing programme where only a few top sires are used has been derived. In addition the inbreeding coefficients over the first ten generation under progeny testing with different bull selection schemes have been given.

9.7 PANDEY, R.K. and SARIN, B.S.—Estimation of Demand for Foodgrains in Uttar Pradesh. *Jour. of National Council of Applied Economic Research, MARGIN, Vol. 18, No. 3, April, 1984.*

This study is based on secondary data. It confirms that an increase in prices of wheat, rice and maize will lead to a fall in their demand. However, the extent of decline will be different for these commodities in different regions. With the increase in retail price of rice the maximum decline in demand for rice will take place in Bundelkhand followed by the central and

eastern regions. The price rise of maize will reduce the demand most in Bundelkhand followed by the eastern, western and central Uttar Pradesh. If there is an increase in per capita income, the demand for wheat and rice will increase while with some exceptions it will fall for maize. The effect of income in the case of wheat is maximum in the eastern region and minimum in the central region. For rice the income coefficient was the highest in Bundelkhand followed by the eastern region.

The co-efficients associated with the price of wheat were statistically insignificant in almost all regions while these were statistically significant in all the regions except the western. For maize the co-efficients of its price were statistically significant in all the regions except the central and western. The co-efficients of per capita income variable were positive and statistically significant for wheat with one exception. The situation is more or less similar in case of rice but the income co-efficients were either negative or statistically significant for maize. The price of substitute commodity had a positive effect through statistically insignificant effect in many situations on the demand of these commodities.

It is evident from the study that the effect of different factors are dissimilar on the demand of the selected grains in the different regions of the state.

10. PAPER ACCEPTED FOR PUBLICATION

10.1 SINGHAL, R.A. and JAIN, J.P.—Estimation of heritability for samples from non-normal situations—*Biometrical Journal.*

11. ABSTRACTS OF PAPERS PUBLISHED BY THE SCIENTISTS OTHER THAN OF THIS INSTITUTE

During the quarter under report the following articles published in various journals were abstracted by the Scientists of this Institute whose names are given at the end of each abstract. The topics of the articles are broadly on 1) Sample Survey theory and applications, including good case studies if any, (2)Design of Experiments (all aspects including combinatorial aspects), (3) Statistical Genetics, Plant and Animal Breeding (with sufficiently new statistical methodology), (4) Statistical inference, sequential analysis and Stochastic Process with biological applications etc. (5) Econometrics and (6) Computer services and Numerical Analysis, etc.

11.1 Sample Survey :

11.1.1 CHAUDHURI, A. and ADHIKARY, A. K.—"On the efficiency of Midzuno and Sen's strategy relative to several ratio-type estimators under a particular model". *Biometrika, Vol. 70, No. 3, December, 1983, pp. 689-93.*

In this paper efficiency of Midzuno-Sen ratio strategy has been compared with several estimators corresponding to equal probability sampling under a postulated linear regression model with uncorrelated error and a gamma-distributed auxiliary character.

In the model the values of y_i and x_i (i=1, ...N) fixed for a given finite population are supposed to be realizations respectively of random variates y_i and x_i jointly distributed with $y_i=\alpha+\beta x_i+U_i$, where α, β are unknown real constants, U_i (i=1,.....N) are random errors distributed with

$E_c(U_i/x_i)=0$, $E_c(U_i^2/x_i)=\delta x_i,^2$ $E_c(U_i U_j/x_i x_j)=0$ for every $i\neq j$. Here $0<\delta<\infty$, $0\leqslant g\leqslant 2$ and the x_i are independently identically distributed with a common gama density.

$$G(\theta)=\frac{1}{\Gamma(\theta)} e^{-\alpha} x^{\theta-1}$$

in which $x>0$, $2<\theta<\infty$

Denote the sampling designs, Midzuno-Sen by pm simple random sampling by pe and independent half sample procedure by ph. For the comparision purposes following strategies are considered :

(i) Sampling design pm and the estimator

$$t_1=\bar{X}\ \bar{y}/\bar{x}$$

where $\bar{y}$, $\bar{x}$ are sample means for y and x respectively and $\bar{X}$ is the population mean for x

(ii) Sampling design pe,

$$t_2=\bar{X}\bar{y}/\bar{x}$$

$$t_3=\bar{Y}+b(\bar{X}-\bar{x})$$

where b is the sample regression coefficient

(iii) Sampling design ph,

$$t_4=\bar{X}r^*$$

where $r^*=2\bar{y}/\bar{x}-\frac{1}{2}(\bar{y}_1/\bar{x}_1+\bar{y}_2/\bar{x}_2)$

$\bar{y}_1$, $\bar{x}_1$ and $\bar{y}_2$, $\bar{x}_2$ are respective sample means for two half samples.

$$t_5 = \bar{y} + (\bar{X} - \bar{x})r^*$$

(iv) Sampling design pe,

$$t_6 = \bar{X}\bar{y}/\bar{x} + (\bar{y} - \bar{r}\ \bar{x})/(n-1)$$

(v) Sampling ph,

$$t_7 = \bar{X}r^* + \frac{\bar{y} - \bar{r}\,\bar{x}}{n-1}$$

$$t_8 = \bar{X}r^* + \frac{\bar{x}(r^* - \bar{r})}{n-1}$$

$$t_2 = \bar{X}r^* + \frac{\bar{x}(r^* - \bar{r})}{n-1}$$

Biases and Mean square errors for the above strategies have been obtained and compared for a few selected combinations of parameters, namely $\alpha = 0.5$, $\delta = 2.0$, $\theta = 5.0$, g=0.0, 0.5, 1.0, 1.5, 2.0, n=6 and n=10

It has been found that Midzuno - Sen ratio strategy performs better than all the other strategies explain above.

(D.C. MATHUR)

11.1.2 RODERICK, J.A. LITTLE—Estimating a Finite Population Mean from unequal probability samples. *JASA (1983), Vol. 78, No. 383, pp. 596-604.*

Two approaches considered to estimate a finite population mean from unequal probability samples are (i) The randomization approach, in which population values are treated as fixed and inferences are based on the known distribution of sample selection, and (ii) the model-based approach, in which inference is based on a model for the population items. In the prediction approach a model is specified for the population values and is used to predict the non-sampled values. In generalized regression approach, the Horvitz—Thompson estimator of the population mean is modified to allow the introduction of covariate information. Generalized regression estimators have the desirable property of asymptotic design - consistency, which is not always enjoyed by estimates in the prediction class. However, it is suggested that the prediction approach is the more principled method of estimation. If asymptotic-design-consistency is desirable property in a given application, than only models that yield asymptotically design-consistent prediction estimates should

be used. Two classes of models with this property are suggested namely fixed and random-effects models that allow a separate intercept for sub classes of the population indexed by the probability of selection. Estimates based on a simple random-effects model perform will in a limited simulation study carried out to illustrate some of the compared estimators. The conclusions arrived at, on the basis of the study are:

1. Inference about $\bar{Y}$ should be based on Prediction estimator. The model, however, should be carefully chosen to limit the effects of misspecification.

