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A bibliography on post-harvest losses in cereals and pulses with particular reference to tropical and subtropical countries: Supplement to G110 (G197)

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Tropical Development and Research Institute

G197

**A bibliography on post-harvest
losses in cereals and pulses with
particular reference to tropical and
subtropical countries**

Supplement to G110

R. A. Boxall

April 1987

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INTRODUCTION

Bibliography G110 listed some 265 references which the author had to hand in July 1976. The list was not exhaustive and it was recognised that an updating volume would be needed in due course. This supplement includes a further 249 references but once more it cannot be claimed to be an exhaustive list. The supplement, like the original bibliography, encompasses the losses which occur throughout the whole post-harvest system but with special attention to storage. Certain references in relation to grain processing have been omitted since they are included in a companion volume G117 - Grain processing losses bibliography, and its supplement G168 (see references R42 and R43 in the Review section of this bibliography).

In preparing this bibliography, the same general format of G110 has been adopted. The material has been arranged in two ways. First, information in the references has been tabulated and cross-referenced according to subject (Tables 1-6). Second, the references, which are listed alphabetically by author, have been grouped into three main categories according to the type of work described, i.e. reviews, experimental work and field estimates. Field estimates have been further subdivided into provisional estimates, supported estimates and complete estimates.

References which are regarded as being particularly useful by providing a full account of the loss assessment methodology or by making a significant contribution towards the development of an appropriate methodology or technique, have been marked with an asterisk.

An additional feature of this supplement is the inclusion of an Author Index.

The reviews (numbered R1 to R86) are papers which, in some cases, merely requote loss estimates indexed under another author in order to demonstrate the importance of applying appropriate protection measures. In other cases they give a more detailed review of research into the methodology of post-harvest loss assessment. A few specialised bibliographies are included in this section.

Experimental work (numbered E1 to E80) includes estimates of loss from work done either in the laboratory or as a small-scale field trial, such as an investigation of specially constructed stores on a research site. In most cases the results of this research will not have been applied by their investigators to full field studies. This section also includes references to experimental work on the development or improvement of loss measurement techniques. These references have been cross-referenced only according to commodity and cause of loss (Table 1).

Field estimates are references concerned with estimates of loss and the methods used to obtain these in the field. They have been subdivided, according to the extent of information provided and the completeness of the investigation, into three categories:

1. Provisional estimates (numbered A1 to A22) are those which consist entirely of an estimate of loss without any detailed description of the method by which it was obtained.
2. Supported estimates (numbered B1 to B36) are those in which the estimate of loss is supported by details of the methods by which it was obtained but has some components missing or not clearly described.
3. Complete estimates (numbered C1 to C25) are those which are fully documented and give the reader sufficient information on the methods employed to enable a decision to be made about the reliability of the estimate.

The tables 1 to 6, each arranged by commodity and cross-referenced by various factors, precede the lists of references. Review material has not been cross-referenced in the tables and experimental work is cross-referenced only by commodity and cause of loss (Table 1).

Tables 2 to 5 include references drawn from the three Field Estimate lists. Table 2 subdivides the references by region. Only a few general estimates are included for Europe and North America for comparison with the tropical and sub-tropical estimates. West Africa is included as representative of

the more humid region of Africa; there is minimal information from the Sahelian zone. The rest of Africa is included under East, Central and Southern Africa. Asia includes such areas as Indonesia and the Philippines which are important for their work on paddy and rice. It is interesting to note that, yet again, no references were available for any of the Pacific Islands and there are very few for Australia.

In Table 3, subdivision is by the cause of loss. Very few separate references to losses caused by mites were available and most micro-biological losses were caused by fungi.

In Table 4, subdivision is by type of loss. The distinction between types of loss is not sharply defined but quantity is regarded as any estimate expressed in terms of weight loss whereas quality mainly includes estimates of damage. Therefore, some references may appear under both sub-headings. In cases where there is doubt the estimate is listed as unspecified.

Table 5 is subdivided according to the level within the post-harvest system at which the loss is measured. Trader/Co-operative is taken as the level immediately above the farmer and does not extend into large-scale commercial practice. Large-scale (e.g. Central Marketing Board) includes both bag and bulk storage and handling facilities.

In Table 6 subdivision is according to the particular activity within the post-harvest system during which the loss occurs. Harvesting loss is included since it is a post-maturity loss and is not normally included within pre-harvest crop loss appraisal methodology. For convenience, the losses in grain processing - drying, hulling, milling, etc. - are placed together; a glance at the title of the reference will distinguish the various processes. (It is appropriate, at this point, to remind readers that additional references to losses in relation to grain processing, including combine harvesting, are given in Bibliography G117 and its supplement G168 - references R42 and R43.)

It is fairly simple to trace a specific reference using the tables; for example a loss estimate for maize storage at farm level in East Africa can be found by listing all the maize references for East Africa in Table 2 and

checking for maize under 'Farm' in Table 5 and 'Storage' in Table 6 to eliminate unwanted references.

Where a pulse has not been given a generic name by the author and it is not obvious from its common name into which category it falls, it has been placed under **PULSES: General**, e.g. beans may not always be Phaseolus sp.

REVIEWS

- R 1 ADAMS, J.M. (1977) A review of the literature concerning losses in stored cereals and pulses published since 1964. Tropical Science, **9**, 1-29.
- *R 2 ADAMS, J.M. (1977) The estimation of post-harvest losses in durable commodities - basic principles. Proceedings of the Seminar on Post-Harvest Losses in the Caribbean and Central America, Santo Domingo, Dominican Republic, August 8-11. Volume II, Document II-C. Santo Domingo, Dominican Republic: Instituto Interamericano de Co-operacion para la Agricultura (IICA).
- R 3 ADAMS, J.M. and TEJADA, R. (1977) Summary of a proposed survey of post-harvest losses of rice in the Dominican Republic. Proceedings of the Seminar on Post-Harvest Losses in the Caribbean and Central America. Santo Domingo, Dominican Republic, August 8-11. Volume I, Document I-M. Santo Domingo, Dominican Republic: Instituto Interamericano de Co-operacion para la Agricultura (IICA).
- R 4 AHMED, H. (1983) Losses incurred in stored food grains by insects - a review. Pakistan Journal of Agricultural Research, **4** (3), 198-207.
- R 5 AMEZQUITA, R. and LA GRA, J. (1979) A methodological approach to identifying and reducing post-harvest food losses. Miscellaneous Publication No. 119. Santo Domingo, Dominican Republic: Interamerican Institute for Co-operation in Agriculture (IICA), iv + 78 + 6pp.
- R 6 ANON. (1976) Post-harvest food losses in developing countries. Farming Development - IFAP - Information Bulletin, **12** (1), 21-22.
- R 7 ANON. (1977) Sri Lanka - Country Statement. Working Papers of the FAO Action Oriented Field Workshop for Prevention of Post-Harvest Rice Losses, Alor Setar, Malaysia. 12-30 March. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 59-81.

- R 8 BALOCH, U.K., IRSHAD, M. and IQBAL, J. (1984) Post-harvest losses, research and extension training in Pakistan - a review. Publication PHL/1, Plant Protection. Islamabad: Crop Sciences Division, Pakistan Agricultural Research Council, v + 25pp.
- R 9 BARBER, S. (1972) Milled rice and changes during aging. In: Rice - Chemistry and Technology. (Ed. D.F. Houston) American Association of Cereal Chemists, pp. 215-263.
- *R10 BOARD ON SCIENCE AND TECHNOLOGY for INTERNATIONAL DEVELOPMENT. COMMISSION ON INTERNATIONAL RELATIONS. NATIONAL RESEARCH COUNCIL (1978) Post-Harvest Food Losses in Developing Countries. Washington DC, USA: National Academy of Sciences, 206pp.
- *R11 BOXALL, R.A. (1986) Assessment of farm level grain losses after harvest. London: Report of the Tropical Development and Research Institute, G191, viii + 139pp.
- R12 BOXALL, R.A., TYLER, P.S. and PREVETT, P.F. (1978) Loss assessment methodology - the current situation. In: Proceedings of the 2nd International Conference of Stored Products Entomology, Ibadan, Nigeria. Kansas: Department of Entomology, Kansas State University, pp. 29-26.
- R13 BULL, J.O. (1978) Contamination of foods by rodents, insects and birds. Institute of Food Science and Technology Proceedings, **11** (2), 96-99.
- R14 CALDERON, M. (1981) The ecosystem approach for apprehending the extent of post-harvest grain losses. Phytoparasitica, **9** (2), 157-167.
- R15 CALIBOSO, F.M. (1977) Studies on the losses of stored grains due to insect pest infestations. Working Papers of the FAO Action Oriented Field Workshop for Prevention of Post-harvest Rice Losses, Alor Setar, Malaysia. 12-30 March. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 149-203.

