PROCEEDINGS OF

FIFTH NATIONAL WORKSHOP ON RESEARCH AND DEVELEOPMENT IN FOOD PROCESSING SECTOR

Date: 24th September, 2013
Venue: Hotel Lalit, Mumbai

Organised by:

FEDERATION OF INDIAN CHAMBERS OF COMMERCE AND INDUSTRY
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EXECUTIVE SUMMARY

FICCI along with Ministry of Food Processing and Industries conducted the fifth national workshop on research and development in food processing sector on 24th September 2013 at Hotel Lalit in Mumbai. The workshop was attended by around 150 delegates representing academia, industry and government institutions from India and abroad.

Any research outcome needs to be checked before it reaches market. Every country has a set of standards and procedures to establish product safety. And it is of utmost importance for the researcher to align themselves with the latest standards to come up with market ready products with fast approvals from the regulators. India too has recently revamped its domestic food safety management system with the enforcement of Food Safety and Standards Regulations in 2011.

Internationally there are well established models available in the area of food safety including risk management, surveillance, and product approval and so on. 2013 being marked as fiftieth year of CODEX became a unique occasion to invite global experts to this workshop.

At a national level we urgently need to address hurdles in validated data generation and management. We have a network of already existing food research institutes and institutes with focus on specific commodity(ies) across our country. In order to find effective ways to generate scientific data for codex can we build and leverage this network in securing our food safety and trade concerns at international forums?

In this backdrop the workshop was successfully organised and was divided in three sessions viz; **a)** CODEX: Journey so far and relevance of Codex in times to come; **b)** Food Research Reaching Markets: Decoding Global Food Safety Management System and **c)** Industry-Academia-Government interface: How to strengthen India's position with validated Research Data?

During the workshop the following key points emerged:

1. Effective engagement at Codex level
2. Food Safety being a shared responsibility
3. Harmonisation with Codex standards
4. Faster response from the Regulators to promote innovation
5. Need of more Academia-Industry-Government Interaction
6. Building indigenous research capability
7. Superior traceability and safety processes

8. Central agency to validate the methods of analysis

9. Parity in Data Reporting

10. Need to do meta analysis of the data

11. Setting up Network of India Centre of Excellence (NICE)

12. Need of Research on MRLs

13. Culture of Quality in Data

There were total 16 speakers in the workshop hailing from India and abroad, as under:

1. Mr K Chandramouli, Chairman, Food Safety & Standards Authority of India
2. Hon'ble Louise Asher, MP Minister for Innovation, Services and Small Business, State Government of Victoria, Australia
3. Ms Anuradha Prasad, Joint Secretary, MoFPI, GoI
4. Mr S Dave, Chair, CODEX Alimentarius Commission
5. Mr Greg Read, Chair, Codex Committee on Food Import & Export Inspection & Certification Systems & First Assistant Secretary-Food Div, Department of Agriculture, Fisheries & Forestry, Australia
6. Dr Samuel Godefroy, Vice Chair- Codex Alimentarius Commission & Director General, Food Directorate, Health Canada
7. Mr Martijn Weijtens, Chair, Codex Committee on Contaminants in Foods & Acting Deputy Director of the Department of Food Quality, Netherlands
8. Dr Mary Frances Lowe, US Codex Manager, USDA
9. Ms Vinod Kotwal, Director (Codex), National Codex Contact Point, India
10. Dr Lalitha R Gowda, Chief Scientist, CFTRI
11. Prof (Dr) Anil Kumar Srivastava, Director & Vice-Chancellor, National Dairy Research Institute
12. Dr D Rama Rao, National Director, National Agricultural Innovation Project
13. Dr Kalpagam Polasa, Director-in-Charge, National Institute of Nutrition
14. Dr M R Sudarshan, Director, Spices Board India
15. Mr Shaminder Pal Singh, Chair, FICCI Codex Cell
16. Dr Jasvir Singh, AVP & Head, SARAN, Kraft Foods

5th National Workshop on Research and Development in food processing sector

The fifth National R&D workshop in Food Processing Sector was organised by the Federation of Indian Chambers of Commerce and Industry (FICCI) in collaboration with Ministry of Food Processing Industries (MOFPI) on 24th September, 2013 in The Lalit, Mumbai.

The workshop was divided in three sessions and was attended by around 150 delegates representing academia, industry and government institutions from India and abroad. The proceedings of the workshop remained as under:

INAUGURAL SESSION

CODEX: JOURNEY SO FAR AND RELEVANCE OF CODEX IN TIMES TO COME

Mr S Dave, Chair, Codex Alimentarius Commission

During the opening remarks Mr Dave gave a brief history of how Codex evolved. The work of standardisation in the food sector was started in 1903 by the International Dairy Federation. Subsequently, countries had their own development processes of standardisation but in 1949 Argentina set up an institution called Código Latinoamericano de Alimentos with a view to having standards for the region in Latin America. In 1955, the Joint FAO/WHO Expert Committee on Food Additives (JECFA) was born. In 1958, Austria set up the Codex Alimentarius Europaeus, essentially for the European countries. Gradually, FAO and WHO came together to establish an international institution that would set standards for the whole world. And that was when, in 1961, they set up the Codex Alimentarius Commission. The first session was held in 1963. At that time there were only 30 member countries, essentially developed countries.

The first Codex committee that was set up was the Milk and Milk Products Committee. Over the last 50 years Codex Alimentarius made rapid progress and from 30 countries at that time, there were now 185 countries plus the European Union. At that time there were just 16 observer organisations, and now there were 222 organisations. The budget of the Codex Secretariat which was based in Rome

had also increased by 151% at 8.3 million for the biennium. And during this period Codex Alimentarius evolved as a science based institution with an approach towards inclusiveness, with all countries participating together. The developing countries had enhanced their participation, due to the capacity building efforts of FAO and WHO.

Mr Dave further observed that Codex Alimentarius was a highly transparent body; consensus building had been the main purpose behind the entire work, and that had led to standards that were acceptable to all countries. Close to 4000 standards, including additives and pesticide residues, had been formulated. One of the major achievements for Codex and the entire world was that Codex standards were taken as reference standards in the framework of WTO. This encouraged all countries to harmonise their standards with Codex, and FSSAI had also initiated these steps.

The capacity building efforts introduced by FAO and WHO with support from several countries had contributed to the developing countries to effectively participate in Codex. The Codex Trust Fund had been of great help in this direction. Vertical and horizontal standards that cut across all groups, for example food additives, food contaminants, pesticide residues, veterinary drug residues, labelling, methods of analysis and sampling and food hygiene had been set up for commodities; the policies and procedures were laid down by another committee called the Codex Committee on General Principles. All this helped countries to save time on framing their own national standards and that facilitated trade. It was India's policy to align with Codex, which was there in the FSSAI Act as well, and the country was working towards it. It was a process that had to be followed; consultation with stakeholders and members of WTO would be an essential part of it.

Having achieved lots of things over the last 50 years, there were certain priorities before Codex. In July, Codex adopted the new strategic plan which was going to take effect from 1 January 2014 for a period of six years, and then a new strategic plan would be devised based on the experience over those six years. A challenge before the Commission was to generate data from developing countries. Because it was a science based body, risk assessment was the very basis of standardisation, but unless developing countries were able to provide data, the Commission could not have standards which could be called global in the true sense. To make it truly global, all countries needed to participate in the scientific assessment and risk assessment for standards. Capacity building programmes were being organised by FAO and WHO, and there were efforts to find new sources of funds in this direction. Meaningful participation of developing countries had increased over the years, and they had really contributed to making global standards. The Codex Trust Fund would come to an end in 2015 and the Commission was looking forward to a successor initiative for the Trust Fund to encourage emerging economies to participate in the Codex process. It would also require strengthening of Codex at the national level. Harmonisation and trade facilitation at the national level would be critical.

There were new areas of emerging risks, for example risks on account of climate change that affected food safety. The world had recently seen what happened because of melamine. There could be unknown risks on account of natural

calamities like earthquakes. These would also need to be addressed by Codex collectively by all the countries. Another important thing was to ensure nutritional security. The challenges before the world on account of over nutrition or under nutrition needed to be addressed by Codex. Codex Alimentarius was addressing these issues in various committees and was looking forward to the next 50 years.

Mr K Chandramouli, Chairman, Food Safety and Standards Authority of India

In his keynote address Mr Chandramouli was sure that the work of the Codex Commission would increase in leaps and bounds as more and more participants entered the Commission to participate actively in its deliberations. Participation had been gaining momentum and the Committee had grown exponentially. However, what needed to be addressed now was that with the world shrinking, and food being exported and imported at such a rapid rate, involvement of everyone - consumers, producers, trade as well as regulators - was extremely important. It was very important for everyone to be on the same page; and the whole system needed to ensure that food which was domestically produced or imported was safe for consumption.

The Indian food safety authority was at the moment grappling with the safety part. The FSSAI had two S's: Safety and Standards. The latest domestic act itself came into being in 2006 and the Authority came into existence in 2008. The Food Safety Authority had taken on itself the onerous task of identifying and bringing on board every food business operator in this country. India has a ball park figure of about 5.5 crore, i.e. 55 million food business operators, small, big, medium, in every size, and the Authority had been given the job of ensuring that food which flows through every one of them is made safe. This in itself was a very big task, and it would not be possible for any single authority to enforce that without every section, every business enterprise, every stakeholder taking part in it. No one was a pure businessman or a pure food business operator as a stakeholder; every one of us is a consumer. So if implemented well, it would help all of us.

He shared that the Authority had been set up with this background, and the infrastructure and facilities were being put in place to implement an Act of this size. It was a big challenge, and it would only happen when everyone came on board. He observed, "We are still very far away from making safe food into healthy food. We are only talking about safe food in the context of its antonym, meaning we should not consume unsafe food. But then, that is not the best food we should consume; we have to move on from safe food to healthy food. More specifically, in a country like ours, where anaemia and malnutrition are so prevalent in the entire country, we need to make a qualitative change from food being just safe to food being healthy. Now that is the second rung of the objectives which we need to address in the coming years. I personally think that it is going to be a very challenging task." In

addition to it being a challenging task, coordination was a huge problem with a country as big as India. From the time food was harvested as a crop to the time it was processed and consumed, the whole supply chain needed to be identified and kept in view so that interventions at every level were possible.

Sharing more on the issues and functioning of the Authority he said, "We have standard setting institutions like the Bureau of Indian Standards, who have also been setting standards in the country for a long time. We need to work closely with them. Water is a huge area where we need to concentrate our work. Water which is used for irrigation is not defined as potable water which is used for cooking. So we have to determine systems by which we differentiate water which is used for irrigation and water which is used for cooking. These are all issues which touch the realm of practical implementation of the Act. That is what we are grappling with right now. But I am sure that in the coming years the Food Safety Authority, with the assistance of a global authority like CAC and other bilateral agencies will be able to come to a situation where scientific standard setting becomes an inbuilt part of our functioning. Let me also bring out with great pride that India has a vast crop of scientists. We are not short of expert scientific institutions who are doing research in many of these areas and they have been doing it for many years now. So we are not short of experts who have been advising us where research and development activities are going on continuously; we need to take their assistance in standard setting and also in developing new areas of R&D. We in the Authority have a system of taking the views and opinions, advice and guidance of scientists in the scientific panels. We have about nine scientific panels; any issue where standard setting has to be done is referred to them, and the scientific panel's recommendations are further deliberated upon by a scientific committee, so that final standard setting is possible."

Coming back to Codex, Mr Chandramouli mentioned that they had a very fruitful Codex session this year. India's participation in the Codex committees had shown a substantial increase in the last couple of years. India had been participating very actively, and as a consequence of its participation in the last meeting which was held in Rome, a committee on setting standards for spices had been entrusted to India to take up as a host country. He was sure that in the coming years, issues which were very important to India and developing countries around India would be taken up in the CAC more actively. Some of the challenges in the Codex Commission - the Commission would need to decide how it would do it - were that it needed to draw in more of the developing countries in the standard setting exercise. Work proposals needed to be invited from all countries including the developing countries. At the end of the day, the developing countries, with their huge populations, were the ones who were going to consume food and the safety part was therefore very appropriate. He suggested that involvement of developing countries should be increased because in the world of the CAC, while a lot of things got settled, a lot of things did not get addressed in the same manner. That was where they had to find ways of ensuring that Codex standards were set and linked to health and safety with as much importance as to trade. Mr Chandramouli also requested the CAC to

consider involving more of the developing countries in the electronic working groups (EWGs), so that the issues which concerned countries like India were addressed.