2. The property of asymptotic-design-consistency, although not a model based concept, appears useful in eliminating models that yielding prediction estimators that are not robust. In the context of regression models for unequal probability samples, the prediction approach together with asymptotical-design-consistency requirement produces model with a separate intercept for each sub-class indexed by the inclusion probability.

3. If there are many such sub-classes, the mean squared error of estimates may be reduced by placing a proper prior distribution on the intercepts, leading to random-effects type estimators.

(D.L. AHUJA)

11.2 Design of Experiments:

11.2.1 AFSARINEJAD, K.—Balanced repeated measurement designs. *Biometrika, Vol, 70, No. 1, pp. 199-204, April, 1983,*

Repeated measurements design are concerned with scientific experiments in which each experimental unit is assigned more than once to a treatment, either different or identical. An easy method of constructing balanced minimal repeated measurements designs when p, the number of period, is less than t, the number of treatments, is given.

A repeated measurements design is balanced with respect to the set of direct and first order residual effects if each treatment is tested λ_1 times in each period and in the order of application each other treatment is immediately preceded λ_2 times by each other treatment. A balanced repeated measurement design thus involves five descriptive parameters : t, n, p, λ_1 &λ_2. These five parameters are not independent of one another and the following relations hold: $n = \lambda_1 t$, $n(p-1) = \lambda_2 t(t-1)$. For given t and p, a balanced repeated measurements design is minimal if $n = t(t-1)/(p-1)$. A balanced minimal repeated

measurements design satisfying these equations and $p < t$ exists if $\lambda_1 pxt$ tables can be constructed cyclically from $\lambda_1 px1$ columns with the property that the differences between pairs of adjacent elements of their first columns are distinct and non zero (mod t). Two examples are given to illustrate the method of construction. In addition a method of construction of extra-balanced minimal repeated measurements designs (i.e. if each treatment is allowed to be immediately preceded by itself as well) is also given.

(D.K. SEHGAL)

11.2.2 EAD, R.M. and STERN, R.D.—Designing of experiments for intercropping research. *Exptl. Agriculture, (1980), Vol. 16, pp. 329-342.*

Research into intercropping has increased enormously during the last decade. It seems that little thought has been given for designing the experiment on intercropping research. Most of the research workers appears to have used very simple experimental designs similar to those they have used previously for monocrop experiments.

The efficiency of many intercropping research programmes could be improved if research workers made fuller use of modern statistical knowledge about experiment design. Important statistical considerations for experimental design and plot sampling are reviewed and their relevence to intercropping research assessed. The use of factorial structure and blocking is advocated and ideas on the use of Systematic design and monocrop plots are discussed. For investigating the effect of changing the density of one component crops, suitable systematic designs have been suggested. The use of Nelder's fan design and its subsequent modification by various research workers have been cited.

(P.K. BATRA)

11.2.3 SINHA, BIKAS K. and SAHA, RITA—Optimal weighing designs with a string property. *Journal of Statistical Planning and Inference, Vol. 8, No. 3, pp. 365-374, December, 1983.*

Consider the usual spring balance weighing design set-up, where the design matrix $\underline{X}$ has only two entries, 0 and 1, and has a string property, i.e. in every row of the matrix, there is exactly one run of unities (the rest of the elements being zeros). The case of $\underline{X}$ being a square matrix is studied in some detail. After deriving some results on the properties, the authors show that (i) $X_0 = I_n$ (an identity matrix of order n) is D optimal for inferring on $\underline{\theta}$, where $\underline{\theta}$ is the parameters vector in the usual linear model. (ii) X_0 is uniquely

D-optimal for inferring on $P\theta$, where P is such that $Q = \frac{1}{p\sqrt{n}} J$ is an orthogonal matrix, J being a column vector of all unities. Some comments on the optimality of designs for inferring on linear combinations of the parameters are also made. Finally, some remarks on the case where X is a rectangular matric (Number of rows being greater than the number of columns) are given.

(A. DEY)

11.2.4 MORRIS, MAX. D. and MITCHELL, TOBY, J.—Two-level multifactor designs for detecting the presence of interactions. *Technometrics, Vol. 25, No. 4, pp. 345-355, November, 1983.*

This paper applies a design optimality criterion tr(L)-optimality to design two -level factorials for the detection of interactions among factors. Rules are also given for constructing tr(L)-optimal designs. Some results on the power of these designs for testing the presence of two factor interactions are also discussed.

(A. DEY)

11.3 Statistical Genetics, Plant and Animal Breeding:

11.3.1 MEYER, KARIN—Estimates of Genetic parameters for Milk and fat yield for the first three lactations in British Friesian cows. *Animal production (1984), Vol. 38, pp. 313-322.*

Published investigations indicate that heifer yield is a good indicator of lifetime performance, but there has always been concern about neglecting later lactation information, in particular with reference to possible changes in the ranking of sires over lactations. Assessing the value of later records for both sire and cow evaluation requires, in the first instance, knowledge of the genetic parameters, i.e., heritability and genetic correlations, concerned. In this paper a multivariate restricted maximum likelihood procedure is used to estimate variance and covariance components between & within sires. This method, which considers all lactations simultaneously, accounted for the bias in later lactation records due to selection on dairy performance. Analysis was carried out for a mixed model with herd-year-season as fixed and sires as random effects, and fiting lactation length, calving age and month within season of calving as covariables. The data included 26176 first, 19978 second and 14868 third lactation records for 679 test sires and were analysed in 13 subsets.

Overall, a slightly bigger increase in estimates of sire components over lactations was observed for multivariate analysis, suggesting the removal of some, albeit small, selection bias. The difference was largest for 3rd lactation variances, where in the univariate analysis the cumulated effect of two cullings expected to bias estimates downwards. Estimates for all components were higher in later than in earlier data sets, probably, to a large extent, because of a scale effect. Pooled estimates of heritabilities for lactation 1 to 3 were 0.28, 0.19 and 0.24 for milk yield and 0.27, 0.21 and 0.25 for fat yield. Genetic correlations of 0.91, 0.91, and 0.95 for milk yield and 0.91, 0.91 and 0.99 for fat yield, were found between lactation 1 and 2, 1 and 3 and 2 and 3, respectively. Results suggested that dairy performance in all lactations is almost indentical genetically.

