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Mailu, S.K and Muhammad, L and Wanyoike, M.M and
Mwanza, R.N.

Kenya Agricultural Research Institute

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Rabbit meat consumption in Kenya

¹Mailu S.K., ¹Muhammad L., ²Wanyoike M., ³Mwanza R.; *et.al.*,

Abstract

A survey was undertaken in 7 counties in Kenya covering a total of 300 rabbit farmers. Another 100 non rabbit keeping farmers was similarly interviewed for comparison purposes. Questions on the survey instrument sought to identify consumption patterns of rabbit meat among the sample farmers. Results were subjected to chi square test for association in an attempt to identify characteristics of respondents that might be pointers to rabbit meat consumption. Education, the number of rabbits kept—as well as whether the farmers actually kept rabbits were strong pointers towards making a particular farmer also a consumer of rabbit meat. Income (in this study, expenditure was used as a proxy for incomes) and the region of residence were marginally associated with rabbit meat consumption. Only 38 percent of non-rabbit farmers consumed rabbit meat compared to 82 percent for those who kept rabbits. The frequency of rabbit meat consumption was found to be very low, even for rabbit keepers with 46 percent of this group doing so at most, once every 12 months compared to 73 percent for non-rabbit farmers.

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¹ Kenya Agricultural Research Institute

² University of Nairobi, College of Agriculture and Veterinary Sciences

³ Ministry of Livestock Development

Introduction

Over the last 50 years, rabbit meat production has increased 2.5 fold with China being the world's largest producer producing 700,000t/year (Dalle-Zotte and Szendrő, 2011). Even in countries of Latin origin (Italy, France, Spain), who practice traditional cuisine, rabbit meat production represents only about 3.7% in France and Spain and slightly larger (11.4%) in (Italy) of total meat production (Dalle-Zotte, 2004). With an estimated population of about 600,000 rabbits, Kenya just like many developing countries which account for only 18% of the world rabbit population is still in the initial stages of developing a vibrant rabbit sector. Exact estimates for Kenya are not currently available but it might not be too far to assume that households keeping rabbits are still as low as what was observed in Uganda where only 1.1% of households keep rabbits holding an average of 5.2 rabbits (Republic of Uganda, 2009). In Nigeria, there appears to be a bigger population keeping rabbits (about 3.4-5.2 percent of Nigerian population) than what the Ugandans report and certainly (Abu et.al., 2008). Rabbitry dates back to the colonial period and in 1980, a bilateral agreement between the Government of Kenya and German International Development Agency (GTZ) saw the revamp of the National Rabbit Breeding Centre at Ngong Veterinary Farm with an objective of providing breeding material for farmers throughout the country. This did not catch the attention of many farmers since rabbit keeping was traditionally a 'thing' for young boys and other multiplication farms in Machakos, Embu, Wambugu F.T.C., and Kilifi were later closed down (Borter & Mwanza, 2011). The industry still lagged for several reasons which might include the lack of viable and well-established markets, insufficient promotion, erratic product supply, unreasonable prices, and

competition from other meats (Lukefahr and Cheeke, 1991). The authors propose that

“in areas where rabbit meat is not widely consumed or marketed, small-scale rabbit projects should be initiated on a backyard family basis, since the ultimate goal of rabbit raising is to provide more meat at the family level. Subsequently, rabbit sales to neighbours and businesses in the rural community may develop. If successful, production could be expanded for marketing in urban areas. This would involve market research and development, and would depend on sufficient and increasing rabbit meat supplies. Once rural community production for urban markets becomes firmly established, the development of large-scale commercial rabbit operations may be encouraged. Ultimately, a more sophisticated market infrastructure may involve product diversification such as breeding stock, tanned skins and processed meat forms, as well as entrepreneurial training, mass media promotion, competitive pricing and/or overcoming market fragmentation. By adopting such a logistic approach to market development, greater assurance of successful marketing may often be realized.” (Lukefahr & Cheeke, ibid)