Hon Louise Asher, MP Minister for Innovation, Services and Small Business, State Government of Victoria, Australia

The minister was in India with some of Australia's leading food and beverage producers as part of the Victorian Government's 'Victoria Week' trade mission to India. Strengthening business links with key markets such as India was one of the Victorian Government's top priorities.

The Premier of Victoria, Dr Denis Napthine, recently announced he would chair a Food and Agriculture Inter Asia Task Force. This Task Force involved a significant string of businesses from Victoria's major export industries, and also included senior ministers such as Louise Asher. It would be targeted to ensure they could maximise their opportunities with regard to food exports into Asia.

Meat was Victoria's second largest food industry and food export sector, with their sheep meat exports worth more than $ 1 billion per annum or 11% of the total world sheep trade. Victoria's meat companies operated under the strictest regulations in the world and were at the forefront of sustainable practices. Last year they received a huge boost in this area when it was announced that Australian lamb would be allowed into India free of quotas, based on their meat industry's compliance with India's food safety requirements. On this she said, "This is a very welcome development for Victoria's meat producers and companies who have a well earned reputation for producing some of the world's highest quality and most sought after lamb. Victorian food and beverage producers achieve the highest quality products through superior traceability and safety processes. Our world class food sector boasts extensive research facilities and is committed to processing innovation and ingenuity. These production efficiencies mean competitive costs, and guarantees of safe transport to overseas markets including to India."

Mr Greg Read, Chair, Codex Committee on Food Import & Export Inspection & Certification Systems (CCFICS)

Mr Read started chairing this committee about 14 years ago, and over that time had seen some prominent changes in the direction of Codex. It was a committee that provided the connection between the standards that Codex developed, and their assurances to relevant authorities in exporting countries; but equally it was around the systems that also supported the purview of food, both within national production systems, but equally in terms of imported food.

Mr Read said, “We worked studiously for 20 years and we’ve developed all these standards about exports and the regulatory role around exports, imports and the exchange of information. We have another standard for traceability. We also did a judgement of equivalents. But what was the gap? Frankly, the gap was, we really didn’t have a standard or a guideline around national food control systems. So in Australia’s case, in an ideal environment, if I was the dictator of Australia and wanted to clean up its food control programmes, what I could have done is wiped out everything that was there, picked up every smart bit of thinking that’s embedded in this guideline and then built it in the country. So what this guideline allows us to do, whether it’s a developed country as in Australia’s case, but equally for developing economies, is to take the smart stuff out of it and put it in our own regulations and embed it into our own systems. Because what it’s about is how do you get assurance back to the farms? How do you take the production system costs out between the farm and the market place? How do you get assurances in terms of the risk, and where do you focus your regulatory efforts? I like to have minimum regulation, but put up where it’s deserved. All this lies within those guidelines, and the themes that sit there are just exceedingly important.”

Mr Read saw extraordinary challenges for Codex. He felt that Codex was important for probably two fundamental reasons: the first was, it had to be making a difference. The second thing was, how could these standards be used to have more liberalised trade? How could businesses actually access markets without some of the nonsense that occurred with markets at the present time? These standards were all around that.

Fifty years of Codex was an interesting celebratory point. But what were the next 50 years going to look like? What were the challenges confronting the world in terms of food in the next 50 years? The world population would double; the need for production of food would double; the agricultural production areas would decrease; and in the last, probably 20, years, food production had only increased by two or three percent a year. So what was going to happen in the next 50 years, that would enable the world to feed a population in terms of the particular nutrients required, the calorie intake required, with foods at that point? “I guarantee that we won’t be eating steak every night. That would be my assessment. We’ve only just recently had the first petri dish-grown hamburger that didn’t originate directly from a cow, but what will happen in the next 50 years? What are those challenges that are going to confront food production between now and then, and what’s the important role of Codex with those challenges? I think some of those issues are going to be around the types of production systems that will need to be enhanced and developed in that next 50 year period, and I see agriculture as the central plank. I see that there’s a range of new technologies that will emerge in the next 10 years; given consumer concerns around the world with some of these new technologies, how we communicate the safety of these new technologies. Equally, we’re in a highly technical environment; the populations of countries are getting very much more adept at dealing with these technologies. So what will effectively happen, again in that period of time, with these technologies is that foods business operators,

growers and regulators can effectively connect with the providers of vital information around both the safety of food and the integrity of the product. And then, how to communicate that to the customers. Frankly, I don't think we've spent enough time thinking about that."

Mr Read ended with the observation that industry looked down and watched its feet for 80%, maybe 90% of the time. That was because it had challenges and risks, and had to make profit; occasionally it would look up at the horizon and look back down again. Codex's responsibility was to look up for 80% and look down for 20% of the time. These standards could take five years to develop; there was no point developing a standard relevant now. It had to be relevant in a decade. Codex needed to position itself against what the world was going to look like, and develop standards that were actually beneficial to the countries and equally to the governments of those countries.

Dr Samuel Godefroy, Vice Chair, Codex Alimentarius Commission

Dr Godefroy believed that those who worked in the context of the Codex Alimentarius Commission had to be passionate. This was an organisation that had in its DNA an objective to ensure that consumers, wherever they were on the planet, had to be given the same level of protection of their health through food supply, safety and nutrition. This was also an organisation that strove to see that there were no undue impediments to food trade, and that essentially fair practices in food trade were enabled.

When the organisation started in 1963, there were 30 countries. They were now over 180 nations. Over 50 years the organisation produced 320 standards, guidelines and Codex Codes of Practice. Other impressive numbers: 1100 MRLs were promulgated for food additives; 2900 MRLs for pesticide residues; and 400 MRLs for veterinary drugs. This was a good testament to the fact that from a quantitative standpoint this organisation had produced a number of standards. And it did that with the 180 members, and with consensus.

Beyond those tremendous achievements, there were some questions. One of the questions was, were the standards that Codex was developing relevant to all the members of the Codex Alimentarius Commission and also to the industry as well as to the consumers? Were they there to address the challenges not only of today, but the challenges of food safety and nutrition for tomorrow? Were they able to sustain the level of work of a science based organisation such as Codex by enabling the production of the scientific information that was so critical to the work that they conducted?

"I do have some elements of answer to the first question; I am an optimist by nature, and I would say that there is an affirmative and positive answer to the first question about the relevance of the standards. I think we have achieved, so far, the

production of relevant standards and I'm going to try to give you some examples to illustrate that.

Dr Godefroy also addressed one criticism. That was about speed. He agreed that the Commission sometimes talked about the same thing for a number of years. But they could be very fast, too. He referred to the melamine incident in 2008. When that incident was discovered and had repercussions around the world, the world united again under the auspices of the Codex Alimentarius Commission. They were able to have the scientific advice needed. The event was publicised in September 2008; in March 2009 CCCF identified this as priority work; and in 2010, one year later, there was the adoption of a standard for melamine in food. This was one of the fastest moving standards that Codex had seen and even compared with national standards, this was probably a milestone in terms of the way Codex operates. So Codex could also meet the test of speed and ability to respond.

Looking at the 50 years ahead, while celebrating successes and trying to build upon them, the Commission had to look at some of its challenges. Its membership would increase; the number of food safety and nutrition issues would not diminish either; the interests of consumers, stakeholders and industries were also increasing; and they would like to see how this organisation could meet the challenges of tomorrow. A few questions that he wanted to see how the audience would react to, were related again to the relevance of Codex standards for the entirety of the membership: how they addressed the needs, but also how they encompassed its own situation; to what extent was the scientific information, on the basis of which Codex standards were developed, truly global; what was the level of contribution of developing countries when calls for data were made; to what extent could they meet their ability to respond swiftly to emerging issues when scientific information was not available and when the resources to generate this scientific information may not be easily accessible. Those were some of the issues that Codex would have to face in the future. He said he would be very much interested in hearing the insights of those present, and any type of advice in this area. Codex had developed a strategic plan for the period 2014-2019. Some of its objectives were aimed to look at how they could address some of these challenges, but he felt that an event such as this would allow the Commission to benefit from the insights of everyone and welcomed comments or questions in this regard.

Dr Martijn Weijtens, Chair, Codex Committee on Contaminants In Foods (CCCF)

Coming from the Netherlands, Dr Weijtens informed the audience that although The Netherlands was a very small country, it happened to be the second exporter of agricultural products in the world after the United States. Being a very small country, politically nearly irrelevant but a very big producer of agricultural products meant that it had a natural interest in international standards, especially those developed in a multilateral context. So Codex was for The Netherlands vital. They would never

be able to import and export like they did without international standards that were more or less generally recognised.

Dr Weijtens felt that Codex was a true success story. Codex started as a rather technical organisation, with a limited number of countries, and most of them from the developed countries. It was not a very representative body. However, from this start 50 years ago, it had evolved to an organisation covering actually the whole world community, which was very spectacular. Not only that, Codex started as an organisation that had quite a technical nature. It was developing standards that were very interesting to the people involved in food safety, which had their merits in protecting the consumer and in creating an overall view of food safety. But from this more technical perspective, it actually became the world's leading standards for the international trade and consumer protection at the same time. In fact, being so important in the framework of the SPS Agreement and the reference standard for WTO, the Codex standards had become the only leading standards in food safety.

Another very important aspect was the increased involvement of developing countries. Standards were now being developed not only by the West but by the whole world.

Another thing that was very important and that Codex was distinguishing itself in was the transparency. Codex was extremely transparent. They had a large number of observer organisations that attended the meetings and were also able to intervene. So they listened to all kinds of stakeholders, not only countries, but also professional organisations, consumer organisations.

Looking forwards, they would further continue their work. There were a number of challenges, and he mentioned some of them from a Dutch and, maybe, European perspective.

What did the involvement of developing countries mean? Codex wanted them to participate in the meetings. But more important, the Commission also needed data from developing countries to develop standards that were truly representative. It wanted them to be involved in the work. This data collection was, however, not that easy. It involved scientific work, sampling, etc. But if Codex wanted these standards to be working, it needed this data. The Codex Trust Fund was going to be revisited very soon. Until now, the Codex Trust Fund was focussing on participation of developing countries in meetings; he hoped that the Codex Trust Fund would focus also on data collection so that data from developing countries could be included in the development of standards. Another aspect that might be relevant in this regard was co-hosting meetings of committees in developing countries.

The relationship with risk analysis was very important. Codex's standards were science based. That meant that risk analysis should take place. That also meant that it needed the bodies to do this and fortunately they had very good bodies in Codex, JECFA, JEMRA and others. But these bodies also needed the necessary funding.

Lately, the work of JECFA was limited due to financial problems. This was of course something that the mother organisations, FAO and WHO, had to solve.

Another discussion that was taking place in the meetings of the Codex Alimentarius Commission was the relation with private standards. It was known that retail organisations in the western world, for example, had their own private standards, and confronted producers with these private standards. There was a lot of concern about these standards because they might mean an extra burden for producers. Codex had shown that it was able to produce a lot of standards, and actually these private standards could be complimentary where there were no Codex standards developed, because Codex was not able to work in all fields. So the challenge was really to develop this relationship with private standards, not see private standards as a danger for Codex standards.

Another aspect was around concerns that existed in the development of standards for growth promotion in animals. Animal welfare issues were not until now a relevant part of the work of Codex. However, these concerns were there. And it had been seen recently that discussions in relation to concerns on animal health could really interfere with the work of Codex. These concerns would probably grow. The good news was that they were confronted with these concerns only in a very limited area of Codex, mainly standards as regards to growth promotion, but they would need to find a way to handle these concerns in their work in Codex.

The last was the relation with the outside world, and more specifically consumer organisations. Codex has in its meetings participation of consumer organisations. That was very important because it needed to be open to gain the trust of consumers. Codex was open, had participation of consumers, but it would have to be seen how this would develop because consumer issues were not part of Codex's work. The Commission wanted to be transparent, and it wanted to be clear about what it did and how it handled the things; and in the meantime, it would have to keep its good reputation and good name with these consumer organisations.

Dr Mary Frances Lowe, US Codex Manager, USDA

The world has changed a lot since Codex had its first meeting, and that Codex has also changed, and must and will continue to change. Probably the most prominent feature of change in the agricultural world had been the globalisation of food trade which had enhanced both food safety and food security. In Codex, probably the most dramatic change was the increased participation of developing countries in the work, including taking leadership roles such as the leadership role that India would be undertaking in chairing the new committee on spices. In the United States, the goal for agriculture was to achieve a safe, varied, abundant and affordable food supply. And they wanted to work to make that goal a reality worldwide. They believed that Codex was key to achieving that worldwide, and also for them.

