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The impact of livestock sector on the environment and societal life of Swedish people - A study based on interviews with agronomists

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Abstract:**Purpose:**

The purpose of this case-study is to find out, how the agronomists specialized in Animal husbandry perceive and respond to the ongoing debate initiated by 'Livestock's long shadow' report about the risks with global livestock production. Moreover, to investigate also their perspective regarding different attempts to reduce the risks as well as the nature of the reactions shown by the farmers and general citizens.

Methodology:

The research study is based on the qualitative semi-structured interviews with fourteen agronomists regarding the research questions about how they understand and evaluate the above mentioned debate concerning the expansion of livestock activities and the related problems. The results are interpreted through the interview quotes of the respondents rather than using any direct statistical data.

Findings:

The results show that the interviewed agronomists are aware of the ongoing debate and confirm that many of the problems raised in 'Livestock's long shadow' report are relevant and need to be addressed on a global level. Whereas, they do not consider any need for substantial changes in the Swedish production system. However, they indicate that Sweden is indirectly responsible for deforestation and expansion of the ongoing livestock activities of Brazil and other South American countries because of importing soyabean and red meat from those countries.

Implications:

The agronomists argue that decrease in red meat consumption side by side with increase in livestock production within the safe limits in Sweden would help to decrease risks for the society and reduce the import of red meat in the country, as well. Moreover, they give suggestions for giving incentives to the farmers by the Swedish government to provide the relief for rearing cattle in higher number and for change of the food habits of people to decrease red meat consumption in the country. The agronomists being animal husbandry experts are aware of and to a large extent agree with the criticism about global livestock production system. However, they do not perceive themselves as adopting the role of 'coordinating risks' through their expert knowledge, rather they consider the politicians and consumers for contributing to make such changes.

Key words:

Meat production, Animal husbandry, Environmental risks, Risk society.

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1. Introduction:

1.1. Background:

Livestock production has been an important branch of farming since the start of agricultural practices and even today is a substantial part of the modern agriculture system. The people throughout the world usually raise livestock as a major means to produce food, directly as the meat and dairy products, and indirectly as draught power and manure for crop production. Foods of animal origin i.e. meat and dairy products are a rich source of essential nutrients and usually added in the meals in reasonable amounts to have a balanced diet. However, these items particularly the meat being very tasty are much relished by the people and more frequently overeaten. The economic role of livestock sector is also quite important as it earns about 40% of the agricultural GDP, employs around 1.3 billion people and provides livelihood for almost 1 billion of the world's people. Nowadays, livestock products fulfill one third of protein intake requirement of human beings. However, according to estimation almost 80% of total livestock sector development comes from industrial production system. The global production of livestock meat is projected to double from 229 million tons in 1999/2001 to 465 million tons in 2050 and the production of milk to grow from 580 to 1043 million tons (Steinfeld, et al., 2006).

The agricultural extension work is prevalent worldwide, whereby the farmers are advised on various matters and problems related to their specific farming system by the agronomists who are specialists in that discipline. These guidelines in the form of professional knowledge based on recent research findings are regularly provided to individual farmers or even to a farmers community as required in that specific locality of the country. Likewise, the agronomists specialized in animal husbandry in Sweden are also performing their role of advising the farmers in livestock sector concerning their particular problems. The role of experts may be mere an advice on the general matters of routine. However, their role may extend to deliberate discussions and interaction in case of relatively complex situations quite often including social problems, as well. That would certainly involve follow up and feedback requirements in such cases.

As most large scale human activities, livestock production contributes with both social values and social problems. Recently, some of the problems with livestock production were addressed in a report named 'Livestock's long shadow' published by FAO as summarized below:

Livestock activities have significant impact regarding serious environmental problems such as land degradation, global warming and climate changes, air and water pollution, water shortage and loss of biodiversity, worldwide. This is mainly due to irrigation of fodder crops for animals and deforestation. Some harmful greenhouse gases such as carbon dioxide, methane, nitrous oxide and ammonia are emitted from the animals and their wastes that cause air pollution, global warming and climatic changes. With the expansion of livestock production, deforestation is continuously increasing in Brazil and other South American countries for developing pastures as well as production of soyabean and other feed crops to meet the demand of the developed countries for the feed of livestock and poultry (Steinfeld, et al, 2006).

As regards its impact on human health, higher and continuous intake of red meat as well as other livestock products including animal fat is considered to be the major cause of obesity. Such people with the rapid nutrition transition are likely to face diet related chronic diseases such as heart diseases, diabetes, hypertension and certain types of cancer (Popkin, et al, 2001).

The sustainability of today, possibly relies upon the reintegration of animals and crops. It does not demand the complete rejection of animal fat and proteins in our food system, while that could be accomplished by the consumption of red meat and dairy products in a more sensible and wise way, as

well as to follow the integrated approach in raising the livestock for food that uses agro-ecological concepts and principles. This can be put into practice by adopting the best aspects of pre-industrial agricultural age into post-industrial age (Gliessman, 2007).

The release of above referred report namely 'Livestock's long shadow' generated quite some discussion in newspapers and broadcast media. The people expressed their specific opinions by and large. Accordingly, voices were raised for substantial changes in the current strategy of livestock production as well as the consumption of livestock products particularly the red meat. Nowadays, the livestock production is a modern activity in which advanced technology has been used for maximum efficiency and economics in that business. These activities are taking place in the modern society, a society which has as one of its basic processes to manage appearing risks. One of the tools the society is using in risk management is knowledge production and coordination. Meanwhile, some professional groups have emerged in the 'risk society', the 'experts' that are agronomists specialized in animal husbandry in this case, with the specialized task to coordinate knowledge in risk management.

With this theoretical background, one interesting question would be how the experts (agronomists) involved in livestock production react when the map of risks is redrawn by the release of 'Livestock's long shadow' report. Moreover, it would also be important to know their response to the critique regarding the presentation of livestock production as a risk for society. The information about the perspective, attitude and response of the agronomists would certainly be important and interesting as they are coproducers of knowledge and associated with knowledge evaluation criteria in livestock production system. These experts are supposed to play an important role in the sociotechnical system of livestock production through coordination of knowledge in risk management. These actors do certainly understand their role of transferring knowledge of applied nature relevant to the needs of farmers to help them make decisions. They are also considered to adopt follow up and feedback activities wherever required so as to be careful and logical regarding knowledge production, evaluation and coordination.