In fact, out of a list of 18 counties, Kenyan farmers were seen to be marketing their rabbits at 7 months against an average of 3.7 months (Lukefar & Cheeke, 1991) possibly an indication of a paucity of markets for rabbits in Kenya. Rabbit's potential remains unrealized in many developing regions which contribute substantially less than 20% of total world rabbit meat production (Lebas et al., 1997). In Kenya for instance, export of rabbit meat in

the period 2000-2010 was paltry with the highest stated exports worth 0.49 million to Sudan in 2008 (EPC website). Many factors constrain the industry in Kenya, an industry which in the past was seen as a pas-time for young boys. However, it appears that the most important constraint in the region is that rabbit meat consumption is very common as a traditional dish. Luzobe (1987) reported that only 35.5% of Ugandans had ever consumed rabbit meat while in Nigeria, . In South Africa, Sonandi et al (1996) outlined some of the main factors inhibiting the popularity of rabbit meat and they included a lack of consumer appeal since respondents found whole rabbit carcasses to resemble a cat or human infant. The taste of meat could also be a deciding factor influencing consumption (Dalle-Zotte, 2002). In Oyo and Osun states of Nigeria, only 8.8 percent of farmers would choose rabbit over poultry and a larger proportion 18 and 27 percent would choose rabbit over goat and beef respectively. This resonates well with the finding among Hungarian households where most declared an unwillingness to pay more for rabbits than what they paid for poultry meat (Bodnar and Horvath, 2008). Still in Nigeria, Kalio et.al., (2008) studied rabbit meat consumers and concluded that taste, availability, cheapness and tenderness were ranked as important to consumers in decreasing order of importance. Kallas and Gil (2011) also investigate hedonic/extrinsic (e.g. price, presentation) and intrinsic (e.g. colours, fat content, marbling) qualities in determining consumer preferences while Dalle-Zotte (2004) concludes that hedonic qualities are important. In Mexico City Olivares et.al. (2005) concludes that 26.2 percent of people consume rabbit meat regularly but the proportion is higher in municipalities (46 percent) of the state of Mexico. In Italy consumers are attracted by quality, appearance, carcass weight and quality-to-price ratio in order of decreasing importance

(De Carlo, 1998). In Louisiana and Texas where rabbit meat prices are comparable to those of bone and skinless chicken breast, research suggest that men, Catholics and nonwhite collar workers are more positive about rabbit meat than their counterparts (McLean-Meynsse et al., 1994; McLean-Meynsse, 2000). In Southern United States, Beal et.al. (2004) conclude that rabbit meat consumers are men aged over 36 years and an income below \$50,000. Szakály et. al. (2009) on the other hand conclude than it Hungary, dietary habits are important in influencing rabbit meat consumption but the price of rabbit meat is not while on the contrary, in Burkina Faso, Hoffman et.al. (1992) state that price is an important determinant in rabbit meat consumption. In Kenya where the share of rabbit in total food expenditure is most likely lower than the 9.6% (Gamba et.al., 2005) for poultry; then any initiatives targeting at improved productivity should be accompanied with those that can translate productivity gains into affordable rabbit meat consumer prices. In Burkina Faso, people who had never tried rabbit meat were found to be unwilling to spend more on rabbit than they would do for poultry (Hoffman, op.cit) a similar feeling among Hungarian households (Bodnar and Horvath 2008). In Nigeria, Dario et.al. (2012) report that rabbit meat ranks 4th behind beef, bush meat and chevon and just ahead of poultry in terms of preference, where 17 percent of those interviewed consumed rabbit meat. In Egypt the share of rabbit meat in household meat consumption was estimated as a mere 3.3% (Alboghady and Alashry 2010). In Egypt rabbit meat consumption was estimated at 0.7kg/capita in 1992 (Galal and Khalil, 1994). Here, just like beef and duck meat, rabbit meat is classified as a necessary good unlike chicken described as a luxury. In Nigeria, a growing demand for rabbit meat is reported to act as a substitute for poultry meat (Abu et.al., 2008). In Kenya, a recent study

classifies indigenous poultry as a necessity (Bett et.al. 2012). In Egypt, as incomes increase the increase in demand for rabbit meat might not rise in equal proportion to this income increase. Whether this is equally true in the Kenyan situation is only a conjecture at the moment.

