NSW Association of Agriculture Teachers Inc.

Bulletin of the NSW Association of Agriculture Teachers

B.A.T.



inside....

HSC White Paper
The Green Machine
ST Gregory's Profile

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NSW Agriculture
University of Western Sydney
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EDITORIAL

Welcome to the first edition of BAAT for 1998 (or the third edition for 1997) ....

We wanted to have it to you in 1997, but time had the final say. Let's hope that BAAT will give you a good start to the new year.

As mentioned in the previous publication we planned that this edition would have a major emphasis on student practicals, worksheets, etc. We have received great support from many teachers, and would appreciate as much input as possible to make BAAT an essential resource. Unfortunately, space limitations and very pressing issues such as the "HSC White Paper" and demand for *The Green Machine* have meant that many resources will be carried over to future editions.

Trevor Sewell must be thanked for his time and effort in response to the "HSC White Paper" and report on the options discussed at a meeting with the Board of Studies on 27 November.

If you have any input please contact Chris Ryan at the Board of Studies - Review Team - fax (02) 9367 8376.

A major concern is member numbers (still). We have now reached the point where we can only afford to supply financial members with editions of BAAT. So if you know of people who are **not** members or if your membership has waned or if you are **not** sure please contact or fax Phil Armour at Yass High School.

In conclusion, thanks to those people who had input into this edition of BAAT and to those who have sent in material for future editions. PLEASE KEEP THEM COMING IN.

Reminders

* NSW Association of Agriculture Teachers "e-mail address"
  aatsectj@acr.net.au.
* HSC on-line
  http://hsc.csu.edu.au/
* 1999 Biennial Conference
  Orange Agriculture College
  18-21 January 1999
* Agriculture - Special Interest Group
  - contact Ian Judd
  Menai High School.

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PRESIDENT'S REPORT



Welcome to the first BAAT for 1998. Probably the most important issues facing agricultural teachers at the moment are proposals relating to the HSC and School Certificate. These proposals have resulted from the White Paper, *Securing Their Future*. An investigation of the proposed 2 unit curriculum model in Agriculture and Design and Technology is currently being undertaken. As you are no doubt aware, the investigation will examine the feasibility of a 2 Unit structure for each of the subjects which already offer a 3 Unit course. The Agriculture subject team consists of Ivan Grant, Adrian Harris, Rod Francis and Jenni Wilkins. Sheree Bourke is representing the association in the Design and Technology area.

Sue Hope, Trevor Sewell and two other agriculture teachers have been to a consultative meeting with the Agriculture subject team in late November (Report in this edition).

Trevor Sewell has put a great deal of thought into the proposed changes and has written a detailed report expressing deep concern about a number of issues. This document has been tabled with the agriculture subject team. It is felt that these changes will seriously disadvantage a number of students. Briefly, the dropping of the separate 3 Unit in most subjects will mean that a number of talented students will not be able to study subjects of their choice at the highest level. Many schools will not have the flexibility to staff additional periods for the proposed Standard and Advanced course. Country and smaller metropolitan schools will be disadvantaged. Student choice in these schools will be reduced (Refer to Trevor's letter in this edition).

Because of the range of courses available to students many schools will find it difficult to run two courses such as Agriculture and Rural Industries due to the competition for limited time allocation and staffing.

Under the proposed changes in the School Certificate, subjects such as Agriculture could be reduced in the elective lines or lost. Whilst students are compelled to take Australian History, Australian Geography and Civics our once diverse curriculum is becoming more narrow and specific.

Essentially these proposed changes could mean a decline of Agriculture in our schools.

Network

The network is up and running. The coordinators are listed for your district. I do not have a coordinator for the Broken Hill, Lake Macquarie, Moree, Port Macquarie or immediate Tamworth District. If an agriculture teacher could help out in one of these districts I would be delighted. I am also missing a few telephone or fax numbers. If you could fax those to me ASAP I will make the changes.

Farm Tractor Safety and Chemical Safety

The association has written a letter to John Aquilina, MP Minister for Education and Training concerning the training of agriculture teachers and farm assistants in the areas of farm tractor safety and farm chemicals. The association would find it desirable if accredited agriculture teachers offer training in farm chemical and tractor safety to farm assistants and their colleagues who have not completed the rural industries course. Mr Aquilina has replied to the letter and suggested that the proposal is worthy of consideration. The concerns have been noted and the matters that have been raised are being investigated.

National Association

The Queensland National Conference was held at the Hyatt Regency, Coolum, On Wednesday, 14 - 17 January. A report on this will appear in the next edition of BAAT. The national executive have been working on a 'wool project' booklet this year. The booklet should be available to all members at the end of this year or beginning of next year.

Many thanks for the enormous effort put in by the association executive and BAAT team last year. The team includes Trevor Sewell, Phil Armour, Craig O'Brien, Dave Kent, Don Selway, Russel Firth and Ross Irvin. I would also like to thank the Sydney executive, Jenni Wilkins and Sally Bannerman for their input, and the many members who contribute many hours of their time to serve on committees such as syllabus committees and advisory committees. I hope everybody had a wonderful Christmas and a great New Year.

A Word from our Gold Sponsor -

COTTON FOUNDATION

COTTON EDUCATION #1

Cotton Australia's education program is aimed at encouraging young Australians to carefully investigate for themselves all aspects of the critical issues now facing Agriculture in Australia, to demonstrate that decision-making is oftentimes a difficult exercise, and to skill them for involvement in community-based committees and groups.

Here is one aspect of the program:

Youth Challenge Forums, are developed and presented by Melbourne-based Ryebuck Media during May each year and are generally held in Sydney and Brisbane and several large regional centres throughout NSW and Queensland. The day-long Challenges are designed to be applicable across the curriculum and present students with a hypothetical situation on video (in 1997 it was *Are Cotton Farmers Good Water Managers)*, take them through a fun interactive on decision-making before they break up into workshops to devise a solution for the hypothetical. Their solution is then presented through a role-play or dramatisation. The emphasis is on fun, investigation, and making decisions.

Schools are invited to send one teacher and up to 10 students, and Cotton Australia offers reimbursement of replacement teacher and travel costs.

Students who attend the Challenge Forums are then invited to do a further Research Project on the issue presented. The research might be presented in a photo essay, on a video, via a 1000 word essay and so on and the eight outstanding researchers win a two day, all expenses paid trip to the city hosting that year's Cotton Conference or Cross Industry Forum (in 1997 that is Brisbane) where they spend a day and a half sightseeing and half a day working on presentations and then presenting their findings to the Cotton Industry.

To register your interest in attending the 1998 Youth Challenge series call Ryebuck Media on - (03) 95002399.

COTTON AUSTRALIA
INTERACTIVE WEB SITE
WWN farmwide,com./au/nff/cotton/cotton.htm



TREASURER'S REPORT

As treasurer, I am very much concerned with maintaining and improving the membership status of the association. There have been a few hiccups along the way in 1997 but as the members of the Executive proceed into their second year it is to be hoped that our efforts come to fruition.

Recently letters were sent to 300 or so Agriculture Teachers who are not members to remind them of the association and BAAT, so we wait to see what effect that has. We need to maintain the financial basis of the association as it funds BAAT, which as many teachers have mentioned to me, is one of the best things the association has to offer.

May I remind those members who find their name on the 1997 members list enclosed in this BAAT that they should fill out the renewal slip below and get it to me ASAP.

Wishing you all a happy New Year in the service.

Phil Armour, Treasurer NSWAAT

NSWAAT MEMBERSHIP RENEWAL

NAME _____

SCHOOL _____

I wish to renew my membership for *(Please Tick)* ☐ one year ☐ two years

I enclose $ _____ ($30 per year or $60 for two years)

Change of Address (if applicable) _____

_____

_____

Please return to - **Phil Armour**
Yass High School
Locked Bag 1
YASS NSW 2582

Letter to the Board of Studies

N.S.W. ASSOCIATION of AGRICULTURE TEACHERS

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'Securing Their Future'

The NSW Association of Agriculture Teachers expresses very deep concern about a number of the proposals in this paper. Of major concerns, at present, are the 3 Unit proposal and the changes to the School Certificate.

HSC Changes - 3 Unit proposal

It is felt that these changes seriously disadvantage a number of students. The dropping of the separate 3 Unit in most subjects will mean that a number of talented students with outstanding academic prospects will not be able to study subjects of their choice at the highest level. Our understanding is that the proposal will do away with the 3 Unit additional work equating to 3 periods in Year 12. This will be replaced by a Standard course with 6 periods in Year 11 and 12 AND an Advanced course with 6 periods in Years 11 and 12. This means that schools will have to find 24 periods to teach both levels of the course, say in Agriculture or Engineering Science. The existing structure requires a maximum of 15 periods. Schools will not have the staffing flexibility to find these extra 9 periods.

Even if the two courses ran only in Year 12 there would be an additional 3 periods required. This can only be offered at the expense of other full 2 Unit courses or by reducing significantly the number of higher level courses offered. This approach will severely limit country schools and in particular smaller country schools.

A typical class in Year 11 Agriculture may be 15 to 20 students in Year 11 doing 2 Unit (6 periods). Of these there are likely to be 3 to 5 students who may be able, or wish to do the course at a more challenging level. The existing arrangements are that these students would be allocated 2 or 3 periods in Year 12, to study the additional 1 Unit course (called a 3 Unit additional). The proposal for two 2 Unit courses would leave the schools with an awkward decision - It cannot afford all the advanced courses so the choice would be between running the standard course for 6 periods for all 15 to 20 students or running an advanced course only, for the 3 to 5 students. There really is no choice as the school has to accommodate the greater number, so the standard course is run. This means that the talented, interested 3 or 5 will have no access to the advanced course.

Some people would say, students can change schools. Go where the courses are. This is not a practical suggestion in smaller country towns with one Comprehensive High School supposedly serving the local community. In most cases a second High School is some 30 to 60 km away. There are often no regular bus services meeting the time requirements for schools. Not like in a city.

Many students will not move away and many parents cannot afford to send students to a compulsory fee school. The supposed equity principles of access and achievement are not being applied. In fact the policy suggested is discriminatory in design as the disadvantage is a known fact.

A second problem associated with this re-structuring, is an emphasis on vocational Education courses to apparently fill the gap left by employers, who do not want to waste time training employees in the specific nuances of their industry. They want fully qualified and experienced employees from day one.

HSC changes - Vocational Courses

Many schools will be unable to run both academic courses, such as Agriculture and the vocational education courses such as Rural Studies. This increases the range of choices competing for the same limited time allocation. So that now a school will have to consider firstly having individual teachers trained to teach the new vocational education courses, such as Rural Studies or Retailing and then offer students Agriculture 2 Unit Standard; Agriculture 2 Unit Advanced and Rural Studies. The outcome will be in smaller schools that only one of these courses will be run. Choosing the VocEd Courses, to apparently satisfy an employer, who will not guarantee a job, limits some of the future options of students. The present evidence is that a majority will stay with the academic choice hoping to get an entry into University or some other institution. This is primarily because the employers are not offering jobs at the same rate as Universities offer placements. There is a very poor apprenticeship or on the job training structure.

So is the future secured for you, if you are not academically inclined, gifted or talented in a school below about 700 students? Or is it very bleak? It will be almost impossible to pursue a future in special subjects because the schools will be unable to accommodate the diverse curriculum that has been developed over the past 20 years. Schools will have to make a simple choice, virtually as a specific ongoing direction for all its students:

1. To continue meeting the needs of academic students, aiming for a good to high tertiary entrance chance;

OR

2. To cater for the vocational courses with specific career type training such as Hospitality, Rural Industries or Building Trades.

Schools will not be able to cater for both on the present staffing formulae. They will not have the flexibility to accommodate both in the teaching periods allowed, in terms of student numbers and in terms of expertise and ongoing support.

Departmental regulations and support already present significant difficulties for schools in terms of the teaching of languages and vocational subjects. If a trained teacher is sick or on any long term leave, it is almost impossible to get a trained, specialist replacement. As an example, at Moruya High School which teaches Hospitality and Japanese, there are no relief teachers trained in these subjects. Teachers have to go through ongoing vocational education training to maintain industry awareness and standards. Whilst they are away there

is no qualified replacement. This applies in the very diversified course called Rural Studies which could be seen in some schools as a vocational alternative to Agriculture.

Consider the choices that a school would have to face in terms of courses such as Agriculture in Years 11 and 12:

a. Offer the 2 Unit Standard course for all interested students;
b. Offer Rural Studies for students more vocationally motivated and less academically inclined;
c. Offer the 2 unit Advanced course for students with a greater interest and ability in the subject;
d. Drop the subject altogether because of competition for the teaching periods.

All three courses running would cost 18 periods per year (36 over the two years). This could only come at the expense of other subjects. With the present structure (including a 3 Unit course) a school could offer 3 basic subjects at 2 Unit level or two and a half basic subjects at the 2 Unit level plus two at 3 Unit level for the same 36 periods. Schools will be forced to adopt, within staffing constraints, the course which satisfies the greatest number of students. This will often lock out either academic or vocational options.

The proposed changes will force schools below 700 students, into becoming "elitist" academic catering for the Advanced courses or vocational schools catering mainly for the career oriented students or standard schools which cannot cater for extensions of talent because of numbers and period constraints.

The changes proposed will marginalise subjects where a normal class size starts in Year 11 at 15 to 20 students. These subjects will end up with split selections and often, as a result, will be non-viable leaving neither course running.

SC Changes

In a somewhat similar way, the proposed School Certificate changes will cause subjects to be lost from the curriculum. Yet the Department of School Education, in its own documents, repeatedly states that an effective school will "provide appropriate curriculum to meet the needs of each student". This is not taken to mean that a school will teach anything. But it is taken to mean that schools will offer a diverse and challenging curriculum.

The SC changes proposed mean that there will be a new compulsory subject - Australian History, Australian Geography and Civics. This will occupy 5 periods of the timetabled week for all students in Years 9 and 10. Students will be compelled to do English, Mathematics and Science, plus the above "subject". The students will then choose three other subjects.

However, in the past, it was compulsory to choose an HSIE subject such as History, Geography, Asian Studies or Commerce. The new structure proposes that the Australian History, Geography and Civics would replace this compulsion. Then students would be free to choose other subjects, including the social studies types named above. A double bite. Students who choose the second go at the HSIE subjects will begin to push out other subjects, such as Agriculture, which provide genuine diversity and fulfil a specific need in the community.

A Summary

From the very parochial view of Agriculture, and with a view to Australia's future, we are extremely concerned about these proposed changes. All reliable evidence suggests that our real marketing and economic future is based on trade with Asia. The major needs of these places will, for years to come, be food and fibre (for clothing) from renewable resources, as well as finite mineral resources. Australian Agriculture will be expected to continue supplying these needs to a large Asian population and to earn the needed import credits to maintain a balance of payments.

Our clean and green image is significant in providing access to these markets and balance of trade prospects. This will also create more jobs in Australia as we meet the food standards being imposed. This will require appropriate education for students who later will enter an Asian oriented work force. A fundamental understanding of Agriculture in its many facets becomes increasingly important both in jobs and in terms of negotiating trade.

Our training pathways and the application of computers must take a view to the long term rather than immediate satisfaction of demand now for jobs or workers. The future of this nation is based on the longer term development of skills, competencies and knowledge that will support this country beyond 2050 or 2100. That must start now and not be usurped by short term demands of employers or short sighted planners. It will essentially be Asia oriented.

Even within our developing cultural links with Asian countries there is a growing need to understand their agriculture and to provide the creative consultancy to increase agricultural productivity. This all requires a fundamental understanding of the concepts and processes of Agriculture and an ability to modify systems to local conditions.

To supply this need, using Australian training and personnel requires a greater number of students studying Agriculture, rather than marginalising the subject or restricting it to those specialised, selective high schools. A similar conclusion can be drawn about Asian Studies and a number of other subjects in elective lines.

A Clarification

Following discussions with some teachers and schools.

At our school, say in Year 9, we have seven subject lines plus the required PE/PD etc.
Line 1 = English; Line 2 = Mathematics; Line 3 = Science;
Line 4 = 6 "Social Science" classes in which it is at present compulsory to do one (Asian Studies, Commerce, Computing Studies; Geography; History 2)
Line 5 = Art, D&T Textiles; Electronic; Food Tech 2; Wood Tech. 5 subjects, 6 classes
Line 6 = Art; Commerce; Computers; Food Tech; Music; Rural Tech 6 subjects, 6 classes
Line 7 = Agric; Computers; Drama; History; Japanese; Wood Tech 6 subjects, 6 classes

Our concern is that students will be compelled to do a new course Australian History/Geography and Civics in Line 4. The 5 subjects presently in Line 4 will move into, and compete with the existing 18 classes already in Lines 5, 6 and 7 which can only have 6 classes each. If we assumed that one History and one Asian Studies class gets up THEN two classes have to drop. These are most likely to be the "at risk" subjects with lower numbers. The subjects at risk in our school, on present numbers would be Japanese, Rural Technics and D&T Textiles.

In 1998 it is possible that Agriculture could be at risk. The point being that six classes would

have to be shed. This has to place subjects with smaller candidature's at risk OR narrow the curriculum.