1.2. Main objective of my research project:

The Purpose of this study is to find out the perspective and response of the actors in knowledge production regarding the debate about the risks with global livestock production. The actors here producing knowledge related to the livestock sector are represented by agronomists specialized in animal husbandry. The study is based on interviews with 14 agronomists who are answering the research questions about how they understand the debate initiated by 'Livestock's long shadow' report, what their own view and position in the debate is, and if they have changed anything in their own activities. Moreover, how they perceive different attempts to reduce the risks and what reactions they have noticed from farmers and general citizens.

1.3. Problem Formulation:

Release of the report entitled 'Livestock's long shadow' has presented the global livestock production as a controversial matter. The farmers and the agronomists (specialized in animal husbandry) entirely rely on livestock activities (red meat and dairy production) as a source of livelihood and also can influence and optimize the direction of this sector. The transition and modification of agriculture can come about due to some external and internal factors. Now, the question arises that how the agronomists make sense of the criticism about livestock production as narrated in the above mentioned report and to what extent the agriculture is willing to alter itself by going through this transition.

1.4. Research Questions:

Now, I like to raise the following research questions, as how the agronomists (animal husbandry advisors) identify, take notice and make sense of the criticism regarding livestock activities as pointed out in the 'Livestock's long shadow' report.

- (1) What the interviewed agronomists have recognized about the ongoing debate?
- (2) What are the contents of the ongoing debate from their perspective?
- (3) How they give value to this ongoing debate?
- (4) How they react and give their suggestions regarding this ongoing debate?

2. Method.

2.1. Introduction:

In the following section, the research methodology has been described. Beginning with the qualitative semi-structured interviews, followed by the selection of interviewees (agronomists) and finally a short description regarding the data collection.

2.2 Selection of Qualitative semi-structured interviews:

The qualitative methods are more suitable to the type of research questions, we want to inquire in our own work that is concentrating on making sense of both individual and group experiences of work. (Cassell and Symon, 1994). *"Qualitative research is increasing in use in a wide range of academic and professional areas. It develops from aspects of anthropology and sociology and represents a broad view, that to understand human affairs it is insufficient to rely on quantitative survey and statistics, and necessary instead to delve deep into the subjective qualities that govern behavior"*. (Holliday, 2007). In case of qualitative research method, we rely on face to face interviews, communication by telephone between researcher and respondent or any connecting link communication between them through the internet. Since by this method, both persons directly interact with each other during the process of interview, the researcher can create and ask any new questions in order to clarify his ideas effectively and in more depth. The qualitative research is connected to social change in two ways: it may be cognitive of social change, and it could be concentrated to accomplish the social change. (Warren and Karner, 2010).

Likewise, Cassell and Symon (1994) suggested that: *"the qualitative methods allow flexibility in the research process. Thus, the responsiveness to individual's and organization's conceptualization of themselves is also related to a willingness to formulate new hypotheses and alter old ones as the research progresses in the light of emerging insights. Thus, through the qualitative methods, the researcher can alter the nature of his or her intervention as the research develops in response to the changing nature of the context"*. (Cassel and Symon, 1994).

Whereas, in case of quantitative research method, we mainly rely upon the questionnaires and that is why, we cannot clarify furthermore some of unclear important points, as compared to face to face interviews. Furthermore, in case of quantitative research method, there are very notable difficulties with questionnaires. These include how the method of asking of questions affects upon the way of response, how far people demonstrate the feelings of reality, how far they perceive and conclude the questions anyway and how far social influence of questionnaire will finally impact upon the process of perception. (Holliday, 2007).

Greetz, while making a comparison between qualitative research method and quantitative research method remarked: *"the qualitative research is 'experience near'-close to other people and social settings-while quantitative research generates 'experience distant 'numerical summaries of social*

life” (Greetz 1973, 1983 and 2000, in ‘Discovering Field Research, Interviews, and Analysis. Qualitative Methods’. by Warren and Karner, 2010). “However, the main area of inquiry of interview should be connected to the past or future as well as to the present”. (Warren and Karner, 2010).

For that reason, I have selected the qualitative research method for my case-study instead of quantitative research method. I selected this flexible method because I do not know enough about the views of the agronomists in order to ask inflexible questions. I selected the qualitative research method, as in this way I want to accomplish objectives of my research project so as to resolve the problem formulation and research questions. In this way, I would be able to explore how the agronomists recognize, react and evaluate regarding the ongoing debate about the global livestock production, and accordingly give their viewpoint and valuable suggestions on the basis of their personal experiences and knowledge by face to face semi-structured interviews.

2.3 The selection process of interviewees (agronomists):

Interview selection process mainly depends upon the meaningful and concise representative sampling. This sort of concise representative sampling picks cases that could be in-depth studied and comprise of ample knowhow and information (Hoepfl,2007).Different interviewees(agronomists) pertaining to this case-study were selected mainly due to following reasons.

Firstly, on account of the particular professional positions of the interviewees being relevant to this project such as the Agronomists (Animal husbandry advisors at MS), Climate expert on livestock activities in LRF (The Federations of Swedish Farmers) in Stockholm, Teaching staff and researchers of the Department of Animal Nutrition and management at Kungsängen Research Centre, SLU, Uppsala and some students of the Master of Animal Science Program at SLU, Uppsala. Secondly, because of their direct contact with the farmers and general people from the society of Sweden. Thirdly, because of their direct contact with the research activities and media. The selected interviewees were contacted by e-mail. Those e-mails comprised of the short description of research along with the request to cooperate in this respect. However, some interviewees were also contacted by telephonic communication due to their very busy schedule.

Selective participants(respondents)	Specific positions of the respondents	Municipality
Interviewee 1	Agronomist(Animal husbandry advisor at MS).Victoria Thiuller	Storvik
Interviewee 2	Agronomist(Animal husbandry advisor at MS). Kristina Dieden	Orebro
Interviewee 3	Two(2)Agronomists(Animal husbandry advisors at MS) (1) Stina Stabo (2) Sofia Ang	Uppsala
Interviewee 4	Climate-expert, Livestock activities in LRF (The Federation of Swedish Farmers). Hilda Runsten	Stockholm
Interviewee 5	Associate Professor, Department,Animal nutrition&managent,SLU. Dr.Maria Nail,	Uppsala
Interviewee 6	Associate Professor , Department of Animal Science and Expert grazing of livestock animals ,SLU, Dr.Eva Sporndly	Uppsala
Interviewee 7	Professor, Department of Animal Nutrition and Management and Expert methane emission, SLU. Dr. Jan Bertilsson	Uppsala
Interviewee 8	Group of Students, Master of Animal Science, SLU. 1. Fredika Lindgren 2.Rebecca Johnson 3.Stina Hellman	Uppsala
Interviewee 9	Student , Master of Animal Science, SLU, Anna Shogae	Uppsala
Interviewee 10	Student, Master of Animal Science, SLU. Felicia Anderson	Uppsala
Interviewee 11	Former Student, Master of Animal science, SLU. Working at the section of Equine studies, SLU, Therese Lundqvist	Uppsala

2.4 Process of data collection:

Face-to-face interviews as well as telephonic interviews were conducted within the limited time frame from 50 to 80 minutes. All interviews were recorded by a tape recorder by adjustment with interviewees. The researcher can give his full concentration to listen the perspective of interviewee, when the interview is being recorded. Moreover, it is most efficient and reliable source of data collection than written notes (Hoepfl, 2007). During the analysis pertaining to collected data high level of proficiency is required, as the raw data have to be organized into identified sections. Then, the data have to be reviewed, compared and ultimately communicated to the reader (Hoepfl, 2007). The precise perspective of the informants (agronomists) will be given and discussed in chapter #4 (Results and discussion).