The success that she mentioned was with the Committee on Pesticide Residues; and how that committee overcame challenges that for a while seemed to threaten to make the Codex standards irrelevant, because they were so slow. That in turn would impede the adoption of important new, safer food production technologies. It could take Codex eight years to establish a maximum residue limit for pesticides. The Committee recognised that this was a problem, beginning under Dutch leadership at the time, and adopted a process that refocused the commitment on basing Codex standards on international expert reviews. This process ensured that all scientific issues would be addressed by the Joint Meeting on Pesticide Residues, the international expert body, that they would be addressed in a timely fashion and that the Committee would accept the results of that review as the basis for moving forward. This was coupled with other reforms that sounded very simple: like looking at how the meetings were scheduled to make sure there wasn't too long a gap between the expert review, the session of the Committee and the session of the Commission. And as a result, Codex MRLs for pesticides were in place much more quickly these days. It was a win-win situation for consumers and for agricultural producers. Consumers benefitted from safer food, and producers gained the benefit of a greater range of pest control technologies.

This process also was especially beneficial for developing countries who may not be able to devote scarce scientific resources to doing the kind of comprehensive review required to establish their own MRLs. Without Codex MRLs, they might have to rely on older, often riskier pesticides. So it meant more guarantees of safer food for consumers from imports, and also enabled the establishment of domestic standards.

Codex continued to face challenges, as did the individual countries. There were governance challenges in terms of making sure that Codex remained true to its mission and followed its rules and procedures. There was the challenge of providing sustainable support for the scientific review bodies that Codex depended on for the scientific basis of its standards; and encouraging more independent experts from developing countries to participate in those scientific review bodies. And there was also the challenge of addressing and promoting innovation to enhance food production, security and quality, especially in meeting the needs of the coming 50 years.

There are world class experts in developing countries, but they may not necessarily have made the connection with the participation in Codex to allow that expertise to be used. So making those linkages happen more easily and more frequently was certainly valuable. The new Codex Strategic Plan gave the Commission the basis it needed for addressing the challenges in the future. It reaffirmed its commitment to science based standards and to the Codex principles on the role of science; it committed Codex to address the emerging issues and new technologies based on those fundamental principles; and it set forth common values that had served the Commission well so far. Those were values of inclusiveness, consensus building, collaboration and transparency.

Codex could be proud of the last 50 years, and Dr Lowe shared the panel's optimism for the next 50 years. She also saw that India was taking a more active role in Codex, which she felt would be good for the organisation, and good for the country.

TECHNICAL SESSION

FOOD RESEARCH REACHING MARKETS: DECODING GLOBAL FOOD SAFETY MANAGEMENT SYSTEM

The next session titled 'Food Research Reaching Markets: Decoding Global Food Safety Management System' was chaired by Ms Anuradha Prasad, Joint Secretary, MoFPI.

Ms Anuradha Prasad, Joint Secretary, MoFPI

The Ministry of Food Processing Industries has been sponsoring this annual R&D workshop with FICCI in conjunction with FOODWORLD conference and Annapoorna exhibition. While deliberating on this year's theme FICCI and the ministry came up with the idea that this year focus should be on Codex and food safety issues. The food sector in India is in a state of transition from the food safety regime under the Prevention of Food Adulteration Act (PFAA) and a multiplicity of product-based food safety acts that were administered by different ministries. All this has been replaced by a unified food safety law with an independent regulator, FSSAI. As in any period of transition there are issues, doubts, problems and difficulties. Some of these doubts include formulation of standards, harmonisation with international standards, risk assessment systems, implementation issues, and enforcement at the state government level. Therefore FSSAI wholeheartedly supported the theme of the conference and Ms Prasad expressed her gratefulness to FSSAI and its Chairperson for gracing the occasion. She also expressed her appreciation of Mr Dave's efforts in bringing to the forum such a distinguished panel of experts from across the world.

The transition to this new food safety framework in India takes place at a time when the food sector has witnessed impressive growth. This year the country reached record food grain production of around 260 million tonnes. India has also emerged as an exporter of food products. Food experts grew by an impressive 20% in the five year period from 2008-09 to 2012-13. This growth rate is higher than the overall export growth. But India is still a very small player in terms of its share in the international agricultural trade. But it is looking forward to increase its share and move up the value chain. It is looking to move from primary produce to more value added products. India's food processing sector has also witnessed impressive growth. Food processing industries have been growing at an annual average rate of more than 7%. The food processing sector occupies the continuum between agriculture and manufacturing, and is growing at a faster rate than both agriculture and manufacturing. Agriculture has grown at just 3%, and manufacturing 5.8% over the last five year period; but the food processing sector has been growing at 7.2%.

India's young population and growing middle class with their changing lifestyles offer an immense market opportunity to the food processing industry. But the growth of the sector has to be supported by a strong R&D base. Research and innovation are needed to bring new, more nutritive and safer products to the consumers. New processing and packaging technologies will make wider and better quality choices available to them.

The government has been supporting R&D in the food sector with a network of laboratories and institutions under the ICAR system and under CSIR. The government also supports research in the processed food sector through project based funding for applied research, both for private as well as public sector institutes. A lot of research also takes place within industry, especially in the larger corporations that have their own dedicated R&D facilities and are constantly working on new products to bring new varieties to the market.

The problem, as far as government-supported research that takes place in the universities and research institutes is concerned, is that it remains on the shelf in the laboratory and does not reach the market. Perhaps industry-academia linkages need to be strengthened and gaps identified so that the research that is undertaken is more demand driven, useful to industry and supports the sector in its growth path. Of course, there are regulatory issues around food safety and compliance with standards when the research output is taken to the market; the message has to be that very strong food safety systems and regulations are needed to ensure consumer safety. At the same time the system has to be flexible to ensure that industry has enough incentives to invest and grow. That balance has to be achieved.

Hence this particular R&D workshop was planned, where the stakeholders could come together and deliberate on some of these issues.

The session was moderated by Dr Lalitha R Gowda, Chief Scientist, CFTRI. The other speakers in the session made their presentations during the technical session as under:

Dr Lalitha R Gowda, Chief Scientist, CFTRI

Dr Gowda observed that as emphasised, the password is food safety and quality. The production of safe, high quality foods for home and overseas markets, as envisaged by any country, has been and should continue to be underpinned by the provisions of guarantees of safety, traceability and authenticity, because all markets are consumer driven. A fully transparent system involving industry, academia, regulatory authorities and public health agencies can assure food safety and quality if underpinned by scientific knowledge. That is the 'user id' for food safety and quality. This includes areas of microbial and chemical contamination, quality traceability and authenticity.

She introduced and invited the distinguished panellists who came from various countries to tell the delegates about what their respective country's role has been in food safety and quality.

Mr Greg Read, First Assistant Secretary - Food Division, Department of Agriculture, Fisheries and Forestry, Australia

Mr Read began with a quick overview of the food safety systems operating in Australia. During his presentation he mentioned that the challenge for food is to maintain a regulatory system that delivers safe food for the population, enables the consumers to make informed choices and also maintains public confidence. It is quite difficult and complex to do. Public confidence in food regulators will depend, firstly, on evidence that there is a low level of risk and, secondly, on the assurance that adequate systems are in place to monitor and analyse food and respond when situations of potential harm occur. In Australia, as in other parts of the world, the consumer considers risk management being nil risk. There is always a risk element. In terms of confidence in the regulator, it only takes one issue for confidence to plunge. The system calls for a lot of transparency and dedicated efforts that can certainly tip quite quickly.

Providing evidence that there is a low level of risk requires methods of analysing food, evidence-based and transparent results, and effective management strategies.

Australia has come quite a long way to this point and recognises that it still has a long way to go. A lot of investment has gone into their food safety systems. In the Australian meat industry, the payback for a lot of the significant investment put into animal production systems in the 1970s came only in the mid '90s. It is a challenge around the world to get the research that sits on the shelf into the system.

The food regulatory system in Australia is not as challenging and complex as that in India. They have a standards setting body called FSANZ. It is a body that is connected both to their Department of Health and Department of Agriculture. It has a coordination policy role. The policy setting itself is done between all the states, and the various ministries, and New Zealand. The standards that are developed are applicable not only in Australia but also in New Zealand. Each state is responsible for harmonised enforcement of the standards. So they have a consistent standard, nationally applied, and also a nationally enforced programme. The variability between the states is not significant.

Some other principles that are being applied nationally have been framed in terms of good regulatory process in the development of regulations. Mr Read felt that a regulator should not use one dollar more than necessary to ensure that the appropriate outcome is achieved. It is very easy to get excessive with regulation and grind industries to a stop. A balance has to be maintained between appropriate

regulation, excessive regulation and insufficient regulation. That is a challenge in Australia, and also in India.

The regulatory approach in Australia is to develop standards where there is a need to, and look for and address risks as they are identified. Beyond that, the responsibility is left to the food business operators.

The domestic food regulatory system operating in Australia aligns with the National Food Control System paper developed by CCFICS. It is a continuous improvement cycle. It is one of the great challenges for CCFIC internationally and also for Australia. It is a measurement of the performance of the food regulatory system. Orders are a good tool to identify compliance. But does that give a measurement of performance and has it led to one state having a better system than another? Has the better system arisen out of the weight of the order report? Are there key performance criteria that can be assessed through a performance matrix to work out which of those states are actually meeting the outcomes required and which are not? Regulators and industries are being challenged with these questions. A clear set of key performance criteria should be set, with the ability to measure them. If they can be measured, problems can be identified and fixed quickly.

The important mantra of the day was the harmonisation of national standards in Codex. Codex invests a lot of time and effort and good science in the development of these standards. So as a national government why does Australia need to replicate those? They take the good standards applicable to their country and embed them where they can in their national food systems.

The use of standards like Codex is presumed to comply with WTO since they are immutable to challenge. What is also important is that as a standard and as it's expressed, it is a very defendable standard in terms of the science, the approach and the credibility that it was produced within. One of the areas that is a little more vague in terms of the challenges is around the TBT Agreement, consumer concerns and the need for appropriate labelling. These are challenges in Codex, but also in their national systems.

Australia does have some differences with Codex standards as probably all countries do, in terms of consumption patterns, dietary patterns, and prevalence of contaminants, whether natural or otherwise. Some modifications may be needed on the general Codex standards to fit domestic national requirements. Within national governments, there will always be some degree of consumer sensitivity around a range of issues and there may well be a requirement to shape some of the descriptive material in relation to the products. To have a really competitive national food system, those particular areas should be as lightly regulated as possible.

Australia has risk analysis processes consistent with Codex. If there are digressions from Codex standards with regard to veterinary drugs and chemicals and their integration into Australian agriculture, and also with regard to their imported food programme, reference is made back to FSANZ for risk assessment.

Australia has a programme of monitoring and surveillance, both through the Australian Total Dietary Studies surveillance activities and also through the communicable disease networks in Australia. A classic example is Ozfoodnet.

The Australian domestic food production system is moving to a residue survey programme; it is one that parallels their current programme that is used particularly for their export sectors. The National Residue Survey is a nationally delivered programme that samples across a range of agricultural produce in Australia and tests it against various chemical and other profiles. There is transparency in the publication of results when detection takes place. Responses are fed back to the states that in turn go back to the farms to deal with the residue breaches. The programme is currently being embellished to provide a greater feedback framework in terms of the domestic food production systems.

Australia is a fairly easy country to actually export food to. They have national production systems that operate from farm to the marketplace, and those requirements have been translated into a Border Inspection Programme that is applied to imported food and is based on risk and appropriate sampling templates. If that food meets the requirements of inspection and compliance with livelihood requirements, it is facilitated entry into the country. This is in relation particularly to food safety; quarantines and animal disease are a different issue though.

Australia exports meat all over the world. The critical point to make in meat inspection is in relation to outcomes. They are very focussed on meeting the performance intent of countries and through Codex, in seeking to develop a systems approach that enables steep performance criteria to end in the product meeting a particular standard. They do not encourage descriptive inputs because most of them are irrelevant and do not benefit the product as an outcome.

Food safety issues can really bite! No matter how well the systems have operated up to that point, once an issue is identified a very coherent emergency response must be put in place in terms of traceability, communication and recall. The more the sophistication on that front, the less damage will be done especially in regard to export markets.

