



THE PRESIDENCY

REPUBLIC OF SOUTH AFRICA

SOCIO-ECONOMIC IMPACT ASSESSMENT SYSTEM (SEIAS) INITIAL IMPACT ASSESSMENT TEMPLATE (PHASE 1) REVISED 2020



THE INITIAL IMPACT ASSESSMENT FOR RABBIT MEAT REGULATIONS

The Initial Impact Assessment aims to ensure that the policy is on the right track by requiring evaluation of alternative approaches. It should help drafters avoid finalising an inappropriate solution because they moved too quickly to select a strategy without adequately analysing the roots of the problem and considering alternative measures. It should facilitate a brainstorm about issues involved in the problem and full range of alternatives to deal with them.

1. The problem/ Theory of Change

1.1. What is the social or economic problem that you are trying to solve?

1.1.1 Unsafe Meat

Implementation of hygiene management systems at the abattoirs promotes meat safety. Rabbit regulations under Meat Safety Act, 2000 (Act No. 40 of 2000), shall stipulates detailed processes to ensure safe meat for consumers. Registration of rabbit abattoirs will be covered by the rabbit regulations.

1.1.2 Illegal slaughter

Stock theft in South Africa is a concern. Rabbit regulations aims to ensure rabbit slaughter under controlled conditions. Disease control measures shall be carried out and information on diseases will be properly documented. Illegally slaughtered meat poses risk to the consumer and must be discouraged. Registration of rabbit abattoirs will be covered by the rabbit regulations.

1.1.3 Problems related to animal welfare issues

DALRRD and NSPCA work jointly to ensure prevention of cruelty and promotion of animal welfare. The Rabbit regulations will cover key procedures with regard to hygienic slaughter, disease control and/or prevention, waste management and meat safety.

1.1.4 Food insecurity

1.1.4.1 Nutritional benefit of rabbit meat

- One female rabbit will produce more meat than a cow in one year while consuming six times less food and water.
- Rabbits are slaughtered in 60 days, when production cycles are full a collective monthly remuneration is earned and a productive doe will produce 6 kits per month collectively.
- A cow requires 7 to 11 hectares of land where a female rabbit and her young require only one square meter.
- A female rabbit can reproduce its own mass a 1 000 times through its offspring in a year.
- Rabbits can be farmed on the most unsuitable agricultural land with much less water than any other farmed animal.
- Rabbits are prey animals with two uteruses that reproduce prolifically in an all-natural manner.
- Rabbits breed all year round and can produce a litter in just 30 days.
- A very low spectrum of disease affects rabbits and there is no transferable disease between humans and rabbits.
- One year or cycle of farming with cattle equals 12 years of rabbit farming experience.
- Can be sustainably farmed while practicing humane farming methods.

- The world health organization considers rabbit meat as a solution to food security.
- It can be a niche product or used to feed the masses.
- It can be mass produced with only capital as a limitation.
- It can be produced by communities for communities.
- It is considered by the USDA as the healthiest meat available to mankind after extensive testing.
- Organoleptic properties of this meat are flavour and tenderness.
- Highest in protein, lowest in cholesterol of all farmed protein available for human consumption.
- Carries the heart and stroke foundation mark of approval and will appeal to 9 out of 10 consumers once tasted.
- It is the cleanest meat available for human consumption, very delicate on the digestive system and a natural product without steroids, antibiotics or growth hormones.
- It is not injected with water or saline solutions to improve profitability and after slaughtering 93% of the carcass is usable while the carcass only consists of about seven percent bone.

Animal	Protein (%)	Fat (%)	Moisture content (%)
Rabbit	20,8 - 25,5	10,2	67,9
Chicken	20,0 - 21,5	11,0	67,9
Beef	16,3 - 19,0	28,0	55,0
Pork	11,9 - 13,3	45,0	42,0
Lamb	15,7	27,7	55,8

1.1.4.2 Rabbit meat has higher protein content compared to other food animal species:

1.1.5 Hindrance of economic growth

According to NAMC (National Agricultural Marketing Council), South Africa's rabbit meat industry is still an emerging industry requiring considerable repositioning to be able to tap into the lucrative global markets. South Africa's rabbit meat and live rabbits are largely destined for markets within Southern Africa. However, given that Southern Africa offers limited export market potential especially for rabbit meat, there is a need for the industry to diversify its rabbit export markets in to Europe. However, unlike South Africa other countries supplying Europe receive much more money per ton of rabbit meat. Therefore, there is a need for South Africa's rabbit industry to benchmark its Market opportunities against countries like the Netherlands, Argentina and Chile among others which receive higher prices. Rabbit meat is considered to have a lower calorie count per serving and a high protein concentration compared to beef, lamb, chicken, fish, and pork, yet it is still a relatively unpopular dish in South Africa. South Africa is a net exporter of rabbit meat and live rabbits/hares. Domestically, consumption of rabbit meat is currently below 20% as compared to over 80% which is destined for export markets. Investing in rabbit farming could enhance food security while as well creating jobs in communities. However, to fulfil the food demand for a growing population, it is important to find different means of food production. Therefore, the rabbit farming is less costly, requires minimum inputs to grow and produces high-quality protein. It can be a great source of food protein. The expansion or commercialisation of the rabbit farming business in South Africa can also result in a positive spill-over effect on the socioeconomic environment, such as creating a source of income and employment. The demand for rabbits globally has more than doubled since 2013, led by strong consumption. According to the Food and Agriculture Organization of the United Nations (FAO), an estimated 1.2 billion rabbits are slaughtered annually. Figure 1 shows countries that imported South Africa's rabbit meat in 2019. Most of South Africa's rabbit meat was exported to for Lesotho (82%), followed by Nigeria (10%), and United Arab Emirates (8%).

Globally, the untapped export market potential of rabbit meat is valued at R1 812 million while the worthiness of the untapped export market potential for live rabbits could not be ascertained due to data limitations. At regional level, the European Union (EU) exhibits the largest untapped export market potential valued at R1 619 million, followed by East Europe and Central Asia (untapped market potential R100 million) while Southern Africa ranks number eleven from the top, with an export market potential worth R103 554. According to the international Trade Centre's (ITC) market access tool, Southern Africa has actually consumed rabbit meat worth R45 501, implying that there is still more room to absorb more rabbit meat worth R100 416.

