EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE
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2018 NSC CHIEF MARKER'S REPORT

SUBJECT:	**AGRICULTURAL SCIENCES**
PAPER:	1
DURATION OF PAPER:	**2 ½ HOURS** **2 ½ HOURS**
DATES OF MARKING:	**01 – 14 DECEMBER 2018**

SECTION 1: (General overview of Learner Performance in the question paper as a whole)

- ✓ The statistical analysis from both Rasch (100 scripts) and 7-point scale for Agricultural Sciences P1 in the Eastern Cape indicates a remarkable improvement in candidates' performance in the paper this year compared to 2016 and 2017.

- ✓ Learners' average performance has increased in 2018 to 56%, which is an improvement of 11,7% and 4.7% from 2016 (44.6) and 2017 (51.6) respectively. However, the quality of passes could be affected negatively by the substantial number of progressed candidates and those who refused to modularize leading to a huge number of learners bunching at levels 1, 2 and 3. The total number of candidates who obtained levels 5, 6 and 7 has slightly increased.

- ✓ The lowest score recorded was 5 and the highest was 134 out of 150 marks. The average performance in the paper was 51,6%. Learners performed slightly better in question 1 followed by question 2, question 4 and lastly question 3. The most problematic question to the majority of candidates was question 3 and it is the same question where most candidates obtained the lowest marks. Question 2 on animal nutrition used to challenge candidates for the past 3 years, but the 2018 matric cohort showed great improvement. Unlike in other years, this year none of the candidates scored an overall mark of zero, and a number of those scoring below 30% has also decreased.

- ✓ The general overview of learner performance for the paper generated from the statistical analysis has been summarized in table 1 and also in table 2 and in figure 2 below:

Table 1: **Performance per question**

QUESTION	TOPIC OR ASPECT TESTED	HIGHEST ACHIEVER			LOWEST ACHIEVER			AVERAGE MARK			AVERAGE %		
		2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
1	• Animal Nutrition • Animal Production Protection and Control • Animal Reproduction	39	43	45	00	00	02	24	23	**25**	52.9	50.6	**55.8**
2	Animal Nutrition	31	34	35	00	00	00	17	17	22	47.4	47.2	63.3
3	Animal Production, Protection and Control	33	34	31	00	02	00	17	20	18	47.0	56.5	51.5
4	Animal Reproduction	32	32	33	00	00	00	18	17	20	50.8	49.0	55.8
GRAND TOTAL		**126**	**124**	**134**	**00**	**02**	**05**	**74**	**76**	**84**	**44.6**	**51.6**	**56.3**
MAXIMUM MARKS		**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**100**	**100**	**100**

QUESTION	KNOWLEDGE (CONTENT) AREA ASSESSED FOR EACH QUESTION
QUESTION 1	Animal Nutrition, Animal Production, Protection & Control and Animal Reproduction (Multiple Choice questions; Column A & B; Terminology and Term replacement)
QUESTION 2	Animal Nutrition
QUESTION 3	Animal Production, Protection & Control
QUESTION 4	Animal Reproduction

Table 2: **performance according to levels**

Year	Levels	1	2	3	4	5	6	7	TOTAL
2016	No. of Learners	**13349`**	**6202**	**2975**	**1147**	**338**	**83**	**07**	**24101**
	Percentage (%)	55,4	25,7	12,3	4,8	1,4	0,8	0,00	**44,6 %**
2017	No. of Learners	**10522**	**6048**	**3342**	**1372**	**476**	**88**	**17**	**21 865**
	Percentage (%)	48,1	27,7	15,3	6,3	2,2	0,4	0,08	**51,9 %**
2018	No. of Learners	**7665**	**5391**	**4152**	**2680**	**1169**	**368**	**71**	**21796**
	Percentage (%)	35,2	24,7	19,0	12,3	5,4	1,7	0,3	**64,8**

