1995 HIGHER SCHOOL CERTIFICATE EXAMINATION

AGRICULTURE

The total number of candidates presenting for Agriculture in 1995 was 2465, of whom 2079 presented for 2/3 Unit and 386 for 3 Unit.

2/3 UNIT (COMMON)

Portions in italics are typical of either low or high scoring types of responses to the questions.

Section I

Question 1

No marks were awarded for naming the farm product studied.

(a) (i) The majority of candidates were able to name **FOUR** inputs needed to produce their specific farm product.

A typical example of a high scoring response for beef was:

1.	*supplementary feed*	e.g. *stored grain*
2.	*drench*	e.g. *Ivomec*
3.	*semen*	e.g. *imported Hereford*
4.	*hormone growth promotants*	e.g. *Ralgro*

NOTE: Examples such as those given here were not required in order to gain full marks for the question. Students are encouraged, however, to give specific examples where possible.

Some candidates still confuse inputs and processes or fail to relate the inputs to the farm product named.

(ii) Most students were able to name, but could not describe, two processes that can add value to their specific farm product, e.g. *butchering, selective breeding.*

Higher scoring responses included a description of the process, e.g. *selective breeding to improve marbling in beef and butchering dressed carcasses to market requirements.*

The poorer responses showed that students did not understand the term *processes* and gave *inputs* instead.

(b) (i) The majority of candidates were able to state an example of feedback from market to farm.

In high scoring responses candidates selected feedbacks which related to the stated products, e.g. *`kill sheets' (chiller assessment) from abattoir to farm.*

(ii) Those who were able to give a realistic feedback link from the consumer to the farmer gained full marks.

Some high scoring candidates recognised the fact that the feedback for their product from consumer to farmer might well be indirect *through the market place or the media, e.g. taste - shown by the preference for grainfed, marbled beef in the Japanese market.*

Many candidates who scored no marks made up unrealistic feedback links, e.g. *complaining by writing to farmers about milk they purchased which was `off'.*

(iii) This question was generally well answered. The majority of candidates successfully gave a feedback example from consumer to market.

In the best responses students identified a relevant feedback link which suited the stated product, e.g. *AMLC supermarket surveys*.

In low scoring responses candidates failed to provide relevant or realistic *consumer to market* feed back.

(iv) Here the specific feedback example selected should have been clearly stated.

The best responses clearly related feedback examples to improving the on-farm decision-making process, e.g. *AMLC supermarket surveys give a*

clear indication of domestic demand for leaner meat. A farmer could change his feeding or breeding program to produce leaner carcasses.
The best candidates, finding it difficult to answer this question in the space provided, wrote in the space above and below the lines. Although this practice is not recommended, wherever possible all of the response from a candidate was marked.

Lower scoring responses did not describe how their specific feedback example could be used to improve decision-making on the farm.

(c) (i) Although the majority of candidates were able to state ONE market specification for their nominated farm product, not all could state why it is important for the market.

The best candidates clearly stated why their chosen market specification was important, e.g. *Marbled beef because the Japanese market buys and pays premium prices for marbled beef.*

In low scoring responses candidates selected generalised market specifications only, e.g *quality*, and then had difficulty in relating it to its importance in the market place.

(ii) Most candidates were able to describe one management decision a farmer could make to help the farm product meet the stated specification.

High scoring responses described *feedlotting* and *selection of breeds to produce marbled beef* to help the farm product meet the stated specification.

In poorer responses students stated only the management practice, failing to link the practice with the market specification.

Question 2

(a) The majority of candidates successfully outlined an improvement in agricultural production, e.g. *AI, genetic engineering, hormonal treatments*.

The best candidates successfully related scientific experimentation to their chosen improvement, e.g. *poultry nutrition trials investigated protein levels for layers and found 14% to be the optimum*.

A number of students, however, were unable to relate this improvement in agricultural production to specific scientific experimentation, e.g. *AI used to improve milk production*.

(b) The majority of candidates mentioned a problem that has resulted from the application of scientific knowledge to an agricultural production system, e.g. *overuse of chemicals, adverse effects of biological control (cane toads), gene pool reduction and soil degradation due to impact of heavy machinery*.

The highest scoring candidates were able to describe in detail the impact of the problem mentioned on the agricultural production system, e.g. overuse of inorganic fertilisers such as superphosphate, nitram leaching into water systems resulting in pollution, algal bloom, etc.

(c) The majority of students were able to state how land management practices used since European settlement have resulted in erosion, e.g. *overgrazing, over-cultivation, excessive irrigation.*

The best candidates explained how each of these management practices have accelerated erosion, e.g. *over-cultivation has led to the breakdown of soil structure and the destruction of peds enabling soil to be exposed to wind and water, e.g. rill/sheet erosion*.

(d) Most candidates responded to this question well, suggesting two changes wrought by drought on both rural and urban communities:

e.g. Rural Communities
decreased income, decreased productivity, rise of social problems, unemployment, rural migration to the cities, bankruptcy and increased debt.

e.g. Urban Communities
Water restrictions, decline in quality and quantity of produce, increased prices, reduced returns to industry, increased CPI and cost of living.

Question 3

The majority of students showed an understanding of the experimental procedure involved although specific skills were lacking in certain areas. For example, the calculation of scale was poor, with many candidates apparently failing to read the information presented at the beginning of the question.

(a) Although many were able to calculate the mean values, a large number did not round off the mean value for each treatment to one significant figure. Full marks were awarded, however, for correctly adding and dividing the figures.

(b) Many candidates misunderstood this question. Such candidates drew conclusions from the table rather than referring to the sources of variation in the field plan (Figure 2).

Higher scoring candidates recognised the significance of the tree and fence, saying, for example, *the tree and fence could have reduced the light to replicate 3, decreasing photosynthesis and therefore decreasing dry plant weight*.

(c) A number of candidates used inappropriate scales to graph the data relating dry-plant weight to plant-back period. Such candidates simply copied the plant-back period time and assigned this to the x-axis without allowing for correct distribution of time. Many plotted raw data rather than the means of the replicates.

The best candidates correctly labelled the x-axis as the plant-back period and the y-axis as the dry-plant weight, showing the correct units for each.

A small percentage of candidates, treating this data as being discrete, drew a histogram but lost no marks.

(d) The higher scoring candidates related randomisation and replication to the elimination of bias and increasing accuracy.

A large number, however, simply gave definitions of randomisation and replication without explaining their relevance to experimental design in cases such as that quoted.