Market Intelligence Report Week 44 of 2019:



Identified Problem	Main Causes of the Problem	Why does it persist as a problem?
Unsafe Meat	Lack of regulations with regard to breeding, transportation and slaughtering, results in uncertainty pertaining to diseases and production processes. Failure by government to invest in research. Failure by academia to include rabbit in the curriculum.	Absence of regulations under Meat Safety Act, 2000 (Act No. 40 of 2000). Production processes are not regulated. Registration of rabbit abattoirs is adversely affected by lack of regulations. Failure by government to invest in research. Failure by academia to include rabbit in the curriculum. Registration of rabbit abattoirs is adversely affected by lack of regulations.
Illegal slaughter	Due to lack of regulations, people are engaged in illegal slaughter and sale of rabbit meat. Currently there are no guidelines available.	Absence of regulations under Meat Safety Act, 2000 (Act No. 40 of 2000). Registration of rabbit abattoirs is adversely affected by lack of regulations.

	Lack of coordination between Department of Agriculture, Land Reform and Rural Development (Dalrrd) and law enforcement agencies.	People see an opportunity in the absence of regulations and authorities are not equipped to curb the practice. Law enforcement agencies losing a battle with stock theft.
Problems related to animal welfare issues	Lack of regulations and guidelines with regard to breeding, transportation and slaughtering, result in practices which often cause harm to the rabbits. Breeding, transportation and slaughter techniques must be regulated to ensure humane handling of rabbits.	Absence of regulations under Meat Safety Act, 2000 (Act No. 40 of 2000). Registration of rabbit abattoirs is adversely affected by lack of regulations. Slaughtering of rabbits take place under uncontrolled environment, compromising animal welfare.
Food insecurity	Lack of regulations and guidelines discourage farmers. Unlike other regulated species, rabbit is left behind and farmers feel that they do not have necessary support from government. Rabbit is affordable, low in cholesterol and high in proteins.	Controls in the form of regulations under Meat Safety Act, 2000 (Act No. 40 of 2000), will encourage farmers' participation. Rabbit meat should be one of the options in addition to red meat, poultry and other known species.
Hindrance of economic growth	Lack of regulations is indicative of government's failure to control industry. People are not made aware of economic participation in rabbit industry hence it's difficult for new participants in the industry. Domestically, consumption of rabbit meat is currently below 20%. Strengthening of controls will ensure compliance with WTO policies, making rabbit exports possible.	Absence of regulations minimises participation in rabbit industry for local and global markets. Importing countries require animal health and meat quality assurance certificates. South African Revenue Services is losing revenue due to unregulated trade of rabbit products.

1.3. Whose behaviours give rise to the problem, and why does that behaviour arise? Remember that several groups including some in government may contribute to the identified problem. Their behaviour may arise amongst others because the current rules are inappropriate; because they gain economically from the behaviour; or because they are convinced that they are doing the right thing. Identifying behaviours that cause the problem should point to the behaviours that must be changed in order to achieve the desired solution.

Identified Problem	Behaviour giving rise to the identified problem	Groups whose behaviour give rise to the identified problem?	Why does the behaviour arise?
Unsafe Meat	Failure by government to regulate rabbit industry. Maximisation of profit by traders by not prioritising hygiene management systems. Failure by government to invest in research. Failure by academia to include rabbit in the curriculum.	 Government Unscrupulous and Opportunists business Rabbit groups Members of the public. Academia 	Lack of abattoirs and implementation of hygiene management systems. Absence of rabbit regulations. Poor economic conditions resulting in demand for cheap meat. Lack of research pertaining to rabbit diseases.
Illegal slaughter	Lack of coordination between Dalrrd and law enforcement agencies. Failure by government to regulate rabbit industry in the form of rabbit regulations under Meat Safety Act, 2000 (Act No. 40 of 2000). Maximisation of profit by traders by not prioritising hygiene management systems. Stock theft due to high levels of unemployment.	 Law enforcement agencies Unscrupulous and Opportunists business Rabbit groups Members of the public Stock thieves 	Lack of abattoirs and implementation of hygiene management systems. Absence of rabbit regulations under Meat Safety Act, 2000 (Act No. 40 of 2000). Poor economic conditions resulting in demand for cheap meat. Stock theft due to high levels of unemployment.
Problems related to animal welfare issues	Lack of regulations and guidelines with regard to breeding, transportation and slaughtering of rabbits, results in practices which often cause harm to the rabbits. Breeding, transportation and slaughter techniques must be regulated to ensure humane handling of rabbits. Society for the prevention of cruelty to animals (SPCA) unable to monitor rabbit breeding,	 Rabbit farmers Rabbit commercial groups Members of the public. SPCA 	Shortage of rabbit dedicated abattoirs. Lack of information with regard to breeding, transportation and slaughtering. Lack of equipment. Failure by SPCA to monitor rabbit breeding, transportation and slaughter.

	transportation and slaughter.			
Food insecurity	Advantages of rabbit farming are manifold: rabbits have the highest protein quantity of all farmed meats and therefore a small amount of meat goes far in supplying nourishment. Rabbits require far less space than any other meat producing animal and are easy to handle. Rabbits can be fed from the vegetable garden and eat leftovers like old bread leftover maze meal porridge. Rabbit abattoir registration cannot be processed in the absence of rabbit regulation. Excellent reproduction (average 1 kit per doe per week / 52 per year). 1 Sheep = 1 lamb = 18kg carcass weight 1 Rabbit = 52 kits = 70kg carcass weight (52 X 1.35kg) Excellent feed conversion ratio of 3:1. Less land – less capital. Eco-friendly – no greenhouse gasses. Feed – does not compete with humans. Water efficiency.	•	Government by failing to regulate rabbit industry under Meat Safety Act, 2000 (Act No. 40 of 2000). Rabbit farmers Rabbit commercial groups.	Rabbit farmers lack support and guidance from government. Lack of regulations under Meat Safety Act, 2000 (Act No. 40 of 2000). Lack of education to new prospective farmers on rabbit breeding, slaughter, marketing and sales. Lack of education to communities with regard to health benefits of rabbit meat.
Hindrance of economic growth	Lack of regulations under Meat Safety Act, 2000 (Act No. 40 of 2000). Unstable labour practices. Lack of government support to rabbit farmers pertaining to breeding, slaughter, marketing and sales.	•	Government by failing to regulate rabbit industry under Meat Safety Act, 2000 (Act No. 40 of 2000). Rabbit farmers Rabbit commercial groups Members of the community	Lack of regulations under Meat Safety Act, 2000 (Act No. 40 of 2000). Rabbit farmers and commercial groups are participating in unregulated industry resulting in failure by South African Revenue Services to collect revenue. Members of the community are breeding rabbits without realising business opportunities.