- R16 CASAS, E. DE LAS (1977) Stored product insects and micro-organisms in grain ecosystems. Technical Bulletin of the University of Minnesota Experimental Station No. 310, pp. 31-34.
- R17 DE LIMA, C.P.F. (1979) Appropriate techniques for use in the assessment of country loss in stored produce in the tropics. Tropical Stored Products Information, **38**, 15-19.
- R18 DE LIMA, C.P.F. (1981) Africa: assessment and control of losses in stored food. Span, **24** (3), 104-107.
- R19 DE LIMA, C.P.F. (1982) An index of quantitative and qualitative food loss. Food and Nutrition Bulletin, **4** (2), 10-12.
- R20 DEORAS, R.J. (1975) Rat menace and how to fight it. Pesticides (India), **9** (8), 38-43.
- R21 DRUMMOND, D.C. (1980) Cuban pilot scheme to assess the value of reducing rodent damage to stored food. Report PFL/CUB/001. Rome: FAO, 9pp. + 6 annexes.
- R22 EGGINS, H.O.W. and COURSEY, D.G. (1968) The industrial significance of biodeterioration of oilseeds. International Biodeterioration Bulletin, **4** (1), 29-38.
- *R23 ELDER, D.I. McA. (1980) Guidelines for assessment of post-harvest losses in farm level in Pakistan. Rome: FAO.
- R24 FAROUK, S.M. (1975) Probable losses in post-harvest period. How to minimise them. In: Proceedings of Workshop in Appropriate Agricultural Technology, February 6-8. Dhaka: Bangladesh Agricultural Research Council, pp. 153-159.
- R25 GREELEY, M. (1981) Farm level rice processing in Bangladesh: food losses, technical change and the implications for future research. Proceedings of 4th Annual Workshop on Grain Post-harvest Technology. College, Laguna, Philippines: South-East Asia Co-operative Post-Harvest Research and Development Programme, SEARCA, pp. 33-48.

- R26 GREELEY, M. (1981) Solving Third World food problems: the role of post-harvest planning. In: Proceedings of NATO Advanced Study Institute Seminar on Post-Harvest Physiology and Crop Preservation, Sounion, Greece, pp. 515-535.
- R27 GREELEY, M. (1982) Farm level post-harvest food losses: the myth of the soft third option. Institute of Development Studies Bulletin, **13** (3), 51-60.
- R28 GREELEY, M. (1982) Pinpointing post-harvest food losses. Ceres, No. 85 (**15** (1)), 30-37.
- *R29 GREIG, D.J. (1980) Draft manual of procedures to measure the losses that occur during the drying, cleaning and handling of grain at farm and village level. Rome: FAO.
- *R30 GREIG, D.J. (1981) Draft manual of procedures to measure rice processing losses. Rome: FAO.
- R31 GUPTA, P.C. (1976) Viability of stored soyabean seed in India. Seed Research, **4** (1), 32-39.
- R32 HARRIS, B. (1970) Paddy processing in India and Sri Lanka: a review of the case for technological innovations. Tropical Science, **18** (3), 161-186.
- *R33 HARRIS, K.L. and LINDBLAD, C.J. (Compilers) (1978) Post-Harvest Grain Loss Assessment Methods. 193pp. Published by the American Association of Cereal Chemists in co-operation with the League for International Food Education, the Tropical Products Institute, the Food and Agriculture Organization of the United Nations and the Group for Assistance on Systems relating to Grain After-harvest.
- R34 HERFORD, G.V.B. (1952) The infestation of stored foodstuffs by insects. Journal of the Science of Food Agriculture, **3**, 1-11.
- R35 HIBLER, M. (1978) Less waste, more food. The IDRC Reports, **7** (2), 19-21

- R36 HOPF, H.S., MORLEY, G.E.J. and HUMPHRIES, J.R.O. (1976) Rodent damage to growing crops and to farm and village storage in tropical and sub-tropical regions. London: Centre for Overseas Pest Research/Tropical Products Institute, vi + 115pp.
- R37 HOWE, R.W. (1978) The principles and problems of storage and pest control. Outlook on Agriculture, 9 (5), 198-203.
- R38 ICHCA (1976) Loss and damage in transport. Proceedings of the International Cargo Handling Coordination Association Conference, Amsterdam, October 28-29.
- R39 INDIA: ADMINISTRATIVE STAFF COLLEGE, HYDERABAD (1978) All India grain storage and distribution. Supporting Study No. 12. Post-harvest Grain Losses. (Study sponsored by the Department of Food, Ministry of Agriculture and Irrigation) Hyderabad: Administrative Staff College, 77pp. + appendices.
- R40 JACKSON, W.B. (1977) Evaluation of rodent depredations to crops and stored products. EPP0 Bulletin, 7 (2), 439-458.
- R41 JOHNSON, I.M. (1978) Problems in assessing harvesting losses. Tropical Stored Products Information, 36 (Special issue: Papers presented at Tropical Products Institute Seminar on Post-harvest Grain Losses, London), p. 12.
- R42 KASASIAN, R. (1983) Grain processing losses bibliography. Supplement 1 to G117. London: Report of the Tropical Products Institute, G168, 69 + ivpp.
- R43 KASASIAN, R. and DENDY, D.A.V. (1979) Grain processing losses bibliography. London: Report of the Tropical Development and Research Institute, G117, iv + 48pp.
- R44 LA GRA, J. (1981) An overview of post-harvest losses in the Caribbean. Report of Post-harvest Losses Consultative Meeting - Caribbean, July 1981. Volume II, 3-20. London: Commonwealth Secretariat.

- R45 LIPTON, M. (1982) Post-harvest technology and the reduction of hunger. Institute of Development Studies Bulletin, **13** (3), 4-11.
- R46 MAJUMDER, S.K. (1977) The effects of difference types of storage structures on quality and condition of grain in storage. Working Papers of the FAO Action Oriented Field Workshop for Prevention of Post-Harvest Rice Losses, Alor Setar, Malaysia, 12-30 March. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 290-309.
- R47 MAJUMDER, S.K. (1982) Approaches to the assessment of food losses. Food and Nutrition Bulletin, **4** (2), 25-32.
- R48 MARTIN, P.M.D. and GILMAN, G.A. (1976) A consideration of the myco-toxin hypothesis with special reference to the mycoflora of maize, sorghum, wheat and groundnuts. London: Report of the Tropical Products Institute, G105, vii + 112pp.
- R49 MAY, R.M. (1977) Food lost to pests. Nature, **267** (5613), 669.
- R50 MPHURU, A.N. (1976) Losses which occur during harvesting and storage of grains: a bibliography. Special Report No. 4. Kansas: Food and Feed Grain Institute, Kansas State University, 73pp.
- R51 PADUA, D.B. DE (1974) Post-harvest rice technology in Indonesia, Malaysia, the Phillipines, Thailand. A state of the art survey. Report - International Development Research Centre. Ottawa: IDRC, 66pp.
- R52 PADUA, D.B. DE (1976) Rice post production handling and processing: Its significance to agricultural development. Paper presented at the International Workshop on Accelerating Agricultural Development - SEARCA, Los Baños, Laguna, Philippines. April 26-30, 1976. iii + 56pp.

- R53 PARPIA, H.A.B. (1976) Post-harvest losses: importance of their prevention on food supplies, nutrition and development. In: Nutrition and Agricultural Development - Significance and Potential for the Tropics. Basic Life Sciences, Volume 7. New York: Plenum Press, 195-206.
- R54 PARPIA, H.A.B. (1977) More than food would be saved. Ceres, **60**, 19-24.
- R55 PEDERSEN, J.R. (1978) Post-harvest losses - the need for reliable data. Chapter 6. In: World Food Pest Losses and the Environment. (Ed. D. Pimental) AAAS Selected Symposia Series, Volume 13. Boulder, Colorado: Westview Press, 95-105.
- R56 POINTEL, J.G. and COQUARD, J. (1980) Le pourcentage de perte en poids et la perte spécifique, critères d'évaluation des dégâts causés par les insectes dans les céréales et les légumineuses stockées. Agronomie Tropicale, **34** (4), 377-381.
- *R57 PROCTOR, D.L. and ROWLEY, J.Q. (1983) The thousand grain mass (TGM). A basis for better assessment of weight losses in stored grain. Tropical Stored Products Information, **45**, 19-23.
- R58 RAMOS, M.G. (1978) Introducing food loss assessment studies into country programmes in the Republic of the Philippines. Tropical Stored Products Information, **36** (Special issue: Papers presented at the Tropical Products Institute Seminar on Post-Harvest Grain Losses, London, March 13-17, 1978), p. 24.
- R59 RAWAL, R.B. (1978) Nepal. Tropical Stored Products Information, **36** (Special Issue: Papers presented at the Tropical Products Institute Seminar on Post-harvest Grain Losses, London, March 13-17, 1978), pp. 29-30.
- R60 REUSSE, E. (1976) Economic and marketing aspects of post-harvest systems in small farmer economics. UN - FAO Monthly Bulletin of Agricultural Economics Statistics, **25** (9), 1-7.