(S.D. WAHI)

11.3.2 YADAV, S.B.S., and SHARMA, J.S.—Trends of Milk Production at various stages of lactation in various genetic groups. *Indian J. Dairy Sci , Vol. 36, No. 3, 1983.*

A study has been undertaken to determine the trends of milk production at various stages of lactaion by utilizing the 557 lactation records of Jersey, Holstein-Friesian and Brown Swiss Half-breds with Hariana breeds of cattle maintained at Animal Farm, Haryana Agricultural University, Hissar pertaining to the period 1971-79. The study indicates that in general Milk Production during a lactation had three phases viz., ascending culminating (peak) and descending phase. Comparison of the lactation curves of different genetic groups reveals that in all the stages of lactation Friesian halfbreds were superior to other genetic groups. The lactation curves of higher yielder were dom or loop shaped where as for low yielder these were flatter shaped. It is also observed that high yielder had high rate of ascent and descent as compared to low yielder which further indicated a negative correlationship between milk yield and persistency.

(LAL CHAND)

11.3.3 GILL, DAVIDSON, J. and LEIGHTON, Jr. A.T.—Effects of light environments and population density on growth performance of male turkeys. *Jour, Poultry Sci., Vol. 63, No. 7, pp. 1314-1321, July, 1984.*

Two experiments using split-plot design were carried out to assess the effects of four lighting procedures x two light intensities as the sub plot treatments and two (high, low) population densities as the sub plot treatments on

the performance of growth, feed efficiency, feathering and live market grade of male turkeys. Birds grown on floor space of 15 and 30 (decimeter)^2/bird from 14 weeks of age were shifted to floor space of 17.8 and 35.6 dm^2/bird at 18 weeks of age.

The results indicated higher body weight gain in experiment 2 at 14 weeks of age on intermittent (2L : 2D) white light. There was significant difference in the interaction between patterns of white light and high intensity (86.1L$_x$) in terms of growth aspect at both 18 and 24 weeks of age. Birds reared under blue light gained more weight through 18 weeks of age in the low intensity (5.4L$_x$) environment. High population density caused lower body-weight gain, lower feed efficiency, poorer feathering, a high incidence of down grading and high mortality them did a relatively low population density. Different light environments (2L : 2D, intermittent) white light, diurnal (12L : 12D) white, red or blue-filtered lights could not alter the responses of turkeys to crowding. From the results it is seen that there is further need of experimentation to derive optimum condition for maximum responses.

(G.C. CHAWLA)

11.3.4 ENGELKE, G. L., JURGENS, M. H. and SPEER, V. C.—Performance of growing-finishing swine fed high mosture or artificially dried corn in complete and free-choice diets.—*Journal of Animal Sciences*, Vol. 58, No. 6, June, 1984, pp 1307-20.

The objectives of this study were to evaluate the utilization of anaerabically stored high moisture corn by the growing-finishing pigs as measured by production measurements. Additionally, two feeding regimens, free choice versus complete diet were also examine. Three trials were conducted on 696 growing-finishing pigs over a period of 15 months. Pigs were allotted randomly to treatments on the basis of weight and sex.

Average daily gain by pigs was not affected by method of corn storage (high moisture versus dried) or by the type of feeding system (complete versus free-choice). Pigs fed free choice diets tended to gain faster ($P < .01$) than those fed complete diets during the early part of the feeding period. Feed efficiency adjusted to an equal dry matter basis, was not different due to method of corn storage or feeding system. Pigs fed free choice diets were slightly more efficient during the early part of the period than those fed complete diets. Little difference was found in carcass composition of pigs fed either high moisture or dried corn.

These trials indicate that, when anaerobically stored high-moisture corn is allowed to undergo proper fermentation, it can be satisfactorily used in growing-finishing swine diets. The pig performance measurements from this study suggested that the feeding value of high-moisture corn is similar to that of dried corn when compared on equal dry matter basis.

(T. B. JAIN)

11.3.5 PAGAN, J. D., HINTZ, H. F. and ROUSAVILLE, T. R.—The digestible energy requirement of lactating pony mares. *Journal of Animal Sciences*, Vol. 58, No. 6, June, 1984, pp. 1382-87.

The energy requirements of lactating pony mares were studied by taking three diets consisting of different ratios of corn, alfalfa meal and soyabean meal. The ratios of alfalfa meal : corn : soyabean for three diets, say, 1, 2 and 3 were 34 : 63 : 3 ; 40 : 53 : 7 and 47 : 37 : 16 respectively. To determine DE content of each diet a digestion trial in 3×3 latin square design was performed with three mature pony geldings. All three diets were fed to the geldings at the rate of 1.5 kg. per 100 kg. body weight. After preliminary feeding for at least twelve days, 5 days metabolism trial was conducted to determine DE content of each diet. To determine digestible energy requirement of lactating pony mares a lactation trial of 11 weeks was conducted with twenty four pregnant pony mares which were statified according the body weight and assigned to one of the three diets. They were fed their respective diets at least 10 days before foaling at a level of intake that would provide crude protein requirement recommended by, NRC, 1978, for late pregnancy. Before being assigned to the treatment, all the mares were fed mixed temothy alfalfa hay adlibitum. Mares fed diet 1 received 2.97 kg., those on diet 2 received 2.41 kg and those on diet 3 received 1.91 kg. per 100 kg body weight. A regression equation that describes the influence of energy intake of the mare on body weight change is $Y = .0031 - .0031\ X_1 + .0531\ X_2$, where Y is average daily weight change of the mare (kg), X_1 = post foaling mare weight (kg) and X_2 daily energy intake of the mare (Mcal DE/day). Using this equation, a 200 kg. mare requires 12.37 Mcal DE per day 85% of NRC recommendation for lactating pony mare. This requirement is expected to maintain body weight during first three months of lactation. A 200 kg mare fed the NRC recommended amount (14.58 Mcal/day) would be expected to gain 5% body weight over this period.