(e) The best candidates were able to make specific recommendations to farmers on the basis of the experiment given and provided a reason, e.g. *the farmer should wait 16-32 weeks before sowing to increase dry-plant weight*.

Some candidates mistakenly recommended improvements to the experiment, while many made vague or unjustified statements.

Section II

Question 4 : 94% of candidates attempted this question

(a) (i) Most candidates were able to determine accurately the difference between the weights of regional lambs and those of Flock 1 at 9 weeks as being 2.5 kg. A range from 2.1 kg to 2.6 kg was accepted.

(ii) About half the candidature scored full marks for giving specific reasons for the performance of Flock 2, e.g. *poorer pastures, variation in breeds, poor genetic stock, poor animal husbandry and disease.*

(iii) In high scoring responses candidates included strategies such as growth promotants, improved pastures, supplementary feeding and cross breeding. These candidates also described the methods by which each specific strategy could increase growth rate, e.g. *growth promotants Ralgro, a steroid, increases the growth rate of muscle tissue and, therefore, productivity of the animal.*

Lower scoring responses included more general comments such as *better feed, reduced stress, improved environment.*

(b) A large percentage of candidates scored low marks for this question. Most of these referred to meat quality rather than carcass composition, e.g. *older animals have tough meat whereas younger animals have more tender meat.*

Other low scoring responses referred to increases in size of carcasses with no reference to composition.

In the better responses candidates referred specifically to changes in the ratio of bone, muscle and fat, e.g. *Young animals have a larger percentage of bone than mature carcasses. Mature carcasses have a greater percentage of muscle and fat*.

(c) (i) Higher scoring candidates explained clearly the role of micro-organisms in the nitrogen cycle, and referred to the interaction between the atmosphere and legume plants, e.g. *rhizobium bacteria form nodules on the roots of legume plants and take nitrogen from the atmosphere, converting it to a form that plants are able to use, i.e. nitrates*.

Responses which discussed the role of micro-organisms in decomposition were common. These responses showed a lack of knowledge of the nitrogen cycle and failed to refer to the interaction between the atmosphere and legume plants as was asked in the question.

(ii) Higher scoring responses referred specifically to inoculation of seed and associated benefits.

Many candidates referred to factors that affect the growth of legumes, inferring that this would therefore affect the micro-organisms. These responses were considered to be average.

Lower scoring responses gave answers such as *cultivation kills micro-organisms*.

(d) This question was generally well answered. Higher marks were awarded to those who were able to describe several consequences of the retention of crop residue, e.g. *increased organic matter results in increased water holding capacity, better aeration, increased C.E.C, reduced erodability, improved structure.*

Low scoring candidates listed only one or two of the above, e.g. *changes soil structure*.

(e) (i) This question was well answered, with the majority of candidates scoring full marks. Those scoring lower marks did so because they failed to name an appropriate farming practice or did not correctly state how the named practice led to soil erosion.

For example, *removal of trees* is an example of a lower scoring response, whereas a typical higher scoring candidate stated *removal of trees for cropping results in soil not being held together and leads to an increase in erosion due to the effects of wind and rain.*

(ii) The same comments apply to this question as to e(i).

The following is an example of a lower scoring answer, *irrigation causes salination*, whereas a higher scoring response would be *over-irrigation in low-lying areas may cause a rise in the water table causing salts to rise to the surface.*

(iii) Most candidates were able to name at least two management practices and describe how they could improve soil structure, e.g. *planting deep-rooted salt-tolerant species that would lower the water table by transpiration or using drip irrigation rather than flood irrigation so that the water table is not likely to rise.*

(f) Most candidates were able to name two management practices that could improve soil structure, e.g. *zero tillage, reduced cultivation, green manuring, pasture-crop rotation.* A common lower scoring response was *adding fertiliser*.

Question 5 : 61% of candidates attempted this question

(a) (i) Most candidates correctly answered this question, identifying declining nitrogen levels as the factor responsible for the trend, viz decreasing grain protein levels as shown in the graph.

Some simplified the soil factor into the broad category of *soil fertility/declining nutrient level*. This response was acceptable.

(ii) Most candidates listed at least one farm practice that involved increasing soil fertility, saying, for example, *the use of nitrogen-based fertilisers, the use of crop rotation based on leguminous crops.*

(iii) Those candidates who scored high marks for this question listed three implications for sustainability of grain production in Australia. These candidates listed the following implications, *markets, demand and industry earnings*.

Candidates who misinterpreted the question listed implications for sustainability of grain production affecting individual farms, and scored poorly.

(b) (i) A high proportion of candidates were able to list three different strategies for ascertaining whether crops or pastures would respond to phosphorus fertiliser, such as a *trial, soil testing, tissue testing and information sourcing*.

(ii) This question was generally poorly answered.

Higher scoring candidates linked the use of superphosphate and poor farm management practices to a description of how water quality deteriorates, e.g. *Poor farm soil management causes increased soil erosion leading to clouding of water and changes to water temperature once washed into the river. Superphosphate carried into the river causes increased algal growth.*

(c) (i) and (ii) Candidates showed a good knowledge of the timing of farm operations and their importance.

High scoring responses explained the importance of the timing, e.g. *joining ewes so that lambing occurs when ample pasture is available*. Many, however, were unable to explain the importance of that timing, simply saying, e.g. *harvesting fruit in October*.

(d) (i) Generally this was a well answered question. Candidates were able to identify two threats to an Australian industry, such as decrease in sales overseas, spread of a significant disease, if a major overseas market were to ban the use of a particular fungicide.

(ii) Higher scoring candidates suggested that the industry might respond by:

developing a new fungicide;
breeding resistant varieties;
turning to other methods of control, e.g. biological control, IPM;
searching for alternative markets.

(e) (i) A high proportion of candidates successfully named an appropriate hormone, e.g. *F.S.H.*

(ii) This question was generally poorly answered since candidates failed to describe accurately the role of the named hormone.

The best candidates described a range of roles, e.g. *oestrogen stimulates the growth of the uterus, development of the udder, and causes the female to display signs of heat or oestrus*.

Responses such as *oestrogen causes heat* scored poorly.

(iii) The majority of candidates correctly named a management strategy such as *removing the testes*.

(iv) To gain high marks candidates needed to describe the effect of the specific management strategy on an animal's hormones and also an observable change in behaviour, e.g. *the removal of the testes leads to a decrease in the production of testosterone. This causes the animal to be easier to handle and less likely to be damaged by bruising from fighting*.