Figure 2: **Performance of candidates according to levels**

Learner performance according to levels for 2016, 2017 and 2018
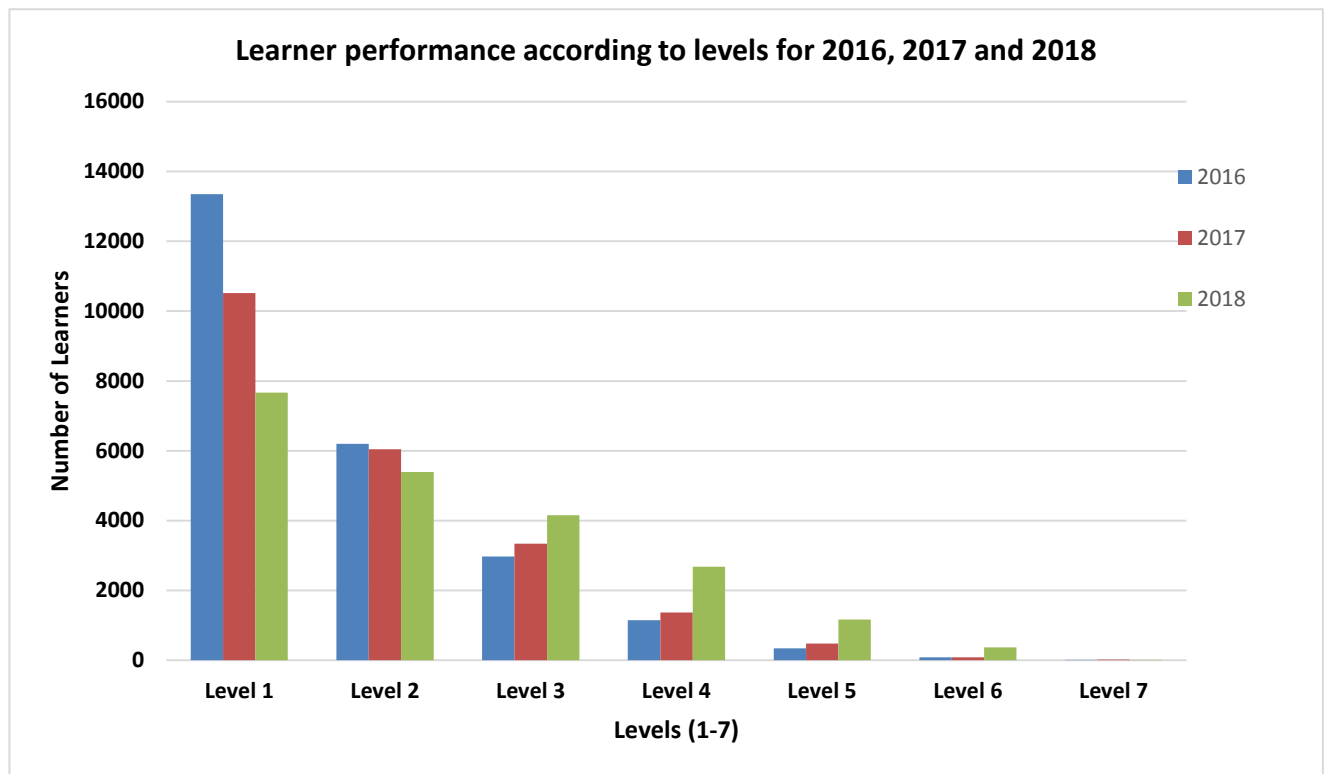
It is evident from the statistical analysis that many learners achieved between levels 1 and 3 with the majority settled at levels 2 and 3. The improved performance in the paper could be attributed to the team work of teachers, learners, the preparations and interventions by the various district subject advisors, revision packs provided by the provincial office to each and every learner, study guides and revision material from the Association for South African Agricultural Educators (ASAAE) and collaborations with various stakeholders in the agricultural sector.

SECTION 2: Comment on candidates' performance in individual questions

(It is expected that a comment will be provided for <u>each question</u>).

QUESTION 1

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

Average learner performance of 55,8% in question 1 displayed an incline of 5,2% compared to 50,6% of 2017.

Average mark from the sample of 100:		**25**
SUB-QUESTION	**TOPIC OR ASPECT TESTED**	**AVERAGE % FROM SAMPLE**
1.1 – 1.4	• Animal Nutrition • Animal Production Protection and Control • Animal Reproduction	55.8%

✓ The learner performance in the entire question 1 indicates that it was fairly answered by candidates, with an average mark of 25. Fairly answered because the majority of learners achieved above 15 marks, and there was evidence of a gradual increase in a number of candidates who achieved more than 50% in this question, however there are still few learners floundering around 30%.

✓ Questions 1.1 and 1.2 were fairly answered, and for a change there was a better performance in Questions 1.3 and 1.4 than the previous years even though they still offered some resistance to weaker candidates who failed to supply the appropriate terms/ phrases of the described statements in 1.3 and in 1.4 they could not correctly replace the underlined words to make the statements true. The highest mark scored in this question was 45 with the lowest being 02 out of a total of 45 marks.

(b) Why the question was poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

1.1	Average of 51.7% for sub-question 1.1. Best learner scored full 20 marks and lowest was 2 in this sub question.

✓ Question 1.1.1 posed a challenge to the majority of candidates as they opted for A or D instead of B. Textbooks refer to the three compartments as forestomachs although in the options it appeared as forestomach and that could have been the reason why most of the candidates did not choose it and lost two marks.
✓ Very few learners were able to identify the two examples of the volatile fatty acids in Question 1.1.2 which was surprising because this is not a new question.
✓ In Question 1.1.4 learners should have known that active absorption needs energy as against the passive absorption which is by diffusion and does not need energy.
✓ Learners also struggled with choosing the correct answer in Questions 1.1.7 which is a combination question and it was even worse with Question 1.1.9. where most candidates seemed to be unfamiliar with the correct sequence of milk release.

