Problems facing agriculture in Queensland

Department of Primary Industries, Queensland

Queensland's agriculture is as diverse as its climate. Most primary production occurs in tropical and subtropical environments although significant livestock industries are based on temperate pastures. Temperate field and horticultural crops are also significant.

Field crops and pastures

The primary production systems utilized on farms have largely developed from temperate climates. These systems have been and are being adapted to the local environments but the recent dramatic expansion in primary industries in the State, particularly in grain cropping, has highlighted the instability of the present farming systems in tropical and subtropical environments.

Most of Queensland, excluding the south-east corner and Cape York, experiences more than 10 per cent greater variability in rainfall than is normal by world standards (1). Production systems have developed which are essentially opportunistic and there is considerable year to year variation in areas planted and in production. The highly variable rainfall has led to irrigation developments to stabilize production and also to significant soil erosion and land degradation in both cropping and pastoral industries.

It is this background that has identified the major issue confronting Queensland's agriculture as the development of production systems which maintain or improve productivity while stabilizing the land resource.

Development of such production systems has been slow and faltering largely because they are so complex that only some of the elements involved have been identified. This complexity demands that research workers, extension officers and farmers integrate their skills to address the components already identified and to identify those presently unrecognised.

Development of these systems is confounded by soil type, topography, climate, crop/pasture adaptation, farm machinery, insects, diseases and weeds, etc.

Considerable attention is being directed at soil surface management. A conservation cropping system has been developed for the friable red earths of the South Burnett (2). This system involves sowing crops in a preferred sequence with reduced tillage under stubble mulch conditions using modified planting and tillage machinery.

Surface management studies require further expansion, particularly in the areas of rainfall runoff and soil loss, crop establishment and stubble breakdown and management, pest control and machinery design. Such studies are required for a range of crops and crop stubbles, soils and environments.

The recent rapid expansion in grain growing in central and south-west Queensland has been in what were traditionally grazing areas. The integration of grazing and cropping systems into stable and productive whole farm management systems is urgent. A modelling approach has been used to integrate pastures, forage crops and supplementary feeds in beef production systems (3). Further development of this approach may be useful in developing systems with both grazing and cropping options.

Soil salinity poses a major threat to the maintenance of stable production systems. Aspects requiring immediate attention include rising saline water tables and saline irrigation water in irrigated soils, and saline seepage development and scalding under dryland conditions.

Emphasis on more traditional lines of research, including crop and pasture genetic improvement, weed control, plant nutrition and plant and crop physiology is essential to underwrite the development of more

productive agricultural systems. There is enormous scope for improvement in these areas in tropical and subtropical agriculture.

While the suite of field crops available to Queensland farmers is large - some 11 field crops are presently subject to major crop improvement programmes - the identification and development of new crops will increase the options for farming systems. Of considerable importance would be the development of dryland summer and winter legume crops adapted to the expanding grain-growing districts. Guar and chickpeas are currently being assessed.

In the better-watered. higher-rainfall areas, cassava shows considerable promise but much research is required to develop stable farming systems involving this crop.

In the animal industries, areas requiring considerable attention include ecological studies, particularly in arid and semi-arid zone communities, development of adapted legumes in all environments but particularly on brigalow and other clay soils, and the pasture plant/animal interface.

Horticultural crops

The range of climatic conditions in Queensland allows for the production of an extremely large number of horticultural crops. This range extends from the Granite Belt region in the south where the temperate fruit industry is located to the wetter northern areas where tropical fruits are produced. Most of the industries are concentrated along the coastal strip. While the south-east zone is the most significant, there has been considerable development of horticultural industries in northern areas and this trend is expected to continue.

The Queensland environment allows for the production of many crops at times when southern producing areas are limited by unfavourable climatic conditions. Despite the highly perishable nature of many horticultural products, a considerable proportion of the State's production is transported to distant markets.

The production of horticultural crops in subtropical and tropical areas frequently necessitates the use of varieties that have been developed for more temperate areas. This is particularly the case with many of the vegetable crops. Extremes of temperature and rainfall in these areas often intensify the pest and disease pressure on these crops and they are found wanting. The lack of varieties with adaptability to these environments and with resistance to pests and diseases is a major problem. In the Dry Tropics region, two serious soil-borne tomato diseases, which are not known problems overseas and for which the only practical control is varietal resistance, are causing concern. Known sources of resistance are very limited.

Intensive cropping in these areas under the prevailing climatic conditions creates problems in plant and soil management and problems of soil degradation are ever-present. Management strategies are required to assist in maximising production while maintaining soil fertility and conserving available resources.

The understanding of management and cropping control in most tropical and subtropical tree fruits is limited as these crops have not benefitted from the levels of research that have been directed to temperate tree fruits. Many of the fruits in production suffer from serious disease problems, a limited range of varieties and rootstocks, low yields and susceptibility to physiological disorders. In addition, there is scope from both the environmental and marketing viewpoints for the expansion of the range of species produced. Some lesser known crops such as litchi, Tongan, guava and persimmon have potential if suitable varieties and cropping systems can be developed. Major crops such as coffee also have potential if management and mechanised production systems can be developed.

A number of indicators suggest that salinity problems are becoming more serious, apart from those of the extension of irrigation in areas of known poor-quality water. Problems are also being encountered with some aquifers where there is a serious deterioration in water quality during drought as a result of high

levels of water withdrawal. Extensive clearing in upper catchments has in some areas resulted in increased erosion, landslips and silting of stream beds. In some cases where difficulty is experienced in preparing seed beds for direct seeding vegetable crops, observations suggest that sodicity is involved.

While effective pest management is a requirement for all crops, this is particularly the case with horticultural crops where any damage of the product results in downgrading. A significant proportion of production costs is invested in pesticide application yet results are often variable. The identification of causes of low pest management efficiency is usually difficult as biological, physical, chemical and mechanical aspects are involved.

Post-harvest handling and distribution costs account for a very high percentage of the final price paid by the consumer for horticultural produce. In addition, losses of produce and downgrading due to poor post-harvest technology add greatly to the cost of horticultural products.

Maintenance of quality by rapid removal of field heat with efficient refrigeration and optimum storage and transport methods have made important contributions to this problem. There is also considerable scope for developments in packaging technology and of handling and transport systems to minimise product damage. An integrated packaging and marketing system, including rationalisation of the number of one-trip packages available to facilitate pallet handling and efficient cooling, the greater use of returnable packages, and the development of mechanised handling systems would address many of the problems now seen in the marketing of horticultural crops.

1. Lloyd, P.L. (1982). Qd. Yearbook (in press).

2. Bateman, R.J. and Rowlings, R.W. (1980). Qd. Agric. J., 106: 3.

3. McKeon, G.M., Rickert, K.G. and Ash, A.J. (1982). Aust. Soc. Anim.Prod. Conf., Brisbane.