A large number of candidates failed to discuss the effect of the strategy on the hormones.

Question 6 : 68% of candidates attempted this question

(a) (i) and (ii) The majority of candidates were unable to differentiate between the soybean-maize and maize-maize lines on the graph. As a result, they failed to draw valid conclusions regarding the effects of soybean on maize yield.

In the higher scoring responses, candidates clearly identified the relationship between soybean crops and fixation of nitrogen in the soil which leads to increased yield in maize crop the following year.

Few candidates were able to see the relationship between soybean and applied nitrogen and how this affects the yield of maize.

(b) (i) Those scoring high marks showed a good understanding of the likely hazards associated with chemical usage, for example, *toxicity, pollution, residual effects, etc.*

(ii) This question was not well answered. The majority of candidates failed to show that chemical costs affect the variable costs of production.

Consequently, they were unable to show whether the chemical should or should not be used in terms of the profitability of an enterprise.

The best candidates gave a formula for calculating gross margins, explained how the cost of chemicals is a variable which may or may not be offset by extra income gained from using the chemical.

(c) No marks were awarded for naming a plant production system, disease or pest.

(i) Most candidates scored full marks for naming an appropriate management practice to overcome the specific pest or disease, e.g. *spray insecticide.*

(ii) In higher scoring answers candidates showed a clear understanding of how the specified management practice affects the interaction between the host, pest or disease, and the environment, saying, for example, *spraying insecticide kills the aphid, thus benefiting the host, but may result in environmental pollution.*

(d) High scoring responses showed a clear understanding of IPM principles and related these to a plant or animal industry they knew, e.g. *mastitis in dairy cattle may be controlled by using a combination of methods including cultural (hygiene in the dairy shed), chemical (teat dips), biological (selection of cows less prone to the disease), use of antibiotics.*

Poor responses simply listed IPM techniques, failing to show an integrated approach or to use an example to describe the program.

(e) It was evident that many candidates were not adequately prepared for this question.

No marks were awarded for naming a plant product.

In the better responses students described a specific breeding program, including reference to breeding systems such as crossbreeding, inbreeding, linebreeding and genetic engineering. These candidates then showed their understanding of the program by clearly relating how it leads to improved quality and quantity of the named product, e.g. *a breeding program involving the crossing of two inbred lines of carnations resulted in a new variety with less susceptibility to rust and this led to reduced disease and greater plant vigour; and therefore an increased quantity was harvested per plant for sale*.

Poor responses simply listed likely outcomes, e.g. *improved yield*, but made no reference to the breeding program used to achieve them.

Many inappropriately referred to asexual techniques, e.g. grafting, tubers, etc, as breeding systems.

(f) (i) The majority of candidates scored full marks in this question, since they stated three reasons for the increased earthworm population, e.g. *increased moisture, protection from harm associated with cultivation, availability of food*.

(ii) This question was well answered, since candidates were able to identify three benefits, such as *improved drainage, increased aeration and infiltration, etc.*

(iii) The majority of candidates gained full marks for this question. Examples of management practices given included *green manuring, addition of lime or gypsum, crop rotation,* etc.

Question 7 : 76% of candidates attempted this question

(a) (i) Most candidates correctly named two States, viz. Victoria, South Australia or Tasmania, where the production of manufacturing milk is more than half of the total production.

(ii) This question was, on the whole, poorly answered. Many candidates stated *reasons* for Victoria's high production rather than *factors* explaining such regional patterns of agricultural development.

Higher scoring candidates gave four definite reasons for such regional patterns of agricultural development, e.g. *soil type, topography, proximity to markets, labour availability and transport*.

(b) No marks were awarded for naming an industry.

Higher scoring candidates were able to explain the reasons for the location of their specific industry, e.g. *the industry is located close to markets and this results in cheaper transport costs.*

Many lower scoring candidates simply listed reasons for the location of their named industry.

(c) No marks were awarded for naming an animal product from the industry studied.

(i) Candidates generally answered this question well.

In lower scoring responses students either only listed management strategies that could contribute to an increase in output of the named animal product, or gave vague descriptions.

Higher scoring candidates described the management strategies, e.g. *supplement pasture with the feeding of grain at milking time to increase milk production in dairy cows*.

(ii) Very few candidates scored high marks for this question. The majority simply restated the question, e.g. *if the manager knows what the market wants then he will produce that product*.

The best candidates gave specific examples and were able to relate them to a management strategy, e.g. *marbled beef is very popular in the Asian market. A farmer could produce animals for this market by grain feeding.*

(iii) Very few candidates scored high marks for this question as they tended to give very general responses, e.g. *quality, quantity, demand and supply*.

In high scoring responses candidates gave two specific sources of market information, e.g. *The Land newspaper, stock and station agents, abattoir reports, radio market reports, Department of Agriculture.*

(d) No marks were awarded for naming a product.

Most candidates showed knowledge of government intervention for their chosen product. Those scoring well described how such intervention worked and what effect this has on farm production, e.g. *The NSW Dairy Corporation has been able to secure year round supply through milk quotas which encourage farmers to produce a minimum volume of milk each month*.

(e) No marks were awarded for naming a plant or animal production system.

(i) A large number of candidates received full marks, naming management practices such as *shearing, crutching, joining, drenching.*

(ii) The best candidates identified specific climatic features affecting their specific animal or plant production system, and related them directly to that system, e.g. *drought leads to poor pasture growth causing low weight gains or weight loss in livestock.*

(f) (i) Most candidates were able to label correctly the axes of the graph to show the correct relationship between stocking-rate (X axis) and production (Y axis).

(ii) The better candidates explained the shape of the graph, saying, for example, *production increased as stocking rate rises to an optimum level when competition for resources occurs. There is a decline in production due to*

lack of feed, access to water and stress caused by overstocking.

Many lower scoring candidates simply described the shape of the graph.

(iii) Many candidates had difficulty in answering this question, the majority only defined the term *stocking-rate*.

High scoring answers gave a list of the information required to determine stocking-rate, e.g. *pasture species, season, soil type, irrigation availability, class of stock, regional stocking-rate and past records*.

Lower range answers listed forms of government intervention.

Section III

It is interesting to note that in Section III candidates from the same schools often answered different elective questions. This seems to reflect the inability of some candidates to handle the specific nature of the extended answer question in each elective, and applies particularly to Question 9(f) relating to ruminant digestion.