Materials and Methods

Through the National council for Science and Technology (NCST) funded project ‘Strategies to promote the rabbit value chain in Kenya’ a questionnaire was designed to collect household data pertinent to rabbit production and consumption. Even basic information about the rabbit industry is currently lacking and the project’s major objective is to promote the development of rabbit supply chain in Kenya. To do this, information on some important aspects including general farm details including rabbit numbers and breed types, housing structures and equipments, feeds and feeding practices, diseases, consumption and marketing and some of the most important constraints limiting the industry were collected using a questionnaire. Many questions took a close ended format but were also interspersed with open ended questions so as to break the monotony associated with the former. The questions were designed to aid the interviewer and interviewee with some order, so that questions lead naturally to the next and those related to one aspect were grouped together in respective sections. This questionnaire was pretested in Ngong during August 2011 and later adjusted to take account of interview length while some questions were reformulated based on observations from the pretest and tested again in Naivasha and Nakuru. Selected interviewers underwent a one day workshop during August 2011 to share the objectives of the entire project, review the final questionnaire and make final changes to the survey instrument as well as the accompanying interviewer’s

manual. For additional quality control, questionnaires filled during the first week of data collection were scrutinized for completeness and any inconsistencies noted and flagged with the survey supervisor. Ministry of Livestock Development officers provided logistical support to the interviewers and identified respondents 25% of whom were non-rabbit keeping households. In all, a total of 400 respondents were targeted from the counties viz; Nakuru, Kiambu, Taita Taveta, Nyeri Meru and Tharaka Nithi between August and September 2011. The interviewers took about 50 minutes with each respondent keeping rabbits during the first week (and 15 minutes for non-rabbit keepers) which went down to an average of 45 minutes during the remainder of the interviews accomplished after the review of the survey questionnaire from the pilot stage. The data were keyed into MS access and the statistical package (SAS V9.0) used to analyze the data. The two related survey questions of interest in this paper were: 1) What fraction of respondents in the survey consumes rabbit meat and at what frequency does this consumption happen? 2) What are the possible correlates to consumption? To answer these questions, we use responses to a set of questions including one which simply sought to find out whether respondents had consumed rabbit meat during the reference 12 month period.

Results and Discussion

In total, 71 percent of the respondents had consumed rabbit meat while 29 percent had not. Among rabbit keepers, 82 percent had consumed rabbit meat as opposed to 38 percent of non-rabbit keepers making rabbit keeping an important correlate of consumption. A chi square test confirms that among the sample, keeping rabbits was an important determinant to consumption of rabbit meat (table 1). This 38 percent is comparable to 47 percent in the Western Cape-

South Africa (Hoffman et.al., 2004) or 31 percent in Hungary (Szakaly et.al., 2009) among the general population. Since rabbit keeping in Kenya may just be closely comparable to the situation in Uganda where only 1.1 percent of the population actually raises rabbits, it means that there is scope for developing a market for rabbit meat among the population that does not keep rabbits. Education level of the household head was also shown to be an important determinant of the consumption decision. Rabbit meat is known for its superior qualities of low fat, cholesterol and calories and high protein and possibly the reason that those with a formal education are likely to consume the meat. For instance only 47 percent of households headed by one without formal education consumed rabbit meat compared to well over fifty percent for households whose head had attended some formal education. However, only 6 percent of the heads of household did not have any formal education while the figure was 12 and 3 percent for mid-level college and university graduates respectively. The age of the household head on the other hand (here representing the life stage of the household) does not show any association with consumption of rabbit meat ($\chi=4.938$; $P=0.2936$). This clearly puts to test the feeling that rabbit keeping (and possibly consumption) is a pass time for the young. County of residence only had a marginal effect on rabbit meat consumption ($\chi=10.17$; $P=0.11$) as shown on table 1. Tharaka county appears to have a population where less than half of the respondents (47 percent) consumed rabbit meat while in all other counties, at least half of the respondents consumed rabbit meat. Geographic segmentation of rabbit consumption is therefore not very strong implying that marketing consumption campaigns would need to take a different route rather than segment the market on a geographic basis. However, an argument for

Kirinyaga as a special case would do since at least 80 percent of the respondents consumed rabbit meat and as is shown on figure 3, whereas incomes (expenditures) per household are modest, Kirinyaga farmers slaughter on average 16 rabbits a year while in Kiambu this is 22 rabbits per year. In the rest of the counties, consumption is less than 10 rabbits on average. A similar conclusion can be made for income (expenditure quintiles) which shows a weak relationship with rabbit meat consumption. This result implies that incomes do not have a strong association with rabbit meat consumption and therefore at present, income elasticities are at best modest.

Revenue that farmers would get on the sale of one rabbit (present prices) was used as a substitute for the price of rabbit meat. Since only those who had rabbits were able give this estimate, this analysis relates to those who kept rabbits. The prices however did not show any relationship to consumption as expected ($\chi^2=7.78$). However, the prices on quoted were quite high (averaging 1115KES/rabbit) compared to poultry (509 KES/bird) and the expectation was to see a negative association i.e. less consumption when prices were high. These high prices strongly suggest that the present market for rabbits is dominated by breeders who multiply these bunnies for sale to other farmers. In fact a separate analysis shows that the scale of production and prices are negatively related, with large scale farmers enjoying relatively better prices than their counterparts. In fact, it is only in the two counties of central region (Kiambu and Nyeri) where large scale producers could be found, bringing in a geographic dimension to pricing. With regard to the number of rabbits kept, there was a significant association between numbers kept and whether a household consumed rabbit meat. It appears as though the number of rabbits kept by a farmer could improve chances of the farmer consuming

rabbits. From the data, it is not clear why nearly all the small scale farmers are not consumers of rabbit meat from their own farms as would be expected, since small scale is usually related to subsistence production. An important segment of the population is that

one which does not keep rabbits but consumes rabbit meat since this represents a sizable population—we estimate only about 1 percent of the farming population keeps rabbits. Given the right signals this segment can provide a viable market for rabbit meat.

Table 1: Cross tabulation of rabbit consumption and socioeconomic variables

	Consume	Do not consume	χ^2	p-value
	--Percentages--			
TOTAL	71.6	28.4		
Expenditure quintile				
1000-5000	68.3	31.4	6.56*	0.16
5500-7000	73.9	26.1		
7500-10000	77.5	22.5		
11000-15000	72.5	27.4		
17000-90000	58.7	41.3		
County				
Kirinyaga	81.2	18.8	10.17*	0.11
Meru	75.8	24.2		
Nyeri	78.5	21.5		
Taita Taveta	65.0	35.0		
Tharaka	47.4	52.6		
Kiambu	73.8	26.2		
Nakuru	70.9	29.1		
Gender				
Male	72.0	28.0	0.64	0.82
Female	71.0	29.0		
Keep rabbits				
Yes	82.3	17.7	69.11*****	<.0001
No	39.0	61.0		
Education of household head				
No formal education	47.1	52.9	9.33***	0.053
Primary school	75.6	24.4		
High school	68.8	31.2		
Middle level college	71.4	28.6		
University	91.7	8.3		
Rabbit Price				
100-400	81.4	18.6	0.78	0.85
450-500	84.9	15.1		
550-1000	80.0	20.0		
1200-2000	84.8	15.2		
Number of rabbits kept				
1-3	75.4	24.6	10.04***	0.03
4-6	86.8	13.2		

	Consume	Do not consume	χ^2	p-value
7-10	72.7	27.3		
11-23	89.7	10.3		
>24	88.9	11.1		

Significant at ****1%, ***5%, **10%, *20%

Of the rabbit farmers interviewed and had consumed rabbit meat, 31 percent had done so at least once every year (Figure 1). Among non farmers, this figure was roughly 20 percent. Most striking among non rabbit keepers was that over half (52 percent) were very rarely consuming rabbit meat doing so at most, once every 2 years. Overall, 30 percent of all respondents that had consumed rabbit meat did so once each year followed by those consuming rabbit meat monthly (21 percent) and biannually (20.7 percent). This indicates that many consumers (70 percent) are rather infrequent rabbit meat consumers, even among rabbit farmers. Seventy three percent of non farmers consume at most once every year while for rabbit farmers, this is 46 percent. This is close to a finding reported in Hungary where 70 percent of respondents consume rabbit meat only once or twice a year (Bodnar and Horvath 2008, Bodnar, 2009) or put differently, 60 percent consume more rarely than once every other month (Szakaly et.al., 2009). Among the rabbit meat consumers interviewed in this dataset, 8 percent consumed rabbit meat once every week and another 1 percent consuming twice a week suggesting this as an important constituency of interest as it forms—though a small fraction—an important market segment. Such frequent consumers can be “micro targeted” in a market campaign designed to try out new recipes and or rabbit

derived products. Of note is that none of the non-rabbit farmers—who consumed rabbit meat—do so more than once each week. Since retaining and satisfying intermittent customers is much more difficult than maintaining more loyal customers, this is one segment that needs to be grown while for the loyal rabbit customers strategies to retain them need to be initiated. That a significant proportion (62 percent) of the general population does not consume rabbit meat is important to note which means that rabbit meat consumption is contained within a very narrow band of the population.

The non-rabbit farmers who consume rabbit meat thus become another important segment to understand. However, to get to that point several unknowns still exist. For instance, questions that could interest researchers and marketers include; what pushes consumers to purchase rabbit meat and what are the limiting factors towards consumption of rabbit meat? What also influences the frequency or repeat consumption of rabbit meat? What mode should a marketing campaign aimed at promoting consumption of rabbit meat take? Would mass media be an appropriate vehicle for promotional messages or is a tailored campaign designed to reach different customer segments a more feasible alternative?

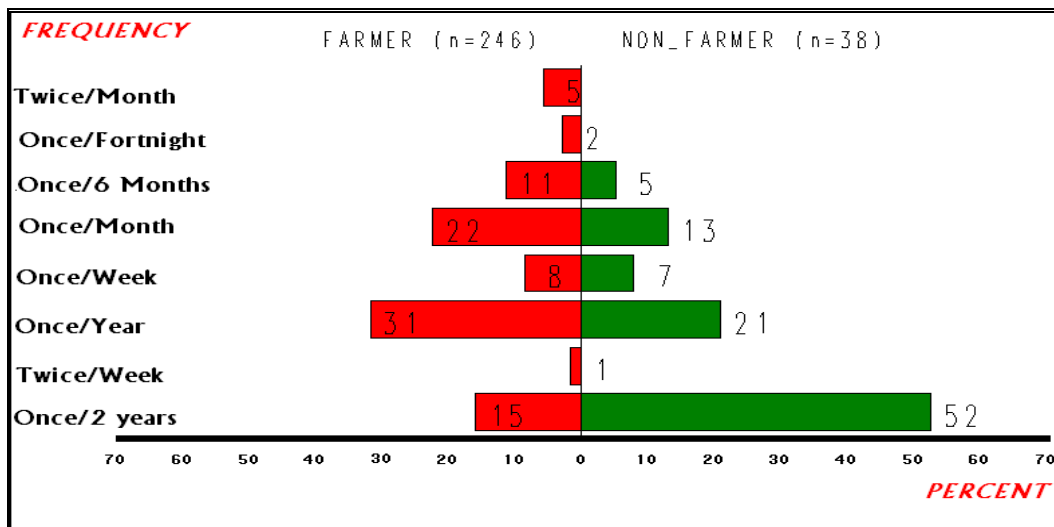


Figure 1 Frequency of consumption

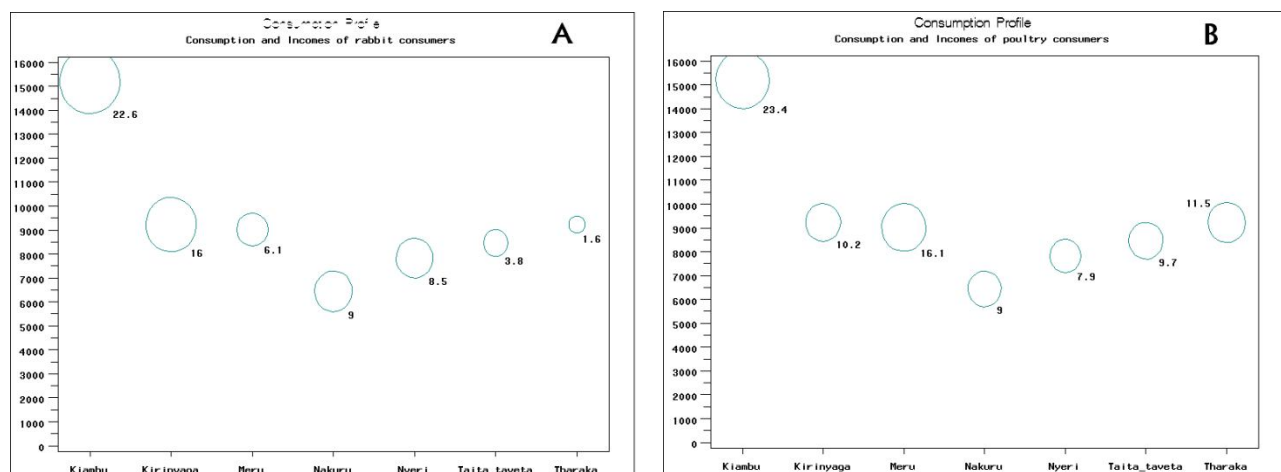


Figure 2: Average number of rabbits (panel a) and poultry (panel b) slaughtered over a 12 month period by county and average monthly household consumption expenditure

Since most of the slaughter at home for rabbits and poultry was cited as for home consumption, it is assumed that the price and quantity data is sufficient to estimate some elasticities using a single demand equation⁴.

⁴ There are some doubts about the reliability of the results obtained by this method but given the data at hand, broad orders of magnitude are sufficient for this exposition. Better models such as the Almost Ideal Demand System or the Rotterdam models are better suited at estimating elasticities

In many demand studies, prices and income are important demand drivers. Therefore, in an attempt to approximate the relationship between these drivers and consumption, we make several assumptions. The data available does not provide opportunity to directly derive expenditure and price elasticities for example by use of the Almost Ideal Demand System (AIDS). We therefore derive naïve estimates of these parameters as shown on table 2 below. We split the sample into quintiles and estimate naïve income and

price elasticities for rabbit and its presumed competitor (poultry). The number of rabbits slaughtered over a 12 month period are 10 while for poultry, this evaluates to about 13 birds (table 2). One surprising result is that the price elasticity for rabbits is positive while that of poultry is as expected, negative. That as prices increase, consumers are possibly going to slaughter more rabbits might indicate that rabbits are a Giffen or Veblen good. We are unable to make further conclusions about the nature of these elasticities and thus further work on this could be implemented to uncover economic descriptors of rabbit meat. The price

elasticity of poultry is negative for all expenditure quintiles meaning that as poultry prices rise, households are inclined to consume less poultry. In the case of rabbits however, when the price of rabbits increases, households are inclined to consume more rabbits. The expenditure/income elasticities are both positive for both rabbits and poultry. However, poultry is marginally more responsive to income/expenditure increases than rabbits since the expenditure elasticity for poultry is .17 as opposed to rabbit's .12.

Table 2: Price-expenditure elasticities for rabbit and poultry for households in different expenditure quintiles

	Expenditure quintile					
	All	1	2	3	4	5
Mean monthly expenditure (KSH)	10,899	4,080	6,788	9,761	13,934	30,666
No of rabbits slaughtered	10.9	8.2	4.2	17.4	9.2	19.4
No. of poultry slaughtered	13.5	8.2	7.9	12.3	13.6	14.6
Expenditure elasticity wrt rabbits	.12	.55	-1.74	6.01	-1.39	-.74
Expenditure elasticity wrt poultry	.17	.12	.27	3.97	1.46	-.31
Rabbit price elasticity	.31	.19	.27	.31	.63	.19
Poultry price elasticity	-.17	-.18	-.05	-.08	-.37	-.76

Conclusion

The results presented above indicate a number of important points as far as the rabbit industry is concerned. For instance, the observation that price is not yet a major determinant of rabbit meat consumption provides a pointer that the sector is still undeveloped or that we are looking at a virtually different market, possibly one composed of rabbit breeders selling animals for breeding purposes and not necessarily for slaughter. The scale of production is still low though these numbers are dependent on region and the main objective of raising rabbits includes commerce and that at the Coast (Taita Taveta), commercial rabbit farming does not appear to be an objective

of any of the farmers unlike in some parts such as Rift Valley where more than 80% of farmers keep rabbits with a commercial slant. That some farmers ceased rabbit production due to lack of a market—and this is also stated by some of those still maintaining rabbits—points at a weakness on the demand side. That most of the consumers are those keeping rabbits also means that there is need for sustained initiatives to encourage more consumption of rabbit meat among this group. Producers also have a very poor record keeping culture which makes it difficult even for the best farmers to determine key production parameters such as costs, efficiency, and

performance. The high prices offered for rabbits might be a further reflection of the inability of farmers to keep track of the actual costs of the enterprise and this can contribute to farmers overpricing so as to minimize the risk of under pricing. Also important to restate is that the prices on offer might be directed more for those seeking breeding animals; prices which might not compete favorably with competing meats such as poultry.

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