3.00 Theoretical framework:

3.1 Theory of Reflexive modernization and risk society: towards a new modernity:

I am applying the theory of 'Reflexive modernization and risk society' presented by Beck and associates (1994) on my case-study regarding 'the impact of livestock sector's activities and meat production on the environment and societal life of Swedish people'. 'Reflexive' here means something that applies to itself. And 'modernization' is the historical process of displacing the premodernity period of old wisdom and traditional cultural life by adopting the modern ways or ideas suited to the contemporary needs of life. 'Modernity' denotes the generalizable modern social conditions and experiences without mentioning any particular chronological references (Harrington, 2005). In other words modernity is that type of ongoing renewal in which past is replaced by a globalized present and where a condition of constant social transformation is necessarily involved. Beck states that: "*Just as modernization dissolved the structure of feudal society in the nineteenth century and produced the industrial society, modernization today is dissolving industrial society and another modernity is coming into being*" (Beck, 1986).

The above mentioned theory of 'reflexive modernization and risk society' describes and concentrates on different historical phases such as premodernity (feudal society), modernity/ primary modernity (industrial society and subsequently the risk society), new or second modernity (aimed at risk management). Moreover, modernity involves a transformation process amongst each of the above mentioned phases. Hence, it is apparent that during the initial transformation process, the structure of feudal society was displaced by the industrial society that subsequently produced the so called risk society. Likewise, to deal with the hazards of risk society, another transformation process as a result of reflexive modernization is operating between the primary modernity (that resulted in risk society) and the second modernity (aimed at risk management). The above mentioned theory is certainly of great significance with respect to the livestock sector related such problems that are indicative of risks for the society. The risks in this case for example appearing due to red meat production and consumption as a result of modernization are supposed to be rectified by the agronomists with appropriate measures taken through coordination of requisite technical knowledge.

Giddens argues that in premodern societies reflexivity was subordinated to the interpretation of tradition, which was passed on without transformation. With modernity, the interpretation of tradition is replaced by reflexivity: "*The reflexivity of modern social life consists in the fact that social practices are constantly examined and reformed in the light of incoming information about those very practices, thus constitutively altering their character*"

(Giddens 1990:38 in 'Modern social theory' by Harrington, 2005).

Beck argues that the current form of modernity is specially shaped by the social impact of risk. What the term 'risk society' draws attention to is less a logic of modernity than a catastrophe inherent in modernity generated by the resources and liabilities of technology. The primary function of the state in

this 'second modernity' is to deal with the societal consequences of risk, which have been engendered by primary modernization. (Beck, 1986 in 'Modern Social Theory' by Harrington, 2005). Risk for Beck is not strictly the same as physical danger or natural hazard. It does not come from nature alone. It derives primarily from society and is essentially human-made. More specifically, risk derives from science and technology. (Beck 1986:21, in 'Modern Social Theory' by Harrington, 2005).

Beck also comments that, the risk society tends to encourage new forms of politics. Risk induces reflexivity because there are no certain answers to its problems; consequently the collapse of the self-legitimation of expertise. The risk society in this sense is a 'discourse society' (Beck 1986: 128-9, in 'Modern Social Theory' by Harrington, 2005). By this Beck means the public contestation of scientific claims and the clash of lay and expert voices. Reflexive modernity is thus a condition in which science is now applied to science, by public actors as well as by experts. (Beck 1986, in 'Modern Social Theory' by Harrington, 2005).

I am connecting the above mentioned theory here, because the risks that occur due to livestock activities (red meat and dairy production) are also not similar to physical dangers or natural hazards and do not come from nature alone. All these risks derive initially from society and the latest knowledge about science and technology, and are essentially human-made, as well. Accordingly, the theory of 'reflexive modernization and risk society' applies here as the agronomists having the advanced scientific knowledge and technology to maximize the production of red meat as a result of modernization process are generally involved in creating risks for the society, worldwide.

However, at the same time the experts are certainly aware of their changing role during the 'second modernity' to deal with the societal consequences of risks produced by 'primary modernization'. Therefore, these actors here keeping in view the reflexivity of modern social life are supposed to constantly examine the social practices and problems in order to reshape them in the light of incoming information relevant to that situation. Accordingly, the agronomists being the experts would play their role in sociotechnical system of livestock production for risk management through coordination of the requisite knowledge.

Now I want to raise the following questions that how the agronomists make sense of the critique about livestock production as addressed in the 'Livestock's long shadow' report and how much the livestock sector would show flexibility for the change by going through this transition.

Question 1: Whether social transformation will take place as described in the theory of 'reflexive modernization and risk society', if the agronomists being experts with the help of politicians would focus on producing the alternative food sources in reasonable quantities along with red meat production?

Question 2: Whether social transformation will take place as pointed out in the above mentioned theory, if the agronomists as experts would give their suggestions to politicians regarding change in food habits so as to ask the people to include alternative food sources in their daily diet along with red meat?

Such social transformations aimed for 'modernity' within the existing 'industrial society' would help to improve the environment as well as the health of people. Accordingly, I have developed a questionnaire for the interview of agronomists on the following research questions during my case-study.

Question 1: What the interviewed agronomists have recognized about the ongoing debate?

Question 2: What are the contents of the ongoing debate?

Question 3: How they give value to this ongoing debate?

Question 4: How they react and give their suggestions regarding this ongoing debate?

Consequently, the results of this case-study would certainly indicate how the agronomists are recognizing, giving value and showing their reactions to this debate, while giving their viewpoint and suggestions that could be much beneficial for the environment, health and societal life of Swedish people.