In the extended answer question in each elective in this section many candidates appeared to have little understanding of the area studied in the elective, consequently their answers did not contain specific examples.

Question 8 : Plant Production 19% of candidates attempted this question

(a) (i) High marks were awarded for a description of the photosynthetic process that included the light and dark reaction.

Candidates in the middle range of marks wrote the chemical equation of the photosynthetic process and gave a brief description of the process.

Lower scoring candidates simply listed the inputs and outputs of photosynthesis.

(ii) High marks were awarded to those who:

1. explained how the manipulation of a limiting factor could increase the photosynthetic rate of a crop within a controlled environment, e.g. *the period of exposure to light can be increased, allowing for a longer photosynthetic period and thus increasing productivity*.

OR

2. listed all possible limiting factors that could be manipulated in a glasshouse environment, e.g. *light availability/intensity, CO_2 levels, water availability, temperature and humidity*.

Lower scoring candidates listed one or two factors affecting photosynthesis without explaining how these could be manipulated. Some did not show an understanding of the concept of manipulating limiting factors.

(b) No marks were awarded for listing a pruning technique.

(i) High scores were gained by those who linked pruning to an effect on plant productivity, e.g. *pruning of trees to remove excessive growth, regulate fruit bud numbers to get better sized fruit.*

(ii) The better candidates linked photoperiod with the plants' reproductive and vegetative phases. Such candidates clearly understood that photoperiod relates to light/dark cycles.

A large number of candidates incorrectly related photoperiod to the time available for photosynthesis.

(iii) The best candidates related optimum density to reproductive and vegetative yield. A mark was awarded for relating density to competition for resources.

(c) Candidates scoring well described the processes of transpirational pull and osmosis in relation to water uptake in plants.

Those scoring lower marks mentioned only plant root hairs but did not describe the processes by which water moves through these and into the plant.

(d) Higher scoring candidates named three methods of hormone manipulation in plant production, e.g. *root initiation, abscission, onset of flowering, fruit ripening,* or mentioned the use of a specific hormone, clearly outlining its effect, e.g. *use of auxins in large concentrations to produce excessive growth and eventual death of weed species and thus reduce competition.*

(e) Most candidates were able to name several techniques and technologies involved in genetic improvement of plants. Such responses included *genetic engineering, cross-breeding, wide crosses, hybridisation and tissue culture.*

The majority of candidates briefly described the methods named. Many, however, were unable to explain adequately how such methods lead to genetic improvement.

In the best responses candidates gave detailed descriptions of several techniques and technologies used, explaining how these lead to genetic improvement, often giving examples such as:

> *the production of hybrid varieties of maize through inbreeding, the development of triticale and the development of insect resistant cultivars of cotton by genetic engineering.*

A significant number, unable to name any means of genetically improving plants, gave generalised descriptions of other ways of improving plant production. No marks were awarded to such candidates.

Many mistakenly stated that vegetative means of reproduction, such as tissue culture or grafting, lead to genetic improvement. Those who explained the role of these technologies in increasing the populations of new genotypes derived from other plant-breeding techniques were rewarded for their understanding of the role of such technologies.

Question 9 : Animal Production 31% of candidates attempted this question

(a) Most candidates were able to identify the differences between the two groups of broilers in terms of Food Conversion Ration (FCR) and of body fat, while recognising the fact that the percentage feeding regime had no impact on body weight. The best candidates concluded that the restricted group performed the better.

A significant number, however, incorrectly interpreted the higher FCR of the restricted birds as being the more efficient.

(b) Most candidates were able to name and describe a recently developed technology that has increased productivity in animal production systems. Many of the technologies named, however, were not very recently developed. Common responses included *A.I., embryo transfer, multiple-ovulation, rumen modifying substances and hormone growth promotants*.

High scoring candidates related the technology they nominated to an increase in productivity, saying, for example, *the increased growth rates and muscle development associated with hormone growth promotants.*

When studying this elective, candidates should study some very recent technologies.

(c) (i) Nearly all students named an appropriate management practice associated with disease control in animals, such as *vaccination, quarantine measures, drenching or the use of antibiotics*.

(ii) Most candidates could state one advantage or one disadvantage of the practice they nominated in c (i). Many, however, were unable to describe the advantage/disadvantage in any detail.

An example of a high scoring response would state *drenching at strategic times keeps worm levels tolerable and increases growth rates.*

(d) (i) The majority of candidates were able to state that it is important to know the ME values of foodstuffs in order to provide the correct amount of such foodstuffs in formulating rations.

The best candidates related this to the maintenance and/or production requirements of animals. Some candidates related ME values to the economics of ration formulation.

(ii) Most candidates described how the conditions mentioned affected the ME requirements of different animals.

Higher scoring candidates explained why the ME requirements of pregnant animals is higher, relating ME requirements to age in terms of animal growth rates at different ages.

(e) The majority of candidates were able to describe genetic manipulation in very general terms but failed to give examples.

The best candidates cited an example and described an appropriate means of genetic manipulation to improve animal-production systems, e.g. *crossbreeding or genetic engineering*, relating this to *improvements in animal production such as hybrid vigour leading to faster growth rates and the possibility of transgenic animals being able to resist insects and/or disease*.

(f) Many candidates either failed to attempt this section of the question, or gave brief answers with little detail.

High marks were awarded to candidates who described:

1. *the breakdown of cellulose into volatile fatty acids (VFAs) by micro-organisms excreting enzymes*,

2. *the digestion of protein to produce amino acids and non-protein nitrogen sources, e.g. urea, to produce ammonia,*

3. *the synthesis of amino acids and ammonia to produce microbial protein,* and

4. *the synthesis of the Vitamin B group and Vitamin K.*

High marks were also awarded to candidates who included any of the following:

the fate of the products of digestion,
the sequencing of the digestive processes and products,
the names of the micro-organisms involved,
problems associated with microbial fermentation, e.g. bloat, and
comparisons with monogastric digestion.

The best candidates described the symbiotic relationship in which named microbes living in a buffered rumen environment convert complex carbohydrates into microbial products to be later digested in named organs in the digestive tract.

Question 10 : Land Management 50% of candidates attempted this question

(a) Most students were able to name four types of soil degradation, e.g. *soil erosion, dryland salinity, acidity* and *nutrient depletion.*

In poor answers candidates either failed to list four types of degradation or listed several examples of the one form of degradation, e.g. *rill, gully* and *sheet erosion*. These are all examples of water erosion.