Australia has some environmental characteristics that make it possible to have very good linkage between the farms and the product. This may be difficult in other parts of the world. All of their farms are identifiable, and they communicate from those farms, through linkages in the food chain, to the sausage and the barbecue. That provides good capability in controlling the product and leads to consumer confidence in it.

Traceability was an issue that Australia dealt with in the development of the traceability standard in Codex. It has to be embedded in the national programmes of a particular country and align with the capabilities within that country. It does not

need high technology. It can be rudimentary, paper based, or use technology. All of these are equally good. What traceability does, particularly for an exporting country like Australia, which exports 40% to 50% of its production, is that it gives a quick time response to capture the problem food if a situation arises. For countries with a high proportion of consumer consumption of the production, rather than trace the product to a particular retail outlet at lightning speed, there may be other supplementary public communication programmes.

Traceability that is not connected to the national food control system is meaningless. Merely clamping RFID readers in the ears of cattle or putting microchip readers on banana stems or broccoli and being able to watch those getting traced around, are a waste of money if they are not connected in a smart way to a regulatory system. There are smarter ways of doing it. There are some extreme challenges on that front. Technology is moving so fast that devices used today may quickly get redundant. These days, there is a capacity in the Internet to have smart forms that are produced to actually open up. A smart form can be opened up, information logged in it and sent down the supply pathway. That information can actually be tracked through to the point of retail. Some of that needs to be developed because it is a smart opportunity for countries to use technology in a clever way without a lot of infrastructure, to provide alignment with traceability parameters.

On food recall systems he said that a high level of trust is required between regulators and industries. If a problem is identified, they should be able to work together to identify the significance of the problem. If it is a potentially major issue, it enables the regulator to put in place a range of timely responses that enable coverage with national consumers and also export markets. A strong industry-government partnership on that front is very important.

Food defence is not a major issue in Australia at this time. They do have a range of trading partners who are starting to talk about food defence systems. Australian companies have concern about exposure to liabilities through intentional contamination; a lot of production facilities have mandatory fences, guards, security facilities, CCTVs and other surveillance mechanisms. There is good control in that area in Australia, but countries that do not have it may want to give this aspect consideration.

Another point that is extremely important in the development of international standards but equally from a national programme perspective, is the ability of the national food control system to recognise equivalence of difference systems meeting the same outcomes. What is important is that outcomes should meet key performance criteria. They may do it in a different way, but if they meet the performance criteria, the product should be deemed to be meeting the import requirements of that particular company or country.

From an Australian perspective but equally internationally, there is significant guidance available to countries to assist with the development of food control

systems. There is a lot of FAO material. There are a lot of countries that have material available on webs and on their Internet. For countries seeking dialogue or information, this is probably a first step, to actually explore some of those opportunities. But one system doesn't fit all. It is important in the context of a national government to establish frameworks that enable that country to make products that meet the import requirements or the national requirements of another country. That can happen both across different countries but equally intra-country between states. The guidance material available may be tailored to meet the risks inherent in the particular national system. It should not be tailored just to parallel what is being done in another country like Australia, the European Union or the US. It has to be built into the context of that particular national system.

Dr Samuel Godefroy, Director General, Food Directorate, Health Canada

Dr Godefroy shared some insights into the Canadian experience in managing the food safety system and in adapting to the evolving environment of food safety and nutrition.

In Canada, as part of the constitutional make up of the country, every level of government has a responsibility and the ability to enact food safety and nutrition legislation and regulation at the provincial, territorial, federal and municipal level.

At the federal level, there are four major departments and agencies that manage the food safety system. These are Health Canada (HC), the Canadian Food Inspection Agency (CFIA), the Public Health Agency of Canada (PHAC) and Agriculture and Agri-Food Canada (AAFC).

Health Canada is responsible for all the health related food standards of all foods that are sold in Canada, whether they are produced domestically or imported.

The Canadian Food Inspection Agency was created in 1997 to gather all the federal responsibilities of food inspection into a single entity. The Agency also has a standard setting mandate for food quality as well as animal and plant health.

The Public Health Agency of Canada acts as a centre for disease control and is responsible for surveillance of illnesses, including food borne illnesses. PHAC administers a food borne illness surveillance system that feeds into a North American database that looks at the occurrence of patterns of major food borne pathogens. PulseNet is an important database that they rely on for identifying food borne illnesses and patterns of pathogens.

Last, but not the least, is Agriculture and Agri-Food Canada. It is an economic department and is there to support the food and agri-food sector through research initiatives in improving the performance of the sector as well as to support some of the market access opportunities.

Food safety and nutrition is an important priority for the Government of Canada. Despite a good ranking and good performance of the food safety system, there is always interest in improving its performance, and mitigating and eliminating, to the extent possible, any food related illnesses. The statistics on food borne illnesses in Canada were updated by PHAC about one month ago. As of 2013 it is estimated that 4 million Canadians, or one in eight Canadians, get sick from a food borne illness. In a lot of instances this is due to consumer mishandling of foods and potential cross contamination at the home. Hence it is not only related to the food, but also to the way in which the food is prepared and consumed. Food safety is a shared responsibility.

The shared responsibility paradigm for a well performing system needs to rely on three pillars:

- Industry's responsibility.
- Consumers' responsibilities.
- Government's responsibility.

A responsible food industry that observes food safety requirements across the supply chain from farm to gate will operate in a culture of proactiveness and prevention. Preventive behaviour aims at the identification, anticipation, and control measures for potential risks. A culture of food safety in industry is very well justified, because a consumer who gets sick or who gets deceived by a label is probably no longer a repeat customer for the industry.

The second element for the paradigm for a well performing system relies on the educated consumer. An exemplary consumer is one who will keep her/himself aware of the risks and the benefits of food, will seek information from reputable sources and will act on the advice given. S/he should adapt food choices and follow consumption behaviour that aligns with her/his condition. For example, someone with hypertension should choose foods that are low in sodium. An allergic consumer should avoid foods containing the ingredient to which s/he is allergic. If there is an anaphylaxis incident that results from the consumption of food, there's nothing wrong with that food. The problem is one of consumer behaviour.

A well performing system also relies on a robust food regulatory regime that uses a mix of interventions, both regulatory and non-regulatory. The importance of education, information dissemination and collaboration amongst partners cannot be highlighted enough. When standards and regulation are chosen as the instruments of intervention, they have to be evidence based. The scientific basis of health related standards is critical. The standards should also be adaptable to the development of new scientific information.

The regulatory regime should be focussed on prevention, to make sure that the issue doesn't arise in the first place, and put potential standards that will enable

that. The regime should also support swift reaction, such as an effective recall mechanism, to mitigate the risk.

Finally, the food regulatory regime should be evolutionary, and adaptable to the innovation of science and technology. Science and technology can be a challenge but also an opportunity. It can be challenging for regulators to catch up with what industry develops. But equally, it can be an opportunity because technology, particularly information technology, can be extremely useful to educate consumers.

He also shared some experiences. For this purpose, he selected three examples:

(i) Discussions about lessons learnt from an important outbreak that Canada went through in 2008.

(ii) An example highlighting the importance of relying on Codex standards.

(iii) About ongoing efforts to modernise the food regulatory system in Canada.

Learning from incidents can make us better. He spoke about the follow up on the major listeriosis outbreak that Canada went through in 2008. The listeriosis outbreak was tragic. It claimed the life of 23 Canadians and resulted in serious illnesses amongst 57 citizens, most of them elderly. It was related to the appearance of Listeria monocytogenes in ready-to-eat meat. Most of that meat was destined for facilities that catered to elderly citizens, and establishments that housed elderly citizens. That explained the toll and the impact. Industry took immediate responsibility for the incident, identified the source of the contamination and mitigated it. Both government and industry worked at ensuring that this incident is prevented from occurring again.

They also looked at their capacity to respond to this event and how they could have minimised the impact that it had on the health of Canadians. The government commissioned an independent review that looked into this system, which reported directly to the Prime Minister. This independent review came up with recommendations to strengthen the system.

These recommendations were all accepted by the government and implemented from 2009 to 2012. They focussed on improving policies and procedures, for example improving the decision making process; the risk assessment process; risk mitigation strategies like identifying the products for recall, ensuring swift recalls and avoiding iterative steps or lengthening the time line that would expand the recall nature; and the need to educate consumers. Ready-to-eat meats are considered risky products for elderly citizens; it was found that although information was available with Health Canada, who issued a lot of pamphlets and items of information, nobody knew about the availability of that information. So they identified the need for better education, and better dissemination of information.

Another element of the recommendations was related to the multi-jurisdictional make up. When managing a food borne illness of this nature, all the levels of

government need to get involved. The best coordination mechanism between these levels is required. Everybody must know their roles and responsibilities because time is of the essence. The reaction must be swift and effective.

Amongst the key deliverables of what they acted upon between 2009 and 2010 is a fully improved and tested protocol to handle multi-province food borne incidents. They clarified the roles and responsibilities, codified steps and enhanced their food safety governance. Great emphasis was laid on communication with stakeholders, and how the information is made available. The communication protocol developed is called the Food Borne Illness Outbreak Response Protocol (FIORP). Currently it is being activated for two incidents that they are investigating.

Another deliverable is a fully coded weight of evidence-based process to support the assessment of risks in the context of food safety investigations. Many times there is a lot of information during an investigation: there is information from the investigation itself, looking into the establishment and the deficiencies; information from laboratory testing through open samples and closed samples of the foods that are being tested; and epidemiological information. The test is to use all this information in a codified, structured fashion and to ensure that all codifiers have the same level of training and follow the same protocol, so that the reactivity is swift.

A document developed by Canadian experts was peer reviewed by international specialists and made available to all federal, provincial and territorial experts to use in the context of food safety investigations. These improvements were fully implemented and have significantly contributed towards updating their ability to anticipate and respond to food safety incidents, whether they are related to illness, or simple incidents arising as a result of an inspection or a consumer complaint.

The second experience is related to the recognition that standard setters cannot do it all. They need to rely on and leverage the international food standard setting regime. Canada has adopted an approach similar to the EU in this regard. There are certain areas where they have decided to rely on Codex's work first, and then develop their own domestic standard. This is the case for mycotoxins in food. They have decided to leverage efforts currently underway as part of the Codex Committee on contaminants in food. Their approach consists of active contribution in the standard development process, whether in the submission of data, or the physical and electronic working groups; and when the standard is developed, they adopt it if it meets the Canadian requirement directly, or they adapt it if they feel that the information needs to be reviewed due to their dietary patterns, and select a different standard. The geography of Canada also needs to be considered. Canada is a northern country. Contaminants called long range transport contaminants tend to accumulate in the north, and so they may have greater prevalence of these contaminants and choose different risk mitigation protocols that meet the Canadian context.

Lastly, despite being based on a solid foundation of legislative and regulatory framework, the Canadian system lacked the regime to adapt swiftly to evolving

science. It would take years between the time a food additive was assessed and deemed to be suitable with conditions identified for its use in food commodities, and it being enabled for use in Canada. That is because every food additive needed to go to Cabinet. Cabinet ministers would review the food additive process.

That system was set in the '60s and needed to be updated. The Food and Drugs Act was recently amended to give the Minister of Health the authorities needed to make these regulations faster and enable faster access to safe food applications. These changes enable faster mechanisms to promulgate food safety measures. Take for example a maximum level for melamine. That is a new issue. If they have a cabinet committee looking into the issue it may take a long time. These are processes that are very clearly codified. There are certain thresholds and requirements to be met for these authorities to be used.

And these authorities are expected to help reshape the food and drug regulations in Canada and address a number of challenges, including re-setting of the framework that manages food contaminants, food fortification and health claims. They have already re-set the food additives regime. Dr Godefroy observed that reforming legislation and developing new regulations is a very important, time consuming and resource intensive task.

These examples were given to highlight the importance of the collaborative approach and shared responsibility in achieving a well-performing food safety system. Food regulatory systems should be preventive, evolutionary and adaptive to the changing environment. There are a number of challenges due to new products, innovations, and consumer demand. An issue that is just at the tip of the iceberg is how food safety and nutrition regulators can have levers of intervention to mitigate non communicable diseases. These are multi-factorial elements where food and diet are involved, but they are not the only contributors. Helping consumers manage their diet is going to be one of the challenges in the future.

There is gain in preventing food borne illnesses in the hope that consumers will not have questions in this regard. Dr Godefroy ended by saying that Canada looked upon the Indian leadership to steer the Codex Committee on Culinary Herbs and Spices. They are looking at regulatory framework and look forward to learning from whatever stems from that work.

Dr Martijn Weijtens, Acting Deputy Director, Department of Food Quality, The Netherlands

Dr Weijtens discussed how to deal with risk analysis in the framework of Codex, which, as he described, is a 'subtle game'. He also offered insights about what the Codex Committee on Contaminants in Foods (CCCF) is about, since most probably this Codex committee will be organised in India very soon.

CCCF is a subsidiary body of the Codex Alimentarius Commission. It means that it is one of the committees that operates in the framework of the CAC and prepares proposals for new standards. There are other committees too, but this one happens to be one of the bigger committees, attracting 80 to 90 countries and 200 to 300 participants; it is a major international event. It prepares draft standards for submission to the Codex Alimentarius Commission, which Dr Weijtens refers to as their 'parliament'. It is the place where the standards are adopted.

The guidelines are that such a committee is hosted by a member country of the Commission, and the host country is responsible for the finances and organisation of its meetings. The host country also provides the Chair of the Codex Commission, and all conference services including the secretariat. An exception is made when a country decides to co-host. In that case the committee will not meet in the host country (The Netherlands in the case of CCCF) but somewhere else, and the two countries then organise the event together.

The CCCF was earlier merged with the Codex Committee on Food Additives, the CCFAC. The CCFAC was split because there was too much work. The Committee itself has been chaired by The Netherlands since 1964. It meets every year. Recently it has been meeting in other countries as well, including Russia, China and Turkey.

The terms of reference are to establish maximum levels for contaminants and naturally occurring toxins in food and feed. Dr Weijtens emphasised on 'feed' because feed is also important in this Committee. Food safety hazards can occur due to feed problems. There are other committees that deal with feed issues as well. A task force on risk analysis in feed was set up recently.

The Committee prepares a priority list for contaminants and toxins for risk assessment by JECFA. JECFA is a risk assessment body comprising an international body of scientists and chaired by the FAO and WHO. They do the work that makes it possible for CCCF to develop standards. JECFA works through an interactive process. CCCF decides on which topics JECFA should give a scientific opinion; JECFA works on that, and comes back to the Committee with the results. The results are discussed extensively. They also consider the methods of analysis for contaminants and toxins and the development of codes of practice. The latter can be very helpful when a standard cannot yet be set, as when they lack data or when they are not done with a discussion. It can enable safer production while awaiting the possible definition of a standard at a later time. It can also be a phase during which more data can be collected by applying the code of practice in countries that can collect data that can then help the Committee to set the standard.

Chemicals such as additives, drugs and pesticides are deliberately added to food and feed; contaminants are there unintentionally. That is the big difference. Levels of residues of additives, drugs and pesticides are controlled by authorisation; levels of residues of contaminants depend on good agricultural and industrial practices. Contaminants are substances that should not be there. Their presence has to be limited as much as possible. Therefore, maximum levels for contaminants and toxins

are set on the basis of ALARA, which stands for 'As Low as Reasonably Achievable'. The notion of 'reasonably' is important because it has to be a standard that can work in practice. If the standard set is too strict, it will lead to a situation where the Codex standard doesn't work. So it depends on the technical capabilities and social circumstances in all member states.

The standards are published in the Codex General Standard for Contaminants and Toxins in Food and Feed that can be found on the website of the Codex Secretariat. It contains levels for mycotoxins, heavy metals, radionuclides and some industrial contaminants. They have, most recently, been working on radionuclides in the context of the Fukushima outbreak. Thus they try to follow developments and needs that are current. This applies to all kind of foods. Sometimes they relate to codes of practice, and sometimes they do not. Sampling plans and analytical criteria could be developed by this committee or by another committee.

The JECFA priority list is the selection of relevant contaminants to be assessed. JECFA works on it and comes up with a scientific opinion that takes one or two sessions. The results are presented to CCCF and they then have a plenary discussion on the results of the JECFA evaluation. The basic question is: do we need an ML or a code of practice, taking into account the results of JECFA's work, and more particularly, sources of contamination, relevant commodities, impact on public health and impact on trade. All these elements are taken into account before arriving at the decision about whether or not to go for standards. If they decide that they want standards, an electronic working group is set up. That is a working group where people work from their homes or places of work, not a group that meets physically; this makes it possible for many more people to attend, especially from countries that may have budgetary constraints for travel. This electronic working group is a very important phase that develops a proposal which is presented to the Committee. The proposal is circulated prior to the meeting, and countries may make comments that are then also formally available during the meeting in special documents that are developed. The process is very interactive and they try to be very realistic because it doesn't make sense to work on standards that are not really needed.

The most important question is: is there a health risk for consumers? And then, which food commodities or animal feeding stuffs contribute to it? Is there trade? Because for purely national or purely regional standards it might be more appropriate to develop something at the national level. If something is not consumed at a global level, it is not really wise to spend time in making a standard at the global level. It is important to take this into account in more developing regions of the world where they might have very specific foods that are very important for them, but probably not for other continents. The concentrations that are feasible in the relevant food commodities and animal feeding stuffs are then discussed, and whether they can be decreased. They consider whether they can actually work on controlling the concentrations. They also look at the national standards that are available.

So at the end they have proposals that are discussed in a Committee. Decisions are taken by consensus and on the basis of sound science. They do not lose sight of the fact that their basis is the science, coming from JECFA advice. The standards must be feasible and will then serve as the recommendations to the CAC where the final decision will be taken. Sometimes there may be reservations at the level of the Committee. These reservations will be introduced in the report and will be noted by the Codex Alimentarius Commission when the standards are further discussed.

The Step Procedure is a kind of resume that starts with a JECFA opinion; this opinion is then discussed; then a working group prepares a discussion paper which again is discussed; project proposals are prepared for new work and then the famous Step Procedure of Codex is applied. It sounds very technical but in principle is just a sensible way to go about it, in steps.

The discussion at the start is fundamental so that they don't realise half-way that they are going to clash or have a major problem. The setting of the standard might take three years, but they did it in two years for melamine. There was a huge request for having a standard very quickly and they managed to make it in two years for powdered infant formula and animal feed. So although Codex has a lot of procedures and sounds slow and technical, they have demonstrated that you can have a global standard in two years' time.

Dr Weijtens observed that there is an increasing awareness of the relevance of Codex standards in international trade. People take Codex more and more seriously. That also makes the discussions more difficult because when the interests are bigger, people tend to be less flexible.

There is a growing participation of members from developing countries. The Committee has had codes of practice developed by Africa, South American and Southeast Asian countries. Thailand, Malaysia and The Philippines are very active in Codex.

The Committee has set many standards for the more easy items. For the more complicated ones, or the ones coming from countries that have less data, a code of practice may be the choice. More codes of practice result in less time needed to reach consensus at the Committee level.

Dr Mary Frances Lowe, Us Codex Manager, USDA

Dr Lowe's talk focussed on the food safety system in the US. The points she covered included the key federal agencies and their responsibilities, the major strategies they use to ensure food safety, how they relate to Codex and about international trade and the implications.

The major federal agencies involved in food safety include the Department of Agriculture, where Dr Lowe's office is located; The US Food and Drug Administration which is within the Department of Health and Human Services; the US

Environmental Protection Agency; and The Centers for Disease Control and Prevention or CDC, also within the Department of Health and Human Services. All these are at the federal level. They also depend heavily on state and local partnerships for certain elements of the food safety system and the private sector also has responsibility to produce safe food. The US has a strict liability legal system and their food producers are aware of that.

The USDA is the lead agency for all agriculture in the US, nutritional programmes like the school lunch programme as well as agricultural research. Within that department, the Food Safety and Inspection Service (FSIS) has the primary responsibility for meat, poultry and some egg products. This includes in-plant and in-facility inspection, enforcement of food hygiene and humane slaughter rules, and labelling requirements. One unique thing about the US is that all US meat and poultry production has to be done under FSIS inspection.

The Food and Drug Administration of FDA has three major components that have key roles in food safety.

The first is the Center for Food Safety and Applied Nutrition or CFSAN. They are responsible for setting standards for microbiological and chemical contamination of foods other than meat and poultry, which are covered by FSIS; approving food additives; regulating food and colour additives; and food labelling other than meat and poultry.

Also within the FDA is the Center for Veterinary Medicine. They have responsibility for regulating animal feeds and veterinary drugs, including residues of veterinary drugs in food.

The Office of Regulatory Affairs within FDA is the organisation that has control over all of FDA's field operations and offices. This is where the primary inspection and enforcement work is carried out.

The 2011 Food Safety Modernization Act (FSMA) gave the FDA substantially enhanced authorities. It is designed to be risk based and prevention oriented. FDA did set standards for food from time to time in the past. This has not been done for many years, because FDA has refocused its work on the food safety element rather than the definition of certain kinds of foods.

The US Environmental Protection Agency is responsible for pesticide registration, which means licensing pesticide products for use in the United States and specifying the conditions for that use on the label. EPA is also responsible for establishing MRLs which are known as 'tolerances' under US law. For that, they require toxicology, dietary consumption and residue data from field trials carried out in varying growing conditions. All these are needed for EPA's risk assessment. Once EPA establishes the MRL, it is then enforced by FDA for most kinds of foods, and by USDA for meat and poultry. In the United States, pesticide is very broadly defined and, among other things, includes many of the most commonly known products of biotechnology

which are modified for pesticidal purposes. Hence, anything that starts with 'BT', like BT corn and BT cotton are registered and require pre-market approval by EPA.

The Centers for Disease Control and Prevention has responsibilities for tracking and surveillance of food borne illness. They are not a regulatory agency; they carry out outbreak investigations and issue reports, and they collaborate closely with the regulatory agencies and advise them on the need for recall and other measures to prevent food borne illnesses.

The most important of the major strategies used in the United States to ensure food safety is pre-market approval of food additives, pesticides and veterinary drugs. This is done at the federal level. The states cannot approve a pesticide, veterinary drug or food additive that has not been approved by the federal agencies. There are comprehensive data requirements for these products. The relevant agency that carries out risk analysis needs toxicology as well as exposure data. All of these products have to meet a general food safety standard in the statute, which is 'A reasonable certainty of no harm to consumers of the food'. This is a great deal of work for the regulatory agencies and a lot of them do the same kind of work. One area where they are looking to change how they do business, particularly in pesticides, is to try to build on the work of others so that everybody does not start from scratch every time. They try to share the burden and benefit from each others' reviews and avoid duplication of work. They are having some success in that. It does not mean that they all reach the same conclusions, but it helps alleviate the burden on the regulatory agencies.

The second category of major strategies to ensure food safety relates to enforcement and includes inspection, reporting and surveillance. They rely on FDA and USDA inspection forces, which may be in a production facility or in courts for imported foods. They have both mandatory and voluntary reporting systems; reporting from consumers is encouraged; and in certain circumstances, companies are required to report adverse information associated with their products. Both FDA and FSIS are involved in recalls when appropriate. These recalls can be for clear pathogenic contamination, they can be very serious, they can be for labelling violations. Sometimes they are mandatory and sometimes voluntary, depending on the type of problem.

Food borne disease and residue surveillance helps in tracking the sources of contamination in food, and also helps reassure the regulatory agencies that when they set residue limits, they are not exceeded in the actual foods that people eat. For pesticides in particular, there is a statutory requirement that they be periodically reviewed to make sure that the data supporting them is up to date and that the assumptions that were made in the risk assessment remain valid. State and local partners are indispensable for inspection sampling and work at local retail and restaurant levels.

Education and outreach involve the stakeholder community that includes not only food processors but also food producers, packers, distributors, consumers, health

professionals and the general public. Consumers play an important role in food safety and just educating people in ways to prevent cross contamination can in many ways do a lot more than any regulatory control.

Other important features of the system involve public participation and transparency. In addition to what is commonly thought of as transparency, they also pay great importance to scientific peer review of scientific issues. When the agencies establish data requirements, they go through scientific peer review. When scientific questions arise during review of an application for, say a new pesticide, they may be referred to an outside advisory board for scientific peer review. When risk assessment policies and guidelines, for example microbiological risk assessment, are issued, they too would be subject to rounds of scientific peer review.

New regulatory requirements are all subject to public comment under US law; trading partners are notified through the WTO procedures. It is part of the law that when they receive substantive comments, they must respond to all of them when issuing the final rule.

These procedures are especially important when contemplating significant changes and upgrades in regulatory policies. The 2011 FSMA Act has a number of rules for comment and one of the areas that they particularly look for comment on is realistic effective dates. Often, industry knows best what it takes for them to turn around their processes to comply with new requirements.

Codex is very important and The US participates in all of the committees and hosts three of them. The delegates who are sent to these committees are the US regulatory officials who set the same standards for their domestic regulatory programmes. Dr Lowe's office is the US Codex office, located within the FSIS but its mission is government-wide, coordinating all of the US Government's participation in Codex, managing an effective stakeholder involvement process and ensuring consistency in US positions. Their public outreach includes federal register notices describing the work; public meetings before each Codex session; and bilateral and regional workshops and outreach programmes with other countries.

Relationship of US standards to Codex standards: US regulatory agencies have to make their decisions are consistent with US law. This means that they do not automatically accept Codex standards. But US law and policy provide that Codex standards must be considered. For example, the Environmental Protection Agency is required to harmonise pesticide residue limits with Codex or publish a notice in the federal register explaining why they are different. FDA has regulations that call for it to consider Codex standards. It is something the agency can do on its own initiative, or anyone can petition FDA to adopt a Codex standard. That permission may not have been used very much in the past, but in the 2011 FSMA Act there was a call for FDA to review all of the Codex standards again and make recommendations on harmonisation with Codex.

In order to import meat and poultry to the United States, FSIS must make an equivalence determination; those determinations are based on policies that are consistent with the Codex texts.

Coming to international trade considerations, the US is a major food exporter and importer. Their domestically produced foods and imported foods are required to meet the same safety standards. Consistent with their SPS obligations under the World Trade Organisation Agreement, their food safety standards must be based on science and risk assessment whether or not they are the same as Codex standards. In some cases the US differs from Codex, and is prepared, if challenged, to provide a scientific basis for those differences.

In addition, they will establish standards that meet the needs of their trading partners if their own standards are met. For example, there may be a pesticide that is not used or registered for use in the US and the manufacturer does not want to register it. The US will still establish an MRL to cover residues in imports if they receive data showing that those residues meet their food safety standards.

Ms Vinod Kotwal, Director, Food Safety and Standards Authority of India

Ms Kotwal identified five themes that are common to all food regulatory regimes. The first one, of paramount importance, is related to ensuring safe food for the health of consumers; the second is evidence based standard setting; the third is allowing consumers to make informed choices, assisted by education and awareness generation; shared responsibility by all stakeholders in implementing a regulatory regime; and finally, a food regulatory regime is a very complex area and is not an 'easy ride'.

These five common themes can be juxtaposed against the Food Safety and Standards Act 2006, which is the regulatory regime governing food safety in India. The Act was passed in 2006 and this was done because of the presence of a multiplicity of food laws and enforcement agencies for different sectors of food. There was a milk order, a food product order, oil order, and most important, there was the Prevention of Food Adulteration Act.

So the Food Safety and Standards Act, 2006 was passed to bring in synergy and create a unified system for implementation of the food regulatory regime. There were nine orders prevalent at that time, which were brought together into the Food Safety and Standards Act.

The objective of the FSS Act is to lay science based standards for articles of food and to regulate their manufacture, storage, distribution, sale and import. The Act led to the creation of the Food Safety and Standards Authority of India in 2008. There are two S's in the Food Safety Authority. One relates to safety, and the other relates to standards. That is the whole framework which governs the implementation of the

FSS Act in the country. The FSS Act is responsible for the food which is produced domestically, and which is imported into the country. Export of food is not within the mandate of the FSS Act. It lies in the jurisdiction of the Departments of Commerce and Agriculture.

The Act has 12 chapters. It is a Federal Act. However, it is implemented across the country, so it is being implemented in the states and union territories. The enforcement of the Act lies with the state governments. The Act spells out the responsibilities enshrined for the various stakeholders, be they food business operators, regulatory officers, or consumers.

India has nine scientific panels on food additives, pesticide residues, GM foods, biological hazards, labelling, functional foods, methods of sampling, contaminants, fish and fisheries. These nine scientific panels are the basic risk assessment bodies that assist the FSSAI in laying down science based standards. Once these standards have been laid, they go through a stepwise approval, and from scientific panels they move on to the scientific committee, and ultimately they are approved by the Food Safety and Standards Authority of India. There are three components in the regulatory mechanism: standard setting, policy and enforcement. As far as India is concerned, all these three components lie with FSSAI. However, enforcement is carried out in conjunction with the state governments. There are around 55 million food business operators who need to be licensed and registered, so enforcement is a shared responsibility between the Centre and the states.

FSSAI is also the national Codex contact point and is responsible for the participation of the country as a whole. The authority works in close association with other relevant ministries like the Ministry of Women and Child Development, Animal Husbandry and Agriculture.

Although the FSS Act was passed in 2006 and FSSAI was set up in 2008, the Act was operationalised only in 2011. Once regulations were rolled out under Section 92, which provides the Food Authority with the approval of the central government to roll out regulations, six regulations became effective with effect from 5 August 2011. So the Act became operational only in 2011. The six regulations which were operationalised with effect from 5 August 2011 relate to licensing and registration. Under this regulation, all food business operators in the country, depending on their turnover, need to be licensed or registered with the Food Safety Authority at the Centre or the state.

The Standards Packaging and Labelling Regulation lays down the standards for the packaging material that is used for food, as well as the labelling on the package. Other regulations include the Food Safety Standards and Additive Regulation, Prohibition and Restriction on Sale, Contaminants, Toxins and Residues, and Referral Laboratories and Sampling.

The Standards and Additive Regulation covers 13 product categories; however, food is one area in which there is constant innovation taking place, with new products

entering the market. Hence it is not possible for any regulation to capture all the standards at any given point of time.

The country is in the process of migrating from the old system to the new system, so there are a lot of transition activities taking place. Ms Kotwal expressed her satisfaction at being able to listen to the other speakers, because a lot of examples could be borrowed from other countries after detailed discussions, and there was no need to reinvent the wheel.

FSSAI has started a harmonisation exercise for updating its standards. The idea behind the harmonisation exercise was that since there are already standards, codes of practice, and general guidelines that have evolved through science based risk assessment and consensus building in Codex, India should consider adopting those standards. However, the word 'harmonisation' has been used very carefully, keeping in mind the various aspects related to consumption patterns and other factors. This challenging exercise has been started by FSSAI under the leadership of Mr Dave, who is spearheading it. As in Codex, they have also tried to do the initial work through the setting up of electronic working groups; once they reach a stage where they are about to formulate a standard, they will have more physical meetings. So the framework for harmonisation that they follow is that they keep in view the existing Codex standards, existing FSSAI standards, and best international practices, and then revise India's food standards. They are looking at both vertical as well as horizontal standards in this exercise.

As far as the risk analysis and the surveillance framework are concerned, there are surveillance activities in various parts of the country at the Centre as well as at the state level. The endeavour is to formalise this surveillance and enforcement network into an institutional mechanism in the coming years so that the information which is being generated in various laboratories is easily accessible. Sampling, testing and analysis of food are the basic bedrock on which monitoring and surveillance are based. Hence it has been decided to upgrade the food testing laboratory network in the country. The plan is to upgrade the 72 state public food laboratories, establish one food laboratory for every 20 districts in the country, and establish one mobile laboratory in each state. In order to develop an integrated framework, FSSAI is planning a Food Laboratory Information Management System that will integrate these laboratories in one network. It is also looking at setting up of a National Food Safety Risk Assessment Centre. This centre will be the core engine on which the risk analysis framework will be based. It will get inputs from the scientific panels, and data will be generated through risk assessment and surveillance activities. All this will serve as inputs for policy making, response strategies and alerts, scientific standards for products, and standardisation of laboratory testing protocols.

This is an ambitious project that FSSAI has embarked upon, but they feel that it is required if they want to ensure a strong and robust food safety regulatory network in the country in the long term. It will also lead to convergence of efforts by various constituents, and give them a framework to bring all these activities together. The

ultimate intention is to ensure safe and healthy food for the consumers of the country. Presently, they are focussing on the food safety aspects, but as they evolve and implement the food safety regulatory system, they will undergo a paradigm shift and move from food safety to healthy food.

Currently the FSSAI is in a transition phase. A lot of regulations are in the pipeline, and the processes and activities need to be streamlined. Some of the important regulations in the pipeline include draft import regulations, which are already there on the website for comments; draft regulations on nutraceuticals, functional foods and dietary supplements, which are at the stage of seeking comments; and another important regulation is on food recall.

Slowly and steadily, the Authority is working on the building blocks which will result in India having a strong food safety regulatory network.

Dr During the open discussion at the end of the session following remained the highlights:

Q1) Although there are lakhs of cases of food infections and intoxications, we do not have a national residue survey or a surveillance system for pesticide residues. A number of patients are admitted in hospitals, but we do not have records of the illnesses which are caused only by consumption of food. Is there a system of surveillance and records so that high and medium risk can be identified?

A1) Ms Kotwal replied that as far as the national residue survey is concerned, there is an all India coordinated network which compiles information related to pesticide residue. This project has been going on for the past five or six years; it is an ongoing activity, and they come up with monthly data on the survey. So the data is there. Regarding information on food borne illnesses, NASRAC has an integrated disease surveillance programme that is being implemented by the Ministry of Health and Family Welfare. Linkages with IDSP are being built, so that information can flow from IDSP to NASRAC to provide more data on food borne illnesses.

Q2) Question by Dr Srinivas, All India Network on Pesticide Residues, Hyderabad: He informed the house that the Central Sector Scheme has been in operation since 2006; samples are collected from 28 centres throughout India, they analyse more than 12000 samples per year on a monthly basis, and they have excellent data on pesticide residue. His question to Dr Lowe was whether FSIS, besides inspecting samples that are processed and available in the market, inspects locally available food that is sold on the roads in the US.

A2) Dr Lowe: Street food is not a federal responsibility. FDA has some guidelines, but the food that is sold through retail street dispensers is primarily handled at the state and local level.

Dr Godefroy: It is a shared responsibility in Canada. Any food that is sold, regardless of where it is sold, is subject to the Food and Drugs Act. Federal enforcement authorities ensure that it meets federal requirements; at the same

time, since it is sold locally and may not go outside the boundaries of either a province or even a city, it is also subject to the requirements of the province and the municipality. If there is an issue, it is most probably more easily enforceable through the local or the provincial authority. Federal authorities will intervene as well if there is an infringement of a federal requirement. Hence it is a collaborative approach.

Dr Weijtens: In the European Union, samples have to be taken of products that are potentially a risk. The system is harmonised at the European level but applied by the individual member states. The Food and Veterinary Office of the European Commission sends inspections to the member states to check whether the law is applied.

Dr Read: Relevant regulations will be reflected in the food standards code that will be applicable across all state jurisdictions, including New Zealand. Residue or sampling surveys are the responsibility of the individual state jurisdictions; they have sampling programmes that they apply both to retail and food outlets. The system will be further expanded through a national residue survey monitoring programme that will focus on products meant both for exports as well as for domestic use. The same type of template is also applied to imported food.

Q3) Dr Jasvir from Mondelez asked Dr Lowe about whether the fact that US agencies have not worked on defining food standards or standardising food for quite some time, has helped or hampered innovation and food safety.

A3) Dr Lowe observed that both food safety and innovation need to be protected, and expediting the review of new technologies, that tend to be safer than old ones, would promote both food safety and environmental protection.

At the end of the session Dr Gowda made her closing observations. She told that as seen from the all the presentations by the panelists, food safety and quality have no international borders and do not require a visa. Food safety is a shared responsibility between the consumer, food industry and the government. Food safety, setting standards, monitoring and regulating are a daunting task; it is a difficult ride and can even bite.

Significant guidance is available to all countries at international levels, to assist them with their food control systems. Any country can use the international guidelines and set their food safety standards. A robust food safety system must be in place, and such a system is generally not static. It has to evolve to address current and emerging challenges.

The sustainability of the food sector is integrally linked to its food safety performance. Protecting the consumer from food hazards should be an industry priority. A highly integrated approach to food safety and quality across the full spectrum of the food chain is required.

There remains an ongoing need to continuously develop high quality risk surveillance and risk assessment capability with respect to food borne hazards. Such

an approach would not be an individual approach but a systems approach, encompassing the whole food chain, benefitting the consumer and the food producer, and above all the country's international repute. Hence food safety clearly identifies the need to provide all consumers with provenance and traceability.

INDUSTRY-ACADEMIA-GOVERNMENT INTERFACE: HOW TO STRENGTHEN INDIA'S POSITION WITH VALIDATED RESEARCH DATA

The interactive session was moderated by Ms Vinod Kotwal, Director (Codex), National Codex Contact Point, India. In her opening remarks Ms Kotwal observed that the traditional role of academia had been to teach and conducting research. This traditional role was being questioned now for a number of reasons. People were looking at institutional connections between research institutions and industry for technological progress and economic development. There was a lot of research being conducted, a lot of data being generated and there was excellent work being done by some very eminent scientists. However one thing that seemed to be lacking was the coordination between various research institutes on the kind of work that they were doing.

It was hoped that this panel discussion would help bridge that gap and identify some pointers to build in linkages between industry and academia. While the session was about generating validated research in the context of Codex, taking the topic to a larger perspective, she felt that it could translate into a stronger connect between industry and academia for the sector as a whole.

The panel included following persons from industry and academia:

Prof (Dr) Anil Kumar Srivastava, Director & Vice-Chancellor, National Dairy Research Institute

Dr Srivastava focussed on the status of validated data and what needed to be done so that India's position at international forums in Codex was still held high. There are three types of data:

Raw or primary data: Any information which is recorded either digitally or in print or as a video or image. There was a lot of primary data on pesticides residue in food and food crops. But this primary data would not serve any purpose. What is needed is processed data.

Processed data: When the primary data is analysed and described appropriately for the purpose for which it is required, the conclusion on the basis of primary data is called processed data.

Published data: Published data is data that goes beyond the domain of the researcher, when the public understand it and when it goes to the consumers.

Dr Srivastava's concern was mainly about processed data, besides educating the consumers as a social responsibility.

Once the data is generated, it needs to be seen whether it can be reproduced, because the fundamental requirement for any research is its reproducibility or repeatability.

Validation is done by examining the data through physical, chemical, biological or clinical means to prove that it fulfils the purpose for which it is generated. A major problem is faced when validating data obtained through observational study, or when there is no recorded data, or in the case of any scientific survey. Experimental data can be validated, and if not validated it has no meaning at all.

Why is validation needed? Without validation no one will accept the data. If the data is not reproducible it is unbelievable. Validated data helps in developing proper policies and plans. It is validated data which will strengthen India's position in international forums, because there are technical barriers in trade; there are sanitary and phytosanitary issues which are based on validated data. Validated data will also help in setting the maximum residual limits (MRLs) of different contaminants. It will help in developing new analytical methods and new regulatory guidelines. In addition, it will aid in comparing data between laboratories, analyses and countries.

When considering where India stands as far as data in international forums is concerned, we have got tremendous raw data, but very negligible data on risk assessment.

As an example, in the last 10 years a lot of very sensitive analytical methods had been developed and scientists are able to detect pesticides and antibiotics to the minimum possible level. But no data is available to assess whether those contaminants cause any adverse effect to health at those low levels. Therefore this primary data creates unnecessary unrest in society. Published papers mention the types of contaminants in food, but these are below the MRLs and create unnecessary panic. The risk and adverse effects must be assessed before publishing such data.

Most of the data is adopted from Codex but that is not correct. Dr Srivastava was categorical that India is a country where all the data need not be taken from Codex. India has 17% of the world's population and India, China, Pakistan and Bangladesh constitute more than 40% of the world's population. Hence the standard for safety of food has to be determined in this region because of different food patterns and habits.

India has to decide what data it should follow if its food habits and consumption patterns are different (from Europe and America). If the consumption pattern is the same, there is no harm in taking the data of Codex for the Indian point of view.

While discussing the problem in creating validated data, Dr Srivastava gave the example of the dairy sector. Seventy percent of the milk in the country comes from farmers who have only two or three animals. It is a problem to create validated data

in the dairy sector because of the fragmented dairy supply chain. Outbreaks of diseases like foot and mouth disease or Haemorrhagic Septicaemia are not being reported. Such outbreaks should be reported and animals that suffer with such diseases should not be included in the validation of data. There is no feasibility or traceability data. When validated data is created, we will be able to go one step behind, to identifying where the products came from, and one step forward to who are the consumers. Lack of such data is a major issue.

India is the number one producer of milk in the world. Fifty five percent of this milk comes from buffaloes. And out of the milk that comes from cows, half comes from indigenous animals. Still, we don't have validated data, for example the percentage of fat, SNF, TS, protein, calcium and phosphorous, on buffalo milk and on indigenous milk; and whether it is from crossbred animals, pure exotic germplasm, Holstein-Friesian or Brown Swiss. This data has to be generated.

There are no validated MRLs for the newer antibiotics. We now have the fourth or fifth generation of antibiotics like fluoroquinolones, P-floxacin, ciprofloxacin and levofloxacin. These are very new antibiotics and are being very frequently used in veterinary practices. It is now time to see what the MRLs of these antibiotics should be in milk, and obtain validated data on the newer antibiotics which are being used. Otherwise the problem may be reported after five years and we will then start working for another five years, by which time that antibiotic will go out of the market. Hence we have to strengthen our facilities for regular monitoring of chemical residues.

Other important issue includes lack of scientific information on the status of chemical contaminants in food products. For example, a paper was presented at the 7th Session of the Codex Committee that talked about lead contamination in milk. As Director of the National Dairy Research Institute, Dr Srivastava has not come across any report that any milk sample in India is contaminated to the level that it has to draw the attention of the international community. It should be verified because there is no scientific coordination between many institutions and industries, and scientific surveys are limited. There is also limited information on the ethnic varieties of food. India is the only country with varieties of ethnic foods and the information available at present is not sufficient.

Lack of coherent action among stakeholders was the essence of the present meeting, and Dr Srivastava offered his comments about how to enhance this interaction. Regarding the lack of proper and dedicated mechanisms for epidemiological surveys, he observed that there is no record on the number of deaths due to food borne diseases arising from Listeria monocytogenes, Staphylococcus, E. coli or Salmonella. One-off reports existed in separate places, but the need is to compile all that at one place, verify it and carry out meta analysis. At the national level there is no concerted effort to create animal disease free zones.

Dr Srivastava also offered few remedial steps as under:

Meta analysis of existing data: This is an important need for India. It is not correct that India lacks in data; it has more than sufficient data. But the data needs to be compiled at one place, meta analysis carried out and the impact of this data on our food safety and food standards needs to be studied. He suggested formation of a working group under FSSAI which could take on the task of performing meta analysis on the data, particularly on data regarding Indian foods. Redefining the role of institutions in Codex-India. In order to generate data, responsibility has to be given to specific institutions. FSSAI should have good collaboration with such institutes for specific jobs. Those authorities should be believed, and within a couple of years meta analysis can be carried out.

Generation of data through scientific surveys: This can be done with the help of government agencies, institutions, universities and FSSAI.

Harmonisation of domestic and international standards: Harmonisation will be meaningful if there is no difference in the consumption patterns, quality and quantity of food intake between Codex and the Indian population.

Referral laboratories: FSSAI and Ministry of Food Processing are doing a very good job of sanctioning a lot of referral laboratories, but they also should be strengthened. They should be established, and given responsibility for the validation of the data. He cited the example of veterinary drugs or pesticides residue. Dr Srivastava was confident that we have more than sufficient data on pesticides residue in all foods.

The need for validation: The data will have to be validated in those referral laboratories. It may be sent to one lab for milk, another for foodgrains. After a couple of years all the scientific data will be validated. Dr Srivastava advocated the establishment of an AOAC type of agency, which is the Organic Analytical Chemists' Association in America. The analytical methods for validation can be identified by this association. He observed that although India has 72 analytical laboratories, these 72 laboratories have got 72 different types of testing techniques to analyse data, and that is not desirable. There should be one agency which can validate the methods of analysis. Good laboratory practices should be made compulsory for all referral laboratories and there should be regular interaction between industry, academia and the government. This does not cost much, it only requires vision.

On the issue of barriers in interaction among academia, industry and the government he made following observations:

The government is ridden with bureaucracy and red tapism which are a blocking stone for many developments. It has to depend on scientists for subject specific knowledge. Usually there is delay and inadequate funding.

As far as academia is concerned, scientists are not interested in applied research. They are interested in basic research that can be published in impact factor journals.

There is a lack of proper infrastructure; there is inadequate interaction; and industry has no confidence in academia.

Industry is always interested in taking technology from abroad. There is limited funding for R&D. R&D for food gets negligible funding. Short term gains get priority. They react to situations that affect their business. They do not have long term vision.

Academia should increase aptitudes for applied and need-based research; develop skill sets and professionally competent human resources; and increase social consciousness.

Industry should support academia in developing technology. He urged the adoption of indigenous technology, instead of running after foreign technology. Human resources in the industry should be trained.

The government should manage funding to develop the infrastructure and mechanism for realistic policies involving academia and industry. That is in the hands of the government. Then only can there be frequent interaction between academia, industry and government.

Dr D Rama Rao, National Director, National Agricultural Innovation Project

Dr Rama Rao belongs to the Indian Council of Agricultural Research. ICAR has 97 laboratories and 60 agricultural universities. He informed what ICAR has been doing in terms of agricultural data.

ICAR has a number of resources. The information is accumulated in any of these resources and all of it is in the public domain.

ICAR has recently started an agri-bioinformatics grid; it has recently installed possibly the third largest super computer in the world. This system is open to all the stakeholders. Not only the ICAR scientists but others can also use it.

He shared some of the key work done under ICAR. About 7000 PhD theses are digitized and made publicly available. All ICAR journals are open access. An agropedia that is being developed by IIT Kanpur is a kind of knowledge management portal that tries to seek information from various stakeholders using social media type philosophies. A very strong management and financial information system takes care of whatever ICAR does. In short, ICAR is very well prepared in putting research data into digital form.

Since a lot of information is getting generated in the Indian agricultural research and education system, ICAR came with up with an open access policy. Whatever is developed is now put on the public domain. It improves transparency and also brings visibility to the Council.

From the broad view of current food safety research, a large number of research laboratories are being established by ICAR with support of various government departments like the Ministry of Food Processing, DBT and others. As far as

biological data is concerned, ICAR mainly looks at genetic parameters like varietal differentiation, GI identification, residues, IPR issues and risk. In all these instances ICAR is an apex body, setting standards and developing protocols. In bioinformatics, ICAR is working on genomics and proteomics. The management of data is weak. But the scientists are free to communicate whatever they want and with whomsoever they wish. So far they have been communicating with their own foreign peer groups very comfortably, but the information is not being shared with Indian scientists.

ICAR also undertakes a lot of risk assessments and research data is available on all the institution websites. ICAR also promotes a common data centre.

On government, industry and academia interaction he said, that a very strong link can be seen between industry and the government. Industry runs to the government and tries to tweak things whenever there is a problem relating to trade. Rarely do they come to academia. The industry academia link is very weak. Academia keeps getting the information indirectly either through the government or on their own, but generally it is never referred to.

Wherever possible, academic research bodies should be included in trade review delegations so that they become aware of the problems and will be able to include them in their research agendas.

Citing an example he said that Mumbai has a 70 year old textile research laboratory which was used as a referral laboratory in British India. It continues to be a notified referral laboratory today too. That institution has rarely ever been consulted by a trade body, exporter or manufacturer. Similarly, 100 km away at Pune, there is a referral laboratory on grapes. It is not consulted. There are a number of similar stories. These laboratories have been developing the referral standards and also supporting the Government of India in bringing out various standards for food and food quality testing.

A reasonably good linkage exists between the government and academia. The term 'government' includes controlling bodies like APEDA and MPEDA, and also Ministry of Food Processing, Ministry of Commerce, and various other departments. But trade information does not flow through the government to academia. Academia has a mechanism of identifying research targets for the next few years; but it is not approached with problems that are plaguing industry. This is despite some institutions having members from the industry. They do not advise academia. Academia is looking for industry participation, and it is absolutely free. It wants to help industry and take up research challenges. Academia can help in skill knowledge development, manpower development, validation requirements and forecasts.

Dr Rama Rao spoke strictly from the point of view of academia and research. Academia can interface with the government in risk analysis which it has been doing so far and will continue to do. It can also do trade policy analysis, but this is very rarely done. In fact, if academia were allowed to assess the trade policy, it would help the entire trade system immensely.

Academia has also been helping in quality evaluation standards; and also environmental impact assessment, which most laboratories have started in the last four or five years.

It is desirable for academia to get into supply chain research, where it is being blocked. Thirty thousand scientists are available almost at notional cost. Even their research will be more fruitful if such questions are referred to them.

He suggested that networks similar to GrapeNet may be established for fisheries, mangoes, and other commodities too.