4. Results and discussion:

4.1 Introduction:

The results are being discussed in this section of the study. The aim here is to give a clear and precise review regarding the ongoing debate about the livestock sector's activities including meat production and the consequent impact upon the environment and society of Sweden. The first part covers, how much importance is given to the ongoing activities by the agronomists as indicated by their perspective, followed by a brief description of their viewpoint regarding different matters relevant to this case-study. Further discussion is regarding the possibilities of motivating the people regarding the change of food habits, so as to include the plant source protein dishes and white meat of chickens in their daily diet as an alternative to red meat of cattle in order to reduce meat consumption. Moreover, as a result of increasing livestock production, decreasing meat consumption and change in the Swedish legislation regarding livestock production, the import of meat for human consumption as well as the import of soyabean for animal feed could be cut short.

4.2 Overall perspective of the interviewed persons (agronomists) in response to the research questions regarding the critique from 'Livestock's long shadow' report:

In this section, I will discuss how the interviewed persons perceive the debate about livestock production and environmental problems, so as to further understand their role as experts in the livestock production sector. When examining the interviews it becomes apparent that the interviewed agronomists have recognized that the livestock production sector is criticized for its contributions to various environmental problems affecting the climate and health of people. However, the agronomists also argue that these problems are less apparent in Sweden than in other parts of the world. It seems as the agronomists have read or heard the critic arguing that livestock production generates a diverse range of problems. While they interpret that the critic is more directed to livestock production in other countries and contexts than their own country.

The agronomists while evaluating the situation however indicate that Sweden is indirectly responsible for deforestation of Brazil and some other developing countries by importing soyabean and red meat from those countries. The interviewed persons further give some suggestions such as increasing the livestock production in Sweden as well as decreasing the meat consumption in the country through changing the food habits of the people so as to reduce the import of red meat from other countries.

One of the agronomists during interview said: /.../ "There are several environmental problems such as air and water pollution, deforestation and loss of biodiversity observed in the world, which are directly connected with livestock farming. But generally, I can say in Sweden, we do not have any harmful effect upon the environment /.../ as we have strict laws and regulations in Sweden. /.../ That is why, we are practicing much limited crop production side by side with other agricultural and livestock activities in Sweden. However, water pollution in Baltic Sea has been rampant with intensive agricultural practices of other European countries such as Poland and Russia for about 10-15 years, while Sweden is not so much involved in this regard."

Another interviewed person is reflecting about the advantages and problems that would appear if the Swedish production system was transformed into more production efficient system: *“If we grow cattle at a faster rate using some synthetic amino acids, antibiotics and hormones, we can achieve the desirable target of enhanced body weight quite easily. However, that meat will be neither wholesome nor tasty, as well as this system would result in more emission of methane and other gases as compared to past.”/.../*

Another agronomist said: *“The expansion of livestock activities are considered as one of the key environmental hazards frequently noticed in the developing countries particularly in Brazil, Argentina and some other countries of world. Whereas, in Sweden there has been very little water pollution problems in lakes due to grazing of livestock in the surrounding area, and the problem of environmental pollution is further relieved by the utilization of animal manure for biogas production.”*

Another respondent (climate expert) remarked: *“We do not have any deforestation problem due to either livestock farming or agricultural activities as we are very much strict about the replantation of forest trees.”/.../*

One of the respondents (expert of LRF organization) said: *“I think, Sweden and other developed countries are indirectly responsible for the problems such as deforestation in Brazil, Argentina and other South American countries due to ongoing livestock activities, because we are importing soyabean from these countries at the cheaper rates. However, nowadays, Swedish government is planning not to import further soyabean from Brazil and other South American countries and instead to give more preference to grow other grasses and fodder crops within Sweden.”*

One of the agronomists said: *“Nowadays, we are importing red meat from Brazil and some other developing countries as the meat consumption in Sweden has been increased by almost 40% since 1990. Therefore, Sweden is also indirectly involved in the expansion of the ongoing livestock activities worldwide because of importing red meat from other countries.”*

Likewise, another agronomist remarked: *“I think, as the red meat consumption is continuously increasing in Sweden, the people are demanding further meat in their diet. On the other hand, production cost concerning the livestock sector is going up and the number of animals is also decreasing day by day, accordingly, the red meat production will also go down./.../ Therefore, we should increase our beef cattle within the safe limits,/.../ as these are the essential components of our economy and agriculture.”*

Another agronomist commented: *“Most of our land already consists of forest trees, hence we cannot utilize that land for crop and livestock production. Moreover, the farmers have to obey the relevant regulations, strictly. Some of our farmers have already quitted the livestock production as the production cost is going up and they do not get reasonable profit from this sector. Therefore, the government should give incentives to provide relief to farmers, so that they are able to rear the cattle in higher number.”*

One of the agronomists suggested: *“We should /.../ increase our livestock production as compared to past, as now the number of our cattle is decreasing and we are importing meat from other countries. In addition to that, we also need to change our food habits such as to eat hamburgers of small size rather than of big size. Moreover, if we want to reduce the adverse effects of the ongoing livestock sector’s activities,/.../ we should reduce the consumption of red meat and dairy products on priority basis. While, the role of electronic and print media can also be very effective to change the attitude and behaviour of people.”/.../*

Another agronomist proposed: *“We require enough land area for growing the fodder crops in order to fulfill the requirement of our livestock. However, it is my personal opinion that we should*

also develop our poultry farming on priority basis in the near future. Accordingly, we will have to import the broilers breeds of chickens /.../ for white meat production. Hopefully, in this way we can also reduce the emission of methane and other greenhouse gases in the environment. Moreover, people must change their food habits and should include the plant source protein dishes in their diet besides those prepared from red meat.”

Now, I will briefly describe the analysis as perceived from the interviews of the agronomists regarding various research questions about the critique from ‘Livestock’s long shadow’ report. It is however, to be mentioned that the results and discussions are merely based on the interview quotes of agronomists rather than using any direct statistical data.

As regards the research question, what they have recognized about the ongoing debate, the respondents appear to have sufficient awareness regarding the possible impacts of the expansion of livestock sector’s activities on the environmental changes and human health, worldwide. They are of the opinion, however, that such problems have not been observed as such in Sweden, whereas frequently reported for other countries, specifically the developing countries, most probably because of the expansion of livestock activities and deforestation. This raises some questions about how they see their own role: Do they consider themselves, in their role as livestock production experts, to be responsible for contributing to change the global production system, or does their view that the problems are caused elsewhere make them think, this is not their responsibility? The possible interpretation of second quote above could be that agronomist thinks she has already taken her responsibility when not pushing the existing production system in the direction of more production efficient system.

