Fourth week, message 197, opinion on question 1

Dear Participants,

As we are now opening the discussions for the last week we also like to come back to Q1.

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) 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?

As contribution to the further discussion of the Question 1 we like to share with you the contribution of Mr. Robert Van Otterdijk who is leading the Food Loss and Waste (FLW) Working Group at FAO. This gives the thinking of the Working Group that led to stating that foods intended for human consumption, if used as animal feed are considered as food loss. In Week 1, most participants did not agree to this statement. We, as moderators, would now invite contributions from the participants in light of the following comments from Robert Van Otterdijk.

"Many definitions and terminologies of FLW are being used by various actors and stakeholders in the global food systems. Sometimes definitions are the same, but different terms are being used; sometimes the terms are the same, but their meanings can be a bit different. It is important to agree on, and accept, a common definition of food loss and waste. It will provide an opportunity towards achieving a globally harmonized approach improving data collection, data comparability, and evidence-based regulatory and policy decisions for FLW prevention and reduction.

FLW has an impact on food security, on local and national economies, on the natural resource base, on waste streams and the environment. FAO's main focus in formulating the definition of FLW is the food security dimension.

Now to the point.

The Definition of food is: *"Any substance, whether processed, semi-processed or raw, which is intended for human consumption"*. And the Definition of qualitative food loss: *"The decrease of quality attributes of food,* including nutritional value and economic value*".*

FAO is approaching the FLW issue from multiple angles:

- Quantification of food loss.

- Assessment of the impact of food loss.

- Developing and prioritizing solutions to reduce food loss.

The Definitions clearly mean that if food has incurred quality decrease and therefore has been redirected to the animal feed chain, or if for economic reasons it has been redirected to the animal feed chain, the nutritional value and the contribution to food security for humans has been lost at the moment and therefore it is defined as food loss. It is nevertheless well acknowledged that the negative impact of this type of food loss is less than when the food would be entirely disposed or incinerated, because as animal feed the products still return some – or even significant - value from the resources used to produce it, still have economic value, and still return nutritional value back in the food system.

A definition of FLW is not a mathematical or physical law, it has many different logics which are equally good, and therefore it is just a matter of choice on what to accept as the Definition. FAO offers this Definition as a global reference for any stakeholder dealing with FLW, and to use it within the context of their operations. It is not cast in stone, and after one year of feedback we will evaluate the functionality of the definition and adjust it if necessary."

[Dear participants: we welcome your comments to the above points made by Mr. Robert Van Otterdijk …… Moderators]

Fourth week, message 198: Opinion on Q1

I still think that the terms loss and waste are already well defined and facilitate calculations on the issue. I believe that the counter argument expressed by the majority is due to the social (or may be ethical) unacceptability of using the term waste for the portions going to animal feeding. If this is true, and the majority continues to consider it unacceptable, then we should try finding other words in place of "waste".

Once again, any new term should facilitate accurate calculations without complicating it further.

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

Fourth week, message 199: Opinion on Q1

When we say, INTENDED FOR HUMAN CONSUMPTION, it may have a different meaning in different contexts. In developed countries like the US, Soybean & maize are grown mainly for animals while in India these are staple food for human consumption. The human population in the US gets substantial food from animals fed on soybean & maize. For the sake of universal definition, should they start consuming maize & soybean and feed the animals poor quality roughages or reduce consuming animal protein? When quantifying the food loss, this varying meaning of food (corn is not food but feed for Americans!!) with changing context would need to be adjusted or else it would yield misleading data.

Mr. van Otterdijk has appreciably nicely concluded: „It is not cast in stone, and after one year of feedback we will evaluate the functionality of the definition and adjust it if necessary."

Thanks,

Dr Mahesh Chander
Head
Div of Extension Education
ICAR- Indian Veterinary research Institute, Izatnagfar-243 122 (UP) India

Fourth week, message 200: Opinion on Q1

This is Khan Shahidul Huque from Bangladesh

The top two points are fine and agreed.

The definition 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.

i) The definition of food loss is kept limited to a conditional clause "if used as animal feed", and does not say anything about the food that will entirely be disposed or incinerated? Will they not be considered as food loss?

ii) Food and feed are equally important for humans; foods are directly/indirectly reached at tables; feeds, on the other hand, reach at table following other biological courses.

iii) Food intended for human consumption, if used as animal feed are considered as food loss- a flavor of undermining importance of animal feeding lies here.

I welcome third point on revising the definition.

Sincerely yours,

Khan

Fourth week, message 201: Opinion on Questions Q15-Q21

My name is Philippe BECQUET, I am an animal nutritionist by education and interested in policy development along feed and feed ingredients.

From a sustainable livestock production point of view, feed efficiency is a key element, linked to the proper supply of nutrients, to support optimal animal production. Hence, it is important to have a good knowledge of the nutritional value (including potential anti-nutritional factors) of food losses, food wastes and non-food parts for the different animal species (monogastric and ruminants). In addition, the variability of the nutritional value of these products needs to be evaluated. This should help the farmers and feed producers to define the incorporation rate of the feed ingredients in their ration, with a view to stabilise the nutrients concentration of feed as much as feasible.

The role of the researchers in this context could then focus on an improved understanding of the nutritional profile of food loss and waste products and their variability. This should particularly focus on the processed ingredients, where the most nutritious part has been used for human consumption. As the feed Industry is already knowledgeable on the use of by-products from food production, the focus should be on new processes and new products, not yet known. The same would apply for the non-food parts, although here the focus will be more on the harvesting part of the value chain. Here also, the animal nutritionists have already a good knowledge on a number of feed ingredients and the focus could be limited to new ingredients.

Furthermore researchers could develop methods to improve the nutritional values of these ingredients, by e.g. improving their digestibility or reducing the impact of anti-nutritional factors.

With regards to safety, specific risk assessment methodology could be developed to support the policy makers to make decision, whether an ingredient can be placed on the market or not, without compromising the affordability of the feed ingredient on the market place. NGOs and Civil Societies have a key role in education for proper collection and storage of food loss and waste, particularly, when food loss and waste occur at home level and similarly, education of farmers for the use and storage of non-food parts.

Policy makers could develop frameworks ensuring that only safe food loss and food waste are placed on the market, by e.g. promoting the HACCP (Hazard Analysis and Critical Control Points) approach for these ingredients by the suppliers. In certain areas, policy makers could develop necessary investments in infrastructure for a better functioning of the supply chain. This would reduce food loss and waste and/or allow their preservation on sites or on farms. Farmers play a key role in the use of food loss and waste, in cooperation with the feed/food industry by evaluating the potential locally produced ingredients to be used on his farm. This is already the case, as an example, with the use of fresh beet pulps (for ruminants) or of whey (for pigs).

Philippe Becquet
Senior Global Regulatory Affairs Manager
DSM Nutritional Products Europe Ltd.
CH-4002 Basel
T +41 (0)61 815 77 92

Fourth week, message 202: Opinion on Q1

Good day all

I beg to differ on the opinion concerning food loss.

Animals stand as food to man and what is used for animal feeding I find it difficult to accept as a loss.

Food is lost when it cannot be used in any form for any purpose is my opinion.

I believe redefinition of the term food loss might be required.

Thank you.

Oluwatosin Kennedy OKO
Nigeria

Fourth week, message 203: Opinion on Q1

This is Abiola John Olusoji from Nigeria.

I think that we should redefine the definition of food loss. Animals are kept as food and they must be fed also. By the definition of the food loss, animals were not captured at all; this is ambiguous in a way.

If animals are therefore captured in the definition it will reduce the confusion.

dnk12_day@YAHOO.COM

Fourth week, message 204: Opinion on Q1

Dear All,

I am Jafarou Sanda Altine from the Ministry of Livestock of Niger

I agree with the view of Dr Mahesh Chander (message 199)

In addition in most African countries there is no food specially grown for animal consumption alone.

Ingénieur zootechnicien
Master 2 Production Animales et Dévéloppement Durable
Ministère Élevage Niger
Email: jsandaaltine@yahoo.com

Fourth week, message 205: Opinion on Q1

I am Tunde Sigbeku; I work with NAFDAC, in Nigeria

I will love to start by congratulating FAO for this e-conference; it has been very educative and interesting.

I strongly think that the definition of FOOD should be looked at before defining FLW. If feed is not captured with the definition of food then the argument on the definition of FLW will persist.

From a regulatory perspective in Nigeria, feed is captured in the definition of food and its being regulated as such. When any material intended for human consumption is being diverted or used to feed animal as a recovery measure, the material is not lost but redirected and it still has economic and nutritional values. But note that not all materials that are not fit for human consumption are qualified as animal feed stuff. There are minimum standard for materials that can be used to feed animal.

Therefore, it is ONLY when a material cannot be use for human and animal consumption that it becomes a loss or waste.

I am looking forward to the review of the FAO definition soon.

Once again CONGRATULATIONS to all participants it has been a wonderful time, reading a comment across the world is so educating; and to the facilitators of this platform I say CONGRATULATIONS for a well thought idea. I am looking forward to more of such in future.

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

Fourth week, message 206: Opinion on Q1

Good day all.

My take on the issue of definition of food loss and waste is that since animals must be fed to provide food for humans, any food part that has lost its quality and can be used to feed animals should not be considered as food loss or waste but using the quality part of food that is meant for human consumption to feed animals is a waste.

Patrick Nwosibe
African Save Food Initiative
Abuja-Nigeria

Fourth week, message 207: Opinion on Questions 17 and 18

My Name is NWOSIBE, Patrick O.