- R61 ROWLEY, J.Q. (1984) An assessment of losses during handling and storage of millet in Mali. Tropical Stored Products Information, **47**, 21-23.
- R62 SAHARAN, G.S. (1970) Deterioration of grains by mycoflora. Bulletin of Grain Technology, **8** (1/2), 35-39.
- R63 SCHULTEN, G.G.M. (1982) Post-harvest losses in tropical Africa and their prevention. Food and Nutrition Bulletin, **4** (2), 2-9.
- R64 SCHULTEN, G.G.M. (1982a) Prevention of Food Losses Programme. Report on a consultancy mission on loss assessment. Rome: FAO, 30pp.
- R65 SCRIMSHAW, N.S. (1978) Global use of the instruments of scholarships for the conquest of hunger: the World Hunger Programme of the United Nations University. Food and Nutrition Bulletin, **1** (1), 6-14.
- R66 SENANARONG, A. (1978) Thailand. Tropical Stored Products Information, **36** (Special Issue: Papers presented at the Tropical Products Institute Seminar on Post-harvest Grain Losses, London, March 13-17, 1978), pp. 26-27.
- R67 SHAMSUDIN, I. (1977) The establishment of rice standards in Malaysia. Working Papers of the FAO Action-Oriented Workshop for the Prevention of Post-Harvest Rice Losses, Alor Setar, Malaysia, 12-30 March, 1977. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp.234-250.
- R68 SHUYLER, M.R., CORBETT, G.G., REUSSE, E. and BARREVELD, W. (1976) Action versus its justification: which comes first? In: Proceedings of the 15th International Congress of Entomology, Washington, D.C., August 19-27, 1976. pp. 705-707.
- R69 SIDDIQUI, M.R. (1976) Pathology of stored seed. Seed Research, **4** (1), 66-72.
- R70 SPENSLEY, P.C. (1977) An eye on the granary. Ceres, **60**, 15-18.

- R71 SPURGEON, D. (1976) Hidden harvest - a systems approach to post-harvest technology. Report IDRC 062e. Ottawa: International Development Research Centre, 36pp.
- R72 SUBRAHMANYAN, V. (1977) Causes and prevention of post-harvest rice losses. Working papers of the FAO Action-Oriented Field Workshop for the Prevention of Post-Harvest Rice Losses, Alor Setar, Malaysia, 12-30 March, 1977. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 1-22.
- R73 SURIEL, T. (1975) Reduction of post-harvest food losses in the Dominican Republic. Tropical Stored Products Information, **36** (Special Issue: Papers presented at the Tropical Products Institute Seminar on Post-harvest Grains Losses, London, March 13-17), pp. 49-50.
- *R74 TOQUERO, Z. (1981) Action Programme for the Prevention of Food Losses. Review of Loss Assessment Activities of PFL projects in the Asian Region (particularly in Nepal and Pakistan). Rome: FAO, 47pp.
- R75 TYAGI, A.K. and GIRISH, G.K. (1977) Studies on the assessment of storage losses of food grains by insects. Part II - Factors affecting extent of damage. Bulletin of Grain Technology, **15** (1), 46-66.
- R76 TYAGI, D.S. (1982) Farm level storage: orderly marketing, the public distribution system and labour absorption. Institute of Development Studies Bulletin, **13** (3), 45-50.
- R77 TYLER, P.S. (1981) Post-harvest losses in durables. In: Report of Post-Harvest Losses Consultative Meeting - Caribbean, July 1981, Volume II. London: Commonwealth Secretariat, pp. 31-39.
- R78 TYLER, P.S. (1984) Misconception of food losses. Food and Nutrition Bulletin, **4** (2), 21-24.
- R79 TYLER, P.S. and BOXALL, R.A. (1984) Post-harvest loss reduction programmes: a decade of activities; what consequences? Tropical Stored Products Information, **50**, 4-13.

- R80 TYLER, P.S. and DENDY, D.A.V. (1978) Measurement techniques and their accuracy. Tropical Stored Products Information, 36 (Special Issue: Papers presented at Tropical Products Institute Seminar on Post-Harvest Grain Losses, London, March 13-17, 1978), pp. 7-8.
- R81 UN: FAO (1980) Assessment and collection of data on post-harvest foodgrain losses. FAO Economic and Social Development Paper 13. Rome: FAO, v + 72pp.
- R82 UN: FAO (1983) Action Programme for the Prevention of Food Losses: experiences with loss assessment in post-harvest loss reduction programmes. Rome: FAO, 21pp.
- R83 UN: FAO (1984) Post-harvest losses in quality of food grain. FAO Food and Nutrition Paper 29. Rome: FAO, 103pp.
- R84 UN: WHO (1976) Joint FAO/WHO/EPPO Conference on rodents of agricultural and public health concern. Geneva, 15-18 June, 1976. Report WHO/VBC/76.643. Geneva: WHO, pp. 1-4.
- R85 VANDEVENNE, R. (1978) Note on crop loss after harvesting in the Ivory Coast. Tropical Stored Products Information, 36 (Special Issue: Papers presented at Tropical Products Institute Seminar on Post-Harvest Grain Losses, London, March 13-17, 1978), p. 35.
- R86 ZOEHRINGER, M.V. and EARLY, J.O. (Eds.) (1977) Proceedings of National Food Loss Conference. Moscow, USA: College of Agriculture, University of Idaho.

EXPERIMENTAL

- E 1 ADAMS, J.M. (1977) The evaluation of losses in maize stored on a selection of small farms in Zambia, with particular reference to methodology. Tropical Stored Products Information, **33**, 19-24.
- E 2 BATO, S.M. and SANCHEZ, F.F. (1972) The biology and chemical control of Callosobruchus chinensis (Linn.). Philippine Entomologist, **2** (3), 167-182.
- E 3 BHATTARAI, M.R., HUNTER, I.G. and THAPPA, B.B. (1982) Evaluation of containers for storing wheat seed grain under farmers conditions. Technical Paper No. 60. Kosi Anchal, Dhankuta District, Nepal: Pakhribas Agricultural Centre, 6pp.
- E 4 BRAUDE, R., LOW, A.G., MITCHELL, K.G., PITTMAN, R.J. and WILKIN, D.R. (1980) Effect of flour mite infestation (Acarus siro L.) on nutritive value of pig diets. Veterinary Record, **106** (2), 35-36.
- E 5 CALIBOSO, F.M. (1977) Studies in the losses of stored grains due to insect pest infestation. Working Papers of the FAO Action Oriented Field Workshop for Prevention of Post-Harvest Rice Losses, Alor Setar, Malaysia. 12-13 March. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 149-203.
- E 6 CALPATURA, R.B. (1981) Variety, maturity and length of straw cutting, interaction on the grain losses of rice during harvesting. In: Proceedings of 4th Annual Workshop on Grains Post-Harvest Technology. Laguna, Philippines: South-East Asia Co-operative Post-harvest Research and Development Programme, pp. 373-382.
- E 7 CASWELL, G.H. (1964) In: Maize in Tropical Africa. (Ed. M.P. Miracle) Madison, Milwaukee, London: University of Wisconsin Press, p. 243.
- E8 CHEIGH, H.S., RYU, J.H., JO, J.S. and KWON, T.W. (1978) Nutritional losses during washing and cooking of rice. Food and Fertilizer Technology Centre Bulletin 103.

- E 9 CHRISTENSEN, C.M. (1967) A note on the invasion of durum wheat by storage fungi. Cereal Chemistry, **44** (1), 100-102.
- E10 CHRISTENSEN, C.M. (1967) Invasion of sorghum seed by storage fungi at moisture contents of 13.5 - 15% and condition of samples from commercial bins. Mycopathologia et Mycologia Applicata, **44** (3), 277-282.
- E11 CHRISTENSEN, C.M., KAUFFMAN, H.H., HAWK, A. and WADE, F. (1978) Gain in weight of grains and grain products exposed to relative humidities of 80-90%. University of Minnesota Agriculture Experimental Station Miscellaneous Journal Series No. 1532.
- E12 CHRISTENSEN, C.M. and LOPEZ, L.C. (1965) Relation of moisture content and length of storage to changes in microflora and germination percentage of rough rice. Phytopathology, **55** (9), 953-956.
- E13 COGBURN, R.R. (1977) Susceptibility of varieties of stored rough rice to losses caused by storage insects. Journal of Stored Products Research, **13**, 29-34.
- E14 DANIEL, V.A., RAJAN, P., SANJEEVARAYAPPA, K.V., SRINIVASAN, K.S. and SWAMINATHAN, M. (1977) Effect of insect infestation on the chemical composition and the protein efficiency ratio of the proteins of Bengal gram and red gram. Indian Journal of Nutrition Dietetics, **14** (2), 244-247.
- E15 DANIELS, N.E. (1956) Damage and reproduction by the flour beetles Tribolium confusum and T. castaneum in wheat at three moisture contents. Journal of Economic Entomology, **49** (2), 244-247.
- E16 DAVEY, P.M. (1961) The acceptability and fitness of maize for human consumption. Tropical Science, **3** (4), 163-173.
- E17 DHARMALINGHAM, C., RAMAKRISHNAN, V. and RAMASWAMY, K.R. (1976) Viability and vigour of stored seeds of black gram in India (Vigna mungo (L.) Hepper). Seed Research, **4** (1), 40-50.