Acceptable responses stated the *type* of soil degradation rather than the *cause,* e.g. *soil structural decline* rather than the cause, e.g. over-cultivation.

(b) No marks were awarded for naming a soil degradation problem.

(i) The best candidates described two farm practices that have led to the problem and showed the link between the practice and the problem, e.g. *removal of trees and excessive irrigation cause a rise in the water table leading to soil salinity.*

(ii) Many candidates listed practices only and did not explain how they have led to the degradation problem.

Full marks were awarded to those who were able to explain the problems and link them back to the processes as well as the effect of the problems on production, e.g. *removing trees and vegetation allows more water to infiltrate into soil and raise the water table. Through capillary action water rises to the surface bringing dissolved salts with it. High salinity levels in the soil are toxic to plants*.

(iii) Higher scoring candidates were able not only explain current practices to alleviate the problem, but also to evaluate the effectiveness of the practice.

Full marks were allocated only to candidates who evaluated the practices well, e.g. *planting saline areas with salt tolerant species, such as saltbush or tall wheat grass, will revegetate the area and reduce the water table; it will not, however, reduce the salinity problem, only prevent erosion and return the soil to a productive state if sheep are subsequently grazed on the saltbush.*

Many poorer candidates simply listed practices used without describing how such practices address the problem or how successful they are.

(c) This question was poorly answered by the majority of candidates since many had limited understanding of land capability assessment. A significant number of candidates did not attempt to answer the question.

Marks were awarded for naming the current land use of an area studied, e.g. *intensive crop production, sheep grazing*, and stating the landclass and describing its characteristics according to the Conservation and Land Management Capability Assessment or the NSW Agriculture Land Suitability Assessment Classes.

The best candidates then commented on the suitability of the use of the land in relation to its capability assessment, e.g. *heavy cultivation and irrigation are unsuitable to this area classed only for grazing and light cultivation.*

(d) Few candidates scored full marks in this question. Those who did so were able to LINK the three levels of a successful program:

role/aim---> action/strategy---> problem solved/sustainability achieved.

They focused on the co-operative philosophies of Total Catchment Management (TCM) and Landcare (LC) and specified appropriate strategies to address real problems, e.g.

1. *TCM educates/co-ordinates community members to plant trees which reduce stream bank erosion thus reducing siltation;*

2. *LC assists farmers to plan and to adopt conservation tillage to reduce soil loss and maintain sustainable crop yields.*

Poorer candidates showed some understanding of TCM and LC as *environmentally friendly* organisations but possessed limited specific knowledge. They failed to refer to the co-operative nature of these organisations, to list specific strategies, or to explain the problems that the actions addressed, e.g.

1. *Farmers plant trees*.

2. *TCM makes rules for farmers*.

3. *Pollution is reduced in creeks.*

Section IV

Essays

Question 11 37.5% of candidates attempted this question

This question was, on the whole, well answered, with the majority of candidates describing similarities and differences in the anatomy and physiology of ruminant and monogastric digestion. In part (b), however, many candidates did not use examples to illustrate how these differences affect dietary requirements, food-conversion rates, ration formulation and feeding-management of ruminants and monogastrics.

(a) The best candidates described both similarities and differences in the physiology and anatomy of ruminants and monogastrics. A common response compared ruminant and monogastric stomachs, differentiating between the four compartments of a ruminant stomach and the single monogastric stomach (structure and function) as well as the similarity between the abomasum and the monogastric stomach.

In less successful responses candidates named one or two differences or similarities. Some were obviously confused about aspects of the two kinds of digestive organs, some, for example, describing up to five compartments for ruminant stomachs.

(b) In the higher scoring responses candidates not only named but also discussed specific examples of dietary requirements, food-conversion rates, ration formulation and feeding management, clearly establishing links with the differences described in part (a).

In these answers candidates discussed aspects such as:

monogastric requirement of protein and Vitamin B in the diet;
significance of fibre in ruminant digestion;
influence of anatomy on food conversion ratios;
foodstuffs as components of rations formulated for ruminants and monogastrics;
management strategies influenced by differences between monogastrics and ruminants such as coping with dietary change.

Lower scoring responses included few aspects of the discussion points in part (b). Candidates found it difficult to quote valid food conversion ratios and to explain the concept underlying the calculation.

Question 12 65% of candidates attempted this question

(a) Higher scoring responses listed two or more reasons for cultivation and then outlined their effect on the farm production system, e.g. *Prepare a seedbed to grow a crop which will aerate soil to facilitate germination*.

Lower scoring candidates simply listed basic reasons.

(b) The best candidates named two or more effects of cultivation on soils and then discussed them in detail, e.g.

soil structure decline leading to compaction,
reduced fertility,
reduced CEC which leads to reduced yield and a loss of productivity.

Candidates were asked to explain why farmers are cultivating less. In higher scoring responses candidates discussed *economic sustainability* and *environmental considerations*.

In lower scoring responses candidates simply listed effects and discussed irrelevant effects unrelated to cultivation.

Lack of careful reading and planning was clearly shown in the responses to this part. Students are reminded to read the whole question before answering.

(c) This part was well answered, with the better candidates discussing in detail two or more technological innovations, e.g. *direct drilling allowing the placement of seed and fertiliser into soil with little or no damage to soil structure.* These candidates generally used diagrams.

Poorer responses simply listed some technologies with no discussion of the successful use of the technology.

(d) This part was generally poorly answered due to confusion about the term *sustainability*.

Generally higher scoring responses followed an essay plan, wrote and structured their responses logically and answered the question clearly and concisely.

This required a good understanding of the broader issue of sustainability of crop-production systems in agriculture. High scoring responses commented on social, economic and environmentally possible outcomes to the whole crop production system resulting from using reduced cultivation in the short and long term. These candidates also gave some very effective definitions of sustainability.

Question 13 8% of candidates attempted this question

This question was poorly answered and the majority of candidates scored low marks.

(a) Those who answered this question well described in detail operations described in at least five enterprise operations, and also outlined the logic underlying the timing of such operations.

The following are some of the examples given:

> *cultivating the soil after rains to allow moisture penetration and soil aeration;*
>
> *harvesting carried out when crop potential was at its maximum, e.g. moisture content and protein levels in wheat.*

In lower scoring answers candidates mentioned only some plant operations, failing to give an indication as to timing.

(b) A significant number of candidates did not answer this part of the question at all.