Lack of information on participation in global market. Lack of information with regard to World Trade Organisation requirements. Failure by South African Revenue Services (SARS) to collect revenue.	• SARS	
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- 1.4. Please explain why implementation of the existing policies/ laws/regulations or any proposals are not effective in addressing identified problems.
- 1.5. Identify the major social and economic groups affected by the problem, and how are they affected. Who benefits and who loses from the current situation? Be mindful of the vulnerable groups (Women, Youth, Children, People with Disabilities), Low income groups, Rural Households and Small Enterprises.

Identified Problem	Groups (Social/ Economic)	How are they affected by the identified problem?	Are they benefitting or losing from the current situation?
Unsafe Meat	Poor people	Poor people tend to buy unsafe meat due to lower prices compared to safe meat.	Poor people are at risk of contracting infection from sick rabbits.
	Illiterates	Illiterate people cannot distinguish between safe and unsafe meat.	Illiterate people are at risk of contracting infection from sick rabbits.
	Unsuspecting consumers.	Lack of information pertaining to production process.	Unsuspecting consumers are at risk of contracting infection from sick rabbits.

	Health services	Meat inspection is primary health care service. In the absence of meat inspection, health services become overcrowded where diseases occur.	Health services become overcrowded where diseases occur.
	Consumers with immune deficiencies.	People with immune deficiencies are likely to be affected by diseases like salmonellosis, food poisoning and other diseases.	People with immune deficiencies are at risk of contracting infection from sick rabbits.
Illegal slaughter	Poor communities	Poor people tend to buy illegally slaughtered meat due to lower prices compared to legally slaughtered meat.	Poor people are at risk of contracting infection from sick rabbits and contaminated products
	Illiterates	Illiterate people cannot distinguish between legally and illegally slaughtered meat.	Illiterate people are at risk of contracting infection.
	Unsuspecting consumers.	Lack of information pertaining to production process.	Unsuspecting consumers are at risk of contracting infection.
	Health services	Meat inspection is primary health care service.	In the absence of meat inspection services, health services become overcrowded where diseases occur.
	Consumers with immune deficiencies.	People with immune deficiencies are likely to be affected by diseases like salmonellosis, food poisoning and others.	People with immune deficiencies are at risk of contracting infection.

	Unemployed people	Unemployment tends to make people engage in illegal slaughter to survive.	Unemployed people end up being arrested by law enforcement agencies.
	Small business	Due to lack of abattoirs, small businesses slaughter illegally under uncontrolled environment.	Small business operates at a loss due to failure to comply with national and international standards, making market access difficult.
Problems related to animal welfare issues	Society for the prevention of cruelty to animals (SPCA)	Lack of resources and funding makes it difficult for SPCA to fulfil its mandate. National Lottery has excluded SPCA from funding list. Inadequate staff and volunteer training are some of the challenges SPCA is faced with.	Animals are often exposed to chemicals and diseases that cause them great pain and suffering. Treatment of animals in the food industry is also an issue, since animals are often confined into small spaces, and killed inhumanely. The Mission of the NSPCA is to prevent cruelty and promote the welfare of all animals, whilst their Vision is to end animal cruelty in South Africa and engender compassion for all animals.
	Small business	Importing countries require attestation that rabbits were handled and slaughtered humanely. South Africa is excluded in global markets due to noncompliance to international standards. Lack of government support is adversely affecting rabbit industry.	Hindrance of business growth and creation of employment in rural areas. Investment from the private sector and support for local economic development in general is adversely affected.
	Poor communities	Women and elderly people can participate in rabbit farming with ease due to non-complicated nature of rabbit farming compared to other species.	Poor communities are disadvantaged from participating in rabbit industry due to lack of support by government.

Small business	Small business is affected by lack of support by government. Rabbit industry will not grow due to government's failure to regulate industry under Meat Safety Act, 2000 (Act No. 40 of 2000). Importing countries require health certificates from exporting countries. South Africa is excluded from participating in global markets.	Small business is adversely affected by lack of support from government. Research in rabbit industry is inadequate due to lack of funding. Rabbit industry is struggling to make trade with other countries due to lack of local standards.
Labour	Employment in rabbit industry does not comply with labour laws. Salaries of employees are not in line with the Basic Conditions of Employment Act (BCEA).	Job creation is adversely affected due to lack of government participation. Regulating rabbit industry will result in job creation and formalisation of industry.

SARS	SARS loses revenue due to illegal activities in rabbit industry. It's uncertain how much revenue the industry is generating.	Loss in revenue collection. Clearly, government must improve on revenue collection. Rabbit industry has been neglected. In the 2019/20 financial year, SARS collected a net amount of R1 355.8bn, against the Revised Estimate of R1 358.9bn, resulting in a shortfall of R3.1bn (-0.2%) and a growth of R68.2bn (5.3%) from 2018/19. The Printed Estimate for 2020/21 was R1 425.4bn with a required growth of in tax revenue of 5.1%. This estimate was revised down in the June 2020 Supplementary Budget to R1 121.3bn due to the COVID-19 pandemic. The revised Supplementary Budget estimate of R1 121.3bn represented a contraction of R234.1bn (-17.3%) against the previous year.

1.6. Which of below Seven (7) national priorities are negatively affected by the identified problem?

National Priority	How is the priority negatively affected by the identified
	problem?
 Economic Transformation and Job Creation 	Job creation is adversely affected due to lack of government participation. Regulating rabbit industry will result in job creation and formalisation of industry. People are raising rabbits as pets and for food. Starting this business is very easy, even the beginners can raise rabbits. There is a great opportunity of rabbit farming and commercial production can be a great source of income and employment. The rabbit production business can help educate and equip young, inexperienced farmers in rural areas, many of whom are currently unemployed, thereby stimulating small and medium-sized (SME) development, ownership and job creation in the communities where they farm. It is also scalable and repeatable and hence can generate growth in economic activity in our stagnant economy.
2. Education, Skills and Health	It is essential that rabbit farmers receive mentoring on the following aspects:

Breeding and reproduction - Know how to select a buck for a certain trait. Be familiar with the benefits and drawbacks of crossbreeding, line-breeding, and other forms of inbreeding. Understand how to use the hereditability of various traits to improve your herd. Understand the reproductive tract of a doe. Be able to keep production records.