- E18 DORWORTH, C.E. and CHRISTENSEN, C.M. (1968) Influence of moisture content, temperature and storage time upon changes in fungal flora, germinability and fat acidity value of soya beans. Phytopathology, **58** (11), 1457-1459.
- E19 EL-HASSAN, H.S. and MUDITHIR, K. (1982) Effect of storage pest damage on seed germination, seed quality and yield of faba beans. Fabis Newsletter No. 4, 47-48.
- E20 FANSE, H.A. and CHRISTENSEN, C.M. (1966) Invasion by fungi of rice stored at moisture contents of 13.5 - 15.5%. Phytopathology, **56** (10), 1162-1164.
- E21 FANSE, H.A. and CHRISTENSEN, C.M. (1970) Invasion by storage fungi of rough rice in commercial storage and in the laboratory. Phytopathology, **60** (2), 228-231.
- E22 FLOYD, E.M. (1971) Relationship between maize weevil infestation in corn at harvest and progressive infestation during storage. Journal of Economic Entomology, **64** (2), 408-411.
- E23 FRANCIS, B.J. and ADAMS, J.M. (1980) Loss of dry matter and nutritive value in experimentally infested wheat. Tropical Science, **22** (1), 55-68.
- E24 GUPTA, S., SINGHAL, S.K. and DOHAREY, R.B. (1981) Studies on the chemical and nutritional changes in Bengal gram (Cicer arietinum) during storage caused by the attack of pulse beetle (Callosobruchus maculatus Fabr.). Bulletin of Grain Technology, **19** (13), 185-190.
- E25 HARMAN, G.E. (1972) Deterioration of stored pea seed by Aspergillus ruber: extraction and properties of a toxin. Phytopathology, **62** (2), 206-208.
- E26 HARMAN, G.E., GRANETT, A.L. and NASH, G. (1972) Seed deterioration by storage fungi. New York's Food and Life Sciences Quarterly, **5** (2), 19-22.

- E27 HARMAN, G.E. and NASH, G. (1972) Deterioration of stored pea seed by Aspergillus ruber: evidence of involvement of a toxin. Phytopathology, **62** (2), 209-212.
- E28 JALOTE, S.R. and VAISH, C.P. (1976) Loss of viability of paddy seed during storage in Uttar Pradesh. Seed Research, **4** (2), 183-186.
- E29 JORGENSEN, J. (1970) Changes in the fungus flora of barley seed stored with a high moisture content. Tidsskrift for Planteavl, **74** (3), 425-432.
- E30 KADKOL, S.B., PINGALE, S.V. and SWAMINATHAN, M. (1957) Changes effected by insect infestation in groundnut kernels. Bulletin of the Central Food Technology Research Institute, Mysore, **6** (2), 30.
- E31 KIK, M.C. (1945) Effect of milling, processing, washing, cooking and storage on thiamine, riboflavin and niacin in rice. Arkansas University Agricultural Experimental Station Bulletin, (458), 1-60.
- E32 KULIK, M.M. (1973) Retention of germinability and invasion by storage fungi of hand threshed and machine threshed wheat seeds in storage. Seed Science and Technology, **1** (4), 805-810.
- E33 LALITHAKUMARI, D., GOVINDASWAMY, C.V. and VIDHYASEKARAN, P. (1971) Effect of seed borne fungi on the physiochemical properties of groundnut oil. Indian Phytopathology, **24** (2), 183-289.
- E34 LILLEMOJ, E.B. and FENNELL, D.I. (1975) Fungi and aflatoxin in a bin of stored white maize. Journal of Stored Products Research, **11** (1), 47-51.
- E35 MAJUMDER, S.K. (1977) The effects of different types of storage structures on quality and condition of grain in storage. Working Papers of the FAO Action-Oriented Field Workshop for Prevention of Post-Harvest Rice Losses, Alor Setar, Malaysia. March 12-30. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 290-309.

- E36 MEDRANO, J.F., BRESSANI, R., GOMEZ-BRENES, R. and ELIAS, L.G. (1979) Evaluation of nutritional value of foods with red flour beetle (Tribolium castaneum). II. Evaluation of corn, wheat and processed soya bean-corn preparation. Nutrition Reports International, **20** (1), 11-24.
- E37 MONDAL, G.C., NANDI, D. and NANDI, B. (1981) Studies in deterioration of some oil seeds in storage. I. Variation in seed moisture content, infection and germability. Mycologia, **73** (1), 157-166.
- E38 MORA, M.A. (1977) Damage to stored maize infested with Sitophilus zeamais Motsch. Dissertation Abstracts International, B37 (7), 3253-3254. Kansas State University.
- E39 MORA, M.A. and ECHANDI, R. (1976) Evaluacion del efecto des condiciones de almacenamiento sobre la calidad de semillas de arroz (Oryzae sativa L.) y de maiz (Zea mays L.). Turrialba, **26** (4), 413-416.
- E40 MORALLO-REJESUS, B. and JAVIER, P.A. (1980) Laboratory assessment of damage caused by Sitophilus spp. and Rhizopertha dominica in stored cereals. Proceedings of 3rd Annual Workshop of Grains Post-Harvest Technology. Kuala Lumpur, Malaysia. January 29-31. Laguna, Philippines: South-East Asia Co-operative Post-Harvest Research and Development Programme, pp. 220-233.
- E41 MORENO-MARTINEZ, E. and CHRISTENSEN, C.M. (1971) Differences among lines and varieties of maize in susceptibility to damage by storage fungi. Phytopathology, **61** (12), 1498-1500.
- E42 MOUBASHER, A.H., ELNAGHY, M.A. and ABDEL-HAFEZ, S.I. (1972) Studies on the fungus flora of three grains in Egypt. Mycopathologia et Mycologia Applicata, **47** (3), 261-274.
- E43 NAGARAJAN, K. and KARIVARATHARAJU, T.V. (1976) Storage studies in sorghum, bajra and maize seed viability in relation to moisture content. Seed Research, **4** (2), 161-166.

- E44 NARASIMHAN, K.S. and RANGASWAMI, G. (1969) Influence of mould isolates from sorghum grain on viability of the seed. Current Science, **38** (16), 389-390.
- E45 NAVARRO, S. and KASHANCHI, Y. (1977) Conservation of wheat grain in a temporarily stored bulk in the open. Progress Report, Israel Ministry of Agriculture, Agricultural Research Organisation 1975/76. Bet Dagan. pp. 49-84.
- E46 NAVARRO, S., KASHANCHI, Y., GONEN, M. and FRANDJI, H. (1978) Causes of loss in stored grain in Israel. Progress Report, Israel Ministry of Agriculture, Agricultural Research Organisation 1976/77. Bet Dagan. xiv + 134pp.
- E47 NICHOLSON, J.F. and SINCLAIR, J.B. (1973) Effect of planting date, storage conditions and seed-borne fungi on soybean seed quality. Plant Diseases Reporter, **57** (a), 770-774.
- E48 NURUNNABI, B.I. and HUQ, M.M. (1975) Effect of parboiling and storage on the total nitrogen, non-protein nitrogen, fat acid value, peroxide value and iodine value of some varieties of Bangladesh rice. Bangladesh Journal of Scientific and Industrial Research, **10** (1/2), 26-31.
- E49 PANDEY, V. and PANDEY, N.D. (1977) Changes in chemical constituents of various maize varieties due to infestation caused by Sitotroga cerealella Olivier. Bulletin of Grain Technology, **5** (1), 27-30.
- E50 PANDEY, V. and PANDEY, N.D. (1978) Relation between the chemical constituents of damaged grains of maize varieties and losses caused by Sitotroga cerealella Olivier. Indian Journal of Entomology, **40** (3), 339-341.
- E51 PINGALE, S.V., KADKOL S.B., NARAYANARAO, M., SWAMINATHAN, M. and SUBRAHMANYAN, V. (1975) Effect of insect infestation on stored grain. II. Studies on husked, hand-pounded, milled raw rice and parboiled milled rice. Journal of the Science of Food and Agriculture, **8** (4), 512-516.