(S. N. BAJPAI)

11.3.6 GONYOU, H. W., STRICKIN, W. R. — Diurnal Behaviour patterns of feedlot bulls during Winter and Spring in northern latitudes. *J. Anim. Sci.*, 58(5), *pp.* 1075 – 83, 1984

The authors study the diurnal behaviour patterns of feedlot bulls during winter and spring. Two trials were conducted during periods when the photo period increased by 7 hr. From trial 1, in which 324 bulls were observed hourly for 24 hrs. on nine occasions at 2 wk intervals, it was observed that on an average 9.8%, 1.9%, 27.4% and 60% of the bulls were eating, drinking, standing and lying respectively. Major periods of eating, drinking and standing were associated with the times of sunrise and sunset and were shifted with seasonal changes. A close synchronization between sunset and afternoon eating was indicated. A significant period of eating involving upto 15% of the bulls at one time, occurred near midnight during longer winter months but the percentage decreased as the day length increased. In trial two continuous observations for 24 hrs. were made at 2 wk. intervals on two groups of nine bulls. When the day length increased the bulls were active at midday, this was especially so when the photo period exceeded 10 hrs. Mounting and agonistic encounters were more frequent near sunset and in general were associated with the major periods of eating and standing. Grooming occurred throughout the day-light portion of the day. From winter to spring, scratching tended to decrease while cross-grooming to increase. Standing and agonistic activity increased with increase in precipitation. In both trials there was a period before sunrise, with lack of activity.

(V. T. PRABHAKARAN)

11.4 Statistical Inference, Sequential Analysis and Stochastic Process with Biological Application, etc. :

11.4.1 DRAPER, NORMAN R.—The Box-Wetz Criterion Versus R^2. *J.R. Statist. Soc. A (1984), 147, Part 1, pp 10.*

R.A. Fisher (1924) noted long ago that the square of multiple correlation coefficient in a regression fit, R^2, can be made large simply by adding to the model terms which exhaust most or all the usable degrees of freedom available from the number of X-sites less the number of parameters in the model. In this paper the author has shown that R^2 can be made small simply by increasing the number of repeat data points. It is argued that R^2 is misleading in such cases. In either set of extreme cases and also in between the Box-Wetz (1973) criterion provides a reliable alternative to R^2 and the author has recommended its use.

(CHANDRAHAS)

11.4.2 SRIVASTAVA, M.S. and LEE, G.C. – On the choice of transformations of the correlation coefficients with or without an outlier *Commun. Statist.—Theor. Meth. 12(21), pp, 2533-47 (1983).*

In this research paper, fine transformations of the correlation coefficient, namely, Fisher's z, Nair's u, Sankaran's v, Ruben's y and Samiuddin's t_s have been compared numerically using confidence intervals. The probability coverage of a confidence interval (based on transformation) is compared with the exact nominal confidence level to find out which transformation has the probability coverage closer to the nominal level. It was found that Samiuddin's tranformation does have the stated property. However, for large sample (of size >25) both Fisher's z and Samiuddin's t_s can be used. In the presence of an outlier (on a minor axis) both Fisher's z and Samiuddin's t_s are not affected as long as $|\rho| \leqslant 0.3$ but are seriously affected when $|\rho| > 0.3$.

(RANJANA AGRAWAL)

11.5 Econometrics :

11.5.1 ROBERT, M. COSTRELL—Equilibrium Unemployment and Excess Capacity in Steady-State and Growth Cycles. *Economica, No. 201, Vol. 51, pp. 69-82. (Feb. 1984).*

This paper is addressed to the interpretation of the average or trend rate of unemployment. Many contemporary macro-economists provide a 'nominal' interpretation of that rate: the trend or 'natural' rate of unemployment is understood to be that rate which is consistent with a stable rate of inflation. Another, distinctly minority, strand of thought gives a 'real' interpretation of unemployment: the trend rate is understood to be that rate which is consistent with a stable distribution of income between capital and labour. The present paper is of the latter variety. This paper has extended the Goodwin model of unemployment to accommodate increasing returns and the excess capacity associates with it.

(ASHOK KUMAR)

11.5.2 CHI, JAI-YOUNG and EDEN S.H. YU.– Customs unions under Increasing Returns to Scale. *Economica, Vol. 51, No. 202, pp. 195-203 (May, 1984)*

The objective of this paper is to examine traditional Customs unions theory under the assumption of variable returns to scale. Following Kemp (1955) and most recently Panagariya (1980), it is assumed that increasing or

decreasing returns to scale are caused by output-generated economics or diseconomics of scale that are external to the individual firm and internal to the industry. As in the standard customs unions theory, authors have employed the three country, two commodity and two-factor model with the modification of allowing the production functions to be subject to variable returns to scale. The demand side of the model is represented by a strictly quasi-concave utility function assuming the balance of payments equilibrium is always maintained. To analyse the welfare implications of a customs union under variable returns to scale, the procedures developed by Batra (1973) and recently extended by YU (1981, 1982) to the case of factors market distortions and a rigid wage economy was followed. This paper has examined the welfare consequence of forming customs unions in a framework that integrates increasing (decreasing) returns to scale into the standard theory of customs unions. The main finding of this paper are as, there are three crucial factors in determining the welfare change associated with trade creation and trade diversion. They are :

(1) type of trade creation and diversion,

(2) the price output responses, and

(3) The ranking between the elasticities of the returns to scale.

(ASHOK KUMAR)

11.5.3 RICCARDO FAINI—Increasing Returns, Non-Traded Inputs and Regional Development. *The Economic Journal, Vol. 94, pp. 308-323, No. 374 (June, 1984).*

It is well accepted that widening international differentials in per capita income are an important feature of prolonged phases of the development process. This paper moves some steps towards an integration of theoretical approaches. It presents a model which incorporates the impact of scale economics on the process of growth in a two region (North-South) context. Furthermore, it provides a framework within which the empirical pattern of exports and investment in both developed and underdeveloped regions have been explained. The main finding of this paper can be summarised as, the existance of increasing return to scale in the production of non-traded intermediate inputs will give rise to a cumulative divergence of regional growth rates. Also the pattern of export and investment in a backward region will be biased towards sectors with very low service input requirements and therefore, very low multiplier effects on the local economy. On the one hand the small size of the service sector is a drawback to industrial development; on the other hand the limited demand for non-traded inputs by a relatively undeveloped

industrial sector becomes an obstacle to the expansion of the service sector. This phenomenon has been of great concern to regional planners. The massage is that, if industrialisation is to succeed, greater attention should be paid to that part of the tertiary sector which produces inputs for industries. The importance, during the development process, of the tertiary sector as a supplier of inputs to industry in developing countries should be analysed together with the technological evolution of the producer service sector.

