

**Messages received during the FAO E-conference on  
'Utilization of Food Loss and Waste as well as Non-Food Parts as  
Livestock Feed '**

1 October – 30 October 2015

**LEADING QUESTIONS FIRST WEEK**

Q1. According to FAO's Definitional frame work of food loss (2014)

([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf) ) any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss. Do you agree with this statement?

Q2. In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced **exclusively** for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand --- the Moderator]

Q3. In your country, are there agricultural products (foods) that are grown/produced **exclusively** for human consumption, and then a portion gets diverted towards feed production or used directly as feed ? Would you wish to give example(s) of such foods and elaborate on them?

Q4. In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal feed i.e. at the time of cultivation/production it is already known that the food is being produced both for human consumption as well as for use as animal feed? Would you wish to give example(s) of such foods and elaborate on them?

Q5. In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), *that part will not be considered as food waste*. Do you agree with this statement? Feel free to elaborate.

Q6. From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed in your country. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution, and consumption stages. [Note: non-food parts could be

produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on --- the Moderator]

Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Do not include non-food parts --- the Moderator]

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### **First Week, Message No 1: Opinion on questions raised**

I am OGAH from Nigeria [Congratulations Dr. OGAH for breaking the ice ... Moderators]

I do not agree with the first statement that if food is used as animal feed then this is a food loss, because animals are themselves food to man and by feeding them with human food this should be considered as adding value to the food by transforming it into a higher food value.

Secondly, we do not have human food that is grown exclusively for animal feeding, the simple reason being that we have enough vegetation in Nigeria to support our animals with feed.

Thirdly, we have crops like maize and sorghum of which parts are shared to boost animal feed, and both the grain and also the forage parts are also used as feed for ruminants.

We do not grow crops deliberately either for human or animal consumption, but excess is normally sold out and middlemen can sell it to feed millers, essentially this is true for crops like maize, guinea corn, ground nut, and soybean.

Of interest for the Nigeria situation is the abundance of crop by-products like stalks, husk, shells, which were previously in most cases burnt, but today are mostly additional source of revenue to the farmers who sell them to livestock owners.

We have a lot of food losses arising from poor infrastructure to preserve crops such as mango, cashew, tomatoes, orange of which large parts are wasted and not even given to animals as sources of feed. Particularly during harvest, there is urgent need to develop a synergy between the producers of these perishable crops and livestock farmers with a view of diverting excess (when there are not human uptakes) to livestock feed.

Dr Danlami Moses OGAH

*Animal Science Department, Faculty of Agriculture, Nasarawa State University Keffi pmb  
135 Shabu-Lafia campus, Nigeria*

[mosesdogah@yahoo.com](mailto:mosesdogah@yahoo.com)

+2348065303418, +2348091325188

### **First Week, Message 2: Opinion on Question 1**

Hi, my name is Samina Khalid. I am working as Assistant Professor in The Department of Environmental Sciences at COMSATS Institute of Information Technology, Vehari, Pakistan.

I want to comment on Q 1 i.e. definition of food waste. I agree with the statement "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are should be considered as food loss". If something (food) is produced for a purpose (human consumption) and cannot be used for that particular purpose (consumption) then it is waste i.e. the purpose is not full filled.

However, it can be used for any other beneficial purpose like energy production or for composting.

Dr. Samina KHALID

Assistant Professor (Environmental Sciences)

COMSATS Institute of Information Technology, Vehari, Pakistan.

### **First Week, Message 3: Reply to Q1**

Jan DIJKSTRA – Academia – the Netherlands

Reply to Q1

Couple of reasons why this definition is incomplete. Reasons include:

A variable part of the food is not really suitable for human consumption (e.g. hulls of soybean; stalks of maize); that part should be excluded and definition adjusted accordingly.

Any food used for animal feed is only partially a food loss. A part of the food ends up in animal product, which contributes to human nutrition again.

The definition does not consider the quality of the food used as animal feed, compared with the quality of the animal product. For example, the DIAAS (digestible indispensable amino acid score) of milk protein is much larger than that of several plant proteins used for human consumption. Obviously the reversed may also be true.

Food (e.g., soybean meal) may actually help to overcome shortages of certain nutrients (e.g., nitrogen) in the feed for animals, therefore leading to improvements in digestibility or nutrient utilization. The 'investment' of some human edible food may then results in higher 'return' in animal product.

In situations of temporary oversupply of food (seasonal aspects), food may be more useful fed to animals to obtain animal products (meat) at certain times of the year when food supplies are limited.

All in all, a simple definition may not capture the full spectrum of possibilities.

Kind regards Jan DIJKSTRA – Wageningen – the Netherlands

### **First week, Message 4: Opinion on questions**

I am ABIOLA John Olusoji from Nigeria.

I quite agree with Dr. Ogah [Message 1 ... Moderators] that we do not have any specific feed grown for animals in Nigeria. However, I think we need to step up our research to have some grass grown for ruminants to reduce the competition for food between humans and animals especially to provide food for middle or low income earners. To grow specific feed for poultry or monogastric animals maybe quite challenging.

Feed wastages can equally come from poor harvesting, storage and processing. Microbial organisms growing on the materials can make them unusable for the consumption of food by humans or feed by animal.

Department of Veterinary Medicine  
University of Ibadan dayspring\_dnk12.  
PEACE OF GOD BE WITH YOU AMEN.

### **First week, Message 5: Opinion on questions**

Hi, my name is Chong Wang; I am from Zhejiang A&F University, China

Following is my reply to the questions:

Q1. According to the FAO's Definitional frame work of food loss (2014) ([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)) please see page 7, para 2e

"any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.

Reply: I agree with this statement. However, in some areas the potential food used for animal feed may be because of, to a certain extent, the poor road conditions and limited feed availability in these areas. So the definition of food may vary in different area. e.g. barley could be used as human food, but normally, it is used as animal feed in my country.

Q2. In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced **exclusively** for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand -- Moderators]

Reply: Yes for example in mountain areas, some farmers use pumpkin to feed the animals. But sometimes if the pumpkin is not treated it can't be kept for a long time. Also when more labour to treat the pumpkin is not available, the farmers prefer to feed it to the animal directly.

Q6. From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution, and consumption stages. [Note: non-food parts from agricultural products could be produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on --Moderators]

Reply: There are lots of non-food parts in food supply chain in China. e.g. the rice straw, asparagus stalk, stems and leaves of *Zizania latifolia*. And these are available when harvesting. Also others are produced while processing, e.g. lees, Sweet potato residue, bamboo shell, etc.

Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Please do not include non-food parts of agricultural products --Moderator]

Reply: sweet potato residue (processing), tea dust (processing), Tender bamboo shoot (processing) could be used as animal feed but are currently not used as feed.

Chong Wang  
Zhejiang A&F University

### **First week, message 6: Opinion on questions**

I am CHUKS Onwunji, a Nigerian.

Answering Q1, I would not regard food originally meant for human consumption as waste when converted for animal use. In general, I will define "Food loss" as food not

consumed (either by human/animals) nor converted to other more stable products but lost to several factors including spoilage, disease, pest infestation, low quality and so on. It may also be of interest to you to know that a number of farmers in Africa don't grow food specifically to feed animals. These animals are fed on parts of food not consumable by humans such as orange peels or stalks or excess food left after human consumption.

Q2. To my knowledge there is no food specifically grown for animal consumption alone.

Q3. Yes a number of farmers grow to feed their families and then keep some for replanting for the next season and some parts for animals they also rear on the side. An example is maize. Consumed by humans, used for corn meal and some are directly fed to birds.

Q4. Maize, Cassava are very good examples. However, this I think is done by large farms which are few compared to the high number of subsistence farmers.

Q5. Yes I agree. Like I said in Q1, so far the food is not lost due to the reasons I mentioned, it is not Food waste in my opinion

Q6. Harvesting: straws, husk.....Processing.....orange pulp, cassava and yam peels

CHUKS Onwunyi  
Erasmus Mundus Food of Life Scholar  
University of Helsinki, Finland

### **First week, message 7: Opinion on questions**

I am RISSO Jimena from Uruguay

Q1 I do agree with FAO's definition. The energy and resources that had been employed in the manufacture of that foods were surely higher than if those crops were initially intended for animal consumption.

Q2 Yes. For example corn is given to hens and chickens. Although humans could eat it, this kind of corn is exclusively grown for animals.

Q3 Yes there are. For example although rice is produced exclusively for human consumption, the broken grains are packed apart, and diverted to animal feed. Moreover, crops like corn and sorghum that are produced for humans are in some part used to feed cattle. Especially to feed the cattle that are raised by the same producer.

Q5 I do agree. If the original intended use contemplates both, human and animals, it cannot be considered food waste.

Q6.a) Whey that is a by-product when producing cheese is given to pigs.

Chem. Eng  
Jimena Risso  
MSc  
Food Safety and Security  
Environmental Management

### **First Week, Message 8: Opinion on Questions**

My name is Charles Okoli. I work at the Department of Animal Science and Technology, Federal University of Technology Owerri, Nigeria.

I do not quite agree that the purpose or use for a product only resides with the designer or producer. Users and consumers continue to adapt products to suit their specific needs. So, food produced for human use and converted to animal feeds in order to avoid wastage should not be considered a loss but food conservation practice. The animal flesh produced with this food will ultimately become human food under most cultures. I agree

with the statement of Dr. Moses Ogah [Message 1.... Moderators] that in Nigeria, "We do not grow crops deliberately either for human or animal consumption, but excess is normally sold out and middlemen can sell it to feed millers", and "essentially this is true for crops like maize, guinea corn, ground nut, and soybean".

Charles

Okoli Ifeanyi Charles  
Professor of Tropical Animal Health and Production  
Tropical Animal Health and Production Research Lab.  
Department of Animal Science and Technology,  
Room 102, SAAT ETF Building  
Federal University of Technology,  
PMB 1526 Owerri, Nigeria  
Mob.: +2348053127006

### **First week, message 9: Opinion on Q1**

Hi, my name is TENDONKENG from Cameroon. I am working as lecturer in the Department of Animal Production at the University of Dschang, Faculty of Agronomy and Agricultural Sciences, Dschang, Cameroun.

I just want to say that concerning Q 1 i.e. the definition of food waste that I agree with the statement "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed should be considered as food loss".

If food is produced for human consumption and cannot be used for that particular purpose, then it is waste because the purpose is not full filled. However, it can be used for any other beneficial purpose like energy production, organic fertilizer or for composting.

Fernand

TENDONKENG Fernand, *BSc, PGD, MSc, PhD*  
Senior Lecturer/Researcher  
Head of Animal Nutrition and Feeding Laboratory  
University of Dschang, Faculty of Agronomy and Agricultural Sciences  
Department of Animal Sciences  
P.O. Box: 188. Dschang - Cameroon.

### **First week, message 10: Opinion on question 1**

Dr Jude Capper, Livestock Sustainability Consultant, United Kingdom (previously USA).

Whilst it is often useful to give broad definitions, I disagree with the substance of the statement in Q1. Although ultimately any human-edible food that is not consumed by humans could be considered "loss", this is subject to various caveats, some examples of which follow.

With the exception of livestock considered to be sacrosanct under religious belief or law, all livestock are ultimately reared and used for human consumption (meat, milk, eggs and/or draught power).

Food loss within the retail or consumer sector is often irreversible, i.e. if I discard half a head of lettuce or a sandwich, that food is sent to landfill with no prospect of nutrient recovery. By contrast, food that is human-edible but aesthetically-unappealing (e.g. misshapen fruit and vegetables); stale (e.g. bakery waste that has ceased to taste fresh) or does not pass quality control standards (e.g. candy or potato chips) can be safely and efficiently recycled by livestock and the nutrients used to produce milk, meat or eggs for human consumption.

Some crop components are human-edible (e.g. soy protein) but demand for a co-product (e.g. soy oil) vastly outstrips demand for the protein component as a human foodstuff, and it is instead diverted to livestock feed. Given that significant cultural (dietary) change would probably have to occur in order to equalate soy oil and protein demand for human consumption, it seems somewhat unfair to the livestock industry to cite recycling of by- or co-products as food loss.

Situations may occur whereby feeding a human-edible crop component to livestock stimulates a greater quality or quantity of human-edible food output than the original input, e.g. adding a small quantity of soy meal to the diet of a lactating dairy cow, thus improving overall diet digestion and garnering a greater quantity or quality of human-edible protein output (milk and/or meat) than input. For a more complex discussion of associated issues I refer you to "Re-defining Efficiency of Feed Use by Livestock" by JM Wilkinson (2011, Animal). The "animal feed = human food loss" assertion does not account for this situation

Many thanks.

Dr Jude CAPPER, Livestock Sustainability Consultant, United Kingdom (previously USA).  
Categorise as: Freelance Consultant.

### **First week, message 11: Opinion on question 6**

Good evening everyone,

My name is Nduta, I am a masters student and a subsistence farmer while in Kenya.

In reference to question six this is what we do on our farm.

First we harvest the dry maize and store it.

Post harvest, the maize plant/stalk which is a 'non food part', is fed to the livestock.

After shelling the dry maize off the cob, (processing stage) we mill the maize cob, which is also a 'non-food part' before we feed it to the animals.

Although I am not sure about the nutritional value of the indicated 'non-food parts', from my experience, it works well as a fodder substitute especially when the price of commercial feeds rise.

Nduta MBARATHI  
Masters Candidate  
University of Kwa-Zulu Natal  
South Africa

### **First week, message 12: Opinion on messages**

I am Dr NWORGU Friday Chima from Nigeria. A lecturer (chief lecturer) at Federal College of Animal Health and Production Technology, Moor Plantation, Ibadan.

The answers to the questions are as follows:

Q1. No, I do not totally agree with this. The reason is that a farmer may not harvest his crop when due as a result some of the yield will be wasted to wild birds, wild animals, flood etc. The waste due to flood may not be useful for animal consumption, even after processing. A farmer may lose some of the food items/produce/products when going to home/market due to accident and the spoilage may not be useful for animal consumption.

Q2. There are no such products in Nigeria presently, that I am aware of, that are exclusively produced for animal feed.

Q3. In Nigeria, maize, cassava, soya bean.

Q4. Yes, for example maize, cassava, soybean, groundnut, millet and sorghum.

Q5. This should not be considered as food waste, because in Nigeria we produce maize grains for both human and animal consumption.

Q6. In Nigeria we use cassava peels, yam peels, fluted pumpkin husk, cowpea seeds/grain waste, vegetable waste/stems, banana/plantain peels, snail shells, egg shells, palm kernel waste, pineapple peels, fruit wastes, water leaf stems/leaves, maize stover, cassava leaves etc.

Q7. a. Cassava pulp, maize husk, maize wastes;

b. Cowpea waste from processing of cowpea flour, water leaf leaves, waste from milling of rice, fluted pumpkin husk.

### **First week, message 13: Opinion on questions**

I am Dr MPS BAKSHI, Former Head-cum-Senior Nutritionist, Department of Animal Nutrition, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India.

Q1. *According to FAO's Definitional frame work of food loss (2014) ([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)) any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss. Do you agree with this statement?*

Answer

No, I do not agree, this is not a food loss. Because the human food (grains, pulses, root crops etc.) which is diverted for animals feeding is returned in the form of animal products like milk, meat and eggs; which re-enters the food supply chain for human consumption. The non-food part of the animals which is not re-entering the FSC is the real food loss.

Q2. *In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced exclusively for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand --- the Moderator]*

Answer

In India, jowar (Sorghum grains) and bajra (Pearl millet) are grown/produced for feeding to livestock and poultry, but in some parts of our country, these are used for making 'chapatti' for human consumption.

Q3. *In your country, are there agricultural products (foods) that are grown/produced exclusively for human consumption, and then a portion gets diverted towards feed production or used directly as feed ? Would you wish to give example(s) of such foods and elaborate on them?*

Answer

In India, wheat, maize and rice are the staple food for human consumption, but about 10-20% of these grains are diverted for feeding to livestock and poultry. These grains are rich sources of starch, therefore used in animal feeding in order to meet their energy requirements.

Q4. *In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal feed i.e. at the*



time of cultivation/production it is already known that the food is being produced both for human consumption as well as for use as animal feed? Would you wish to give example(s) of such foods and elaborate on them?

Answer

Edible oils: Consumed as a source of energy in the diet of humans, livestock and poultry.  
Vegetable crops: Potato, carrot, sugar beet, turnip consumed by humans, livestock and poultry.

Q5. In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part will not be considered as food waste. Do you agree with this statement? Feel free to elaborate.

Answer

Yes! I agree with the above statement. Because the part of food originally meant for human consumption when diverted for animals feeding is not a food waste, because we in turn get the animal products for human consumption.

Q6. From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed in your country. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution, and consumption stages. [Note: non-food parts could be produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on ---the Moderator]

Answer

a) **are currently used as animal feed.** While harvesting grains cereal straws, stovers and millet stalks. Post harvesting baby corn Baby corn and sweet corn husk with silk and sweet corn Baby corn and sweet corn fodder. Processing barley grains Spent brewer's grains. Processing cereal grains Maize husk, maize grit, corn gluten meal, maize oil cake from starch industry. Processing sugar beet pulp from sugar industry, sweat pea shelling, empty pea pods, processing industry Sarson (*Brassica campestris*) saag waste.

b) **which have potential for use as animal feed but not currently used as animal feed:** While harvesting fodder seeds, leguminous and non leguminous fodder straws, Post-harvesting edible mushrooms, Spent straws, Processing Citrus pulp, tomato pomace, amla pomace, spent sugar syrup from amla processing industry.

Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Do not include non-food parts --- the Moderator]

Answer

'food loss and waste' that

**a) are currently being used as animal feed**

Processing Mess/kitchen waste

**b) have potential for use as animal feed but are currently not used as animal feed.**

Post harvesting fruits and vegetables during peak production season

Processing potato chips waste, noodles waste, Kurkure waste, ice cream cone waste etc

**First week, message 14: Opinion on question 1**

Hello, I am Ogunleye Blessing from Nigeria.

Question 1: I do not agree with the definition of food loss as conversion of foods intended for human consumption to animal feed.

Putting into consideration the food supply chain, which is all about the serial connectivity of stages resulting to production, processing, distribution and consumption, the food is not loss when it is redirected to animal feed because most of our animals are deliberately produced for human consumption. Hence the last stage of the food supply chain which is consumption is attained, and then it is not a loss. Whether it is converted to animal feed or it is used as food to human the apparent target is human consumption.

Ogunleye Blessing D.  
Livestock development officer  
Federal Ministry of Agriculture and Rural Development  
[Ogunleyeblessing65@gmail.com](mailto:Ogunleyeblessing65@gmail.com)

**First week, message 15: Opinion on question 1**

I am Dr Devasena BUSINENI, an academic person in the university, from India,

I do not agree with the first statement that if food is used as animal feed it is a food loss, because animals are being reared for human requirements either as food or for work purpose. So, by feeding animals we are getting some output either in the form of animal food or as work. For any such output, we need to provide some input. This comes under input.

Secondly total product produced may not be consumed some times by human, and then it becomes wastage. By feeding it to the animals we are preventing the wastage.

Thirdly the soil, water and time spent for the food production can be minimized as it is now shared among the human and animal population. If animals are to be fed with other foods, again we have to spare the soil, water resources separately and spend the time also for producing animal foods. One way we are saving our resources by using the foods both for animal and human communities.

Fourthly food wastage in majority of the situation occurs due to improper storage during which the rats spoil by consuming and soiling and spoilage due to the development of fungus also a commonly seen occurrence. On an overage thousands of tons of food grain are being wasted in developing counties, because of lack of infrastructure for storage.

Dr. Deva Sena Busineni  
M.V.Sc.,PhD  
Associate Professor & Head Department of Animal Nutrition  
College of Veterinary Science  
Proddatur- 516360, YSR Kadapa (dt)  
Andhra Pradesh, INDIA

**First week, message 16: Opinion on questions**

Good day.

My name is Maria Theresa URSAL from the Philippines.

I would like to thank the team for setting up this E-conference. I gain a lot of info from these conferences; and the discussions and questions stimulate me to think more about

the current practices in our country and learn about other viable practices from participants.

Here are some of my thoughts on each question that are based on my observations and limited experiences in the field.

Q1. My initial reaction is to disagree as I have the same thoughts as Dr. OGAH in Message No. 1 that by feeding human food to animals, we are simply adding value to the animals which are also consumed by humans. On the other hand, if one will consider the resources used up to produce human foods (which may be considerably higher than resources used to produce animal food), then feeding animals food that are intended and are still fit for human consumption, then it is a food loss. Add to that, animals are equipped to digest and utilize other less expensive feed sources that cannot be consumed by humans.