In response to the research question that, what are the contents of the ongoing debate from their perspective, the main global environmental problems indentified by the agronomists include: air and water pollution, hazards of biodiversity survival such as deforestation and overexploitation of fish population that are directly connected with livestock farming. However, the above referred environmental hazards are not as such a problem for Sweden, because of strict laws and regulations in this country being directly related to environment, agriculture, animal welfare and livestock farming. For example, it is evident from the third quote above that animal manure related environmental pollution problem in Sweden, that could be relieved by utilizing it for biogas production.

Regarding the research question that, how the agronomists give value to the ongoing issue, the respondents are of the view that there is no such problem as deforestation in Sweden due to either livestock farming or agricultural activities. However, the country is considered to be indirectly responsible for the deforestation and expansion of the ongoing livestock activities of Brazil and other South American countries. That is because of importing the soyabean for use in cattle feed as well as the import of red meat for human consumption from those countries. The agronomists further add that consumption of red meat has been increased by almost 40 percent since 1990 in Sweden, whereas the production cost relating to livestock has been going up and some of the farmers have already quitted the livestock production as they do not get reasonable profit from this sector. Hence, the number of animals is continuously decreasing as well as the red meat production, thus necessitating the import of red meat to fulfill the rising demand of the meat for the people in the country.

The above mentioned issues as pointed out in fifth, sixth, seventh and eighth quotes above show the concern of agronomists who probably observe all that in the direction for development of ‘risk society’. Accordingly, in view of such challenges they suggest to find other alternatives to soyabean and to increase livestock production in Sweden for ‘risk management’ instead of importing soyabean and red meat from other countries. Likewise, they also propose that Swedish government should give incentives, to provide relief to the farmers so that they are able

to increase the number of cattle. However, they have not mentioned the nature of such incentives, perhaps they mean that such incentive could be in the form of subsidy given to the farmers or some relaxations in the existing regulations related to livestock production.

With respect to the research question that, how agronomists react and give their suggestions regarding this ongoing debate, they appear to react positively, while giving very sound and useful suggestions to improve the situation in Sweden in that regard. The agronomists, in general, show almost similar reaction that red meat consumption of the people in Sweden is continuously increasing, while the number of cattle is decreasing and consequently red meat is being imported from other countries. The ninth quote is very interesting in the sense that the agronomist appears to have recognized the problems pointed out in the 'livestock's long shadow' report and as a response she suggests to increase livestock production in Sweden and to decrease meat consumption, as well. I guess that although she is herself responsible for knowledge production in the Swedish livestock production chain, she does not clearly suggest that she should recommend changes to farmers or that politicians should change the regulation of livestock production. The suggestion is to increase production which would create more jobs for her and her clients (farmers) and reduce meat consumption which is not within her mandate or responsibility. The tenth quote in addition to other points does focus on the development of poultry farming on priority basis but it does not show whose responsibility it is to create this change. It is interesting that the agronomists think the change is necessary. Although, they are important part of the knowledge system of agriculture, they do not take on the responsibility themselves neither identify any other key actor, but hope that 'information' will change the 'attitudes', ultimately leading to change the 'society'.

The suggestions of the agronomists for increasing red meat production in Sweden are:

(1)The agronomists consider the beef cattle as the essential components of their economy and agriculture, and accordingly suggest to increase their number within the safe limits so as to improve the existing situation of red meat production in the country and to facilitate reducing its import from other countries.

(2)The Swedish government should give incentives to provide relief to farmers so that they are able to rear the cattle in higher number. Moreover, some suitable alternatives to soyabean for use in the animal feed should be found instead of importing it from other countries.

The suggestions of the agronomists for change of food habits to decrease the red meat consumption are:

(1)The Swedish people should eat small size hamburgers rather than of big size. The people should also include plant source protein dishes as an alternative for animal source protein dishes particularly the red meat as that is considered to show adverse effects on human health especially the obesity syndrome.

(2)Moreover, the politicians as well as the relevant institutions such as food industry and private enterprises should seriously consider promoting poultry farming on priority basis for the production of white meat of chickens as an alternative to red meat of cattle. The poultry farming is also considered to have less adverse effect on the environment relative to cattle farming activities for the production of red meat. At the same time, the role of electronic and print media would prove very helpful to convince the Swedish people in this regard.

4.3 Viewpoint of the farmers regarding this ongoing debate:

I will briefly describe here the perspective of agronomists expressing indirectly the viewpoint of farmers concerning the ongoing debate about livestock sector's activities and the related

problems. According to the interviewed agronomists the farmers are nowadays living at very hard position and are not happy with the strict regulations regarding animal housing specifications and other related matters.

One of the agronomists said: “Farmers are keeping the animals in this planet from so many years/.../ that provide meat, milk, butter/.../ etc., in order to fulfill the dietary requirements of people. Therefore, the farmers do not think of stopping altogether the meat production in future, as it is their main business. According to them, animals alone are not creating air and water pollution, but the vehicles /.../ and various industries are also causing the environmental pollutions. Therefore, the authors of ‘Livestock’s long shadow’ report and media personnel should also keep these environmental problems in their mind. However, lots of Swedish farmers are also admitting that the cattle as a result of grazing are creating some environmental problems for human beings.”

The group of two agronomists expressed their joint perspective, “The farmers keep the animals on this landscape in order to increase the production of meat and other livestock products. Some of the farmers want to be self-sufficient in meat production, so that there is no need to import meat from other countries. However, some farmers also realize about the Swedish government’s strict regulations, /.../ mostly concerning with the construction of sheds for the rearing of animals. Therefore, /.../ farmers are expecting some favourable relaxations and changes instead of the current laws.”/.../

Another respondent (climate expert) from LRF organization (NGO) said: “Farmers are nowadays, living at really very hard position. When the people ask them regarding the active role of their cattle, pigs and other animals in creating serious problems for the environment, while the farmers do not deny this fact, they further respond that no one comments with respect to very harmful impact of the fossil fuel used for transportation.” The respondent continued that their organization is working nowadays, on this ongoing debate and finding ways of communicating the /.../ society for the welfare of the farmers.

I will now briefly describe my analysis as perceived from the interviewed agronomists. The farmers consider the livestock production as their main business and do not indicate any intention of entirely stopping the red meat production, in future. Some of them like to increase meat production so as to be self-sufficient in this respect instead of importing it from other countries. However, at the same time they also realize the Swedish government’s strict regulations regarding animal housing specifications and expect some favourable relaxations in the current laws. The farmers admit that although animals create environmental problems, the vehicles and various industries using fossil fuel are also causing the environmental pollutions. Hence, their viewpoint most probably justifies that the critics of ongoing debate including media personnel should also highlight this category of factors causing environmental pollution.