I work with the African Save Food Initiative, an NGO focused on reducing food loss and waste in Nigeria through research and public enlightenment/sensitization.

The role of I see for NGO and Civil Society in making use of food loss and waste as animal feed is that of advocacy and sensitization of the public. The NGOs are supposed to be the one educating the general public on the need to avoid food loss and waste by converting those food parts which would have been lost or wasted to be used as animal feed. Often lack of adequate information or cultural values can be a barrier but with adequate sensitization and advocacy, people will buy into any noble idea and this is where NGOs and Civil societies come in.

Here in Nigeria my organisation, African Save Food Initiative, has been involved in this kind of advocacy and public sensitization for nearly two years but now lack of cooperation by the government and lack of adequate funding often poses a serious challenge.

NWOSIBE Patrick O
Managing Partner
African Save Food Initiative
42 Onitsha Street, Area 11,Garki Abuja.
africansavefood@gmail.com, +2348037710269,+2348030996936
www.africansavefood.org

Fourth week, message 208: Opinion on Questions 1

Hi, this is Steve Bartle, Beef Cattle Nutritionist, Kansas State University, US.

This is my first time to participate in an FAO activity and I do not know if my idea is an old approach, but I would like to submit it to the group.

What if food loss (or gain) was estimated with an equation something like the following:

Net food loss or gain = Food gained - Gross food loss

Gross food loss would be defined as originally stated - Any food intended for human consumption that is diverted to animal feed, is a loss. However, we give credit back for the food produced (food gained). Most foods diverted to animal feed would receive a negative value because the loss would be greater than the gain. This approach has the potential to present a more accurate estimation of the effects of diverting food. I understand that it may difficult to put gain and loss on similar terms or units.

This equation would also help describe the role of ruminants in the world's food supply; food produced by ruminants from non-competitive feed ingredients would receive a positive value because food loss would equal zero.

Thanks for your consideration,
Steve

Fourth week, message 209: Opinion on Questions 1

Hello everyone,

I am Mohamed a Livestock Management Officer from Comoros

I agree and support the opinion of Dr. Mahesh Chander (Message 199 posts) that in most African countries, no feed is specially grown for animal consumption only. In our country there are especially forages grown.

Fourth week, message 210: Opinion on Questions 1

I am Dr Bakshi from India

My opinion regarding Q. No. 1

In most of the developing countries there is no demarcation in grains, millets, oilseeds, oil etc to be used as food for humans or as feed for animals. In turn the livestock, poultry and fish provide meat, milk and eggs, which also constitute human food and these have better nutritive value than vegetarian food listed above. Keeping in view these facts, it should not be considered as food loss. I do not agree with the points made by Mr. Robert Van Otterdijk regarding the definition of Food. The definition of food should be considered in broader perspective and may be redefined.

Fourth week, message 211: Opinion on Questions 1, response to Message 208

Jude Capper, Livestock Sustainability Consultant, UK (formerly USA).

In response to message #208 from Steve Bartle: I think his proposal (equation to estimate food loss that accounts for food diverted to animal feed) is particularly valuable if food quality is considered, e.g. nutrient composition and provision from milk vs. soy meal or corn gluten.

It leads to a further question however - how do we account for crops or animal products that are technically human-edible but not consumed due to cultural or taste preferences? For example, many people could consume soy (in the form of tofu) but instead choose other proteins; and many components of animal carcasses (e.g. pig trotters, chicken feet, and sheep eyes) are commonly consumed in some cultures but are in extremely low demand in, for example, in Europe and the USA. Where does the cultural aspect fit in to the food waste problem? Will we have to accept that a certain quantity of food "waste" is

inevitable simply because some foods are culturally (or in some cases religiously) undesirable?

Interesting discussion - many thanks to all commentators to date.

Fourth week, message 212: Opinion on Background document

This earlier sent message was kept for discussions during the fourth week (Moderators)

Almudena Rodriguez from the European Commission, EC RESPONSE

EC-COMMENTS ON THE FAO BACKGROUND DOCUMENT FOR E CONFERENCE

"UTILIZATION OF FOOD LOSS AND WASTE AS WELL AS NON-FOOD PARTS AS LIVESTOCK FEED

OCTOBER 2015"

- The European Commission (EC) would like to thank the FAO for the opportunity to comment on the proposed background document and trusts that the comments below will be taken into account.
- The subject at stake touches several different legislative frameworks and therefore the EC suggests a holistic approach.
- The EC has already undertaken several initiatives such as the "Commission's Roadmap to a resource-efficient Europe", "Good practices in food waste prevention and reduction" or "Good practices in food waste prevention and reduction"
- Currently, the EC is working on the Circular Economy Action Plan that explores, amongst others, synergies of waste management with other policies. The plan would develop different actions and also propose to amend the waste legislation. Food waste is an integral part of the Plan.

COMMENTS

INTRODUCTION

The quantifications are very difficult to substantiate but are more or less in the order of our estimation. Very high amounts lead to high expectations that –due to the complexness of the issue- will be difficult to achieve at international level with the leverage that exists.

The strategies that may be developed to reduce food waste are very different depending on the industrialisation process in the different countries. In industrialised countries over 40% of food waste occurs at retail and consumer level while for developing countries over 40% of food losses occurs at harvesting and processing.

Other important element to consider is the cooperation between stakeholders and authorities to develop policies intended to reduce food waste.

The EC is very concerned about feed safety. Several incidents showed that waste -- not fit for feeding purposes-- was introduced into the food chain via feed which resulted in huge financial losses, be it directly (costs for withdrawal of contaminated feed and food from the market) or indirectly (price depression for animal products due to loss of consumer confidence which resulted dramatically reduces food demand). More precisely, we have concerns about the use in feed of non-edible parts e.g. packaging materials, metals, plastics or glass. We would like to draw the attention that we have very restrictive provisions for the feed use of animal by-products, former foodstuffs of animal origin and other substances covered in the document to ensure animal and human health.

DEFINITIONS

We agree that the definition of food waste entails further discussion. This definition is also under discussion in the EU.

ABOUT THE FRAMEWORK

It should be more stressed that any opening of the feed chain for "waste products" may by no means compromise animal health, animal welfare and human health.

The hierarchy for food losses and waste should bear in mind that there are many risks associated with the use of certain animal products such as catering waste or the presence of packaging material in former foodstuffs. The established hierarchy should not give the impression that we have to prioritise those products.

Ad "*Also producing bioenergy directly is more efficient than producing food and then energy.*": This is a premature judgement; should be deleted.

Ad "*Furthermore, in no case, in this framework economic gains will override resource use efficiency and long-term sustainable food production in making decisions for not using food wastes and losses as well as non-food parts as animal feed*.": The phrase is unclear, generally such a-priori settings should be avoided and undermined by the following text. Therefore it should be deleted.

SCOPE OF WORK AND SYSTEM OF BOUNDARIES

The boundaries of the framework are crucial for the project. The clear examples are helpful but some fine tuning might be good.

We suggest clarifying if former foodstuffs destined to feed as defined in Regulation (EU) No 68/2013 are within the boundaries of this framework.

POSSIBLE PROGRAM CONTENT

We think that all the aspects are interesting and would be useful but the content is very ambitious. Thus, due to the sophisticated subject good quality results can be only achieved with a very high administrative burden and resource input.

LINKAGES WITH OTHER INITIATIVES

This is very important element that would help to fulfill the expectations.

A lot of work and data collection is already done at various levels.

Horizontal (between the different policy areas) and vertical (national-international) cooperation and a stringent coordination are of utmost importance t

http://ec.europa.eu/food/safety/food_waste/index_en.htm

http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R0068

Fourth week, message 213: Opinion on Food Loss and Waste

[This earlier sent message was kept for discussions during the fourth week …Moderators]

I am SOUMITRA JASH from India

Representing the second populous nation of this planet, I would like share snippet on a „Small Step for a giant leap of MANKIND".

In Jaipur, capital of the western state of Rajasthan, Dr. Vivek S. Agrawal, a physician who has left his government job and has started Centre for Development Communication in1995. Looking into the menace of food wastage in large congregations, he has started a programme called "Annakshetra" or „the region of food". The programme envisages volunteers to collect surplus or leftover food and make it available in a community feast

to the ragpickers, labourers and waste collectors. Even, refrigerators have been kept outside their office for the people of Jaipur to keep surplus food.

Endeavours are being made to provide the further unpalatable items for domestic livestock. The effort is being percolated even to school-children and caterers- with the message " to adopt cooking and eating as much as the need be". The motto generated being "not hunger eradication, but minimise food wastage" Further, I feel the issue of loss/wastage of food need to be regulated in the lines of "FOOT PRINTS", just as we have come with "CARBON FOOTPRINTS". Nations-who deliver more WASTAGES as per their standards, need to be cautioned.

Bon Voyage- the HERCULEAN efforts of the FAO, in lime-lighting this issue.

Fourth week, message 214: Opinion on Food Loss and Waste

This earlier sent message was kept for discussions during the fourth week….Moderators]

[Should you have a similar example, please feel free to share with the participants …. Moderators]

Turning food waste into livestock feed

Allow me to introduce myself: My name is John MORAN from Australia and I was the Coordinator of the Asia Dairy Network over the last three years. I own a consultancy called Profitable Dairy Systems, Kyabram, Victoria, Australia with a website; www.profitabledairysystems.com.au

I would like to describe a new role for agribusiness in Australia in providing high nutrient supplements for dairy stock.