Rabbit health and welfare- Establish a working relationship with a veterinarian for conducting advanced diagnosis and consult on the proper use of antibiotics. Understand the importance of sanitation and biosecurity on your farm. Be able to develop a biosecurity plan for everyday practices and for a biosecurity emergency. Know the components of a rabbit health and welfare program. Be familiar with common rabbit diseases such as coccidiosis and pasteurella. Be familiar with common external parasites of rabbits such as fur/wool mites and ear mites.

Nutrition - Be familiar with elements of feed management, such as sanitation, feed quantity, feeding frequency, and feeder structural materials. Be familiar with types of rabbit feeds and their nutrient values. Be able to recognize common nutritional disorders.

General management- Be able to identify and express the goals of your rabbit operation. Understand how rabbits (both does and bucks) behave in different situations. Know and use the safety guidelines for handling rabbits. Be able to transport one or more rabbits safely & humanely. Be able to safely load rabbits into a crate.

Facilities- Be able to calculate adequate space for rabbits. Understand space requirements for rabbits at different ages/growth stages. Know how to fabricate/repair rabbit cages and hutches. Know how to select proper nesting materials for rabbits. Be familiar with ways to properly store feed. Know how to design a basic manure management system. Know how to effectively control flies. Know the principles, design, and components of a rabbit handling unit for holding, quarantining, and treating individual animals. Understand the need for proper barn ventilation in different seasons and conditions.

Pastures- Understand the basics of pasturing rabbits. Know how to design a pasture for flexible usage. Recognize common pasture forages.

Selling products- Be familiar with the SA rabbit industry infrastructure. Know the food safety and food-related regulations. Know the grades of rabbits (both quality grades and yield grades). Know the cuts of meat and from what part of the rabbit carcass they come. Understand the value of an animal at different growth stages and conditions. Be familiar with and know how to find annual price cycles and trends for different ages of rabbits. Be able to determine when a meat rabbit is ready for market. Know how to develop a marketing plan for your own operation. Be able to identify marketing options (such as rabbit

		sales, private treaty, cooperative marketing, and direct marketing) and choose the right ones for your operation. Understand the importance of value- added rabbit products. Economics- Be familiar with different rabbit enterprise types (such as laboratory, purebred, or meat). Know how to determine herd size to produce to your targeted market. Know how to use rabbit-based enterprise budgets. Know how to determine the break-even point for your enterprise. Know how to interpret market reports and know when to sell. Be able to keep accurate financial records (on a computer or on paper). Be able to analyse financial records to make wise decisions. Be able to identify and implement money-saving or labour-saving practices.
3.	Consolidating the Social Wage through reliable and quality Basic Services	
4.	Spatial Integration, Human	
	Settlements and Local Government	
5.	Social Cohesion and Safe Communities	Youth, elderly people, disabled people and unemployed should be engaged into rabbit farming. Farming with rabbits is becoming popular because the production requirements are extremely cost-effective, easy to produce at small scale, therefore, this enterprise is ideal for backyard production, food security and income generation. Rabbit has an entire value chain and nothing is a waste farming rabbit. Money is made from the meat, the hide which is the skin, the pooh and the urine. Regulating rabbit industry will result in job creation and formalisation of industry. Rabbit farmers should interact with animal health practitioners with regard to the health requirements of rabbits. Mentoring of new rabbit farmers is critical.
6.	Building a Capable, Ethical and Developmental State	It is imperative that small scale farmers start considering less conventional niches like rabbit farming. Rabbit rearing could enhance the diversification agenda of the present administration and provide sustainable means of livelihood for the teeming youth population. Many rural communities have a prominence of elderly people and children. Cattle, goats and sheep are not easy for them to manage while chickens are impractical as they need grains, which can be used for human food. Rabbit has an entire value chain and nothing is a waste farming rabbit. From the meat, the hide which is the skin, pooh and urine are all moneymaking machine.
7.	A better Africa and World	Rabbit meat contains a very low calorie content per serving but with a high concentration of protein. The meat has fewer amounts of cholesterol, fat and sodium as compared to other

meat types. Due to its health properties, with the World Health Organisation describing rabbit meat as the healthiest available as a result of its high protein and low-fat content. Protein is important for healthy cellular processes and functions that in turn support tissue development, repair, and maintenance. Rabbit has the lowest fat content in the meat as compared to other meats. In addition, 63% of rabbit meat's fat is unsaturated fat, which is regarded as the good fat. Rabbit meat is also low in calories compared to all similar white meat i.e. content per gram. Rabbits have the highest protein quantity of all farmed meats and therefore a small amount of meat goes far in supplying nourishment. They require far less space than any other meatproducing animal and are easy to handle. They can be fed from the vegetable garden and eat leftovers like old bread and leftover maze porridge. Both rabbit poop and urine can actually be used as an incredibly nutrient dense fertilizer. Plant eating behaviour of rabbits creates a smaller carbon footprint. Meat production, especially beef, produces significantly higher greenhouse gas emissions than plant alternatives.

2. Options

- 1.7. Describe least three options for addressing the identified problem, including (a) your preferred proposal, and (b) an option that does not involve new or changed regulation (baseline or existing option)
 - a) Promulgation of rabbit regulation in terms of Meat Safety Act, 2000 (Act No. 40 of 2000).
 - b) Amendment of poultry regulations to make provision for rabbit regulations.
 - c) Rabbit Meat Safety Scheme in terms of Meat Safety Act, 2000 (Act No. 40 of 2000).
- 1.8. Are the proposed options linked to other existing government laws or regulations and what are the gaps / limitations of those existing ones to address your identified problem?