- E52 PUSHPAMMA, P. and REDDY, M.U. (1979) Physico-chemical changes in rice and jowar stored in different agro-climatic regions of Andhra Pradesh. Bulletin of Grain Technology, **17** (2), 97-108.
- E53 QASEM, S.A. and CHRISTENSEN, C.M. (1960) Influence of various factors on the deterioration of stored corn by fungi. Phytopathology, **50** (10), 703-709.
- E54 RICHARDS, O.W. and WALOFF, N. (1946) The study of a population of Ephestia elutella living on bulk grain. Transactions of the Royal Entomological Society, **97**, 253-298.
- E55 SAHARAN, G.S. and GUPTA, V.K. (1973) Influence of Aspergilli on soybean seeds in storage. Phytopathologische Zeitschrift, **78** (2), 141-146.
- E56 SANDS, L.D. and HALL, G.E. (1971) Damage to shelled corn during transport in a screw conveyor. ASAE Transactions, **14** (3), 584-585, 589.
- E57 SAUER, D.B. and CHRISTENSEN, C.M. (1966) Comparison of hard red spring and winter wheats in storage. Phytopathology, **56** (6), 619-623.
- E58 SAUER, D.B. and CHRISTENSEN, C.M. (1968) Germination percentage, storage fungi isolated from and fat acidity values of export corn. Phytopathology, **58** (10), 1356-1359.
- E59 SAUER, D.B. and CHRISTENSEN, C.M. (1969) Some factors affecting increase in fat acidity values in corn. Phytopathology, **59** (1), 108-110.
- E60 SAUL, R.A. (1967) Rate of deterioration of shelled corn. Iowa Farm Science, **22** (1), 21-23.
- E61 SAUL, R.A. and STEELE, J.L. (1968) Relation of mechanical damage to drying and storage time. Proceedings of Symposium on Grain Damage, Iowa State University. St Joseph, Michigan: American Society of Agricultural Engineers, pp. 11.01 - 11.03.

- E62 SAXENA, S.C. and VIR, S. (1977) Influence of moisture and temperature on the loss in weight in stored grains by khapra beetle. Bulletin of Grain Technology, **15** (3), 226-227.
- E63 SHARMA, S.S., THAPAR, V.K. and SIMWAT, G.S. (1979) Biochemical losses in stored wheat due to infestation of some grain insect pests. Bulletin of Grain Technology, **17** (2), 144.
- E64 SIMWAT, G.S. and CHAHAL, B.S. (1981) Effect of storage period and depth of stored grains on the insect population and resultant loss of stored wheat with farmers. Bulletin of Grain Technology, **18** (1), 35-41.
- E65 SINGH, D.P. and SHARMA, S.S. (1981) Studies on weight loss in different varieties of moong and mash during storage caused by Callosobruchus maculatus Fab. (Bruchidae: Coleoptera). Bulletin of Grain Technology, **19** (3), 194-197.
- E66 SINGH, D.P. and SHARMA, S.S. (1982) Studies on grain damage and germination loss caused by Callosobruchus maculatus Fab. in different varieties of moong and mash during storage. Bulletin of Grain Technology, **20** (1), 20-24.
- E67 SINGH, K., AGRAWAL, N.S. and GIRISH, G.K. (1974) Studies on the quantitative loss in various high-yielding varieties of maize due to Sitophilus oryzae. Labdev Journal of Science and Technology, Series B, **12** (1), 3-4.
- E68 SINGH, N.B., CAMPBELL, A. and SINHA, R.N. (1976) An energy budget of Sitophilus oryzae (Coleoptera: Curculionidae). Annals of the Entomological Society of America, **69**, 503-512.
- E69 SINHA, R.N. (1982) Food losses through energy transfer from cereal grains to stored produce insects. Food and Nutrition Bulletin, **4** (2), 13-20.
- E70 SINHA, R.N., WALLACE, H.A.H. and CHEBIB, F.S. (1969) Canonical correlations of seed viability; seed-borne fungi and environment in bulk grain ecosystems. Canadian Journal of Botany, **47** (1), 27-34.

- E71 SOWUNMI, O. (1978) The effect of insect infestation on cowpea Vigna unguiculata. 1. Chemical assay of nutrients. 15th Annual Report, Nigerian Stored Products Research Institute. Technical Report No. 4. pp. 43-47.
- E72 SRIVASTAVA, A.K. (1976) Physiological studies on soybean seed viability during storage and its practical applicability. Seed Research, **4** (1), 56-61.
- E73 TOQUERO, Z., MARANAN, C., BROWN, L. and DUFF, B. (1979) Assessing quantitative and qualitative losses in post-production systems. Grains Journal, **4**, 15-28.
- E74 U MAUNG MAUNG (1977) Shelling efficiency of rubber roll shellers. Working Papers of the FAO Action Oriented Workshop for Prevention of Post-Harvest Rice Losses, Alor Setar, Malaysia. March 12-30. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 388-392.
- E75 UN: FAO (1981) Action Programme for the Prevention of Food Losses. Development of Improved Grain Handling and Storage Facilities in the Sudan. Final Technical Report. Project PFL/SUD/002. Rome: FAO, 112pp.
- E76 VIDHYASEKARAN, P., SUBRAMANIAN, C.C. and GOVINDASWAMY, C.V. (1970) Production of toxins by seed-borne fungi and its role in paddy seed spoilage. Indian Phytopathology, **23** (3), 518-525.
- E77 WELLING, B. (1968) The influence of threshing damage on microflora and germination of barley during storage. Tidsskrift for Planteavl, **72** (4), 513-519.
- E78 WELLING, B. (1971) Fungus flora and germination power in mouldy grain before and after drying. Tidsskrift for Planteavl, **75**, 581-585.
- E79 WILCOX, J.R., LAVIOLETTE, F.A. and ATHOW, K.L. (1974) Deterioration of soybean seed quality associated with delayed harvest. Plant Diseases Reporter, **58** (2), 130-133.

E80 ZDARKOVA, E. and RESKA, M. (1976) Weight losses of groundnuts (Arachis hypogaea L.) from infestation by the mites Acarus siro L. and Tyrophagus putrescentiae (Schrank). Journal of Stored Products Research, **12** (2), 101-104.

FIELD ESTIMATES

PROVISIONAL ESTIMATES

- A 1 AHMED, C.R. (1978) Major insect pests of Pakistan. World Crops, **30** (3), 120-121.
- A 2 ANON. (1968) Report of the study group on the feasibility of pilot projects concerned with improved methods of harvesting, drying and storage of paddy and rice at farm level. Dacca: Agricultural Marketing Directorate, Government of East Pakistan, 56pp.
- A 3 ANON. (1970) Survey on problems of transportation, storage and distribution of foodgrains. Tokyo: Asian Productivity Organisation, 120pp.
- A 4 ARIF, A.G. and AHMAD, M. (1969) Some studies on the fungi associated with sorghum seeds and sorghum soils and their control. Part I. Flora of sorghum seeds and seed treatment. West Pakistan Journal of Agricultural Research, **7** (4), 102-117.
- A 5 BLATCHFORD, S.M. and HALL, D.W. (1963) Methods of drying groundnuts. I. Natural methods. Tropical Science, **5** (1), 6-33.
- A 6 BORCSOK, A. (1978) Analisis de los resultados de la encuesta de perdidas post-cosecha granos basios en la municipalidad de Brus Laguna, Departamento de Gracias a Dios, Del Ano Agricola. 1976-77. Report of Secretaria de Recursos Naturales. Tegucigalpa, Honduras: Secretaria de Recursos Naturales.
- A 7 CHAMBERLAIN, D.W. and GRAY, L.E. (1974) Germination, seed treatment and microorganisms in soybean seed produced in Illinois. Plant Diseases Reporter, **58** (1), 50-54.
- A 8 CHAMP, B.R. (1965) Investigation of peanut storage pests in Queensland. Queensland Journal of Agricultural Science, **22**, 227-257
- A 9 DICHTER, D. (1976) The stealthy thief. Ceres, **9**, 51-53, 55.

- A10 FAROUK, S.M. (1975) Probable losses in post-harvest period. How to minimise them. Proceedings of Workshop in Appropriate Technology. Dhaka: Bangladesh Agricultural Research Council, pp. 153-159.
- A11 GAISER, D. (1981) A brief summary of paddy loss in Indonesian Rice Post-Harvest System. Proceedings of the 4th Annual Workshop on Grains Post-Harvest Technology. Laguna, Philippines: South-East Asian Co-operative Post-Harvest Research and Development Programme, pp. 133-138.
- A12 GIRISH, G.K., JAIN, S.K. and KRISHNAMURTHY, K. (1974) Quality analysis of wheat available for procurement in a few Western U.P. markets during 1974. Bulletin of Grain Technology, **12** (1), 45-49.
- A13 KAMARI, A. and NOUR, D.M. (1977) Post-harvest handling of paddy in Malaysia. Working Papers of the FAO Action Oriented Field Workshop for Prevention of Rice Losses, Alor Setar, Malaysia, March 12-30. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 204-224.
- A14 KENNARD, C.P. (1981) Post-harvest problems in Guyana. In: Report of Post-harvest Losses Consultative Meeting, Caribbean, July 1981. Volume II. London: Commonwealth Secretariat, pp. 183-189.
- A15 KIM, M.H. (Ed.) (1969) The reduction of the loss of agricultural products. Research Report, Korean FAO Association, 80pp.
- A16 KOGA, Y. (1977) Rice post-harvest process in Japan. Working papers of the FAO Action Oriented Field Workshop for the Prevention of Post-Harvest Rice Losses, Alor Setar, Malaysia, March 12-30. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 340-351.
- A17 LALITHAKUMARI, D., GOVINDAWAMNY, C.V. and VIDHYASEKARAN, P. (1971) Isolation of seed borne fungi from stored groundnut seeds and their role in seed spoilage. Madras Agricultural Journal, **59** (1), 1-6.