A unique factory has recently been established in northern Victoria (Australia) which recycles out-of-specification (usually past the use by date) human food waste into livestock feed. These food waste products were previously disposed as landfill and now end up as livestock feed. In fact, 30% of all our food waste ends up as landfill and in Victoria, this amounts to 1 million tonnes per year. The seed of the business began in 2006 during a lengthy drought in southern Australia when a fruit caning factory offered a dairy farmer some out-of-specification apricots. Together with cereal straw, the products were put into a mixer wagon to feed dairy cattle during the drought.

Initially the cans were all opened by hand and the contents poured into a 200 L (44 gallon) drum to be mixed with a bale of cereal hay and a bale of cereal straw. In the early days, the farmer tested the feed mix for protein and fibre contents but not now. The mix includes limestone and sodium bicarbonate depending which dairy stock are being fed. It is fed as a liquid into a trough where the stock drink it like a soup.

From an initial on-one-farm operation, the livestock feed is now produced in a recently vacated tomato processing factory and employs 11 local people, which incidentally includes 2 staff with intellectual disabilities. The staff break down the retail packs of fruit, confectionery and other food waste, extract the contents (using mechanical aids) then capture the packaging (plastic, aluminum, glass and cardboard) to sell to recyclers. The factory has a 98% recycling rate of all (food and packaging) products entering its front gate. The suppliers even pay the processors to take the product as they often have no other option than to dispose of the waste as landfill. Food and drink processing companies in Australia are being required to pay higher and higher disposal charges to landfill, and to meet tougher conditions.

The company currently processes 10 t/day and has 10,000 tonne of waste product in store waiting to be recycled. They plan to eventually process as much as 100,000 tonne of product annually and employ up to 30 people. The waste products now incorporated into the livestock feed include bottled and canned drinks, dairy and fresh fruit, processed fruit products through to biscuits, cheeses, jam, dried fruit, confectionary and

lollies. They are separated into liquid and solid livestock feeds. Some liquids are high in energy so can be used in a number of ways and fed as replacement for water or feed under controlled conditions. The end products can be shipped out to farmers in plastic bins or tankers. Being a complementary feed, as a portion of a diet, it tends to be low in fibre so cattle must be fed additional forages. There are also restrictions in the amount fed per animal per day.

The solid feed mixtures are fed out in large plastic bins and their formulation is based on experience from observing any adverse reactions from the stock. Basically there are two major series of observations, firstly palatability (hence appetite) and secondly rumen health. One prime example of subsequent poor rumen health was the inebriation (and even death of a few cows) following a large feeding of fresh grapes to milking cows, which fermented in the rumen to produce large volumes of toxic alcohol. The company (Resource Resolution) has veterinary back up support to assist with diagnosing potential feeding problems.

At the moment the liquid and solid feed mixtures are simply fed out fresh to stock, thus limiting their "shelf life" to a few days. Additional processing, such as drying or fractionating various components of the feed mixtures are being considered to improve the flexibility and value add the end products. This would also increase the potential size of the farmer market by concentrating some of the end products hence reducing their high transport costs.

Fourth week, message 215: Opinion on Q1 and Q15-Q21

Dear Participants this is Datta Rangnekar from Ahmedabad, India. I am very late in participating due to touring and pre-occupation and wish to make the best of this opportunity since the subject is of personal interest to me. I shall try to be as succinct as possible. My views and suggestions will have a bias being involved since decades in Sustainable Livelihood development of resource poor Rural Families through development of Livestock, Crops, Natural Resources and Social Mobilization.

As far as the FAO definition of Food and Food Loss/Wastage is concerned I was about to write that the FAO definition of FOOD LOSS appears acceptable but after consulting dictionaries I found *their definitions of Food* were much broader. For example "Reader's Digest Word Power Dictionary defines food as *"any substance that people or animals eat or drink or plants take in to stay alive" and t*he 'Webster's New World Dictionary' defines food as *"any substance taken into and assimilated by a plant or animal to keep it alive and enable it to grow and repair tissues".* I realize it is a matter of semantics but are we justified in adopting reductionist approach of calling only that material which is eaten by humans as food and hence what is not eaten is Food Loss?

The word WASTE has a different connotation *and needs rethinking before application.* I am tempted to mention comments of several hundred rural families that I heard in last few decades - they say that 'on a mixed farm there is NOTHING LIKE WASTE' - their perceptions are different since everything is recycled (output of one sub-system is input for the other). Weeds from farms of large farmers are fodder for small farmers - women involved in weeding collect the weeds meticulously and take back to feed their animals. Cereal straws are usually offered un-chopped (in many parts of India) and parts not eaten by animals lie on the flooring, get mixed with urine and dung and considered waste (wastage was estimated through some research projects). However, the farmers questioned where is the wastage since pieces of straw mixed with urine and dung are not thrown away as these are invaluable as organic manure fro soil amelioration.

I wish to briefly express my views on Q. 15 to 21 of the Fourth Week as these topics are of special interest to me. Minimizing losses / wastage and maximizing utilization of food / feed resources is one of the potential options to improve feed availability situation since land is limited and water a scarce commodity in India. Compartmentalizing working or roles of research / extension and development organizations (GOs or NG*Os) and Livestock keepers is not desirable. There is need for solution (recommendations or*

technologies) that are "not only technically sound, economically beneficial but also socially acceptable/adaptable".

Such approach and result is possible only if '*all stakeholders work together, utilize each other's knowledge to understand the situation and look for INNOVATION to find solution/s'.* We (I mean those in developing countries) will not get very far by compartmentalizing roles of various actors. There is much to be learning for livestock keepers (farmers) - they may not know everything but they know a lot and the same is true for other actors in this field.

I suggest adoption of "Knowledge based Innovation Systems Approach" - recommended by the World Bank and being adopted in the CG system. The features of this approach as I see them are:

- It focuses on policy and development interventions that mobilize knowledge and information possessed by all actors to support a continuous process of innovation.
- The approach *takes into consideration the entire value chain up to* marketing stage.
- All actors / stake holders are identified and their practices, roles, knowledge and views are studied and taken into consideration.
- It aims at creating 'Enabling Environment' through institutions and formulating policies.
- It shifts focus from conventional approach of 'developing new knowledge to mobilize available knowledge, improve on it if needed and use it'.
- It is a departure from 'Transfer of Technology *(developed at research institutions)* or *Linear Technology Diffusion' approach* to developing linkages, institutional environment, integration and mobilization of different knowledge sources and adoption of appropriate ones that meet the needs / requirements in local context.

I should stop here since the mail has become longish.

Thanks in advance to those who would spend time going through the views expressed and mail their responses.

With best wishes.
Datta Rangnekar

Fourth week, message 216: Opinion on Food loss and Food waste

Hello, my name is Reza Lotfi from Iran.

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

Considering "Food loss and Food waste", I present a question regarding "Water" and I was wondering if you would mind discussing this topic "Water is a Food or Water is a nutrient".

What is the role of water in Food chain and Food production?

Best Regards
Reza Lotfi

Fourth week, message 217: Response to message 214

This is Khan Shahidul HUQUE from Bangladesh; I want to add our experience related to the message 214.

John MORAN from Australia has given an excellent example of turning food waste into livestock feed; urban dairy farmers in Bangladesh are using to feed different fresh food wastes available at their local markets. This is a traditional practice and they use a very

negligible part of the total fruit and vegetable wastes available. Recent initiatives of the Bangladesh Livestock Research Institute (BLRI) on their quantification show that fruit and vegetable waste may be even up to 1.0% of the fresh biomass marketed. By engaging unemployed young and women for daily collection of waste biomass and shifting it to a processing plant, BLRI experimentally developed a system for collection, transferring, processing and value additions to waste fruits and vegetable. The processed waste vegetable based feed was fed to cattle.

However, the initiative requires awareness creation of the fruit and vegetable sellers, market authorities, and entrepreneurs including the local government. Mechanical devices are required for collection and processing of food wastes and their value additions. These are very much unavailable in Bangladesh, and this is one of the limitations for further improvement of a cost effective system. All these may change ongoing practices but, this requires international and local coordinated efforts.

Fourth week, message 218: Opinion on Q1 and response to message 197

Revisiting Question 1

My name is Paul FEATHERSTONE, United Kingdom. I am President of EFFPA, the European Former Foodstuff Processors Association, and 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.

[the text of the message 197 is not repeated here as in the original message….Moderators]

My Considered Response:

I entirely appreciate where Mr. Robert Van Otterdijk is coming from. Indeed he is looking for a neat set of words and definition to finalise this issue of Food Loss & Waste. However, it is clearly an issue as, in your own words, most participants did not agree to the proposed definition. By re-visiting the same question with some guidance and clarification from Robert you hope to gain one of key items of consensus you seek from this E-Conference.

Unfortunately I fear this will not happen. It is clear from the Q1 consensus in week one that any food product being utilised for animal feed, the very start of the food chain, should not be classified as a loss or waste.

I understand the need to put a name to the stream of food that is diverted to food-producing animals. I would reiterate that approaching this in terms of losses would be incorrect (my motivation I have already given in week 1). For what it's worth I have my own proposal. I would suggest to call that stream "food diverted to feed". This still allows quantifying it without connecting a qualitative term to it. Instead of "food loss", the FAO could therefore perhaps use the term "food chain loss" for the stream of food resources that are literally lost from the food chain. This holds a clear qualitative connotation, and is more closely connected to the concept of "food waste".