4.4 Viewpoint of agronomists regarding organic meat farming in Sweden:

I will briefly describe here the viewpoint of interviewed agronomists about organic meat farming in Sweden. It is obvious from the interviews of the agronomists that in organic meat farming the animals are fed using native crops and grasses instead of using imported feeds such as soyabean for them. It is, in general, considered better for environment as well as for the survival of biodiversity. Moreover, in case of organic farming the agro-chemicals such as fertilizers, pesticides and weedicides are usually not used. Therefore, on the one hand the crop yield would certainly be less but on the other, there are less chances of water pollution in Baltic Sea.

One of the agronomists said: /.../ “In organic farming, we are feeding the animals using our own crops and grasses and need not to purchase any imported feeds such as soyabeans for them.

Organic farming is also better for environment but it depends upon the type of grasses or crops used, as some of them emit less ammonia, nitrous oxide and carbon dioxide gases. It is also better for the survival of biodiversity, as we do not use pesticides in organic farming and hence, no adverse impact on the insects and butterflies.”

Another agronomist commented: “Almost only 15% farmers are practicing organic farming for red meat production, as it may not be so economical and profitable in beginning but later on it could be better for the animal welfare as well as for the farmers and environment in Sweden. However, the consumers have to pay higher prices for the purchase of organic meat. We do not use antibiotics, hormones and synthetic amino acids in Sweden, keeping in view the welfare of animals in organic as well as conventional meat farming.”/.../

Another agronomist remarked: /.../ “The organic farming is at disadvantage, however, if the good quality native forages or grasses are not available for the grazing of animals. It could give rise to a sort of digestion problem with an adverse effect on the welfare of animals and eventually a considerable reduction in meat production.”

Another agronomist said: /.../ “In case of organic farming, as we usually do not use fertilizers, pesticides and weedicides, there would be undoubtedly less crop yield but at the same time less chances of water pollution in Baltic Sea.”

Another respondent commented: “I think, there is a need to make some changes in our existing legislations, so that the Swedish government should allow the farmers to keep their cattle outside the animal sheds during the summer season. It would help to improve the meat production potential of such organic animals in future. Moreover, the grazing of animals in open and free environment will also be beneficial for the welfare and health of animals.”

I would now briefly outline my analysis about the organic meat farming in Sweden perceived from the interviews of agronomists. The organic meat farming appears to be in the initial stage and being practiced at present by almost 15 percent farmers in Sweden. It is supposed to be less economical and profitable in the beginning, however, with the passage of time it could prove better for the animal welfare, farmers and the environment. Moreover, the organic meat is claimed to be relatively costly for the consumers. Now the question arises that, what are the contributing factors that make the organic meat farming relatively better for animal welfare, survival of biodiversity, farmers and the environment in spite of the fact that products such as antibiotics, hormones and synthetic amino acids are apparently not used in the organic as well as conventional meat farming in Sweden in view of the animal welfare. It seems that profit of farmers in organic meat farming is likely to reduce by the lower crop yields and to increase by the higher prices of organic meat. Organic meat farming is at advantage for better survival of biodiversity due to disuse of pesticides, for less chances of water pollution because of not using agro-chemicals and for better environment if such type of grasses and crops are used which emit less ammonia, nitrous oxide and carbon dioxide gases, and for better animal welfare due to grazing of animals in open and free environment.

Moreover, various interview quotes while providing quite interesting and useful information regarding organic meat farming, also present somewhat conflicting views and opinions concerning the operational details and procedures. One quote for instance indicates that organic farming is at disadvantage if good quality grasses are not available for grazing of animals, thereby giving rise to a sort of digestion problem, with an adverse effect on the welfare of animals and on the meat production, as well. Another quote while being in favour of keeping the cattle outside the animal sheds during summer claimed that it would help to improve the meat production potential, and moreover the grazing of animals in open and free environments will also be beneficial for the welfare and health of animals.

4.5 Viewpoint of the people regarding meat production in Sweden:

According to the interviewed agronomists most of the people in Sweden consider the Swedish meat much better with respect to good hygienic standard as compared with the imported meat and favour to increase its production in future rather than to import it. Mostly the people in Sweden are of the view that beef production activities are not good for the environment as well as the human health.

One of the agronomists commented: *“Majority of the people consider the Swedish meat much better in terms of good hygienic standard due to strict regulations of Swedish government as compared to the imported meat. Most of the people in Sweden are in favour of excessive red meat production in future in order to reduce the import of meat from other countries.”/.../*

Whereas, another agronomist said: *“The people in Sweden, generally give due importance to the ongoing discussion regarding the meat production and the consequent impact on the climatic changes. Hence, mostly people in Sweden have a perspective that beef production activities are not good for the environment as well as the human health. However, if they include the red meat in their daily diet, then they should buy only the Swedish meat. Whereas, when the people go to grocery stores, /.../ most of them usually select the cheaper meat being imported,/.../ because of the high prices of Swedish meat and probably due to low salaries of the consumers also./.../*

Now, I will give my brief analysis as recognized from the interviews of the agronomists. The people of Sweden, in general, regard the Swedish meat much superior in quality and hygienic standard relative to the imported meat, and that is certainly attributed to strict regulations of Swedish government. According to them, the Swedish people believe in excessive beef production in the country so as to curtail its import in future. In contrast to that Swedish people, in general, are also very conscious of the ongoing discussion regarding meat production related problems and consider such activities unwholesome for the environment and human health. The interviewed agronomist further reveals an interesting but paradoxical point that although people consider Swedish meat relatively superior in quality, but while going to grocery stores mostly purchase the cheaper imported meat.

4.6 Viewpoint of the agronomists regarding concerns of the farmers over the strict regulations about livestock farming in Sweden:

In this section, the interviewed agronomists, while giving their own viewpoint also indirectly express the concerns and feelings of the farmers regarding this specific issue. According to the agronomists it appears that the farmers are having some concerns over the inflexible legislations regarding livestock farming and the other connected issues. The farmers feel that they do not earn much profit from this business, as the government is also not taking care of their interests. Hence, many of them seriously think about quitting the livestock farming business in the near future.

One of the agronomists remarked: *“We have to obey very strict legislations concerning the livestock farming in Sweden. According to law, we need to provide sheds for animals in the form of standard buildings with specific measurements. Moreover, during the inspection of animal buildings, if inspectors find any minor irregularity or mistake regarding the construction standards, they can impose heavy fine to the farmers. On account of that, now the farmers are having some concerns over these inflexible legislations regarding livestock farming and all other connected issues”.*

Another agronomist said: *“The farmers/.../ realize that, they do not earn much profit from this enterprise and the government is also not taking any care of their interests. The farmers want agreement with the government /.../ to keep their animals in open places /.../ during the summer season, and /.../ are demanding some changes in the law for keeping the animals in open places. Most*

of the farmers seriously think about quitting this business and if the scenario is the same, then probably the last farmer of Sweden will also quit this business until 2052”.