The comment is not exclusively an Agriculture argument. It is more that subjects, in smaller schools which have only one class and may be at risk from numbers are under greater threat. Our country increasingly needs people who understand Agriculture, its problems and the future. There is also an increasing need to provide for non-work time with creative activities. The "hobby farm" and drift to the country is clear evidence of the trend in terms of life style and personal choice.

The proposed change, in time, has the real potential to marginalise some subjects in many schools. Our fear is that Agriculture will be one such subject.

We hope that you have time to consider the enclosed in terms of your real position. We see schools, especially small schools, being significantly affected. The ultimate outcome will also affect staffing in terms of a potential increase in HSIE/History staff, without an increase in total staffing.

Yours faithfully,

Trevor J. Sewell
Secretary
NSW Association of Agriculture Teachers Inc
28 October 1997

High School was perfect venue for ag conference

Emerging Opportunities in Agriculture has attracted 500 people to Murrumburrah High School.

Interested landholders from across southern NSW and as far away as Sydney, Canberra and Victoria travelled to Harden on Friday to hear from 48 speakers.

Designed as a once-off conference, organisers were more than pleased with the support from the local farming and business communities while conference goers appreciated the opportunity to discuss their personal situation one on one with speakers between sessions.

Harden-Murrumburrah Landcare President Neill McColl said the High School proved an ideal venue and received numerous positive comments throughout the day.

One fellow said he was surprised how good it was.

With the subjects proving more than acceptable, speakers were kept busy working very hard to answer the many questions being asked of them.

The most popular subjects were the growing and processing of olives, followed by bramble and berry fruits, the commercial production of herbs and trees, Mr McColl said.

Also capturing the crowd's attention was the butchers section, showing how to cut up lamb.

A perfect end to the day was a shower of rain at the close of the conference.

The 60 page manual from the conference is available for $10 per copy through (cheque payable to) Harden Landcare Conference Account, 10 Meymott Place, LATHAM ACT 2615.

(Extract from Harden Express, 6 November 1997)

HSC WHITE PAPER - AGRICULTURE CONSULTATION

2 December 1997

Dear Agriculture Teachers,

On Thursday 27 November, T. Sewell, S. Hope and R. McGregor attended a meeting involving the Agriculture Subject Team in Sydney, resulting from the White Paper, *Securing Their Future*!

The Agriculture subject team is consulting separately with groups from across the **education** sector. **The Agriculture subject team comprises of Brian Davis (OSE), Rod Francis, Adrian Harrison, Ivan Grant and Jennie Wilkins**.

This meeting is most important because it considered the future of 2 & 3 Unit Agriculture in a slightly different format.

We were asked to pass opinions on weaknesses and strengths of 3 models. It would appear that our 2 Unit/3 Unit Course we NOW teach was not under any consideration.

All Agriculture teachers need to know what is happening in their subject area. **Nothing will change until the year 2000.**

Outlined below is a draft set of Models relating to the Preliminary and HSC courses post McGaw white paper.

Most groups of professionals argued that the (2) New Single Course was the best of the 3 proposals. YOU NEED TO THINK ABOUT THE EFFECTS OF THESE PROPOSALS IN YOUR SCHOOL. Remember, 17 subject groups are to meet and come up with a common proposal.

HSC AGRICULTURE - PROPOSED MODELS - 1997

Model I
Present
6 +
6 + 3
15 periods

PRELIMINARY COURSE - 6 X 40 minute periods

HSC 6 x 40 minute periods

3 unit - 2 or 3 x 40 minute periods

\+ CURRENT PRELIMINARY

\+ CURRENT HSC

➜ This model was **not** considered

Model II
New SINGLE Course
6 +
6
Research groups incorporated periods

PRELIMINARY COURSE - 6 x 40 minute periods

HSC - 60% CORE
4 x 40 minute periods

A. RESEARCH PROJECT
40% 2 x 40 minute periods

Students do either A or B in the one class at the same time or go to a Learning Centre

B. RESEARCH ELECTIVES
40% 2 x 40 minute periods

\+ CURRENT PRELIMINARY

➜ Recommended Model

* 3 Unit is abolished

* Students in your class can elect to do either the Research Project or the Research Elective ie 2 courses could run in your class at the same time in the HSC Course.

Model III
DIFFERENTIATED Course A
6
4 + 2 + 4
16 periods IF both courses run

PRELIMINARY COURSE 6 x 40 minute periods

STANDARD COURSE

4 x 40 minute periods + 2 x 40 minute periods

40% INDUSTRY STUDY

20% FARM PRODUCT & CASE

40% COMMON COMPONENT PRODUCTION

40% RESEARCH PROJECT

20% RESEARCH ELECTIVES

2 x 40 minute periods + 4 x 40 minute periods

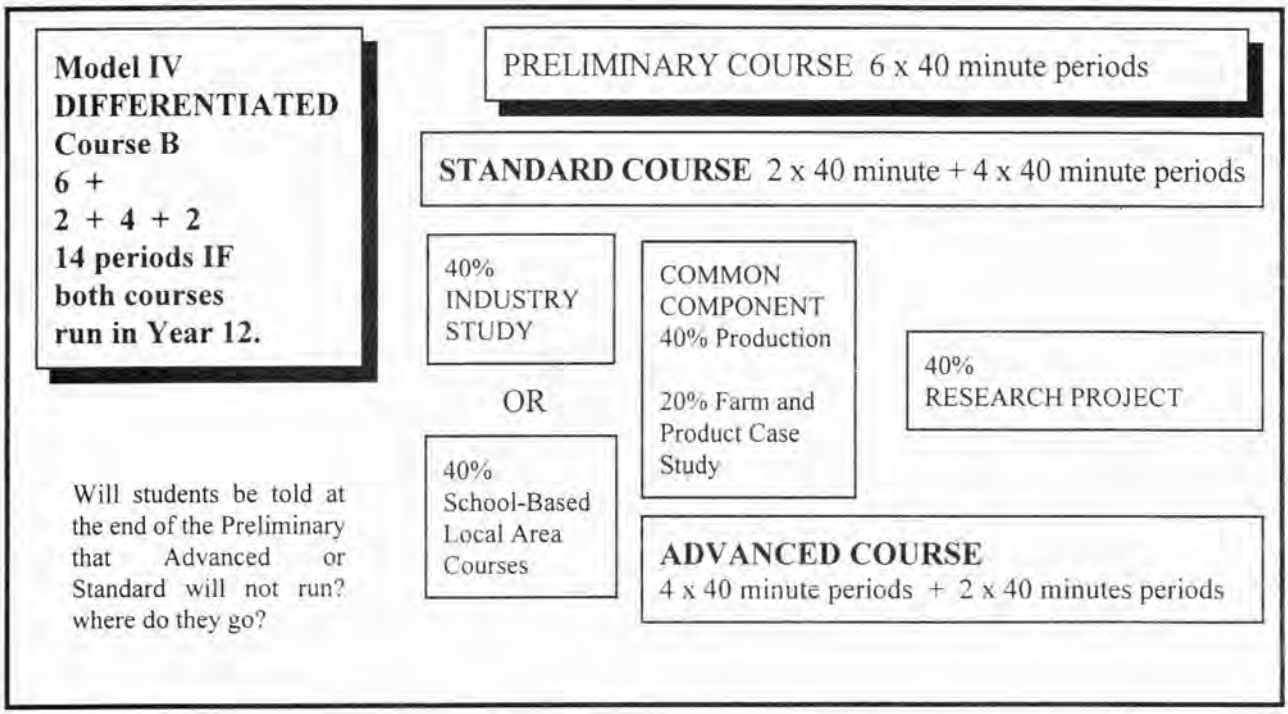
ADVANCED COURSE

Need to consider whether the school has the time and resources to allocate both courses and whether student numbers can warrant both OR will you reduce period allocations to accommodate.

\+ Current Preliminary

* It consists of a Standard + Advanced Course in the HSC year. A teacher could be expected to teach the elective and Research Project in the one class. If schools wished to teach Standard and Advanced courses within the HSC course they could be teaching three different content areas.

This proposal is also more expensive in terms of periods.
Therefore Preliminary = six periods. HSC = 4 periods + 2 periods + 4 periods Total.



\+ Current Preliminary

* It consists of a standard and advanced course in the HSC year. A teacher could be expected to teach **ONE** of the following options.

OPTION 1		Standard Course	6 Periods
OR	2	Advanced Course	6 Periods
OR	3	Common Component	4 Periods
		+ Standard Course	2 Periods
		+ Advanced Course	2 Periods
		TOTAL	8 Periods
OR	4	Standard & Advanced Courses run together	6 Periods

Model IV has a larger Common Component and a wider choice. This would be even more demanding on teacher time. Again not impossible, but an added burden to organise the Industry Study as well as a School based Local Area course. The same competition for Standard or Advanced courses.

Schools with a high student population could afford to run both the Advanced and Standard Course. Schools with a small population of Agriculture students (the majority) could only afford to run one course ie. Standard or Advanced. Few schools can afford to run 2 courses due to staffing arrangements and timetabling concerns ie. 12 periods for the HSC year.

The Agriculture Association argued that this was not equitable or fair to teachers or students. There needs to be **equity** between **ALL** schools in NSW.

DISTANCE LEARNING MATERIALS

In recent months, the number of distance learning materials to support modules within the National Rural Skills Traineeship has increased significantly.

Should you require further information or assistance, please contact me on **1800 647798**.

Kathy Luff



EDITOR'S REPORT - Moss Vale High purchased a number of these modules in 1996 and have found them to be an excellent and cheap resource for Rural Industries CEC and will fit nicely into the new Junior Syllabus

* ***Order form supplied as "flier"***



NSW DEPARTMENT OF SCHOOL EDUCATION
STATE AGRICULTURE ADVISORY GROUP

Meeting : 9.30am, 10 November 1997
Bridge Street Sydney

Present : Jim Mather, Delroy High School; Peter Jones, Colo High School; Phil Armour, Yass High School; Phil Hurst, Hawkesbury High School; Craig O'Brien, Moss Vale High School.

Apologies : Chris Evans, Mt Druitt District Office.

Business Arising
All items noted in the minutes have been acted upon.
The Group's attention was drawn to the Schools' Financial Management Folder with regard to the disposal of unwanted and dangerous equipment.

Agenda Items

1. AGRICULTURAL STORES VOTE

a. *Small School Funding*
The meeting agreed that all Central and High Schools declared as "small" schools would now be given a base funding rate of $400 per year. NB - This figure replaces the amount allocated during the meeting of 18 September of $200/small school/year.

The meeting agreed upon a cut off point, between small and large schools, equal to or less than 415 points.

There are 53 small schools and each will be paid $400/year = $21,200.

b. *Larger Schools*
Schools with a points value in 1997 greater than 415 are to be funded by the equation:

Number of points allocated to that school in 1997* value of the point in 1997

The money left for the large schools = $273,000 - $21,200
= $251,800

There are 263,869 points allocated to the large schools.

Therefore the value of the point will be = $251,800
263,869 points
= $0.9542613/point

2. ALLOCATION OF THE MACHINERY MAINTENANCE VOTE

The allocation of money linked with the maintenance of agricultural machinery used on school farms for the 1998 school year is to be based on the points allocated to each school.

Schools are to be classified into either of three groups. These are:

(a) small schools which are to be allocated a sum of $250/year
(b) medium schools which are to be allocated a sum of $450/year
(c) large schools which are to be allocated $600/year.

Size of School	Old Cut Off Points	New Cut Off Points
Small	equal to or less than 415	equal to or less than 415
Medium	greater than 415 but less than 1,200	greater than 415 but less than 1,200
Large	greater than 1,200	greater than 1,200

Using the new cut off points then the funding will be allocated as follows:

68 small schools *$250 = $17,000
86 medium schools *$450 = $38,000
95 large schools * $600 = $57,000

Total allocation	$112,700

3. TRACTOR REPLACEMENT PROGRAM

a. *New survey sent to some schools*

A second survey is to be sent out to all schools identified on the agricultural student survey return as teaching agriculture but indicates that they have minimal agricultural equipment for the purposes of teaching the subject (if any).

This questionnaire will be used to accurately gauge the following:

- past and present trends in teaching Board approved courses in agriculture;
- the facilities presently available at the school or in close proximity to school that can be used to teach agriculture, eg. shedding, fencing, lands, machinery, allocation of a farm assistant, etc.
- the type and amount of support the school is prepared to give the teaching of agriculture.

This survey is to be sent out by the Schools Financial Support Unit.

This advisory group will discuss the responses from the surveys and make recommendations to the Director of the Properties re. the inclusion of these schools on the tractor replacement program.

b. *Which gear is to be replaced?*

It was suggested by the Director of Properties that:

(i) Properties Directorate would consider the replacement of the following equipment
- one tractor used on the school farm
- one slasher used in the teaching of agriculture
- one PTO driven rotary hoe.

(ii) It would be the individual school's responsibility to replace the walk behind rotary hoe.

(iii) School Principals need to have broken equipment *fixed or disabled* so that it can not be used and then that equipment needs to be disposed of as per the School Financial Management Folder or turned into a museum piece.

(iv) Principals need to determine if equipment is beyond economic repair.

(v) Consideration should be given to the age of the machine and the hours used.

(vI) There would be little need in having a tractor with a power rating greater than 25hp (18.65KW) on a school farm.

(vii) A possible criteria to consider tractor replacement could be 3,000 hours and over 10 years of age.

Due to inaccuracies in the reporting of the hours in the original survey it has been decided that the criteria for replacement is as follows:

Priority 1 - dangerous equipment
Priority 2 - purchase date (oldest tractors to be replaced first)
Priority 3 - tractors with high usage rates.

It was recommended at the meeting that equipment be replaced in a "package deal". The package will consist of the following:
- a 20 to 25hp (14.92 to 18.65KW) tractor which has four wheel assist drive
- a PTO powered rotary hoe with a maximum cut of 1.2 metres
- a 1.2 metre wide slasher.

Such a package would cost in the vicinity of $15,000.

Any school due to receive this machinery allocation would be notified prior to its delivery by Properties Directorate or their agent.

Any school which feels that the package is not suitable for their conditions would need to notify Properties Directorate and establish dialogue with regard to that school contributing to the costs of upgrading the package.

The following recommendation has been presented to Properties Directorate for their discussion.

RECOMMENDATION

1. The Tractor Replacement Program be re-established.
2. School be supplied a package of agricultural machinery as listed above at an interval of not more than 7 years.
3. Schools have the ability to upgrade their package by meeting the difference in costs.
4. The State Agricultural Advisory Committee is to advise Properties Directorate of the priority schools to be supplied in the forthcoming year.

Letters to the Editor

FROM: Col McEntyre
John Paul College
COFFS HARBOUR

It is great to see that our Association is involved in putting the case for "Agriculture Studies" on behalf of the teachers and potential students. Our subject is not always seen as important by Principals and Curriculum developers - to wit, the inclusion of Agriculture in Design & Technology.

There is also concern in my school about the loss of 3 Unit Agriculture. This course has been used by some students to dismiss a poor elective course and by many more to develop their understanding of scientific research methodology and to increase their knowledge of a particular area of Applied Science.

WHAT'S HAPPENING IN THE ARMIDALE DISTRICT



FROM: John Lee
Glen Innes High School

On 9 November 1997 we held a meeting of the Armidale District Agriculture Teachers' Network at Glen Innes. It was attended by 28 Agriculture teachers from private and government schools from WeeWaa to Woodenbong and most places in between. The main focus was the new Junior Syllabus. We decided to hold a two-day meeting to further develop the implementation of the new syllabus during February 1998. This meeting will be in Armidale; any interested people are invited to attend.

We are hoping to hold the Northern Schools Prime Lamb competition for 1998 in Armidale (hoof) and Wallangara (hook) during late Term I or early Term II next year. Further information can be obtained from Jill Wagner NEGS, Armidale or myself.

The Northern Schools Prime Stock Competition for 1998 will be held during the first week in November. The hoof section will be held in Armidale and the hook section in Tamworth. Anyone into steer raising and interested in participating is invited. Further details can be obtained from Rob Forsburg, TAS, Armidale or David Grady, Inverell High School.

We have just completed the 1997 Northern Schools Prime Stock Competition. Hoof section was run by Charlie Cochrane and helpers at Moree; hook section at Tamworth meatworks Inverell High cleaned up - Champion steer on hoof, champion carcass (a different steer) and champion overall steer. Overall, 18 schools competed with sixty-four steers being killed.

PRACTICAL EDUCATION IN AGRICULTURE at MURRUMBIDGEE COLLEGE OF AGRICULTURE



An emphasis on practical, hands on learning has made the Murrumbidgee College of Agriculture (MCA) a popular education provider since 1963.

The College offers a range of full time courses and traineeships which are open to Years 10, 11 and 12 school leavers.

Certificate II Traineeships include:

- Viticulture
- Rural Skills
- Amenities Horticulture
- Pigs
- Poultry
- Dairy
- Food Processing.

Traineeships consist of on the job and off the job training. The Viticulture Traineeship is totally workplace based training.