(ASHOK KUMAR)

16.1 Computer Service and Numerical Analysis :

11.6.1 EFFELSBERG, WOLFGANG AND LOOMIS, MARYF, S.—Logical, internal and physical reference behavior in CODASYL database systems· *ACM transactions on database systems, Vol. 9, pp 197-213 (1984).*

This paper is an investigation of one aspect of the performance of CODASYL data base system. The data reference behavior. The authors introduce the model of data base traversals at three levels viz., the logical, internal and physical. The mapping between the logical and internal levels is defined by the Schema, whereas the mapping between the internal and the physical levels depends on cluster properties of the database. The model used by authors explains the physical reference behavior for a given sequence of DML statements at the logical level.

The authors have implemented the software to monitor reference in two selected CODASYL DBMS applications. In a series of experiments the physical behavior was observed for varying internal schemes and cluster properties of data base. However, the measurements have been limited to retrieval transaction so that a variety of queries could be analyzed for the same well-known state of the data base. The authors have considered only small data bases, in order to allow fast reloading with varying internal Schema parameters. In all cases, considered, the database transactions have shown less locality of reference than do programs under virtual memory operating systems. However, some databases showed no locality at all. No evidence of physical sequentiality was found, suggesting that standard page replacement strategies are not optimal for CODASYL database buffer management, instead replacement decisions in a database buffer should be based on specific knowledge available from higher system layers.

(I.C. SETHI)

11.6.2 STIRLING, W. DOUGLAS—Iteratively reweighted least squares for models with a linear part. *Applied Statistics*, Vol. 331 pp. 7—17, (1984).

This paper is an extension of Nelder and Wedderburn's method for maximum likeihood estimation of the parameters in an exponential family of regression models to a more general type of models. As an example, the method has been used for censored and grouped data, models involving the negative binomial or beta binomial distributions and in robust estimation.

In a numerical example, the author has shown that the algorithm presented by him converged considerably faster than the EM algorithm given by Dempster et. al. (1977) in J.R. Statist. Soc. B, 39, 1-38.

(I.C. SETHI)

11.6.3 HARDING, E.F. - An efficient minimal-storage procedure for calculating the Mann-Whitney U, generalize U and similar distributions. *Applied Statistics*. Vol. 33, No. 1, pp. 1- 6, (1984).

This paper contains a simple procedure for calculating the null distributions of the 2-sample Mann-Whitney and the K-Sample Jonckhneeree U-Statistics. It utilises the form of their generating functions and generalize directly to distributions with similar generating functions. The procedure definitely requires minimal storage and may optionally be restricted to any desired tail area, and has run-time at least as short as any other algorithm. The programming part is also very simple and can be implemented even on a micro-computer and is a useful contribution particularly in non-parametric theory because assumptions of parametric tests are seldom satisfied.

The Author has even prepared a program for the computations, which can be handled on T-159 calculator and the copy of program can be had upon request.

(I.C. SETHI)

11.6.4 BLAIR, ERIC L.—Acceptance sampling plan design with the Apple III Micro—Computer. *Computers and Industrial Engineering*, No. 2, *pp.* 129—41. 1984.

The use of MICRO—OC programs in designing single and double sampling plans has been illustrated through an example. The realtime display of OC curves, graphical characterization, evaluation and comparison of the sampling plans can be obtained easily and quickly with the help of these programs. The computer program for designing acceptance sampling plan developed by the Industrial and Management Engineering Center at Rensselaer and written in (floatingp-oint) BASIC has been given.

(PRANESH KUMAR)

12. ABSTRACTS OF DISSERTATIONS APPROVED

12.1 M. Sc.

12.1.1 BHATNAGAR, AMITA – A review of asymmetrical factorial designs.

A number of research workers have contributed towards the development in the field of Designs for asymmetrical factorial experiments which was first initiated by Yates in 1937 but the work of all the authors in this field is scattered in the journals. Thus, an attempt has been made in the present investigation, to produce them at one place. Various methods of construction and analysis of designs for asymmetrical factorial experiments are reviewed in a chronological order, in the present work.

(Guide—Dr. A. K. Banerjee)

12.2 Diploma in Advanced Computer Programming.

12.2.1 SOLAMBY, NAGENDRA SINGH—Word Processing Software.

A word Processing software has been developed using the Burroughs Programming language. Linked structure has been used for Disk file records. The editing facilities include-corrections, Insertions and deletions of the text. The documenting features of the software provide facilities for –New page, New para, next line, set width of text, setting margin, and some more procedures.

(Guide – Shri S.N. Mathur)

13. ABSTRACTS OF SEMINAR TALKS

During the quarter under review, 16 seminar talks were delivered by the Scientists/Staff/Students of the Institute on various topics of interest in the fields of agricultural statistics and allied disciplines. The abstracts of seminar talks are given below :

13.1 Seminar Talks delivered by the Ph.D. Students :

13.1.1 Agricultural Statistics :

(i) JAISWAL, U.C. —Estimation of Heterosis in cross bred dairy cattle.

The word 'Heterosis' was first coined by Shull (1914) to describe the increased vigour of cross breds, relative to their parents. Heterosis is a measure of non additive genetic effects and usually estimated as the amount

by which the average performance of the halfbreds exceeds the average of two parents. This method requires the knowledge of average performance of both the parents. But in dairy cattle breeding programmes the performance of exotic parent under native conditions usually remains unknown because of the germplasm of exotic bred being imparted through frozen semen. In such situations there can be two approaches for the estimation of heterosis. One is to produce grades of different levels of exotic inheritence and use multiple regression technique, The value of heterozygosity under this technique is obtained by assuming one locus with two alleles. Obviously this assumption is not warrented as the quantitative characters are polygenetically determined. The other approach which is based on the fitting of genetic models specifying the contributions of additive, dominance of epistatic gene effects to grademeans can be adopted.

(ii) MAHAJAN, V.K. – Some thoughts on Regression and Prediction.

Regression is the most widely discussed technique in Statistical literature. However, there seem to be some aspects of the regression technique which have not been adequately discussed in literature. As a consequence, there have been some misuses of this technique.

A classical example is the use of the regression method in what is known as the disagregation problem which has led to meaningless results. Multicollinearity has been defined with special reference to the precision of the prediction in the domain of interest of explanatory variables rather than high inter-dependence among them. Precision of prediction in certain directions of the vector of explanatory variables may be extremely good although the variables are highly correlated among themselves. The effects of multicollinearity have been studied in detail, including the case where explanatory variables are subject to errors of observations.