Another agronomist commented: “The problem in Sweden is that, we have also some very small farmers having just 5-10 cattle, and they get very less payments from EU-funding, which is insufficient for the construction of ideal animal buildings which are quite expensive, too. In addition to that, the rules and regulations pertaining to construction of animal buildings are very strict, so that the farmers are also not allowed to keep their animals outside. Moreover, the number of slaughter houses is decreasing day by day, ultimately leading to increase the unemployment. In case, the strict regulations continue in future the livestock farming business will depend upon the attitude and interest of new farmers who enter in this business as well as on that of the existing farmers.”/.../

Now, I will briefly present my analysis regarding above mentioned subject as perceived from the interviewed agronomists. The agronomists are of the view that majority of the farmers are not much satisfied with their ongoing livestock farming business, apparently due to strict regulations about livestock farming particularly with reference to construction of animal sheds in the form of standard buildings with specific measurements. Accordingly, if the inspectors find any minor irregularity regarding the construction standards during the inspection, they can impose heavy fine to the farmers. Hence, the farmers are demanding some changes in law for keeping animals in open places during the summer season. Moreover, the small farmers having just 5-10 cattle also face the problem of getting insufficient payments for the construction of ideal animal buildings from EU-funding. Furthermore, they appear to be much worried about the future of the slaughter houses in the country as their number is continuously decreasing, ultimately leading to increase the unemployment. In short, the agronomists realize that livestock farming business in future will depend upon the attitude and interest of the newcomers as well as the existing farmers.

4.7 Viewpoint of agronomists concerning the changes in attitude, behaviour and food habits of the people of Sweden:

According to the interviewed agronomists the red meat is certainly very important for human health, as it contains a number of essential nutrients in relatively higher proportion, but the actual problem is that people consume too much meat as compared to other foods, particularly as a result of certain advertisements. They further comment that it is really very difficult to change the existing habits of the people immediately as it is a gradual changing process. Accordingly, they give some suggestions in this respect to improve the present situation.

The viewpoint of one of the agronomists was: *“Red meat is no doubt very essential for human health as it contains relatively higher composition of fatty acids, proteins, vitamins and minerals particularly iron as compared to other food sources .But the real problem is that people are eating too much red meat as compared to other foods. In addition to that every week a new cook book and a new recipe relevant to meat are being added. Eventually, the people are buying too much red meat in order to prepare these dishes.”*

Likewise another agronomist remarked: *“Obesity has started to appear as a major global problem especially in developed countries .Furthermore, it is really very hard to change the existing habits of the people immediately and certainly it would take almost 10-30 years /.../ to change the attitude and behaviour of the people./.../ Therefore, the Swedish government should increase the prices of red meat at a much higher level so that the majority of people are not able to purchase the meat easily, hence, the people would possibly change their food habits.”*

Another agronomist suggested: *“Swedish government can put warning labels and stickers on the meat cans and packets similarly as on the cigarette packs, such as, ‘you should not eat this meat as the activities involved during its production are injurious for the environment and climate of the world, as*

well as, it is a major cause of obesity and heart diseases among human beings'. Moreover, the politicians can play an important role, /.../ if they ask the people to change their food habits on priority basis and voluntarily instead of changing them forcibly, particularly as our politicians as well as the people already recognize this matter."/.../

The suggestion of another agronomist was: *"I think, it is very hard to change the food habits of the people immediately, rather we should change our strategy. As we all know the cattle emit methane gas which is not good for the environment, therefore we should keep them on limited scale just for production of milk and other dairy products. As regards, meat production we should side by side develop our poultry farming on an emergency basis, /.../ to fulfill the requirement of proteins. Hopefully, this white meat could be a good alternative of red meat from the human health point of view. Moreover, chickens are much less harmful for the environment and climate of the world as compared to cattle."*

I will now briefly describe my analysis on the basis of interviews of the agronomists. The intake of red meat in reasonable amount so as to balance the human diet acts as growth promoter and is definitely beneficial for the human health, whereas, too much consumption of that meat is considered to be the cause of certain severe health problems including obesity. They also realize that it is very hard to change the existing food habits of the people instantly, rather it is a time consuming process to change the attitude and behaviour of the people.

One of the suggestions in this respect was that Swedish government should increase the red meat prices at such a high level that majority of people being unable to purchase the meat would possibly change their food habit. Another suggestion was regarding putting of warning labels on the red meat packets by the Swedish government such as alerting the people not to consume it as the activities involved during its production exert negative impact on the environment and climate worldwide, as well as it is the major cause of obesity and heart diseases among human beings. Likewise, it is suggested that politicians being the influential personalities can advise and influence the people to change their food habits on priority basis and voluntarily, particularly in view of the great significance of the matter. It was also suggested that we should develop poultry farming on an emergency basis for producing the white meat of chicken to fulfill the protein requirement and that could prove a good alternative of red meat from human health point of view, as well. Moreover, poultry farming is considered to be relatively less harmful for the global environment and climate in comparison to cattle farming. Amongst the various suggestions given above, however, the first suggestion for making a drastic increase in the red meat prices by the Swedish government appears to compel the people to change their food habits forcibly.

5. Conclusions:

The main aim of this study is to investigate how the Swedish agronomists (advisors of Animal husbandry department) relate and respond to the ongoing controversial debate regarding the livestock activities including red meat production about the risks with global livestock production and accordingly give their suggestions for the risk management. For this purpose, the research questions used in this study are:

Question 1: What the interviewed agronomists have recognized about the ongoing debate?

Question 2: What are the contents of this ongoing debate from their perspective?

Question 3: How they give value to this ongoing debate?

Question 4: How they react and give their suggestions regarding this ongoing debate?

These questions have been answered by the interviewed agronomists during the interview session of this study.

In this section, I present the conclusions of my case-study drawn out of the results interpreted from the quotes of the interviewed persons. The viewpoint of the agronomists in the form of interview quotes has obviously been given in response to various research questions asked regarding the critique from 'Livestock's long shadow' report concerning the livestock sector's activities (red meat and dairy production) and the related problems. It is, however, worth consideration that the results and discussion as well as the conclusions are based only on the data recorded as interview quotes of the interviewed agronomists, who give their own perspective and occasionally present indirectly the viewpoint of the farmers and general citizens or consumers, rather than any direct statistical data.