Q2. Country-wide, I do not think there is any agricultural product in the Philippines that is grown/produced exclusively for animals. However, there are a few animal farms like the one I am working at, where some hectares of lands are allocated for growing crops like corn intended solely for animal feeding.

Q3. Cassava and corn. Cassava is used mainly for human foods such as chips and cakes. But during grading, some crops are removed and sold to farms or feed millers to be used for animal feed production. Corn kernels that did not pass the standards for human food production are sold to animal feed producers or traders of raw materials.

Q4. The answer for Q2/3 may be applicable to this also. More farmers are partitioning their lands to grow crops human foods AND animal feeding. The production is affected by market price and the costs of transportation of the commodities to factories that process these crops to human foods. Some farmers allocate a portion of their land to growing corn for silage purposes; instead of raising them to full maturity at 110-120 days, they can harvest the whole plant at 70-80 days and produce silage for animal feeding.

Q5.

**Q6. "Non-food parts that are currently used as animal feed includes:**

1. Harvesting: coconut water, sugar cane tops, cassava leaves
2. Post-harvest: corn stovers, rice straws.

Many farmers are giving those for free instead of burning them. Unfortunately, a bigger portion is getting burnt as there are more fields for crops than animal farms to get them.

3. Processing: sugar cane molasses and bagasse, pineapple pulp, spent brewer's grain, corn meal, copra cake, pairing cake, whey, (soybean meals are usually imported but there seems to be small local producers)

Fruit pulp and skin are also available but because they have a very short storage life, the use is limited.

**Q7. Examples of 'food loss and waste' that a) are currently being used as animal feed:**

1. Harvesting: bruised fruits and vegetables
2. Post-harvest: substandard sizes of root crops like cassava; low-grade corn kernels
3. Processing: substandard coco flour, coco oil
4. Distribution and Consumption: returned or unsold processed milk products: milk, cheese, yogurt

Some unsold fruits and veggies are normally bought by backyard farms, but markets are surely producing a lot of these.

**Maria Theresa Ursal, D.V.M.**  
Farm Supervisor

Hacienda Macalauan, Inc.  
(Privately-owned Dairy Farm and Processing Plant)  
Mabacan, Calauan 4012  
Laguna, Philippines  
+905-293-0919

### **First week, Message 17: Opinion on question 1**

Hello, It's Manju WADHWA from INDIA

In response to Q. # 1

No, I do not agree to this. Grains and root crops are energy sources; when fed to the animals, this energy is converted into quality protein (milk-a complete food for each one of us, eggs and meat- good source of essential nutrients like; vitamins, minerals and choline etc). The nutrient dense animal products obtained after using grains and root crops in animal feed can't be considered as food loss. Regarding pulses, in general by-products like chuni, husk, soybean meal etc are used as feed for livestock; however soybean is used for poultry and roasted full fat soy for high yielding dairy animals). Moreover zero waste technology has done wonders, as after getting the real edible products, the slaughter waste is again recycled into feeding of other animal species (except for ruminants), bones, blood, skin, feathers etc are used to prepared other value added products. So no food loss .....

Dr. Manju Wadhwa  
Sr. Nutritionist -cum- Head Dept. of Animal Nutrition  
GADVASU, Ludhiana,  
India

### **First week, message 18: Opinion on question 1**

My name is Nico van Belzen from ScienceConsult BV.

(Disclosure for transparency reasons: I am also the Director General of the International Dairy Federation. However I have not reviewed this comment with the IDF community, so it is not made on behalf of IDF but as a personal comment).

I would like to express my strong agreement with the comment from Dr. OGAH (Message 1 ... Moderators] that if food is used as animal feed this is **not** a food loss. Food produced from animals provides valuable micronutrients including many vitamins and calcium, as well as high quality protein; as Dr. OGAH writes, "feeding [livestock] with human food (...) should be considered as adding value to food by transforming it into a higher food value". Physiologically humans are omnivores.

Thank you, best regards

Nico van Belzen, PhD  
[nico.van.belzen@gmail.com](mailto:nico.van.belzen@gmail.com)  
<http://www.scienceconsult.eu/>

### **First week, message 19: Opinion on question 1**

I am Dr Pavan Kumar, working as Assistant Meat Technologist, Department of Livestock Products Technology, GADVASU, Ludhiana, India

Cereal, roots that are utilized for feeding to animals may not be called as food loss. Although it may be inefficient utilization as converting the vegetable protein into animal protein is not economical. According to Stockholm International Water Institute,

production of 1 kg of grain fed for beef production requires 5-40 times more water than to produce 1 kg cereal grains.

So I partially disagree with that

Thanking you  
With Warm Regards

Dr. Pavan Kumar  
Cell- 8284900284  
Assistant Meat Technologist, Department of LPT,  
College of Veterinary Science, GADVASU-Ludhiana

### **First week, message 20: Opinion on question 5**

Hello, it's Manju WADHWA, from INDIA

Response to Q. 5

Yes I do agree, the part which we decide to be diverted for animal feed, shouldn't be considered as food waste. In India, the hotspots for losses are; in grains losses occur due to improper ware houses where these grains are stored, roots crops like potato (being perishable) during glut season (beyond the capacity of cold storage) are thrown on the roads, again at the first place planning for sown area for a particular crop is important, its consumption in the market (minimum support price for a particular crop) is important. Non-food parts like cabbage leaves, cauliflower leaves, pea pods, pea vines etc. if left in the field or on the roads should be considered as food loss. Processing of fruit and vegetables could account for 30-50 per cent of the original as waste, if not diverted to animal feed or other value added products should be considered as real food loss.

Dr. Manju Wadhwa Sr. Nutritionist -cum- Head Dept. of Animal Nutrition GADVASU, Ludhiana.

### **First week, message 21: Opinion on questions**

I am Dr Ime UMOH, from Nigeria

Answering Q1, I would not regard food originally meant for human consumption as waste when converted for animal use. In general, I will define "Food loss" as food not consumed (either by human/animals) nor converted to other more stable products but lost to several factors including spoilage, disease, pest infestation, low quality and so on. It may also interest you to know that a number of farmers in Africa don't grow food specifically to feed animals. These animals are fed on parts of food not consumable by humans such as orange peels or stalks or excess food left after human consumption.

Q2. To my knowledge there is no food specifically grown for animal consumption alone.

Q3. Yes a number of farmers grow to feed their families and then keep some for replanting for the next season and some parts for animals they also rear on the side. An example is maize. Consumed by humans, used for corn meal and some are directly fed to birds.

Q4. Maize, Cassava.....are very good examples. However, this I think is done by large farms which are few compared to the high number of subsistence farmers.

Q5. Yes I agree. Like I said in Q1, so far the food is not lost due to the reasons I mentioned, it is not Food waste in my opinion.

Q6. Harvesting: straws, husk.....Processing.....orange pulp, cassava and yam peels.

Dr Ime Umoh

Federal Ministry of Agric  
Abuja  
Nigeria

**First week, message 22: Opinion on question 1**

I am JIMOH Kazeem Akanni from Nigeria. I work with the Bio-medicinal Research Centre, Forestry Research Institute of Nigeria.

Response to Q1.

Animal Scientist will always believe that food fed to animals is not a waste. This is because, it is the cheapest source of nutrition for their animals. But to the farmer whose primary aim of farming was to get food and got something less, it is a loss to him.

JIMOH AKANNI KAZEEM  
Bio-medicinal Research Centre,  
Forestry Research Institute of Nigeria,  
Ibadan, Oyo State.  
NIGERIA.  
+2347037746586

**First week, message 23: Opinion on question 1**

My Name is JAFAROU SANDA ALTINE from Ministry of Livestock of Niger

Response to Q1

I do not agree with this statement because by definition loss is something not utilizable but in this case it can be used as animal feed.

**First week, message 24: Opinion on questions**

My name is Dr Perfecto Buyamba KABANSHI, State Veterinarian from Zambia-Government Extension Services.

1. I agree with the statement according to FAO's definitional framework of food loss, because food is meant for human consumption; and feed for animals.

2. In Zambia yellow maize is sometimes grown for animal feed (silage, stock feed). However, due to vitamin A deficiencies in some regions of the country, yellow maize and orange maize is being promoted for human consumption as well.

3. Most food crops in Zambia are grown primarily for human consumption and only partly given up for feed production. This includes maize, soya beans, cassava, and groundnuts. In most cases animal feed industry benefits from food processing by-products such as maize bran, soya cake, and groundnut cake.

No food crops are grown to be used specifically for both humans and animals.

4. Agricultural foods are originally grown for human consumption.

5. Where agricultural foods are grown for multiple purposes and are used as such, there is no food loss at all.

6. (a) Crop residues such as maize stovers, straws.  
(b) Bran (maize) soya cake.

7. (a) White maize intended for human food, used to produce stock feed.  
(b) Vegetables and fruits are potential products for animal feed.

### **First week, message 25: Opinion on question 1**

I am Dr Olufemi Alabi from Bowen University, Nigeria.

Response to Question 1:

I do not agree with the FAO definition of food loss. Food meant for animals are basically residues or by-product from the food being processed for human consumption. Food loss may arise at various levels of production, processing, storage and even presentation to the animals. Conversion of food meant for human for animals may arise in an economy with much surplus that cannot be exported and usually done without affecting food provision for humans.

### **First week, message 26: Opinion on question 1**

Dear all,

I am Emmanuel ZZIWA working with the Food and Agriculture Organization, based in Uganda under the Global Climate Change Alliance Project.

My response to Q1:

I do not agree with the statement defining human intended food given to animals as food loss because;

1. The definition on page 7, uses the words "discarded" and "redirected to non-food use" in explaining food loss and waste. We should note that these are not applicable to animals because food re directed to animals is in anticipation of getting high quality foods in return, thus it still holds food value and is not discarded because it rejoins the food supply chain at a later date.

2. Also farmers may intentionally redirect food intended for human consumption to animal feed depending on prevailing circumstances and it results into production of high quality food production. Let's reflect on this example: I may produce maize anticipating USD 0.4/kg market price. By the time of harvest, the market is so saturated that my maize, although fit for human consumption is to fetch USD 0.1/kg. Here I decide that I redirect the maize to Broiler feed and I get one kg of meat/10 kg of maize. The one kg of meat is sold at USD 4. As a farmer, I would have got USD 1 from the 10 kg of maize, now I have earned USD 4 by redirecting the maize to poultry and still provide food to humans in terms of poultry meat. This should not be termed a food loss.

3. I believe we should declare food loss when produce intended for human consumption is declared unfit for human consumption and is withdrawn from the food chain. In this case, even when converted into animal feed, it would have already caused a loss at one stage in the FSC [food supply chain .... Moderator].

Thanks.

Emmanuel Zziwa, PhD  
National Consultant - Climate Change Adaptation  
Global Climate Change Alliance  
Food and Agriculture Organization of the United Nations (FAO)  
Plot 88, Buganda Road Wandegaya  
P.O BOX 521, Kampala - Uganda  
Tel: +256774835991  
Skype: emma.zziwa

### **First week, message 27: Opinion on questions**

I am Niki Rust, Science Manager at Compassion in World Farming and am from the UK.

Q1: I definitely agree that feeding crops to animals is a waste because nutrients get lost along the way. Humans could instead eat some of these feed crops, which would free up a lot of agricultural land. Much water and energy is expended feeding crops to livestock and the end result (meat) has lost much of the nutrients. For example, for every 1 kg of meat produced, pigs and beef need 5 kg feed; eggs need 3 kg feed; broiler chickens need 4.5 kg feed, ducks need 6 kg feed. This represents a massive loss in potential food available. The protein conversion ratio of dairy is 43%; eggs is 35%; chicken is 40%; pork is 10%; beef is 5%. For every 100 calories fed to animals in the form of human-edible crops, only 17-30 calories are available in the form of meat and milk. A 50% reduction in EU livestock consumption would reduce soy meal requirement by 75%. Being that soy meal drives deforestation (and therefore has huge climate change implications) it would be unreasonable not to include this inefficiency and loss of feeding feed crops to livestock. A Chatham House paper concludes that the feeding of cereals to animals is "staggeringly inefficient".

Q2: In the EU, 53% of cereals grown are fed to farm animals.

Q3: sometimes if a crop meant for human consumption (e.g. wheat) does not grow well due to bad weather, this food is then diverted to animal feed.

Q5: I agree with this statement.

Q6: not currently used is food waste from supermarkets and consumers. Potential problems with disease, transport and cost though.

Niki RUST  
Scientific Manager – Sustainability  
Compassion in World Farming  
NGO

### **First week, message 28: Opinion on question 5**

I am JIMOH Kazeem Akanni from Nigeria.

Response to Q5.

I disagree with that. Since there is a deviation from its intended use for Human consumption to Use as Animal feed. It is a WASTE. According to [wiktionary.org](http://wiktionary.org), Waste simply means "Ineffectual Use"

JIMOH AKANNI KAZEEM  
Research Scientist,  
Bio-medicinal Research Centre,  
Forestry Research Institute of Nigeria,

### **First week, message 29: Response to message 27**

I am Syed Raza Hassan

This is in response to message number 27 from Nikki Rust

I agree with Nicki but what about BV [biological value ... Moderator] and taste of animal origin food?

### **First week, message 30: Opinion on questions**

I am W.M.P.B. Weerasinghe, working as a researcher at the Veterinary Research Institute, Sri Lanka.

1. Reply to question 1: I do not totally agree with this. The efficiency of conversion of food into nutrients in human body may be higher than that same food consumed by animals and then come to human as animal products, but still the food is not wasted.



Therefore, my view is if food intended to use for humans is consumed by animals, it is not wasted.

2. Reply to question 2: We don't have many such foods, but Maize is almost exclusively grown for animal feeding. Sri Lanka is self sufficient in maize (occasional importations during low production due to bad weather etc) and about 90% of the total production is used for poultry diets, however, we have seen increase in the use of maize for cattle feeding as well.

3. Reply to question 3: One good example for questions NO 3 is rice. It is grown exclusively for human consumption and is the main stable energy source in the diet. Sometimes the harvest is in excess for human use (Sri Lanka is self sufficient in rice and recent years saw surplus production), therefore, used for animal rations. In addition, low quality rice (due to poor storing or expired for human consumption) is also going for animal feeding.

4. Reply to question 4: We don't have (or not significant) such products.

5. Reply to question 5: I agree with this.

6. Reply to question 6: Main "non food part" under our system is rice bran/polish, but it is not wasted and total production is used for animal feeding. Rice straw is partially used and sugar cane tops; available in large quantities during harvesting times is rarely used for animals. Other products such as palm kernel cake, is moderately used.

7. Reply to question 7: This would mainly include vegetables and fruits, which are thrown away due to; low quality or over production.

Many thanks,

W.M.P.B. WEERASINGHE

Dr WMPB Weerasinghe, BVSc, MSc (Sri Lanka), PhD (United Kingdom),  
Veterinary Research Officer, Veterinary Research Institute,  
Gannoruwa, Peradeniya, Sri Lanka.

Tel: +94718154286

### **First week, message 31: Opinion on question 1**

I am Mahesh CHANDER, Scientist working with the Indian Veterinary Research Institute, Izatnagar, India

Response to question 1:

Most food crops, vegetables, legumes in India are grown primarily for human consumption and only partly used (including crop residues) for feed. But there is growing trend to divert it for feed (Maize, wheat, soybean, millets) with increasing emphasis on commercial scale livestock farming (poultry for instance). Thanks to efforts on improved livestock feeding, the poor farmers are getting good prices for these crops when diverted to animal feeding (Maize would have disappeared due to non remunerative market as human food, if not used for poultry feeding!!!). When improving returns from the farm is the goal, farmers would benefit more if they grow for food & feed both depending on the market demand. With growing income & awareness there is increasing preference for animal products, so to get more animal protein we have to divert it to feed animals, thus it's no food loss!!!!.

Thanks!!

Dr Mahesh Chander

Principal Scientist & Head

Div of Extension Education

Indian Veterinary Research Institute, Izatnagar-(243122 (UP) India

### **First week, message 32: Opinion on question 1**

I am Dr. Yakubu from Nigeria

The response to question No. 1 depends greatly on the angle it is being viewed. We should remember the fact that we have people who feed solely on plants and those who consume both plants and animals. To strict vegetarians, foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed, will amount to food loss. To consumers of both plants and animals, this may be seen as 'value addition' as stressed upon by earlier contributors. However, considering the high level of hunger and poverty globally, any food consumed by man should not be seen to be in competition with animals. Otherwise, the poor will remain pauperized since they will not have enough money to buy food due to high demand. Instead, efforts should be intensified towards converting crop wastes to livestock feeds in what could be termed 'waste to wealth' until we get to a less competitive stage.

A. Yakubu (PhD),  
Senior Lecturer of Animal Breeding and Genetics,  
Department of Animal Science,  
Faculty of Agriculture,  
Nasarawa State University, Keffi,  
Shabu-Lafia Campus, P.M.B. 135, Lafia, Nigeria.  
Email: [abdul\\_mojeedy@yahoo.com](mailto:abdul_mojeedy@yahoo.com)  
Mobile no: +2348065644748

### **First week, message 33: Opinion on questions 2-7**

I am Emmanuel ZZIWA, FAO – Uganda,  
Responses to Qns 2 to 7 in respect to the situation in Uganda.

Q2. In Uganda, lablab is grown exclusively for animal feeding (the vegetative parts). However, in the process of harvesting the beans for multiplication, a significant proportion is now finding its way into the human food chain and is found in supermarket stall as human food.

Q3. There are many agricultural products (foods) in Uganda produced exclusively for human consumption and get diverted to feed.

These include maize, soya bean, and sorghum. There is a growing competition for grain between humans and animals in Uganda especially for maize. Food and feed dealers buy maize from the same market. At some times, the price of maize and that of maize bran are equal and farmers resort to use of maize rather than the milling byproduct (maize bran).

Q4. Yes in Uganda, this exists a lot especially in mixed crop-livestock production systems (which are the dominant in the country). Right at production level, majority of mixed crop-livestock farmers set goals of how much of the food will be consumed by the household, how much will be sold for income, and how much will be given to own animals. This exists in many crops including maize, sorghum, sweet potatoes, rice, and cassava.

Q5. Yes I agree to the statement. This is because food will be just diverted to produce more nutritious foods also required by humans to live a healthy life. Some of the reasons may be decline in market price of the produce, thus making economic sense if fed to animals to give better priced products like eggs, meat, milk, and fish.

Q6. The non-food parts in the food supply chain currently used as animal feed or with potential.

These include banana peels, banana leaves, cassava leaves, sweet potato leaves, cassava peels, sweet potato peels, pine apple pulps, cereal straws and cereal brans.

The limited or no use of the same products in some parts of the country and by some farmers means that these potential to be used as feed that is not exploited due to lack of awareness, knowledge in processing and lack of technology to process.

Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Please do not include non-food parts of agricultural products --Moderator]

Food loss and waste currently used as animal feed include;

1. Cereals and grains (maize, sorghum, rice, ground nuts) that are rejected from human consumption due to poor quality (moulds).
2. Roots and tubers that get spoilt due to poor postharvest handling rendering them unfit for human consumption (eg. Cassava, sweet potato, Irish potato).
3. Fruits and vegetables such as mangoes, pumpkins, avocado, water melon, cabbage, etc. that due to either poor postharvest handling, lack of value addition technology and longer stay on market shelves become unfit for human consumption and are given to animals.

Thanks

Emmanuel Zziwa, PhD  
National Consultant - Climate Change Adaptation  
Global Climate Change Alliance  
Food and Agriculture Organization of the United Nations (FAO)  
Plot 88, Buganda Road Wandegaya  
P.O BOX 521, Kampala - Uganda  
Tel: +256774835991  
Skype: emma.zziwa

### **First week, message 34: Opinion on questions**

I am TEBUG Thomas Tumasang, a livestock specialist working in the University of Dschang Cameroon as an animal Health laboratory Technician

- 1) As for me I think that any loss in the food intended for human consumption used as animal food is not food loss but food transformation. I consider livestock or animals as transformers. They transform what we cannot eat and what we give them to food of higher value. This is so because at the end we still eat the animals or the products as food. Animals cannot be fed with food of same value as food they will produce or with same form they will produce. 1 kg of corn or of grass feed to chicken or ruminants respectively will not be same as the meat or milk they will produce.
- 2) In Cameroon there are no food crops grown for animal feeding. But now our days most maize is grown and a larger portion used in monogastric feeding (Poultry and pigs) in commercial farms.
- 3) In Cameroon maize, soya bean, cocoyam, sweet potatoes, some species of banana and to some extent cassava is grown for human consumption but to some extent used as livestock feed.
- 4) In Cameroon maize and soya are cultivated nowadays for human consumption and for animals' consumption.
- 5) In Cameroon now maize is cultivated for human consumption and animal feed. We know that when the maize is bad or spoiled it can still be used for animal feed. The economic value between the good and the spoiled grain is not much so this is why storage facilities for corn or maize are deteriorating now.