13 1.2 Agricultural Physics :

DUBEY, S.K. : Crop Yield Models By Remote Sensing Technique :

The pre-harvest estimates of crop yield are important in planning procurement, distribution, price structure, import and export of agricultural commodities. The present methods for yield forecasting are some what inadequate for assessing the productive potential. From remote sensing devices operated through air or satellites, it may be possible to make a quick assessment

and provide timely and accurate information for very large areas. The respective coverage from space eract offers an opportunity to monitor crop growth and development at short intervals of time. The various model's used for predicting crop yields, require solar radiation, day length, maximum and minimum temperature, precipitation, relative humidity and leaf area index as inputs.

(A): **Dry Matter Production :** Crop yield is based on the estimation of photosynthesis and respiration from daily CO_2 exchange.

Daily matter production: Crop yield is based on the estimation of photosynthesis and respiration from

Daily dry matter production: Kg. $p_g.R$ x 0.71 gm/m^2

(i) When Ks = ET/P & T [ET-Evapotranspiration, PET= Potential Evapotranspirating]

(ii) $P_g = CO_2$ uptake $= -\dfrac{P_{max} I}{I+K}$

Where I = solar radiation

P_{max} = Asymptotic rate of photosynthesis

K = radiation at $P_{max}/^2$

Gross photosynthesis depends to a large extend on the amount of light intercepted by Canopy. Puckridge (1973) related P_{max} and k with LAI for spring wheat as follows.

$P_{max} = 0.83 + 1.72$ LAI

$k = 0.08 + 0.09$ LAI

(iii) $R = R_g + R_m$

$$R = P_g + 0.014\ \beta \text{ wt. } 2^{(TAV-20)/10.}$$

where, TAV = mean of max. and minimum air temperature

Wt. = above and below dry matter (q/m^2)

(B) The simple (non-partitioned) yield model based on SDD and CWSJ can be written as

$$y(\text{Grain or biological yield}) \ \alpha_1 - \beta_1 \sum_{i=e}^{m} (CWSI)_i$$

$$y(\text{Grain or biological yield}) \ \alpha_2 - \beta_2 \sum_{i=e}^{m} (SDD)_i$$

where $(CWSI)_i$ crop water stress index on day. $(SDD)_i$ is the mid day difference between crop canopy and air temperature on day i.e. and m are the seedling emergence and maturity stage of crop respectively are $\alpha_{1,2}$ and $\beta_{1,2}$ are regression constants.

13.1.3 Agricultural Economics:

SINGH, R.P.– Statewise Variation in growth of foodgrains production in India.

In India, agricultural sector which remained neglected and stagnant in the pre independence period received a place of price in the developmental programmes under Five Year Plans. New strategy of agricultural development especially around high yielding varieties programme resulted in significant increase in food grains production. But the results realised were not uniform over time and space. It was therefore deemed appropriate to study not only the statewise variations in growth of foodgrains production but also the factors responsible therefore.

To study the variations compound growth rates of production and productivity were computed and important foodgrain crops and total foodgrains for different states. Exponential functions of the form $Y = AB^x$ were fitted and compound growth rate was given by $r=(\text{Antilog } b-1) \times 100$ where $b=\log B$.

The main findings of the present study was that there was marked variations in the growth rates of production of foodgrains in the states which was mainly because of the variations in the rate of growth of productivity which in turn was highly influenced by intensity of resource use in the states like irrigation, high yielding variety seeds and fertilizer consumption. Rice and wheat showed to have the highest rates of growth because of comparatively more impact of modern technology on these crops. Amongst the states, Punjab and Haryana had the highest growth rate of production and productivity where as Assam, Bihar, Orissa, Madhaya Pradesh had lower rates of growth.

13.2 In addition to the above seminar talks the following seminar talk delivered by distinguished visitor during the quarter ending Sept, 1984.

Dr. B. Chandra, Assistant Professor, Department of Mathematics, Indian Institute of Technology; New Delhi.

'Stochastic forecasting models'

14. PAPERS PRESENTED AT INTER-ORGANISATIONAL SEMINARS, CONFERENCES, WORKSHOPS, ETC.

The title and authorship of papers presented and the particulars of the workshops, seminars etc. at which these were presented are given below.

14.1 FAI Group Discussion on means to increase Crop response to fertilizer use; organised at New Delhi on Sept., 4-5, 1984 by the Fertilizer Association of India.

(i) Bhargava, P.N. and Jain, H.C.—An overview of yardstick of inputs for different crops-current status of yardstick of inputs.

(ii) Raheja, S.K. and Mehrotra, P.C.—Current status of yardsticks of additional production due to factors other than fertilizers.

14.2 Symposium on 'Oilseeds production constraints and opportunities, 'organised by Hindustan Lever Research Foundation, Bombay at New Delhi on 7.9.1984.

Raheja, S.K., Batra, M.S. and Ohri, N.K.—Cost of Production in India

15. CONFERENCES/SEMINARS/SYMPOSIA/WORKSHOPS, ETC. ATTENDED BY THE SCIENTISTS.

Date	Name of Seminars, etc.	Name of the Scientists with designation.
Aug., 27-29	Seminar on "Local Area Net Works" held at Taj Palace, New Delhi.	Sh. R. Gopalan, Scientist (S-2)
Aug., 27-29	15th Annual Workshop of All India Co'ordinated Agronomic Research Project held at Jaipur.	Sh. P.N. Bhargava, Scientist (S-3) Sh. H.C. Jain, Scientist (S-1) Shri P.K. Batra, Scientist (S-1) Mrs. Rajinder Kaur, Scientist S-1)

16. MISCELLANEOUS

16.1 Personnel Information :

16.1.1 Appointment/Promotion/Transfer, etc. :

(a) Appointment :-

Consequent upon his appointment as Scientist 'S' in Central Institute for Research on Goats, Mathura, Shri V.K. Jain, Technical Assistant (Stat.) T-4, has been relieved of his duties with effect from the afternoon of 31st August, 1984.

(b) Promotion :

Shri Ashok Kumar, Scientist 'S' has been promoted to the post of Scientist (S-1 w.e.f. 1-7-83.

(c) Transfers :

(i) Shri Lal Chand, Scientist (S-1) has joined duty at IASRI with effect from 7.8.84 on transfer from C.S.W.R.I., Avikanagar.