Full time courses include:

Certificate III in Agriculture
Certificate IV in Agriculture
Certificate IV in Pastoral Property Management.

One year courses attract Austudy and Abstudy.

College graduates can be found working on rural properties, stock and station agencies and rural service industries.

Certificate IV graduates may articulate into Charles Sturt University by special entry with credit points for various course components.

College facilities include modern residential accommodation and sporting facilities, new mechanisation training workshops, computer rooms with the latest technology and livestock training facilities including recently completed "state of the art" horse stables and yards.

Student tours and off campus training are integral parts of all courses. For example, cooperative training at the Northern Territory Rural College, Katherine and agricultural tours of Tasmania.

For further information on courses and 1998 enrolments phone (02) 6951 2700.

CB ALEXANDER AGRICULTURAL COLLEGE "TOCAL"

PRACTICAL HANDS-ON TRAINING

At Tocal Agricultural College, students spend half their time in practical on the job training. The College has a 2200ha property with large commercial beef, dairy and poultry enterprises. It also has sheep and horse sections, and students work closely with staff on these farms.

Tocal College is in the Hunter Valley, and commercial farms in the Hunter and throughout NSW and Queensland are also used to give students on-the-job work experience. Some students even do work experience in the Northern Territory or New Zealand.

The College offers a range of courses including full time, part time, and home study programs. Most students live on campus and have the opportunity to become involved in a wide range of after hours activities, including sporting and social events.

Students attending the College, vary from those who have completed Year 10 or 11, to HSC students and people who have been in the workforce for a number of years. Students come from a variety of backgrounds. many come from properties throughout NSW, while some people have little farm experience and come to Tocal to learn the necessary skills.

Graduates have no trouble finding positions on farms, working on beef, sheep or horse properties in Western and Northern NSW, whilst some go on to university, and others go into agribusiness such as stock and station agencies, machinery and chemical companies, or large commercial feedlots.

All College courses provide practical training which is relevant to the needs of industry. The fact that graduates have little trouble finding positions, demonstrates the value of the College courses.

Prospective students can easily gain further information by phoning the College on : 1800 025520.

AGRICULTURE offers exciting opportunities

NSW Agriculture's Colleges offer a range of courses in the food and fibre industries

- Full time residential courses
- Part time courses (traineeships and apprenticeships)
- Home study courses
- Short courses

New Courses

- **National Diploma and Advanced Diploma in Rural Business Management**
- **Viticulture and Food Processing Certificates**
- **Certificate in Rural Skills (Aboriginal Communities)**
- **Landcare Certificate**

Agricultural College courses are for:

- School leavers
- Land holders
- People working on farms
- New entrants to agriculture
- Aboriginal communities
- Food and fibre producers

NSW Agriculture



FOR FURTHER INFORMATION

Murrumbidgee College of Agriculture
Yanco NSW 2703
Ph (02) 69512700

C B Alexander Agricultural College
Tocal,
Paterson NSW 2421
Ph 1800 025520

Some Thoughts On Plant Propagation At School

Plant propagation has been a major part of the Agriculture course at Camden High School since 1985. Throughout this time Year 9 students have completed a unit of work on plant propagation that begins relatively early in the year (March - April), to take advantage of good environmental conditions for the growth of cuttings, and continues on throughout the year as follow up activities (potting on, etc) are required. We aim to have our nursery full of young plants at the end of the year so that they are ready for planting or sale in the autumn months. Obviously a reliable watering system is essential over the Christmas break. Battery operated "computer waterers" work well if you remember to check the batteries regularly.

Only native species are grown and most of these are from the local area, especially those grown from seed. Some thought needs to go into the selection of the species to propagate and it is important to have some means of disposal of your plants in mind. We sell a few to staff and parents. Most, however, are sold to the local council. Other possibilities include golf clubs, local farmers and Landcare groups. My suggestion is to talk to representatives of these groups to establish which species they are interested in and how they like to receive their plants, ie. to be stock, nursery bags, hard plastic nursery pots, etc. Also establish a price for your plants - we sell trees 60 - 70 cm high in 1.5 litre bags for $3 each and get no complaints about price.

I like to try to get kids involved in planting some of their trees / shrubs in the local community. Doing so involves some liaison with local councils, service clubs, Landcare groups, golf clubs and the like but this is time well spent. The kids get a real sense of ownership when they plant trees that they have propagated themselves.

The new Junior syllabus offers an ideal opportunity to include a unit of work on nursery production and to incorporate into it some Aboriginal perspectives (bush foods) and environmental perspectives (trees on farms, Landcare, TCM, etc.). A wide range of plant propagation techniques can be learnt by students, including cuttings, seeds, budding and grafting, division and layering.

Some useful contacts that I have made regarding the supply of plant propagation equipment are as follows :

1. Q Stores - secateurs, plastic pots, seedling trays.

2. Pieter's Horticultural Supplies
PO Box 352
Coogee 2034

   Mail order service supplying a wide range of nursery bags, labels, hormones, fertilisers, etc. Send for a price list.

3. Ellisons Horticulture P/L
PO Box 365
Nowra NSW 2541

   Wide range of native seeds - send for a catalogue.

A few more tips :

* make your own seed raising / cuttings mix from 50% coarse sand and 50% cocopeat. This is better than commercial seed raising mixes;
* buy a good quality potting mix in bulk;
* some potting mixes are very difficult to re-wet if allowed to dry out. I have found watering with Wetta-Soil works;
* supervise potting up of seedlings / cuttings closely as a poor job at this stage can ruin all the good work already done;
* use Osmocote, Nutricote, etc., on your plants or water with ½ strength liquid fertilisers occasionally;
* try collecting some seeds from around your school / community and grow them;
* BBQ'ing banksias is a fun lesson. Chuck some bangers on too, but not until the work is done!!
* use good quality ***black*** pens to write on labels, eg. Artline 70 or 700. Write on the side of punnets and pots full of cuttings to thwart the odd idiot who wants to change your labels around.

Go on, give it a go. Kids enjoy growing plants of all descriptions.



Arthur Kelly
Camden High School.

Why are Australian soils so poor?

Dr. W. D. Roots

We were settled by Europeans, who failed to realize that Australia has 'three-season soils'. That is, three consecutive crops would exhaust the original soil nutrients. European farming history carried no such handicap. So why the difference?

Soil science started in Russia. Their soil classification scheme easily adapted to European and North American conditions. However, to apply it to southern hemisphere countries required the invoking of so many "special" cases that it became a joke. The reason?

All Northern Hemisphere continents were glaciated in the last ice age, with polar ice sheets reaching far south across the United States, Asia and Europe. Ice sheets slowly moving south ground loose rocks over bare bedrock, producing rock flour, a good homogenized nutrient-rich instant soil.

As the climate warmed, the glacial perimeter reduced, but ice flow southward was faster than the rate of perimeter retreat, so debris and rock flour collected as terminal moraine in a widening band at the foot of the retreating glaciers, top dressing the newly exposed land surface, **all in the last 40 - 20,000 years**.

The northern continents were thus progressively covered by new nutrient-rich soil. This was relatively deep, and so able to withstand generations of farming. Its productivity depended on both water supply and latitude (which controlled the length of the growing season and the local temperature range).

In response, Europeans developed a farming ethic based on family ownership (it retained people on their farms), crop rotation, and annual crop and/or herd output. This is still reasonaly successful there (with some problems now developing).

In contrast, Australian (Aboriginal) farmers had developed fire-stick farming, with tribal land ownership, people rotations, and infrequent use of any one piece of land. This was possibly the end result of a succession of other methods that proved inappropriate over the last 200-100 thousand years. Our European settlers made no use of this experience, seeing no evidence of farming or land ownership (in the European sense).

All southern hemisphere continents have problems conforming to the northern soil classification scheme. **Why?**

Why the common problem in the south? The reason is a combination of both climate and plate tectonics.

Consider southern hemisphere soils. Australia, Africa and South America were not joined to Antarctica in the last ice age. Australia lost final contact with Antarctica some 45 million years age, after which glaciation there began, and all Antarctic glacial ice terminated in the Southern Ocean.



The southern continents were not glaciated in the last ice age, and Australia had not been for the **250-350 million** years before that! Neither did we have any explosive volcanism for a similar time (these are the two main ways that widely distribute fresh crystalline nutrient-rich soil forms). OZ retains a thin layer of extremely ancient soil, with some plant material that is added and consumed from year to year. All of the biological nutrients reside in these living or rotting plants.



Marketing farm produce permanently removes nutrients from the land (where it passes on to the oceans via humans). Ploughing causes soil nutrient loss by wind. However, the greatest long term modifiers of our soil (since their original formation) has been rain, aided by wind. Since their formation, some **50 million metres of rainfall** has passed through our crystalline soils. The resulting extraordinary leaching removed everything crystalline that was soluble (and of nutrient value).

Australian soils are now an accumulation of the few most insoluble common rock forming minerals (sand-sized **quartz**, coloured by **rust** dust, with a little retained **aluminium oxide**). All are subject to winnowing, the end result being our beautiful but barren Red Centre landscapes. The main soils of all the Gondwana continents formed in this way.

JOHN'S DISEASE INFORMATION

(Sent by Jim White - Armidale, D. O.)

ARMIDALE·RURAL·LANDS
PROTECTION·BOARD
PO BOX 110, ARMIDALE NSW 2350
PH. (067) 72 2366 FAX (067) 72 7274

NEWS

Edited by : John Macfarlane, District Veterinarian Phone : 018 668 351

OJD CO-ORDINATING COMMITTEE

The OJD Committee (a sheep industry based committee) was concerned to hear that Ovine Johne's disease has been detected on a number of studs, and has spread into areas previously considered to be free. This emphasises that sheep producers cannot be too careful when purchasing sheep.

The committee recommends that all persons purchasing sheep make every effort to prevent OJD being introduced onto their property.

Rams should only be purchased from studs that have entered the "Australian Sheep Johne's Disease Market Assurance Program". Many studs have commenced testing under this scheme.

To meet sheep owners' requirements, the committee is recommending that rams sold in ram sales should be in the OJDMAP this season, and it be compulsory next season.

Ewes should only be purchased when an Enhanced Vendors Declaration is available - this is from properties that have tested 50 sheep for OJD. This scheme is currently being established for commercial flocks selling sheep.

Sheep owners would be aware the committee is currently working towards making an application to have the New England declared a Protected Are for OJD. However, this in part requires the committee to demonstrate the area is free of disease - and unless studs and commercial flocks do some testing and checking for the disease, this will be very difficult.

Prevention by BUYER BEWARE is very true for OJD, as once it si introduced on to a property, the consequences can be disastrous.

D. MOEN
Chairman

Will Bovine Johne's Disease Affect You?



If you think the answer is "No" - then you must read on. If "Yes" is your answer, you may be on the right track but probably should read this anyway!

1996 saw the introduction of the National Johne's Disease Program. Since then, Queensland has made it clear that over a three year period, cattle will not be allowed to enter Queensland from NSW unless from a herd of known JD status - TN1 or MN1 under the Johne's Disease Market Assurance Program (JDMAP), unless consigned to an abattoir or an approved feedlot for slaughter within Australia.

This has enormous implications for many norther NSW cattle breeders. A number have already asked the question : How can a political boundary legitimately be used to provide a trading barrier based on freedom from disease?

As a result, there has been a move to define the feasibility of establishing areas of northern NSW as a "Protected Area" from JD, which would enable free trade into Queensland but at the same time impose trading restrictions with other areas of eastern and southern Australia.

The Armidale Rural Lands Protection Board has formed a committee to pursue this proposal and ask you to consider the following point 'for' and 'against' a "Protected Area" status for your RLP Board.

The case For a Protected Area

* Herds within the area will attain the same status as Queensland (equivalent to TN1 or MN1 in the JDMAP).
* Armidale Rural Lands Protection Board generally being a net exporter of cattle, cattle will be able to be sold to anywhere in NSW or South East Australia (except to herds of higher JDMAP status).
* There will be no restriction of movement out of the area.
* Cattle introduced into the region can only come from herds assured of freedom from JD.
* The insidious spread of JD can be checked. The disease should be confined to existing areas of infection where eradication methods can be concentrated.
* Surrounding RLPB's are also looking at becoming Protected Areas. Potentially creating a large trading bloc with 'clean' status.

The case Against a Protected Area

* Movement restrictions will apply INTO the region. Cattle will not be able to be moved into the area unless from tested herds or other protected areas. A significant proportion of imported cattle from the coastal region would currently be ineligible to enter.
* In drought situations agistment cattle could only be returned to the protected area from other protected areas or similar MAP status herds.
* Infected herds will be quarantined. Control or eradication will be compulsory.
* Enforcement of movement / sale restrictions largely will be on a voluntary basis. Government is no longer inclined to support compulsory eradication schemes and compensation for infected herds is not currently available.

A survey will be conducted to canvas producers' views, followed by a public meeting, after which a case may be put to have the Board declared a JD Protected Area. Cattle owners with any comments should address these to the committee as listed below :

Hugh White - Ph : 712 022, Fax : 711 312

Charles Koebel - Ph : 777 534, Fax : 777 534

Quentin Wright - Ph : 758 535, Fax : 758 541

John Griffith - Ph : 751 208, Fax : 751 208

Brian Lewis - Ph : 773 966, Fax : 773 803

John Macfarlane - Ph : 22 366, Fax : 727 274

WORMKILL

Keeping the "Super Worm" out

There has been publicity recently on a "Super Worm" in the Northern Tablelands of NSW. This "super worm" is a strain of Barbers Pole worm, resistant to both closantel (Seponver®, Razar®, Closicare® and the macrocyclic lactone (ML) drench group (Ivomec®, Cydectin®, Oramec®, Virbamec®). What can sheep producers do about this new strain?

Keep the "Super Worm" Out

To keep all currently known resistant worms, it is recommended that all sheep coming onto a property are given a "quarantine" drench. This should be an "ML" drench also a combination (BZ/LEV) drench (Combi®, Duocarel®, Salvo®, Sanda®, Two-Up®). After this, the sheep should be held for 24 hours (allowing all worm eggs to pass out) before release onto pasture, preferably ***not*** 'low-worm' pasture.

This may seem like a lot of bother and expense, but it is the current 'best bet' to keep out known resistant worms. (Remember there is now resistance to ***all*** the drench groups on the market.) The choice is yours.

The Enemy Within

Over 90% of Australian sheep farms have resistance to ***at least*** one of the drench groups. Resistance to 'white' drenches (benzimidazoles or Bz's) and 'clear' drenches (levamisole or 'LEV') is quite common, new cases of resistance to the 'Mis' are appearing, and resistance to closantel is becoming quite common in parts of the New England region. So, it is likely that quite a few farms have the markings of a "super worm", that is, the genes for worm resistance to closantel and the Mis (for example) are present in the worm population on these properties. Whether this appears as a problem (decreased drench effectiveness) depends on whether these resistant worms are a small part of the worm population or a big part of it. This in turn depends on the selection pressure applied by the producer's worm control program.

Integrated Worm Control

There needs to be a shift from "drenches" to a "multi-strand" integrated approach to worm management, with drenches being just one strand. Worms, like armies, find it harder to cope when being attacked on many fronts.

This "multi-strand" integrated approach will include :

- the right drench at the right time, and less often
- breeding resistant sheep; rams selected for resistance to worms are now available
- grazing management : creating 'low-room' pastures for highly susceptible sheep (lambs / weaners)
- nutrition : better nourished sheep are more resilient. Poorly grown weaners have poorly developed immunity to worms
- flock and weaner management - a "tight" joining and lambing, and weaning by 12 - 14 weeks after lambing starts. All this results in better worm control.
- Information is power!
  - * regular monitoring of parasite levels (WORMTESTs)
  - * regular testing for drench resistance (DRENCHTEST or DRENCHRITE®) - every two years
  - * expert advice >>> fine tuning
- future "strands" : nematophagous (worm-eating-fungi? vaccines? other?



HELP



A Desperate Plea from Simone .....

I'm desperately seeking someone to fill my gumboots!!!

There does not seem to be any Ag. casuals on the Central Coast and I am due to go on Maternity Leave at the end of Term 1, 1998



School :	Berkeley Vale Community High School
Start :	Day 1, Term 2, 1998
Finish :	Last Day Tem 2, 1999

Classes Involved (this year) :
* 3 Unit Ag
* 2 Unit Ag - Year 12
* 2 Unit Ag - Year 11 and
* 3 x Year 10 Ag

If anyone can help Simone Neville please phone (02) 4388 1899 or fax (02) 4388 5539 during school hours.

Another Word from our Gold Sponsor -

COTTON FOUNDATION

COTTON EDUCATION #2

Cotton Australia's education program is aimed at encouraging young Australians to carefully investigate for themselves all aspects of the critical issues now facing agriculture in Australia, to demonstrate that decision-making is oftentimes a difficult exercise, and to skill them for involvement in community-based committees and groups.

Here is another aspect of the program :
A **Farm Field Day** program has been designed to allow one or two classes to spend a day at a cotton farm investigating the many aspects of farming. This program begins with a quick tour of the farm to give students an opportunity to orient themselves with the aid of a farm map, again poses a hypothetical on video, moves through the decision-making stage, and sees the group break up into investigative workshop groups - whole of farm planning, irrigation, nature reserves, soil quality and crop rotation, water quality, harvesting and processing and so on. The groups then workshop a presentation on what they have learned in their group for the benefit of students in the other groups.