- A18 MOHAMMED, N.H. (1981) Rice grain losses from KADA area (Malaysia). An over-view vis-a-vis traditional storage systems. Proceedings of 4th Annual Workshop on Grains Post-harvest Technology. Laguna, Philippines: South-East Asian Co-operative Post-Harvest Research and Development Programme, pp. 115-131.
- A19 OILSEEDS CONTROL BOARD (1976) Twenty-fourth annual report of the Oilseeds Control Board for the year 1st July 1975 - 30th June 1976. Pretoria, South Africa: Oilseeds Control Board, 111pp.
- A20 PAOMA, M.C. and SHARANGAPANI, M.V. (1957) Studies on rat control. Food Science (India), **6**, 32-33.
- A21 SOEMANGAT, M. and SOEHARGO (1981) Survey of post-production practices among rice farmers in a densely populated farming area. Proceedings of 4th Annual Workshop on Grains Post-Harvest Technology. Laguna, Philippines: South-East Asia Co-operative Post-Harvest Research and Development Programme, pp. 49-59.
- A22 UNITED STATES DEPARTMENT OF AGRICULTURE, CENTRAL ACCOUNTING OFFICE (1977) Food waste: an opportunity to improve resource use. Report CED 77-118. Washington D.C.: USDA, General Accounting Office, 75pp.

SUPPORTED ESTIMATES

- B 1 AFRICAN RURAL STORAGE CENTRE (1975) Loss assessment on maize in farm stores - Ghana. Report TF/AFR/45(DEN) of the African Rural Storage Centre (FAO), IITA, Ibadan, 3pp.
- B 2 AGANON, T.M. (1981) Studies on rat damage in Nueve Ecji rice mill warehouses. Central Luzon State University. Scientific Journal (Philippines), **2** (2), 19-30.
- B 3 AGRAWAL, R.K., SINGH, K.N. and SRIVASTAVA, P.K. (1971) Studies on the assessment of storage losses in wheat due to stored grain insect pests in Himanchal Pradesh. Bulletin of Grain Technology, **19** (3), 198-200.

- B 4 ANON. (1976) Survey of post-harvest practices. Bangkok: Thailand Department of Agriculture, Agricultural Engineering Division, 103pp.
- B 5 ANON. (1981) A study of farm level grain storage practices in Nepal. Report of the Agricultural Projects Services Centre. Kathmandu: Agricultural Projects Services Centre, 120pp. + 3 annexes.
- B 6 ANON. (1981) An assessment of farm level storage losses in maize in six panchayats of Palpa district. Report to the Tinau Watershed Project. HMG/SATA. Katmandu: NEW ERA (P) Ltd., 19pp.
- B 7 BADAN URUSAN LOGISTIK. (1976) Rice post harvest technology. Progress Report 11 Badan Urusan Logistik. Jakarta, Indonesia: Badan Urusan Logistik, 26pp.
- B 8 BAINS, S.S., BATTU, G.S. and ATWAL, A.S. (1976) Distribution of Trogoderma granarium Everts and other stored grain insect pests in Punjab and losses caused by them. Bulletin of Grain Technology, **14** (1), 18-29.
- B 9 BARAK, A.V. and HAREIN, P.K. (1981) Losses associated with insect infestation of farm stored shelled corn and wheat in Minnesota. Miscellaneous Publication 12, University of Minnesota, 94pp.
- B10 BORSODORF, R. (1975) Grain storage and handling facilities in Panama and evaluation: proposed agricultural marketing capital assistance programs. Grain Storage Processing and Marketing Report 55. Food and Feed Grain Institute, Kansas State University, iv + 71pp.
- B11 CASWELL, G.H. (1981) Damage to stored cowpea in the Northern part of Nigeria. Samaru Journal of Agricultural Research, **1** (1), 11-19.
- B12 CHATURVEDI, G.C. (1974) Damage by rats and their control. Pesticides (India), **8** (10), 33-42.
- B13 CHAUDHRY, M.A. (1979) Wheat losses at threshing and winnowing stages. Agricultural Mechanisation, **10** (4), 67-70.

- B14 CHAUDHRY, M.A. (1980) Food grain losses in Pakistan. 6 volumes. Faisalabad: University of Agriculture, li + 574 pp.
- B15 DHALIWAL, G.S., BAKSHI, A.S. and BHATNAGAR, A.P. (1976) Quality analysis of wheat, maize and paddy arrivals in the Ludhiana grain market. Journal of Research, Punjab Agricultural University, **13** (4), 404-409.
- B16 GAISER, D. and ESMAY, M. (1981) Traditional rice harvest loss and labour values in Indonesia. ASAE Transactions, **24** (5), 1162-1166.
- B17 GUGGENHEIM, H. (1978) Of millet, mice and men: traditional and invisible technology solutions to post-harvest losses in Mali. World Food Pest Losses and the Environment. (Ed. D. Pimental) Boulder, Colorado: Westview Press, pp. 109-162.
- B18 GUNARTO, B. (1978) Indonesia. Tropical Stored Products Information, **36** (Special issue: Papers presented at the Tropical Products Institute Seminar on Post-Harvest Grain Losses), pp. 25-26.
- B19 HAYS, H.M. (1975) The storage of cereal grains in three villages in Zaria Province, Northern Nigeria. Savanna, **4** (2), 117-123.
- B20 HOPPE, T., RABOUD, G., DE BREVE, M., SIEBER, J., PERDOMO, J. and AVANTHAY, R. (1983) Proyecto post cosecha. A practical approach to reduce post-harvest losses of basic food grains at the small and medium farm level in Honduras. Proceedings of Third International Working Conference on Stored Products Entomology, October 23-28, Manhattan, Kansas, USA, p. 276.
- B21 IDUSOGIA, E.O., OLATUNBOSUN, D. and OLAYIDE, S.O. (1973) Implications of agricultural wastes in Nigerian nutrition and economy. Bulletin of Rural Economics and Sociology, **8** (2).

- B22 INDIA: ADMINISTRATIVE STAFF COLLEGE, HYDERABAD (1978) All India grain storage and distribution. Supporting Study No. 12. Post-harvest Grain Losses. (Study sponsored by the Department of Food, Ministry of Agriculture and Irrigation) Hyderabad: Administrative Staff College, 77pp. + appendices.
- B23 KHALIL, A.A.R. (1975) Estimation of losses in stored agricultural products at Port Sudan. Plant Protection Administration Bulletin, Khartoum North No. 2.
- B24 KHARE, B.P., SINGH, K.N., CHAUDHARY, R.N., SENGAR, C.S., AGRAWAL, R.K. and RAI, P.N. (1976) Insect infestation and quality deterioration of grain. I. Germination, odour and palatability in wheat. Indian Journal of Entomology, **36** (3), 194-199.
- B25 MERTENS, A. and AUTRIQUE, A. (1979) Contribution a l'étude de la conservation des denrées alimentaires en milieu rural au Burundi. Report Annex 1. - R.A. Technique 1977, Institut des Sciences Agronomiques du Burundi, 46pp.
- B26 NYANTENG, V.K. (1972) The storage of foodstuffs in Ghana. Tropical Publications Series No. 18. Legon, Ghana: Institute of Statistical, Social and Economical Research, vii + 92pp.
- B27 PFOST, H.B. and DAHL, R. (1978) Marketing, transportation and storage of domestic and imported wheat in Bolivia. Report, Food and Feed Grain Institute, Kansas State University, Manhattan, Kansas, USA, 31pp.
- B28 RAMASIVAN, T., KRISHNAMURTHY, K. and PINGALE, S.V. (1986) Studies on the preservation of foodgrains in rural storage. Part II. Storage of grain in villages near Hapur. Bulletin of Grain Technology, **6** (2), 69-75.
- B29 RANA, P.N. and GANESH, K.C. (1976) A review of entomological problems of stored grain with special emphasis on wheat. Report, Ministry of Agriculture, Entomology Division. Khumaltar, Khatmandu.