(ii) Shri P.N. Vali, Accounts Officer has been transferred to CAZRI, Jodhpur on promotion to the post of Senior Accounts Officer and relieved at the IASRI with effect from 24.8.1984.

(iii) Dr. D.K. Aggarwal (S-1) has been transferred to ICAR Headquarter alongwith post and relieved at the IASRI with effect from 31.7.1984.

(iv) Consequent upon her accepting the post of Research Asstt. in the pay scale of Rs. 550-900 offered by the Punjabi Academy, Delhi Administration, Delhi, Smt. Bachint Kaur, T-I-3, Key Punch Operater has been relieved of her duties at IASRI, 2.7.84.

16.1.2 The Scientists of IASRI were deputed to attend training/study tour/ meetings and to deliver lectures etc. during July-Sept., 1984.

1. Prof. Prem Narain,	(i) Participated in the Symposium on 'Vertical Growth in Agriculture' organised by the Indian Society of Agricultural Statistics at I.A.S.R.I. on 27th July, 1984 on the occasion of the Felicitation Function of Prof. P.V. Sukhatme.

(ii) Attended the Academic Council meeting of I.A.R.I. on 4th August, 1984.

(iii) Attended meetings of the Executive Committee and Council of the Maharashtra Association for the Cultivation of Science, Pune on 8th and 9th August, 1984.

(iv) Presided over two-days programme of Group Discussion on 'Crop Forecasting Models' held at IASRI, New Delhi on 13th and 14th August, 1984 in which scientists from IASRI; Indian Meteorological Department, Pune; Space Application Research Centre, Ahmedabad, ICRISAT Patancheru, NCAER, New Delhi participated.

(v) Attended Fourth Meeting of National Advisory Board on Statistics held at CSO, New Delhi on 21st Augugt, 1984.

(vi) Attended meeting of the Sub-Committee on Training Courses in Biostatistics of the Institute for Research in Medical Statistics, New Delhi on 27th August, 1984.

(vii) Delivered a lecture on 'Livestock Planning, at the Institute of Economic Growth, Delhi on 28th August, 1984 in a Course on 'Training in Investment Planning and Project Evaluation' for Officers associated with planning in the state Govts. as well as Central Ministries,

(viii) Delivered a lecture entitled 'Application of Statistical Tools in Agricultural Marketing' on 17th September, 1984 to the participants of the VI Course of Senior Level Training in Agricultural Marketing organised by the Dte. of Marketing & Inspection, Ministry of Rural Development, Govt. of India, New Delhi.

(ix) Attended on 19th September, 1984 a Group Discussion on 'Agricultural Development in India' with Dr. John Mellor, Director of the International Food Policy Research Institute Washington, D.C. orga nised by the Director of the United States A ID Mission, New Delhi.

(x) Attended a meeting with Dr. C.H. Hanumantha Rao, Member, Planning Commission and Members of the Study Groups on Agricultural Strategies for the Eastern Region, Rainfed Areas and Fertilizer Consumption of the Planning Commission on 19th Sept, 1984.

2. Dr. S.S. Pillai, Jt. Director (CS & NA) — Attended the meeting of the Committee set up by ICAR for Studying the usefulness of continuing the membership of the Common-Wealth Agricultural Bureau on 22.8.1984.

3. Dr. S.K. Raheja, Sr. Scientist

(I) Participated in the meeting of the High Level Coordination Committee, Simla, H.P. on 27.8.1984.

(ii) Participated in the meeting of the High Level Coordination Committee, Haryana Chandigarh on 18.9.84.

(iii) Acted as Chairman in the Hindi Day Function held on 14.9.1984.

(iv) Delivered a lecture entitled "Computation of Fertilizer Requirements and Effect of Factors like Soil & Crop on Fertilizer Demand" to FAI-NR training Programme for field representative and State Personnel, New Delhi on 25.9.1984.

4. Dr. O.P. Kathuria, Sr. Scientist. — Attended a training programme on Manpower, issues in Agricultural Sector organised by Institute of Applied Manpower Research, New Delhi from July 4-10,1984.

5.	Sh. P.N. Bhargava, Sr. Scientist	(i) Attended working group Meeting of All-India Diara-Land, Project at Sebour during 8th & 9th Aug., 1984.
		(ii) Attended working group meeting on Assessment of Yield advantages from Intercropping Experiment in Dry-land agriculture from 21st and 22nd Sept., 1984.
6.	Sh. S.N. Mathur, Scientist (S-2)	(i) Attended a talk on 'Local Area Network' by Dr. S.K. Tripathi at Hotel Akbar on 27.8.84.
		(ii) Attended advanced training in Structured programming through 'PASCAL' from 10th to 21st Sept., 1984 at CMC, 115, Sarojini Devi Road, Secunderabad.
7.	Dr. A.K. Srivastava, Scientist (S-2)	(i) Delivered lectures on designing of sample surveys and estimation on 12th & 13th July, 1984 to the trainees statistical officers in the Directorate of Economics & Statistics, Govt. of Madhya Pradesh.
		(ii) Delivered lectures between 27.8.84 to 7.9.84 in the Training course on sampling & Household survey methodology conducted by CSO in support of the national household survey capability programme.
8.	Shri H.C. Jain, Scientist (S-1)	Participated in the meeting of the Working Group on "Statistical Assessment of yield advantages from Intercropping Systems in Dryland Agriculture" held at IASRI, on 21st and 22nd Sept., 1984.

16.2 Distinguished Visitors :

1. Mr. Gerard Van Bilzen, Commission European Communities and Mr. Rue De Lo Loi Zoo, 1049 Brussels/Belgium visited for discussion with the Director on possible training of African National in the field of Agricultural Statistics.

16.3 Monitoring Cell :

There was a meeting on 17th August, 1984 under the Chairmanship of the Director to fix up the procedure for handling the work of the VI Plan Co-ordinated Project for primary data collection involving ad-hoc field staff. The progress was also reviewed.

There was a meeting on 1st September, 1984 under the Chairman ship of the Director, for the formulation of the VII plan of our Institute and for the procedure for the review of the projects initiated in the VI five year plan period.

16.4 IASRI Representatives at the meetings of Scientific Panel of ICAR :

Name of the Officers	Name of the Scientific Panel and Date
Shri H.C. Jain	'Agronomy' held on 29th Sept., 1984.
Dr. O.P. Kathuria	'Fisheries.'

16.5. Following meetings of Head of Divisions and Sr. Scientists/Sr. officers were held during the quarter under report.

Meeting	*Date*
1. Sr. officers	18-7-1984
2. HDS and Sr. Scientists	20-7-84
3. HDS and Sr. Scientists	30-8-84

16.6 Benevolent Fund:

A sum of Rs. 334/-(Rupees Three hundred thirty four only) has been collected on account of Employees Benevolent Fund from the officers/Staff of the Institute.

17. हिन्दी के प्रगामी प्रयोग में प्रगति

भारतीय कृषि सांख्यिकी अनुसंधान संस्थान की राजभाषा कार्यान्वयन समिति तथा केन्द्रीय सचिवालय हिन्दी परिषद् की संस्थान शाखा की कार्यकारिणी की बैठकों में लिए गए निर्णयों के अनुसार, सितम्बर, 1984 में समाप्त होने वाली तिमाही के दौरान, हिन्दी प्रयोग से सम्बद्ध अनेक महत्वपूर्ण कार्यक्रम आयोजित किए गये और राजभाषा कार्यान्वयन पर बल देने संबंधी विविध विषयों पर आवश्यक कार्रवाहियाँ की गई जिनका संक्षिप्त ब्यौरा नीचे प्रस्तुत है :-

केन्द्रीय सचिवालय हिन्दी परिषद् की संस्थान शाखा की कार्यकारिणी की बैठक में निर्णय लिया गया कि अगस्त-सितम्बर, 1984 अवधि में हिन्दी व्यवहार पखवाड़ा, हिन्दी कार्य-शाला तथा निबंध, टिप्पणी एवं प्रारुप लेखन, वाद-विवाद, प्रश्नमंच विषयों पर अनेक हिन्दी प्रतियोगिताओं जैसे कार्यक्रम चलाए जाएँ। कार्यकारिणी ने संबद्ध कार्यक्रमों पर विचार-विमर्श तथा आयोजन के लिए निरीक्षण, प्रतियोगिता तथा कार्यशाला उपसमितियों का गठन करके व्यवहारिक रुप देने पर जोर दिया। इन उपसमितियों की बैठकें दिनाँक 21.6.84, 26.6.84, 4.8.84 तथा 6.8.84 को हुई।

नौ जुलाई को जारी परिपत्र के माध्यम से संस्थान के सभी प्रभाग/अनुभाग, आदि के अधिकारियों एवं अधीक्षकों से हिन्दी प्रयोग संबंधी तिमाही प्रगति रिपोर्ट 15 दिन के अन्दर स्पष्ट और सही रुप में प्रस्तुत करने का अनुरोध किया गया। 11 जुलाई के कार्यालय आदेश में विशेषकर सात प्रमुख मुद्दों पर भारत सरकार की राजभाषा नीति एवं नियमों तथा संस्थान की राजभाषा कार्यान्वयन समिति के निर्णयों पर अमल करने की याद दिलाते हुए पाई गई कमियों को दूर करने का अनुरोध किया गया।

हिन्दी व्यवहार पखवाड़ा 13 अगस्त, 84 से मनाया गया और इसके लिए 7 अगस्त के एक परिपत्र के माध्यम से सभी कर्मचारियों को सूचित किया गया था कि इस पखवाड़े के दौरान हिन्दी में अधिकाधिक काम करने वाले अनुभाग तथा कर्मचारियों को हिन्दी व्यवहार प्रतियोगिता के अंतर्गत पुरस्कृत किया जाएगा।

दिनाँक 16 अगस्त के परिपत्र द्वारा, सभी अधिकारियों एवं कर्मचारियों को 7 सितम्बर से 13 सितम्बर, 84 तक होने वाली हिन्दी व्यवहार, लेख टिप्पणी एवं प्रारुप लेखन, वादविवाद तथा प्रश्न मंच प्रतियोगिताओं के आयोजन के समय एवं तिथि से अवगत कराया गया और 14 सितम्बर को मनाए जाने वाले हिन्दी दिवस समापन समारोह एवं पुरस्कार वितरण के विषय में भी इसी परिपत्र द्वारा सूचित किया गया।

केन्द्रीय सचिवालय हिन्दी परिषद् शाखा की कार्यकारिणी की बैठक 23 अगस्त, 84 को हुई जिसमें हिन्दी व्यवहार संबंधी निरीक्षण उपसमिति का पुनर्गठन, प्रतियोगिताओं के आयोजन 14 सितम्बर के समारोह संबंधी प्रबंध समिति का गठन तथा शाखा के चुनाव, आदि विषयों पर विचार-विमर्श तथा निर्णय लिए गए ।

राजभाषा कार्यान्वयन समिति की बैठक दिनाँक 25 अगस्त को निदेशक महोदय की अध्यक्षता में हुई जिसमें आम विषयों के अतिरिक्त कुछ महत्वपूर्ण मुद्दों पर विशेष चर्चा हुई । हिन्दी को बढ़ावा देने संबंधी आयोजित की जा रही हिन्दी कार्यशाला तथा विभिन्न प्रतियोगिताओं में पुरस्कार वितरण का अनुमोदन किया गया ।

संस्थान की दूसरी हिन्दी कार्यशाला का आयोजन दिनाँक 27 अगस्त से 4 सितम्बर, 84 के दौरान संस्थान के सभा भवन में किया गया जिसमें संस्थान के विभिन्न प्रशासनिक अनुभागों के 29 कर्मचारियों ने भाग लिया । निदेशक महोदय ने 27 अगस्त को कार्यशाला का उद्घाटन करते हुए कार्यशाला में दिए जाने वाले व्याख्यानों को ध्यान से सुनने-समझने के बाद व्यवहारिक प्रयोग किए जाने पर बल दिया तथा इस अवसर पर प्रेरणादायक तथा बधाई संदेश दिए । कार्यशाला में विभिन्न विषयों पर व्याख्यान देने के लिए संस्थान से बाहर के अनेक हिन्दी विद्वानों को बुलाया गया जिनके अनुभवी अध्ययन के परिणामस्वरुप कर्मचारियों में हिन्दी प्रयोग के प्रति रुचि हुई तथा टिप्पणी तथा प्रारुप लेखन में विद्यमान झिझक दूर हुई । भारत सरकार से सेवा निवृत वयोवृद्ध हिन्दी स्तंभ सर्वश्री हरि बाबू कंसल तथा जगन्नाथजी आदि का विशेष योगदान चिरस्मरणीय रहेगा । कार्यशाला का सफल आयोजन, कर्मचारियों के लिए प्रभावकारी सिद्ध होने की आशा है ।

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