Government legislative prescripts	Custodian department / units within your department	Areas of Linkages	What are the limitations of existing prescripts?
Meat Safety Act, 2000 (Act No. 40 of 2000).	Directorate of Veterinary Public Health (VPH), Department of Agriculture, Land Reform and Rural Development (DALRRD).	Rabbit regulations are necessary in terms of Meat Safety Act, 2000 (Act No. 40 of 2000), to outline processes pertaining to rabbit breeding, transportation and slaughtering.	The act does not provide detailed requirements with regard to rabbit breeding, transportation and slaughtering. The aspects of meat inspection for other species are detailed in relevant regulations to ensure meat safety. Rabbit regulations should provide guidelines with regard to hygiene management systems. The aspects of Rabbit abattoir planning and construction must be addressed. Procedures to ensure humane handling of rabbits must be covered under rabbit regulations.
Poultry regulations under Meat Safety Act, 2000 (Act No. 40 of 2000).	VPH, DALRRD	Existence of similarities in poultry and rabbit abattoir structure but different processes with regard to breeding, transportation and slaughtering.	Poultry regulations do not provide detailed requirements with regard to rabbit breeding, transportation and slaughtering. The aspects of meat inspection and handling of meat for poultry are detailed in poultry regulations to ensure meat safety. Rabbit regulations should provide guidelines with regard to hygiene management systems. Poultry regulations do not address rabbit diseases hence meat safety is compromised.

1.9. What social groups would gain and which would lose most from the each of the three or above options? Consider specifically the implications for the households earning less; micro and small business; black people, youth and women; and rural development.

Option	Main Beneficiaries	Main Cost bearers
a) Promulgation of rabbit	Regulating rabbit industry can	SARS loses revenue due to illegal
regulation in terms of Meat	be of great social	activities in rabbit industry. It's
Safety Act, 2000 (Act No. 40 of	and economic value to both	uncertain how much revenue the
2000).	the family and the community	industry is generating.
	at large. Any exported meat	Society for the prevention of cruelty
	must meet international	to animals (SPCA)
	standards. Rabbit regulations	Animals are often exposed to
	will promote quality	chemicals and diseases that cause
	assurance, hence enabling	them great pain and suffering.
	international trade. New	Treatment of animals in the food
	farmers, majority being	industry is also an issue, since
	blacks, stand to benefit from	animals are often confined into
	rabbit industry regulations.	small spaces, and killed inhumanely.
	Rabbit rearing could enhance	The Mission of the NSPCA is to

	the diversification agenda of the present administration and provide sustainable means of livelihood for the teeming youth population. Many rural communities have a prominence of elderly people and children. Cattle, goats and sheep are not easy for them to manage while chickens are impractical as they need grains, which can be used for human food.	prevent cruelty and promote the welfare of all animals, whilst their vision is to end animal cruelty in South Africa and engender compassion for all animals. Job creation is adversely affected due to lack of government participation. Regulating rabbit industry will result in job creation and formalisation of industry. Unemployed youths are on the receiving end of lack of regulations. Justice system unable to prosecute rabbit meat offenders due to lack of regulations.
b) Amendment of poultry regulations to make provision for rabbit regulations.	Rabbit regulations require undivided attention. Hence must be separated from poultry. Poultry regulations do not cover rabbit breeding, transportation and slaughtering. Currently practices cause harm to the rabbits. Breeding, transportation and slaughter techniques must be regulated to ensure humane handling of rabbits. Society for the prevention of cruelty to animals (SPCA) unable to monitor rabbit breeding, transportation and slaughter.	Rabbit farmers and traders are on the receiving end of lack of regulations. International trade is adversely affected. The youth are mostly affected by lack of employment. Poultry regulations do not cover rabbit diseases and meat inspection.
c) Rabbit Meat Safety Scheme in terms of Meat Safety Act, 2000 (Act No. 40 of 2000).	Rabbit regulation in terms of Meat Safety Act, 2000 (Act No. 40 of 2000) will supersede any form of guidelines and policies.	Rabbit farmers and traders are on the receiving end of lack of regulations. International trade is adversely affected. The youth are mostly affected by lack of employment. Youth unemployment rate in South Africa is expected to be 64.00 percent.

- 1.10. For each option, describe the possible implementation costs, compliance costs and the desired outcomes, listing who would bear the costs or, in case of the outcomes, enjoy the benefits.
- a) Promulgation of rabbit regulation in terms of Meat Safety Act, 2000 (Act No. 40 of 2000).
- b) Promulgation of rabbit regulation in terms of Meat Safety Act, 2000 (Act No. 40 of 2000).
- c) Rabbit Meat Safety Scheme in terms of Meat Safety Act, 2000 (Act No. 40 of 2000).

For South Africa to actively participate in international rabbit meat trade, dedicated abattoirs must be built. It has been proven that low throughput poultry abattoir can successfully handle rabbit slaughter. Emerging farmers will create new jobs. With high unemployment rate, a large number of people depend on government grants to survive.

SCOPE OF WORK AND COST FOR LOW THROUGHPUT POULTRY ABATTOIR

PHASE 1 ACTIVITY 1: EQUIPMENT

	DESCRIPTION	QTY	UNITPRICE	AMOUNT
_				
1	······································		D44 225 00	D11 225 00
	12 Bird stunner	1	R11 235.00	R11 235.00
	12 cone bleeder	1	R11 235.00	R11 235.00
	200 litre Scalding tank	1	R16 398.00	R16 398.00
	Bowl plucker Stainless steel/galvanized	1	R35 568.00	R35 568.00
	EV Trough 2,5m stainless steel	1	R18 468.00	R18 468.00
	EV Trough line with 20 shackles	1	R18 468.00	R18 468.00
	Packing table 870x650x2100mm.	1	R9 300.00	R9 300.00
2	Processing, Packaging & chilling			
	Bagging chute stainless steel	1	R820.00	R820.00
	Portion cutter stainless steel	1	R19 972.00	R19 972.00
	Tape bag sealer with 1 box pvc tape	1	R890.00	R890.00
	Process knives	6	R1 840.00	R11 040.00
	Feather screen/ waste water septic tank	1	R916.00	R916.00
	Hand knife sharpener	2	R615	R1 230.00
	Boot wash/ hand basin/ steriliser	2	R25 617.00	R51 234.00
	Hose reel with hose/ fire extinguisher	4	R2 439.00	R9 756.00
	Giblet wash table	1	R19 613.00	R19 613.00
	Giblet pack table	1	R8 900.00	R8 900.00
	Mala basket	1	R7 500.00	R7 500.00
	Process hand tools (spoon/ d-cone)	2	R3 550.00	R7 100.00
	Extraction fan	1	R12 500.00	R12 500.00
	Tablet chlorinator	1	R28 229.88	R28 229.88
	Feed pump and tank	1	R47 900.00	R47 900.00
	Waste flume/ blood tank	1	R38 700.00	R38 700.00
	Whirleybird ventilator	1	R22 000.00	R22 000.00
3.	Accomply and installation of any invest			
٦.	Assembly and installation of equipment Assembly and installation of equipment, mains supply	1	R118 800.00	R118 800.00
		1 1		
	Transport	T	R22 000.00	R22 000.00
			SUB TOTAL	R549 772.88
			VAT	N/A
			TOTAL	R549 772.88