- B30 RAWNSLEY, J. (1969) Crop Storage. Technical Report No. 1.
(PF:SF/GHA/7). Accra, Ghana: FAO Food Research and Development
Unit.
- B31 SETTLE, W. (1978) Report on the survey and analysis of government
millet stores in the 5th Region of Mali. Report of the Smithsonian -
Peace Corps Environmental Program. Bamako: Smithsonsian - Peace
Corps Environmental Program, 19pp.
- B32 SIGNHAKOWINTA, V. (1977) Rate of losses and wastage in agricultural
production: rice production in Central Region 1976. Research Report
201. Bangkok: Department of Business Administration, Faculty of
Economics and Business Administration, Kasetart University, 7pp.
- B33 TENNE, F.D., PRASARTSEE, C., MACHADO, C.C. and SINCLAIR, J.B. (1974)
Variation in germination and seed-borne pathogens among soybean seed
lots from three regions in Illinois. Plant Diseases Reporter, **58**
(5), 411-413.
- B34 TYLER, P.S. (1965) Insects infesting farm stores - surveys.
In: Pest Infestation Research. London: Agricultural Research
Council, p. 23.
- B35 UN:FAO (1981) Reduction of post-harvest losses of rice in on-farm
operations and primary marketing. Storage losses of rice at farm
level in Liberia. Report PFL/LIB/001. Rome: FAO.
- B36 VIMALA, V. and PUSHPAMMA, P. (1983) Storage quality of pulses
stored in three agroclimatic zones of Andhra Pradesh. 1. Qualitative
changes. Bulletin of Grain Technology, **21** (1), 79-82.

COMPLETE ESTIMATES

- C 1 BHARDWAJ, A.K., SRIVASTAVA, P.K. and GIRISH, G.K. (1977) Assessment of storage losses in wheat due to insect damage in Punjab. Bulletin of Grain Technology, **15** (2), 126-129.
- *C 2 BOXALL, R.A. and DORTBUDAK, N. (1985) Prevention of post-harvest losses in Central Anatolia, Turkey. Storage loss assessment. Final Technical Report AG:GCPP/TUR/027/NET. Rome: FAO, 102pp.
- *C 3 BOXALL, R.A. and GILLETT, R. (1982) Farmer level storage losses in Eastern Nepal. London: Report of the Tropical Products Institute, G157, vi + 26 pp.
- *C 4 BOXALL, R.A., GREELEY, M., TYAGI, D.S., LIPTON, M. and NEELAKANTA, J. (1978) The prevention of farm level storage losses in India. A social cost benefit analysis. IDS Research Report. Brighton: Institute of Development Studies, University of Sussex, 239pp.
- *C 5 CALVERLEY, D.J.B., CREE, T.J. and DENDY, D.A.V. (1977) Field losses in the second crop harvest in the Muda Area of Malaysia. Working Papers of the FAO Action Oriented Field Workshop for Prevention of Post-Harvest Rice Losses, Alor Setar, Malaysia. March 12-30. (Eds. Ismail Shamsudin and Fatimah Abdullah) Kuala Lumpur: Research and Planning Division, Lembaga Padi dan Beras Negara, pp. 273-289.
- *C 6 DE BREVE, M., RABOUD, G., SIEBER, J., PERDOMO, J.A. and VALESQUEZ, J.E. (1982) Proyecto Post-Cosecha: informe sobre los primeros resultados. Tegucigalpa, Honduras: Ministerio de Recursos Naturales, Co-operation Suiza al Desarrollo, 126pp.
- C 7 DE LIMA, C.P.F. (1979) The assessment of losses due to insects and rodents in maize stored in Kenya. Tropical Stored Products Information, **38**, 21-26.
- C 8 DE LIMA, C.P.F. (1982) Strengthening the food conservation and crop storage section (Ministry of Agriculture and Co-operatives - Swaziland). Field Documents and Final Technical Report. Project PFL/SWA/002. Rome: FAO.

- C 9 DOHAREY, R.B., SRIVASTAVA, P.K. and GIRISH, G.K. (1975) Studies on the assessment of losses of wheat in Punjab. Bulletin of Grain Technology, **13** (3), 159-161.
- C10 GARG, H.O., SOVARANSINGH and VARMA, B.K. (1979) Studies on losses in foodgrains in threshing yards due to birds and rodents around Hapur. Bulletin of Grain Technology, **17** (3), 216-221.
- C11 GOLOB, P. (1981) A practical assessment of food losses sustained during storage by smallholder farmers in the Shire Valley Agricultural Development Project Area of Malawi 1978-79. London: Report of the Tropical Products Institute, G154, vi + 47pp.
- C12 GOLOB, P. (1981) A practical appraisal of on-farm storage losses and loss assessment methods in Malawi. I. The Shire Valley Agricultural Development Area. Tropical Stored Products Information, **40**, 5-13.
- C13 GOLOB, P. (1981) A practical appraisal of on-farm storage losses and loss assessment methods in Malawi. 2. The Lilongwe Land Development Programme Area. Tropical Stored Products Information, **41**, 5-11.
- C14 GREELEY, T.M., BOXALL, R.A. and NEELAKANTHA, J. (1977) Size and distribution of costs and benefits of farm level rice storage improvements in Andhra Pradesh, India. Interim Project Report, September 1974 - March 1976. Brighton: Institute of Development Studies, University Sussex, 26pp.
- C15 GREELEY, M. and RAHMAN, S. (1980) Wet season post-harvest food losses. Dhaka: Report of the Bangladesh Council of Scientific and Industrial Research, 22pp.
- C16 HALLIDAY, D. (1976) Build up of free fatty acid in Northern Nigerian groundnuts. Tropical Science, **9** (4), 211-237.
- C17 HERNANDEZ, A. and DRUMMOND, D.C. (1984) A study of rodent damage to food in some Cuban warehouses and the cost of preventing it. Journal of Stored Products Research, **20** (2), 83-86.

- C18 HODGES, R.J., DUNSTAN, W.R., MAGAZINI, I. and GOLOB, P. (1983) An outbreak of Prostephanus truncatus (Horn) (Coleoptera: Bostrichidae) in East Africa. Protection Ecology, **5**, 183-194.
- C19 HUQ, A.K.F. (1980) Some estimates of farm-level storage losses in Bangladesh. Tropical Stored Products Information, **39**, 5-12.
- C20 HUQ, A.K.F. and GREELEY, M. (1980) Rice in Bangladesh: an empirical analysis of farm level food losses in five post production operations Proceedings of Third Annual Workshop on Grains Post-Harvest Technology. Laguna, Philippines: South-East Asia Co-operative Post-Harvest Research and Development Programme, pp. 245-262.
- C21 LA GRA, J., MARTINEZ, E. and MARTINEZ, J.F. (1982) Identificacion, evaluacion y reduccion de perdidas de post-cosecha. Arroz en la Republica Dominicana. Publicacion Miscelanea IICA 358. Santo Domingo, Dominican Republic: Instituto Interamericana de Co-operacion para la Agricultura, 129pp.
- C22 ROWLEY, J.Q. (1984) An assessment of losses during handling and storage of millet in Mali. Tropical Stored Products Information, **47**, 21-23.
- C23 TOQUERO, Z., MARANAN, C., BROWN, L. and DUFF, B. (1974) Assessing quantitative and qualitative losses in post-production systems. Grains Journal (Philippines), **IV**, 15-28.
- C24 TOQUERO, Z., MARANAN, C., EBRON, L. and DUFF, B. (1976) An empirical assessment of alternate field level rice post production systems in Nueva Ecija, Philippines. International Rice Research Institute Paper 76-03AE. Laguna, Philippines: International Rice Research Institute, 17pp. + 17 tables.
- C25 TYLER, P.S. (1981) Report on a survey of grain losses. Action Programme for Prevention of Food Losses, Cyprus. Report AG/PFL/CYP/001. Rome: FAO, 10pp.

APPENDICES

Table 1
Experimental work: cause of loss cross-referenced by commodity

Commodity	Cause			
	Biological factors		Physical factors	
	Insects and mites	Microbiological	Handling	Environmental
Cereals				
General	E4 E69	E26 E78		
Maize	E1 E5 E7 E16 E22 E36 E38 E40 E49 E50 E62 E67	E1 E5 E16 E34 E41 E42 E53	E56 E58 E59 E61	E11 E39 E43 E60
Paddy/rice	E5 E13 E40 E51	E5 E12 E20 E21 E28 E76	E8 E31 E48 E73 E74	E6 E28 E35 E39 E52
Sorghum/millet	E40 E46 E62 E75	E10 E42 E44 E75		E43 E52 E75
Wheat	E15 E23 E36 E45 E46 E54 E62 E64 E65 E68	E9 E32 E42 E70		E3 E70
Others		E29 E77		E77
Pulses				
General		E26		
<u>Vigna</u> sp. (cowpeas, etc.)	E17 E71			
<u>Phaseolus</u> sp. (beans, etc.)	E2 E65 E66			
<u>Cicer</u> sp. (grams, etc.)	E14 E17 E19 E24			
Others	E19 E65 E66	E25 E27		
Groundnuts	E30 E80	E33		
Other oilseeds	E36	E18 E37 E47 E55 E79	E79	E11 E72