To arrange a Farm Field Day for your class, ring Shelley Spriggs on (02) 9319 3677.

Pre-farm visit reading and stand-alone **structured investigative projects** for the classroom are available in STUDIES magazine which is sent free of charge to every school in Australia. If you don't have access to STUDIES magazines in your school, call (03) 9500 2399 to order your free copies.

Student and teacher study materials, along with a 'front-end' to guide students and teachers to the information most applicable to different areas of the curriculum, are available free of charge from Cotton Australia. Call (02) 9310 3677.

Cotton Australia's world wide web site - **www.farmwide.com./au/nff/cotton/cotton.htm** - carries a lot of general information on cotton growing in Australia; and we can be e-mailed for further information on shelleysp@msn.com.

* * * *

Agriculture Quiz Master Series

available on CD-ROM

IBM

Interactive Multimedia Quiz

For one low price of $10 per topic (for 2 or more topics) you can select the quiz's you wish to include on your CD. Topics include:

- Animal Terms 1
- Animal Terms 2
- Vegetable Production
- Sheep Production
- Beef Cattle Production
- Dairy Cattle Production
- Breeds of Cattle
- Breeds of Sheep, pigs, goats
- Bee Production
- Pig Production
- Farm Machinery
- Pasture and Fodder Production
- Animal Behaviour
- Farm Management
- Soils
- Maize Production
- Fruit Production
- Poultry Production
- Pasture Production
- Goat Production

Every quiz package comes complete with a site license for your school.

The quiz's come complete with sound and pictures so they are an interesting way to revise a topic or test a students existing knowledge. Each topic gives you the option to print a certificate of achievement for each student.

The quiz's are ideal for Novell Networks and include a one step installation and uninstall program.

For more information/orders contact Xstream Solutions

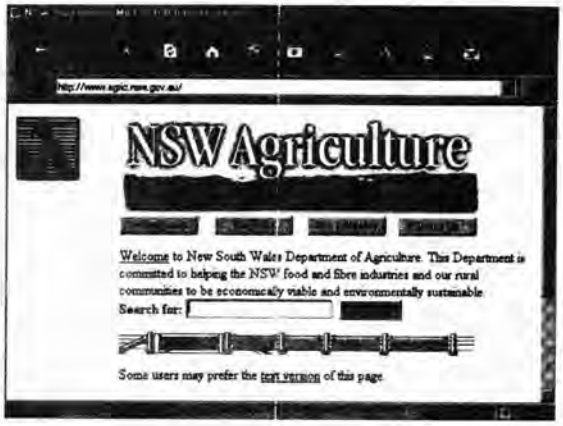
Phone: 02 98735334
Fax: 02 98735336

- *Order form supplied as a "flier"*

NSW Agriculture On Line

Information for the 21st Century

www.agric.nsw.gov.au.



NSW Agriculture's Internet home page is a gateway to a comprehensive information service that is one of the keystones in the Department's information strategy for the 21st century. The address is :

http://www.agric.nsw.gov.au.

Many popular *Agfacts, Agnotes*, newsletters and other publications are available from the Web site free of charge. Information about the Department and its services; and information on the agricultural industry is also available.

An electronic bookshop provides access to thousands of other publications, books, videos and posters by mail order.

Information
At the heart of the Web site are hundreds of freely available publications on dozens of different topics. You can browse through the subject index or do a simple search for words of interest.

Services
NSW Agriculture provides knowledge and services that help our food and fibre industries meet the challenge of remaining viable and successful in fiercely competitive international and domestic markets. The services page summarises the many and varied services of NSW Agriculture including where to find our offices and information on our perograms and institutes.

Our industry
Highlighting the vital role that agriculture plays inthe economy and life of New South Wales. This page will grow into a comprehenseive resource on the agricultural industries. It also provides links to other providers of agricultural information on the Internet.

About us
A profile of NSW Agriculture, this page features the goals, aims and structure of the Department and provides access to information from the annual report.

Grapevine
News and topical issues are brought together on this page which provides access to media releases, issues from the Minister's office, media and public affairs contacts, links to electronic newsletters and a summary of what's new on the Web site.

Front Gate
In keeping with our rural theme, the 'Front Gate' is our way of linking you back to the Home Page at any time. A handy reference for finding your bearings.

For more information :

E-mail: webmaster@agric.nsw.gov.au

or write to :
NSW Agriculture
Electronic Delivery Services
Locked Bag 21
ORANGE NSW 2800
Ph (02) 6391 3216 Fax (02) 6391 3515

HOT SITES # 1

WITH THANKS TO
HEATHER WIGGINS
RICHMOND HIGH SCHOOL

DAIRYING

NSW Dairy:	www.dairy.nsw.gov.au.
Canadian Dairy Research Network:	/res.agr.ca/PUB/CDRMengmain.htn
Dairy Cattle Breeds:	www.ansi.okstate.edu/breeds
Dairy Aust:	www.ddc.aust.com
Moo Milk:	www.moomilk.com
National Dairy Database:	www.inform.umd.edu/EdRes/Topic/AgrEnv/nc
Aust. Dairy Industry:	www.dairy.com.au
CCE - Dairy Industry:	www.cce.cornell.edu/programs/ag/dairy.html
Genetics Australia:	www.genavst.com.au
Qld Dairy Authority:	www.dairypage.com.au
Tas. D. Auth:	www.tasdairy.com.au/index.htm
United Dairies Vic:	www.vff.org.au/udv/udv.htm

PUBLICATIONS

Ag Online:	www.agr.culture.com
Beef Today:	www.beeftoday.com
Journal of Dairy Science:	www.adsa.uiuc.edu
F@rming Online:	www.rpl.com.au/farming
Farm Journal	www.farmjournal.com
Dairy Today:	www.dairytoday.com
Livestock plus online:	www.livestockplus.com
Italian Journal of Agronomy:	www.uniud.it/ija/welcom.htm
Ag Notes:	www.netc.net.au/ag.html

PLANTS/SOILS

Hort. Resources:	www.hcs.ohio-state.edu/hcs/htr/htr.html
Forage + Crop pub's:	www.inform.umd.edu/EdRes/Topic/AgrEnv/ndd/crop.h
Cotton Aust.	www.farmwide.com.au/nff/cotton/frames.htm
Groundwater:	www.netc.net.au/wwpl.html
Dryland Salinity:	www.pi.sa.gov.au/info/factshts/dsal-lp.htm
Hort. + Crop Science	www.hcs.ohio-stat.edu/hcs/hcs.html
What is Soil:	www.netc.net.au/AG0058.html
Forage Info System:	www.forages.css.orst.edu
Something to grow on:	www.cals.cornell.edu/dept/flori/growon/field.ht
Fruit and Vegies:	www.dole5aday.com/COOL/COOL.html

GENERAL

Iowa State AgNIC:	www.lib.iastate.edu/agnic.agnic.html
Dep't Prim. Ind. S.A:	www.pi.sa.gov.au
AgWeb Search Engine:	www.ceresgroup.com/cgi-bin/find-agweb.cgi
Clip Art Search:	//leviathan.tamu.edu:7o/7c/clipart/.cache
AgNet Aust. Ag:	www.agnet.com.au/topics.html
Animal Health Stats:	www.brs.gov.au/brs/aphb/aha
B-eye:	//cvs.anu.edu.au/andy/beye/beyehome.html
Pork Council:	www.farmwide.com.au/nff/PORK/PCA.htm
Breed Info:	www.ozemail.com.au/~dkgsoft/index.html
CSIRO:	www.csiro.au
Heather:	wiggins @fastlink.com.au

From - Al McMillan
Wagga Wagga Technology High School

Reminder to Agriculture Teachers of the

"Rotary Trees for 2000 Program"

Wagga Wagga Technology High School approached their local Rotary Club and a couple of months later a greenhouse kit arrived with a watering system, a supply of tubes and a manual All you have to do is put it together.

Thanks Al.

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HOT SITES # 2

THANKS TO

KAREN HEAP
MUIRFIELD TECHNOLOGY HIGH SCHOOL

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DISTANCE & RURAL EDUCATION
STRATHFIELD

Australian Wheat Board
http://www.awb.com.au/

Cows eye dissection
http://www.exploratorium.edu/learning_studio/cow_eye/

CSIRO Division of Atmospheric Research
http://www.dar.csiro.au/pub/info/index.html

Infarmation
http://www.infarmation.com.au/

Breeds of Livestock
http://www.ansi.okstate.edu/breeds/welcome.htm

Australian Dairy Corporation
http://www.adc.aust.com/adc.adcpage.htm

Aquaculture
http:/www.dpie.gov.au/resources.energy/fisheries/fishfacts/ff8.html

Commonwealth Bureau of Meteorology
http://www.bom.gov.au/

Australian Cotton Foundation
http://www.farmwide.com.au/nff/cotton/cotton.htm

NSW Dairy Corporation
http:/www.dairy.nsw.gov.au

Dairy Industry
http:/www.pi.sa.gov.au/sa_i_gl/dairy.htm

Dairy Ressearch and Development Corporation
http://www.adc.aust.com/drdc/resnotes/resnotes.htm

Landcare information
http://kaos.erin.gov.au/land/landcare/landcare_new.html

Canberra Organic Growers Society
http://www.pcug.org.au/~jallen/cogqart.htm

Outlook 96
http://www.abre.gov.au:80/Outlook96/Fisher/FisherOutlook.html

The Society for Growing Australian
http://www.ozemail.com.au/~sgap/propagat.html

The Rural Book
http:/www.dpie.gov.au/rural/book95/home.html

Rural Press
http://www.rpl.com.au/farming/farm/news/nsw.html

Dryland salinity series
http:/www.pi.sa.gov.au/pi_pub/factshts/dsal_lp.htm

Sheep Meat
http://www.pi.sa.gov.au/sa_i_gl/sheep.htm

What is soil?
http://www.netc.net.au/AG0058.html

Commodity Outlook
http:/www.westpac.com.au/4dvrjoz.html

Australian Council of Wool Exporters
http://ozemail.com.au/~acwemelb/

Virtual Dairy Farm
http://www.moomilk.com/tours/tours1-1.htm

Milk Facts
http://www.moomilk.com/moove.facts.htm

Cowtown America
http://www/cowtown.org/townmap.html

Milk-Where's Your Moustache
http://www.whymilk.com/index2.html

Japanese Dairy Improvement Program
http://ws4.niai.affrc.go.jp/dairy.html/

Jason Rankins Dairy Page
http:www.gold.net/jrr/index.htm

Donald Firsching's chicken page
http://ccwf.cc.utexas.edu/~ifza664/index.html

International wool secretariat
http://www.woolmark.com./

Agriculture in Australia
http://rolf.ece.curtin.edu.au/~clive/agrirobot/aust.htm

PDIC -Cloning of animals
http://www-pdic.vet.cam.ac.uk/Breed_Inf/cloning.html

Organic Cotton Exhibition
http://www.simplelife.com/organiccotton/

ABC National Rural News
http://www.abc.net.au/rural/news_states/trannrn.htm

Agribusiness Glossary
http://128.146.140.187/ae601/glossdir.html

Fantastic Forest
http://www.nationalgeographic.com/modules/forest/index.html

Kidz Korner
http://www.mda.state.mi.us/kids/index.html

PETER JONES - as part of a WORKCOVER project needs teachers comments/concerns in relation to safety issues in Agriculture.

Please contact/fax him at Colo High School

Phone 02 45712011
Fax 02 45713391

NEW SOUTH WALES DEPARTMENT OF SCHOOL EDUCATION

Agriculture by distance education

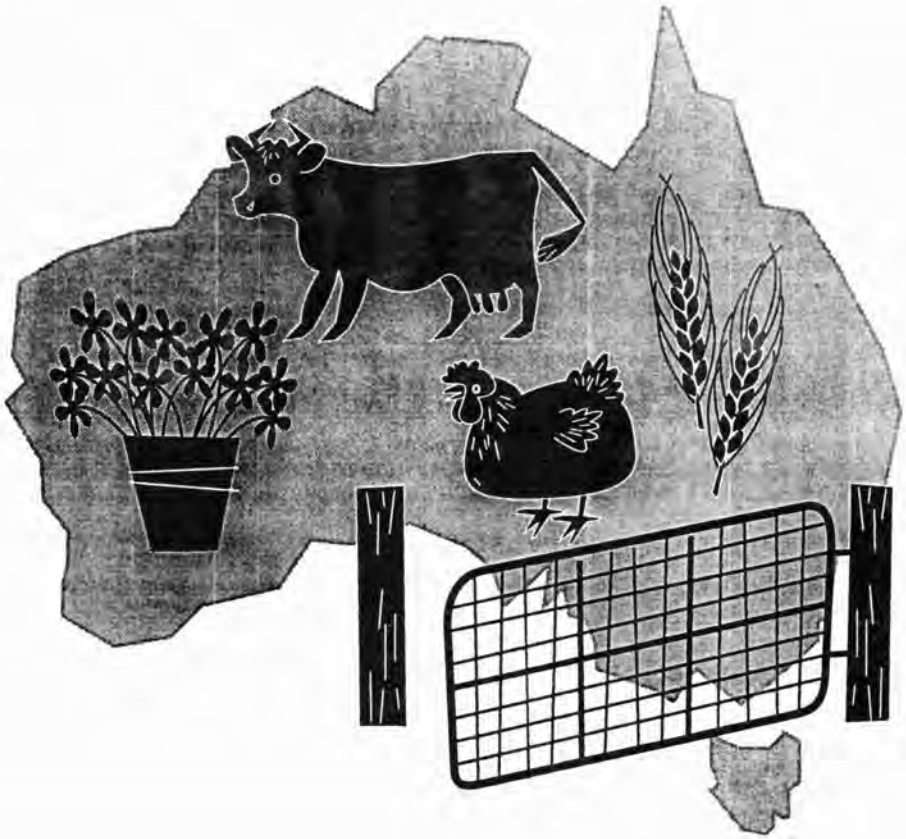
The Learning Materials Production Centre (LMPC), located at Strathfield, is part of the Distance and Rural Education Directorate, NSW Department of School Education.

The LMPC designs, develops and produces quality distance education learning materials for students from Kindergarten to Year 12. These materials are distributed to the Department's 19 Distance Education Centres throughout NSW—12 Primary, 7 Secondary and the Open High School.

There are many students in New South Wales who study 2 Unit Agriculture by distance education. The learning resources provide the basis of the students' learning and give the students opportunities to demonstrate the outcomes specified in syllabus documents.

These learning materials are a valuable resource to assist in the implementation of Board of Studies syllabuses and Department of School Education policies and priorities.

Some of these materials are available for sale to classroom teachers. A flyer is included in this edition of BAAT. The remaining HSC units of work will be available early in 1998.





2 Unit Preliminary

Unit 1—It's a Big Field
This four week unit provides students with an overview of the course and features a systems view of the production of cut flowers and stone fruit.
Product number: 97149
Cost: $20
Contents: a student book and audio cassette

Unit 2—On the Case
This two week unit provides a model showing students carrying out their farm case study on an organic farm.
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Cost: $20
Contents: a student book and video

Unit 3—Down to Earth
The influence of soil properties on broadacre cropping is investigated in this unit. A six week unit.
Product number: 97141
Cost: $35
Contents: a student book, audio cassette and 5 Mac format disks

Unit 4—Looking at Ewe
Students can investigate the influence of market demand on prime lamb production. A four week unit.
Product number: 97142
Cost: $15
Contents: a student book

Unit 5—Hands On
This two week unit provides guidelines for students to manage and monitor an animal's growth and development.
Product number: 97143
Cost: $12
Contents: a student book and audio cassette

Unit 6—Crop This
The influences on crop enterprises and the related management strategies. A five week unit.
Product number: 97144
Cost: $35
Contents: a student book, audio cassette and computer disks for Mac and PC users

Unit 7—A Lot of Feed
Students can investigate aspects of feedlotting as an intensive production system. A five week unit.
Product number: 97145
Cost: $15
Contents: a student book

Unit 8—Risky business
This two week unit allows students to explore the social and economic aspects of farming.
Product number: 97213
Cost: $15
Contents: a student book and audiotape

2 Unit HSC

Unit 1—Soils and Climate
This four week unit focuses on the interaction between soils, climate and farm production.
Product number: 97146
Cost: $15
Contents: a student book

Unit 2—Plants, the Vital Food Source
The focus of this four week unit is the importance of plants in farm production.
Product number: 97147
Cost: $12
Contents: a student book

Unit 3—Food and fibre
Students can explore aspects of wool, beef and broiler production on farms.
Product number: 97217
Cost: $20
Contents: a student book

ST. GREGORY'S COLLEGE
Badgally Road,
Campbelltown 2560
Telephone: (046) 26 3477
Fax: (046) 28 1594

Teachers: Adrian Harrison
Greg McAlpin
David Baker
Paul Jones

St Gregory's College is a Catholic Boys Secondary School catering for 260 boarders from rural NSW and 750 boys from the Sydney region. The college is situated on a 426 hectare property between Camden and Campbelltown. The school farm of 14 hectares includes a shearing shed, show cattle shed, poultry section, a vineyard, orchard and vegetable growing area.