The interviewed agronomists are aware of the ongoing debate and they acknowledge that many of the problems and issues raised in the 'Livestock's long shadow' report are quite relevant and need to be addressed on the global level. They do recognize problems with the production but argue that these problems are caused by the production in other countries than Sweden. However, they do not consider that there is any need for substantial changes in the livestock production system in Sweden. These interviews do not show any indication that any of agronomists have themselves made significant changes in their own activities. Red meat consumption has continuously been increasing while its production decreasing in Sweden, thus necessitating the import of meat from other countries. Sweden is considered to be indirectly responsible for the deforestation and expansion of livestock activities in Brazil and some other countries because of importing soyabean for cattle feed and red meat for human consumption from those countries.

We can connect this point with the theory of 'Reflexive modernization and risk society' presented by Beck and associates (1994) as: "*Just as modernization dissolved the structure of feudal society and*

produced the industrial society, modernization today is dissolving industrial society and another modernity is coming into being." (Beck, 1986:10, in 'Modern Social Theory' by Harrington, 2005).

The agronomists rather than suggesting a decrease in the Swedish production system, suggest an increase of livestock production in Sweden, however, within the safe limits in order to decrease the import of red meat in the country and at the same time not creating risks for the society. Moreover, it would also decrease the livestock production and consequently facilitating risk management in countries considered as the main contributors to certain environmental problems.

This point could be linked with the theory of Beck about the sense of risk for the society that, risk is not strictly the same as physical danger or natural hazard. It does not come from nature alone. It derives primarily from society and is essentially human-made. More specifically, risk derives from science and technology (Beck 1986:21, in 'Modern Social Theory' by Harrington, 2005).

The agronomists also suggest that government should give incentives to provide relief to the farmers, so that they are able to rear the cattle in higher number. They argue that decrease in red meat consumption side by side with increase in livestock production would help to reduce the import of meat in the country. They suggest different measures in this respect to change the food habits of people such as eating the small size hamburgers rather than of big size, including plant source protein dishes as an alternative of animal source protein dishes particularly the red meat, promoting poultry farming for producing white meat of chicken as an alternative of red meat of cattle, advertising on electronic and print media to convince the Swedish people in this regard, increasing the red meat prices at a much higher level and putting of warning labels on the red meat packets. It is also worth noticing that these changes are not within their responsibility.

One of the problems the interviewed persons do acknowledge and relate to the Swedish production is the use of soyabean in the livestock feed. They indicate that the Swedish contribution to biodiversity loss due to soyabean production in other countries will decrease due to steps taken by Swedish government and hope that national legislation will be changed to support alternative production system for solution of the problem. Accordingly, they do not clearly express, it is within their own role as knowledge producers to create this change through changing their advices to the producers in a risk society.

The agronomists expressing the viewpoint of farmers further comment that farmers do not think of stopping altogether the red meat production in future as it is their main business. However, the farmers have some concerns over the very strict and inflexible regulations regarding livestock farming in Sweden and accordingly want some relaxations in the existing regulations by the Swedish government to be self-sufficient in meat production. The interviewed agronomists identify the consumers as being responsible for changing the production system. They perceive that many consumers act paradoxically, when on one hand criticize the livestock production, at the same time demand cheap meat.

This may be linked with the statement about risk society and second modernity that, what the term 'risk society' draws attention to is less a logic of modernity than a catastrophe inherent in modernity generated by the resources and liabilities of technology. The primary function of the state in this 'second modernity' is to deal with the societal consequences of risk, which have been engendered by primary modernization (Beck, 1986 in 'Modern Social Theory' by Harrington, 2005).

It is worth consideration that the agronomists specialized in animal husbandry are aware of and to a large extent agree with the criticism about global livestock production system. However, they do not perceive themselves as adopting the role of 'coordinating risks' through their expert knowledge, rather they consider the politicians and consumers for contributing to make such changes.

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Appendix: 1

Interview Questions asked from the Agronomists for research project:-

- (1) What position do you have nowadays?
- (2) What are your current tasks nowadays?
- (3) Who are your clients and what are the major concerns of your clients?
- (4) What type of help you are providing to your clients?
- (5) What will be the major constraints for meat production during the next ten years?
- (6) What is your experience, as how the people in Sweden do think about meat production?
- (7) What do you think about the consequences of the 'livestock's long shadow' report on the reputation of meat production?
- (8) How do you think about your client's perception about this ongoing debate?
- (9) How do you think, whether the ongoing livestock activities are nowadays creating any serious problems for the environment of the Sweden and what will be their ultimate consequences in future?
 - (a) What types of harmful effects arise due to livestock manures?
 - (b) What do you suggest to overcome this problem?
- (10) Do you think the organic meat farming is vital for Swedish society as well as environment?
- (11) What is your perspective, whether the people in near future can change their food habits resulting in less consumption of red meat, if human nutrition experts prescribe any suitable alternative plant source protein rich food?
- (12) Do you think red meat is good for human health?
- (13) How do you think, whether the ongoing livestock activities would be a threat for biodiversity conservation especially overexploitation of fish population and deforestation in Sweden or not?
- (14) What is your opinion regarding, how farmers are generally thinking about the livestock activities in Sweden?
- (15) Do you think due to the ongoing livestock activities, there could be any risk of transfer of some harmful infectious diseases from livestock animals to human beings such as mad cow, avian flu and Pig influenza, etc. in future?

Appendix: 2:

The letter sent to interviewees regarding the appointment.

Subject: - Making an appointment to carry out the interview regarding my research project (case study) and thesis:

Dear Sir/Madam,

With reference to above-mentioned subject, it is most respectfully submitted that I am currently student of master program in Environmental Communication and Management at SLU, department of Urban and Rural Development, Uppsala. Actually I have made a case-study after discussion with my supervisor, Mr. Lars Hallgren, Assistant professor of the same department, regarding the impact of livestock sector's activities on environment and societal life of the people of Sweden.

Therefore by interview with you, I want to get your particular perspectives regarding the ongoing debate pertaining to the expansion of livestock sector's activities and their possible impact on the environment and societal life of people of Sweden with regard to all possible aspects according to the opinions of the authors of the 'Livestock's long shadow' (FAO and LEAD report of 2006) as well as your personal point of view also. However, I will carry out my interview in English language as I don't know the Swedish language. Indeed, I am hopeful you will give me an appointment of at least 60-90 minutes so that I will be able to cover all my intended questions during the month of May, 2011.

Thanking you in anticipation and looking forward for any positive response from you.

Yours Faithfully,

SYED ASSAD RAZA KAZMI,

Student of Master program in Environmental Communication and Management,

Department of Urban and Rural Development,

SLU, Uppsala, Sweden.

Date: