REPORT ON -

KELLOGG RURAL ADJUSTMENT UNIT (KRAU) CONFERENCE

"PRODUCTIVITY IN AGRICULTURE AND FARM INCOMES"
SYDNEY AUGUST 9-11, 1977

Summary and Conclusions

Highlights - formal sessions
- informal contacts

Summaries of individual papers
- general (6 economists)
- grains (1 BAE, 2 research, 1 farmer)
- sheep (1 BAE, 2 research, 1 farmer)
- beef (1 BAE, 2 research, 1 farmer)
- supplementary papers (2 dairy, 2 genetics)

Discussion group aims and results

Key pages: 1, 2, 3, 19-24

Bound volume of papers is held in the Department of Agriculture library.

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Summary and Conclusions

The aim was for the 170 attenders to define how much productivity increases could help farmers in the main rural industries, and what size increases are likely in the foreseeable future (especially the next 5 years), and to recommend feasible Government and industry action to stimulate increases in farm productivity.

Geoff Filler (now Director, B.A.E.) provided the foundation for the conference with his paper in 1976 which highlighted the inevitable intensified cost-price squeeze facing Australian farmers over the next 5 years. In it he pointed out that agriculture cannot isolate itself from events in other sectors.

The attenders included about 37 researchers, 29 educators, 23 policy makers, 18 from service industries, 14 farmers, 5 regulators, 5 farm finance institutions, and 3 markets. Many of these people have multiple roles crossing the categories I have created.

The conference took the form of 2 days of talks with some questions plus 1 day of group and plenary discussions. As expected, there were too many people, too many subjects and too little time to allow a well enough considered consensus. The exercise was completed, but its effectiveness was limited.

Communication between individuals from wide geographic and work areas will benefit most who attended and probably improve our future usefulness in agriculture.

To my mind there was a shortage of creative ideas for immediate increases in productivity. Much of the time was spent defining terms, describing the present situation and problems, and even criticising other disciplines.

A brief summary of the papers gives a broad perspective of the situation and prospects in the main industries, but mainly aims to list opportunities for increased productivity.
Discussion group aims and results follow the summary of papers, and include a brief evaluation of group experience.

HIGHLIGHTS

From formal sessions:

1. Real family incomes have increased more slowly in agriculture than the national average.

2. To resist change would be very costly to farmers and the nation in the long run.

3. Productivity growth in Australian agriculture averaged only about 1.5% p.a. in the 1950's and 1960's, and has quickened to at least 2% p.a. in the 1970's. However, this is apparently lower than the rate of 2.5% p.a. reported for the U.S.A. in the 1960's. Farmers' terms of trade are likely to decline by 3% p.a. over the next 3 to 5 years.

4. 25% of Australia's farmers face a significant low income problem in 1980-81 if they do not get out or earn off-farm income, even with a labour productivity increase of 5% p.a.

5. Group farming offers many advantages for those who are willing to get on with others.

6. Carcase classification has a wide range of benefits to offer the beef industry, as has computerised selling, mainly in the form of better market information and incentive to produce for the market.

7. More research should be multi-disciplinary and involve farmers at the planning stage.

8. Research outside established organisations should receive more funding.

9. Electric fencing offers significant cost savings in the beef industry.

10. Unnecessary bias against bull beef up to the age of 14 months is costing us 10 per cent of the potential growth rate of male calves.
11. Computerised accounting using metallic ink coding could save hundreds of dollars a year for an average sized farmer.

12. The domestic meat market is unnecessarily biased against size irrespective of age of cattle.

From informal contacts:

1. Bowen's long range weather forecasts are less likely to be useful than rumours in W.A. have suggested
   - he only predicts dryness/wetness of a season relative to the preceding season;
   - his predictions haven't yet been tested fully by time;
   - the Academy of Sciences is said to have on theoretical grounds rated his forecasts no better than other long range forecasts.

2. Smart farmers tend to sell things when they're dear, buy them when they're cheap - Jim Shepherd sold off about 1500 sheep at $20 each and increased crop area within the limits of existing plant.

3. Productivity in terms of meat output per man at Australian meatworks is no higher now than 20 years ago, the only net benefit being improved hygiene.

4. David Wordsworth suggests the Department should admit that carrying capacity of Esperance pastures has fallen and do something to solve the problems of the uneconomic beef industry rather than determine optimum super rates with Decide.

5. Orange Agricultural College is having apparent success with its new course for girls in farm management and secretarial work, and with its preference for generalist teachers to emphasize integration rather than specialist teachers in separate fields.
"THE AUSTRALIAN FARM SITUATION - PAST ECONOMIC TRENDS AND FUTURE PROSPECTS"

Herb Flunkett, B.A.E.

There has been a long term downward trend in the sector's terms of trade, which has intensified in the last decade and is expected to continue into the medium term future. The bulk of the response to future economic pressures for change will come from within the sector as there is seen to be limited likelihood of preventing or offsetting the underlying pressures, which largely arise from developments elsewhere.

Future developments in the Australian economy seem likely to contribute to a continuing divergence between domestic and world terms of trade for agriculture. While reducing tariffs would improve the cost situation, it would be only a once-off effect. The rapid growth of mineral exports has had about double this effect over the past decade, as estimated by Gregory.

Future changes in agriculture will inevitably require the continuing departure of labour from the sector. Counselling, relocation assistance and direct welfare payments may well need to be associated with these changes.

"STRUCTURAL INTERDEPENDENCE: IMPLICATIONS FOR AGRICULTURAL POLICY"

Sandy Cuthbertson, I.A.C.

To explain the changes which have occurred in the rural sector during recent years, it is essential to understand the size and ramifications of developments throughout the entire economy.

The rate of growth of agricultural output has been low relative to the rest of the economy over the period 1962-63 to 1974-75.

Competition arising from productivity improvements within a particular sector can be one of the many competitive elements giving rise to cost-price pressures in that sector.

Change is largely influenced by productivity gains in particular sectors. The quicker a community adjusts to change, the cheaper is the cost of doing so.
"PRODUCTIVITY GROWTH IN THE AUSTRALIAN FARM SECTOR"

Roy Powell, K.R.A.U.

Total productivity is the most useful concept, since maximising physical partial productivity ratios will not achieve economic efficiency.

Increasing the partial productivity of the scarcest resource is perhaps the most common approach. Hence future technical developments in Australia may be oriented to coping with the rapid rises in the price of such inputs as phosphate, labour and fuel.

A second approach is changing the organisational structure of farming, to achieve specific economies of size. This is up to farmer initiative, contrasting with the largely institutional research involved in improving technology. Policy measures may be necessary to remove credit, legal or management constraints.

Elimination of inefficiencies is a third approach, which will require education and extension to improve management skills, though it is not always financially or psychologically rational for individuals to operate with the "best" technology.

Cost saving developments are the safest ones for increasing incomes.

Productivity growth has accelerated in the 1970's in Australian agriculture, mainly through savings on inputs as a result of farmers cutting back on expenditure and/or restructuring farms.

"THE INFLUENCE OF THE RATE OF PRODUCTIVITY GROWTH ON AUSTRALIAN NET FARM INCOMES"

John Dillon, U.N.B.

In this paper he and John Wicks use A.F.A.A.A. (Aggregative Programming Model of Australian Agriculture) to investigate the likely impact of alternative rates of labour productivity growth on farm incomes in 1980-81. The model comprises 521 representative farm linear programming matrices. Resource and cost parameters were updated to 1975/76 and 1976/77.
Farmers terms of trade were projected to continue to decline at a rate of 3% per annum.

Output prices for 1980-81 were taken as the average of the five year trend for each commodity up to and including 1975-76.

The A.P.M.A.A. model maximises expected total gross margin for each representative farm. Productivity growth rates of 0.0, 2.0 and 5.0 per cent from 1970/71 to 1980/81 were incorporated through a decline in labour required per unit of each activity. Fixed farm costs were derived from the 1973/74 Australian Grazing Industry Survey and indexed according to the B.A.H. Index of Prices Paid.

Even at the highest rate of productivity growth, average net farm income is less than $10,000.

The expected levels of farm incomes vary widely between States, between regions and between farm types. Those areas which have problems of small farms appear unlikely to be able to benefit greatly from enhanced productivity. All of the scenarios investigated suggest that at least 25 per cent of Australia's farmers would have a significant low income problem (i.e. less than $2,500 per annum) in 1980/81 if they had not got out by then or still had agriculture as their sole income source.

"NON-PRODUCTIVITY OPTIONS FOR THE AUSTRALIAN FARM SECTOR"
Jack Makeham, U.N.E.

The rapid increase in the growth rate of productivity since 1968/69 resulted mainly from the low wool and sheep prices in the early 1970's and the high and increasing costs of bought inputs since early 1973. Producers cut their spending on labour and superphosphate, but there is less scope for increasing productivity this way in the next 10 years. Non-technological alternatives are as follows:

i) tighten the belt and hope for the best - this will be a real option for some, remembering that 50% of farmers have no debt and there'll be another boom as sure as there'll be another bust;

ii) change the mixture of enterprises;
"PRODUCTIVITY IN THE AUSTRALIAN SHEEP INDUSTRY"

Chris Easter, B.A.E.

The analysis in this paper is based on a simulation model using Australian Grazing Industry Survey data, and is designed to examine the impact on sheep output, sheep and beef industry returns and total grazing industry incomes of changes in various productivity parameters.

Preliminary results suggest that productivity gain associated with pasture production and fodder utilisation are areas where research and extension may perhaps be directed. From this result, pasture species breed improvement, sheep breeding programmes and extension advice relating to pasture and stock management strategies appear to represent the potentially most significant avenues for research and the implementation of existing technology.

The model accommodates changes in combinations of enterprise in response to changes in gross margins. As a result the calculated productivity elasticities of sheep outputs, enterprise price returns and industry income do not bear an obvious relationship to the individual productivity changes.

"A REVIEW OF SHEEP PRODUCTION RESEARCH"

Peter Booth, A.W.C.

Developments that are ready to apply on the farm but are not as widely used as they might be:

- more efficient use of fertilisers using Decide approach and soil testing;
- low formononetin clovers still not being used enough in N.S.W.;
- selection for breeding based on economically important characteristics;
- more efficient use of shearing shed labour, with raised shearing boards, revolving wool tables, objective clip preparation and automatic self-pinning presses.
Developments already in the pipeline:-
- endo micorrhizal fungi to promote phosphorous uptake;
- blowfly control by genetic manipulation of fly populations and possibly by selection against susceptibility in our flocks;
- chemical shearing, though has problems for animal survival and carcase quality;
- automated mechanical shearing;
- "jumbo" bales - 450 kg lots in plastic bags.

Future research possibilities:-
- selection of low-nutrient tolerant pasture plants;
- immunological approach to internal parasite control;
- fertility and lamb survival in pastoral zone sheep;
- increased attention to market requirements and implications of on-farm changes for processors.

"IMPLICATIONS OF SHEEP RESEARCH IN THE 1970's"

Peter McInness, N.S.W. D/A

Suggests future research direction should incorporate closer interaction of the expertise available from major research organisations.

Rated sheep research areas in terms of their on-farm usefulness in the next five years. High rating areas under the four headings were as follows:-

Breeding research - merino breeding to increase fleece weight per sheep and improve fertility.

Nutrition research - drought feeding to formulate more accurate diets for breeding ewes.

Reproduction research - nil.

Management and carcase research - sheep handling equipment that has been developed mainly by the private sector.
- blowfly control using mulesing and genetic manipulation of the blowfly population.
Agronomic research - plant breeding, pasture fertilising and weed control all rated "fair".

From this paper and several others, I conclude that adoption of many innovations appears to be much slower in the Eastern States than in .

Regionalisation and multi-disciplinary research are favoured by McInness and an increasing number of researchers, farmers and educators.

"FACTORS AFFECTING ARID ZONE PRODUCTIVITY IN THE SHEEP INDUSTRY"
Ian McLachlan, C.A. Grazier and vice Pres of Aust. Woolgrowers' & Graziers' Council

The paper concludes that pressure on incomes may only be relieved by a continued drop in sheep numbers and the consequent supply on wool prices.

The arid zone carries about 25 per cent, or 30 million, of the national sheep flock.

Labour costs now can constitute two-thirds of total costs. The investment in fencing and watering facilities is also large in relation to sheep numbers.

On-farm factors affecting productivity:
- stocking rate - must be kept down to maintain or improve the vegetation and improve wool cut per head;
- wool cut per head can be improved by objective selection;
- fertility - should avoid fertility problems and multiple births in the arid zone;
- management - being absolutely sure that water available at all times, knowing where the stock are likely to be at all times;
- structures - must be trouble-free and long lasting; can't go in for high use such as portable yards, as they can in higher rainfall areas;
- 5 000 sheep per man is a maximum due to physical limits;
- 15 000 sheep should be minimum carrying capacity of each property to allow permanent employment of 2 adults and 1 junior;
- Recent improvements have been in the areas of increased reliability and range of vehicles, improved high tensile fencing, cheaper and more rust-free water carrying equipment, improved windmill pumps, IVC bore liners and improved crutching devices;
- sale one-man gyrocopters would improve work-force mobility.

"PRODUCTIVITY IN THE AUSTRALIAN BEEF CATTLE INDUSTRY"
Onko Kingma, B.A.

Again using a simulation model of the Australian grazing industry, the analysis indicates that increased productivity in the areas of pasture production/utilisation and livestock performance and management may be worth pursuing.

As with the use of the model in the sheep industry analysis, no account is taken of the time span or research costs involved in achieving productivity improvements in the areas listed. The partial productivity changes analysed were — veterinary and medical, livestock selling, labour, calving rate, feed intake, pasture production, pasture carryover, superphosphate, plant and machinery.

"BEEF RESEARCH AIMED AT INCREASING PRODUCTIVITY IN AUSTRALIA"
like Jones, A.H.B. and A.H.R.C.

Opportunities for increased productivity:
- using sheep to clean up the pasture in the seven months before winter where Ostertagia ostertagi are a problem, plus strategic doses of fenbendazole in August;
- control of cattle tick by destocking procedures and strategic dipping;
- better cultivars and management of tropical pasture legumes;
- subclover cultivars resistant to clover scorch;
- dung beetles to control bush and buffalo flies;
- selecting for faster growth rates, then crossing with exotic breeds;
- possibility of relating disease resistance with different histocompatibility loci and hence selecting for resistance;
- genetic engineering to produce all female calves;
- improved harvesting processes - carcase classification, highly automated meat plants.

Clairs economic research won't play a constructive role since traditionally economists have tended to be historians.
Emphasized the need to consider research problems as part of a dynamic system which has economic and social as well as biological components.

Technological information is abundant but cannot be utilised in practice until its role in the producing system can be defined and evaluated.

Research and extension organisations structured on disciplinary lines are not conducive to system analysis and problem solving which require multi-disciplinary and multi-organisational groups. Such groups have special personality requirements as well as scientific skills.

Funding bodies could be more adventurous in their support of special groups outside established organisations and orthodox proposals through the "proper channels".

"FACTORS AFFECTING PRODUCTIVITY OF THE SPECIALIST BEEF PRODUCER"

Guy Wheal, Keith, S.A.

Purchased a 1620 ha property in the 525 mm rainfall area in 1973, when 1000 ha was roughly cleared and sown to mixed subclover, strawberry clover, phalaris and native grasses. A minimal number of wethers were to be run, in conjunction with the cattle, since the home property is 42 km distant.

Technological innovations are being held back by social prejudice, vested interest and lack of confidence in the industry. Cost cutting measures on his farm:

- will be culling any cow that has a late calf or that rears a poor calf;
- will use cross breeding on all but the replacement herd;
- will administer drench with honey on supplementary feed, using 10% extra drench, to cut down on physical handling of stock which interrupts growth;
- handling facilities will be improved so that all jobs can be successfully and simply done by one man.
Other opportunities for raising productivity:
- pooling of labour - many farmers underestimate the value of having somebody experienced to help them with particular farm operations;
- more care in composition and time of applying of fertilisers;
- fencing design - strategic subdivision with a four wire electric fence;
- high fertility cattle breeds, such as the Jersey;
- allow bull calves to grow to a greater age before castration, which would preferably be by chemical or hormonal implantation to avoid stress of conventional methods;
- carcase classification, computerisation and objective market reporting;
- cut out spraying for winter lice;
- lower stocking rate to enable greater flexibility of management in years of low rainfall or extremes of markets;
- short term bank loans for stock purchases;
- group breeding schemes;
- application of psychology to the planning of cattle yards;
- management education - graduates who can apply technology;
- bookkeeping system to handle both management and tax accounting - e.g. N.Z. system of coding cheques with metallic ink;
- avoid exotic breeds which prolong the calving cycle;
- utilise specific growth patterns of different breeds;
- blood, soil and leaf sampling;
- multiple natural calving;
- mechanical meat harvesting at the abattoirs;
- selection of pasture plants capable of extracting presently unavailable nutrients.
SUPPLEMENTARY PAPERS

"INCREASING PRODUCTIVITY IN THE SHEEP INDUSTRY - THE ROLE OF BREEDING" Jim Shepherd A.M.S., Kwolyin

Productivity improvements in the livestock industries have lagged behind those in cropping because farmers have left too many decisions to other people, in particular the stock firms in marketing and the studs in breeding.

Revolution must be at grass roots level, as with group breeding schemes.

"PRODUCTIVITY AND DAIRY FARMERS' RETURNS" N.S. Snow

A one-day seminar on June 23, run by the Australian Dairy Corporation and the Productivity Council of Australia, came up with a list of suggestions for the farm and manufacturing levels. The list emphasized farmer training, better use of extension services and increased herd size per man.

PRODUCTIVITY - A DAIRY FARMING VIEWPOINT" J. Bennett

The answer does not lie in diversification, lower input costs are not on, and nor is a lower standard of living. Leaving the industry does not offer good prospects under present economic conditions. Increased price of milk plus new technology are seen as the only answers.

"WORKSHOP ON IMPROVING THE SERVICING OF ANIMAL BREEDING PROGRAMMES IN AUSTRALIA - DRAFT CONCLUSIONS" Keith Hammond, N.S.W. D/A

Of the 18 detailed conclusions, the following are worthy of special note:

Herd size for some animal industries is often so small as to require co-operative breeding groups or other large gene-pool methods.
Successful large scale breeding programmes often follow advances in technology, hence the opportunities created by sale of wool by measured sample, and carcass classification in meat animals. Planned extension programmes should take account of sociological factors influencing the acceptance of breeding programmes. Those factors need to be better identified.

Communication problems exist particularly between animal geneticists and industry.

There is a need to define the size of gains available from genetic improvement, since they benefit the nation as a whole.

There is a need for further co-ordination of data collection and processing services and breeding programmes by Government and the industry. Perhaps this should include the establishment of national livestock improvement centres as have recently developed overseas.
DISCUSsION GROUP AIMS AND RESULTS

Ten groups averaging about 15 people in each were given about 5 hours to come up with conclusions in specific subject areas, broken by a 1½ hour plenary session to get wider feedback on ideas generated in first 2½ hours of group discussion.

The final plenary session aimed to arrive at a final consensus report for each of the following areas:

   I  - grains
   II - sheep
   III - beef
   IV - syndication
   V  - land and related issues
   VI - credit and investment
   VII - education and related labour issues

Aims

- identify the greatest productivity pay-offs;
- indicate the chances of achieving these pay-offs;
- suggest how relevant people should go about achieving these pay-offs.

Results

As expected, the group size was too large and the subject matter too extensive for this exercise to be really effective. Nevertheless, the group discussion sessions were valuable to me in getting to know and learn from other group members, who included Ivo Dean (Principal, Marcus Oldham), Shankar Chamala (ld Uni extension lecturer), Beryl Ingold (Pres., NSW Ag. Bureaux), Bill Shields (Ires., Rural Youth), Rob Napier (Principal, Orange Ag. College), Josie Aheal (student, Roseworthy), Doug Randall (C.H.S.O., Canberra), Roger O'Farrell (Snr L.O., Echuca), Gavin Riggs (Asst. Dir., Roseworthy), Bill McClymont (Iprof. Nutrition, UNE), Barrie Thistlethwayte (Principal, Wagga Ag. College), Bruce French (Dep. Dir. Gen, NSW D/A), Sandy Cutlbertson (Asst Commissioner, IAC), and Ron McCutcheon (Tas. Dept Ag adviser).
The group was keen to know more about the Farm Management Foundation and promote type of continuing farmer education.

A printed summary of group conclusions will be provided by WRAU later. They have already indicated they intend to undertake a study of syndication with a view to publishing in about 12 months a booklet on syndication for farmers.

Following is a brief summary of major points brought out by groups:

I GRAINS INDUSTRY

Production increases through productivity increases in Australia won't depress world prices.

Market outlook information from reputable sources should be co-ordinated for growers and disseminated more widely and more often.

Research should be more problem oriented and less career oriented.

Farmers should be more involved in planning research.

System of rewards to individual scientists should be changed to encourage problem orientation.

Payment for grain should be based on relevant quality measures.

Agricultural engineers should more often be in research teams tackling applied problems.

There is scope for more use of big machinery commensurate with hectarage.

Biggest pay off opportunity is greater adoption of available technologies in the areas of plant breeding, soil science and machinery.

Encourage research, extension and commercial organisations to adopt the Feekes scale of plant growth.

Take long range weather forecasts and distribute them widely.
II GROUP FARMING

Pay offs:
- lower labour and machinery costs;
- group decision making ("think-tanks") catalyses innovative thinking and member confidence;
- security for members and ability to bear more risk;
- better record keeping, working conditions and treatment by lenders;
- enhance independence of members and more socialisation of farm families.

Conclusions: -
- group farming only accepted by a small minority;
- acceptance would increase with illustration of benefits by ventures already operating;
- economic circumstances of the 1980's may well force adoption of group farming.

Recommendations: -
That VRAG initiate a project to
- identify types of group farming ventures and the benefits and problems of each;
- establish guidelines for the establishment of group farming ventures.

III SHEEP INDUSTRY

1. There's a need for effective extension of proven technology, e.g. have successful innovators on short term contract to State Departments of Agriculture.

2. Further research and application needed in the areas of blowflies, wool harvesting, higher fertility, identification of dry ewes, and drenching vs immunisation.

3. Increased proportion and age of ewes would reduce replacement costs and increase turn-off.

4. Sharing of labour, equipment, yards and woolsheds.
5. Increased flock size.

6. Need to foster farm apprenticeships and management education.

7. Need to increase the flow of market information.

8. Need to identify the problems of and gains from syndication and amalgamation.

IV BEEF INDUSTRY

1. Carcase classification will lead to better market awareness, hence better management, breeding, disease awareness and nutrition for finishing.

2. Input levels can be reduced by the development of easy care animals and rationalisation of management systems.

3. Herd reduction should be used to cull heavier and eradicate disease.

4. Better farm results requires - better feeding for first pregnancies;
   - new pasture management and fodder conservation techniques;
   - improved management skills and organisation;
   - breeding programme on objective lines;
   - heterosis.

Recommendations:

- immediate introduction of objective electronic carcase classification and development of computer based selling systems;

- review of adjustment measures to help disadvantaged producers and rural communities;

- continuous monitoring of the national herd size, output, number of producers and their income situation;

- encourage research in disease screening and culling techniques;
- more aggressive approach to overseas marketing;
- highlight the degrees of risk in giving better situation and outlook information in language farmers can understand.

V LAND
Pay-offs most pronounced from more leasing and syndication.

A comprehensive regional approach should be adopted to structural adjustment, including ownership and use, to ensure the wise use of resources for farm, community, conservation and environmental purposes. KRAU should study the effectiveness of various agencies in providing or arranging management counselling for farmers. Individual initiative is the best approach to overcoming the social, financial and legal constraints to leasing and syndication. KRAU or Government should identify the potential gains from leasing and syndication as exemplified now in Australia and overseas.

VI CREDIT
LED's should be usable as security by banks if necessary, rather than be redeemed to finance a capital project. More flexibility in repayment arrangements.

A booklet should be produced which informs on credit facilities available to farmers and how to obtain financial and technical advice. It should be distributed to bank managers, accountants, consultants and solicitors as well as farmers.

VII EDUCATION
Existing educational facilities are not being fully utilised because of a lack of perceived relevance.

Negotiability of agricultural college training should be improved - i.e. tickets should be relevant to a wider range of jobs.

School teachers have an inferior image of farming which tends to promote it only to the less intelligent students - could correct this partly by closer contact of extension people with schools.
Extension services should do more to promote courses and the need for courses.

Home study courses would counter the geographical problems to access and should involve local tutorial support.

The most effective method of extension is by intensive extension efforts where the problem areas have been defined by small group discussions.

Training of extension workers should lead them to identify with farmers.

Block release courses and activities of the style of the Farm Management Foundation should be encouraged.

NOTE: Final conclusions and recommendations are to be published by K.R.A.U.