The college operates a Limousin and Shorthorn cattle stud as well as a Corriedale sheep stud. In 1995 we were awarded Grand Champion Corriedale ewe at the Sydney Royal Easter Show.

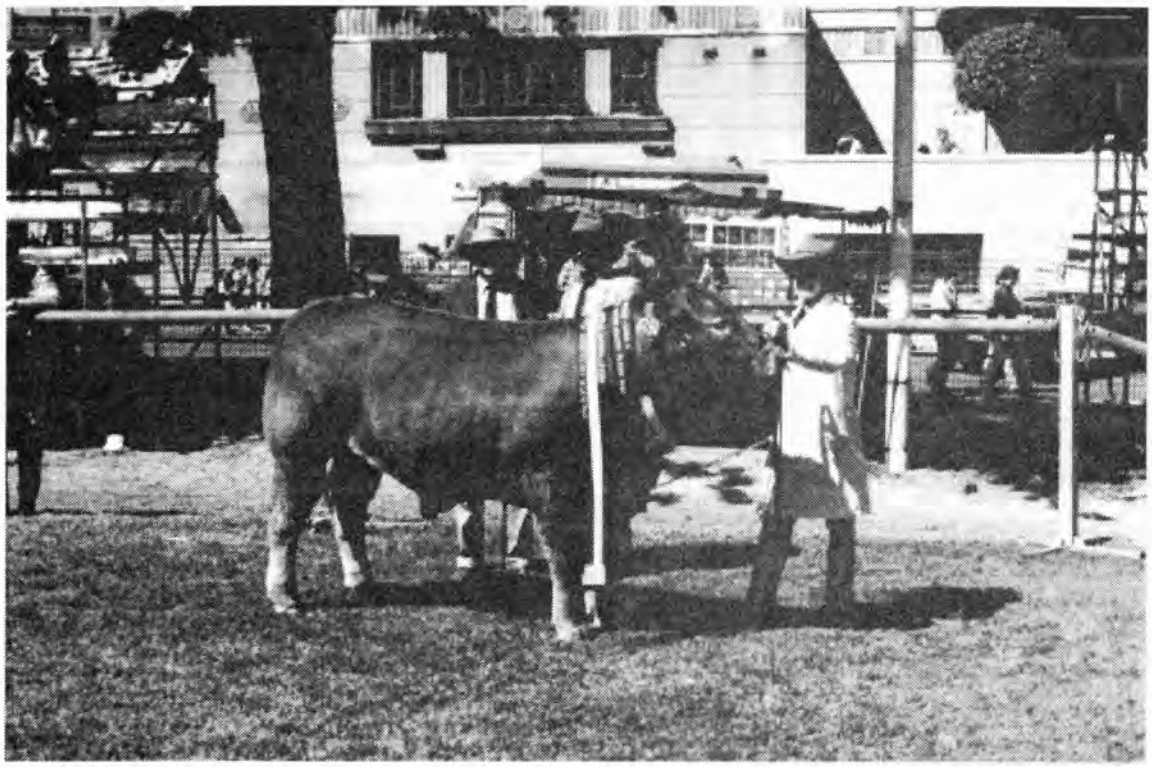
Students from St Gregorys have won the Merino fleece judging competition at Sydney Royal in 1995, '96 and '97 and this year Bradley Croker the College School Captain went on to win the National fleece judging title. We are one of the few schools which still operate a Sheep Husbandry and Wool Technology Course in Years 11 and 12.

CATTLE

A major activity for our junior students is the preparation and showing of cattle. We have 70 boys involved in exhibiting at 7 local shows as well as Sydney and Canberra Royals and the National Steer Show at Dubbo. The highlight was winning champion heavyweight steer at both Sydney and Canberra Royal Easter Shows. In 1996 as well as a second and third at the National Steer Show. Norman Corkhill (Boorowa) won the paraders competition at Canberra Royal in 1996. In 1997 the students achieved champion steer at both Robertson and Castle Hill, Grand Champion Bull at Robertson, Champion Limousin Cow at Campbelltown, Champion Shorthorn Cow at Castle Hill and Campbelltown as well as 4 reserve champions and many other awards. At the Sydney Royal Easter Show (1997) the boys achieved a second, third, two fourths and a fifth with the college cattle. To support this programme the college has a cattle shed which has 16 individual pens, a washbay area as well as yards, crush and scales which have been donated by Rudweigh.

The Rural Industries classes is Years 11 and 12 have been establishing a vineyard and orchard during the latter part of 1997. They have constructed the trellises, propagated the vines and planted out four rows of grapes as well as an orchard area with apples, peaches, apricots, nectarines, plums and citrus trees. A drip irrigation system has been set up to water these trees and vines.

Year 7 & 8 students do both a food and agriculture context in Design and Technology and with this they grow a range of vegetable crops using a variety of garden designs including permaculture, no dig, hydroponics, terrariums, hanging pulses and traditional soil culture. They also operate a worm farm and spend time mulching compost. Year 7 students examine Australian bush tucker and learn to cook a range of basic foods.



SHEEP

The Colleges Corriedale stud was established in 1988 from an initial purchase of a ram and 6 ewes from "Gundowringa" stud at Crookwell. The flock is managed by Year 11 and 12 sheep husbandry and wool technology students who do all the crutching, shearing and selection of stock. The ewes are mated in March to lamb in August. This year we had 5 sets of twins, 1 set of triplets and a lambing percentage of 125. The College currently runs a ewe flock of 20 and selects 2-3 rams each year for sale.



POULTRY

The College has a poultry section which includes a shed with 50 laying cages, four outdoor breeding pens and a chicken raising section. At present this area is not in use, but in the past we have had four poultry breeding trio's as well as 20-30 x-bred layers.



Year 11 students wool classing.



Establishing vineyard and orchard.

THE GREEN MACHINE

(GENETICS)

Presented by

Janette Kennard at the 1997

Conference at Berry

Gene Technology - The hows and whys of Genetic Engineering.

At the *Green Machine* Science Education Centre in Canberra, hands-on workshops for secondary school students introduce them to genes, DNA and Genetic Engineering. The *Green Machine* is a joint venture between CSIRO, the Plant Science CRC (Co-operative Research Centre) and the ACT Department of Education and Training. Our student workshops are predominantly laboratory based - students extract DNA from dried peas and then discover how to cut up the DNA and separate the fragments (steps in any genetic engineering project). The students have great fun and, dressed in lab coats, enjoy the experience of the "real" science laboratory setting. It's a great learning experience too - the experiment is a great starting place for teaching DNA science, and lots more. The tried and true DNA extraction method we use is easy to carry out in a classroom and I would encourage all teachers of genetics to try it with his/her class. (The method appeared in ASTJ and is provided in these proceedings.)

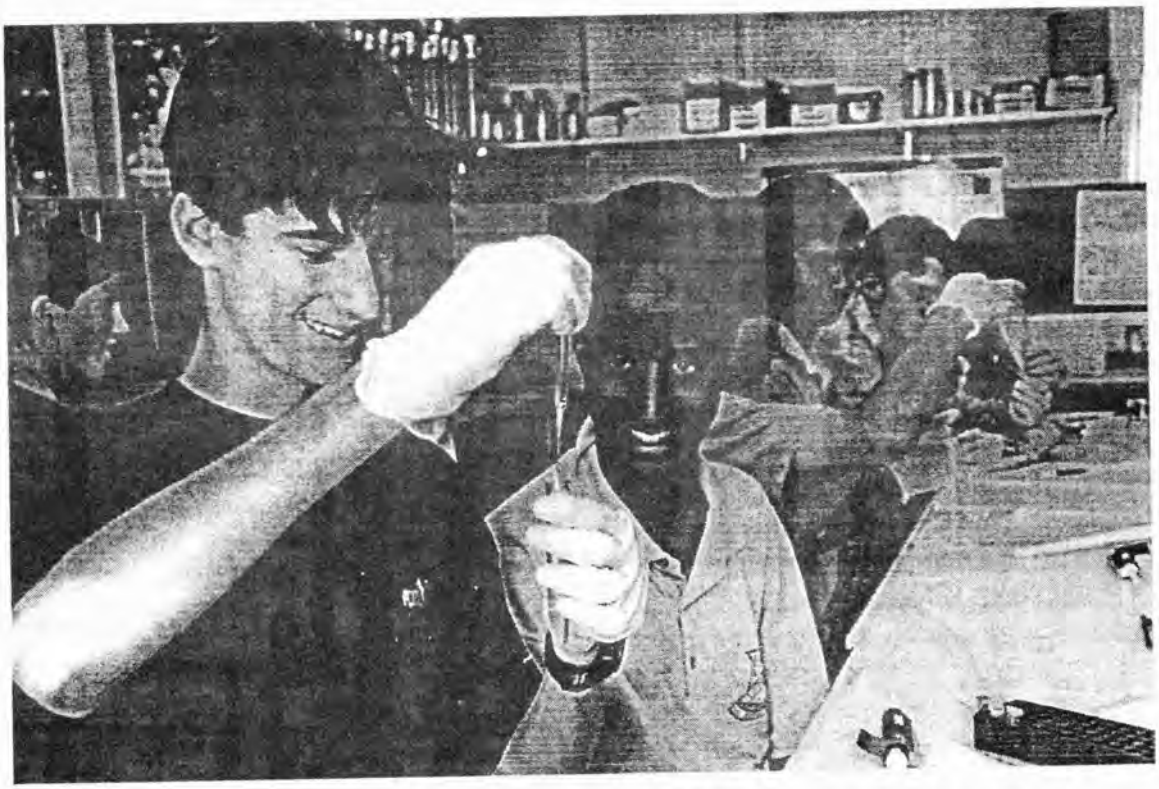


Figure 1: Students purify and analyse DNA at a Gene Technology session at the Green Machine

Extracting DNA - dispelling myths

Simply seeing DNA is instructive for students. It removes the mystery surrounding this much talked of "molecule of life". Most students will gleefully tell you that the DNA looks rather like "snot" - there's not a double helix to be seen ! Since the DNA is extracted from peas, students realise that they eat DNA all the time, that it is not poisonous. This is a common misconception, and there are more. In fact, much of our workshop is aimed at dispelling myths and erasing misconceptions. Some common examples:

- DNA is NOT "living"
- Genetic engineering does NOT involves making weird mutations or creating dinosaurs from ancient DNA (with thanks to "Jurassic Park")
- You can NOT re-constitute a pea from a test-tube full of pea DNA
- You can NOT turn you dog/cat into a pea by injecting pea DNA into it (no, genetic engineering isn't that easy !)
- Genetic engineering is DIFFERENT to selective breeding. Merino sheep and seed-less grapes are NOT products of genetic engineering. Genetic engineering involves a specific single gene change, rather than the random combination of two complete genotypes which occurs in selective breeding. Further, genetic engineering can be used to transfer genes across the species barrier which confines selective breeding. It is worth while pointing out that genetic engineering will not replace the selective breeding methods that farmers have been using for centuries. It seems likely that genetic engineering will be used to further enhance the best breeds of crops and livestock obtained through selective breeding.

Background Understanding

To understand genetic engineering, students need to appreciate some basic genetics. First are.the Mendelian ideas that a **gene** is responsible for a particular **trait**, and that these genes are passed on from one generation to the next. Students must then realise that these genes are composed of DNA, and that DNA contains the information to confer the gene's trait on the organism. Note that DNA is just the information molecule and that the trait arises from the presence of the gene product - a protein (Fig. 2). This is the second link, that each gene provides the information or recipe for the cell to make a particular protein (a gene is said to "code for" a particular protein). Some biology courses cover the structure of DNA. I provide students with an idea of DNA structure so that they can understand how DNA provides information via the sequence of bases or base pairs which make up the "rungs" of DNA's "twisted ladder" (double helix).

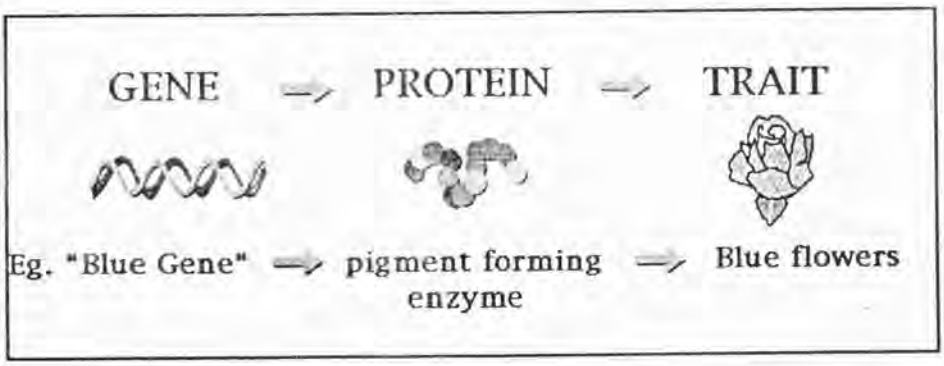


Figure 2: The major links: The **gene (DNA)** codes for the production of a **protein** which produces a particular **trait**, in this case the blue colouring in a flower. Every gene provides the recipe for the production of a single protein.

Genetic Engineering - a definition

A general, accurate definition of genetic engineering is: "the alteration of an organism's genetic make-up in order to change **one** particular characteristic". Most often this involves "adding a new trait by adding the DNA encoding that trait" (another nice definition). Usually, the added DNA is a **single** gene from other organism. The power of genetic engineering lies in the fact that the source of this gene can be a completely unrelated organism, since DNA is common to almost all forms of life (hence, DNA is often referred to as the only universal language). However, genetic engineering doesn't always involve such gene transfer. Some projects involve manipulating an organism's own genes - turning off a particular gene for example.

When teaching, I am careful to follow any definition of genetic engineering with some good examples. Otherwise, the process seems a little crazy - Why take a chicken gene and put it in a plant ? or put a gene from a bacterium into a plant ? (see later).

Genetic Engineering - How it's done

The first step in any genetic engineering project (Fig. 3) is to identify a trait in one organism (the "donor") that would be useful in another organism (the "recipient", the organism being genetically engineered). As long as this particular trait is controlled by only one gene (many traits are much more complex), it is now possible to isolate this single gene and transfer it to the recipient organism. Once that single gene is incorporated into the recipient cell's DNA, its "code" is deciphered along with the code of all the other genes, and just as it would have been in the donor cell. Hence, the gene's protein is now produced in the genetically engineered organism, conferring the new trait on the recipient organism. Genetic engineering has hence added to the recipient a protein not normally found in the organism.

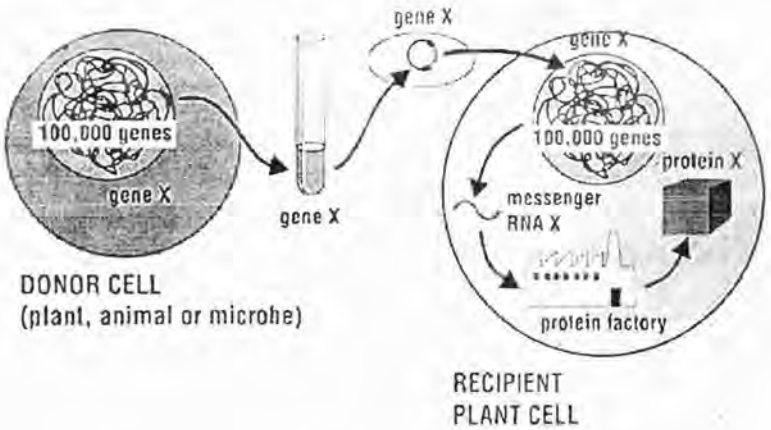


Figure 3: An overview of the steps involved in genetic engineering (addition of gene X to a plant cell). DNA is extracted from the "donor" organism and gene X is isolated. The gene is then inserted into the chromosomes of the recipient plant cell. From this gene, protein X is now made in the plant cell - a protein normally found in the donor organism.

Isolating the gene:

Isolation of the gene in question begins with the extraction of DNA (the full genome) from the "donor". We can use any type of tissue and most extraction procedures use centrifugation and differences in solubility of the various components of the cell to separate the DNA. The extracted DNA contains potentially 100,000 genes. Plants and animals typically have 50,000- 100,000 genes; bacteria a few thousand; humans have approximately 70,000 genes - that's about 2 metres of DNA !

In order to find a single gene amongst these thousands, scientists first cut up the long molecule of DNA into roughly gene size pieces. This is done using "restriction enzymes". There are hundreds of different restriction enzymes. Each enzyme cuts the DNA at a different specific site called its "recognition sequence", typically a particular series of 8-12 base pairs. Restriction enzymes cut DNA in such a way the fragments generated are able to be re-joined, even to DNA from unrelated organisms. After cutting the DNA into many fragments, scientists separate the pieces using gel electrophoresis. The DNA sample is loaded onto a gel of agarose (similar to the agar in agar plates) and then exposed to an electric current. The negatively charged DNA then moves toward the positive electrode. The smaller DNA molecules find it easier to move through the gel while the movement of the large molecules is inhibited - so the fragments become separated according to size. After separation, the gel is stained to visualise the myriad of DNA fragments, each appearing as a band on the gel. To find the particular DNA fragment that contains the gene of interest, a radioactive probe designed to bind to the gene is used. This "lights up" the corresponding band on the gel which can then be purified - now we have found the gene of interest from amongst the many others.

Inserting the gene:

To genetically engineer an organism, the gene to be inserted must reach the nucleus of the cell and then incorporate into the DNA that already exists there. This is one of the hardest parts of a genetic engineering project and has a very low success rate. Three methods are commonly employed, discussed below.

The agrobacterium system uses a naturally occurring soil bacteria which infects plants - *Agrobacterium tumifaciens* - to deliver a gene. Usually, when the bacteria infects a plant, it inserts some of its own DNA (the 'Ti" plasmid - see Fig. 4) into the plant (it's a natural genetic engineer !!). Genetic engineers hijack this system, replacing the bacteria's gene with the gene of interest which the bacteria, non the wiser, then inserts into the plant DNA.

Biolistics uses a "gene gun" to literally fire a gene into plant cells. Tungsten or gold particles are coated with the gene and young tissue is then bombarded with the particles. Some particles, by chance, end up in the nucleus, delivering the DNA, which may happen to integrate into the chromosomes.

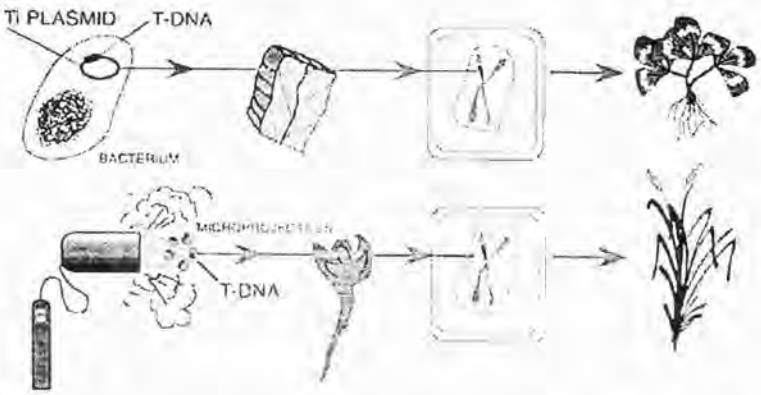


Figure 4: The use of *Agrobacterium* (top) and biolistics (below) to insert a foreign gene into plants (a process called "transformation").

Biolistics and agrobacterium are used for engineering **plants**. Both lead, as a rare event, to a single cell receiving the new gene. These genetically engineered or "transformed" cells are then selected for and grown into entire plants using **tissue culture**. This creates a plant which now has the new gene in every cell, including the seed. These plants can then be propagated through traditional means.

Genetically engineered animals are obtained by micro-injecting the gene into the nuclei of single celled embryos. Once implanted, these embryos grow into animals which have the genetic change in every cell.

Why use Genetic Engineering - some applications

At present, most progress in genetic engineering has been made in plants. Genetic engineering is being used to confer resistance to plants from viral, bacterial, fungal or insect attack. Crops and pastures have been engineered to have a greater nutritional value or resistance to herbicides to facilitate greater weed control. Genetic engineering has also been used to extend the shelf-life of fruits and flowers.

A Fountain of Youth ?

The only genetically engineered products currently for sale in Australia are flowers - carnations which have an extended vase life (and also a purple carnation). Florigene, the Melbourne based company responsible for their production, have used genetic engineering to "turn off" a gene which leads to the aging of cut flowers (through ethylene production). With this gene turned off, the cut flowers live much longer (up to three weeks) before going brown.

Similarly, "Flavr Savr Tomatoes", on sale in the US, UK and parts of Europe, have been engineered for an extended shelf life. A gene which leads to the break down of the cell wall and hence the softening of fruit has been turned off. The tomatoes stay firm and ripe for weeks. However, consumers were unhappy with the texture of the tomatoes. Now, they are sold exclusively as tomato pastes and purees, the sturdier cell wall making the production of these goods more efficient. The tomatoes are currently being tested for sale in Australia. Note that both these examples involve the manipulation of the plants' own DNA rather than the introduction of DNA from another organism.

Insect Resistant "Bt" Cotton:

Cotton is an important crop in Australia - worth around $1.3 billion dollars last year. Unfortunately, the cotton industry is also Australia's biggest user of chemical pesticides, at a cost of around $300 million annually and of significant environmental concern. In order to reduce pesticide use, scientists have used genetic engineering to produce a cotton (known as BT cotton) which produces a pesticide itself, in every leaf of the plant, leading to greatly decreased need for spraying.

The pesticide produced by the plants is the "BT toxin", a protein toxin produced by the soil bacterium *Bacillus thuringiensis* . The toxin is very specific to caterpillars - it doesn't kill other insects nor effect mammals, birds etc. This is extremely useful since caterpillars, especially the "cotton boll-worm" (actually a caterpillar) are the most destructive pests of cotton in Australia.

To produce the plants, the bacterial gene which codes for the BT toxin was isolated and then introduced into a cotton plant. These "transgenic" (another word for genetically engineered) cotton plants use the gene to produce the BT toxin in their leaves. Caterpillars nibbling on the leaves quickly die, providing effective protection for the crop.

BT Cotton was planted on a commercial scale for the first time last season (80 hectares was planted in Queensland and northern NSW), 8 years after the project began at CSIRO. Genetic engineering is a slow, difficult business, requiring the effort of many scientists. Like all genetically engineered organisms, the cotton had to comply with the regulations set down by The Genetic Manipulation Advisory Committee or "GMAC", a government regulatory body. To begin a project, to grow modified organisms in a glasshouse, to perform field trials or to sell a genetically engineered organism, clearance must be obtained from GMAC, and certain tests performed at each step at ensure the safety of t he product.

Virus Resistant Potatoes

Potatoes are another important crop for Australia. One of the most destructive diseases of potatoes is caused by a virus called the Potato Leaf Roll Virus (PLRV) - it causes the leaves of the plant to roll at the edges, making the plant unable to collect enough light energy to produce decent potatoes - they are small and discoloured.

Scientists at CSIRO in Canberra have genetically engineered potato plants to be resistant to the PLRV. This has been done by inserting a gene from the virus into the plant - a gene that encodes the virus's "coat" protein (which forms a protective coat around the virus). These plants now produce the virus coat protein in their leaves. But how does this make the plants resistant? Scientists don't really know how, but it does work. In a way, it is similar to immunisation (except that plants have nothing like an immune system) or you could imagine that when the virus tries to infect the cells by "taking off" its protein coat it immediately gets wrapped up again by all the spare "coats" present in the plant. What ever the case, the virus simply can't multiply in plants which already have coat protein present in their cells.

Initially, these genetically engineered potatoes will probably be used by snackfood manufacturers. The coat protein has no taste, causes no visible change to the potato and is harmless. In fact, 60-80% of vegetables currently on the market contain viruses, so we are already consuming whole plant viruses. Interestingly, the Australian and New Zealand Food Authority (ANZFA) will require that crisps made from these potatoes are labelled as genetically engineered.

Big Pigs

The genetic engineering of animals is also occurring world wide. The first transgenic animals were mice, created in the US in the early 1980's. These mice had an extra copy of the growth hormone gene and therefore produced higher levels of growth hormone than normal. As a result, the mice grew much more quickly and so were twice the normal size when they stopped growing. Similarly, pigs have been produced by Bresagen in Adelaide which have an extra growth hormone gene copy, grow 22% faster than other pigs and contain 30% less fat. These pigs have been awaiting commercial release since 1991, caught up in some complex politics.

Garbage gobblers

Compared to plants and animals, bacteria and yeast are simple to genetically engineer. Scientists are engineering bacteria to be more efficient at breaking down wastes so they can clean up oil spills and degrade human garbage more efficiently.

Insulin

Genetically engineered bacteria produce around 90% of the insulin used to treat sufferers of diabetes in Australia (about 100,000 people). The bacteria have had the human insulin gene inserted into their DNA, and can be grown in great numbers, producing vast quantities of very pure human insulin. Insulin produced in this way has largely replaced the need to extract insulin from pigs and cattle - a difficult and costly process. Further, since the bacteria produce *human* insulin side effects arising in the past from the use of non-human insulin are avoided.

Human genetic engineering

Genetic engineering of humans is also possible. Many are excited about the potential for human genetic engineering to cure genetic diseases. This "gene therapy" is currently being employed, in small scale clinic trails, to treat people with Cystic Fibrosis. Several years ago, scientists discovered which gene is faulty in patients with this lethal condition. (Finding genes responsible for particular genetic diseases is a great hurdle for gene therapy. In the case of cystic fibrosis, a large degree of luck was involved in finding the responsible gene.) Now, copies of the correct gene can be inhaled by sufferers of Cystic Fibrosis (which predominantly affects the lungs) temporally genetically engineering the layer of cells lining the lungs. With the corrected gene present in these engineered cells, they function normally, no longer producing the dangerous excess mucous in the lungs which typifies the disease.

Human genetic engineering raises many fears and much debate and controversy. Many people fear the potential of the technology. Scientists also realise the incredible potential of human genetic engineering so , at an international meeting of genetic scientists in 1989 an agreement was formed that no genetic engineering of human germline cells would occur ie. the sex cells (sperm and egg) could not be genetically altered (such as would occur if an embryo was microinjected with the DNA as described earlier). Only somatic cell therapy - like that for cystic fibrosis - is permitted ie. the alteration of cells other than the sex cells. This means that any genetic changes made cannot be passed onto the next generation.

Gene Technology in YOUR classroom

Teachers tell me that they find gene technology/genetic engineering difficult to teach because they're not confident with the content and that they have trouble finding information and identifying useful resources in this very new science.

Some of the best sources of information are free publications which explain genetic engineering and some specific projects in easy to follow terms (listed below). Many of these should have been sent to schools already, but if not, they are only a phone call away (most can be provided as class sets). The internet is also a great source of up-to-date, well present information. Some good sites are listed below. If you would like to build a greater depth of knowledge on this new science, a range of texts are available for you and your students. A comprehensive review of current resources in Biotechnology (texts, videos, kits) is available from the Green Machine.

At the beginning of this article I stated that getting students to actually extract DNA for themselves is an invaluable part of teaching gene technology. Educational links with such an extraction are numerous from science ethics to the principles of solubility (see Figures 5 and 6). Use the extraction as an enthusiasm generator, and then step into the range of science that it opens up.

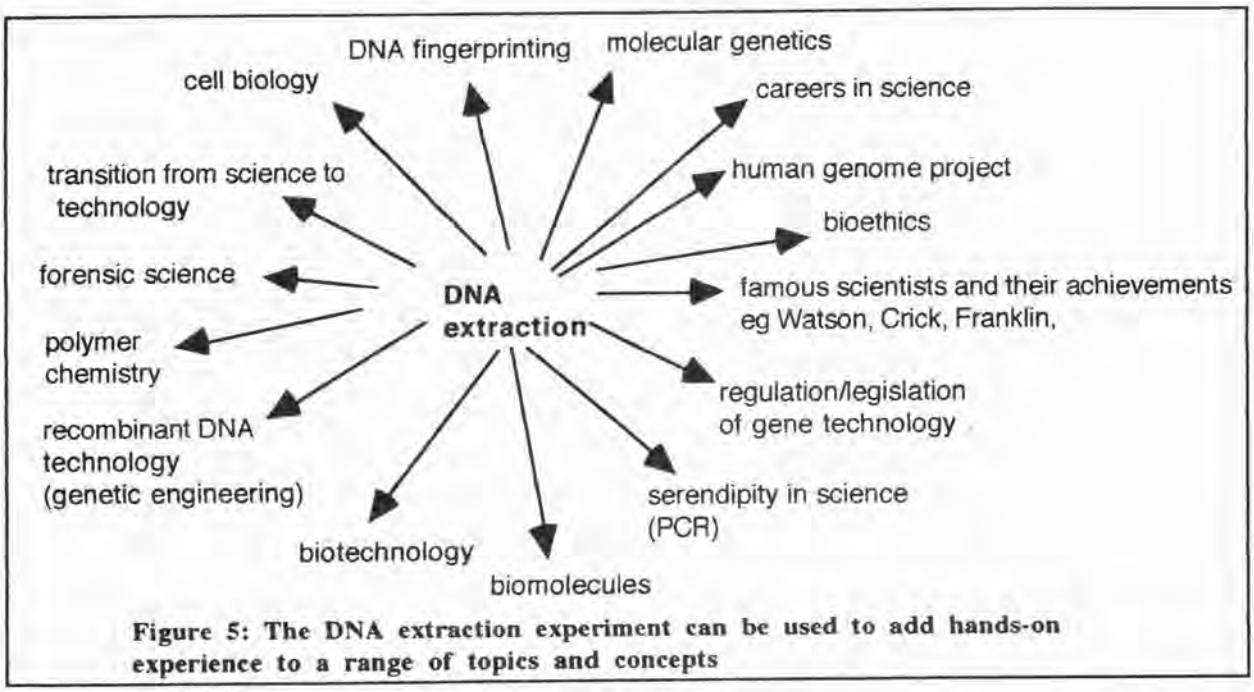


Figure 5: The DNA extraction experiment can be used to add hands-on experience to a range of topics and concepts

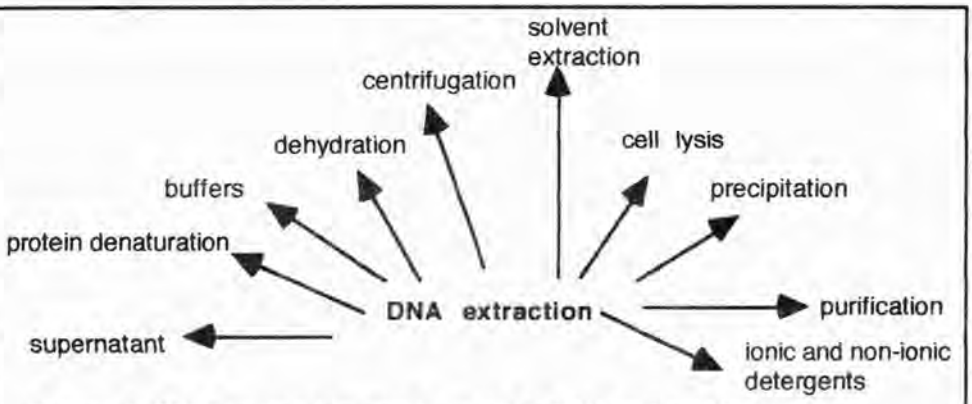


Figure 6: DNA extraction can be used to link and reinforce a number of processes, skills and concepts

So how do you run a DNA extraction in your class ? An easy to use procedure is included in these proceedings, allowing you to easily extract loads of DNA from dried seed peas. Modifications of the solutions used are provided so that no fancy chemicals are required, and all you need is a bench centrifuge (the hand operated types work fine). If you can't get a centrifuge, contact me for a range of alternatives. Either way, I suggest that you try any procedure for yourself a few times so that you feel confident when you bring this exciting experience into your classroom.

Janelle Kennard
The "Green Machine"
CSIRO Education centre
PO Box 1600
Canberra ACT 2601
Phone/Fax (06) 246 5279

FREE GENE TECHNOLOGY RESOURCES

Today's Technology: Gene Technology at Work (1995). A colourful 15 page book published by the Gene Technology Information Unit. Free class sets and accompanying teaching notes can be obtained from Today's Technology, PO Box 3284, St Kilda Rd, Melbourne, VIC 3004; fax (03) 9 589 2571.

The Biotechnology Revolution (1995). A bright 17 page book sponsored by the Biotechnology Section, Department of Industry, Science and Technology, GPO Box 9839, ACT 2601; ph (06) 276 1299, fax (06) 276 1997.

The New Biology: the science and its application ((992);
Ingard (BT cotton): some basic facts and perspectives (1995).
Monsanto Cotton Team, Monsanto Australia Limited, PO Box 4077, Melbourne, Victoria 3001; ph 1 800 639 899, fax 1 800 655 202.

Gene Technology: Issues for Australia (1993) Occasional Paper No. 27. An excellent information source produced by the Australian Science and Technology Council. ASTEC, Level 2 AMA Building, 42 Macquarie St. Barton, ACT 2600; phone (06) 273 4966.

Information leaflets available from the Australian Biotechnology Association. These cover a number of topics including Biotechnology in Medicine, Agriculture and Waste Management as well as Genetic Engineering and Genetic "Fingerprinting." ABA, PO Box 4, Gardenvale, Victoria 3185; phone (03) 596 8879 **OR** download from their www site (see internet addresses).

Genetic Manipulation Advisory Committee Information. Details of the regulation of genetic engineering in Australia.

- Newsletter -published 2-3 times a year
- Annual Report
- Public information sheets for planned release proposals assessed by GMAC
- Biotechnology Information series from Iowa State University (see their www site below). A good set of information.

GMAC Secretariat, GPO Box 2183 Canberra, ACT 2601; ph (06) 276 2134, fax 276 1302.

Useful WWW sites:

http://www.dist.gov.au/science/gmac/gmachome.html
Genetic Manipulation Advisory Committee Homepage. The site contains all of GMAC's public information sheets on proposed releases plus a variety of other useful material.

http://www.geneinfo.gtiu.gov.au/
Gene Technology Information Unit Homepage. The Unit is part of the Australian Government's response to the need for providing high quality public information on the emerging field of gene technology. The site includes useful fact sheets.

http://biology.anu.edu.au/greenmachine.html
Our page with information on Biotechnology education in Australia

http://biotech.zool.iastate.edu/Biotech_Public_Ed.html
Biotech Education Homepage. Includes biotechnology education resources from Iowa State University with information about products available from other institutions.

http://www.gene.com:80/ae/
Access Excellence, a US educational program, puts high school biology teachers in touch with colleagues, scientists and information sources through an online network.

http://www.reading.ac.uk:80/NCBE/
Pages for the National Centre for Biotechnology Education in the UK. Contains links to many useful sites and houses a great range of very well presented classroom activities in biotechnology and microbiology.

http://www.aba.asn.au/
The Homesite of the Australian Biotechnology Association, it includes a lot of information about biotechnology industries in Australia. Contains a range of resources including the association's leaflets (as above).

http://www.wehi.edu.au/science/science.html
DNA Science, Walter & Eliza Hall Institute of Medical Research.

Extraction of DNA from Peas

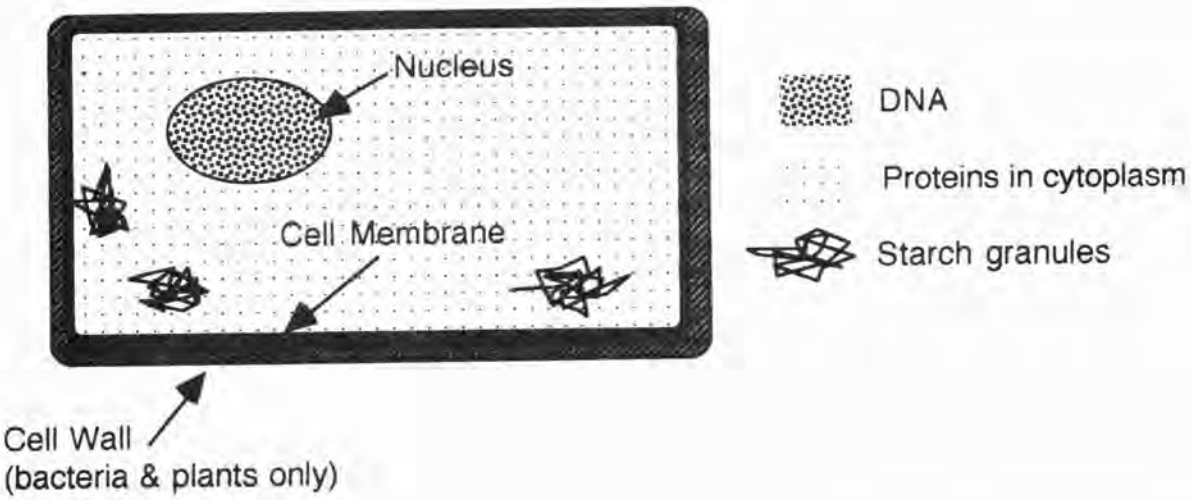
DNA can be readily extracted from the tissues of a number of organisms by:

1) breaking down the cell and nuclear membranes ie. "lysing" the cells (with a detergent of some sort);

2) degrading (with a proteinase - eg. meat tenderiser) or removing (solubilising) cellular proteins;

and 3) precipitating out the DNA (usually with ethanol).

Dried beans are rich in DNA, protein and starch. These are the cell components that we are focusing on separating in this protocol.



Procedure (if steps 1 and 2 are carried out prior to class the extraction takes only about 50 mins):

1. Place about 1g of dried peas in a mortar and grind with a pestle to break up any large pieces. Grind the peas while gradually adding 10 mL of **Solution 1**. (We actually use a coffee grinder to make enough pea powder for the entire class and then transfer it and the corresponding amount of solution 1 into a large beaker).

2. Place the pea mixture in a small beaker and add 0.25 mL of **Solution 2**. Add a stirring flea and place on a magnetic stirrer - set it to stir moderately fast. Keep the mixture stirring for at least an hour, the more stirring the better.

3. Filter 10 mL of the pea soup through gauze into your plastic test tube and centrifuge until a well packed pellet is formed.

4. The liquid above the solid contains proteins and other salt soluble substances. Pour off this liquid and keep the pellet, which consists of starch and cell nuclei.

5. Add about 10mL of **Solution 3**. Stir gently with a metal rod until the pellet is completely resuspended.

6. Centrifuge again until a well packed pellet is formed (about 5 minutes) and discard the supernatant which contains more protein.

7. Add 4mL of **Solution 4** and stir gently with a metal rod for about 5 minutes to remove all lumps.

8. Centrifuge until a well packed pellet is formed. **This pellet will be mainly starch and the DNA will be in the supernatant.** ***Do not discard your supernatant!***

9. Use a plastic pipette to draw off about 2mL of the supernatant and dispense it into a clean glass test tube. Be careful not to disturb the pellet of starch and leave behind the foam on the top of the liquid.

10. Slowly add about 3mL of ice-cold ethanol to the liquid in the test tube. Tilt the test tube and pour the ethanol down the side so that it forms a layer on top of the DNA solution rather than mixing with it.

11. Using a glass hook gently stir the layer where the ethanol touches the DNA solution and observe the formation of the long fibrous strands of DNA. If you can spool the DNA on the end of the glass rod you may be able to pull it out of the test tube. DNA is fairly transparent - if your DNA appears whitish it is due to contamination with protein that was not completely removed in steps 2 to 7.

The Solutions

Solution 1
10 mM $MgCl_2$, 10 mM Tris Buffer pH 7.5 and 0.2 M NaCl

 # 1 is a buffering and salt solubilising solution. Tris buffers the cell components at a pH of 7.5 while the salts $MgCl_2$ and NaCl cause proteins to become soluble.
So, after the first centrifugation the supernatant contains proteins and other salt soluble substances while cell nuclei containing DNA and starch granules are compacted in the solid pellet at the bottom of the tube.

Solution 2
Triton X- 100 (20% in H_2O)

 # 2 is a cell membrane lysing solution. Triton is a neutral (non-ionic) detergent which dissolves cell membranes releasing all the cell contents (nuclei containing DNA, protein and starch).
Treatment with Triton exposes all the cell contents to solution #1.

Solution 3
10 mM $MgCl_2$, 10 mM Tris buffer pH 7.5 and 0.5% Triton X- 100

 # 3 is a buffering, lysing and salt solubilising solution. Tris buffers the cell components at a pH of 7.5, Triton lyses any remaining cell membranes and $MgCl_2$ solubilises any remaining proteins.
After you have centrifuged your suspension the second time, the supernatant will contain most of the remaining protein, while cell nuclei (containing DNA) and starch will again be in the pellet.

Solution 4
1% sodium dodecylsulfate (SDS) solution in H_2O

 # 4 is a nuclear membrane lysing, DNA solubilising and starch precipitating solution. SDS is an ionic detergent that is capable of dissolving cell nuclei (unlike non-ionic Triton). DNA is soluble in sodium dodecylsulphate while starch granules are not.
So, after the 3rd centrifugation the DNA will be in the supernatant and the starch will still be in the pellet. At this stage DO NOT discard the supernatant

Ethanol precipitates DNA.

All of the solution components should be readily available from any chemical company. We obtain chemicals from SIGMA (free call 1800 800 097).

Simpler Solutions For Your Classroom

Alternative solutions that require even simpler ingredients are listed below. This method gives a lower quantity and quality of DNA, but does work.

Solution 1: 10 mM $MgCl_2$, 10 mM Sodium Phosphate Buffer pH 7.5, 0.2 M NaCl.

Solution 2: Omit this solution but still keep the ground peas stirring for at least an hour in step 2.

Solution 3: 10 mM $MgCl_2$, 10 mM Sodium Phosphate buffer pH 7.5.

Solution 4: 20% liquid wool wash in H_2O. Try and obtain a liquid wool wash which has Sodium Lauryl Sulphate (another name for SDS) as one of its main ingredients (listed number 1 or 2) and which has few additives as possible. Earth's Choice, Eucalyptus Wool Wash is the brand that we used.

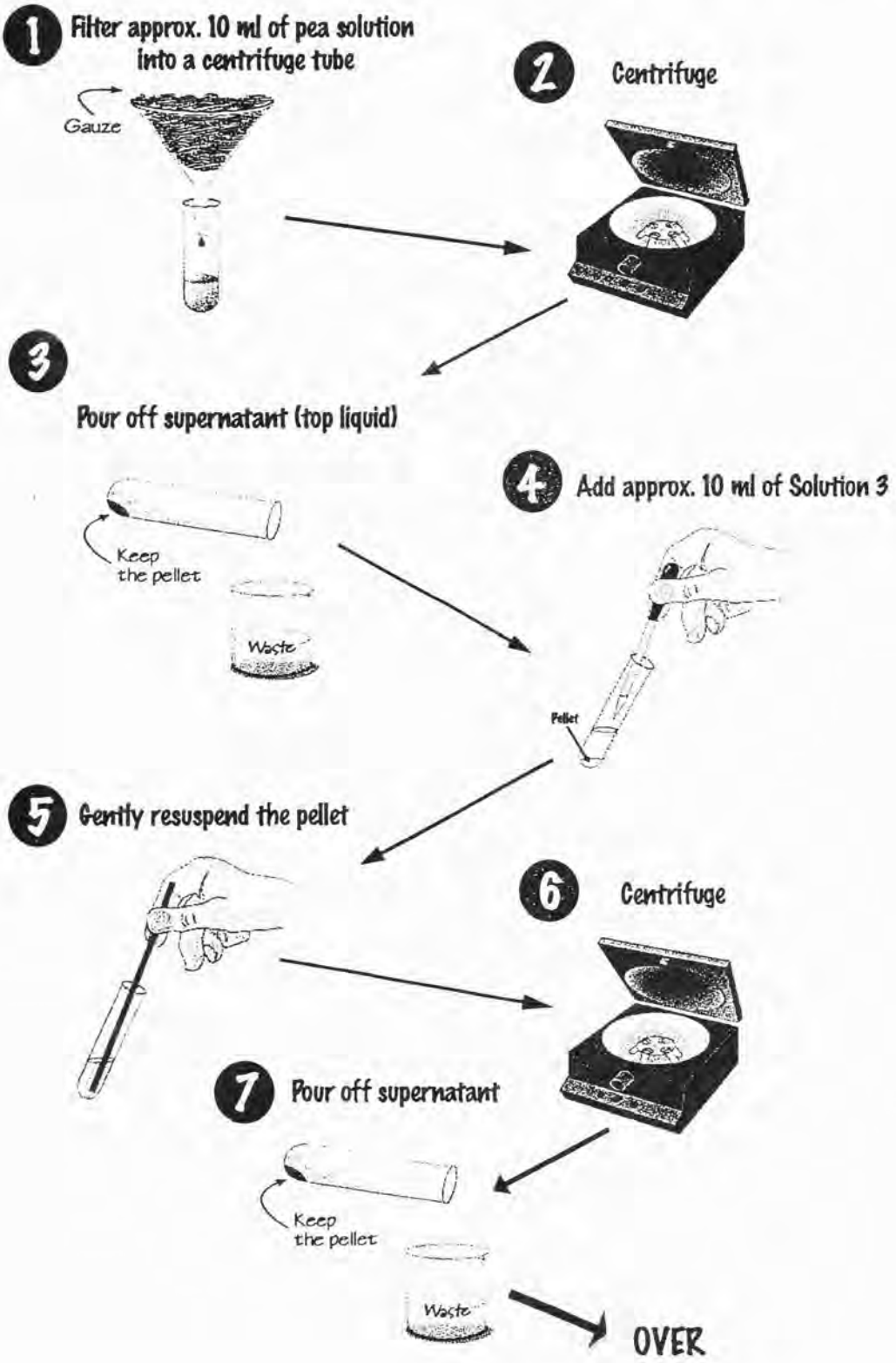
To make the Sodium Phosphate Buffer for Solutions 1 and 3:

For 1 litre of 10mM Sodium Phosphate buffer, mix:

810 ml of 10mM Na_2HPO_4

190 ml of 10 mM NAH_2PO_4

Steps in Extracting DNA from Pea Seeds




8 Add approx. 4 ml of Solution 4
Pellet
9 Gently resuspend the pellet
10 Centrifuge
11 Pour ALL of the supernatant into a clean glass tube
Starchy pellet
12 Layer approx. 3ml cold Ethanol
Cold ETHANOL
13 Extract DNA using glass hook
DNA strands stick to glass hook

STUDENT PRACTICALS

Once again our thanks go out to those teachers who have supported BAAT through supplying a range of practicals, etc.

In this edition we specifically thank -

- **Ian Taylor** - McCarthy Senior Catholic High School
  - Tillage Implements
  - Senior Learning Contract
  - 3 Unit Alternative Agriculture Unit

- **Dave Grady** - Inverell High School
  - Beef (Steer) Unit

Many others have sent in material. Unfortunately, lack of space has limited this edition. We will make sure that you will receive these in future editions.

PLEASE KEEP SENDING THESE IN !!

Another REMINDER

Send in activities/lessons/experiments

that work

We want to publish them in the next issue
SEND THOSE PAPERS INTO THE EDITOR
PLEASE!!!

There's just never  enough paper work ....

Soil Management

Types of Tillage Implements

Name : .....

Problem :

You have just bought a 1500 ha. property on the South-Western Slopes of NSW for the purpose of growing cereal crops (wheat, barley and oats). Lupins will be grown in rotation with the wheat to improve soil fertility.

You will need to borrow money to buy the equipment necessary to cultivate the soil, sow your crops and harvest the crop. To reduce your costs you will buy second hand machinery initially. The property unfortunately has a history of poor management, resulting in soil compaction problems (hardpan), so you will choose equipment to rectify this problem.. Since you will pay a contractor to cart the produce, you will not make allowance to buy a truck at this stage. However, you will need on-farm storage for a least 200 tonnes of lupins.

The machinery should be adequate to handle 800 ha of cereals and 200 ha of lupins each year. The rest of the property will be left as pastures for grazing sheep.

The Task :

Prepare a financial plan for the bank manager estimating the amount of money you will need to borrow for machinery. Base your estimates on the prices from the classified advertisements in the 'Land' newspapers.

Choose a suitable piece of equipment for each of the tasks listed below, cut out the advertisement and paste it in the space provided. Write a brief description of the implement in your own words.

Finally, calculate the total amount of money you must borrow from the bank for machinery.

1. Tractor

Description ..... Cost ..... Paste Advertisement Here

.....

.....

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.....

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2. Initial cultivation of paddocks

Description ..... Cost ..... Paste Advertisement Here

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3. Treatment of soil compaction

Description Cost Paste Advertisement Here

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.....

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4. Secondary cultivations to break up clods

Description Cost Paste Advertisement Here

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.....

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5. Fallowing to kill weeds and conserve moisture

Description Cost Paste Advertisement Here

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6. Sowing seed and fertilizer

Description Cost Paste Advertisement Here

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7. Spraying for weeds (wild oats and skeleton weed)

Description Cost Paste Advertisement Here

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.....

.....

.....

.....

8. Harvest

Description	Cost	Paste Advertisement Here
.....	.....	
.....		
.....		
.....		
.....		

9. Grain storage

Description	Cost	Paste Advertisement Here
.....	.....	
.....		
.....		
.....		
.....		

10. Grain handling (transferring grain from silo to truck, etc.)

Description	Cost	Paste Advertisement Here
.....	.....	
.....		
.....		
.....		
.....		

ESTIMATE OF TOTAL COST : .....

List the other major expenses you would need to allow for :

.....

.....

.....

.....

Assuming that you expect a yield of 1.0 tonnes/ha SAE grade wheat and 2.0 tonnes/ha of lupins, calculate the amount of money you will receive for your first crop. (Where can you get information to estimate the wheat and lupin prices?)

.....

.....

.....

.....

Why would the bank need to know the expected return for the crop?

.....

.....

Ian McCarthy, Senior Catholic High School

LEARNING CONTRACT

1. The topic will take ..... weeks to complete.
2. All your work must be signed off by the teacher by ..... (date).

Marks are awarded on the following basis :

- You must do ALL the required work to meet the minimum standard required of the course topic.
- The value of the required work is 10 marks.
- You may do OPTIONS to increase your mark.
- The mark value of options are indicated on the work contract.
- The maximum award will be 20 marks.
- Completed tasks must be registered with the teacher to check whether they are of a satisfactory standard.

Directions :

* Only objectives checked and registered with the teacher before the due date will count for your mark.
* Prior to the commencement of the unit, choose your mark. Make sure your teacher records the mark. **This then becomes your contract.** If you do not fulfil the requirements of the contracted mark by the due date you will be penalised a MINIMUM OF 3 MARKS.
* If you do not complete the required work then the **maximum** mark will be 10/20.

CONTRACT :

I agree to do the work as indicated on the worksheet to a value of ..... marks.

FINAL DATE FOR SUBMISSION OF TASKS : .....

STUDENT SIGNATURE : .....

TEACHER SIGNATURE : .....

3 Unit Agriculture
Elective 3 : Alternative Agricultural Systems

This is a HSC Assessment Task

The objectives are divided into required work and options. The required work represents the minimum amount of work necessary to satisfactorily complete this course topic. The options give you the opportunity to study particular aspects of the work in greater detail.

Marks will be awarded on the basis of :

- Satisfactory completion of all required work objectives - 10 marks.
- Satisfactory completion of each additional option - 1 or 2 marks as indicated.
- Maximum possible marks - 20 marks.

Sources of Information :
Information necessary to satisfactorily complete the "required work" will normally be readily available in the school library or your local municipal library. Some useful references are :

- Brown et al. - Dynamic Agriculture, Books 3 & 4
- Reid : A Manual of Australian Agriculture
- Yearbooks of Australian Agriculture
- Periodicals such as Australian Farm Journal, Hobby Farmer, Farm
- Agfacts
- Rural Research - CSIRO
- The Land Newspaper

Information necessary to satisfactorily complete the "options" may be found in the above sources though students may also need to seek information from primary sources such as :

- NSW Agriculture and Fisheries
- Breed Societies
- Farmer Associations
- Interviews with farmers (at Field Days, Agricultural Shows, Agview, etc.)

Satisfactory Completion :
Have your work checked and initialled by your teacher regularly to ensure your answers are of the required standard. It is quite acceptable to seek the advice of other people, but all written work must be the student's own original work.

Where students share sources of information, the content of the answers may be similar but it is not acceptable to copy another student's work, then neither student will be considered to have satisfactorily completed that objective.

You have ..... weeks to complete the objectives in this work contract. The work must be submitted for marking on or before the due date of ...../...../..... .

3 Unit Agriculture
Elective 3 : Alternative Agricultural Systems

This option involves the study of alternative agricultural system including :

1. Changes and innovations to existing production systems, eg. open range poultry, organic farming, super fine wool production.
2. Development of new enterprises such as the introduction of new animal industries, eg. alpaca, ostrich or new crops, eg. jojoba.

In completing the following objectives you should target one alternative animal enterprise **and** one alternative plant enterprise from the following lists.

Alternative Animals	Alternative Plants
Deer	Hydroponic Vegetables or Flowers
Emu	Organic Vegetables or Crops
Ostrich	Cut Flowers for Export
Game Poultry	Micropropagated Orchids
Free Range Eggs	Tissue Cultivated Plants
Dairy Goats	Jojoba Oil
Dairy Sheep	Trees for Farm Planting
Cashmere	Tea Tree Oil
Angora Goats	
Alpaca	
Aquaculture (fish farming)	

It may be possible to study other enterprises not on these lists if you obtain the prior approval of your teacher.

3 Unit Agriculture
Elective 3 : Alternative Agricultural Systems

Required Work	Init.	Options	Init.

1. Outline the Diversity of New Agricultural Enterprises

i) Compile a collection of newspaper / magazine clippings on unusual alternatives to traditional agricultural enterprises (at least 5 plant enterprises and 5 animal enterprises). Write a short synopsis of each article.		i) Find estimates of the size of each enterprise type (in real or dollar terms). (1 mark)	
ii) Read "Dynamic Agriculture, Book 4", Chapter 21, pp 309-318. Do questions 1 to 9.			

2. Appraise the Alternative Production Systems Available for Existing Enterprises

i) Read "Dynamic Agriculture Book 3", Chapter 21 "Organic Farming". Do questions 1 to 16.		i) Research the work of Bill Mollison and the principles of 'Permaculture'. (150 words) (2 marks)	
ii) Read "Production of Eggs and Meat on Free Range"; *Australasian Poultry*, Vol. 4 No. 2, June/July 1993, pp 15-18 **and** "Free Range Poultry Production in Australia" *Australasian Poultry*, Vol. 4 No. 4, Oct/Nov 1993, pp 12-13.		ii) Read "Combining Organic Egg and Vegetable Production" *Australasian Poultry*, Vol. 4 No. 4, Oct/Nov 1993, pp 15-18. (1 mark)	

3. Case Study : Production Technology

i) Field Study : From observations of a case study farm (or farms), report on the changes farmers would have to manage in changing from a conventional to an alternative type of enterprise.		i) Interview a farmer in one of your nominated agricultural enterprises. Report on the production problems and technical difficulties of the enterprise. (2 marks)	
		ii) Prepare a folder of technical literature on your nominated alternative plant enterprise. The folder should comprise at least 10 newspaper clippings, magazine articles, agfacts, promotional material, etc. (1 mark)	

3 Unit Agriculture
Elective 3 : Alternative Agricultural Systems

Required Work	Init.	Options	Init.
		iii) Prepare a folder of technical literature on your nominated alternative animal enterprise. The folder should comprise at least 10 newspaper clippings, magazine articles, agfacts, promotional material, etc. (1 mark)	

4. Case Study : Marketing

i) Define the term "market niche".		i) Interview a farmer in one of your nominated agricultural enterprises. Report on the marketing strategies for the enterprise. (2 marks)	
ii) Contact, by letter or telephone, the relevant industry association for your chosen alternative enterprises. Describe the role the association plays in marketing (and market development) for their members.		ii) Make a projection for the future of the nominated industry. Present the evidence for your prediction - • market size • market development • growth or contraction in supply or demand • risk (2 marks)	
iii) Make an oral report to the class on (date : .....) describing innovation and marketing in one of your nominated alternative enterprises.		iii) Read "Planning for the Future of the Australian Ostrich Industry" *Australasian Poultry*, Vol. 2 No. 1, pp 24-25. (1 mark)	
iv) Choose at least 2 plant and 2 animal enterprises from the list above. Draw up a table showing the range of products marketed and the market niche(s) that each product is targeting.		iv) What are the advantages of targeting a "market niche" and what are the possible drawbacks? (1 mark)	

5. Research

i) Describe the nature of current research being carried out to solve problems in the chosen alternative enterprise.		"The Hearty Egg" *Australasian Poultry*, Vol . 4 No. 4, Oct/Nov 1993, p5. (1 mark)	

In addition to this unit of work, Ian has :

- 2 Unit Land Management
- 2 Unit Beef Industry Study
- 3 Unit Research Project Proposal

SENIOR AGRICULTURE

The following information was supplied by Dave Grady from Inverell High School. Dave asked the local butcher to do a break down of yield and costs of four steers that were raised by the school.

As a literacy exercise this information can be used for input into a reading (interpreting) and writing exercise.

Students could be presented with this exercise :
The following tables contain information on four steers with different breeding. Use the information presented in the tables, "Carcase Bone Out", and, "Summary", to write an explanation outlining which breed of steer would be most suitable for a butcher.

Before attempting the task the teacher should spend some time helping students interpret the information.

A series of simple questions may help clarify what the students already know and what they need to learn to complete the task. These might include :

- What do the following terms mean?

  Siver Side _____

  Top Side _____

  Round, Rump _____

  Chuck _____

  Mince Trim _____

  Sirloin _____

  Eye Fillet _____

  Forequarter Blade _____

  Cube, Brisket _____

  Roast _____

  Sausage Trim _____

  Bone & Fat _____

  Saleable Meat _____

  Yield _____

  Hot Carcase Weight _____

  Cold Carcase Weight _____

  Dressing % _____

  Shrinkage _____

  Taste Test _____

  Limousin _____

  Murray Grey _____

  Saler _____

  Hereford _____

  Angus _____

- "Which steer had the best yield?" may help students locate the information.
- Another question could be "Which steer had the lowest percentage of bone & fat?

The next page outlines how an "explanation" text type is structured.

BEEF CUTS - TOTAL IN (kg) AND PRICE PER BEAST (sale)

BREED / ORIGIN	SILVER SIDE	TOP SIDE	ROUND	RUMP	SIRLOIN	EYE FILLET	FORE 1/4 BLADE	CUBE	CHUCK	BRISKET	ROAST	SAUS TRIM	MINCE TRIM	BONES + FAT	TOTAL WEIGHT OF SALEABLE MEAT	PRICE	YIELD %
Angus $ W	55.66	62.72	38.44	57.1	97.56	50.05	46.65	106.7	41.71	42.88	20.79	52	87			$759.26	
X																	
Hereford $ R	97.41	94.08	57.66	102.78	151.76	57.2	77.75	135.8	66.74	68.6	33.26	78	195.75			$1,216.79	
Limo																	
kg TOTAL	13.915	15.68	9.61	11.42	10.84	3.575	15.55	9.7	16.685	17.15	8.315	26	43.5				
Limo $ W	60.6	64.16	41.4	56.28	97.02	62.65	52.73	95.48	35.6	36.53	18.54	49	98			$767.96	
X																	
Saler $ R	106.05	96.24	62.1	101.03	150.92	71.6	87.88	121.52	56.96	58.44	29.66	73.5	220.5			$1,236.40	
Angus																	
kg TOTAL	15.15	16.04	10.35	11.255	10.78	4.475	17.575	8.68	14.24	14.61	7.415	24.5	49				
Limo $ W	56.76	61.9	37	62.05	98.01	52.92	40.79	87.95	31.1	30.65	19.23	48	81			$707.36	
X																	
Murray $ R	99.33	92.85	55.5	111.69	152.46	60.48	67.98	111.93	49.76	49.04	30.76	72	182.25			$1,136.03	
Grey																	
kg TOTAL	14.19	15.475	9.25	12.41	10.89	3.78	13.595	7.995	12.44	12.26	7.69	24	40.5			$1,136.03	
$ W	80.3	88.16	49.7	71.53	114.12	66.08	52.44	110.11	36.7	40.34	20.93	47	116			$893.41	
Limo																	
$ R	140.53	132.24	74.55	128.75	177.52	75.52	87.4	140.14	58.72	64.54	33.48	70.5	261			$1,444.89	
kg TOTAL	20.075	22.04	12.425	14.305	12.68	4.72	17.48	10.01	14.68	16.135	8.37	23.5	58				

CARCASE BONE OUT

	BEEF CUTS - total in kg and % of TOTAL WEIGHT																
BREED / ORIGIN	SILVER SIDE	TOP SIDE	ROUND	RUMP	STRIP LOIN	TENDER LOIN	FORE 1/4 BLADE	CUBE	CHUCK	BRISKET	ROAST	SAUSAG TRIM	MINCE TRIM	BONES + FAT	TOTAL WEIGHT ALL KG COMPONENTS	KG SALEABLE MEAT	YIELD %
Angus kg	13.915	15.68	9.61	11.42	10.84	3.6	15.54	9.7	16.7	17.15	8.3	26	43.5	93.56			
X															295.5	201.94	68.30%
Hereford	4.50%	5.30%	3.20%	3.90%	3.70%	1.20%	5.20%	3.30%	5.60%	5.80%	2.80%	8.70%	14.70%	31%			
Limo																	
Limo kg	14.19	15.48	9.25	12.41	10.89	3.78	13.6	7.99	12.44	12.26	7.69	24	40.5	79.52			
X															264	184.48	69.90%
Murray Grey	5.40%	5.95	3.50%	4.70%	4.10%	1.40%	5.10%	3%	4.70%	4.60%	3%	9.00%	15.30%	30.10%			
Limo kg	15.15	16.04	10.35	11.25	10.78	4.48	17.58	8.68	14.24	14.61	7.42	24.5	49	79.43			
X															283.5	204.07	72%
Saler	5.30%	5.60%	3.60%	3.90%	3.80%	1.60%	6.20%	3.10%	5%	5.20%	2.60%	8.60%	17.30%	28%			
Angus																	
kg	20.08	22.04	12.43	14.3	12.68	4.72	17.48	10.01	14.68	16.14	8.37	23.5	58	73.58			
Limo															308	234.42	76.10%
	6.50%	7.20%	4%	4.60%	4.10%	1.50%	5.70%	3.30%	4.80%	5.20%	2.70%	7.60%	18.80%	23.90%			

SUMMARY TABLE

STEER 1 BREED	LIVE WEIGHT kg	HOT CARCASE WEIGHT kg	DRESSING %	COLD CARCASE WEIGHT kg	SHRINKAGE %	% FORE QUARTER	% HIND QUARTER	YIELD SALEABLE MEAT %	$ SALEABLE MEAT	$ SALEABLE MEAT per kg	TASTE TEST PLACING
ANGUS X LIMOUSIN/ HEREFORD	514	305.5	59.4	295.5	3.4	56.2	43.8	68.3	1216.79	2.40	1st
LIMOUSIN X MURRAY GREY	438	275	62.8	264	4	51.9	48.1	69.9	1136.01	2.59	4th
LIMOUSIN X SALER/ANGUS	470	294	62.6	283.5	5.4	54.5	45.5	72	1276.83	2.71	3rd
LIMOUSIN	510	321.5	63	308.0	4.2	51.5	48.5	76.1	1444.89	2.83	2nd

DISTRICT CO-ORDINATORS

DISTRICT	CO-ORDINATOR	SCHOOL	ADDRESS	PHONE	FAX	POST CODE
* ACT	Rowland Clark	Canberra Grammar	Menaro Crescent, Red Hill		06 2952 923	2603
* Albury	Tony Butler	Tumut High	PO Box 70, Tumut	02 6947 1077	02 6947 2497	2720
* Albury	Dave Johnson	James Falon	Fallen St, Albury	02 6025 1688	02 6040 1983	2640
* Armidale	John Lee	Glenn Innes	Edwards St, Glenn Innes	02 6732 1322	02 6732 1972	2370
* Bateman's Bay	Trevor Sewel	Moruya	Albert St, Moruya	02 4474 2155	02 4474 3782	2537
* Bathurst	Loyd Cleaver	All SaintsCollege, Bathurst	Ophir Rd, Bathurst	02 8331 3911		2795
* Bathurst	Tracey George / Karen Domic	Bathurst	Hope St, Bathurst	02 63313755	02 6332 2302	2795
* Broken Hill						
* Central Coast	Grant Jackson	Gosford High	Racecourse Rd, Gosford	02 4325 2948	02 4323 3175	2250
* Clarence/Coffs Harbour	Col McEntyre	John Paul College	Hogbin Dr, Coffs Harbour	02 6853 3155	02 6858 1954	2450
* Deniliquin	Richard White	Balranald Central	We St, Balranald	03 5020 1103	03 5020 1769	2715
* Dubbo	Graeme McIntosh	Dubbo Christian High	Sheraton Rd, Dubbo	02 8882 0044	02 6884 2907	2830
* Griffith	Kieran O'Keefe	Griffith High	Coolah St. Griffith	02 6962 1711	02 6964 1465	2680
* Griffith	Daryl Williams	Temora High	Anzac St, Temora	02 6977 1888	02 6977 4197	2666
* Lake Macquarie						
* Lismore	Mick Melino	St Johns	Woodlawn Rd, Lismore	02 6421 2318		2480
* Maitland	Nigel Cox	Singleton High	York St, Singelton	02 6571 1199	02 6572 4889	2330
* Moree						
* Northern Beaches	Louise Fletcher	Freshwater High	Harbord Rd, Harbord	02 9905 2634	02 9905 2877	2096
* Orange	Pat McCann	James Sheehan	Anson St, Orange	02 6362 1422	02 6382 0776	2800
* Orange	Owen McLaughlin	Canowindra High	Browns Ave, Canowindra	02 6344 1305	02 6344 1085	2840
* Port Macquarie						
* Queanbeyan	Phil Armour	Yass High	Locked Bag No. 1, Yass	02 6226 1711	02 6226 3174	2582
* Queanbeyan	Sue Hope	Goulburn High	Goldsmith St, Goulburn	02 4821 4022	02 4822 1437	2580
* Shellharbour	Craig O'Brien	Moss Vale High	Narellan Rd, Moss Vale	02 4868 1717	02 4868 2787	2577
* Shellharbour	Ross Irwin	Lake Illawarra	Reddall Pde,Lake Illawarra	02 4298 3844	02 4296 3948	2528
* Sutherland/Sydney	Sydney Branch	Menai (Ian Judd)	Gerald Rd, Menai	02 9543 7000	02 9543 5513	2234
* Tamworth						
* Hunter	Grant Taylor	Muswellbrook High	Kink St, Muswellbrook	02 6543 1033	02 6543 3927	2333
* Taree	Peter Tait	Taree High	Albert St, Taree	02 6552 1166	02 6551 2167	2438
* Tweed Heads/ Ballina	George Liddell	Tweed River High	Heffron St, Tweed Heads	07 5524 3007	07 5524 9501	2488
* Wagga Wagga	Allan McMillan	Wagga Wagga Tech High	Cloeman St, Wagga Wagga	02 6925 3611	02 6925 5150	2650
* Wollongong	Ross Irwin	Lake Illawarra High	Reddall Pde,Lake Illawarra	02 4298 3844	02 4296 3948	2528

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