1.2	Average of 50% for sub-question 1.2. Best learner obtained full 10 marks and the weakest performer obtained 0.

✓ This question was not well answered by most learners even though they followed the instruction for the question. There was however still a remnant of candidates that continued to disregard the instruction to write A only, B only, Both A and B and none, but the number of these cases have decreased considerable. Learners were unable to correctly analyse the questions before making the

		informed choices and none of the questions seemed to have been the favourite of the candidates.
1.3		Average of 50.3% for sub-question 1.3. Highest mark was 10 and again 0 was the lowest.
		✓ Most of the learners managed to score 6 marks out of 10 and were challenged by Questions 1.3.1 and 1.3.2. The few that correctly identified the deficiency in 1.3.1 as Parakeratosis mostly struggled with writing the correct spelling.
		✓ Very few learners (less than 10%) knew the answer for the equipment fitted with a water valve and a nozzle to supply water to the sow and piglets. This is only because most of the current prescribed textbooks do not have the term nipple drinker. Most common responses were drinking troughs, pig drinker, nozzle drinker etc.
		✓ Most of the learners did not know that the process of cell division through which the primary spermatocytes divide into secondary spermatocytes is Meiosis. Some learners wrote mitosis. Others wrote meiosis 2 which is the same as mitosis.
1.4		✓ Average of 60% for sub-question 4.4. Highest was 5 and the lowest was 0.
		✓ This question was fairly answered. This question was well handled by most candidates and only the weaker candidates could not take full advantage of the easy marks on offer in this question. More than 80% of the learners lost the mark by writing the wrong spelling Person square instead of the Pearson square and Distocia instead of Dystocia.

(c)	Provide suggestions for improvement in relation to Teaching and Learning

✓ Teachers in collaboration with subject advisors should develop concept bank from different references per topic to exercise learners on the language of the subject. These concepts should be assessed timeously so as to allow learners the opportunity to constantly engage with them until they are understood clearly.

✓ Compilation of a document to explain the common action verbs and the expected responses should be prioritized by Subject Advisors and teachers. Learners should write monthly tests assessing them on work already covered and only on Section A type questions.

✓ Teachers must apply the same teaching, assessment and marking principles in the FET lower grades (i.e. grade 10 and 11) and these learners must also be exposed to examination instructions and questions so that they are confident when they are confronted with the question paper and so that the jargon of the examination does not become an obstacle.

✓ Educators should also develop interesting games when teaching terminology using word puzzles, cards, charts and PowerPoint presentations, which can also improve their spelling competency.

✓ Educators should utilize the electronic media resources at their disposal such as smart boards and internet when teaching concepts to improve learner spelling ability.

✓ Educators should train learners on how to identify the main phrases in a question in order to relate to the specific content studied.

✓ Study groups could be formed and learners who have firmly grasped topics can support those who have a poor grasp of topics.

✓ Teachers from different schools in a given circuit or cluster could work closely

together to support one another in mediating challenging topics to learners.

- ✓ Teachers MUST use the CAPS Document and Assessment guidelines when teaching and assessing formally and informally.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- ✓ Candidates showed no competence in eliminating the incorrect options in Question 1.1 and in matching the items in column A with the descriptions in column B in Question 1.2.

- ✓ Candidates who did not do well were unable to provide insight and failed to comprehend basic examination terminology.

- ✓ The candidates who performed well had a good knowledge of and insight into the content, a good command of the English language and managed to respond in accordance with the instructions and the mark allocation.

- ✓ Teachers MUST continuously use the Eastern Cape Revision Resource Pack 2017 in the form of mock exam, informal activities, in-class revision sessions to address the understanding of concepts.

QUESTION 2

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

✓ Question 2 was generally fair to candidates, although it was very long and took a big chunk of their time because of the graph that was too demanding to the candidates. Performance in this question improved significantly this year to 63,3 % compared to 47,2% in 2017.

Average mark from the sample of 100:		**22**
SUB-QUESTION	TOPIC OR ASPECT TESTED	AVERAGE % FROM SAMPLE
2.1 – 2.6	Animal Nutrition	63.3%

Most candidates performed well in this question, the lowest score recorded was 0 and the highest was 35 with an average mark of 22. More than five candidates managed to get 35 out of 35 marks in question 2, which is unprecedented since the dawn of the CAPS. Teacher's efforts in preparing, engaging and drilling candidates on various approaches to grasp content, concepts and terminology of animal nutrition need to be acknowledged, although there are some challenges that need to be addressed as mentioned in the report below. The following questions were challenging to most learners 2.1.3; 2.2.1; 2.2.2; 2.2.3; 2.3.2;2.3.3; 2.3.4; 2.4; 2.5 and 2.6.3.

(b) Why the question was poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

The main challenge for learners in this question was that they could not express themselves well in English, as result they were unable to correctly phrase their responses. They

	experienced difficulty in interpreting questions based on data meaning that they lacked the skill to correctly manipulate information.
2.1.	Average of 53.7%
	✓ Candidates lost marks in Q.2.1.1 because they could not identify the internal structures of ruminant stomach compartments, many confused omasum and reticulum with rumen and abomasum resulting in the loss of 2 marks. ✓ Their performance in Q.2.1.1 influenced Q.2.1.2 because some were unable to describe the functions of omasum instead they wrote storage of food, drying of food etc. and in 2.1.3 a number of learners were unable to name papillae confusing it with villi. ✓ In sub-question 2.1.4 majority of learners correctly stated the requirements of rumen microbes, however some confused requirements with functions of rumen microbes.
2.2	Average of 62.9%