The majority of those attempting the question did, however, link harvesting at the correct time to market disposal and pricing. Some of those answering this part

misinterpreted the question by tending to repeat many of the points given in their answer to the previous part, e.g. *considering timing of operations* and not linking them to product disposal/marketing.

Those who scored well outlined clearly the link between production time and market disposal, mentioning factors such as *supply and demand, marketing schedules, supply of labour, availability of transport and harvesting equipment.*

Question 14 9% of candidates attempted this question

(a) Many candidates answered this question simply by reiterating the theme contained in the preamble, stating that *there have been technological and management innovations and these have improved the quality and marketing of agricultural products.*

These candidates scored low marks because they neither gave specific examples of innovations nor did they illustrate the quality and marketing attributes resulting from these innovations.

Although some of the innovations given were somewhat dated, e.g. *artificial insemination,* they were accepted, but scored all of the marks available for this part only if they were clearly linked to the generation of quality attributes, e.g. milk *quality* rather than *quantity*.

Most candidates focused on technological and management innovations in the beef cattle industry, usually citing ultrasound scanners, CALM and video marketing, and specialised feed-lotting aimed at either domestic or export markets.

(b) Although some candidates scored almost full marks in this part of the question, many were unable to identify specific consumer preferences and community attitudes to any product, agricultural or otherwise.

Many answered the question in general terms, agreeing with the points specified in the question. It was interesting to note that many candidates were unaware of the marketing of beef, milk, white meat, etc, that has been dealt with so regularly in the media.

Those who scored well identified community attitudes and preferences such as:

white meat vs red meat
saturated vs unsaturated fat
fat-free or low-fat foods
organic or chemical-free produce,

and also identified specific marketing innovations such as emphasis on:

iron content in red meat,
calcium intake from dairy products
recipe leaflets for short beef cuts.

3 UNIT

Research Project

This year the projects covered an extensive range of topics and included an increasing mixture of quantitative and qualitative research styles. As well as experimental projects, research methods included surveys of producers, consumers and marketers, as well as comparative case studies. Comparative case studies of farms and farmers is a valid qualitative method which helps reveal the complex nature of farms, as well as farmers and their decision-making.

The majority of projects addressed all requirements; a few projects, however, failed to complete all requirements. It is important that students should be aware of the 3 Unit Project Outcomes and Format in the Syllabus so that all components are included.

General Comments

Photographs

Photographs included should be relevant, captioned and discussed in the text. They should add to the quality of the text and enhance the reader's understanding of the project. Pictures can be powerful tools of communication but, if they fail to provide information, they can hinder the flow of communication.

Many projects produced on a word processor had typographical errors. The use of a spell check would improve these projects.

Process Diary

The Process Diary is designed to assist students to work through the process of carrying out the research project, rather than being considered as a requirement and, as such, is only a one or two page summary of work done, with interaction between teacher and student. In many cases it was noted that where diaries were extensive and included

reflections by students as well as constructive comments by teachers, the finished project was always well constructed.

It is hoped that, through this kind of approach, students' ideas will be enhanced and, in some cases, redirected so that projects have the maximum chance of success.

Literature Reviews

Literature reviews should be focused on the research question being investigated and should include little material that is irrelevant to the project. Key points to note include the following:

(i) A literature review is not a list of abstracts of readings but a discussion of appropriate literature on methodology and existing knowledge.

(ii) Reference should be cited when claims are made that are obviously based on the student's reading.

(iii) Correctly cited references, e.g. Smith (1985) should be included in the reference list, **not** a bibliography.

Presentation of Results and Analysis

Statistics should be fully explained to prove that the student knows not only why he/she is carrying out a statistical analysis, but also the meaning of the results of such analysis.

Graphs from different treatments related to the same topic should be on the one axis so that the trends can be compared visually - that is the value of a graph as an effective way of communicating information.

In some animal trials the final weights of animals were compared although they did not start at the same weight - criteria such as weight gain/time should be used.

Results must be discussed and the conclusions drawn from them highlighted. In many cases results were presented and implications drawn, although no attempt was made to show the link between them.

In survey analysis students need to select appropriate statistics - simply presenting averages for each item is not always the best method. It is far more important to correlate responses. For example, in showing whether people of different ages, sex or particular views give conservative responses, statistics to correlate different responses can provide a richer analysis.

1995 HIGHER SCHOOL CERTIFICATE EXAMINATION

3 UNIT (ADDITIONAL)

Section I

Question 1 (Compulsory)

(a) High scoring responses named and briefly outlined an agricultural issue, e.g. *genetic engineering, conventional cultivation, minimum tillage, reproductive techniques, land degradation*, etc.

In these responses candidates showed that they understood the implications of the term *perspectives*. They had obviously analysed information, thereby reaching an understanding of a debate around an issue.

Candidates in a lower category did not demonstrate this skill, but presented general opinions about the issue, or stated information without proving that they had encountered and understood different perspectives. Many of these candidates failed to identify an issue and, consequently, had difficulty in describing perspectives, i.e. opinions, attitudes, aspects.

Students must be provided with numerous opportunities to work through such a process in relation to a number of different issues in order to develop skills in analysing situations and information from different points of view.

(b) Those who answered this question fully named and described three separate issues, each of which supported the stated perspective.

The better responses contained a discussion of research work which was clearly related to the specific issue and used such research in support of their chosen perspective. For example, a student might refer to research into the effects of maintaining stubble on reducing rates of soil degradation. Many of those who referred to research could state where and when the research was carried out and the conclusions drawn from it.

Due to poor choice of *issue*, the majority of low scoring candidates were unable to find sufficient evidence to support their arguments adequately. Those choices which were classed as *poor* included areas about which a lot of information was available but which were not really *issues* as such.

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Question 2 : Animal Breeding and Horticulture

(a) 86 candidates attempted this question.

(i) In higher scoring responses candidates clearly identified a range of undesirable traits, e.g. *poor temperament, eye pigmentation linked with cancer, small pelvic area, infertility*, etc. Candidates were able to discuss how their specific examples might have affected both reproductive efficiency and product quality.

(ii) Many candidates referred only to breeding systems, e.g. *inbreeding, crossbreeding, artificial insemination, Breedplan*, etc. The best responses outlined the above in terms of how they minimised the undesirable traits referred to in part (i).

(iii) This section was poorly answered by most candidates, although the majority had some idea of the processes involved in manipulating DNA and/or gene splitting.

Few, however, were able to describe accurately how the process could be used to reduce the problem and how it would benefit production generally.

(b) 155 candidates attempted this question.

(i) The best candidates explained how a knowledge of hormonal systems and animal reproductive anatomy enables a more efficient breeding program to be carried out, e.g. *synchronisation of oestrus using progesterone*.

The majority named various parts of the animal reproductive anatomy and hormonal systems, with the best candidates explaining the practical applications of this knowledge, e.g. *testicular circumference is an indication of fertility of bulls*.

Generally, however, candidates found it difficult to discuss the importance of a knowledge of hormonal systems and animal reproductive anatomy.

Some explained in detail embryo transfer and artificial insemination programs - this was not necessary and rarely scored extra marks.

(ii) Higher marks were awarded to those who could describe how product specifications were improved and introduced into animal production systems by new reproductive technologies, e.g. *dairy EBVs used to select sires and dams for embryo transfer programs*.

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Question 3 : Horticulture

(a) 23 candidates attempted this question.

(i) Candidates answering this section well used specific examples of horticultural industries/activities/products in discussing at least four difficulties encountered in locating new markets for horticultural products, e.g. *Australia's isolation, transport costs, preservation, packaging, research in foreign countries, identification of cultural preferences, popular products overseas*.

Those gaining lower marks identified fewer, if any, of the above difficulties, confining their comments to more general areas such as climatic differences, racial differences, soil differences and farming techniques.

(ii) The best candidates discussed at least two changes in types of products, production techniques, e.g. *netting, trellising, organic farming, IPM, use of hormones to reduce the flowering period,* and post harvest handling of specific horticultural products, e.g. *storage, packaging, transport, gas ripening, cold storage to slow down flower opening, plastic wrap*, etc.

In poorer responses candidates made more general comments, often without mentioning any examples or making comments that rightly belonged to the first section of their essay about changes.

(b) 8 candidates attempted this question.

This question was generally poorly answered by the small number of candidates attempting it.

These candidates failed to show any depth of understanding of the impact of anatomy or physiology on:

propagation;
reproduction;
size of plants in horticulture;
the production cycle of a horticulture system.

The majority of candidates simply named one or two parts of a plant and explained one way in which each specific part is involved in propagation or reproduction.

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Question 4 : Alternative Agricultural Systems

(a) 70 candidates attempted this question.

(i) The better candidates named alternative systems of agriculture and clearly explained the reasons behind the development of the specific systems within the wider agricultural industry.

Those scoring poorly in the first part often failed to justify the development of the alternative system, or simply listed responses without giving any reasons for the development.

Common examples included:

Ostriches developed because they are soft-footed and don't damage soil;

all the bird (meat, feathers, hide) can be used;

good return on costs;

disease-free;

good feed converters, and

the meat is low in cholesterol.

(ii) The best candidates divided the response into the given boundaries of agricultural research, management and marketing, and discussed profitability and sustainability within these areas.

Many candidates could elaborate on practices affecting profitability in research, management and marketing, but did not link their responses to the subject of sustainability of the specific alternative system within those fields.

Often responses consisted of generalisations which failed to score well because of their lack of specific information.

(b) 54 candidates attempted this question.

(i) Nearly all candidates were able to identify and describe a new agricultural system they had studied. Some of the enterprises discussed were farming of

alpacas, ostriches, emus, yabbies and deer. Few plant enterprises were mentioned.

Market research and details of marketing arrangements in such enterprises were generally well discussed. High scoring candidates discussed both local and export markets, product range and enterprise associations such as *the Australian Ostrich Association*, as well as consumer demand and preferences.

(ii) The majority of candidates were less successful in explaining how a knowledge of plant or animal biology has been used to develop their specific new enterprise. Details of *reproduction, nutritional needs, diseases and parasites, climatic needs and product harvesting* were discussed by those scoring well in this section.

(iii) Most candidates were able to name some legal or institutional requirements to be met in establishing the new enterprise they nominated. These included examples such as *permits and licences, quarantine regulations and registration with breed societies and council restrictions.*

Question 5 : Technological Perspectives in Agriculture

(a) 3 candidates attempted this question.

On the whole this question was poorly answered.

Candidates clearly lacked specific knowledge about computer applications and their role in production and marketing.

(i) All students were able to identify at least one computer application involved in production and most could describe its role, e.g.

Data base for general record management.
Graze Plan to enable effective pasture management with a grazing herd.
CALM provides an alternative market for sheep, cattle and pigs.

(ii) The assessment of a computer system was required here; most candidates, however, were unable to do this.

(iii) No candidate could evaluate the use of computers in the marketing of ONE plant or animal product.

(b) 11 candidates attempted this question.

Those attempting this question showed poor understanding of the role of technology in replacing labour or in improving production monitoring.

Many confused *production monitoring* with *improved production*.

(i) A thorough knowledge of farm chemicals and their role in a farming system was shown here, although most candidates were unable to show how their usage could reduce labour or how it could improve production monitoring.

Acceptable answers included:

Herbicide applications allow a farmer to control weeds more quickly than using cultivation, hence reducing labour.

Paddock assessment of plant nutrient levels using Farmlab test kit...

(ii) The majority of candidates showed no understanding of the term *post-harvest*.

In high scoring responses candidates included a discussion of bulk handling and storage of commodities which result in reduced labour requirements. They stated that production monitoring is improved by the use of techniques such as protein testing, moisture meters and purity of samples.

(iii) Most candidates showed a better understanding of this section.

In high scoring answers candidates discussed a range of harvesting and planting equipment and how mechanisation has reduced labour requirements in such areas. These candidates also identified equipment such as grain monitors in headers.

In lower scoring responses candidates simply listed types of planting or harvesting machinery.

Question 6 : Pasture Production

(a) 131 candidates attempted this question.

(i) This part of the question was generally well answered since the majority of candidates were able to list the characteristics of at least four pasture species; many could list a larger number.

Higher scoring responses included a description of the listed characteristics, e.g. *palatability - the animal must like the taste of the pasture to maximise consumption and hence increase production levels*.

Lower scoring candidates failed to list a minimum of four characteristics and/or included no descriptions.

(ii) The majority of candidates did not correctly interpret the keyword *evaluate* and proceeded to *describe* the role of introduced and native pasture species. As a result many did not evaluate the suitability of introduced and native pasture species when deciding the needs of a farm system.