Fourth week, message 219: Response to message 213

I am Dr Bakshi from India

Opinion on Food Loss and Waste.

This is in support of marvelous job done by Dr. Vivek S. Agrawal (Message 213)

As per one of the estimates in developing countries like India the food losses during processing and distribution are around 40% and the share during consumption is only 7%. But reverse is the case in developed countries like USA where the figures are 12-14% and 28-30%, respectively. In India there are homes for the welfare of destitutes

(Pingalwara); likewise homes for those suffering from leprosy (Kohdi ashram). No doubt, there are a number of NGOs that manage their daily food requirements. But in big cities, in get-togethers, gatherings, wedding receptions, parties etc. the cooked food becomes surplus, rather than dumping in landfills and polluting the environment, it is sent for those living in Pingalwara or Kohdi ashram or at places where there are large number of beggars. Similarly, the food waste from above gatherings is collected by landless, marginal farmers and fed to pigs, leading to zero wastage.

Fourth week, message 220: Opinion on question 1

My name is Anton van Engelen, working with the Ministry of Agriculture, Irrigation and Livestock in Afghanistan.

Let us call it "diverted food": "diverted through feed back to food" food? To include it as 'food loss' is too strong: there is something lost in the diversion and conversion, but it also facilitates the better use of roughage into human food (e.g. dairy cows in the Netherlands eating bread): the net effect on overall food availability, especially in ruminants, might well be neutral in the end if counting the positive effect on the digestion of roughages through more easily digestible carbohydrates in the overall ration of the ruminant.

Fourth week, message 221: Opinion on question 1

Congratulations to all participants and to host the e-conference. This subject is very interesting and I can see that the problems to evaluate, use and quantify the co-products are the same worldwide.

I am Gustavo Castro. I work in the public sector in UFVJM in Brazil, where I am a university professor, develop research and extension projects with nutrition and animal production, especially with small farmers and ruminant production systems.

I don't agree with the statement that food used as animal feed is considered to be waste or loss of food. For me, the use of parts of food that is not used in human feeding as animal feed implies the sustainable use of natural resources. In Brazil, it is difficult to say that the food is grown or produced exclusively for animal or human consumption. Only in specific cases, this situation exists. This difficulty increases when evaluating food and feed in the world, because there are different cultures related to feeding, with consequent use of different foods.

Another difficulty is to interpret the lost in the food chain because it is a process where there are losses that are intrinsic, being higher or lower, depending on the practices used, it will still interfere with the co-product of the production scale. The use of co-product still depends on the nutritional value, which sometimes have local importance and the results or information concerning the use are published or available in national periodicals, and not easily accepted by international journals.

The terms used for feed is another issue in Brazil, and I could see in e-conference, which is also around the world. In Brazil they use three terms to describe the feed from the agro industrial processes, co-products, by-products and waste.

Just once, I heard an explanation that convinced me of the difference between these terms. However, this considers the monetary value in relation to the main product obtained by the agro-industry. Co-product refers when it has the same market value as the primary product; by-products if the value is lower than the main product and waste when it has no resale value. With this explanation, I understand the industry's position, which for this market need to develop a business model, and this has a cost, which will depend also in hand scale to enable commercialization.

If the intention of all of us is the exchange of that information, perhaps with the support of FAO, we can create a network that allows the exchange of information or the

execution of works in collaboration. I suggest that the 'Feedpedia' portal can be initially this location.

But all this, in my opinion, is only valid if the use of co-products by producers is considered important; through development, extension projects or programs to bring this information to the producer, logically after the toxicological evaluation, the checking for presence of anti-nutritional factors and bromatological evaluation of co-products. These assessments can also be standardized from the network proposed above.

These are the ideas that I have had from the e-conference and leave as a means of collaboration at all on this subject.

Greetings and thanks for the opportunity to attend the e-conference

Gustavo Castro
Livestock Production Department / UFVJM
Feed Lab Analysis

Fourth week, message 222: Opinion on question 1

Dear all participants, I am Budi from Indonesia. For the last week of conference I would like to comment that the understanding of 'food loss and waste' will be different depending on the angle of view of the food supply chain in relation to the user.

The definition of 'food loss and waste' should be clear in the context of the user (human versus animal). All agricultural products intended for human consumption, may be partially loss in every stages of food supply chain, either in the process of harvesting, processing, distribution and consumption. In the context of human consumption, actually the 'food loss and waste' is only those parts that are not consumed by humans after being processed from raw materials. The loss at the stages of harvesting, processing and distribution, before being processed will not be considered as 'food loss and waste' if those parts of food supply chain are used as animal feeds.

However, if 100% of raw agricultural products (grains, pulses, root crops, vegetables, fruits etc.) from the beginning of food supply chain are considered as food for humans then the unutilized parts are 'food loss and waste'. The definition of 'food loss and waste' will be different depending on the country's angle of view in terms of raw (unprocessed) agricultural products. Under the understanding that 'food loss and waste' is only those unutilized parts of processed parts of food supply chain then the easiest way to estimate the 'food loss and waste' is from the number of human population because everyone will have to eat every day. If there are 200 million people all over the country and eat 200 g of food per day then it is estimated that 40 million kg of food will be consumed. Under the assumption that 0.005% of the consumed food is loss and wasted then there are approximately 200 tonnes available for livestock feed everyday which it will be amounted to 200 x 365 = 73,000 ton a year. If the dry matter content of the food loss is 20% then 14,600 ton of dry matter is available. If this dry matter of food loss is used as component of a total mixed ration at a level of 10% then there will be available an amount of146,000 ton of TMR which is adequate to feed 48667 heads of matured cattle year-round. The problem is how to collect this dry matter correctly which needs further thought.

With regards,

Prof. Budi HARYANTO, Senior Researcher in Ruminant Nutrition, Indonesia Research Institute for Animal Production, P.O. Box 221 Bogor 16002West Java. Indonesia

Fourth week, message 223: Response to messages 218 and 219

I am Dr. ASHOK KUMAR NAGPAL, National Research Centre on Camel, Bikaner, India

Opinion on 218 and 219

I agree with the opinion of Dr. M.P.S. Bakshi – (Message 219) that the food and feed problem in our country is not the surplus but deficit; we need to grow more food (cereals, pulses and oils) to become self sufficient instead to import from other nations. Currently the low pulse production (17.1 million vs. 27.1 millions) is our problem. While developed nations have surplus food and face food loss problem, and can afford food for livestock feeding, developing nations have low food production and face wastage problem that needs to be prevented at harvesting, transport storage, and distribution points through better machinery and storage capacity building and effective management. The wastage may be spoilage through excessive rains or other reasons.

If special business/ industrial zones/ hubs are created by the governments for food, feed and storage bins/ godowns, food, feed loss and wastage may be reduced considerably.

Some part of food going into fuel, ethanol production may be termed as diversion as pointed out by Mr. Paul FEATHERSTONE, United Kingdom-(Message 218) as this is not loss but diversion meant for purpose.

Regards
A. K. Nagpal, India

Fourth week, message 224: Opinion on Q1

Steve Bartle, Kansas State University, US

I am probably out of step with the discussion, but it appears to me that the difficulty the group is having defining food loss, is that we do not define "food gain" when the ingredients are fed to animals.

In comment no. 208, I suggested that an equation be used to quantify "net food gain or loss" which includes estimates of food gain and gross food loss.

Dr. Capper (comment 211) raises an excellent point that an accurate estimation of net food loss or gain ideally would take into account nutrient composition. For example, in a situation where energy is adequate but protein is deficient, animal products should be weighed greater than in situations where dietary protein is sufficient.

I would suggest that a system that accounts for all the different situations would be very complicated and unworkable. Would a system that successfully accounts for 60 to 80% of the desired information (net food = food gain - gross food loss) be a reasonable first step? Extensive footnotes could be used to help explain the weaknesses of the estimates for the 20 to 40%. The system could be improved with experience. I would quantify food gain and loss in terms of digestible energy (monogastric) in the initial system.

Again, I may be out of step with the discussions, and I do not mean to change the direction. But I wish to get my 2 cents in the discussion.

Thanks,
Steve

Fourth week, message 225: Comment on moderators' message

To my view the line may be:

"In particular quantification, evaluation of feeding value (nutritive value and effective/safe level of inclusion) of the different materials based on long term feeding trials and value addition through processing and supplementation of limiting nutrient (s) seems to us a priority".

With regards and thanks for giving me a chance for interaction.

Dr. Mandal A.B.

Fourth week, message 226: Opinion on questions Q15-Q19 (Third week)

European Commission

Please find below the responses for the third week of questions.

QUESTIONS FOR WEEK 3

Q15. What role do you see for researchers in making use of 'food loss and waste' 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.

Research and innovation are key elements at all stages of the food chain.

Around 90 million tonnes of food is wasted in Europe annually. This works out to about 180 kg per capita per year.

Global demand for food is expected to increase by 70% by 2050, while a steep increase in biomass use will also put pressure on agriculture. Feeding the world without damaging the environment is the goal of several EU-funded research projects.

The EU is investing over €4 billion in research and innovation for a European bioeconomy that makes the most of our renewable biological resources. Agriculture is a key component, securing food production, ensuring the sustainable management of natural resources, and supporting development in rural areas. Some of these projects are focusing for example in turning agricultural waste into animal feed (NOSHAN project) or in optimizing the use of food processing by-products into food or feed (NAMASTE project).

Q16. What role do you see for researchers in making use of 'non-food parts' 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.

The response to Q15 is applicable to this question

Q17. What role do you see for NGOs and Civil Societies in making use of 'food loss and waste' 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.

The active participation of civil society, NGOs or other organisations is very important to develop and support a policy that needs cooperation between different parts of the food/feed chain. Some Member states have established successful alliances between their governments' academia, business consumers and civil society.

Business organisations are also important to bring operators into projects that will require additional efforts. These organisations may voice the interests of small and medium size enterprises that do not have the time to invest in representing their interests directly and may represent a consensus view amongst all different types of businesses.

The Commission is analysing in close cooperation with industry, consumer and other NGOs, food sector experts and Member State policy experts how to reduce food waste without compromising food safety and is discussing options for possible EU actions.

Co-operation with Member States is facilitated through a dedicated Expert Group bringing together relevant national organisations to help the Commission and Member States to identify and prioritise actions to be taken at EU level in order to prevent food losses and food waste.

Co-operation with stakeholders is spearheaded through a Working Group on Food Losses and Food Waste, which supports the Commission in sharing of best practices in food waste prevention and in identifying possible EU actions.

Another of cooperation with civil society the EC is funding FUSIONS project under the European Commission Framework Programme 7. The project will contribute towards:

- the harmonisation of food waste monitoring;
- improved understanding of the extent to which social innovation can reduce food waste;
- the development of guidelines for a common Food Waste policy for EU-27.

This project has partners from academia, food consumers' organisations, food banks or governmental departments and international organisations (FAO).

Also many different organisations (200) have expressed their support: food retailers, consumer groups, social organisations, charity organisations & NGOs, food service/hospitality sector, food producers/manufacturers, waste management organisations, other industry(Agriculture, food packaging, ICT, supplier companies, etc.),retail, food-service, food producer associations, academia governments, policy makers, food safety authorities and regulators.

Q18. What role do you see for NGOs and Civil Societies in making use of 'non-food parts' 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.

Response to Q 17 is applicable to this question

Q19. What role do you see for the policy makers in making use of 'food loss and waste' 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.

Policy makers are an essential element to establish provisions or guidelines to promote the use of food loss and waste in animal feed without compromising food safety. Also they can support projects, public-private partnerships and cooperation between different levels of the food/feed chain and can encourage and support research and innovation.

Policy makers in Europe have the responsibility to implement and develop EU legislation. Although the national competent authorities are responsible for the implementation of the EU legislation, each Member State has its own distribution of competences that may imply the action of other policy makers at regional or local level.

The European Commission is currently reflecting on the scope of the new proposal to promote circular economy including actions to prevent food waste. In the meantime different actions already described in Q17 are in place.

Almudena RODRÍGUEZ SÁNCHEZ-BEATO
European Commission
DG Health and Consumers
Unit G1 Animal Nutrition
Office: F101 00/69
B-1049 Brussels/Belgium
+32 2 29 50154
almudena.rodriguez@ec.europa.eu

Fourth week, message 227: Response to message 226

From Patrick NWOSIBE,

Message 226 from European Union is most encouraging and challenging to me as a Nigerian and African. It should also be to everyone on this platform from Africa. The problem of food loss and waste can better be tackled if approached from national and regional level and that is what European Union is doing already.

For us here in Africa, we need to borrow a leave from them, there should be a policy frame work in Africa on how to tackle food loss and waste. What is most unfortunate is that most food loss along the food supply chain occurs in developing nations and Africa is

worst hit by this menace. The reason being that lack of good road network to transport agricultural produce from farm to market, lack of adequate power supply in most cities in African, lack of technological know-how in best method of harvest and post-harvest handling is still a big issue in Africa.

Unfortunately Africa as a continent has not mapped out a clear road map to arrest the issue of food loss and waste in its domain. Whenever the issue of food security is discussed here in Nigeria, much emphasis is always on increased food production but research conducted by my NGO (African Save Food Initiative) and other stakeholders shows that at least 40% of agricultural-produce in most part of sub-Sahara Africa is lost or wasted due to the factors I earlier mentioned. It is therefore imperative to note that achieving food security in Africa will remain a far cry unless the issue of food loss and waste is properly addressed. This is the very message our NGO, African Save food Initiative has been preaching for some years now but it has been near impossible to get government attention in Nigeria and make them see things from this perspective because emphasis is always on increased food production. I therefore urge African Union and member states like Nigeria, Ghana to borrow a leave on what European Union is doing in the areas of policy framework, research and partnership with NGOs, civil societies and other interest parties.

My NGO, African Save Food Initiative is ready to partner with the regional body, member nations, other NGOs and interest groups in this regard especially in the areas of research, advocacy, public enlightenments and so.

Thanks

Patrick O Nwosibe
Managing Partner/Corporate Strategist
African Save Food Initiative
42 Onitsha Street, Area 11 Abuja
+2348037710269, +2348030996936
www.africansavefood.org.,africansavefood@gmail.com

Fourth week, message 228: Opinion on food loss and waste

Dear participants,

As we are arriving at the end of the e-conference I would like to make final comments:

1- The subject is very important in terms of world food security and thanks to the organizer to promote the discussion of the use of food loss, co-products, residues or non-food part to animal feed.

2- Probably everyone knows that Brazil has enormous participation on the agriculture and livestock production for the world so the "residue" from agriculture can contribute to animal feeding but we need:

i. Residue analysis (ex. government laboratories)

ii. Polices (ex. Food security - contaminations)

iii. Research & extension services (ex. in vivo trials)

to make it more useful from the farm level to the industries level.

3- We need to keep in mind that it is very important to maintain the "residue" in the soils as source of organic matter otherwise the next agriculture production cycle will be very dependent on chemical fertilizer, which is not sustainable. Therefore, a balance between the use of residue for animal production and source of organic matter to the soil should be well defined otherwise land degradation will be increased.

4- It is incredible how big the number of colleagues from Asia, India and Africa are discussing about this subject and fewer are from Brazil or South America. Why? I am not

sure about the answer but this could be related to the relationship between country population and food availability.

Brazil is one of the biggest agriculture/livestock producers and exporters so is now a time to start to think that we are exporting not only food but also fertilizer, organic matter, water and energy. Are we given the correct destination/use to our incredible volume of residues to the animals or to the soil? In addition, our population is increasing (as in the whole world) and more food is necessary so probably in near future we will give more attention to the residues!

Rogerio M. Mauricio
Animal Science
Bioengineering Department

Fourth week, message 229: Opinion on food loss and waste

From Atuhaire Andrew Mwebaze, Research officer, Livestock nutrition, National Agricultural Research Organisation, Uganda.

I wish to extend my thanks to the organizers and innovators of this platform. I have come to understand many new things. Keep it up.

Fourth week, message 230: Comments on previous messages

This is Ericka McThenia from USA, grad student.

In regard to Mr. van Otterdijk's comments, I don't think there is a negative impact to the environment when food is 'lost' from human consumption to animal feed. Recycling food loss as animal feed is a far better option than sending the food to a landfill and it seems most agree on the validation and importance of recycling these nutrients back into the food chain.

I completely agree with Mr. Kennedy from message 202, that food is only truly lost when we cannot use it in any form at all. Again, I would like to bring up the value of compost and stress that even when food is reused to make nutrient rich fertilizer that it is still not lost or wasted. I believe that food is only absolutely lost or wasted when it is sent to a landfill. Reusing food to feed animals is a great way to mitigate food to a landfill, but certainly not the only way of measuring food loss or waste.

And I think Mr. Lotfi’s message 216 raises a most interesting and crucial point when considering water in the food supply chain. So much of our resources are wasted when food is wasted in a landfill; however, recuperating some of the water and energy footprint of food as animal feed, compost or even bioenergy, is not an absolute loss of water input. Nevertheless, it is a very important aspect to consider and I think we would be foolhardy to leave out the waste of resources when talking about food waste.

As for the role of researchers, NGOs, and policy makers; I believe they absolutely have a role to play in speeding the information and working together to spread that information. Researchers and NGOs should relay important data to policy makers so we can attempt a top down and bottom up approach in tackling this problem. Without data to back it up, some policies seem unjust and part of the population may be unwilling to alter behaviors, therefore I think it is important to form allies and spread the message about these findings from all directions. Policy may be the best way to reach a mass of people, so I think policy makers should be informed of all data findings.

Thank you to all the participants for all the insightful comments and to the moderators for organizing this. It has been an honor to read all these ideas.

Fourth week, message 231: Comments on previous messages

From Eldine Charles, Farmer, Saint Lucia, West Indies

I would like to first thank the organizers and everyone. I, unfortunately, only got the last week of this and would like to know is there somewhere I could get all the exchanges to further understand.

[We will distribute tomorrow a compilation of all messages…Moderators]

Thank you in advance

Kindest Regards

Fourth week, message 232: Response to message 230

I am Oko Oluwatosin Kennedy

Dear Erika (message 230), I truly agree with your points and I strongly recommend a redefinition of the term 'Food Loss' to take into account all areas covered in this conference.

To the organizers of this conference, I say Bravo, it is a good medium for knowledge sharing. Keep up the good work.

To all participants, thank you for sharing your ideas and experiences. I have really learnt a lot, it seems I was in for a training course. Once again thank you.

I look forward to the compilation from this conference and future events.

Sincerely,
Oko Oluwatosin Kennedy
Department of Animal Science

Fourth week, message 233: Opinion on programme

I am Dr.A.K. Nagpal from Bikaner, India

Opinion on Programme Points:

- **Quantification of food losses and waste** for possible use as animal feed: Approximate figures of food losses and waste can be arrived at by knowing the difference between total food production from cereals, pulses, oilseeds, vegetables and fruit production and total consumption as raw or as products from various cereal, pulse, oil mills, factories/ industries. Losses and waste occur at every stage during harvest, transportation, production, storage, distribution and consumption, even at the household level. Of course, we cannot predict the losses of food due to rains, floods and droughts. Both agriculture production and livestock population remain in dynamic changes due to various factors. Large variations are seen at local, regional and national level. Standard proforma surveys need to be conducted to generate information on actual food losses /waste at harvest, transport, storage, distribution and consumption points.
- **Quantification of non-food parts**, for possible use as animal feed: Attempts have been made in the past by various workers/ institutions to quantify the availability of non-food parts (straws, brans, pulse chunnies, oil cakes, and sugarcane byproducts) from agricultural crops, forest, pastures/ rangelands, trees and their possible use as animal feed. I myself tried to generate information of food and feed production for my district –Bikaner and state- Rajasthan. [The report can be obtained from Dr. Nagpal … Moderators].
- **Quantify losses and waste in non-food parts**, so as to develop strategies for reduction of the losses and waste. Losses and waste occur at the level of harvest, transport storage and even the animal feeding level. Livestock in India are mostly fed

crop residues of straws and a few supplemented fodders. There is wastage of around 10-15% at this level. However attention has not been paid to the important aspect of losses and waste and surveys through standard proformas need to be done to arrive at actual figures and take the remedial measures.

- **There is abundant green grass / edible bushes/shrubs/ tree cover during monsoon season**. These valuable resources disappear soon after the rainy season is over. Efforts are needed to harvest, conserve and utilize these feed resources to increase the feed availability for animal feeding. Small farmers are normally seen to harvest and carry grasses/weeds for feeding their livestock.
- **Waste from vegetable markets and fruit industries** should be utilized effectively for animal feeding but before that sufficient feeding trials should be done for making recommendations in the interest of animal safety health.
- **Develop, identify and upscale strategies** for efficient and safe use of food losses and waste and of non-food parts as animal feed. Various participants gave excellent examples of food losses/wastage and provided solutions for their salvage. There are options available for preventing losses/wastage of non-food parts by chaffing fodder, making silage /hay of surplus fodder, urea/ammonia treatment, feeding mixed /complete rations. Best options are making complete feed block or complete feed pellets although the latter requires capital/machinery and energy inputs. These methods not only increase the feed availability but also increase nutrient digestibility and availability. We can increase the feed/ nutrient availability by 20% simply by adopting these techniques.
- **Evaluate impact of using the above materials as animal feed**. Long term feeding trials can be done to assess the production performance of livestock and impact on their health and environment.
- **Strategy and policy formulation** on using food wastes and losses and non-food parts as animal feed.
- **Special economic zones** should be created amid agriculture fields for storage of agricultural produces (cereals, pulses & oil seeds) cereal mills, pulse mills, oil extraction plants, food products (noodles, bakery, cakes etc. wines/beer), dairy industries, mineral mixture plants, and to utilize the losses/ waste/byproducts at the same place by value addition of non-food parts through complete feed block/ complete feed pellets plants This also helps in cutting down losses/waste due transportation.
- **Special tax holidays** for industries, soft loans, tax incentives should be provided to encouraged food and feed industries located in special economic zones.
- Effective **early weather warning system** is needed to save the losses of food and feed resources.
- **Insurance cover** for crop/livestock, food and feed industries to mitigate economic losses by farmers/livestock owners and industry people.
- **Floods/hail-storms/ droughts** play havoc with the crop production, human & livestock lives. It is in the interest of the nation and public in general that policy makers give due attention to inter-linking of rivers so that the water which is curse in flooded areas is diverted to drought areas for irrigation and drinking and becomes boon for higher agriculture production**.**
- **Provide technical support** to small scale industries to utilize food wastes and losses and non-food parts as animal feed. A close partnership through conference/seminar/ workshops is needed among food technologists, feed scientists, agriculture engineers, extension workers for innovation, technical knowledge transfer and effective utilization of food and feed resources. In fact, the government institutions are already doing it but scattered. Private industries should collaborate

with the government research institution for joint need based research and both get benefitted.

- **Raise awareness and develop partnerships**. A comprehensive partnership is needed among researchers, food & feed industries, policy makers, NGOs and farmers through joint efforts, conferences/seminars/meetings/ radio TV talks/technical bulletins/ leaflets. Livestock owners are largely un-educated, feed their animals mostly crop residues/fodder and rarely give concentrates, not aware of scientific feeding of livestock. They need to be educated and given practical demonstrations of silage making, hay making, ammonia/ urea treatment of straws, TMRs (total mixed rations), advantages of complete feed pellets and complete feed pellets.

Staff of the Animal husbandry (veterinary doctors) and agriculture departments (agriculture officers) of the state governments need to partnered as they have close linkage with the farmers/ livestock owners and play important role in dissemination of technical knowledge.

FOOD SAVED = FOOD PRODUCED

FODDER SAVED = FODDER PRODUCED

FEED SAVED = FEED PRODUCED

Regards
Dr.A.K. Nagpal, Bikaner, India
Email: scientist.com_aknagpal@mail.com

Fourth week, message 234: Opinion on Q1

Yes, I agree with the Oko Oluwatosin Kennedy, Erika (message 230) and others who are in support for the redefining of the term 'Food Loss'.

Muneendra Kumar, India

Fourth week, message 235: General comments on food loss and waste

I am Dr.Chong Wang from Zhejiang A&F University, China

I agree with some points of Dr.A.K. Nagpal, Bikaner.

Regarding quantification of food losses and waste for possible use as animal feed: the prediction of the losses and wastes of food associated with the season and treated method must be a large work in front of us. Also, different places should have different methods to transport, treat, or store the food losses and waste. For example, things are very different in forest areas than in flat areas. The situation of quantification of losses and waste in non-food parts is similar, different places should have different methods; large amount of work is needed. For example in south China, a lot of rice straw is burned every year, this may be due to the lack of method and labor to treat it effectively. If there will be subsides or reward, which is the responsibility of government, or effective methods of treatment and machinery, things will be different. The most import thing is to have a balance of profit and efficiency. We should develop a system that gives the producers more profit, taking the benefits of time into consideration.

Kind regards!
Chong Wang

Fourth week, message 236: Utilization of fruit and vegetable waste

I am Dave Russick from USA.

We are working with food processing companies that may be considered distributors. What may be unusual in the US is that the Fruit and Vegetable processor removes cores

and skins etc for sale to grocery stores. These fruits are packaged and pre-cut into edible fruit less the core and skins. The same is true of some vegetables for example broccoli. The stem might be cut back and certain parts of the vegetable discarded so the consumer is not purchasing what would be considered inedible parts of the food.

We take the fruit and vegetable waste and process it at high temps in our operation to kill the pathogens. We dehydrate the food waste to under 12% to have a shelf life for distribution to swine producers in the region. I am in Minnesota which is part of a region in the US with the highest hog producing volume.

The same is true of fish in our region. It is deboned and packaged for grocery stores and restaurants. In grocery stores the consumer would buy the fish meat only in small portion sizes. We take the discarded fish waste such as bone, skin, heads, and some fish meat and process it in the same manner as the fruit and vegetable waste.

We would do the same with post consumer waste found at restaurants and institutions.

Our operation is at a small scale working solely with a prototype at present but we have processed the food waste with good results to date.

The differences between developed and developing economies are very apparent in the discussions from around the world. I don't know if what we are doing would have applications globally.

Dave Russick
TUBS, Inc.
USA

Fourth week, message 237: Views on questions 15-21

My name is Dr. (Mrs.) Victoria Attoh-Kotoku. I am an Animal Nutrition and Production teacher and interested in climate change issues relating to livestock.

I want to thank the moderators for putting up such a great concept and work and also the participants for the enormous contributions. From a food security point of view, feed quality and feed efficiency are the keys to optimal livestock productivity and quality animal products.

Researchers first need to quantify food that is lost and wasted during harvesting, post harvesting, processing, distribution and consumption. Depending on the magnitude of the food loss and waste at each level research work on the chemical and nutritional components can be carried out as well as the potential anti-nutritional factors as submitted by Philippe BECQUET in message 201. The knowledge from the research can then be made available to NGOs, extension officers and farmer groups to be disseminated to members.

For non-food parts, I would want to dwell on some tree pods and fruits that can be used as animal feed. I do not know if they qualify as non-food parts. An example is dried Samanea saman pods. These are very nutritious with high energy content that can be used as livestock feed. Another is breadfruit (*Artocarpus altilis*). In Ghana these two only drop after maturing and rot under the trees, nourishing the soil. Some research is going on with the breadfruit for both human and animal nutrition (food/feed) as it is very high in energy. Thus researchers can work on non-conventional non-food parts as well as on a lot of tropical seeds and nuts that are not consumed by humans that can be used after research for livestock feed.

NGOs and Civil Societies in their advocacy can help disseminate research findings on food loss and waste as animal feed to policy makers as well as end users who are mostly industry and farmers.

Policy makers should make laws that would safeguard the use of food loss and waste as animal feed so as not to compromise the health of animals as well as the health of humans. They should also be conscious of the fact that good policy frameworks for the

proper utilisation of this food loss and waste for animals would actually free most of the grains especially maize for human consumption especially in the developing world.

Dr. (Mrs.) Victoria Attoh-Kotoku, Faculty of Agriculture, KNUST 233 244 24 27 64

Fourth week, message 238: Comments on the e-conference and Q1

I am FAMUYIDE, Ibukun, a Graduate student from the College of Veterinary Medicine, Federal University of Agriculture, Abeokuta. Nigeria.

Reading all the excellent opinions and submissions of various contributors and the moderators so far has deepened my knowledge on this important global issue; this is my first time of participating in such an e-conference.

I have learnt from other people's views and experiences. It is obvious from the different submissions thus far there is need to have a holistic all-inclusive definitions of food accommodating both humans and animals as such that if a food destined to feed humans is diverted (through various circumstances) to animal feeding, then such is not truly lost, but transformed or recycled.

I am looking forward to participating in more of this innovative global discourse.

Thanks to FAO and the moderators, as well as the various colleagues worldwide for this conference.

Kind regards,

Famuyide

Fourth week, message 239: Comments on the e-conference

Good evening all, I am Nduta MBARATHI,

I would like to express my sincere gratitude to the moderators and their team for organising this e-conference. I would also like to thank the participants, I have learned a lot from the contributions highlighted in forum.

Once again Asante Sana!

Kind regards,
Nduta Mbarathi
Masters Candidate
University of KwaZulu-Natal
South Africa

Fourth week, message 240: Comments on the e-conference

Dear Organizers, Moderators and Participants,

I am NWORGU Friday Chima from Nigeria. I thank the organizers, moderators and participants for a successful e-conference on the subject matter. I sincerely thank the organizers (FAO) and the moderators for giving me the opportunity to participate in this successful e-conference. It has been great and wonderful contributions globally. My prayer is for the knowledge and information generated, be it modified for utilization and for questions arising from the e-conference to further be attended for better environmental suitability and for quality animal products production through adequate and proper utilization of food waste, food loss and non-food parts and generation of simple technologies.

Fourth week, message 241: Comments on food loss and waste

Hello everybody. My name is Santiago Carralero, anthropologist and historian, specialist in mobile cultures, and founder/director of YURTA NGO (www.indigenousculture.org), working for biocultural diversity conservation (Highlands of Central Asia)

I would like to contribute for a second time, giving some alternative ideas about the concept of waste and loss related to food. Since my fieldwork has been carried out among the mobile peoples (hunter-gatherers, itinerants, pastoralists) I use to provide references of consumption which take place in specific environmental contexts where mobile peoples live: taiga, tundra, steppes, deserts, savannah, tropical forests, and mountains, but also in "non-developed" agrarian rural areas. I consider these cultural spaces too large to be ignored in this discussion, and also these different economic patterns may shed some extra light to the matter of food waste/loss.

Such economic patterns are featured by a relative lack of variety in the daily diet, but also by an almost inexistence of food waste and loss, with manufacturing sites small, often family owned, or operated by small cooperatives. Variety, quantity and social complexity increase the capacity of generating food waste and/or loss exponentially. So, for me it is the human factor that produces and creates itself both the concept and reality of food waste/loss. Across our actions as humans and our interventions on processing, packing, distributing and long-term conserving, we are altering and transforming nature by adding inputs of energy, time, effort, money, raw products found in nature and "naturally wasted" acquire a not objective added value titled "human food". Here we can also include the food intended for animals, as animals are finally used by humans as food or in some way to generate income to buy food (transportation, wool, etc.).

In the big city, sumum of the human development in terms of shelter and consumption, the idea of food waste/loss gains strength and relevance. Restaurants in the big cities have proven to be a particularly source of waste, due to two reasons: first, we don´t know how much food we are going to order over the menu; second, our distance to "raw food" as consumers is very long and a lot of inputs has been added from the original gathering to the final act of consumption. In the restaurants we are totally "divorced" of the food which we are going to eat. All this wasted food is indeed the same thing like the naturally fallen fruit getting rotten on the ground of the rain-forest floor, but in our minds we consider it a waste because all the involved extra-waste products and actions (gathering, processing, packing, transport, cocking, presenting, plus all the salaries and time) are "wasted" in all the processes since the milk is milked until the consumer decides to leave it on the bar without consuming.

Mobile peoples, and other indigenous and traditional small producers show us that a lesser distance between consumers and food, a shorter segment of processing between the act of obtainment and the act of consumption, and a lesser population pressing over the resources scattered over a given territory works good to reduce our perception of food waste/loss.

Finally, I want to express my gratitude to the moderators and FAO for this nice discussion and innovative method.

Mr. Santiago Carralero
Santiago Carralero Benítez
"Working for Nomads and Indigenous Peoples"
Iniciativa YURTA: www.indigenousculture.org

Fourth week, message 242: Comments on food loss and waste

My name is Togtokhbayar N, from Mongolia

Livestock farming is crucially important for provision of animal-based food products for the population, and as a source of income for many resource-poor farmers in Mongolia. However, the main constraint to livestock development in Mongolia is the scarcity and

fluctuation in the quality and quantity of the year around animal feed supply. There should be no food loss. We grow food for our consumption, but some parts might be food wasted. Waste should be processed for animal feed. During the harvest, some amount is wasted depending on standard requirements. Researchers with their students are developing some technologies. Nowadays people do not use animal derived fat; it is lost and that is also a problem. Policymakers should work on Legislation to ensure that food losses/wastes are processed for feed at production site to minimize environmental pollution and for quality assurance and NGOs and Civil Societies should monitor its regulation. They should work in synergy with researchers and NGOs and Civil Societies support their work.

Mongolian State University of Life Sciences
School of Animal Science and Biotechnology

Fourth week, message 243: Comments on food loss and waste

My name is Dr. Godwin Oyedele Oyediji. I am an Animal Scientist and the Registrar/CEO of the Nigerian Institute of Animal Science, Nigeria.

I sincerely thank the FAO team that put together this electronic conference. I also thank and appreciate all participants for the brilliant ideas forwarded which were shared with others in different parts of the world.

The discussions have uncovered new business opportunities particularly in engineering and designs. Small portable machines that can be used on small scale for pelletizing crop residues are urgently needed in Nigeria. Nigeria produces 80 million tonnes of crop residues most of which are wasted. Examples are various cereal cobs, such as maize and sorghum cobs, groundnut haulms and many others already mentioned by various discussants from Africa and India. These are wastes that ought to enter the food chain for Human beings through livestock.

I agree with all those who suggested that food loss should be redefined by FAO.

Dr.Godwin Oyedele Oyediji
Registrar/Ceo
Nigerian Institute of Animal Science
1 & 3 Road 45, Off 4th Avenue, Gwarinpa Ok
Abuja. Nigeria
+234 803 3201272
email: oyedeleoyediji@yahoo.com

Fourth week, message 244: Comments on food loss and waste and Q1

I am Dr. Muneendra KUMAR

I would like to express my sincere gratitude to the moderators and their team for organizing this e-conference. Questions raised and opinions given by participants of different countries during the time-frame of the e-conference were very informative and will definitely be helpful in designing a road map for betterment of the livestock sector. Furthermore, certain terms and definitions given by FAO need to be redefined.

Dr. Muneendra Kumar
Assistant Professor, Department of Animal Nutrition
College of Veterinary Science & Animal Husbandry, DUVASU, Mathura
281001, India

Fourth week, message 245: Comments on food loss and waste

My name is Xiaoyulong Chen, Doctorate student in University of Milan. I followed almost all your comments and what came to my mind is also the phytopathogens and yield limitation of agriculture:

Globally, agricultural systems are faced with the challenge of providing for the demands of a massive growing human population. To meet this demand, yield losses caused by phytopathogens should be under control in terms of maintaining the food quality and abundance. Concurrently, yield limitation due to soil fertility and nutrition deficiency add extra pressure to plant production. Thus, searching for sustainable solutions to suppress phytopathogens, to increase the yield are gaining high interests in recent years. A diverse assemblage of plant associated microbes can contribute to crucial ecosystem services in agricultural landscapes, including plant growth promotion (PGP) and biological control activities. The abilities of these microorganisms to positively interact with their host and phytopathogens are fundamental prerequisites of microbial assisted plant protection and production.

In order to prevent the food lost, we need to continue our research in searching for new biocontrol agents and plant growth promotion bacteria, in compliment of policy support, like FAO.

Xiaoyulong Chen, PhD student

DeFENS - Dep. of Food, Environmental and Nutritional Sciences, Via Celoria, 2 - 20133 Milano – Italy, University of Milan

(Without ignoring the importance of production efficiency, the concept of Food Loss and Waste as defined by FAO refers only to the post harvest components of the value chains – Moderators)

Fourth week, message 246: Comments on food loss and waste

This is Olawale F. Olaniyan from the Gambia.

Dear Moderators,

The past 3+ weeks had presented to us the challenges and opportunities concerning proper utilization of crop materials for food as well as for feed. I will like to add my final 'voice' to this present discussion by saying there are still many areas that researchers, NGOs, policy makers, agricultural development agencies in the developing countries still need to explore. Irrespective of the stance we might have taken concerning FAO's definition of food loss and waste, this online discussion forum should gear us towards ensuring a better and sustainable use of agricultural produce either as food or feed. We should endeavour to collaborate at national and international levels to reduce food wastage or loss. Together, we can achieve food security and reduced environmental impacts of food loss/waste in the developing countries.

Finally, I will like to commend the moderators for their efforts. To all the contributors, it is my pleasure to say "WELL DONE!" having read your posts.

Thanks and best wishes to all.

Olawale F. Olaniyan
University of The Gambia
International Trypanotolerance Centre
www.itc.gm

Fourth week, message 247: Comments on e-conference

I am Dr Vijay from India. I would like to thank FAO for organising this conference and giving us the opportunity to interact with and to share the opinions on topics of mutual concerns.

Regards

Fourth week, message 248: Comments on e-conference

This is Khan Shahidul Huque from Bangladesh

I am really enjoyed and benefited through this e-conference, thanks a lot to all contributors, especially, to FAO, Rome for organizing the conference. Let me take another chance to add my opinion on the outcome and follow ups.

In Bangladesh, almost all diets fed to different ruminant animals consisted of non-food parts of different crops at various levels, almost 50% of which are lost at different stages. Food wastes, to some extent, are also used for feeding ruminant animals but, at a very limited level. Their feeding system is conventional and sometimes it does not match with animal daily requirements, resulting in failure in expressing full genetic production potentials of animals produced through costly breeding programmes. Market oriented value additions practices of feeding non-food parts and food wastes to animals, as we have seen in different messages (like message 236 of John Moran from Australia) should be multiplied in places where they fit socioeconomically. Other countries similar to Bangladesh may also benefit from adopting these practices to bring a change in their present system.

Thanks to FAO, who already initiated this sort of programme, and the best example is transferring densified straw-based feed technology from India to Bangladesh under its South-South cooperation programme.

May I request FAO and other concerned international organizations to concentrate more on this sort of initiatives to have action oriented programmes on replicating good practices on non-food part and food waste uses as animal feeds. Out of the e-conference we have very good knowledge on global good practices. No doubt this could be a pioneering initiative under SDG-17 (Target 17.6).

Khan Shahidul Huque, PhD
Chief Scientific Officer & Head, Animal Production Research Division & former DG, Bangladesh Livestock Research Institute, Savar, Dhaka 1341, Bangladesh; Cell: +8801552376788

Fourth week, message 249: Comments on e-conference

Dr Nitin Mehta from Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Punjab, India

Dear Moderators

I would like to congratulate you for this meticulous and informative effort in conducting this session encompassing the issues regarding utilisation of wastes for feed purpose and targeting global food security through control of food loss.

Thanks and best wishes

NITIN

Fourth week, message 250: Response to message 233

Dear All, I am Gbemenou Joselin Benoit Gnonlonfin, Consultant, Beninese, based in Nairobi, Kenya.

I agree with most of the points raised by Dr A.K. Nagpal (message233). A general survey with a well structured questionnaire on food lost and waste and non-food is crucial. This will help to gather information that ultimately will be used in the quantification processes. I could also see some synergy and complementary actions between this platform and the one that is led by Daniela Battaglia, FAO (Hazard associated with animal feed) and the new agreement between FAO and the Texas University on proficiency testing. Capacity building actions are in the center of all these frameworks. I would congratulate the moderators for organizing this platform on knowledge exchange and all participants for their valuable contribution.

Regards Benoit

Fourth week, message 251: Comments on markets, food loss and feed

Hi my name is Sai Krishna Danamudi. I am an entrepreneur and have created the online price discover platform VARI for agricultural produce and products in India.

We have around 90,000 farmers in our platform. Our mission is simple: Price Discovery, Price Transmission and Price Transparency.

Over the past few weeks I closely followed the responses of my fellow colleagues about food loss, waste and animal feeds. I can only say that it all depends on the price that farmers are getting for their crops or produce and **marketing** options available for them.

An example is Corn. Farmers are growing it because there is a better market for it even though the price is not so high. Corn can be used to feed people instead it is used to feed animals because there is a better **market** for meat. So my view is that the **market** determines!

I support the idea of Gbemenou Joselin Benoit Gnonlonfin (Message 250) that general survey with a well structured questionnaire on food lost and waste.

Thanks for FAO for arranging this E conference.

Thanks
Sai Krishna Danamudi
CEO/Founder
www.vari.co.in

Fourth week, message 252: Comments on feed regulation

My name is Dr.Godwin Oyedele Oyediji. I am the Registrar/CEO of the Nigerian Institute of Animal Science based in Abuja Nigeria.

As part of the regulatory mandates of the Institute in its Act, the Institute has published its 2015 list of approved feed ingredients for the feed industry in Nigeria. The list excludes some food wastes whose current handling and distribution have been considered not very safe for animal feeding possibly affecting adversely the safety of animal products derived from feeding such wastes.

This is one of the points raised by many discussants on the definition of actual food loss. I observed that many of the contributions submitted skipped the issue of legislation in the recycling of food wastes for feeding livestock.

This is probably because many countries are yet to establish laws that professionalize animal science practice that will enable Animal Scientists be licensed and consequently regulate the feed industry and livestock markets. Nigeria has advanced in this regard with the establishment of the Nigerian Institute of Animal Science that registers Animal Scientists and currently advocates for appropriate technologies and equipment that will enable crop residues become more tradable in local markets through pelletization to reduce bulkiness. Appropriate professional leadership suffers in many Sub-Saharan

countries in Africa when dealing with feed issues. Governance is about projects and projects that are best driven by appropriate experts that are registered and licensed.

I appreciate and support message 251 that market is the main issue from where all other discussions flow.

Again I thank the FAO and the moderators for the educative conference.

Dr.Godwin Oyedele Oyediji
Registrar/CEO
Nigerian Institute of Animal Science
1 &3 Road 45 Off 4th Avenue
GWARINPA, Abuja Nigeria
email: oyedeleoyediji@yahoo.com

Fourth week, message 253, general comments on food loss and waste

Much of the discussion I have read evolves around the more efficient use of waste. I see the problem as being a much bigger one.

The world cannot tolerate a wastage rate of 40% of edible food. We need to completely rethink (and I mean radical rethink) of our marketing chains and supermarket system. Why should supermarkets consign any perfectly good food to the tip because the "used by or best by" date has passed, when there are underprivileged people in both developed and developing countries who could well use the food.

Storage facilities have to be upgraded in many countries. Some of the feed markets in Pakistan provide little to no shelter for feed and grain from inclement weather. I instance the storage of grain in Kenya. In one year they had a bumper crop that exceeded domestic consumption and then the next year there was drought and famine. Very little excess grains from the previous year had been stored properly for distribution during the drought.

I think the FAO should take the lead to organise an international colloquium on the subject. I know there are very large vested commercial interests; however is this something that the Gates Foundation might fund? The Asian dairy network should contribute to this also.

I look forward to further discussion on this critical subject and contributing to any outcomes.

Best regards,

Peter

Peter Wynn
Adjunct Professor of Animal Production
School of Animal and Veterinary Sciences
Charles Sturt University, Locked Bag 588, Wagga Wagga NSW 2678
Telephone +61 2 6933 2938, Facsimile +61 2 6933 2991, Mob 0428679954
email: pwynn@csu.edu.au, School Website http://www.csu.edu.au/vet/
Boorooma Street, North Wagga NSW, Australia

Fourth week, message 254: Opinion on Q1

I'm Jonathan Rivin, formerly with the University of Wisconsin, as a waste management specialist and currently in a job transition state. This has been a great discussion and educational experience. I have not been able to read most of the responses at this point, but intend to over the next week or so.

Q1. I have only been able to sporadically read all of the messages, so my response may not reflect what others have said:

I classify any food that does not end up at its intended target as food loss (or waste, depending upon stage of the supply chain as defined by FAO). I like to use the term "recovered food" to indicate that the food intended for a specific purpose was lost, but then recovered or repurposed for another use.

Message 79 (Carzon) agreed with others that food is not totally being lost when fed to animals, just transformed. Message 76, indicated that we feed animals food, but the animals end up on our plates. In both cases the assumption is that we (humans) retrieve the value of the food to some degree, and in some cultures. One can never guarantee that the animal will end up on someone's plate. Excluding "normal" animal mortality, cultural preferences come into play (e.g., Hindus do not eat beef, some cultures in Asian countries eat dog meat, horse meat is rarely eaten in the US). And what cultures eat the whole animal? Few. And what about milk produced by some animals that are never eaten? Is that "full" transformation"? So if we don't capture the full degree of food value, where is the amount not captured? Lost?

If we take this "transformational" rationalization a step further, then if we compost wasted food and use it for soil amendment to grow consumption crops, then the food waste is not being lost either, just transformed! Then the only food that is wasted is that which is only deposited in landfills? But then an argument could be made that landfill leachate when not recycled, and is land applied or sewered, also recovers wasted food.

Consequently, no food is wasted, only transformed (in some cultures)! I've taken this "transformed food" rationalization to an extreme to make a point. We need a demarcation between direct intended use (e.g., actual human consumption) and all other non-intended usage. The primary need for terminology is for quantification. What is important when categorizing food "stages" is that an explanation in included so that everyone understands the meaning.

Fourth week, message 255: Comments on utilization of feed waste

I'm SOUMITRA JASH, from ICAR-NIANP, Bangalore, INDIA.

I feel like having a BIRD's EYE-VIEW as the curtain fall to this HIGHLY INFORMATIVE NET-WORKED TOPIC.

Success of Utilization of Feed Waste may possibly depend on:

1. Reduction of moisture percentage and exploring issues regarding bio-safety.

2. Addressing enhancement on shelf-life of the product, using prompt cost-effective industrial methods.

3. Co-ordination between individual, social agencies and administrative policies of the state/ nation.

4. Development of distribution channels through defined technology for packaging and transportation of the products.

5. Introduction of pilot/ sample studies on specific product and region for impact assessment.