PHASE 1 ACTIVITY 2: CONSTRUCTION OF POULTRY ABATTOIR 12500mmx8320mm (103,75m²)

DESCRIPTION	QTY	UNIT PRICE	AMOUNT
Substructure		R473 100.00	R473 100.00
Setting out.			
Strip Trench excavations.			
Foundation reinforcing steel fixing. Pouring footing concrete.			
Foundation brickwork 220mm wall.			
Backfilling & hard-core compaction on surfac	e		
beds			
Installation of steel reinforcement mesh Ref 245			
Installation of 250 micron DPC Green membrane	:		
Pouring surface bed concrete slab			
Superstructure			
Brickwork 220mm from Dpc to wall plate.			
Brickwork from door height to wall plate level.		R399 950.00	R399 950.00
Construction of gables and parapet walls.			
Beam filling Plastering interior walls			
Plastering exterior walls			
Painting of exposed concrete walls.			
Roof fabrication of trusses and installation of IBF	ર		
roof sheets.			
Installation of all doors and windows including			
ironmongery.			
Plumbing Works			
Wall chasing for copper pipe installation.			
Trench excavation & Drain pipe laying			
Installation of bathroom & toilet fixtures Installation of cold water			
Installation of hot water & geyser		R40 800.00	R40 800.00
Electrical Works			
Wall chasing			
Tubing			
Wiring Connection of fittings			
Testing & Commissioning			
Certificate of Completion (COC)		R34 180.00	R34 180.00
			D040 000 00
		SUB TOTAL	R948 030.00
		VAT	N/A
		TOTAL	R948 030.00

PHASE 2 ACTIVITY 3: STEEL STRUCTURE CANOPY AND 2 CAR WASH BAYS

DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL AMOUNT
Wash Bay 6000mmx10000mmx3600mm High, steel structure construction, complete with roof sheets, all bolts included.	2	R198 500.00	R397 000.00

One 10m side with gutters and downpipes			
Canopy over the Abattoir building 13000mm2000x13500x3200mm High flat roof construction, complete with roof sheets, all bolts included 9000mmx9000mmx3200mm High flat roof construction, complete with roof sheets, all bolts included. Two structures merged to make one L-shaped structure.	1	R499 980.00	R499 980.00
Material Description		SUB TOTAL	R896 980.00
<i>Trusses: 120x64x82 IPE Columns: 140x73, 160x82 IPE</i>		VAT	N/A
Base plate: 300X130X8MM & 350X180X12MM Roof sheets: 0.5mm IBR (Galv) Lipped channel: 100x75x20x2mm		GRAND TOTAL	R896 980.00
Cross bracing: 40x40x3mm & 50x50x3mm Angles Structure steel Paint: Grey or Red oxide (client choice)			

PHASE 2 ACTIVITY 3: ADDITIONAL EQUIPMENT AND PANELLING

NO.	DESCRIPTION	QTY	UNIT PRICE	AMOUNT
1.	Roofed Product loading area 4000x3000mm Supply steel and erect Roofed product loading area. 120x64 IPE Beams. 125x100x20 lipped channel. 100x50 lipped channel. IBR roof sheets 4.2m, 0.4mm thickness. Excavate footings 400x400x600 deep. Plant uprights and cast concrete. Installation of Gutters square 100x100. Installation of Galvanized flashing. All steel works. Painting all steel with Grey primer paint	1	R30 800.00	R30 800.00
2.	Hand dryer: Ladies, Gents, Eating area, Abattoir Supply and fit Automatic sensor hand dryer 2500watts. Brushed stainless steel. Square nozzle. Size 230x260x190mm Electrical connection: Connect hand dryers to mains 220v. All cabling, connection of Isolators. All electrical works.	5	R3 350.00 R3 200.00	R16 750.00 R3 200.00
3.	PVC curtains 950mm x 2100mm Supply and install 200mm Clear strip curtain to entrances leading into the abattoir.	3	R2 850.00	R8 550.00
4.	Knee operated valves Supply and install knee operated valves on hand wash basins. Plumbing works to feed water to valves. Connect all flexi connectors to the basin goose neck. Testing of valves. All plumbing materials and labour	3	R4 800.00	R14 400.00
5.	Foot valves Supply and install foot valves on pre/post evisceration points. Secure valve to floor with rawl bolts. Plumbing and designing of copper pipes to feed the foot valves. Piping and connection of flexi connectors to the washer water outlet. Testing of valves. All plumbing materials and labour.	2	R4 790.00	R9 580.00
6.	Pressure pump Supply and install a pressure pump 0.37kw to increase water pressure flowing to the main building. Connection of class 6 water pipe from the pump to the abattoir. Electrical connection from the DB board to the pressure pump including a 4x2 plug. All plumbing material, plumbing works and labour.	1	R3 500.00	R3 500.00

R2 850.00	R2 850.00
R4 400.00	R4 400.00
SUB TOTAL	R96 230.00
VAT	N/A R96 230.00

POULTRY ABATTOIR PLAN



1.11. Based on the above table on costs and benefits, describe how different options would contribute to or detract from the national priorities. Remember this is a think-tool, so explore the issues freely.