Most candidates were able to name examples of introduced and native pasture species (including their botanical names) but did not illustrate their answers by stating examples of where choice of pasture species had been important.

Higher scoring responses named examples of native or introduced species and described their roles in meeting the needs of the farm system, referring to practical situations, e.g. *in saline conditions the native species saltbush will establish and grow effectively, hence providing valuable livestock fodder.*

Most lower scoring responses named examples of native or improved species but did not describe their roles.

A common aspect of the responses to this question was that, in answering, a significant number of candidates tried to show a sound knowledge of pastures without adapting that knowledge to meet the requirements of the question.

(b) 32 candidates attempted this question.

Most candidates answered this question in fairly general terms and, therefore, were not awarded marks allocated for specific details and management strategies.

The majority were able to name at least one type of soil degradation and to identify some ways of establishing and managing pastures in rehabilitating degraded land.

The better candidates were able to identify three or more types of land degradation and their causes, e.g. *soil erosion, salinity, acidity, compaction.* They provided a range of specific points in terms of suitable pasture species to be used and of management strategies to be initiated, e.g. *the use of salt tolerant species such as saltbush, or legumes, such as lucerne, to improve fertility/structure*.

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Question 7 : Coping with Climate

(a) 23 candidates attempted this question.

(i) High scoring candidates:

- described at least three impacts of major droughts on the local economy, e.g.
  dislocation of local population,
  loss of farm income,
  social stress.

- described at least three impacts of drought on the national economy, e.g.
  increased cost of social services,
  increased urbanisation,
  shortage of products.

- described at least two impacts of major drought on the international economy, e.g.
  loss of market share,
  loss of market distribution,
  product cost increases.

In lower scoring responses candidates discussed the impact of major drought without referring to the local, national and international markets.

(ii) Generally this section of the question was not as well answered as the previous part.

The candidates who scored the highest marks evaluated as many as four long-term and short-term strategies that farm managers use to reduce the impact of a drought on farm income and the environment, e.g. *minimum tillage, fodder conservation, stubble mulching, diversification, off-farm investment, insurance, risk management, bore sinking*, etc. Such answers also evaluated environmental strategies such as *tree planting, conservative stocking rates, lower impact breed selection, native pasture retention.*

Lower scoring candidates named strategies without evaluating their effectiveness, particularly in relation to the environment.

(b) 8 candidates attempted this question.

(i) This section was generally well answered, with the majority of candidates outlining different types of climate and weather information sources for micro-climate, short, medium and long-term weather/climate information now available to the rural industry. Common examples of technologies included *soil probes, satellites, computer models, radar*.

(ii) Those who scored well in this section were able to describe several uses of climate and weather forecasts used by farm managers to improve the timing of management practices both in the short-term and in the long-term. Examples included *short-term management practices such as the timing of the grain harvest and seasonal use of soil moisture for crop establishment*.

Poorer scoring candidates talked only in general terms about weather or climate, failing to relate this information to specific management practices.

Question 8 : Agribusiness

(a) 14 candidates attempted this question.

(i) Most candidates named a farm product as well as evaluating alternative selling-systems for both the local and international markets. A high proportion, however, failed to identify specific alternative selling-systems for international markets.

(ii) This question was poorly answered by the majority of candidates who discussed marketing strategies rather than value-adding methods to create new markets or increase marketability.

(b) 8 candidates attempted this question.

(i) All candidates were able to list at least one method for analysing a farm's financial situation. Higher scoring candidates discussed at least three methods for doing so. Half the candidature showed an understanding of the process involved in the analysis.

(ii) Most candidates referred to financial institutions such as banks, co-operative building societies or insurance companies. In the best answers candidates were able to distinguish between the various categories of finance. Some mentioned refinancing the farm through sale/renting/restructuring of assets.

(iii) The majority of candidates recognised the need for thorough preparation to obtain relevant data before lodging an application for finance. Many candidates had difficulty in explaining multiple strategies.

Question 9 : Whole-Farm Planning

(a) 64 candidates attempted this question.

Most candidates displayed a general understanding of the principles involved in whole farm planning.

(i) The higher scoring candidates were able to link several features on the farm, e.g. *gully erosion*, with the possible effect that they may have on the ecosystem or community, e.g. *lost soil resulting in decreased productivity* or *salt area run-off results in a saline creek which lowers the quality of the town water*.

Lower scoring candidates failed to link the farm with its rural community or surrounding ecosystem, i.e. they described *on farm* processes. They discussed socio-economic factors only and did not describe the interaction within a whole-farm planning context, i.e. *farmer buys machinery from local town*.

(ii) In the best responses candidates described briefly the nature of financial advice given to farmers and the precise way in which at least three agencies contributed, e.g. *Landcare group may assist in attracting funding to a tree planting program on the farm*.

Those receiving lower marks gave only very generalised descriptions, e.g. *outside agencies give advice and provide service to farmers*, or *nurseries sell trees to farmers*.

(iii) The best candidates sketched the recommended changes. Such candidates were aware of priorities, time factors and financial limitations of whole farm planning. They showed and described the consequences of rectifying the salt and gully erosion problems. Land management techniques were also mentioned.

Lower scoring candidates concentrated on the techniques involved in reclamation of saline areas and gully erosion.

(b) 63 candidates attempted this question.

(i) Higher scoring candidates were able to describe clearly the role of both property and financial planning in improving the sustainability of a farm within a time frame. These candidates discussed the importance of farming within land capabilities, combating degradation problems, and deciding which activities take precedence in the execution of the property plan. They also discussed the following:

financial considerations, cash reserves, off-farm income, need for budgeting, effect of drought and markets on cash flow.

Lower scoring candidates simply stated that property financial planning was important without linking it to farm sustainability.

(ii) Those who scored well in this part of the question explained in detail all three factors, as well as the way in which they affect the rate of implementation of any whole-farm plan. Financial factors included Government policy, e.g. *tax concessions, rural assistance authority loans, level of indebtedness and insurance*. Social factors included attitudes, values, goals of the farmer and his family within the framework of the community.

Lower scoring candidates gave a general rather than a specific discussion.

(iii) High scoring candidates discussed strategies that could be used to reduce the impact of inevitable drought and related them to the implementation of the farm plan. Such strategies included fodder conservation, cash reserves, diversification of farm enterprises, water conservation, use of off-farm climatic data.

In lower scoring responses candidates described the effects of drought instead of explaining strategies aimed at accommodating the effects of drought within the whole farm plan.