6) There are so many of non food part of food supply chains which are currently used as feed for animals. These are by products from breweries (both industrial and local) sugar industries, wheat factories vegetable industries etc.

7) Bad corn, or in short bad grains, fruits and most vegetables are used as animal feed.

**TEBUG T. TUMASANG**

*Agricultural Engineer (Livestock specialist)  
Department of Animal Production  
Faculty of Agriculture (F.A.S.A)  
University of Dschang  
P.O.box 138-Dschang*

**First week, message 35: Opinion on questions**

I am Emmanuel Zziwa

Responding to Message 27, by Niki Rust.

It is true that production of animal products consumes more water and also consumes more food crops. For example as indicated in message 27, Broilers need 4.5 kg of feed for 1 kg of meat. We should also note that we need more kg of plant origin to make up the same quality protein, vitamins and minerals as in animal proteins.

What we need in the science fora is to develop ways of increasing feed conversion efficiency but not to regard the process as a waste.

To borrow a leaf, crops transpire to grow and a lot of water is lost in the process! But because water is lost for beneficial purposes, we cannot condemn the entire process. What was done to develop crop varieties that are more efficient in water use e.g. water efficient maize?

Thanks.

Emmanuel ZZIWA

**First week, message 36: Opinion on questions**

Dear All

I am Gbemenou Joselin Benoit Gnonlonfin, Consultant,

I strongly support Dr Ime Umoh, Nigeria (Message 21) on most of the questions that are well elaborated. In fact there is no food loss especially in African context.

Regards

Benoit Gnonlonfin, PhD

Consultant

**First week, message 37: Opinion on questions**

I am Acho Okike, Senior Agricultural Economist in ILRI Nigeria.

Reply to Q1

I do not agree with the statement. It is often the case that grains intended for human consumption are stored in silos for years as "strategic reserves" that end up used or not used for periods up to 5 years. To my mind, it is more strategic and adds value if such

“value-added storage” is done in animals rather than in silos. As such, I do think that the definition of food loss is still missing some key elements e.g.:

1. Temporary diversion: where the period of use of human food for animal feed is shorter than storage time in silos e.g. for the production of broiler feed where broiler production happens in less than 8 weeks or for that matter egg production.
2. Strategic value-added storage: where the period of use of human food for animal feed approximates storage time in silos e.g. for raising and maintaining dairy cattle for milk production over say a cycle of 4-5 years.
3. Delayed availability: where composting is a last resort, provided that composting is intended for soil improvement.

In summary, food loss in this category only occurs where food intended for human consumption ends up in landfill for estate development.

Regards,

Acho

### **First week, message 38: Opinion on questions**

I am Erastus Mbugua Kiruiro working as consultant with International agency, Kenya.

Q1: I do not agree with the statement. Any ingredients arising from foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed should not be considered as food loss so long as these fed to livestock. They remain a loss if deliberately dumped as waste (used to compost). These ingredients are transformed into food and recyclable nutrients (in manure) and FSC remains a loop always.

Q2: In Kenya, maize and some types of sorghums, cassava are human consumables but may be exclusively grown for fodder (mainly for ensiling for fresh parts, or dry forage/stalks). Any such use intended for feeding should not constitute food loss other than processing losses (field losses during harvesting, processing by mechanical means, ensilage, transportation and feeding). Cassava is increasingly being used for livestock feeding although originally human food but the debate still on whether this is the best option during a time when the need to meet food security is critical. Informed choices cannot be made on the best options for use of such agricultural foods until adequate data is made available to justify more use for feeding than human food or return per nutrient if these enter the feed chain and converted to milk, meat, manure etc.

Q3: There are many in this category. Almost all food crops grown in Kenya have components of them used. These range from cereal crops –wheat, maize, rice (grain and straw/stalks used), bananas (pseudo-stems/leaves used), ground nuts and cowpeas (foliage, hull/husks used), coffee (hulls used), avocado (fruits and leaves- latter cherished by goats), oranges (peels used), sunflower (seed/hulls used), sugarcane (leaves, tops or stem used), soya beans (foliage/hulls). The primary products like in many other countries are meant for food but the remaining components used to feed livestock. Losses only occur as explained above Q2. Under a situation where we are heading to zero-waste tolerance most foods and their derivatives (byproducts as indicated above lists) will be used to feed livestock with increased advances in science to improve efficiency in utilization through chemical, electrical/infra-red, physical and biological treatments (e.g. urea & NaOH treatments, fungi treatments etc.).

Q4: There is always a distinction between products intended for food and feed for livestock. For food takes largest share but feed is relegated to their by-products, which nevertheless not considered as losses as explained above.

Q5: As long as pre-conceived as feed then this should not be considered food waste other than for other losses as in Q.2 above.

Q6: Harvesting- pineapple leaves; coffee berries; cowpea/ground nut forage; sunflower, oat, wheat and barley seeds;

Post-harvest- straws/ stalks from maize (fresh/dry), straws from sunflower

Processing-Coffee hulls, pineapple/citrus and tomato pulps, cotton seeds & hulls, sunflower seedcake, cotton seed cake, soybean cake

Q7: Losses occur during harvest, transportation, post-harvest processing when there is no deliberate effort to utilize left-overs such as sunflower heads with/without seeds, pea pods, sweet potato vines, maize/oat leaves and stalks (during fresh and dry harvesting), various vegetables such as kales, cabbages, canning of food products (e.g. citrus, pineapples, sugarcane- a lot wasted including juices that may be energy sources for livestock).

Erastus KIRUIRO

Feed Resource Development Consultant

Development worker with an International Development Agency

### **First week, message 39: Opinion on messages**

Olawale F. Olaniyan, University of The Gambia and International Trypanotolerance Centre, The Gambia

It has been insightful reading previous comments sent to this forum. I will like to add few contributions:

Q1. FAO (2014) definition of food loss is ideal but not real in the context of developing countries. The delineating phrase in that definition is "intended for human consumption".

Such a definition applies to the developed countries that are relatively sufficient in food (grain) production and where acreage of land could be solely dedicated to planting of for example, maize as a forage crop. Because quantity of food (especially the grains) production is still below demand in many developing countries, crops are primarily cultivated to address the challenge of food insecurity.

Therefore when crops primarily cultivated for human consumption in the developing countries are used as animal feed, such practice can be considered as food loss.

Q2 and Q3. Just as the moderator pointed out "although in many African countries, cassava is grown/produced mainly for human consumption", there is no agricultural crop exclusively grown for livestock production in the Gambia. However, I know of a young farmer who is contracting other farmers to cultivate groundnut with the intention to collect hay from them after the harvest of groundnut seeds.

Q4. Rice is the main staple food in The Gambia. It is widely cultivated in the rainy season and in few irrigated fields during the dry season. Rice farmers are known for gathering rice straws as feed for livestock. This is used for personal animals or they are sold to livestock farmers who will store it and use it later. Sometimes, animals (cattle) are allowed to graze directly on the straws after paddy rice had been harvested. Also, groundnut hay is very much utilized by livestock farmers.

Q5. Yes. As explained in Q1.

Q6 a. rice straws, groundnut leaves and stems, cowpea leaves and stems, maize and sorghum straws,

b. tree crops: a lot of spoilt mango, cashew, orange fruits rotten and are lost in the field.

Q7. As previously explained.

Best regards and good continuation of this discussion,

Olawale F. Olaniyan

## **First week, message 40: Opinion on question 1**

My name is Steve Bartle; I am beef cattle nutritionist at Kansas State University, USA.

In the United States, we have the good fortune of producing an excess of most food items. This good fortune is due largely to a high amount of arable land per capita, often adequate rainfall, and wide use of production enhancing technologies. A food excess creates a different perspective and different decision points than much of the world. For example corn or maize can go into a regional storage facility at harvest, and then be sold in truck load lots into the food industry one day, for livestock feed the next, and for ethanol production the third. Obviously, almost all of the maize is useable as food, but market forces send substantial portions to other uses.

Question 1 – I do not think food fed to animals is a food loss in most cases. There are exceptions.

Question 2 – In the US, many grains (maize, wheat, sorghum) that could be used for human consumption are used for livestock feed. If the decision is made that an agricultural product is going to be used as a livestock feed, then it should not be considered a food loss.

Question 3 – In the US, vegetables such as tomatoes, carrots, and fruits such as apples and peaches are grown for food purposes. However, a portion is discarded because of bruises, deformities or other blemishes. Some of these products are used as livestock feeds. Another example that may fit this question is maize that is harvested as silage for livestock feed.

Question 4 – Maize and wheat are planted with the understanding that the resulting grain may go to either food or feed uses.

Question 5 – In the US, there are many processing by-products of the food industry that may be suitable as food but are used as animal feed. Examples include: corn gluten feed, corn germ meal, hominy, soybean hulls, soybean meal, wheat bran, wheat midds. Also, by-products from the ethanol and brewing industries are used as animal feeds. Examples include: corn distiller's grains with solubles, and brewer's grains; both are relatively high protein and high energy feed ingredients.

Question 6 – Crop residues such as wheat straw and maize stover are used as livestock feeds to varying degrees.

Question 7 – In the US, there is a large loss of food during the retail and consumption phases that could be used as livestock feed, but is not. These losses include items that are beyond their expiration date, bruises and blemishes, and what is termed "plate waste" or food that is prepared and served, but not consumed. Most of this food is not used as feed because of it is dispersed, difficult to collect, and the waste occurs in urban areas, where population is dense but there is little livestock.

Best,

Steve

Steven J. Bartle, Ph.D.  
Research Director  
Beef Cattle Institute  
Kansas State University  
Office: 785-532-4259  
Cell: 785-477-5353  
Email: [sjbartle@vet.ksu.edu](mailto:sjbartle@vet.ksu.edu)  
Web: [www.beefcattleinstitute.org/](http://www.beefcattleinstitute.org/)

## **First week, message 41: Opinion on questions raised**

HARYANTO Budi from Indonesia.

Reply to Q1: I think we have to have a similar definition of food; by definition food is the processed raw materials (foodstuffs intended for human consumption. Parts of raw foodstuffs or unprocessed foodstuffs may not be considered as food for human; therefore if we are talking about food loss and waste it means we are discussing about processed foodstuffs that are not utilized or wasted by human. By this means we are not talking about loss of foodstuffs. Different from foodstuffs, feedstuffs are intended indeed for animal feeding.

Responding to Q2: I think there is no example of agriculture product exclusively for animal feeding. Usually agriculture is intended for human consumption except for large business such as corn which is entirely to fulfill animal requirements.

Respond to Q3: I think there are many agricultural products which are initially intended for human consumption, but ultimately parts of the products are used for animal feeding.

Respond to Q4: Many agricultural production can be used for humans and animal feed even though the proportion is more for human needs. As an example is rice, corn, cassava or sugarcane.

I am not agree to the statement in Q5 because in some cases the agricultural production which is intended to produce food due to draught or extreme climate conditions the crops are damaged and it is possible to be used as livestock's feeds.

Responding to Q6 example of non food parts that can be used as animal feed are a lot such as those from estate crops byproducts or waste from industrial production of canned fruits.

Reply to Q7 example of non food parts that already used as animal feeds such as horticultural waste (cabbage, onion etc). Those has the potential as animal feeds but not being utilized such as corn cobs, palm fronts and byproducts of palm oil (solid decanters).

Regards,

Prof. Budi HARYANTO  
Ruminant Nutritionist  
Indonesian Research Inst. for Animal Production  
PO Box 221 Bogor 16002. West Java. Indonesia

### **First week, message 42: Opinion on questions**

I am Ericka McThenia, a graduate student from the United States fulfilling an internship for my thesis project (about food waste and food security) in Lima, Peru with the FAO.

I agree with many participants thus far and the response to Question 1.

I don't think food intended for human consumption is lost or wasted when used as animal feed. I think food is truly lost and wasted when it is not captured in any way, but rather sent to a landfill (which, unfortunately, is not so uncommon in the US). I don't have a heavy meat diet and I understand the inefficiency in the transfer of caloric ratio when feeding animals grains, crops, etc.; by using these grains and others to feed animals, that food was not grown in vain and nor are the resources (energy, water) for the production of that food used for nothing. I also think composting is an excellent use of food loss and waste, as it can return nutrients back to the earth, repair some of the highly degraded soils, and capture carbon. I believe food is truly lost or wasted when it is sent to a landfill, where it will not decompose properly and contribute to climate change, and therefore make the FSC more linear. But by feeding humans first, feeding animals, making compost, and using that to grow more food, we can make the FSC more circular.

I also agree with Dr. Bakshi (Message 13) regarding Question 7: "Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal



*feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages.*

My answer is that 'food loss and waste' that

a) are currently being used as animal feed Processing Mess/kitchen waste

b) have potential for use as animal feed but are currently not used as animal feed include: post harvesting fruits and vegetables during peak production season, processing potato chips waste, noodles waste, Kurkure waste, ice cream cone waste etc". In the US, I think there is a great opportunity to recycle some plate waste and other common food waste items either as animal feed or compost to local farms, the zoo, pets, etc.

### **First week, message 43: Opinion on questions**

I am Adelaja ADESINA, a private agribusiness consultant in Nigeria.

Q1. The use of the tubers like cassava in Nigeria as animal feed ingredients sometimes presents an opportunity to the producers of cassava to maximize their revenue when the prices for human products from cassava are unattractive. To that extent I disagree with the statement in Q1.

Q2. Pigeon peas (*Cajanus cajan*) are grown in some parts of Nigeria exclusively for feeding ruminants but rarely consumed by humans.

Q3. Yes. Cassava and groundnut.

Q4. Yes. The maize produced in Nigeria is essentially both for human and animal consumption.

Q5. Yes I do agree with the statement, since there was a pre-production focus.

Q6. a) Cassava peels, groundnut shells and leaves used to feed ruminants, wheat by-products, rice bran,

b) Cocoa husks

Q7. a) Cassava peels, wheat by-products, rice bran, b) Cocoa husks

Best regards

Dr Adelaja Adesina (Ph.D.)

Chief Executive Officer

Bdellium Consult Ltd

"Agric Business Solutions Provider"

### **First week, message 44: Opinion on questions**

I am Tunde Sigbeku from Nigeria. I work with the National Food and Drug Regulatory Body (NAFDAC)

I wish to thank all contributors so far as there have been informative responses.

I wish to strongly agree with all that have disagreed with the definition on question 1 (especially comments 1 and 6). From a regulatory point of view, food is defined as any substance, whether processed, semi processed or raw, which is intended for HUMAN and ANIMAL consumption. Kindly note that from the information available in the FAO Manual on Good Practice for the Feed Industry, any material intended for animal nutrition must be accorded the same level of hygiene and standard applicable to human food. It will of interest to all of you to know that the same regulatory measures are in place in Nigeria for both human food, animal feed and Pet food. The waste or by-product from food industry intended for animal feeding must be subjected to all necessary hazard evaluation before being approved. As rightly commented by Dr Ogar, (1st Comment) any animal that is raised with the intention of feeding man is regarded as food from day

one. However, what I want to see as food loss, as expressed by one of the participant, is food, that processed, semi processed or raw that is not consumed by human or animal due to poor quality, damage, spoilage or loss to natural disaster such as flood etc.

Wishing you all a wonderful conference

Thank you

Tunde Sigbeku

JP; RAS Head, Animal Feed & Premix Division (AFPD) Veterinary Medicine & Allied Products (VMAP) Directorate, NAFDAC Plot 1, Isolo Industrial Estate Oshodi - Apapa Expressway Isolo, Lagos

### **First week, message 45: Opinion on questions**

Dear colleagues, my name is Alexander Döring. I am from Germany, living in Belgium, working for the European Feed Manufacturing Federation as Secretary General since 1994. The responses below are my own personal observations and remarks, thus shall not be attributed to the European Federation I work for.

*Q1. According to the FAO's Definitional frame work of food loss (2014) ([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)) please see page 7, para 2e "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.*

I do not agree with this statement, since the main purpose of animal feed used for food producing animals is to produce food of animal origin for human consumption. Animal feed or food is therefore integral part of the food chain and therefore cannot be considered as food loss. Like other commentators have observed, the term food loss should refer the part of food production which leaves the food chain for various reasons (pre- and post-harvest losses).

*Q2. In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced exclusively for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand -- Moderators]*

In Europe a large volume of cereals are indeed used in animal feed, the EU feed sector including industrial and on-farm mixing, is actually the largest user of cereals grown in the EU, but very rarely are these cereals planted for an "exclusive" feed use, one exception being silage maize grown for on-farm mixing & feeding purposes. In fact most cereals can be used directly in human food production, or feed production or indeed non-food production (Biofuels, chemical industry, starch industry etc.). Feed wheat, feed barley or silage maize are good examples of field crops in Europe, whose most important market destination is feed use, but are certainly not grown for "exclusive" use in feed, as they could still be channeled for food production purposes or biofuel/renewable energy production (e.g. flour milling, ethanol production, starch etc) pending market conditions and quality specifications.

*Q3. In your country, are there agricultural products (foods) that are grown/produced exclusively for human consumption, and then a portion gets diverted towards feed production or used directly as feed ? Could you please give example(s) of such foods and elaborate on them?*

In addition to my comments above, I believe it is important to highlight that a significant volume of cereals in Europe is indeed specifically grown for food use under Identity Preserved growing programmes and contracts. "Diversion" to feed generally appears when the IP crop does not meet the contractual quality specifications, mainly due to adverse weather conditions (e.g. Durum wheat destined for pasta production, malting barley destined to the Malting industry).

**Additional clarification:** IP crops stands for **Identify preserved crops**. Identify preserved crops: a homogenous lot of a certain grain variety kept separate at harvest, from other grains in order to maintain the grain variety's specific quality characteristics, meeting the end users product specifications.

*Q4. In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal feed i.e. at the time of cultivation/production it is already known that the food is being produced both for human consumption as well as for use as animal feed? Could you please give example(s) of such foods and elaborate on them?*

As explained under Q2 / Q3, most of the field crops in the EU are planted without "a priori" knowledge of the farmer, of the final market destination ( exception IP programmes), however there is a market trend in the EU for more acreage subject to contractual growing programmes (IP programmes for food use and also the Biofuels & Renewable energy sector)

*Q5. In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part will not be considered as food waste. Do you agree with this statement? Feel free to elaborate.*

I agree with the statement that any product of the food chain but also the Biofuels/renewable energy sector, which is destined for feed use for food producing animals, cannot be regarded as waste. In fact waste cannot be legally used in the EU for feeding of food producing animals which are destined to be sold to market, as it does not meet the basic legal requirement on traceability and safety imposed by the EU's General food law.

*Q6. From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution, and consumption stages. [Note: non-food parts from agricultural products could be produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on --Moderators]*

The European feed industry uses today app 90 Mio tons of co-products from the food industry and the Biofuels industry. In practice any new technical process introduced in the food and "non-food" sector using agricultural raw materials may generate "new" co-products, which could be used in the feed sector provided, key requirements on safety and traceability are met.

*Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Please do not include non-food parts of agricultural products --Moderator]*

Former foodstuffs (e.g. cookie meal) is a growing segment in the EU feed supply chain. These are food products which for various reasons cannot be marketed as foodstuffs (broken biscuits, misshapen & mislabeled products etc). These products would become food losses unless they are used in animal feed. There is still additional growth potential both at food industry and retailer level to channel such products to feed use via dedicated processors of former foodstuffs, provided both food industry and retailer take up their responsibility to ensure product traceability and safety conditions for these products.

Just to remind you again:

Alexander Döring  
Secretary General  
+32 (0)2 285.00.506 +32 (0)2 230.57.22  
[adoring@fefac.eu](mailto:adoring@fefac.eu)  
[icon-twitter-thumbnail] @FEFAC\_EU  
FEFAC Annual Report 2014/2015 out now!  
rue de la Loi 223 bte 3  
1040 Bruxelles  
[www.fefac.eu](http://www.fefac.eu)

### **First week, message 46: Opinion on questions**

I am Yakubu ABUKARI, an animal production and extension officer, Ghana. Country of residence: Perth, Western Australia.

Q 1. Yes I will agree if the word losses is replaced with redirection for the definition to read "any **redirection** in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as **alternative food use** / food loss if takes a different route and longer time to reach the final consumer (man)". Here the loss in food is **time** for the item to reach a hungry man. The definition based on **intention** but not the final product to man seems flawed. Even in this current definition it cannot be considered as food loss since the final product will be utilized by man. It is worth noting that the animal product (egg, meat, cheese and milk) will provide better nutrition to man. A business oriented farmer who intended to produce maize for human consumption will not sell if prices are low but will sell for poultry feed production if they offer better price. I therefore disagree with the definition and concept.

Q2. *Cajanus cajan* (pigeon pea) in Nigeria as mentioned by Adesina [message 43 ... Moderators]. In Ghana *Cajanus cajan* (pigeon pea) is used as food for human consumption in Northern Region. The by-product is used to feed livestock in the dry season when feed resources are scarce.

Q3. Yes in Ghana maize is used to formulate feed for commercial poultry and pig production. In rural communities, farmers every morning drop some grains from maize, sorghum and millet to their local poultry and guinea fowls.

Q4. In Ghana if a peasant farmer produces maize, sorghum and millet solely for family (human) consumption. Surpluses from subsistence production could end up in feeding animals when bought by a pig or commercial poultry producer. However, a commercial producer might be producing for any of the outlet that gives the better price.

Q5. Yes I agree. Waste is when the final product does not benefit both man and livestock in any form.

Q6. a) Rice straw raw or urea treated for livestock feeding (post harvesting)

Groundnut haulms, Bambara haulms, pigeon pea haulms mostly in the Northern region of Ghana (post harvesting).

Sweet potato vines (post harvesting) and peels (processing and consumption), yam, cassava and plantain peels (processing and consumption).

Rice bran (processing)

Q6. b) Cocoa husk, orange pulp

Q7. a) Some soy cake (processing), brewer's malt (processing)

7 b) Shea and groundnut cake (processing)

Best Regards

Yakubu ABUKARI

Government extension worker (Ministry of Food and Agriculture, Ghana)

Master student (The University of Western Australia) - Perth, WA.

### **First week, message 47: Opinion on questions**

My name is CEBALLOS Silvia from Mexico. I am working in the Technological Institute of Mérida, Yucatán as a professor, teaching the subject: sustainable development.

Reply to Q2: In Mexico we do not have agricultural products that can be consumed by humans but are grown exclusively for animal feeding.

However, there are agricultural products such as sorghum and yellow maize produced in a high percentage in order to feed animals (about 98% and 70% of the entire production respectively) which are also used for human consumption.

Reply to Q5: I do not agree to the statement because I consider there is no difference before or after deciding that a part of food intended for human consumption is going to be used for animal feed, since the original purpose was not met. That is why I think it has to be considered as food waste.

Dra. Silvia Guadalupe Ceballos López

Instituto Tecnológico de Mérida

### **First week, message 48: Opinion on questions**

I am Khan Shahidul HUQUE working in Bangladesh Livestock Research Institute (BLRI), BANGLADESH

Q1; The answer is No; the views on 'food loss' definition expressed so far, in my opinion, may further be extended considering the following:

a) animals are creations for human benefits, so feeding of animals whether it is food, feed or non-food-parts is simply diversification of biochemical forms of biomass that support i) food (milk, meat, eggs), ii) clothing (hides/skins/hairs), iii) power (draft, traction), iv) livelihood (income, employment, women empowerment).

b) undigested biomass fed to animals (manure) is no more considered as wastes; solid or liquid manure are most potential raw materials for biogas, biopower, biofertilizer, biopesticide, condensed biomethane (CBioCH<sub>4</sub>) production.

So, redefining of "food loss" is essentially required, at least to change our common conception on feeding of animals, the immediate human benefactor; the present definition undermines the synergistic role of animals to human.

"Food loss" may be redefined as "unreachable food for intended uses"

Q2. Corn in Bangladesh

Q3. Broken rice; a rejected portion of rice millings, rural animal feeding practices on farm after boiling with some brans & others.

Q4. No

Q5. Yes, I agree, Potatoes/sweet potatoes/cabbage/tomatoes/pigeon peas, for example in Bangladesh some times, considering variable situations of both regional, seasonal, forward supports, are used for feeding animals in Bangladesh.

Q6. (a) Straws (rice, wheat, minor cereals); pulse offals, Sugarcane tops, leaves, b) Corn stover (harvesting), Banana pseudostems (harvesting), vegetable wastes (harvesting and marketing), potato plants (harvesting),

Q7. b) potato peels and wastes during processing for starch production, fruit wastes (Mango/pineapple etc) during processing

Khan Shahidul HUQUE

Chief Scientific Officer and Head, Animal Production Research Division  
Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh

### **First week, message 49: Opinion on questions**

I am Dr. RAJA KISHORE KONKA, Assistant Professor, Animal Nutrition, INDIA

Warm Greetings

Q1. The statement might not be absolute in the complete sense. These cereal and pulse crops are grown mainly for human consumption and part of the food crop is being used as animal feed. Normally the unfit or damaged food for human will not be used as animal feed, certainly the feed of optimum quality should be provided to animal. So, the statement may not be agreed completely from my side.

Q2. In India, no such food crops are exclusively grown for animal feeding which are normally being used for human consumption.

Q3. Yes. Cereal crops-Maize, jowar, bajra

Pulse crops- Red gram , green gram, black gram, bengal gram, ground nut etc.

Other crops-Sugarcane, oil palm, sunflower etc.

Q4. Yes. Maize is being extensively produced for human consumption and livestock (Mainly **Poultry**) consumption.

Q5. Yes. I agree with the statement as the agricultural product is subjected to prior processing and then fed to animals.

Q6. a) Rice Bran, Wheat bran, De-oiled rice bran, rice husk, shea nut cake

b) Palm press fibre, cocoa pods, Palm oil meal effluent, sugar cane press mud, Maize spent liquor, maize flour,

Q7. a) Straws and stovers of maize, jowar, green gram, ground nut haulms

b) Maize cobs, maize spent liquor, Fruit and Vegetable waste of different varieties.

Best Regards

**Dr. K. Raja Kishore, PhD**

Assistant Professor

Department of Animal Nutrition

NTR College of Veterinary Science

Gannavaram-521102

Andhra Pradesh, INDIA

### **First week, message 50: Opinion on questions 3, 4, 6, 7**

My name is Ismail Zaidi, I am from Tunisia and a Senior Zootechnical Engineer

#### Question 3 and 4

Yes, in Tunisia many products that are grown for human consumption are used if the price on the market is low, for consumption by livestock. For example: carrots, potatoes watermelons, melon and some fruits.

#### Question 6 + 7

There are more foods that are used for both humans and livestock and especially by-products from peas, beans, grains and also oats, barley and wheat straws that are used directly for animal feed or after urea treatment.

There are other materials like brewer's grain, tomato pulp, raisins, sugar beet waste, and waste of beans or peas after cleaning which constitute an important source for animal feed.

Other by-products are poorly utilized for livestock feed in Tunisia despite their huge quantity that includes olive pulp, and residues from processing of figs and other fruits.

#### **First week, message 51: Opinion on question 1**

I am Adebawale ADEBIYI from Nigeria.

In response to question 1,

I do not agree with the definition. In as much as such food and food products are provided to animals that also serve as food to man, this should not be considered as food loss or waste. Rather, it should be viewed as multi utilization of food/food products. Also, certain parts of these foods which are not particularly consumed by man are utilized as animal feeds (such as corn/rice/wheat bran, rice husk, cassava peels).

Department of Veterinary Microbiology & Parasitology, University of Ibadan.

"In science, curiosity may eventually save the cat"

#### **First week, message 52: Response to message 40**

Dr Perfecto Buyamba KABANSHI

I agree with the contributions in message 40 by Steve BARTLE, which implies that where there is excess agricultural production, the issue of food loss and waste takes a different angle. That is, the question of food loss becomes more evident at storage and consumption levels rather than whether the food is used by humans or animals.

However, when food is in low supplies like is the case often in some regions, there is always a nutritional conflict of interest between humans and animals.

Regards

#### **First week, message 53: Response to message 27**

I am Tej Krishan Walli from India

This is in response to the argument put forth by Niki Rust from UK. No one would question the figures quoted by her regarding the lower protein conversion ratios of producing various animal products from human foods, especially grains. But with the winds of change like prosperity and better purchasing power sweeping across the developing world, the demand for food products of animal origin is showing a steep rise. In these countries only limited amounts of grains are diverted for animal feeding, especially with regard to bovine feeding, which mostly thrive on crop residues, as the

major roughage and the byproducts of the grains, pulses and oil seeds and fruit and vegetable industries as the concentrate part of their diet.

Yes, in these countries, there is still an enormous food loss with respect to grains, oilseeds, pulses, cakes, fruits and vegetables. This is because of the lack of infrastructure for the proper storage of foods produced. Apart from rats and rodents stealing the food, a very heavy loss is due to fungal spoilage, so much so, it generally has a high level of aflatoxins and that makes them unfit for even animal consumption. What is in fact needed in these countries is a massive investment in building up the infrastructure for storage, especially the silos. That is the only way to check food losses and even divert a part of the food saved to animal feed.

Dr. T. K. Walli  
Former Head, Dairy Cattle Nutrition Division  
National Dairy Research Institute, Karnal  
Haryana, India.  
A part time FAO Consultant

### **First week, message 54, opinion on questions**

I am Netra P. OSTI from Nepal, working in the Animal Nutrition Division of the National Animal Science Research institute Khumaltar Lalitpur, Nepal

[www.narc.gov.np](http://www.narc.gov.np)

Q-1, It does not imply that all are food loss for example rice bran, wheat bran are good source of animal feeds, I mean which are not used in animal feed are food loss, like kitchen waste, potato waste, tomato waste when manufacturing tomato juice etc.

Q-2, Not such vast production, but cotton seed cake/meal is usually not being used in animal feeding.

Q-3, Yes. Maize (corn) is extensively used for human consumption but nowadays very much used for animal feed (poultry).

Q-4, Yes, many like maize for both human as well as animal feeding, sugarcane, cow pea, etc.

Q-5, Yes, such as bone meal, whey from milk, which are being used for animal feeding.

Q-6, (a) Molasses from sugarcane factories, rice and wheat bran, rape seed cake, sunflower cake etc

(b) Sugarcane bagasse, cotton seed cake/meal.

Q-7, (a) Rice bran/polish, Wheat bran, Rapeseed cake, sunflower cake, Sugarcane tops, Rice straw, maize stover.

(b) Sugarcane bagasse, cotton seed cake, kitchen waste, waste from industrial vegetables

Netra Prasad Osti

Senior Scientist (Animal Nutrition and Feeding) National Animal Science Research Institute (NASRI), Khumaltar Lalitpur, Nepal

[http://www.narc.gov.np/org/bio\\_netra\\_osti.php](http://www.narc.gov.np/org/bio_netra_osti.php)

Tel: 00977-1-5523039 (O)/ -1-4880682 (R)

Mobile: 00977-9803487112

Email: [n\\_osti@yahoo.com](mailto:n_osti@yahoo.com)/[ostinp@narc.gov.np](mailto:ostinp@narc.gov.np)

### **First week, message 55: Opinion on questions**

Dear colleagues:



I am Jiaqi Wang from the China, Chinese Academy of Agricultural Sciences.

Food loss is not the only issue, because we have also food byproducts in our industry. We should consider the byproducts and the loss as our valuable resources.

王加启

中国农业科学院

Jiaqi Wang, PhD, Professor

Chinese Academy of Agricultural Sciences, Beijing

### **First week, message 56: Opinion on question 1**

My name is Apeh OMEDE, from Nigeria but residing currently in Australia. I can be listed under Academia

Q1

To some extent, I do agree with the statement in Q1 in the context it was presented. If food that was intended for human consumption ends up as animal feed, especially if there are alternatives that could serve the purpose of animal nutrition and also when the people the food intended for have not met their basic nutritional intake requirements, then, this can be considered as food loss. This may be applicable in regions of the world where there are issues of food insecurity.

However, this loss is nothing compared to loss suffered all through the steps of the food supply chain.

But in a situation where the food used as animal feed is a leftover of surplus that may have reduced in quality, this may not be considered as food loss, as the low quality leftover food originally intended for human consumptions, when fed to animal after a certain level of processing usually results in highly quality animal food, which in turn serves as human food.

Apeh A. Omede

Lecturer/Researcher

Department of Animal Production

Kogi State University, PMB 1008, Anyigba, Kogi State, Nigeria

Google scholar: <http://scholar.google.com/citations?user=BGqa91oAAAAJ>

Twitter accounts: @jabulaniapeh, @ApehOmede, @theAgroYouthCentre

Facebook: facebook.com/apehomede, Skype: jabulaniapeh1

<http://www.theagroyouthcentre.wordpress.com>

<http://www.apehomede.blogspot.com>

[www.about.me/apehomede](http://www.about.me/apehomede)

PhD Candidate, Poultry Nutrition, University of New England, Armidale, 2351, NSW, Australia. [aomeded@myune.edu.au](mailto:aomeded@myune.edu.au), Office: +61 2 6773 3929; Mobile: +61 422 344 912, "Make the most of yourself, for that is all there is of you." ~ Ralph Waldo Emerson

### **First week, message 57: Opinion on question 1**

Dear All

My name is Reza Lotfi from Iran and I am a PhD candidate at the Ferdowsi University of Mashhad.

I am pursuing my PhD program in the field of ruminant nutrition.

I am grateful to you for your valuable information presented in this E-conference and to the moderators of this E-conference.

Reply to Q1: As you know, terminology is an important topic in a scientific subject and the definition in this case is incomplete because:

1-The term "Animal" in this sentence is not defined (mono gastric animals or ruminant animals). As you know, each group has different energy and protein requirements and different energy and protein systems as well as different digestive systems.

2-In order to have an acceptable feed efficiency and best responses in animal performance, food Loss is essential and inevitable.

3-Edible food loss and non edible food loss and competition between human and animals in this topic are important. Based on this topic, mono gastric animals and ruminant animals have difference value and cause change in our definition significantly.

4-Carbon and nitrogen footprint as well as mineral elements footprint in food chain production and animal feeding help us to improve our definition (Food loss and waste).

5-Food production practice and agronomy (for example, corn grain production) in all over the world is affecting our definition (import and export a cereal grain and food production per capita).

6-The ecosystem of each country defines Food loss.

7-Also, we should consider thermodynamic laws in food chain and food production (foods originated from Animal and plant source).

8-There is a difference in nutritive value of animal products and plant products in meeting energy and protein as well as other nutrients for human. Overall, sustainability in animal feeding as well as efficient management of food loss is important but this needs more attention and more consideration. Also, I have a suggestion and this is classification of Food Loss. This classification depends on many factors. For example, food loss in ruminant nutrition and poultry nutrition or food loss for in-country produced food products or food loss for imported food products and so on.

Finally, understating "Why" food loss is observed would be an important progress in better definition of term "Food Loss".

Food Loss = Feed Loss

The responses are my own personal observations and remarks.

Best Regards, Reza Lotfi

### **First week, message 58: Response to message 30**

Maria Theresa URSAL from the Philippines.

After reading WEERASINGHE's comments in message #30, I realized corn may have been used more for animal production than for human food, or perhaps 50/50 distribution, here in the Philippines. Poultry and swine as well as other animals like cattle have corn-based concentrate diets.

And kudos to Sri Lanka for being self sufficient in rice production.

Additional for Q#6: rice bran of different grades and rice hulls are commonly fed to animals. Soya pulp is also available but has a very short storage life due to high moisture content.

URSAL, Philippines

### **First week, message 59, opinion on question 1**

I am Onyejike Chinenye Keren, from Nigeria

I work as a Livestock Development Officer with the Federal Ministry of Agriculture and Rural Development; I am also an Animal Scientist.

Greetings

I do not agree with the first statement that feeding animals with food is waste. This is because animals themselves are food, so feeding them with food meant for human consumption is just like a form of recycling.

This also prevents waste in a form because, most of our crop residues /food outputs can be used in formulation of feed, examples are groundnut cakes, wheat by-products etc.

I completely disagree on the statement because in my country most of the feed ingredients used in formulation of feed are basically food ingredients.

Thank you.

Chinenye Keren Onyejike  
Livestock Development Officer  
Federal Ministry of Agriculture and Rural Development

### **First week, message 60: Opinion on question 1**

I am Johnson Oluwasola AGBEDE, a lecturer at the Federal University of Technology, Akure, Nigeria.

I want to appreciate those who have contributed to the on-going e-conference. Perhaps the only question I want to address is Question 1. I think the FAO definition of Food Loss is right. For instance, in government circle if certain amount of money meant for say building of road is diverted to building of say school, though the two are infrastructural facilities, the government will say this is misappropriation of fund and it is an offence. In the same manner an agronomist will see a maize plant grown on a yam farm (mono culture) as a weed if maize is not planted on such farm. Similarly, if a food item that is grown or processed for human consumption is diverted to the feeding of animal other than man, this can be considered as a loss to man. Thus, the purpose for which the food item is produced is a factor when defining 'Food Loss'. In a nut shell, I agreed with the FAO definition.

PROF. J.O AGBEDE  
DIVISION OF NUTRITIONAL BIOCHEMISTRY  
DEPT. OF ANIMAL PRODUCTION & HEALTH  
THE FEDERAL UNIVERSITY OF TECH.  
P.M.B.704, AKURE NIGERIA

### **First week, message 61: Opinion on questions**

I am Ghulam HABIB from Pakistan, a retired Professor of Animal Nutrition and working now for an international organization in Pakistan.

*Q1. According to the FAO's Definitional frame work of food loss (2014) ([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)) please see page 7, para 2e "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.*

Answer: I do not agree with this statement because foods such as grains, pulses, root crops when used as animal feed are converted to food of high biological value (milk, meat, eggs) that make essential part of the human food for balanced human nutrition. The efficiency of conversion of these products to human edible animal source food vary among animal species.

*Q2. In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced exclusively for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand -- Moderators]*

Answer: Human edible agricultural products that are used in animal feed shall not be considered as food loss. The priority of their use as food or feed is determined by the economy of scale. In Pakistan large part of maize that constitute part of human food is mainly used in animal feeding both as grain and in the form of maize fodder/silage. Similarly other coarse grains such as millet and sorghum are also used as animal feed in Pakistan and to a small extent used in human food. When price of sugar cane is low farmer feed it to animals instead of selling to sugar mills. Same is the case with turnips, pulses crops and small size potatoes. Some farmers prefer to feed standing wheat crop to animals as fodder and find this practice more income rewarding in the form of milk sale as immediate return.

*Q3. In your country, are there agricultural products (foods) that are grown/produced exclusively for human consumption, and then a portion gets diverted towards feed production or used directly as feed ? Could you please give example(s) of such foods and elaborate on them?*

Answer: Cereal grains (maize, millet, sorghum, wheat, rice, barley) are examples of food items part of which is diverted towards animal feed. In Pakistan 80% of the total maize produce is used as animal feed. The estimates for wheat, broken rice, millet and sorghum as feed are 3, 19, 61 and 5 percent of total produce, respectively and fluctuates over time in response to market dynamics. In addition to this, any damaged or failed cash crop due to weather conditions is diverted to animal feeding.

*Q4. In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal feed i.e. at the time of cultivation/production it is already known that the food is being produced both for human consumption as well as for use as animal feed? Could you please give example(s) of such foods and elaborate on them?*

Answer: At the time of cultivating grain crops, sugar cane, sugar beet, pulses the farmer aim in addition to grains for crop residues as animal feed. The monetary value of crop residues as feed vary up to 60% of the value of main crop. The farmer's choice for selecting grain variety also depend on how much straw/stover it would yield as feed for animals.

*Q5. In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part will not be considered as food waste. Do you agree with this statement? Feel free to elaborate.*

Answer: I agree with the statement that any part of the agricultural products and of all other items in the food chain which is channeled to feed use cannot be considered as waste because it is ultimately converted to human food by the animals.

*Q6. From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing,*

*distribution, and consumption stages. [Note: non-food parts from agricultural products could be produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on --Moderators]*

Answer: All fibrous parts of food supply chain which cannot be used as human food are utilized as animal feed to a varying extent in Pakistan. This include residues and byproducts such as straws after harvesting (wheat straw, maize stovers, rice straw, chickpea straw); cereal brans (wheat bran, rice bran & polishing, maize bran), oilseed cakes (cottonseed cake, maize oil cake, rape seed cake) and oilseed meals (cottonseed meal, rapeseed meal, corn gluten meal, sunflower meal, sugar beet pulp), molasses after processing; damaged and substandard grains (wheat, maize), pulses (chick pea), roots (sugar beet, turnips) at post-harvest distribution; and left over/refused bread, vegetables, fruit waste at consumption level. In addition new agricultural byproducts resulting from new industrial processing are getting available for animal feeding such as those obtained from biofuel industry.

Ghulam HABIB

PAKISTAN

### **First week, message 62: Opinion on questions**

My name is Philippe Leperre. I am a rural development and animal health consultant. Veterinary doctor and livestock & environment PhD

Q1: I disagree with it because it is too restrictive. Food loss, as I understand it, is food that could be used for human consumption and that isn't. What about the huuuuge amount of food wasted in MacDonald s, supermarkets, restaurants, airplanes, etc? In the name of food safety they are not used for feed. Actually as I write it occurs to me that food safety is one of the worst enemies of food security. In less"" developed"" countries, restaurant left-overs can be used as feed. Good or Baaad? The human world produces already enough food for much more than the present human population. But for business reasons a large percentage of this food is wasted (I mean going from producer to garbage without being consumed by neither humans nor animals) THAT is what I call food waste. And accessorily I accept that food that can be consumed by humans and is instead used for feed may be also called a food waste.

Q2 In my -adoptive or adopted- country (Laos) there is precious little agri product produced for feed except perhaps cassava for pigs, but only in one or two ethnic groups. In my original country they produce plant only for feed purpose -We only eat meat. Joke. :-)

Q3 Once again, here feed is just beginning to be an issue and in imported. Livestock is in majority feeding from the bush/forest

Q4 Not applicable here or very rarely

Q5 To me, as I said, what can be food and is not, is food waste. No matter the original intention. I thus disagree with the q5 statement. But a definition of a word does not need to be agreed with it just needs to be adopted to be used by all to make the exchange clear and avoid quid pro quo.

Q6 broken rice, rice bran, rice straw.

Q 7 a) fruit left overs, all sorts or food stall wastes b) coffee by products and spent ground coffee.

Best regards Philippe

### **First week, message 63: Response to messages 34 and others**

I am Niki Rust, Science Manager at Compassion in World Farming and am from the UK.

This is in response to message 34 and others who have commented on the fact that feeding crops to livestock is not a waste:

*"1) As for me I think that any loss in the food intended for human consumption used as animal food is not food loss but food transformation. I consider livestock or animals as transformers. They transform what we cannot eat and what we give them to food of higher value. This is so because at the end we still eat the animals or the products as food. Animals cannot be feed with food of same value as food they will produce or with same form they will produce. 1 kg of corn or of grass feed to chicken or ruminants respectively will not be same as the meat or milk they will produce."*

In fact eating a varied plant-based diet will provide just as much nutrition (and a healthier balance) than when adding meat. A plant-based diet is also better for the environment. Producing a healthier diet that is better for the environment and uses less land and resources is surely the kind of thing we want to head towards, no?

In response to message 35:

*"We should also note that we need more kgs of plant origin to make up the same quality protein, vitamins and minerals as in animal proteins."*

In fact, in developed countries, we eat too much protein (mostly from animal origin), which causes a whole host of health problems. Thus this protein is "wasted" because it is over consumed – it is not necessary for our health and actually damages it. Overconsumption of food is a waste and should be clarified as such.

Niki Rust  
Senior Scientific Officer  
Direct Dial: 01483 521 616

### **First week, message 64: Response to Message No 57**

I am Dr. Jacob AKYOO, a public veterinarian from Tanzania

I am responding to the point elaborated by REZA LOTFI (Message No 57)

THE EXPLANATIONS ARE TRUE AND SCIENTIFIC but I think we should talk more on ruminant and pig feeding considering food loss and waste. Ruminants and somehow pigs are the widely kept food animals which also compete with humans for grain requirements. This is a problem in Africa where grain production doesn't fulfill the public requirements. Still with brans, pollards, and low graded grains Africans can improve ruminants and pigs feeding and from what could be food lost / wasted mainly due to post harvest caused by poor storage, poor processing, poor machinery and lack of technical knowhow. For ruminants we can improve feeding by use of ammonization through urea fermentation of straws and supplementing with brans, grains and oil seed cakes.

### **First week, message 65: Opinion on questions**

I am, Dr. J. Raju, Ph.D. Scholar, Department of Animal Nutrition, Hyderabad Veterinary College, India.

*Q1. According to FAO's Definitional framework of food loss, any losses in the foods such as grains, pulses, root crops, etc. Intended for human consumption, if used as animal feed are considered as food loss. Do you agree with this statement?*

Answer: I do not agree with the definition of food loss. If the food intended for human consumption is in surplus and then it is diverted to animal feed, it may not be treated as food loss, as this food again enters the food chain in the form of animal products like milk, meat and egg for human use.

But in countries where food insecurity is a problem, food intended for human use is diverted to animal feed, it may be called as food loss as the conversion efficiency of animals is low.

*Q2. In your country, are there agricultural products that can be consumed by humans but are grown exclusively for use as animal feeding, and according to the above FAO's Definitional framework of food loss, any losses in such products (foods) will NOT be considered as food loss? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them?*

Answer: No agricultural products are grown exclusively for animal feeding as per my knowledge. But farmers are growing crops like Sorghum and Bajra for fodder purpose and they are harvesting them at flowering stage only. If they can allow these crops to mature, the produced grain may be used for human consumption.

*Q3. In your country, are there agricultural products that are grown exclusively for human consumption, and then a portion get diverted towards feed production or used directly as feed?*

Answer: Broken rice is used directly as feed.

*Q4. In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal? Would you wish to give example(s) of such foods and elaborate on them?*

Answer: Yes. Maize and Soybean

*Q5. A part of food, which was originally intended for human consumption, is to be used for animal feed, that part will not be considered as food waste. Do you agree with this statement?*

Answer: Yes. I agree with the statement. If the food originally intended for human consumption is in surplus and then it is used for animal feed, it may not be treated as food loss, as this food again enters the food chain in the form of animal products like milk, meat and egg for human use.

Q6. Answer:

a) Non-food parts that are currently used as animal feed:

Harvesting: Stover and straws of Cereal crops and millets, legume straws

Post harvesting: Sunflower heads.

Processing: Brans (rice and wheat), Pulse chunnies  
[chunnies are outer layer of pulses/legume grains ... Moderators].

Processing of grains: Distillery byproducts (DDGS, WDGS, CDS and maize gluten, Brewers spent grain etc.)

Processing of sugar industry: Bagasse, Molasses

b) Non-food parts which have potential for use as animal feed but not currently used as animal feed: Fruit industry waste (like pineapple waste, citrus pulp and peels), Maize cobs, Groundnut hulls, Red gram straw and Sugarcane tops are not exploited adequately for animal feeding.

Q7. Answer:

a) Food loss and waste that are currently being used as animal feed:

Hotel/kitchen waste

b) Food loss and waste that has potential for use as animal feed, but are currently not used as animal feed: Biscuit factory waste, Surplus vegetables and fruits, vegetables and fruits which do not meet the food standards in terms of size and quality

With regards

Dr. J. Raju, Ph.D. Scholar & ICAR-SRF,  
Dept. of Animal Nutrition, College of Veterinary Science, Sri P.V.N. Rao Telangana State  
Univ. for Veterinary, Animal & Fishery Sciences, Hyderabad,  
Telangana, India - 500030, Mobile No. 09492429878

### **First week, message 66: opinion on questions**

Hi, I am Dr. Muneendra KUMAR, working as Assistant Professor in Animal Nutrition Department, College of Veterinary Science and Animal Husbandry, DUVASU, Mathura, India.

I wish to thank all participants of FAO e-conference on 'Utilization of Food Loss and Waste as well as Non-Food Parts as Livestock Feed' so far as there have been informative responses.

Reply to Q 1.

I do not completely agree with the statement that "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". The definition of food losses (FAO's Definitional frame work of food loss, 2014) could be reasonable for developed countries but not for developing countries where food insecurity and poor nutrition are major issues. Among low income families, animal play a crucial role and provides food security and products of high nutritional values. In my opinion, diversion of surplus food and food with low cost and low nutrition values in animal feeding may not be considered as food loss.

Reply to Q 2.

In India, no such agricultural products that can be consumed by humans but are grown/produced solely for use as animal feeding.

Reply to Q 3.

Yes, cereal grains like wheat and rice are grown/produced exclusively for human consumption, and then a portion gets diverted towards feed production or used directly as feed. The market cost of these produce will decide whether they can use for human consumption or as animal feed.

Reply to Q 4.

Yes, cereal grains like maize, sorghum, pearl millet, oat, and barley that are grown for human consumption as well as for use as animal feed. Yes, at the time of cultivation it is known that these cereals are being produced for human consumption as well as for feeding of animals.

Reply to Q 5.

Yes, I am completely agreed with the statement that any agricultural products from the time it is decided that a part of that, which was originally intended for human consumption, is to be used for animal feed, that part will not be considered as food waste. In my opinion, this statement will also consider while redefining food losses.

Reply to Q 6. Non-food parts in the food supply chain which

a) Currently used as animal feed

Harvesting: Wheat straw, paddy, straw, barley straw, oat straw, pea, and gram straw

Post-harvesting: Maize, sorghum, and pearl millet stover

Processing: Rice bran, rice polish, wheat bran, gram husk, mustard cake, soybean meal, cotton seed cake, sesame cake, ground nut cake, and sunflower cake.

b) Have potential for use as animal feed but not currently used as animal feed;



Processing: Vegetable waste, apple pomace, citrus/tomato/mango pulp  
Distribution/Consumption stages: Fruits and vegetables damaged during transportation and fruits and vegetables unfit for human consumption.

By-products from breweries and sugar mills like spent wash, thin stillage, brewers soluble, babul pods and non conventional neem seed cake.

Reply to Q 7. Food stuffs from food processing industry and bakery which for various reasons cannot be marketed as foodstuffs (broken products, misshapen and mislabeled products). These products would become food losses unless they are used in animal feed.

Kind regards

Muneendra KUMAR

Dr. Muneendra Kumar (PhD)

Assistant Professor, Department of Animal Nutrition

College of Veterinary Science & Animal Husbandry\*\*DUVASU, Mathura –  
281001, India

### **First week, message 67: General opinions on food loss issues**

Hello, its' Manju WADHWA from INDIA

I was just thinking that we are talking about food loss, considering foods such as grains, pulses, root crops, etc. but food is not only about these groups, food includes fruits and vegetables, milk & dairy products and egg, fish, meat as well. If we redefine food then I think no food loss is there. Till now we were talking about conversion of so called food groups into animal products. Considering the old food pyramid or my new plate, all these groups of food are included, though their proportions have changed (in terms of saying goodbye pyramid ....hello to my plate). Environmental pyramid might say eat less of animal products and go vegetarian, but at the global level, the water foot print (on a per kg product basis) of milk compares favorably with other food sources (even lower than the cereals). On per unit of nutritional value as well, the water foot print compares reasonably well and is among the lowest when compared with other livestock products. Moreover the human-edible protein output : human-edible protein input ratio is highest for sheep and goats and lowest for intensive poultry (Dairy Asia: Towards sustainability, 2014).

Some people might think and some have mentioned that feed conversion efficiency is low in ruminants in comparison to other species, but we must not forget that the ruminants are part and parcel of mankind and every agriculture system.

If food is recovered in one way or the other, it should not be considered as a loss.

Dr. Manju Wadhwa

Sr. Nutritionist -cum- Head Dept. of Animal Nutrition GADVASU, Ludhiana

### **First week, message 68: Opinion on questions**

I am TELEU NGANDEU Emil, Senior livestock development specialist, International consultant, Yaounde Cameroon

Q1.

Yes we may agree that any losses in the food intended for human consumption, if used as animal feed could be considered as food loss since it did serve the main purpose that is used directly for human consumption. However it will not be definitely lost if efficiently used as animal feed, because this will result in producing animal protein for human consumption. So for me it depends on how we turn problems into opportunities. This said, I am aware of many questions that could be raised such as feed efficiency.

Q2.

No in Cameroon there are no agricultural products (foods) produced exclusively for use as animal feeding.

Q3.

Yes. For instance, corn produced in Cameroon is primarily meant for human consumption but part of it is used for compound feed for animal feeding notably poultry and pigs. This is also true for cassava and soybeans. This situation is a matter of permanent concern because the quantity of corn produced locally for instance is very low, thus high prices with direct effect in the production cost of meat (chicken, pork and eggs). On the other hand and corn is very often imported to fill the Gap.

Q4.

Yes as developed in Q3. You know, there is no clear line on this matter. But since Cameroon has a very important livestock sector it is evident that at the time of cultivation/production farmers who are in search of revenues are on the watch to see where they can get more out of their products. This said, it must be known that corn for instance is a main staple food in Cameroon (more than 70% of corn produced is consumed by humans). The remaining 30% is shared between the animal feed industries, breweries and others. Thus the need to import corn for feed. The competition between animal and humans for some agricultural products in Cameroon is a matter of concern especially related to monogastrics.

Q5.

We may agree with this statement. But for a nutritionist it depends on other factors such as feed efficiency. The question is whether it is more efficient for instance to use cereals for meat production? It is a matter of comparative advantages since at the of the day the outcome is to feed human beings, and the meat produced using agricultural products is meant for human consumption

Q6.

Currently used as animal feed

During harvesting: straws, sorghum

Post-harvesting: cereals, corn (poorly stored)

Processing: millings by-products, palm kernel, palm kernel, pits, bones

Distribution: spoiled /expired tomatoes, fruits,

Consumption stages: oyster shells, banana peelings

TELEU NGANDEU Emil B.Sc, M.Sc (North Carolina, USA 1982)

Senior Livestock development specialist

Animal nutritionist, Certified LEGS trainer

International consultant

(Former sub/Director animal feeds and feeding, and retired Director of studies, statistics and Cooperation in the Ministry of Livestock, Fisheries and Animal Industries, Cameroon)

### **First week, message 69: Opinion on questions**

I am Bola Adedugbe from Nigeria. I am a member of YPARD and Agribusiness consultant.

I do not agree with Q1 and I totally support Ogah's submission (Message No 1)

Q4: I would say yes, because in Nigeria we have cassava, maize, groundnut etc as examples.

Bola Adedugbe

YPARD Nigeria

Farmideas Nigeria

### **First week, message 70: Opinion on questions**

I am Santiago Carralero, a Spanish historian and anthropologist specialized on nomadic/mobile cultures, now working on yak-herding context

Q1. From a global anthropological perspective I not only don't agree with this definitional frame work but also I don't consider the term "loss" appropriate, since any natural resource (and any resource found on Earth, weather natural or transformed, comes from nature itself).

Hence, I prefer to speak of "waste", as most of the food consumed by humans need energy (combustible, time) to be collected, preserved and processed, and any loss in this sense cannot be considered a "loss" in absolute terms, but rather a waste of energy for humans.

Q2. Although my native country is Spain, my usual fieldwork is developed in the realms of yak-herding cultural context (high mountain areas of Central Asia). There, animals are almost exclusively fed by grass. But this grass is later transformed into dung, which provide combustible for food preparation for human consumption, therefore again one cannot speak about these issues in such categorically way, and the conclusions reached by this non-inclusive methodological framework will be wrong.

Q5. We cannot think about the world as a global larder intended for human consumption. Hunter-gatherers get a significant portion of their food directly from nature and they consume it without any previous processing. In this sense they eat the same thing that the animals living around, being that domesticated or wild. Some agro-pastoralists could use part of their crops intended initially for humans for the animals when winter hazards make the access to grass very difficult. However, these cases don't point out to the subject of loosing of food, but again of loosing of energy, or better said, waste of energy, the energy spent by humans to get this food ready to be consumed by them. Specially, for pastoralists any supply of food provided to their herds is a guarantee of obtaining milk and dairy products, meat and animal fibers for themselves. Natural pasturage is not only the best feed for animals but also the less expensive in terms of "energy use" for the herders.

### **First week, message 71: Response to message 27**

Although the statement of Niki Rust (message 27) is accurate for developed countries this statement seems not to be true in developing countries.

In developing countries, high human population limits utilization of land for fodder production. Therefore, most of the animals thrive on agro-industrial by-products and no and/or very small piece of land is used for cultivation of fodder crops. Along with that, animals are best converter of poor quality agro-industrial by-products into animal products of high nutrition values.

Kind regards

Muneendra KUMAR

### **First week, message 72: Response to message 62**

My name is Charles Okoli, Federal University of Technology Owerri, Nigeria.

I wish to contribute again.

Philippe Leperre (Message 62) has made some strong points mentioning that *"food safety is one of the worst enemies of food security"* and *"accessorily I accept that food that can be consumed by humans and is instead used for feed may be also called a food waste"* and *"for business reasons a large percentage of... food is wasted.... going from producer to garbage without being consumed by neither humans nor animals"*.

I believe that these comments underscore the essence of the present debate (Food security moralities?).

Charles

Okoli Ifeanyi Charles  
Professor of Tropical Animal Health and Production  
Tropical Animal Health and Production Research Lab.,  
Department of Animal Science and Technology,  
Room 102, SAAT ETF Building  
Federal University of Technology,  
PMB 1526 Owerri, Nigeria

### **First week, message 73: Response to message 63**

I am Mahesh CHANDER from the Indian Veterinary Research Institute, responding to Message 63 (Niki Rust)

Yes, in developed countries there is too much consumption of animal protein, thus, most of the food grains consumed as feed (not necessarily food loss!!!). This is increasingly being realized compelling people to think of sustainable diet- to eat less meat, consume more plant based products including legumes to minimize environmental & health problems. Livestock are blamed for degrading & polluting environment, then why not to reduce dependence on them. Recently at the 1st International scientific conference of the International Society of Organic Agriculture Research (ISOFAR), Goesan (S.Korea), sustainable diet was prominently discussed. This discussion may be a little away from the theme, nevertheless relevant, considering health and environmental implications of raising livestock!

Mahesh Chander  
Dr Mahesh Chander  
Principal Scientist & Head Div of Extension Education  
Indian Veterinary Research Institute, Izatnagar-243122 (UP) India

### **First week, message 74: Response to messages 63 and 34**

I am Dr. Sharif Ahmed Chowdhury, working as Livestock Specialist in PKSF Bangladesh

This is in response to message 63 of Niki Rust, UK.

*"In fact eating a varied plant-based diet will provide just as much nutrition (and a healthier balance) than when adding meat. A plant-based diet is also better for the environment. Producing a healthier diet that is better for the environment and uses less land and resources is surely the kind of thing we want to head towards, no?"*

I think message 34 is right as *"any loss in the food intended for human consumption used as animal food is not food loss but food transformation"*.

In message 63 a point that is missed is that animal is a part of natural food chain. Whether we eat them or not animal is there and will be there as an important component of food chain. The problem lies with us with the fact of irrational or disproportionate use of foods of animal origin in our diet. This should not be used as the basis of any definition.

### **First week, message 75: Response to message 63**

Dr Jude Capper, Livestock Sustainability Consultant, UK (formerly USA) in response to message 63 from Niki Rust (CIWF).

The point that is so often missed by groups opposed to animal agriculture, is that dairy and beef cattle in a grazing and supplemental feed system produce more human-edible energy and protein than they consume. Thus the discussion should not be "We shouldn't

eat animal products" but "We should make the best use of human food and animal feed resources", which means using human-inedible crops or crop components as animal feed. Converting to whole-scale vegetarianism and veganism increases the reliance on fossil fuel-based fertilizers (due to a lack of animal manures) and increases the land requirement per kg of plant protein due to the production of legumes as green manures. While it is convenient to suggest that removing livestock production is better for the environment, examining carbon emissions alone does not account for land use, biodiversity, maintenance of natural rangelands nor the myriad of non-food benefits of livestock including fibers, hides, draught power and social status. Simply because we can replace meat with plant-based proteins is not sufficient rationale for doing so.

Overconsumption is indeed a significant problem in the developed world, but this is not confined to animal-based foods. It is entirely possible to waste food through overconsumption and incur consequential health issues on a vegetarian or vegan diet.

Email: [jude@livestocksustainability.com](mailto:jude@livestocksustainability.com)

Websites: <http://bovidiva.com> and <http://wsu.academia.edu/JudeCapper/talks>

Twitter: @bovidiva

### **First week, message 76: Opinion on questions**

I am Mohammad Salah UDDIN Senior Officer (Animal Nutrition) cattle feed plant Bangladesh milk producer's co-operative union limited, Bangladesh

Q.1: I disagree with the statement in Q1 because I don't think food for human consumption is lost or wasted when used as animal feed but food transformation. I think food is truly lost and wasted when it is not captured in any way. These ingredients are transformed into food and recyclable nutrients (in manure) and FSC remains a loop always. I consider livestock or animals as transformers. They transform what we cannot eat and what we give them will become food of higher value for us. This is so because at the end we still eat the animals or their products as food. Animals cannot be fed with food of same value or form as food they will produce. 1 kg of corn or of grass feed to chicken or ruminants respectively is not the same as the meat or milk they will produce.

Q 2: In Bangladesh there are no food crops grown for animal feeding only. But nowadays most maize is grown and a larger portion used in monogastric feeding (poultry and pigs) and cattle feeding in commercial farms.

Q3: In Bangladesh these are maize, soybean, sweet potatoes. Some varieties of bananas are grown for human consumption but to some extent used as livestock feed.

Q4: In Bangladesh maize and soybean are cultivated nowadays for human consumption and for animals' consumption. Broken rice; a rejected portion of rice milling is used as an animal feed.

Q5: Yes I agree with the Q5. Potatoes/sweet potatoes/cabbage/tomatoes/pigeon peas, for example in Bangladesh.

Sometimes in the milk industry some milk solids are burnt (app.0.4%) during milk powder production in dryers that could be used as calf milk replacer. During ghee production some milk solids (residual) are burnt (app%2) that can be used as by-pass fat with some mineral and a little bit of protein.

Q6 Q7

a) Straws (rice, wheat); pulse residues, sugarcane tops, leaves

Corn Stover (harvesting), Banana pseudo stems (harvesting), vegetable wastes (harvesting and marketing), potato plants (harvesting), Soybean plants (harvesting), rye plants (harvesting). Sometimes in the milk industry some milk solids are burnt (app.0.4%) during milk powder production in dryers that could be used as calf milk replacer. During ghee production some milk solids (residual) are burnt (app%2) that can be used as by-pass fat with some mineral and a little bit of protein.

Many thanks

Mohammad Salah UDDIN BSc (A.H), MS (Animal Nutrition) BAU  
Senior Officer (Animal Nutrition), Cattle feed plant, Bangladesh milk producer's co-operative Union limited (Milk vita), Bangladesh

### **First week, message 77: Opinion on questions**

I am BOUGOUMA YAMEOGO Valérie M. C. Associate Professor in Animal Science, Institute of Rural Development, Polytechnical University of Bobo-Dioulasso

Q1: The definition is incomplete. Include: any food used for animal feed is only partially a food loss.

Q2: Yes. For example corn is given to hens and chickens. Although humans could eat it, this kind of corn is exclusively grown for animals.

Q3 Yes, for example rice although it is produced exclusively for human consumption. Moreover, crops like corn and sorghum that are produced for humans are with some parts used to feed cattle, especially those cattle that are raised by the same producer.

Q4: Yes. The maize produced in Burkina Faso is essentially for humans and animal consumption (Majorly poultry, pork).

Q5: Yes, I do agree with the statement.

Pr BOUGOUMA-YAMEOGO Valérie M. C.

Maître de Conférences, Zootechnie-Nutrition Animale Directrice de la Promotion des Enseignants et Relation avec le CAMES (DPE-CAMES) Chevalier de l'Ordre National Institut du Développement Rural Université Polytechnique de Bobo-Dioulasso01 BP 1091 Bobo-Dioulasso, Burkina Faso

### **First week, message 78: Additional comments to message 30**

I am WEERASINGHE, Researcher from Sri Lanka

In addition to my disagreement to the question No1 (message No 30), I have seen majority with the same opinion. However, few have agreed to the definition. Their main argument is that the efficiency of converting food into animal product is far below that directly consumed by humans and therefore food (human) going through animal production cycle is a waste. This has been counter argued by many, so I am not going again to mention those.

But if we consider that human food used for animal production is a waste, should we discourage animal products? As the production efficiency of food animals is increasing steadily thanks to genetic improvements and better feeding, more and more quality food, which can be used for human consumption is going for animal feeding. Nutritionists may agree that modern livestock feeding cannot rely 100% on crop residues and agricultural by products without compromising the production and profitability. And, as we encourage rural farmers to have profitable livestock enterprises rather than dependant, inefficient farming, what kind of feed should we recommend?

We all know that developed nations use huge amounts of cereals for livestock feeding and produce affordable animal protein for their population. Shouldn't we encourage the same in the developing world? We have to remember that the reason why farmers are going away from livestock in most parts of the developing world is mainly due to the low production and profitability of their animals, in which feeding is the main contributing factor.

In addition, food preference; whether plant originated food or animal originated is a human right and intake of minimum amount of animal protein is a proven fact. As developing countries are far below that consumption level, shall we try to increase animal

production only through crop residues and agricultural by products or through better feeding of animals including some human food; not categorizing them as a waste?

Hope colleagues may critically analyze this.

Dr WMPB Weerasinghe, BVSc, MSc (Sri Lanka), PhD (United Kingdom),  
Veterinary Research Officer,  
Veterinary Research Institute, Gannoruwa, Peradeniya, Sri Lanka.  
Tel: +94718154286

### **First week, message 79: Opinion on questions and response to messages**

Hi everyone, better late than never!

My name is Maria Florencia CARZON, from Argentina. I'm about to get my degree on human nutrition

Q1. According to the FAO's Definitional frame work of food loss (2014) "*any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss*". Do you agree with this statement? Please elaborate on this.

I don't agree. I think it only could be consider as food loss if those animals don't get to people's plates. So at this point I agree with message 3 from DIJKSTRA, when he says "*food used for animal feed is only partially a food loss*". However, producing food to feed animals is transforming their value. So here I agree with message 67 from WADHWA. That definition is really clear. And I also agree with message 40 and 52. It depends from which country we are talking about. I tend to consider the use of food for biofuels as food waste, but I still have my doubts.

Q2. *In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced\*exclusively \*for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them?*

An example in Argentina would be soybeans. They are produced for use as animal feeding that we export.

Q5. *In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part **will not be considered as food waste**. Do you agree with this statement? Feel free to elaborate.*

Again here I agree we won't consider as food waste if the animals get to people's plates.

Regards!

### **First week, message 80: Opinion on questions and comments**

Hi, this is Agha Waqar Yunus, Senior Scientist, National Agricultural Research Center, Islamabad, Pakistan.

I am speaking on behalf of our Animal Nutrition Group.

I would like to congratulate this team on arranging such activities. Due to their initiatives FAO is becoming more and more noticeable. I hope that benefits of these activities will be transferred to the food producers and consumers.

#### Q1: The definitions

I think Santiago Carraler has very rightly pointed out the philosophy of the terms which were being missed in the discussion. To extend this point further, I would like to highlight that even the grains lost in the fields (imagine about straws left in fields) are not wasted as those are ultimately broken down to crop nutrients. So does that mean NO food loss has occurred?

I believe that we are somehow overlooking the purpose of the terms "loss" and "waste" in the discussion. It should be noted that food spoilage is already included in the term loss while excluded from the term waste. As a matter of fact, the food being used in livestock feeding, whether being transformed to a better form, is no more available for human feeding. Therefore, if the term waste is not acceptable then we need to find an alternate to describe that a certain percentage of a certain food is not available for human consumption but has been used elsewhere for transformation to a better form. Before this is achieved, the present terms loss and waste in my opinion are well phrased by the FAO.

Last but not the least; we need to come up with definitions and terms that facilitate accurate but at the same time simple calculations of food losses and waste/"transformation".

Q2. Crops exclusively for animals: Sorghum is grown exclusively for animal use.

Although not exclusively for animal use, the major part of millet goes to animal feeding.

Q3. Crops for humans with some part going to animals. Just like in other countries in the Indian sub-continent, some parts of the rice goes to chicken feeds. Some percentage of wheat used to be utilized in chicken feeds but for the last decade such use of wheat is legally prohibited. Sugarcane is grown for sugar production, but also used at times for ruminant feeding.

Q4. Crops for both human and animals: Maize is grown for both purposes and the purpose is not known until the produce is purchased by the end user. Unfortunately, the best quality grains go to animal production.

Q6 On non-food parts: a. Harvesting: straws of most grains are used in livestock feeding. Processing: rice polish, rice bran, maize oilcake, corn gluten, sugarcane molasses etc are used in animal feeding.

b. Although some percentage is used, most of the groundnut and cotton stovers, citrus pulp, and banana leaves etc are lost without any use in animal feeds.

Q7. On Food loss and waste:

- a. Wasted bread, and bakery items are used in livestock feeding
- b. b. None is known at least to me.

Kindest regards

Agha Waqar YUNUS PhD/Dr. scient. vet. (VMU Wien)

Senior Scientific Officer

Animal Nutrition Programme National Agricultural Research Centre Park Road, 45500 Islamabad

Tel: +92 51 90733936 | Assistant Professor Animal Genomics and Biotechnology PARC Institute of Advanced Studies in Agriculture NARC Campus, Park Road, Islamabad

#### **First week, message 81: Opinion on questions**

I am Dr. A. K. Nagpal, Principal Scientist (Animal Nutrition) working in National Research Centre on Camel, Bikaner (Rajasthan) India

I appreciate and congratulate FAO for its initiatives and participants for their valuable comments.



About Food Loss or Food Waste, I am of the opinion that only that part of the food (cereal grains, pulses, oilseeds) and feed (straws, stovers, haulms cobs, cereal, brans, pulses, chunies, oil cakes and fodder should be regarded as Food loss or waste which gets spoiled and rendered unfit for human /livestock consumption due to moisture/rainwater or fungal infestation and is dumped in soil/landfill.

### **First week, message 82: Response to message 63**

I agree with the statement of Niki Rust (message 63) that "any loss in the food intended for human consumption used as animal food is not food loss but food transformation. They transform what we cannot eat and what we give them to food of higher value."

Kind regards

Muneendra KUMAR

Dr. Muneendra Kumar

Assistant Professor, Department of Animal Nutrition

College of Veterinary Science & Animal Husbandry, DUVASU, Mathura

281001, India

### **First week, message 83: Opinion on questions**

Dear All,

My name is Rogerio M. Mauricio, working on animal science in Brazil.

*Q1. According to the FAO's Definitional frame work of food loss (2014)*

*[http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf) ) please see page 7, para 2e "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.*

I agree with the definition. It is considered "loss" for human use only. But if it is possible to be used for animals it will not be considered loss, could be food by-products? Example: There are several fruits, legumes which are not appropriate for supermarket which goes direct to animal feeding.

*Q2. In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced exclusively for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand -- Moderators]*

In Brazil in the arid zone there is one cactus (palma forrageira) that is "mainly" produced for animal feeding. However, according to needs it could also be used as food.

*Q3. In your country, are there agricultural products (foods) that are grown/produced exclusively for human consumption, and then a portion gets diverted towards feed production or used directly as feed ? Could you please give example(s) of such foods and elaborate on them?*

Cassava is most of the time produced as food but according to quality it could be used as animal feed.

*Q4. In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal feed i.e. at the time of cultivation/production it is already known that the food is being produced both for*

human consumption as well as for use as animal feed? Could you please give example(s) of such foods and elaborate on them?

Rice is a good example. According to the size of the grains or even if it is broken or not it could be used for animal feed.

Q5. *In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part will not be considered as food waste. Do you agree with this statement? Feel free to elaborate.*

I totally agree. It is the case of soybean which after the oil extraction the residue could be used for animal feed. In this case it will be considered food by products for animal feed?

Q6. *From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution, and consumption stages. [Note: non-food parts from agricultural products could be produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on --Moderators]*

A - Grains husks/parts (soya, rice, wheat etc.) are good examples of "non-food parts" used for animal feed.

B - Supermarket waste is a good example (vegetables, fruits)

### **First week, message 84: Response to message 63**

Rogério M. Mauricio again

I also agree to the message 63: In nature nothing is created, nothing is lost, everything is transformed (Lavoisier!)

Could be applied?

Rogério M Mauricio

### **First week, message 85, response to message 75**

Hello, Manju WADHWA from INDIA again

In response to message 75 of Dr Caper "*While it is convenient to suggest that removing livestock production is better for the environment, examining carbon emissions alone does not account for land use, biodiversity, maintenance of natural rangelands nor the myriad of non-food benefits of livestock including fibers, hides, draught power and social status. Simply because we can replace meat with plant-based proteins is not sufficient rationale for doing so*".

I fully agree with her for the simple reason that animals are the integral part of the sustainable agriculture, sustainable food security and sustainable nutritional security. People who are below poverty line, I will take the example of *gujjars* (taprivias or people on the move) might not have a place to live, but will always have dairy animals (cows, goats), they feed the paddy straw or any crop residue to have milk for their family.

The objective is to have efficient utilization of food waste; directly by channelizing the food waste (not consumed and is off the shelves) to the underprivileged people or indirectly by feeding to animals before it gets spoiled or infested with microbes.

I am also of the opinion that use of grains for beer (the most consumed alcoholic beverage in the world) production is a sheer food waste. Why do we need to drink it when we have so many things to eat and drink? Why this grain can't be used for poor people?

Regards

Head Dept. of Animal Nutrition GADVASU, Ludhiana.

### **First week, message 86: Opinion on Q3**

Fola YUSUF from Walter Sisulu University, South Africa

In answering part of question three, gliricidia septum (Yoruba- Agunmaniye; Hausa-Zogale) is a tree crop planted for feeding goats and sheep in confinement. The tree crop is used for fencing while the leaves are harvested for feeding the goats. Unfortunately, this practice is dying amongst the smallholder farmers but still common with the resource poor farmers in the rural areas. It was common in the 60s and 70s in South West Nigeria and to the Hausa, it is a food crop. It is nutritious and of high medicinal value. Its medicinal values had been confirmed in several literatures.

Dr. Fola Yusuf  
Post-Doctoral Fellow

### **First week, message 87: Response to message 53**

I am Dr. N. Nalini, Associate Professor & Head, Department of Animal Nutrition, College of Veterinary Science, Hyderabad, India

I quite agree with the response of Dr. T. K. Walli (message no. 53) that, diverting food to animals is not a food loss. Food loss occurs more during the harvest, post harvest and processing phase in developing countries and this is due to poor infrastructure, poor temperature management, low levels of technology and low investment in the food distribution systems, especially the cold chain. Lack of the utilization of sustainable cost effective post harvest practices is leading to high levels of food loss on the farm and in whole sale and retail markets. Improving the methods and practices will minimize the food losses and a part can also be diverted towards animals thereby increasing the human food quality in terms of milk, meat and eggs.

Regards,

Dr. N. Nalini

### **First week, message 88: General comment about food loss**

Sirs/Madams. My Name is ABIOLA Olusoji from Nigeria

I wish to add another dimension to the food loss theory. Can the food planted or produced for humans actually consumed without also being fed to animal? If this is not possible which I believe so then that food given to animals is not "loss" at all. We need to project animals into the food chain to make the food chain complete.

PEACE OF GOD BE WITH YOU AMEN.

### **First week, message 89: Opinion on questions**

Hi, I am Gregory Ndwandwa Sikumba, Nairobi Kenya

*Q1. According to the FAO's Definitional frame work of food loss (2014)([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)) please see page 7, para 2e "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if*

*used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.*

Answer: I do not agree because crop residues are a major source of livestock feed in sub-Saharan Africa especially in the dry season. They are not losses because they can be sold to farmers who have a lot of livestock but little or no grazing land. [Comment of the Moderators: Q1 does not refer to crop residues]

*Q2. In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced exclusively for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand -- Moderators]*

Answer: In east Africa, most farmers do not grow forages; they mainly rely on natural pasture and crop residues. Only commercial dairy and beef farmers grow maize as fodder specifically to make silage. Also commercial feed producers for poultry, fish farming and pigs also grow maize and other crops to make feed.

*Q3. In your country, are there agricultural products (foods) that are grown/produced exclusively for human consumption, and then a portion gets diverted towards feed production or used directly as feed ? Could you please give example(s) of such foods and elaborate on them?*

Answer: In East Africa crop residues Cereals (Maize stover and rice straw), legumes (beans hulls, cowpeas and pigeon peas) and Sweet potatoes vines are diverted to livestock feed.

*Q4. In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal feed i.e. at the time of cultivation/production it is already known that the food is being produced both for human consumption as well as for use as animal feed? Could you please give example(s) of such foods and elaborate on them?*

Answer: Most livestock farmers in East Africa grow cereals and legumes for food consumption and use the by-products and residues for cattle feed. Those who don't have livestock sell their crop residues to livestock farmers.

*Q5. In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part will not be considered as food waste. Do you agree with this statement? Feel free to elaborate.*

Answer: I agree

*Q6. From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution, and consumption stages. [Note: non-food parts from agricultural products could be produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on --Moderators]*

Answer: During harvesting, maize stalks and cobs are usually wasted because they cannot be chewed and swallowed by the animal. This is a source of feed wastage but if

processed using a forage chopper to make them palatable, these feed sources could be made available to livestock. New technology has also shown that cassava peels can be used as livestock feed. Same applies to sweet potato vines. <http://news.ilri.org/2015/07/09/from-food-waste-to-animal-feed-cassava-peels-potentially-big-business-for-nigerian-women/>

*Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Please do not include non-food parts of agricultural products --Moderator]*

Answer:

A. Kitchen by products for pig feeding and immature maize spoiled due to drought is converted to silage and fed to cattle.

B. nil

C. nil

Gregory Ndwandwa Sikumba | PhD Graduate Fellow  
International Livestock Research Institute |ilri.org |P.O. Box 30709|Nairobi, Kenya  
Office Phones: +254 39-2-081154/5| Mobile: +254 713762838| Skype: gregorysikumba  
Email: [g.sikumba@cgiar.org](mailto:g.sikumba@cgiar.org)

### **First week, message 90: Opinion on questions**

My name is Ricardo Luis SAGER, from Argentina; I work as Manager of Scientific and Technological Development of the National Institute of Agriculture Technology, and as Animal Nutrition Professor at the University of San Luis, (Argentina).

Q1: I agree with most of the colleagues that if for any reason, food intended for human consumption is used as animal feed this should not be consider as food loss. In some cases, the use by animals increases nutritional value of the actual food.

Q2. Yes, in Argentina, Sorghum is the best example. In some countries, Sorghum is intended for human consumption but not in Argentina. With some restrictions, when we talk about corn production we do not take into account that there are something like 40 or more varieties of corn, some of them are exclusively produce for human consumption and other just for feed.

Q3. Yes, and it is common with fruits (apples, pears), fresh vegetables (lettuce) and roots crops (Carrots, anions, potatoes), because production (yield) exceeds human needs prices go down and the surplus is fed to pigs or processed and preserved to feed ruminants.

Q4. Yes, corn is the example. Corn yield depends, among other things, on proper amount of rain and temperatures, but in some marginal areas of Argentina, if corn yield is not high enough as to harvest it for food, it is used as bovine feed (deferred standing corn).

Q5. Yes, I agree with the statement of "will not be considered as food waste". By the time agricultural products are ready for use, prices or specific type of demand could indicate that it would be better to transform primary products (grains) into secondary products (meat, milk).

Q6. Non-food parts

a) **Currently used as animal feed:** Corn stalks (harvesting), Gluten feed (processing), Gluten meal (processing), Distiller grain (ethanol industry), Soybean hulk (harvesting), Peanut husk (processing), Cottonseed (processing)

b) **Have potential for use as animal feed but not currently used as animal feed:**  
Apple pomace (processing), Tomato pomace (processing), Grape pomace (processing), Citrus pulp (processing), Soybean Okara (processing), Sugar cane bagasse (processing)

Q7. Food loss and waste

a) **are currently being used as animal feed (no recommended):**

Greengrocery stores residues (distribution), Restaurants residues (consumption),

b) **Have potential for use as animal feed but are currently not used as animal feed.**

Bakeries residues (processing)

Thank you, it is great to see the diversity of opinions and opportunities.

Dr. Ricardo L. Sager

Instituto Nacional de Tecnologia Agropecuaria (INTA) / National Institute of Agricultural Technology.

Gerencia de Gestion del Desarrollo Cientifico y Tecnologico / Management for Scientific and Technological Development

Coordinacion Nacional de Investigacion y Desarrollo / National Research Coordination

TE: 011-43384600 int. 4024

Rivadavia 1479. 1<sup>o</sup> F

C1033AAE. Ciudad Autonoma de Buenos Aires.

Argentina

### **First week, message 91: Opinion on questions and response to other messages**

Good day all

I am OKO Oluwatosin Kennedy from Nigeria.

I disagree with the definition, in line with messages 1, 76, 79, 30, 62 and participants concerning food loss. Food loss is any wastage encountered during production, harvesting and processing.

In Nigeria, losses could rise above 50% especially for perishable items.

Icacinia, is among other underutilized roots, tubers and pulses that are being exploited for animal feeding.

Peels, haulms, stems, husk, brans are some major by-products used.

Some browse plants including Aspilia, Costus afer and siam are used in monogastric and ruminant feeding.

Dr. OKO Oluwatosin Kennedy  
Department of Animal Science  
Faculty of Agriculture  
University of Calabar  
Nigeria

### **First week, message 92: General comment on food loss**

Considering the moderator's comments on calculating the cost of food lost, I believe it is essential to be cognisant of the fact that 75-90% of the energy consumed by livestock is used up in body maintenance or is lost via excretions and non-usable by-products such as some of the skin and bones [some by-products are of course still used by humans though, e.g. leather]. If we are really talking about a holistic picture of calculating all losses to the chain, this loss in energy represents a huge waste.

Reference: Rööös E, Sundberg C, Tidåker P, Strid I, Hansson P-A. Can carbon footprint serve as an indicator of the environmental impact of meat production? *Ecol Indicators* 2013; 24:573-81

Niki RUST, Compassion in World Farming, UK

### **First week, message 93: Response to message 75 and 85**

Dear Wadhwa and others,

I just want to make the argument from Dr Caper stronger. I also agree and would like to support their arguments with a paper (*Science* 327, 822 (2010); M. Herrero, et al. *Revisiting Mixed Crop-Livestock Systems Smart Investments in Sustainable Food Production*) that shows the importance of Livestock to agriculture and vice versa. The key point is related to the benefits of livestock as a feces producer to be used by the agriculture (Organic or not!). Also the importance of Agriculture biomass to feed animals, people, energy, nutrients etc. which is improved by feces!

Best regards and thanks for this opportunity,

Rogério M Mauricio

### **First week, message 94: Opinion on questions**

Dear Moderators,

I would also like to express my opinion on the questions paused.

Q 1- I do disagree with the statement, especially on the perspective of the integrative nature of the farming systems for profitability through increased productivity and sustainability of enterprises. As such crop and livestock are highly integrated and use of product intended for human to provide feed for livestock cannot be a loss. However, if we are inclined to look at it at an angle of commodity value chain with ultimate end-market/consumer, then I would reluctantly consider it a loss.

Q2-In some parts of Uganda, particular where commercial farmers do exist truly, some crops like maize are grown purposely for silage production. Although in many marginal areas maize is grown for human consumption.

Q3- Maize is one crop that I can qualify for this question. It is more often used for poultry feed production in cracked form.

Best regards

DR. HIGENYI JAMES

Senior Veterinary Inspector

Ministry of Agriculture, Animal Industry and Fisheries,

P.O. Box 513 Entebbe, Uganda.

Mobile [Tel:+256772672550](tel:+256772672550)

Email:higenyjames9@gmail.com

### **First week, message 95: Opinion on questions**

Dear All, my name is Vivian Iwar. I am the Head of Division for Animal Resources Development at the ECOWAS Commission in Nigeria.

Q1 Livestock is reared for human nutrition. The consumption of feedstuff ingredients should not be considered as loss. However, feed ingredients that are not the natural feed for livestock should not be turned into the primary source of feed for livestock. For example, ruminants feed primarily on grass and therefore grass should be their main source of feed. For ruminants therefore, the use of food meant for human consumption is clearly an anomaly.

Q2 Generally, feed ingredients are not produced primarily for animal consumption in Nigeria. Often, small farmer holdings depend on left overs from what humans have consumed to feed their animals. However, the bigger producers in the poultry sector compete for grains with humans for the production of poultry feed.

Q3 Generally, agriculture products are produced for human consumption. However, grains such as maize could be used for production of poultry feed. Soybean cake, rice bran and other by-products of human food products are used for producing animal feed, particularly poultry and fish feed.

Q4 I think generally, agriculture products are produced for human consumption in Nigeria

Q5 Agriculture products are generally produced for different uses in Nigeria, including human consumption and animal feed. Farmers will sell their produce to consumers wishing to purchase without necessarily finding out what the produce will be used for. I believe the economic principles of demand and supply rules such markets, but I suspect that where the demand outstrips supply, animals are likely to suffer the shortfall.

Q6 Agriculture by-products abound in the West Africa region. Straw, rice bran, cassava peels, and others are usually abundant during the harvest season, and available for animal consumption. There is need to also begin to utilize fruit pulp, as these are also abundant during harvest. However, the problem is usually preserving these feed ingredients because the out-of-season period is big challenge in the region.

Q7 Whereas straws, bran, cassava and cassava peels, groundnut shells, etc are abundant during the harvest and immediate post-harvest season, this is not the case thereafter. More than any other factor, poor storage and preservation account for a lot of food loss and wastage

Thank you.

Kind regards,

Dr Vivian N Iwar

Head, Animal Resources Development Dept of Agric and Rural Development  
ECOWAS Commission, 101 Yakubu Gowon Crescent Asokoro District - PMB 401.Abuja.  
Nigeria. Phone: (234-9)314-7647-9Fax: (234-9)314-7646'

### **First week, message 96: Opinion on questions**

Please find some commercial aspect from the business perspective for your first set of questions.

My name is Paul FEATHERSTONE, United Kingdom. I am President of EFFPA, the European Former Foodstuff Processors Association, President of UKFFPA, the UK Former Foodstuff Processors Association and Procurement Director at SugaRich Ltd. I would like to share my views on the questions relevant to my expertise and experience.

*Q1. According to the FAO's Definitional frame work of food loss (2014) ([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)) please see page 7, para 2e "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this*

I don't agree with this, however the statement may be incomplete. When food is no longer suitable for human consumption but is used in feed for food-producing animals, the nutritional resources are kept in the food chain. The food (i.e. its nutritional resources) is therefore not lost. It would be wise to amend the statement in a way that food eaten by humans and feed eaten by food-producing animals are seen as one from a food chain perspective. I understand the need to label the food that has been "downgraded" to feed in a consistent way, but I would approach it from a positive angle. The safe use of food chain resources in animal feed is by far the most sustainable



alternative to human consumption and should be encouraged as a means to reduce food losses.

*Q3. In your country, are there agricultural products (foods) that are grown/produced exclusively for human consumption, and then a portion gets diverted towards feed production or used directly as feed? Could you please give example(s) of such foods and elaborate on them?*

The companies and associations represented in EFFPA process food with unintentional production errors (so-called former foodstuffs) occurring at food manufacturing level into animal feed for food-producing animals. Examples are bread, biscuits, breakfast cereals, pasta, chocolates and confectionary (of importance are the energy levels in the form of sugars, oils and starches). These foods were manufactured for human consumption and don't present any animal health risks when used as feed. Typical reasons for former foodstuffs to occur are production errors linked to incorrect shaping (e.g. broken), flavouring and packaging of the foodstuff (packaging is mechanically removed). Many of the products used are also of intermediate status. Surpluses resulting from seasonal production such as sports events, Christmas, Easter, Halloween are also an important source. Food manufacturers always first take the options for food bank donation into account.

*Q5. In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part will not be considered as food waste. Do you agree with this statement? Feel free to elaborate.*

Yes. In my view, a resource can only become a food waste, or be wasted, through intentional or negligible behavior (in Europe mostly at the consumer stage). It may therefore be better to use the term "food wastage", as this implies this negative behavioral output. It is generally illogical, or at least insensible or unethical, for an operator in the food chain to not valorize a food resource in the most sustainable way possible. As the question indicates, the destination can change over time. It could therefore be stated that when food chain resources are used in bioenergy this constitutes a food loss (it's lost from the food chain), however under the circumstances that it is the most sustainable alternative the resource may not necessarily be wasted. Nevertheless, we would consider a former foodstuffs used as a feedstock in bioenergy that could have been used in animal feed as both a food loss and food wastage.

*Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Please do not include non-food parts of agricultural products --Moderator]*

Food processing/manufacturing: Former foodstuffs have great value in feed manufacturing, as it can reduce the need for cereals. In the European context, former foodstuffs processing mainly take place in North-West Europe (plus Spain, Italy and Greece). There are still many countries in Eastern and South-Eastern Europe where feed-eligible former foodstuffs are lost from the food chain and used in bioenergy, composting or even landfill. In the countries where former foodstuff processing takes place, this mostly concern food manufacturers. There is still potential to expand the activities at both the food distribution and food retail level. Another significant potential that is not being used currently are former foodstuffs containing ruminant gelatin, such as certain sweets and cakes. An estimated 100.000 tonnes of former foodstuffs in the EU are lost due to a ban of ruminant gelatin in feed. Please also refer to my comments on Question 3 in regard to food wastage currently being used in animal feed.

With kind regards

PAUL

Paul Featherstone  
Procurement Director  
07793 269712  
SugaRich  
The Brackley Dryer, Biddlesden Road, Westbury, Brackley, NN13 5JL  
Tel: 01280 840 692  
Fax: 01280 840 693

### **First week, message 97: Opinion on questions**

Dear all,

I am Dr. A. Bharathidhasan, from India.

The foods used for human consumption can also be used for animal feeding, which is not considered as food loss and it could save the cost of feed for animal production. Further the food produced for human use, converted to animal feeds should not be considered a loss and converted into edible food like meat, milk and egg production for human consumption. It is a continuous food chain for human and animals.

Maize, broken rice, sorghum, pearl millet are used for the livestock/poultry feed preparation and also used for human consumption. Similarly cassava is also used for both human and animal consumption. The byproducts like rice bran, wheat bran and waste from the field after harvesting the grains or pulses are commonly used for animal feeding. Further the waste from fruit and vegetable industry is also used for animal feeding after human consumed the main product from agricultural industry.

With regards

Dr.A.Bharathidhasan,  
M.V.Sc., PhD., Assistant Professor, Department of Animal Nutrition, Madras Veterinary College, Chennai -600 007.Mobile:91-9841092427Email ID:bdhasanvets@yahoo.co.in

### **First week, message 98: Further opinion on questions 1**

Hello,

This is Reza Lotfi again.

I am grateful to the participants for their valuable information presented in this E-conference and to the moderators of this E-conference.

*Q1. According to the FAO's Definitional frame work of food loss (2014)([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)) please see page 7, para 2e"Any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.*

Reply to Q 1: I presented some explanation for this question in Message No 57. I add a new explanation for Question No1.

Last but not least, the term "Food" in this definition is simple and should define clearly (whole and unprocessed food or agricultural Food). Soybean and soybean oil or soybean protein (or meal, are foods?). Lack of clear definition of food type would result in misunderstanding in answering Q 2 up to Q 7. In other words, based on Question 2 up to 7, this topic is challenged "Grown/produced" or "in raw, semi-processed or processed forms" or "harvesting, post-harvesting, processing, distribution, and consumption

stages". This emphasized the importance of Food Loss classification. As you know, as whole and unprocessed food consists of carbohydrate, protein, oil, vitamins, minerals, as well as anti-nutritional factors.

In conclusion, understanding "Why" food loss is observed would be an important progress in better definition of the term "Food Loss". Also, the classification of Food Loss is a suggestion. Furthermore, maximizing our scientific efforts for efficient use of Food Loss and decreasing Feed Loss in animal feeding systems as well as decreasing Food Waste in Food chain production would be our target for sustainability in animal feeding and animal farming.

*[Comment of the Moderators: The term FOOD is defined in the background document]*

Best Regards

Reza Lotfi  
Reza Lotfi BS, MS  
PhD Student of Ruminant Nutrition,  
Department of Animal Science,  
Ferdowsi University of Mashhad,  
P.O. Box 91775-1163,  
Tel: +98-915-506-8496,  
Mashhad, Iran.  
My homepage: <http://rezalotfi.student.um.ac.ir/>

### **First week, message 99: Comment on previous messages**

I do not agree that in Africa grains are basically used for pigs and ruminant feeding.

To be specific, in Nigeria, one of the most populous countries in Africa, poultry production is the fastest and highest user of grain products.

To meet the animal protein need, efforts are geared towards the least cost of poultry production.

Oko, Oluwatosin Kennedy  
Nigeria

### **First week, message 100: Opinion on questions**

I am Danilo PEZO, from Costa Rica, formerly Researcher and Project Manager, and currently a Freelance Consultant.

I have reviewed the many interesting reactions received from participants, and will try not to repeat what others have said. Also, I would like to refer to the case of Costa Rica and Central America in general, as I have not seen comments of participants from this region. [We agree with Danilo. We have not received many contributions from Latin America. We encourage others in the region to contribute .... Moderators]

Q1.

If food is diverted for animal consumption –for any reason, i.e., lack of access to market, surplus production-, and used as feed, this cannot be considered a "loss", it is still used but for a different purpose than initially planned, and eventually the animal products produced by the animals fed with it will contribute to improve the livelihood of human beings. If the food is left to waste and spoiled, then will be a "loss".

Q2.

Yes, there are few examples I would like to mention. Maize –particularly the yellow grain varieties- and sorghum are frequently grown exclusively for use in animal feeding. Also, it is well known that those crops could also be grown as forage sources to be used either in fresh or as silage. Also, in the sub-humid tropics of Central America, there is a

traditional cropping system called "guatera", in which maize and sorghum are grown in the second cropping season at higher planting density, and harvested at a very immature stage, and later dried and used as high quality hay.

Q3.

Other participants have mentioned several examples of those, but I would like to add one. In Costa Rica, at least 20% of the banana fruits cannot meet the quality requirements for exportation, a small proportion of those can be consumed locally, either in fresh or used for producing banana puree (baby food), but there is still a significant amount that is used as an energy source for feeding dairy cattle, pigs, etc. If those are not used as indicated above, are important sources of pollution in many banana exporting countries. A similar situation applies to other fruits that are processed (e.g., orange and other citrus pulp, pineapple peelings).

Q4.

In the case of Central America in general, but particularly in the case of smallholders practicing crop-livestock systems, and with limited area for grazing, crops are important sources of forages, particularly during the dry periods. In those cases, grains, pulses and tubers are used as food, and the crop residues used as feed. In the case of sugarcane, the tops –and eventually bagasse–are used for animal feeding. Also, in the case of bananas and plantains, the leaves and pseudo-stems are used as fodder sources.

Q7.

Although I am not going to be specific on "food loss and waste" currently used or that have potential for use as animal feed in the case of Costa Rica or Central America, I want to stress that the limited availability of and/or access to information on the nutritive value of many of those feeds, do not allow farmers to make a proper use of them. Moreover, there is little information on the risks and measures to assure food/feed safety for most of the "food loss and waste" that come from the last nodes of the food supply chain. When regulations exist, in many cases those do not respond to the reality of the developing world, because have been "copied and pasted" from developed countries.

Congratulations for the initiative of bringing these points for discussion with many colleagues worldwide.

Best regards,

Danilo

### **First week, message 101: Comments on earlier messages**

This is Philippe Leperre, again

It seems we are getting progressively towards a certain consensus and more subtleties appear as we go.

I am still a little confused with the use of words, i.e. 'food loss' and 'food waste'.

For me 'Food loss' relates to loss of food produced and made available to human. I would put in that category: the rats that eat the maize, the pre harvest floods, the droughts after planting, the use of food for production of biofuel, (or beer :-)

On the other hand "food waste" would be what has been produced but is not consumed as food directly or indirectly. In that category I would gather, wastes of unconsumed food from restaurants and supermarket (with the additional waste of resources that this food has been processed, packaged, advertised etc), un-utilised left overs, food dumped on the street during strikes and protests, food left to rot or destroyed to maintain the market prices, rice field covered to leave place to more profitable real estate project,, etc..

[the term 'food loss' encompasses "food waste" in the FAO's Definitional frame work of food loss (2014)

([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf) .....Moderators].

Food used as feed seem to me similar to 'food processing', a certain food item is made more affective: cooking; or palatable or attractive as status symbol or by concentrating its nutritional value: meat production=used as feed. The plant use is not lost as food it is just submitted to a transformation but the end product is still food.

The case for the nutritional value of meat versus vegetable is perhaps more about loss/waste of energy resources and pollution increase, than about food loss. And it is an important discussion too, but it is not 'loss' or 'waste' in the meaning I propose above.

The case of meat being a value added commodity and the transformation of food for greater profit, or other business considerations are also of great importance, but do not =in my opinion- come into this discussion of food loss/waste but rather in a discussion about profit loss or missing business opportunities. Real estate on a (fertile) rice field is a food waste - AND a business gain and may be a economical gain if the trend is not leading to having a lot of money and no food to be bought, but I digress...

Despite the undeniable value of vegan and vegetarian theories in term of nutrition and in term of climate change and energy consumption, there is no possibility to take livestock & animals out of the picture. They are part of the cycle of re-fertilisation, dissemination and sometimes needed for seed awakening (legumes). Moreover in areas where agriculture is not possible at subsistence level, such as higher Himalayas, cold or hot semi deserts, steep slopes, ruminants can convert available non-food plants into meat and milk and pelts, etc. They are as useful as insects to the propagation of plants. But this again is not the subject of these discussions.

The case of Biofuel puzzles me. It is a food loss, but perhaps only a partial food loss, since the oil cake byproduct is edible at least by animals and therefore can be transformed into food (and maybe the cake could, with attractive processing, be consumed by humans). It is certainly a waste of food, since a very nutritious part is used to further pollute the atmosphere and contribute to climate change rather than as food. It perhaps leads to food loss when the land is taken from more edible or directly edible crops. But then the fuel produced is partially used to process and transport raw food.

In conclusion, definitions are anyway arbitrary decisions to be taken at the onset of a discussion in order to make sure that all involved are using the words with the same meaning. Sometime we use acronyms to that effect (and confuse most). So whatever definition is adopted by the majority will be as good as another for me.

Best regards to all

Philippe Leperre

### **First week, message 102: Opinion on questions**

Hi. my name is Amriana Hifizah, from Indonesia. I'm now a PhD Student in the School of Animal Biology, UWA, Australia

I want to give comments on questions:

Q1. I agree with the statement. The term Food Loss only refers to the loss in quality and quantity for human food consumption. And for the Food Waste, I think the term is alright, because it is a waste if not consumed by humans at all but still can be fed to animals through some treatments to increase its quality.

Q.2: In Indonesia, all foods are grown only for human consumption. The by-products of the agricultural plants or crops will then be used for animal's feed.

Q.3 I think Corn is the only example of food crop in Indonesia that has small portion grown for animals. That's why probably; the commercialized feed industry in Indonesia is still importing good quality corn for the animal's complete feed.

Q.4: I don't think there is such agricultural product in Indonesia that is grown both for human and the animals. However, I have seen on a TV program that Alfalfa which is known good for ruminants is recently made as tea for human consumption, but I'm not sure whether it's already commercialized or not.

Q5: I totally agree with the statement. As long as the agricultural products can be consumed, no matter if it is intentionally for human but then is used for animals, and still in good quality, it means it is still useful, because at the end the animals products will be beneficial for human. So, it is not a waste.

Q6: Straws while harvesting rice plants and corns, cassava waste, palm kernel.

Amriana HIFIZAH  
PhD Student at School of Animal Biology  
University of Western Australia

### **First week, message 103: Response to message 86**

I am Dr.A.K.Nagpal, Principal Scientist (Animal Nutrition) working in National Research Centre on Camel, Bikaner (Rajasthan) India

This is in continuation of the opinion of Fola YUSUF from Walter Sisulu University, South Africa

Tree leaves form an important fodder for browsing animals like goats and camels. Rajasthan farmers lop trees (*Prosopis cineraria*- locally called Khejri) for leaf fodder during the winter season (November and December) and store them for feeding livestock during the lean season. While this practice is prevalent in Rajasthan I have not observed or seen reports from anywhere else. If fodder trees are lopped in surplus states and transferred to feed deficient state like Rajasthan, it will not only reduce the feed shortage but will also enhance animal production.

*(Comment of the moderator: Similar practices are found in Baltistan, Northern Areas of Pakistan)*

### **First week, message 104: Comment on question 1**

I am K S PRASAD from India

Q-1- I agree with the statement regarding situations where the people are on hunger, deaths, malnutrition and where their buying capacity for food is low. As animal products are no doubt highly nutritious but costlier too, hence not within the reach of poor people, particularly in under developed and developing countries.

Under these circumstances the food used for livestock is considered as loss as it is not used primarily for human consumption for which it is produced.

Some alternative is quest for new feed resources which are noncompetitive for human food.

Dr K. S. Prasad  
Principal Scientist  
Animal Nutrition Division, National Institute of Animal Nutrition and Physiology, Aduvodi,  
Bangalore,  
India-560030

## First week, message 105: Comment on questions

I am Dr. Mohammad Mohi UDDIN, working as Assistant Professor in the Department of Animal Nutrition, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh. I am keen on research that deals with feeds, feed resources, water and carbon emission in livestock sector development in South Asia. Please below find my response to each of the Questions.

*Q1. According to the FAO's Definitional frame work of food loss (2014) [http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf) ) please see page 7, para 2e "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.*

Answer: I do not agree to the terminology used. The word "losses" is applicable for those food items which are solely produced and used for human consumption but in reality human cannot use because it is either spoiled or become waste due to human nature. But if those wastes /losses are conserved and used for animal as feed, then it is not really lost, rather it is alternative use of food. Since animal produces high quality products by using low or so called uses of loss products, so this definition is not completely meaningful.

*Q2. In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced exclusively for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand -- Moderators]*

Answer: In Bangladesh: no example of such agricultural products (foods) is documented

*Q3. In your country, are there agricultural products (foods) that are grown/produced exclusively for human consumption, and then a portion get diverted towards feed production or used directly as feed? Could you please give example(s) of such foods and elaborate on them?*

Answer: In Bangladesh, we produce rice and wheat exclusively for human consumption. Yes I agree that some portion is used directly as feed such as broken rice (produced from rice) and wheat as grain for poultry and wheat bran for both poultry and large ruminants.

*Q4. In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal feed i.e. at the time of cultivation/production it is already known that the food is being produced both for human consumption as well as for use as animal feed? Could you please give example(s) of such foods and elaborate on them?*

Answer: Maize is produced mainly for animals especially in the northern part of the country which is produced for poultry; however, at least 5-10% of them are used for human consumption.

*Q5. In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part will not be considered as food waste. Do you agree with this statement? Feel free to elaborate.*

Answer: I agree to this statement but I prefer to add one additional point as "if the food is affordable by the farmers in terms of price and also if the farmers can have access to those foods, since there might be already deficit for human needs, difficult to allocate for animal even it is low quality."

*Q6. From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution, and consumption stages. [Note: non-food parts from agricultural products could be produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on --Moderators]*

Answer: a) Sugarcane tops and sugarcane bagasse b) no example

*Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Please do not include non-food parts of agricultural products --Moderator]*

Answer: Research is on-going about the use of vegetable waste as animal feed but it is not yet used by the farmers.

Thank you very much

Best regards

Dr. Mohammad Mohi Uddin

Academia

Affiliated as "Assistant Professor of the department of Animal Nutrition, Bangladesh Agricultural University, Coordinator of the Asia Pacific Animal Feed Network operated by FAO.

### **First week, message 106: Response to message 92**

From Dr Jude CAPPER, Livestock Sustainability Consultant, UK (formerly USA) in response to message 92 from Niki Rust (CIWF).

Note that the maintenance requirement cited is characteristic of all organisms (including humans and plants) as a proportion of total nutrients are required to maintain the body's vital processes. However, the citation of 75-90% of energy being used for maintenance is a significant overestimate. For example, a lactating dairy cow producing 29 kg of milk (approx 5 kg less than the current US average) per day only uses 33% of her daily energy requirement for maintenance (Capper, J. L., R. A. Cady, and D. E. Bauman. 2009. The environmental impact of dairy production: 1944 compared with 2007. J. Anim. Sci. 87: 2160-2167) and a growing beef steer uses 45% of daily energy for maintenance (Capper, J. L. 2011. The environmental impact of beef production in the United States: 1977 compared with 2007. J. Anim. Sci. 89: 4249-4261).

By-products from livestock production such as skins, hides and bones are used to produce other products for human use including textiles, mineral products, adhesives, pharmaceuticals, and many more. These do not lack value or use simply because they are human-inedible, and can be compared to the human-inedible component of crop production which, in some instances, may considerably outweigh the human-edible mass (e.g. crop waste and pods from pea production). Indeed, a cycle exists wherein human-inedible crop products can be efficiently used to feed livestock, and human-inedible livestock products can be efficiently used to fulfill human manufacturing product requirements (and to fertilise cropland).



There are few, if any, plant proteins that are not processed before consumption (e.g. producing tofu from soybeans), thus the assumption that energy losses only occur within the animal-based food chain is incorrect.

Dr. Jude L. Capper

Livestock Sustainability Consultant

Email: [jude@livestocksustainability.com](mailto:jude@livestocksustainability.com)

Presentations: [https://www.researchgate.net/profile/Jude\\_Capper](https://www.researchgate.net/profile/Jude_Capper)

Blog: <http://bovidiva.com>

Twitter: @Bovidiva

LinkedIn: <https://uk.linkedin.com/in/judecapper>

### **First week, message 107: Opinion on questions**

Dear colleagues, I am Dr (Mrs.) Manpal Sridhar. I am a Principal Scientist and Acting Head of Department at the National Institute of Animal Nutrition and Physiology, Bengaluru, India.

Hats off to the organizers for the very pertinent topic selected and all the contributors as well for their excellent interaction.

Q1 Livestock are reared for the benefit of humans. In a country like India left over feedstuffs are fed to animals and cannot be considered as loss. Here ruminants are fed primarily on straws and stovers as their main source of feed.

Q2 Generally, feed ingredients are not produced primarily for animal consumption in India apart from a few forages like berseem and maize etc. Farmers mainly depend on left overs from what humans have consumed and crop residues to feed their animals. Grains are consumed mainly in poultry rearing.

Q3 Majority of the agricultural products in India is produced for human consumption. However, grains such as Soybean, maize, rice bran and other by-products of human food products are used for producing animal feed, particularly poultry and fish feed.

Q4 Agricultural products in India are produced for human consumption.

Q6 Agriculture by-products are available in plenty during harvest and are burnt in the field also. Pineapple waste, tomato pulp etc are available in bulk from processing industries and could be channelized for animal feeding by preserving through silaging to feed in deficit periods.

With Kind regards,

Dr Manpal Sridhar, Principal Scientist, NIANP

Aduodi, Bangalore-560030.India

### **First week, message 108: Opinions and response to message 76**

I am Dr. Farhad Mirzaei, working as Senior Researcher in the Department of Animal Production Management, Animal Science Research Institute of Iran. I am keen on research that deals with feed resources, pasture, water and carbon emission in livestock sector development in Iran.

Following to Prof. Dr. Uddin from Bangladesh

Q1.

A1: The word "losses" is applicable for those food items which are solely produced and used for human consumption but in reality human cannot use because it is waste due to human efforts. But if those wastes /losses are conserved and used for animals as feed, then it is not really lost, rather it is an alternative use of food. Since animal produces high quality products by using low or so called uses of loss products, so this definition can be disagreed by me.

Q2

A2: In Iran: no example of such agricultural products (foods) is documented.

Q3.

A3: We produce rice and wheat exclusively for human consumption. Yes, I agree that some portion is used directly as feed such as broken rice (produced from rice) and wheat as grain for poultry and wheat bran for both poultry and ruminants.

Q4.

A4: Maize is produced mainly for animals, dairy cows and poultry as well, in the different parts of the country.

Q5.

A5: I agree to this statement but I prefer to add one additional point as "if the food is affordable by the farmers in terms of price and also if the farmers can have access to those foods, since there might be already deficit for human needs, difficult to allocate for animal even it is low quality."

Q6.

A6: a) Sugarcane tops and sugarcane bagasse b) no example

Q7.

A7: Research is on-going about the use of vegetable waste as animal feed but it is not yet used by the farmers.

Best regards

Farhad Mirzaei, PhD

[www.iaapm.org](http://www.iaapm.org)

### **First week, message 109: Response to messages by N. Rust**

This is Tej Walli, again

From the arguments put forth by Nikki RUST, representing Compassion in World Farming, UK., it transpires that the humans need to take to vegetarianism at a large scale, by sparing the food producing animals and perhaps packing them to forests and turning them back to wild species. I agree that when the food or feed passes through the animal system, there are huge losses of protein and energy. Apart from that, the GHG being emitted by these animals during the rumen and enteric fermentation also pollute the environment. But in the developing countries, at least ruminants, if not poultry and pigs, are mostly raised on crop residues and crop byproducts, so, there is less competition with the humans. Yes, in the West, vegans don't even take milk and milk products, but for the large vegetarian population of India, milk and large number of indigenous dairy products are part of their daily diet. So, in a way, it is not really practical for the whole world population to turn vegan and dislodge the food producing animals from the food chain. We may then again end up with a different kind of ecological imbalance.

Tej Krishan Walli

Former Head,

Dairy Cattle Nutrition Division

National Dairy Research Institute,

Karnal - India.

### **First week, message 110: opinion on questions**

I am Maureen LARTEY from Ghana

Question 1

The reality in Ghana is that crop cultivation is primarily for human consumption. Excess may be sold (Agribusiness) which is still focused on human consumption. If food (grains, root crops etc) is declared unfit for human consumption, it may be used for animal feed. It is however still regarded as a post-harvest loss.

Question 2

In Ghana no agricultural produce is grown exclusively for feeding animals.

Question 3

Yes, small portions of maize, cassava, soybean, millet and sorghum are diverted to animal feed.

Question 4

Foods are principally grown only with human consumption in mind.

Question 5

We do not agree with the statement. It will still be regarded as food waste considering that Ghana suffers a food deficit for human consumption. The good quality portion still goes for human consumption.

Question 6

Non-food parts include maize cobs, stalk, leaves, wheat bran, rice bran, peels of cassava, yam, and cocoyam.

Processing waste includes fish waste from canneries, cocoa husk and domestic waste.

Question 7

- a. Unfinished animal products and agro products, damaged grains, post-harvest infested grains
- b. Domestic Waste

Maureen LARTEY  
Food and Drugs Authority Ghana

### **First week, message 111: Response to message 107**

I am Netra Osti from Nepal, I agree with Dr. Manpal's opinion (message 107). This is also the case of Nepal.

### **First week, message 112: Opinion on questions**

I am Dr P L SHERASIA from INDIA.

*Q1. According to the FAO's Definitional frame work of food loss (2014) ([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)) please see page 7, para 2e "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.*

Reply: I do not agree with this statement, because food intended for human consumption, if used as animal feed means these food are directed to animals, which in turn produces high quality foods for human. Thus it still holds food value and is not discarded because it re-joins the food supply chain at a later stage.

*Q2. In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced exclusively for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods)*

*will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand -- Moderators]*

Reply: As per my knowledge, in India there are no such agriculture products that can be consumed by humans but are grown exclusively for animal feeding.

*Q3. In your country, are there agricultural products (foods) that are grown/produced exclusively for human consumption, and then a portion gets diverted towards feed production or used directly as feed ? Could you please give example(s) of such foods and elaborate on them?*

Reply: In India, there are many agricultural foods like cereal grains and pulses that are grown exclusively for human consumption, and parts of these products like broken grains, rejected grains etc., or their by-products like straws and stovers are used for animal feeding. Other examples are sugar cane, tea, coffee etc. These are mainly grown for human consumptions, and their byproducts/ residues are used for animal feeding in many parts of the country.

*Q4. In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal feed i.e. at the time of cultivation/production it is already known that the food is being produced both for human consumption as well as for use as animal feed? Could you please give example(s) of such foods and elaborate on them?*

Reply: In India, oilseeds crops are originally grown both for human consumption as well as for animal feed.

*Q5. In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part will not be considered as food waste. Do you agree with this statement? Feel free to elaborate.*

Reply: I agree with this statement.

*Q6. From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution, and consumption stages. [Note: non-food parts from agricultural products could be produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on --Moderators]*

Reply: a) Examples of non-food parts currently used as animal feed are food crop byproducts like brans, oilseed meals, chunnies etc and crop residues like straw and stovers of food crops. Tree leaves, tree pods, unconventional feed ingredients like rubber seed cake (*Hevea brasiliensis*), sun hemp seeds (*Crotalaria juncea*), niger seed cake (*Guizotia abyssinica*), dhaincha seeds (*Sesbania bispinosa*), ambadi cakes (*Hibiscus cannabinus*), subabul seeds (*Leucaena leucocephala*) etc. b) Examples of potential animal feed but not currently used as animal feed includes fruit and vegetable industry waste, starch industry waste, bakery waste, water chestnut (*Trapa natans* L. var. *bisinosa* Roxburgh) locally known as "Singhara", weeds like *Phalaris minor* (canary grass), *Jatropha* (*Jatropha curcas*), thornless cactus, biofuel co-products, insects etc.

*Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are*

*currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Please do not include non-food parts of agricultural products --Moderator]*

Reply: a) Food loss and waste that are currently being used as animal feeds are broken grains, rejected grains, byproducts and residues of food crops. b) Fruit and vegetable industry waste, starch industry waste, bakery waste, water chestnut (*Trapa natans* L. var. *bisinosa* Roxburgh) locally known as "Singhara", weeds like *Phalaris minor* (canary grass), *Jatropha* (*Jatropha curcas*), thornless cactus, biofuel co-products, insects etc have the potential for use as animal feed.

Regards,

Dr Pankaj L Sherasia  
National Dairy Development Board, Anand, Gujarat, INDIA

### **First week, message 113: Opinion on questions**

I am Dr. Amr Salah Morsy you can call me Morsy, Assistant Professor, Livestock Research Department, Arid Land Cultivation Research Institute, City of Scientific Research and Technological Applications, Alexandria, Egypt

Warm Greetings

*Q1. According to the FAO's Definitional frame work of food loss (2014) [http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition and Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf) ) please see page 7, para 2e "any losses in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.*

Answer: My point of view is the same as expressed by Dr. Mohammad Mohi UDDIN [Message 76 .... Moderators]. I do not agree to use the word "losses" in this context, because loss means when humans cannot use food because it is either spoiled or become wasted due to human nature. But if used to feeding animals, then it is not really lost but it will be turned over into other products (milk or meat), and thus is rather an alternative use of food. Since animals produce high quality products this definition is not completely meaningful.

Q2. In Egypt, no such food crops are exclusively grown for animal feeding which are normally being used for human consumption but there is the contrast with grown for human consumption and its residual used for animal feeding.

Q3. Yes. Cereal crops, maize

Q4. Yes. Maize is being extensively produced for human consumption and livestock consumption.

Q5. Yes. I agree with the statement as the agricultural product is subjected to prior processing and then fed to animals.

Q6. a) Rice Bran, Wheat bran, De-oiled rice bran, rice husk, shea nut cake

Q7. a) Straws and stovers of maize,

Yours

Dr. Amr Salah Morsy  
Researcher Arid Lands Cultivation Research Institute (ALCRI),  
City of Scientific Research and Technological Applications, Universities and Research  
Center District, New Borg El-Arab, Alexandria, Egypt. P.O.Box: 21934 ALEX,  
Tel: (203) 4593417- (203) 4599307- (203) 4593416 Fax: (203) 4593423 Cell  
Phone:(+02) 01221491410

21934 ALEX, Tel: (203) 4593417- (203) 4599307- (203) 4593416 Fax: (203) 4593423 Cell  
Phone: (+02) 01221491410

**First week, message 114: Opinion on questions 3, 4, 6 (in addition to Message 23)**

My Name is JAFAROU SANDA ALTINE from Ministry of Livestock of Niger

Q3 Cereal crops, crops residues cowpea leaves groundnuts leaves, groundnuts hulls, cereals by-products (brans).

Q4 Maize (maize is used as source of energy in poultry feed)

Q5 I do agree with this statement because this gives opportunities to be used as animal feeds in order to increase animal productions.

Q6 a) Cassava and Potato peels b) Citrus, tomato and Banana pulps

**First week, message 115: Response to message 109**

Yes, I completely agree with the opinion given by Tej Krishan Walli (Message 109) over the issue raised by Nikki RUST. As per Nikki RUST, humans need to take to vegetarianism at a large scale, by sparing the food producing animals. It is true for countries whose major human population does not depend on milk and milk products. In countries like India, milk and milk products impart a major portion of vegetarian diet. Therefore, sparing of food producing animals especially ruminants is not possible.

Kind regard

Muneendra KUMAR

Dr. Muneendra Kumar

Assistant Professor, Department of Animal Nutrition

College of Veterinary Science & Animal Husbandry, DUVASU, Mathura

281001, India

**First week, message 116: Response to message 27**

I agree with the comment of Dr. TK Walli on Message 27; let me share my opinion on the message. We should remember that the nature used to keep everything in balances, human manipulation affects the balance; we should not blame our source of goods/foods. The animals are created for us and they are contributing accordingly to human civilization. Methane emission from the rumen used to be considered to blame ruminant animals. What would happen with the plant biomass produced everyday if not used by ruminant animals? Will it not produce GHGs aerobically???? Why is the automobile system introduced and used by humans using fossil fuel? It is polluting the environment. We should not blame any natural creation rather we should behave rationally with them for the benefit of the globe.

Khan Shahidul Huque, PhD

Chief Scientific Officer & Head, Animal Production Research Division & Former DG, Bangladesh Livestock Research Institute

Savar, Dhaka 1341, Bangladesh; Cell: +8801552376788

**First week, message 128: Opinion on questions**

Almudena Rodriguez from the European Commission, EC RESPONSE

Q1. According to the FAO's Definitional frame work of food loss (2014) ([http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)) please see page 7, para 2e "any losses

*in the foods such as grains, pulses, root crops, etc. intended for human consumption, if used as animal feed are considered as food loss". Do you agree with this statement? Please elaborate on this.*

We consider that this discussion should focus more on how best to utilize the resources in animal feed rather than entering in a discussion on the competition between food and feed resources.

We do not agree with this statement. Many cereals and grains may be used alternatively for food and feed. The operator may decide to use those crops for feed uses on the basis of economic/commercial reasons, quality requirements etc. Finally the feed enters in the food chain through the consumption of animal products. It should be noted that a great proportion of those products are intended to food producing-animals.

*Q2. In your country, are there agricultural products (foods) that can be consumed by humans but are grown/produced exclusively for use as animal feeding, and according to the above FAO's Definitional frame work of food loss, any losses in such products (foods) will NOT be considered as food loss (you may also refer to point 3 at page 5 of the Background document)? Would you wish to give example(s) of such agricultural products (foods) and elaborate on them? [Cassava in Thailand is grown/produced exclusively for animal feeding, although in many African countries cassava is grown/produced mainly for human consumption. Therefore, as an example, a reply to this question will be cassava in Thailand -- Moderators]*

In the European Union most cereals can be used for food/feed purposes. There are certain varieties that for their composition and characteristics are intended for feed uses. There are some examples: as silage maize, feed barley or alfalfa (Lucerne) for forage production. Livestock farmers are the largest user of cereal in the EU via on-farm mixing and industrial production of feedstuffs.

*Q3. In your country, are there agricultural products (foods) that are grown/produced exclusively for human consumption, and then a portion gets diverted towards feed production or used directly as feed? Could you please give example(s) of such foods and elaborate on them?*

Food industry has contractual relations with food producers to ensure traceability of the process and to guarantee that the products meet the specifications that the industry has set down.

Certain varieties of durum wheat for example are produced for food (pasta) but sometimes the harvest does not comply with the specifications of the food industry and must be diverted to other uses such as feed.

*Q4. In your country, are there agricultural products (foods) that are originally grown/produced both for human consumption as well as for use as animal feed i.e. at the time of cultivation/production it is already known that the food is being produced both for human consumption as well as for use as animal feed? Could you please give example(s) of such foods and elaborate on them?*

See question 2.

*Q5. In many situations agricultural products (for example grains, root crops and pulses, milk, among others; in raw, semi-processed or processed forms) are cultivated and produced not exclusively for animal consumption but for potentially different uses including for human consumption and animal feeding. In such cases, from the time it is known (or decided) that a part of food, which was originally intended for human consumption, is to be used for animal feed (not for reasons of low quality), that part will not be considered as food waste. Do you agree with this statement? Feel free to elaborate.*

Yes, we agree. Something that is lost from the food supply can be regarded as waste but in this case a decision is taken to divert the food to other material uses such as feed or bio-based products, so that, it cannot be considered as a food waste.

*Q6. From your country please give examples of 'non-food parts' in the food supply chain which a) are currently used as animal feed, and b) which have potential for use as animal feed but not currently used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution, and consumption stages. [Note: non-food parts from agricultural products could be produced during harvesting (e.g. straws while harvesting grains), processing (e.g. citrus or tomato pulp), and so on --Moderators]*

The European food/feed industry is very efficient in the use of non-food parts as they are a very important part of the feed diet in many livestock species. All of these products are regarded as feed materials and listed in the Catalogue of feed materials [1] with a description that explains the way as the product is obtained.

There are many examples in the catalogue: almond hulls, buckwheat middlings, coffee skins, citrus pulp, black cumin expeller, walnut kernel expeller, hemp fiber etc.

*Q7. From your country please give examples of 'food loss and waste' that a) are currently being used as animal feed, and b) have potential for use as animal feed but are currently not used as animal feed. While answering the question you may wish to divide the food supply chain as during: harvesting, post-harvesting, processing, distribution and consumption stages. [Note: please restrict your answer to 'food loss and waste' only. Please do not include non-food parts of agricultural products --Moderator]*

In the EU there are many restrictions to the use of food waste in animal feed. One example is the prohibition of catering waste to feed animals. The use of former foodstuffs in animal nutrition is now under evaluation. The presence of packaging material (plastics, metals, glass, and paper) in the final products poses a problem for animal and human health.

In the food industry it may happen that during the processing some foods are not diverted to food for various reasons (e.g. broken biscuits) but they are not yet packaged so that the use in animal nutrition of these products is quite common. For the same example food already packaged but mislabeled is not diverted to feed because the problem of the packaging material.

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[1] Commission Regulation (EU) No 68/213 on the catalogue of feed materials

### **First week, message 135: Response to message 128**

In response to the message 128 on week 1

Re Q7. Thanks to the EU, the very important point of over-packaging is new to the discussion, and "We" in turn would probably all (am I presumptuous) welcome an EU directive against over-packaging, but perhaps that would not please the industry lobbies who rule the EU.

Philippe Leperre