Priority	Option 1	Option 2	Option 3
1. Economic Transformation and Job Creation	Job creation is adversely affected due to lack of rabbit regulations. Regulating rabbit industry will result in job creation and formalisation of industry. People are raising rabbits as pets and for food. Starting this business is very easy, even the beginners can raise rabbits. There is a great opportunity of rabbit farming and commercial production can be a great source of income and employment. The rabbit production business can help educate and equip young, inexperienced farmers in rural areas, many of whom are currently unemployed, thereby stimulating small and medium- sized (SME) development, ownership and job creation in the communities where they farm. It is also scalable and repeatable and hence can generate growth in economic activity in our stagnant economy.	Poultry industry is well established. Amending poultry regulations to accommodate rabbit will disadvantage both species. Rabbit industry requires undivided attention. Even though rabbits are slaughtered in poultry abattoirs, there are major differences in rabbits and poultry which require separate regulations to adequately address issues pertaining to the two species. Failure to regulate rabbit industry will adversely affect job creation and trade.	The Schemes are not compulsory and lack penalties in case of noncompliance with regard to breeding, transportation and slaughter of rabbits. Stringent measures must be in place to boost economic growth and job creation. Other countries are realising the importance of supporting rabbit industry and South Africa must follow suite.
2. Education, Skills and Health	Regulating rabbit will encourage new farmers to enter the industry. There is less research in as far as rabbit is concerned. Government participation will create awareness hence new farmers will be motivated to learn about rabbit breeding, transportation, slaughter and distribution. Rabbit welfare issues are not known. Diseases are of great concern. For trade, animal health certificates must be signed by veterinarians.	Diseases affecting rabbits are different from poultry diseases. Meat inspection personnel must receive training on rabbit anti mortem and post mortem diseases. Lack of knowledge pertaining to rabbit will hamper growth.	The Scheme is not compulsory hence implementation will not resolve issues to boost growth. Rabbit farming, slaughter and distribution demand skills different from other species. Animal welfare issues are unique and require research to allow South Africa to compete in international trade. Microbiological and residue content of rabbit meat must be monitored to ensure consumer safety.

		Microbiological and residue monitoring of rabbit is critical.		
3.	Consolidating the Social Wage through reliable and quality Basic Services	Supporting rabbit industry will result in job creation. New farmers can easily enter this market due to the fact that production requirements are extremely cost-effective, easy to produce at small scale, therefore, this enterprise is ideal for backyard production, food security and income generation. Rabbit has an entire value chain and nothing is a waste farming rabbit. Money is made from the meat, the hide which is the skin, the pooh and the urine. Regulating rabbit industry will result in job creation and formalisation of industry. Regulating rabbit industry will enable SARS to collect revenue.	Poultry industry is well regulated and developed. Rabbit must be regulated distinctively to achieve maximum growth like other regulated species. Treating rabbit like poultry is currently disadvantaging rabbit industry. When there are poultry trade bans, they tend to affect rabbit.	The Scheme will not contribute positively towards growth of rabbit industry. Rabbit is a new commodity and must be regulated to ensure growth. Without regulations, there will be no growth due to lack of strict government participation.
4.	Spatial Integration, Human Settlements and Local Government			
5.	Social Cohesion and Safe Communities	A safe and secure country encourages economic growth and transformation by providing an environment conducive to employment creation, improved education and health outcomes, and strengthened social cohesion. Rabbit regulations will be in a better position to create new jobs. Job creation will eventually reduce crime rate.	A safe and secure country encourages economic growth and transformation by providing an environment conducive to employment creation, improved education and health outcomes, and strengthened social cohesion. Rabbit regulations will be in a better position to create new jobs. Job	A safe and secure country encourages economic growth and transformation by providing an environment conducive to employment creation, improved education and health outcomes, and strengthened social cohesion. Rabbit regulations will be in a better position to create new jobs. Job creation will eventually reduce crime rate.

		eventually reduce	
		crime rate.	
Building a Capable, Ethical and Developmental State A better Africa and World	The rabbit meat industry in South Africa is in its early stages of repositioning itself to stimulate growth both in the	Regulations provide tools for policy implementation, backed by	Regulations provide tools for policy implementation, backed by enforcement, as well as procedures for the
	domestic and international markets. Rabbit meat is a slowly growing part of Africa's diet. Due to its health properties, with the World Health Organisation describing rabbit meat as the healthiest available as a result of its high protein and low-fat content, the meat is now trending especially in European restaurants. In the South African setting, the demand for rabbit meat is increasing as a result of the growing number of producers making enquiries about this farming practices of rabbit. About 80% of South Africa's rabbit meat is destined for export markets while only 20% consumed domestically, according to National Agricultural Marketing Council.	enforcement, as well as procedures for the redress of damages. Poultry regulations are not designed to fully address rabbit issues. Rabbit meat international trade will be disadvantaged.	redress of damages. Schemes are not designed to fully address rabbit issues. Rabbit meat international trade will be disadvantaged.

1.12. Describe the potential risks that could threaten implementation of each option and indicate what can be done to mitigate the identified risks.

Option	Potential Risks	Mitigation Measures	Comments
Promulgation of rabbit regulation in terms of Meat Safety Act, 2000	 Building of new abattoirs is costly. Farmers not familiar with rabbit diseases 	 Business models that will make use of existing poultry abattoirs will maximise profit. 	Currently poultry abattoirs are used for rabbit slaughter. Government has failed to assist rabbit industry. Vigorous rabbit meat marketing strategies will

(Act No. 40 of 2000).	 and humane handling of rabbits. At abattoirs, meat inspection personnel not familiar with rabbit diseases and humane slaughtering of rabbits. Failure to meet microbiological and chemical requirements and other meat safety requirements will lead to condemnation of meat. 		facilitate market growth. Few people know about the health benefits of rabbit meat. Dieticians must start paying attention to rabbit meat health benefit and encourage people to consume rabbit meat. Funding of the rabbit industry by government will kick start the market and as a result, new jobs will be created.
Amendment of poultry regulations to make provision for rabbit regulations	 Amending poultry regulations will disadvantage rabbit industry. Poultry industry is well established and covering rabbit under same regulations will rob rabbit industry of its growth. Slaughter techniques of the two species differ. The diseases affecting rabbits are different from poultry diseases. 	 Investment in rabbit meat awareness is crucial. Locally, rabbit meat is not popular due to lack of information. 	Promulgation of rabbit regulations will promote healthy diet patterns among South Africans. Rabbit industry will create new jobs in the farming sector. Currently farming sector contributes positively to overall SA GDP.
Rabbit Meat Safety Scheme in terms of Meat Safety Act, 2000 (Act No. 40 of 2000).	 The Schemes are not compulsory and lack penalties in case of noncompliance with regard to breeding, transportation and slaughter of rabbits. Stringent measures must be in place to boost economic growth and job creation. Other countries are realising the importance of supporting rabbit industry and South 	 Implementation of a scheme will be beneficial in overcoming delays with regard to promulgation of rabbit regulations. 	 Implementation of Rabbit Meat Safety Scheme will not facilitate rabbit meat export to other countries. Failure to regulate rabbit industry, will deprive it of successfully contributing to economic growth and job creation.

Africa must follow
suite.
The scheme will delay
the establishment
and strengthening of
rabbit industry.

At this point, if you think the analysis points to a more useful or stimulating set of options, revise the SEIAS. You may find that you would like to combine some of the options, or that the process of discussion around the options has generated ideas that are better than your original ideas. Ideally, the three options considered should all be good ideas-that provides the best test for the final strategy adopted.

2. Summary

- 2.1. Based on your analysis, as reflected in the discussion of the three options above, summarise which option seems more desirable and explain?
 - Promulgation of rabbit regulation in terms of Meat Safety Act, 2000 (Act No. 40 of 2000).

The Department of Agriculture, Land Reform and Rural Development focuses on four broad policy-guiding themes for driving agricultural expansion, inclusive growth, job creation, an integrated rural area and eradicating hunger, namely;

- 1. Transformation and redistribution
- 2. Addressing inefficiencies
- 3. Growth and expansion
- 4. Coordinating policies and investments for the integrated rural economy.

Rabbit meat must be regulated in terms of Meat Safety Act, 2000 (Act No. 40 of 2000). Regulating rabbit will strengthen international trade which will lead to job creation. Supporting rabbit industry will result in economic growth. Currently farming sector contributes positively to overall SA GDP. New farmers can easily enter this market due to the fact that production requirements are extremely cost-effective, easy to produce at small scale, therefore, this enterprise is ideal for backyard production, food security and income generation. Rabbit has an entire value chain and nothing is a waste farming rabbit. Money is made from the meat, the hide which is the skin, the pooh and the urine. Regulating rabbit industry will result in job creation and formalisation of industry will facilitate compliance with labour laws and SARS will collect revenue. Rabbit industry is on the receiving end of lack of government participation.

Stock theft in South Africa is a concern. Rabbit regulations aims to ensure rabbit slaughter under controlled conditions. Disease control shall be carried out without and information on diseases will be properly documented. Illegally slaughtered meat poses risk to the consumer and must be discouraged. Registration of rabbit abattoirs will be covered by the rabbit regulations.

DALRRD and NSPCA work jointly to ensure prevention of cruelty and promotion of animal welfare. The Rabbit regulations will cover critical procedures with regard to breeding, transportation and slaughter of rabbits.

According to the Integrated Food Security Phase Classification analysis report, an organisation that analyses food security in the Southern African Development Community, from January to March 2021, 11.8 million people in South Africa were classified as being at IPC Phase 3, which means their level of hunger is at crisis level. One female rabbit will produce more meat than a cow in one year while consuming six times less food and water. Rabbits are slaughtered in 60 days, when production cycles are full a collective monthly remuneration is earned and a productive doe will produce 6 kits per month collectively. A cow requires 7 to 11 hectares of land where a female rabbit and her young require only one square meter. A female rabbit can reproduce its own mass a 1 000 times through its offspring in a year. Rabbits can be farmed on the most unsuitable agricultural land with much less water than any other farmed animal. Rabbits are prey animals with two uteruses that reproduce prolifically in an all-natural manner.

Implementation of hygiene management systems at the abattoirs promotes meat safety. Rabbit regulations under Meat Safety Act, 2000 (Act No. 40 of 2000), shall stipulates detailed processes to ensure safe meat for consumers. Registration of rabbit abattoirs will be covered by the rabbit regulations.

2.2. What specific measures can you propose to minimise the implementation and the compliance costs of your preferred option, to maximise the benefits?

Currently rabbits are slaughtered at poultry abattoirs. The design of poultry abattoir is suitable for rabbit slaughter. Rabbit farmers have developed a business model that maximises profit for emerging farmers. Building abattoir from the scratch will be too costly and will compromise profit.

There are veterinary public health officials at poultry abattoirs therefore, this will further minimise implementation costs.

Equipment at poultry abattoirs is suitable for rabbit slaughter. It is not necessary to purchase new equipment.



Example of business model for small farmers:

The following resources are necessary for the establishment of small rabbitries in communities, as part of rural and township economy revitalisation:

8 Does + 1 Buck

- 4 Cages (16 compartments)
- 6 poles + 16 feeders + 16 nipples + water pipes + 2 pans
- Feed for 6 months

2.3. What are the main risks associated with your preferred option, and how can they best be managed?

Regulating rabbit industry will result in possible restructuring of the current business model. Working together with rabbit industry, will assist in resolving obstacles. The rabbit industry has developed business models which support growth. Government must prioritise funding of rabbit industry to ensure growth.

Small farmers will be adversely affected, due to lack of resources. However, with government's intervention, they will be afforded opportunity to grow and contribute positively towards economic growth.

Rabbit industry is slowly developing. However, lack of knowledge with regard to breeding, slaughter and distribution will hamper growth. Marketing strategies must be developed to ensure that rabbit industry competes with other known species. The benefits of rabbit meat are not known by majority of consumers.

Training and mentoring of new farmers is of utmost importance. Government's financial support is critical.

Lack of rabbit abattoirs- Existing poultry abattoirs are modifiable to accommodate rabbit slaughter. Business model currently implemented by the industry, involves supporting of small farmers to ensure maximisation of profit under current conditions.

Disease control- Farmers are not familiar with rabbit diseases hence disease control measures are often not implemented. Rabbit regulations will stipulate requirements to ensure that control measures are in place. Implementation of disease control measures will ensure food safety and facilitate participation in international trade. Implementation of disease control measures will require additional funding. Hence government financial support will be required to boost rabbit industry.

Lack of rabbit meat inspection manuals- Currently there are no meat inspection manuals for rabbits. Directorate of Veterinary Public Health must ensure development of rabbit meat inspection manuals.

Unavailability of rabbit meat examiners- Additional training of current poultry examiners will be necessary.

2.4. What additional research should you do to improve your understanding of the costs and benefits of the option adopted?

Additional research is needed to understand diseases associated with rabbit. Some of the diseases do not occur in South Africa due to environmental conditions. Authorities must liaise with The World Organisation for Animal Health (OIE) for declaration of such diseases.

The current poultry abattoir design and structure must be analysed to ensure the suitability of handling rabbit slaughtering. Poultry abattoirs may require minor adjustments to ensure compliance with animal welfare requirements.

The type of medicines used in rabbit industry must be profiled to ensure addition of the species to the national grid for residue monitoring program.

HOLDING RABBIT MARKET INFORMATION DAYS WILL PROMOTE AWARENESS WITH REGARD TO RABBIT FARMING!!!

For the purpose of building SEIAS body of knowledge please complete the following:

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