	✓ Sub-question 2.2 was quite fair to candidates as a result some managed to obtain the full marks for the calculation in 2.2.1, however most struggled in the following aspects:
	  o Correct formula: they multiplied by 100% instead of 100
	  o Calculation of the 10% moisture was not a challenge, but most candidates did not subtract the 1.2kg moisture content from the total feed intake in order to get dry mass of feed.
	  o Very few candidates were able to write the formula in full with kg's in brackets, the majority (even though they were not penalized) abbreviated it as follows:
	
	   $\dfrac{DMI - DME}{DMI} \times \dfrac{100}{1}$ instead of $\dfrac{DM\ intake\ (kg) - DM\ manure\ (kg)}{DM\ intake\ (kg)} \times \dfrac{100}{1}$
	
	  o Some wrote kg's as units for coefficient of digestibility instead of percentage and they lost a mark.
	  o Other learners lost marks for not showing all the steps of the calculation.
	✓ Learners could not describe the implications of the calculated digestibility value in 2.2.2, they just stated that "it is low" or just "35,2 %".
	✓ In sub-question 2.2.3 majority of learners were able to classify the feed as a roughage.

2.3	Average of 70%
	✓ In sub-question 2.3.1 candidates identified feed A correctly as a feed suitable for young growing farm animals, but failed in 2.3.2 to provide the main reason for supplying feed A to young growing animals instead they wrote feed A has little crude fibre or high total digestible nutrients (TDN), they could not relate growth to high protein content or narrow nutritive ratio (NR) of the feed. There were learners who provided suitability of Feed B for growing animals as having a small, less or low nutritive ratio instead of narrow NR. ✓ It was evident from the candidate's responses for 2.3.3 that correct manipulation of data is still a challenge that need to be addressed urgently and vigorously. Candidates could not use the data to correctly justify not recommending feed B as a main feed for non-ruminants, instead of basing their argument on crude fibre content (difficult to digest for non-ruminants) of the feed they wrote low protein content or wide NR as a reason. ✓ On average 69.6% candidates performed well in sub-question 2.3.4, but some were struggling to explain the relationship between crude fibre content and TDN of feed A.
2.4	Average of 56.8%
	✓ Majority of learners had a challenge in the energy flow concept and its interpretation. Learners did not follow the instructions in 2.4.1 where they were required to indicate energy lost in manure if farm animal consumed 5kg of feed, instead they wrote 8.5 kg which is the energy lost in manure when 1kg of feed is consumed, again lack of

	skills to analyse data and the question. About 65% of candidates were able to identify methane as a gas from the table, however most wrote energy lost in manure, which might be due to the incorrect phrasing of the question because they just looked at the one with highest energy loss without putting emphasis on "gas". ✓ In 2.4.3 learners were unable to present the formula for Net Energy, instead they wrote long calculations resembling the schematic representation of energy flow, leading to errors and loss 2 of marks. Mostly they scored a mark for the units (joules). Some candidates could not pick that the question is asking for net energy when referring to available energy for growth and production in 1 kg of feed.
2.5	Average of 70.1%
	✓ Sub-question 2.5 was quite fair to learners as a result they managed to obtain the full marks in 2.5.1 and about 3 to 4 marks in sub-question 2.5.2 on the graph. ✓ On average 69.6% candidates performed well in sub-question 2.5.2, most learners were able to draw the bar graph, although some struggled with aspects such as the type of graph, heading with both variables, indication of tons as units on y-axis and scaling or calibration. ✓ Some candidates struggled to differentiate between dependent and independent variables as a result they plotted the feed available on the y-axis and animal feed requirement on x-axis instead of months of the year. Instead of writing months from July to June on the x-axis they simply wrote July to December (six months) due to space some opted to draw two graphs on opposite pages to cater for six months in each. ✓ Some learners could not differentiate between a bar graph and histogram which is a clear reflection that some teachers do not train learners on how to draw different types of graphs.
2.6	Average of 58%
	✓ In 2.6 candidates obtained an average of 58% mainly from 2.6.1; 2.6.2 and 2.6.4, however most learners could not score marks in 3.6.3.because they could not link implants to growth-promoting hormones for increasing feed conversion rate. Candidates confused supplementary ration with implants. The poor performance in 3.6.3 might be due to lack of exposure to other textbooks and or educational visits to farming areas.

(c) Provide suggestions for improvement in relation to Teaching and Learning

✓ Learners should be given enough informal tasks to train them on tackling data response questions, to improve and expand their understanding of the subject content knowledge as well as their vocabulary and these tasks should expose them to various activities including different forms of calculations and graphs. Teachers should guide learners on how to process data in all forms (tables and graphs, calculations etc.) especially fodder flow programme.

✓ Instruction verbs should be unpacked to learners and must form part of the informal assessment during the development of learners for examination readiness.

✓ Teachers should emphasise the concepts of digestibility coefficient, nutritive ratio, energy flow and TDN. Different approaches to teaching the digestibility coefficient and energy values should be employed, for example, explanation of the concept, the meaning, formulae, interpretation and implications of all NR and the ability to analyse the data with its units in order to arrive at the correct answer. When teaching calculations, teachers should constantly train learners on different forms of conversion of scales.

✓ Terminology journals should be developed for each topic to improve and expand learners' understanding of the subject terminology. Teachers should also expose learners to other forms of reading materials other than textbooks e.g. farmer's weekly, extracts from internet, PowerPoint presentations on farming activities, etc.

- ✓ Teachers should at times approach the external and internal structure of alimentary canal by addressing the different sub-systems and their functioning whilst presenting the entire digestive system, where possible samples of different digestive systems be made available as teaching aids to enhance teaching and learning of nutrition topic.

- ✓ The CAPS Agricultural Sciences policy document (page 41) and 2017 Grade 12 Agricultural Sciences Examination guidelines (page 11) clearly addresses the approach on how to teach the types of feeds, therefore teachers should constantly use these documents whenever they prepare for their teaching and assessment.

- ✓ Teachers should expose learners to different forms in which fodder flow programme can be presented such as graphs, tables, calculation, case studies and scenarios. They should also emphasise the purpose of fodder flow, its components for example shortage/deficit and surplus as well as how to mitigate challenges of shortage and dealing with the surplus. Use the different approaches to revise fodder flow by making use of past question papers. Educators should guide the learners on how to use past question papers so that they don't just take the answers but read the whole question with understanding and then respond accordingly.

(d)	Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- ✓ Teachers are advised to promote reading and analysis of text and should discourage memorising without understanding the concepts, focusing on all aspects of the content that are listed in the CAPS document and Examination Guidelines. Remember there might be topics that have not been covered in recent question papers, but still remain important content topics to be taught.

- ✓ Learners should be able to link the data given to the content that they have been taught in class even before they work on the questions given. Learners have a tendency of memorizing instead of reading with understanding hence they fail to apply the knowledge they have learnt, instead they regurgitate previous papers' responses. Teachers need to place more emphasis on making the learners understand the concepts instead of just memorizing by assessing them the way national papers are structured.

- ✓ Learners displayed understanding of calculating the digestibility coefficient, however they are still challenged with the formula, conversion, units and implications of the calculated value.

- ✓ Types, examples, deficiencies, sources and forms of supplementing minerals should be presented in a table form using different Agricultural Sciences and Life Sciences sources when compiling as informed by the CAPS and Examination guidelines to address concerns raised in question 1.3.1 and 2.6
- ✓ Learner responses in question 2.6 serve as evidence that some teachers are teaching with only one textbook available at school which is not acceptable. Teachers should have a minimum of three different prescribed textbooks and make notes thereafter to supplement the missing content from the learner's textbook.

QUESTION 3

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

- ✓ Learner performance in this question was not inspiring. This was the worst performed question in 2018 for Agricultural Sciences P1. Question 3 has contributed greatly to the poor performance of most learners with an average of 50.5% compared to 49% in 2017

depicting an incline of 1.5%. The lowest score recorded was 0 and the highest 31 out of 35 marks, with an average of 18 marks.

Average mark from the sample of 100:		18
SUB-QUESTION	TOPIC OR ASPECT TESTED	AVERAGE % FROM SAMPLE
3.1 – 3.6	• Animal Production • Animal Protection and Control.	50.5%

The section on animal production especially handling and housing facilities contributed most to this poor performance. Learners performed poorly in the following questions 3.3; 3.4.1; 3.4.2; 3.4.3; 3.5; 3.6; 3.7.1 and 3.7.4

(b) Why the question was poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.	
✓ All questions based on facilities (both handling and housing) were poorly performed including the subsequent sub-questions e.g. 3.3.1 3.3.2 3.3.3 3.5.1, 3.5.2 3.5.3	
3.1	Average of 74.5%
	✓ Generally, the performance in the sub-question 3.1 was satisfactory, learners were able to obtain 3 out of 4 marks that is about 75% performance. ✓ Learners performed excellently in 3.1.1 and 3.1.2, clearly indicating understanding of how to analyse the pictures based on different production systems. ✓ Some learners referred to A and B as external and internal production systems instead of extensive and intensive. Other learners confused production systems with farming systems e.g. commercial & subsistence ✓ Learners incorrectly related capital investment with low profit/income or high profit/income, although this may not be the case as extensive production system could be generating higher income than intensive production system depending on various variables. Some expressed capital investment as cheap or expensive, some used capital investment and production as one and the same concept which is not the case.
3.2	Average of 63.1%
	✓ Almost 90% of candidates managed to obtain the full marks in sub-question 3.2.1, because they took their responses directly as they are from the data presented. ✓ In sub-question 3.2.2 learners performed fairly well, but some could not correlate the feed programme presented in the table with the question give a reason for the nutritional requirements in growth stage A. instead of relating high protein to growth, candidates copied what was presented, some gave the reason as to produce or reproduce whereas the priority for day old chicks cannot be to produce or reproduce, but need high protein for growth. ✓ Sub-question 3.2.3 required learners to name TWO factors to increase production in broilers, except nutritional requirements, candidates included feeding and nutrition in their responses indicating clearly that they do not read instructions carefully.
3.3	Average of 34%

	✓ In sub-question 3.3.1 and 3.3.2 candidates performed dismally, they could not identify the facility in the photograph. Only a few candidates (about 20%) could correctly identify the facility as a farrowing pen, learners wrote responses such as crush, pig facility, creep feeding facility and pig facility. In 3.3.2 although the question was guiding them to state design feature that can prevent the piglets from being hurt, they could not identify the steel partition in the picture. Understanding of the word "design feature" might have been a challenge in 3.3.2. ✓ Candidates could not name the equipment or material that can be used to provide heat and insulation of the floor for piglets on a cement floor. For (a) they wrote lights and lamps and for (b) floor rugs, blankets, mats, rubber mats. They also confused soil sods for iron supplementation with bedding (lay soil sods for insulation).
3.4	Average of 48%
	✓ Sub-question 4.3 was based on the scenario and it challenged the candidates. In 3.4.1 they could not identify key condition that impacts negatively on production in the scenario, they also gave responses such as hot and cold, climate and weather conditions, instead of adverse weather conditions of extremely hot or cold, again the language issue might have affected the learners in their failure to identify "adverse" and "extremely" as key in their responses. ✓ In sub-question 3.4.2 very few candidates obtained the full 2 marks, candidates were required to describe economic impact of the condition for the farmer, but they gave general impact e.g. decrease in the economy ✓ Candidates could not name the measure to reduce the impact of varying temperature in an extensive cattle production system, instead they gave those applicable to an intensive system like air conditioners, cooling fans and heaters. They could not differentiate between holding pen and holding shed.
3.5	Average of 37.8%
	✓ The performance in sub-question 3.5 was not good at all. Candidates could not identify the facilities A (holding pen) and C in sub-question 3.5.1 as a result they were unable to give the purpose of the structure in 3.5.2 and design features to consider when constructing the crush in 3.5.3. They also confused the measures to design the crush with the precautionary measures to reduce stress when transporting farm animals. ✓ In both questions 3.3 and 3.5 based on handling and housing facilities candidates performed very poor and the fact that they could not identify the facilities affected performance in subsequent questions.
3.6	Average of 53%
	✓ Generally, candidates have poorly performed in animal health section. ✓ The sub-question 3.6 based on diseases gave candidates a challenge especially symptoms (F) and mode of transmission (B and E). They wrote tick or tick bite instead of blue tick bite for E and mostly they copied direct contact from the table for mode of transmission.
3.7	Average of 44.8%
	✓ Sub-question 3.7 provided an opportunity for candidates to score marks, but they performed poorly. The average performance in this question was 45% indicating that candidates struggled to answer it. ✓ Learner's responses in sub-question 3.7.1 indicated misunderstanding and inability to differentiate between the name of a parasite and the type of a parasite, some wrote internal parasite instead of tapeworm, but this could be attributed to the fact that even the question was not specific, it just required learners to identify the parasite. It could have been clearer to learners if it was phrased as "identify the name or type of parasite in the diagram above". ✓ Sub-question 3.7.2 was looking for the number of hosts, learners gave names of the hosts e.g. man, human and pig instead of two host, some wrote 3 hosts /5 hosts

	/8 hosts literally counting the number items in the picture.
	✓ In sub-question 3.7.3 candidates could not state economic implications of the tapeworm for the farmer. They gave general economic implications not specific to farmers, such as economy of the country will go down.
	✓ Subsequently candidates were unable to provide the role of state in controlling the spread of internal parasites as requested in sub-question 3.7.4, their responses mostly related to proclaimed diseases and highly infectious diseases e.g. deworming by state, quarantine, vaccination which roles of the famer are not the state in the case of internal parasites.

(c) Provide suggestions for improvement in relation to Teaching and Learning
✓ The drop in question 3 performance can be attributed to a number of factors including relying too much on previous question papers, candidates lacking content knowledge, inability to apply theory learnt in class to a farming situation, failure by schools to organize farm visit for learners
✓ The paper assessed content knowledge learnt in class by providing different agricultural contexts before learners to test different skills and an extent to which they can apply those in solving farming related challenges, unfortunately many candidates displayed lack of these skills especially when it comes to handling and housing facilities.
✓ Teachers should access the handling facilities, housing facilities, tools, apparatus and equipment used in animal production on internet, periodicals and magazines, and present using PowerPoint for the learners. The activity can assist learners to be able to identify the name of the tool, its functions or use, design features, management practise and the reason for its use.
✓ The performance of learners in 3.2 and 3.4 clearly indicate that teachers should engage in teaching learners on how to analyse and identify responses from scenarios.
✓ Teachers should seek assistance from other educators in neighbouring schools for topic/s where the teachers feel uncomfortable, because it is evident that most teachers do not cover the animal production and animal health topics thoroughly for learners to understand facilities and concepts involved.
✓ Learners should be taught how to associate a deficiency disease to its symptoms.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.
✓ Learners must be trained on how to adhere to the instructions as provided in the previous question papers, emphasise on its importance relative to obtaining marks in the examination.
✓ Subject advisors and teachers should train learners on how to handle all types of question in a question paper, concentrating on the correct interpretation of questions more than correct responses.
✓ Animal diseases should be taught in a table form as presented in the CAPS document (page 46) and Examination guidelines (page 14) in order to expose learners to the holistic approach of all the important diseases found in South Africa as prescribed for Grade 12.
✓ The role of state and the farmer should be taught separated when teaching the animal health section. At the end of each sub-topic in animal health section a summary of these roles should be presented to learners as they form the important aspect of the topic.

QUESTION 4

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

The general performance of learners in question 4 reflect a marked incline by a noteworthy margin of 6.8% from 49% in 2017 to 55,8% in 2018.

Average mark from the sample of 100:		**20**	
SUB-QUESTION	TOPIC OR ASPECT TESTED		AVERAGE % FROM SAMPLE
4.1 – 4.5	Animal reproduction		55.8%

(b) Why the question was poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

Significant improvement has been observed in the quality of responses of candidates. Pockets of excellence were identified in the quality answers that reflected depth in the candidates' understanding of agricultural concepts. This then adds to the gradual upward trajectory shown in the overall pass rate in the paper. However, some candidates displayed inadequacies regarding comprehension, analysing and application skills.

Most candidates have shown improvement in understanding the subject terminology and concepts such as synchronisation of oestrus, ovulation, fertility and sterility. Candidates who could not define simple agricultural sciences terminology were unable to correctly answer application questions assessing these concepts. Many candidates lost valuable marks for not following the instructions in some of the questions such as in Question 4.3.1.

The 2018 cohort seemed to display a significant increase in the number of stronger candidates and a decrease in the number of weak responses. Common errors, misconceptions and misinterpretations in Question 4, although still recurring, seem to be on the decrease this year and this could be attributed to the time teachers devoted in addressing them.

4.1	Average of 53.3% for sub-question 4.1
	✓ Generally, there was a commendable performance of candidates in 4.1.1, almost 90% managed to obtain 1 mark out of 2, and very few were able to get total marks. Majority of candidates managed to correctly identify **B** as urethra, but they struggled to identify **A** (i.e. ampulla), they wrote incorrect responses such as vas deferens (sperm duct), seminal vesicles or vesicular gland, prostate gland, ejaculatory duct, epididymis etc.
	✓ About 50% of candidates could not state functions of vesicular glands, most of them wrote provide the fluid for the sperms but did not expatiate on the importance of the fluid. Some wrote provide nutrition and supply energy as two separate answers but were awarded 1 mark because the marking guideline combined the two as one point.
	✓ In sub-question 4.1.3 candidates performed very poorly at 38%. They might have been challenged by the term "congenital" (i.e. inherited or born with). They gave responses such as broken penis, injuries, transport sperms to vagina, diseases etc. instead of hypoplasia, cork screw, etc. Other learners' responses indicated that they did not even know that part **D** was penis.
	✓ Question 4.1.4 was assessing learner understanding of the reproductive concepts infertility and sterility. A good number of candidates could identify the effect on fertility of the bull in both cases (a) and (b), but they excelled in (b). Some candidates were too ignorant in writing "the cow" will not be able to produce sperms instead of "the

	bull". Some learners also seemed to think that sperm cells, not the bull, would be infertile. Another misconception by a lot of candidates was that sperms and semen are one and the same thing as some books like to use them interchangeable.
4.2	Average of 63.9% for sub-question 4.2
	✓ The performance was commendable in this sub-question. In 4.2.1 most candidates could identify oestrogen and progesterone, but some lost two marks for confusing the two hormones. Some could not correctly identify the hormones instead they were extracted those indicated on the diagram i.e. FSH and LH. ✓ In the light of the commendable performance generally in the sub-question 4.2, challenges were experienced in sub-question 4.2.2 and 4.2.3. Some learners only wrote "release of ovum" or "bursting or rupturing of Graafian follicle" and could not get full 2 marks. Many candidates still confuse the ovum with the ovary. Some wrote, the mature ovum (instead of the ovarian/Graafian follicle) bursts to release the ovary (instead of the ovum). ✓ Learners were unable to correctly analyse the question and describe visible signs of oestrus instead they wrote general signs which were totally incorrect such as bellowing noise, fluids in or swelling of vagina (not visible) instead of vulva etc. Other responses that were common but incorrect included, isolates itself and stops eating. ✓ A substantial number (about 78%) of candidates were able to state the function of FSH. Some wrote "stimulate change in follicle" taken directly from the diagram in the question paper.
4.3	Average of 63.9% for sub-question 4.3
	✓ The performance for this sub-question was at 70% i.e. 5 out of 7 marks, obtained mainly from 4.3.1 A, D & E and 4.3.2 for the definition of synchronisation of oestrus. Most candidates could not comply with the requirements of the question i.e. to arrange the reproductive processes given in chronological order using **only** letters despite the fact that this format has been used in the past question papers. It was very disheartening to discredit those who rewrote all the letters chronologically (A, B, C, D and E) and then the perfect order of appearance in words. The candidates would have scored 5 full marks in this question had they adhered the instructions. Contrary to expectations some of those who followed instructions did not get the order correct and the majority scored between 0 and 3 marks which showed lack of depth in content. ✓ For the definition "synchronisation of oestrus" many candidates wrote "changing oestrus cycle of "a cow" instead of a "group of cows". Some just mentioned that cows come into heat simultaneously and failed to mention that it is artificially manipulated through hormone injections. Candidates must learn to answer questions guided by the instruction and the marks allocation. For two marks candidates are expected to give two valid points. Few candidates confused "synchronisation of oestrus" with "superovulation".
4.4	Average of 49% for sub-question 4.4
	✓ The general performance of candidates in this sub-section 4.4 was fair: Many candidates could not manage to identify the month in which AI should have taken place for the dairy cow. They thought June was the correct month since pregnancy started in June. ✓ Candidates in Question 4.4.2 were asked to suggest reasons for the cow not conceiving and the fact that a considerable number of candidates wrote responses such as that the cow did not conceive because it was already pregnant, it's on dry period showed lack of application, comprehension and analytical skills. ✓ About 80% of candidates scored full marks in question 4.4.3, they were able to state the three causes of abortion in dairy cows.

	✓ Majority of candidates wrote lactation, gestation and pregnancy as the last reproductive process before the start of milk production in 4.4.4 instead of birth or parturition. Some learners were giving expulsion or egestion of foetus as a correct answer relating it to the fact that it is the last stage of parturition process.
4.5	Average of 48.9% for sub-question 4.5
	✓ More than 50% of candidates indicated the month when an average of 35 litres of milk was produced as June instead of sixth month. Learners were aligning months 1 – 10 to calendar months, hence June for the 6th month and they were marked down.
	✓ The question 4.5.2 was completely misinterpreted by some candidates, instead of simple writing 45 litres they gave varying answers that were completely farfetched. They might have not understood the meaning of "peak month".
	✓ The question on describing the relationship between the crude fibre content and the fat content of the milk created problems with many candidates deciding to write their observation of the two variables in the graph and nothing was mentioned about how they relate or how they influence each other. Learners were expected to indicate that as the crude fibre content in feed increases, the fat content(cream) in milk will also increase.

(d) Provide suggestions for improvement in relation to Teaching and Learning
✓ Some challenges identified in the previous examinations still persist and they must be given priority. These recurrent areas of weakness must be incorporated in the subject improvement plans and become the baseline for intervention by Subject Advisors. Continued reference to previous Chief marker and diagnostic reports is strongly advised.
✓ Teachers should use the CAPS policy and the examination guidelines when planning and executing their lessons. All learners should have unrestricted access to these documents so that they can also play an active role in their learning.
✓ Subject terminology and definitions for Animal reproduction must be clearly understood by learners. Teachers need to lay a solid base of concepts and use them frequently until they are understood.
✓ English across curriculum must be reinforced and be integrated in both teaching, learning and assessment of the different topics. The candidates who performed well had a good knowledge of and insight into the content and texts, a good command of the English language and managed to respond in accordance with the instructions and the mark allocation. Teachers are therefore encouraged to work collaboratively to integrate a school-based language strategy that aims to improve learner performance
✓ Learners should be exposed to a wide array of exercises that also include questions that assess the interpretation of graphs, tables, scenarios and case studies (e.g. learners should be trained on how to identify the trends, observations and the relationships between the variables used.
✓ Also, the use of the frequent reinforcement of small segments of learning and an emphasis on frequent diagnostic assessment of the learners' progress, paired with immediate corrective instruction.
✓ In addition, standardized formal tasks should be prepared in order to raise the level of questioning and to train learners to be ready in answering questions such as those in question 4 that need critical thinking, reasoning and application.
✓ Teachers should ensure that learners do not take the oestrus cycle and hormonal functions as two different/separate topics but should clearly show how the two concomitantly relate and when presenting the oestrus cycle, they should use graphs, tables, flow diagrams, schematic representations to show characteristics, functions, hormones and processes

involved in the different stages.

- ✓ Animal reproduction section should be taught using diagrams, sketches and flow charts with pictures to link the different topics/reproductive processes in their chronological order and to show how these processes interweave.

- ✓ Videos and projection of ASAAE slides should also be used for enrichment and enhancement of learning.

- ✓ Learners must be taught that if they are asked for THREE points, for example in the question where they were asked to write the visible signs of oestrus, they must choose the three points that are most likely to be credited.

- ✓ Candidates must be exposed to examination instructions and questions so that they are confident when they are confronted with the question paper and so that the jargon of the examination does not become an obstacle.

(d) Describe any other specific observations relating to responses of learners and

comments that are useful to teachers, subject advisors, teacher development etc.

- ✓ Learners tend to confuse the accessory glands (prostate glands, vesicular glands, bulbo -urethral gland) with each other and with the secondary sex organs and their functioning in Animal reproduction.

- ✓ They also need to know that fertility can only refer to the animal (bull/cow) and not to the sperms/ova, sperms are said to be healthy or viable.

- ✓ Teachers must not take it for granted that all learners know the difference between a bull and a cow, sperms and semen, calving and lambing and other simple agricultural terminology. They often learn better by seeing and hearing than by reading and therefore incorporating pictures (illustrations), films, simulations, videotapes, and audio into lessons might help eliminate some of these inadequacies.

- ✓ Where a question required a certain number of responses, candidates wasted time writing more than the required answers but could not be credited as only the required number of responses was assessed. The choice can never be left to the marker as that would lead to innumerable unfair practices.   This principle is followed across all subjects and is the only valid and fair way to prevent the marker from choosing the best responses on behalf of the candidate.