Table 2

Field estimates: geographical region cross-referenced by commodity

Commodity	Geographical region							
	Europe and Mediterranean	Australasia	Americas Central, South, West Indies		Africa West East, Central, Southern		Asia Indian Subcontinent Elsewhere	
Cereals								
General			A6 B10		A9	B23	A1 A4 A20 B12 B22	A2
Maize			A14 B20 C6	B9	B1 B17	B25 C7 C8 C11 C12 C13 C18	B5 B6 B14 B15 B22 C3	
Paddy/rice			A6 C21		B35		A2 A3 A10 B5 B14 B15 B22 C3 C4 C10 C14 C15 C19 C20	A2 A11 A13 A15 A16 A18 A21 B2 B7 B16 B18 B22 C5 C23 C24
Sorghum/millet			B20 C6		B17 B19 B31 C22	C11 C12 C13	A4 B5 B14 B15 B22	
Wheat	C2 C25		B27	B9	B17		A12 B3 B5 B8 B13 B14 B15 B22 B24 B28 B29 C1 C3 C9	
Others	B34 C25				B19			
Pulses								
General							B22	
<u>Vigna</u> sp. (cowpeas, etc.)			A14		B11			
<u>Phaseolus</u> sp. (beans, etc.)			A6 B20 C6		B30	B25	B36	
<u>Cicer</u> sp. (grams, etc.)							B22 B36	
Other pulses						B25	B36	
Groundnuts		A5 A8	A14	A7	C16	A19 B25 C13	A17	
Other oilseeds				B33		A19		
General		A5	C17	A22	B21 B26		A20 B22	

Table 3

Field estimates: cause of loss cross-referenced by commodity

Commodity	Cause			
	Biological factors			Physical factors
	Insects and mites	Vertebrates	Microbiological	Handling/processing
Cereals				
General	A1 A2 A9 B22 B24	A1 A2 A9 A20 B24	A2 A9 B22	A2 B22
Maize	B1 B5 B6 B9 B10 B14 B15 B20 B22 B30 C3 C6 C7 C8 C11 C12 C13 C18	B5 B10 B14 B20 B22 C3 C7 C8	B1 B5 B13 B14 B20 C3 C6	A6 B10 B14 B22
Paddy/rice	A3 A10 A18 B4 B5 B14 B15 B18 B22 B35 C3 C4 C14 C19 C20 C21 C24	A3 A10 A18 B2 B5 B10 B14 B18 B22 B35 C3 C4 C14 C19 C20	A10 B4 B5 B14 B18 B21 C3 C4 C14 C19 C20	A3 A6 A10 A11 A13 A15 A16 A18 A21 B4 B7 B10 B14 B16 B18 B22 B32 C5 C15 C20 C21 C23 C24
Sorghum/millet	B14 B17 B20 B32 C6 C11 C12 C13 C22	B14 B17 B20 C6	A4 B14 B20 C6	B14 C22
Wheat	A12 B3 B5 B8 B9 B14 B15 B22 B24 B28 B29 C1 C2 C3 C9 C25	B5 B14 B22 B29 C2 C3 C10	A12 B5 B14 B22 C2 C3	B13 B14 B22 B27
Others	B34 C25		B17	
Pulses				
General	B22	B22	B22	B22
<u>Vigna</u> sp. (cowpeas, etc.)	B11			
<u>Phaseolus</u> sp. (beans, etc.)	B10 B20 B25 B30 B36 C6	B10 C6		A6 B10
<u>Cicer</u> sp. (grams, etc.)	B22 B36	B22	B22	B22
Others	B25 B36			
Groundnuts	A8 B23 C13 C16	B23	A17	A5 A14 A19
Other oilseeds			A7 A34	A19
General	B22 B26	B12 B22 B26 C17	B22 B26	A22 B21 B22

Table 4

Field estimates: type of loss cross-referenced by commodity

Commodity	Type of loss				
	Quantity	Quality	Nutrition	Germination	Unspecified
Cereals					
General	A2 B22	B22	B22	B22	A9 B23
Maize	A2 B1 B5 B6 B10 B14 B15 B19 B20 B22 B25 C3 C6 C7 C8 C11 C12 C13 C18	B2 B14 B15 B22	B14	B14 B22	A14 B10
Paddy/rice	A2 A3 A6 A10 A11 A13 A15 A16 A18 A21 B2 B4 B5 B7 B10 B14 B15 B16 B18 B22 B32 B35 C3 C4 C5 C14 C15 C19 C20 C21 C23 C24	A13 A21 B14 B15 B22 C4 C5 C15 C19 C20 C21 C23 C24		C4	B32
Sorghum/millet	B17 B19 B20 C6 C13 C22	B17 B31		A4	
Wheat	B3 B5 B8 B13 B14 B15 B22 B27 B28 B29 B34 C1 C2 C3 C9 C10	A12 B14 B15 B22 B24 C2	B14	B14 B22 B24	
Others	B19 B34 C25	B19			
Pulses					
General	B22	B22	B22	B22	
<u>Vigna</u> sp. (cowpeas, etc.)	B11				A14
<u>Phaseolus</u> sp. (beans, etc.)	A6 B10 B20 B25 B30 B37 C6	B37			
<u>Cicer</u> sp. (grams, etc.)	B22 B36	B22 B36	B22	B22	
Other pulses	B25 B36	B36			
Groundnuts	A5 A8 B23 C13	C16		A17	
Other oilseeds	A19			B33	
General	A3 A20 A22 B12 B21 B22 B26 C17	A20 B12 B26 C17			

Table 5

Field estimates: level within post-harvest system cross-referenced by commodity

Commodity	Level			
	Farm	Trader/co-operative	Large scale	Unspecified
Cereals				
General	A2 A9 A10 B23	A2 B22	A2 B22	A1
Maize	A6 B1 B5 B6 B9 B14 B19 B20 B22 B25 B29 B30 C3 C6 C7 C8 C11 C12 C13 C18	B14 B22	B14 B22	A14 B10
Paddy/rice	A3 A6 A10 A11 A13 A15 A16 A18 A21 B4 B5 B7 B14 B16 B18 B22 B32 B35 C3 C4 C5 C14 C15 C19 C20 C21 C23 C24	A13 B14 B18 B23 C23 C24	A13 A15 A16 B2 B14 B18 B22 C21 C23 C24	
Sorghum/millet	B17 B18 B19 B20 C6 C11 C13		B31 C22	A4
Wheat	B3 B5 B8 B13 B14 B22 B24 B27 B28 B29 C1 C2 C3 C9 C25	B14 B15 B22 C11 C25	B14 B22 B27 C25	A12
Others	B19 B34 C25	C25	C25	
Pulses				
General	B22	B22	B22	
<u>Vigna</u> sp. (cowpeas, etc.)				A14 B11
<u>Phaseolus</u> sp. (beans, etc.)	A6 B20 B25 B30 B36 C6			B10
<u>Cicer</u> sp. (grams, etc.)	B22 B36	B22	B23	
Other pulses	B25 B36			
Groundnuts	A5 C13		A8 B23 C16	A17
Other oilseeds			A19	A7 B33
General	A22	A22	A22 C17	B12 B21 B26

Table 6

Field estimates: activity in post-harvest system cross-referenced by commodity

Commodity	Activity				
	Harvesting	Threshing, drying, handling, processing	Storage	Transport	Unspecified
Cereals					
General		B23	A2 A9 A10 B23	A2 B23	A1
Maize	A6 B14	A6 B14 B15 B20 B22	A6 B1 B5 B6 B9 B10 B14 B19 B20 B22 B29 C3 C6 C7 C8 C11 C12 C18	B14 B21	A14
Paddy/rice	A3 A6 A11 A13 A15 A21 B7 B14 B16 B18 B32 C5 C15 C19 C20 C21 C23 C24	A2 A6 A10 A11 A13 A16 A21 B4 B7 B14 B15 B16 B18 B22 B32 C5 C7 C10 C15 C19 C20 C21 C23 C24	A2 A6 A10 A15 A16 A18 B1 B2 B4 B5 B7 B14 B18 B22 B35 C3 C4 C14 C19 C20 C21 C23 C24	A13 A16 B4 B14 B18 B22 B32 C21	
Sorghum/millet		B22	A4 B17 B18 B20 B31 C6 C11 C12 C22		
Wheat	B14	B13 B14 B15 B22 B27 C10	A4 A12 B3 B5 B8 B9 B14 B15 B22 B24 B27 B28 B29 C1 C2 C3 C9 C25	B14 B22 B26	
Other			B19 B25 B34		
Pulses					
General		B22	B22	B22	
<u>Vigna</u> sp. (cowpeas, etc.)			B11		A14
<u>Phaseolus</u> sp. (beans, etc.)	A6	A6 B20	A6 B10 B22 B26 B32 B37 C7		
<u>Cicer</u> sp. (grams, etc.)		B22	B22 B36	B22	
Other pulses			B25 B36		
Groundnuts		A5	A8 A17 B23 C13 C16		A14
Other oilseeds			A7 B34		A19
General		A22	A22 C17	A22	B12 B21 B26

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