Academia can do trade facilitations like policy research support, strategy support, etc, if it is given to it. Most laboratories are developing technologies for the supply chain. With a little bit of tweaking, specific technologies can be developed for the supply chain. Traceability chains in the food trade must include academia; the research link is weak in all of them.

Speaking as a researcher, Dr Rama Rao expressed his people's frustration. Whatever little trade data is available to academia from EXIM Bank, DG-Foreign Trade, APEDA and other ministries, is not uniform. The data does not follow any standards and is given in varied formats. DGCI&S gives data but that data is not free. Most of the data from world bodies can be obtained free of cost, but our own ministry charges for it. ICAR and 10 of its laboratories can afford to pay for the data. But out of 30000 scientists, 25000 do not have access to the information. ICAR provided the entire country with online access to its journals. ICAR paid for its 143 institutions to access the information they wanted from electronic journals and scientific journals. If DGCI&S shared their data, it could be made accessible to the institutions. He agreed that data did cost money to procure, but he felt that it is the government's job to procure and make it available so that academia can make meaningful use of it.

There is no single agency. Every agency puts data in its own format. There is no common policy. This is needed, so that everyone can speak the same language. Every ministry has data. There is no single ministry identified as the nodal ministry to give data standards that all government bodies must follow. It is extremely important to have an apex body to issue the standards; then, following those standards will not be difficult.

Dr Kalpagam Polasa, Director-In-Charge, National Institute of Nutrition

Dr Polasa briefly touched upon the point that food safety is important since all of us are consumers; even researchers, industry, regulators eat food every day and are therefore consumers.

The food should have zero toxicity and zero risk. Food that contains even a small amount of an antibiotic may have a long lasting effect and produce resistance to antibiotics. If it contains a small amount of a drug, it may result in chronic toxicity particularly to the kidney or other organs. Therefore risk analysis must be done, and relative food safety must be considered.

Safe food is a shared responsibility. The government is concerned with food legislation and enforcement, and also provides advisories for industry. The government is also concerned with consumer education.

The consumer has a responsibility to educate himself and also educate others. Consumers are now very discriminative and know what to and what not to eat. In particular, urban educated consumers are aware about food safety. Safe food practices are not relevant only to industry or large manufacturers; poisoning can occur even at home, and hence safe food practices must be followed even at home.

Industry is concerned with food manufacturing practices, and other good practices like transport and hygiene. Retail manufacturers, hotels and caterers are also concerned with good practices. Quality assurance and control on processing have to be followed strictly.

Academia does its basic research, but at least a section of the people in research institutions and universities can do useful research with may be directly applicable to public health related issues; they can play an important role by conducting community need assessment and identifying gaps.

Meta analysis is an important agenda not only in food safety research but also in health management and health economics. NIN has a lot of databases generated in their laboratory and work is done on data mining and data storage. Bioinformatics is used to perform risk assessment with GM foods. Risk assessment is also done for various other contaminants. The level of contaminant is studied with regard to the dietary intake.

Academia has to align all these findings with the National Reference Values. Risk assessment on nutrients should be done in relation to the recommended dietary allowances for the country and the intake of the nutrient by the population.

NIN had created a database for 'Knowledge, Attitude, Belief and Practices' on food and drug safety in India for the Ministry of Health and Family Welfare. This was a capacity building project, aided by the World Bank. This is the first such database created, and information is available on food safety and drug safety practices.

She shared insights to another NIN study called the 'Andhra Pradesh Total Diet Study' wherein the presence of contaminants like pesticides, heavy metals, toxins, fluoride etc was estimated in daily consumed food items. As per WHO guidelines, the food was processed in table-ready form as it would be at home. Even water from different areas was procured and analysed for all these contaminants. Information on dietary intake was available from the National Nutritional Monitoring Bureau. The study threw up an interesting observation that cadmium levels were very high in rice samples from certain areas; in a worst-case scenario analysis it was found that pregnant women were consuming more rice and therefore their levels were about 50% of the provisional tolerable weekly intake (PTWI). For pesticides and certain

other contaminants, MRLs were high but exposure amounts were quite low and below the PTWI.

Another study on processed and non processed foods in India was done for FSSAI. Risk assessments for various contaminants are covered in that report, which is available with FSSAI. The risk assessment was carried out considering various populations and their intake levels. Risk assessment was also done for trans fat present in partially hydrogenated vegetable oil based on a recent government regulation in that connection. Consultations were held with all stakeholders including the activists and the guidelines proposed were accepted. Likewise, risk assessment was done for energy drinks, for melamine and caffeine. A study on the consumption of carbonated beverages was carried out and submitted to Parliament very recently. The government wants to know how much carbonated beverage is consumed, and Dr Polasa shared with the gathering that the intake per day per person is not very significant. So there is no need to be unduly worried about the contaminants present. These findings apply to urban and not to rural areas.

Dr Polasa explained that the idea of focussing on all these projects was to show how academia can work with industry and the government. Its own research interests are built into these projects. Some of these issues are of use to industry as well as to the regulators.

Coming to the role of the government, the regulators need to examine the research data or the data derived from the meta analysis. They should have an idea about what tests have been done, statistical analysis should be performed and the findings should be comparable with international data or the status if it is available.

Recently, the Electronic Working Group had consulted guidelines from the European Union, Codex and other food safety authorities across the globe; the guidelines were then modified to suit our own population needs. An example is dietary fibre. Dietary fibre may not be required in the same high concentration as it is needed by other populations. Even nutrients have an upper safe limit and every nutrient would have its own risk if it is not regulated. It is important to understand our population's needs and also the recommended dietary intakes that are allowed for our population.

The government also has the responsibility of introducing food legislation and enforcement in consultation with other stakeholders; advising industry appropriately; educating the consumer; and networking effectively with other government departments. For example, for special foods for children including nutrition or medical foods that are used in parenteral nutrition, the Ministry of Women and Child Development is always involved, because it is necessary to know about the type of meal programme being implemented, from the safety as well as nutrition angle.

The way forward is for the food industry to play its role, using IT. The Codex cell should be the fulcrum of the whole network; there are the scientific panels.

Scientific bodies and organisations like the Association of Food Science and Technology, Nutrition Society of India, Indian Dietetic Society etc. should also be involved.

FICCI and other trade associations play a very important role; they bring together people on one platform. An interactive web page or forum could also be set up, such as the one on food security and nutrition by the FAO. All questions can be posted there, and issues can be discussed. Such a forum may be considered by FSSAI. A prioritised agenda is important. Every organisation should know what it wants to do in the next five years, or else it will not be done in a proper way.

Finally, public-private-partnership is a must. Industry should not be viewed with suspicion; they are also scientists who are working. NIN has done a successful partnership with Bioserve Company at Hyderabad and together they have developed several quick detection PCR-based tests to identify food borne pathogens. This is one example where public-private-partnership has resulted in translational research that will be useful to the population.

Dr Polasa concluded with the observation that safe food is a composite of various views and descriptions; a single definition of safe food from a particular angle will not be sufficient and may be over-simplistic. Safe food is a very complex and multifaceted concept. The criteria by which the food is defined as safe will become more detailed and comprehensive as new steps are adopted and food safety is improved as a whole. Industry, government and all others have an equal responsibility for improving safety and educating consumers.

Dr M R Sudarshan, Director, Spices Board India

Dr Sudarshan represents the Spices Board. This was constituted in 1987 under the Spices Board Act 1986, by merging two bodies under the Ministry of Commerce and Industry: the Cardamom Board and the Spices Export Promotion Council.

The Spices Board undertakes export promotion and development of 52 scheduled spices and their processed form. It provides support for the production, processing, domestic marketing and export of cardamom, both small and large. The Board does not have a mandate for production or research on spices other than cardamoms.

The strength of the spices industry lies in the fact that the agro-climatic conditions prevailing in the country are suitable for the cultivation of a variety of spices. India cultivates more than 60 varieties of spices out of the 109 listed. India is the world's largest producer, consumer and exporter of spices.

The countries to which we export spices include East Asia followed by the American Zone, European Union, West Asia and others.

India's annual average spice exports have been growing at about 12% in terms of volume and 22% in terms of value. The greatest challenge is to sustain this rate of growth.

We also import spices, mainly for value addition and re-export. Sometimes, as in the case of cloves and cinnamon, we don't have enough production so these are imported. Some spices like fresh ginger and large cardamom are imported under bilateral agreements.

Of late there has been a shift of focus to value addition. For centuries, India has been exporting raw spices in whole form. There is now a shift to value addition, but we still have a long way to go. Our exports of value added products have not even reached 50%. Non traditional applications of oils, oleoresins, health foods, cosmetics, nutraceuticals and medicinal properties of spices are being highlighted and are catching up. The trend is 'go organic' and the thrust is on food safety, traceability, sustainability and fair trade.

The sector has challenges, like any other sector. Spices are exported in different forms: whole, cracked, powdered, mixes, blends, pastes, dehydrated form, oils, oleoresins and active ingredients. Harmonisation of these standards is a major task. The Bureau of Indian Standards has been trying to come up with Indian standards like Agmark. International standards organisations have been coming out with standards like the ISO. The task of harmonisation of standards was project in Codex, and in its 36th meeting, Codex approved the formation of the Codex Committee on Spices and Culinary Herbs to form standards for various forms of spices and culinary herbs.

Research is conducted by ICAR, CSIR institutions, and central and state agricultural universities. A lot of data is generated. The challenge is to collate the data and bring all of it on one platform so that standards can be developed on a scientific basis.

The industry faces the challenge of stringent food safety regulations by the importing countries, and consumer expectations of food safety. The test is to contain, prevent and eliminate contaminants from getting into the supply chain. Examples of contaminants include microbial contaminants and the presence of salmonella in some spices that were exported. The contaminants could be introduced anywhere in the storage to handling systems, but can be contained with good hygienic practices and good manufacturing practices. Technology like ETO, steam sterilisation or irradiation is available for anti microbial treatment, but it adds to the cost, and the product becomes uncompetitive in terms of pricing.

Mycotoxins pose a big challenge to the spice industry. Contamination takes place due to improper post harvest handling, transport and storage facilities. There is a lot of variation in the limits prescribed by various countries, ranging from 5 µg/kg to 30 µg/kg. Codex has fixed the standard at 20 µg/kg. There is a wide variety of spices and the mycotoxin limits have to be fixed for each of these spices and formulations. It is a challenging task.

The question asked by industry is: are the standards really based on scientific risk analysis? Are they based on total daily intake or average daily intake? Can the Codex standards be used as a reference point by all countries?

All this needs to be looked into. Research institutes who have the wherewithal to work on mycotoxins can come out with some data to substantiate the prescribed limits. That data can then be taken to the appropriate Codex committees and incorporated into Codex standards.

There are a number of pesticide molecules which are registered. Pesticides are registered by the CIBRC. The pesticides registered in each country vary, and their levels also vary. So many times there are no MRLs fixed for specific spices. A pesticide MRL fixed for chilli could be directly advocated to dried chillies with the dehydration factor added. This is neither scientific, nor is it based on scientific risk analysis. Many times this is seen as a technical barrier to trade by the industry.

The Spices Board has taken many initiatives to address some of these issues. Quality evaluation laboratories with NABL accreditation have been established. Out of five functioning laboratories, two have NABL accreditation, and three are in the process of getting accredited. One laboratory is about to be inaugurated, and two more are coming in. The Board also provides support for in-house laboratories. Spices parks have been established to bring in primary processing and direct linkages from farmers to the exporters. A collaborative training centre has been set up in association with Joint Institute for Food Safety and Applied Nutrition (JIFSAN), USFDA, for food safety and supply chain management in spices.

Work is on to establish a traceability system for spices, called Spicenet. A unique programme called Farmer Sample Analysis Programme has been initiated for chilli in Andhra Pradesh. Farmers can bring in their samples, and they are analysed for the presence of mycotoxins and dyes at very nominal prices. This gives them bargaining power when it comes to exports. A Spice Growers' Society has similarly been set up to make traceability easy.

Dr Sudarshan mentioned that the same disconnects between industry, academia and government that apply to the dairy industry or agriculture also hold good for the spices sector.

The vision of the spices industry is to become an international processing hub and the premium supplier of clean and value added spices and herbs to the industrial, retail and food service sectors by meeting the food safety and quality requirements. This will be possible if and only if industry, academia and the government join hands and march forward.

Mr Shaminder Singh, Chair, FICCI Codex Cell

The second FICCI Codex Cell is a six-member team. The team tried to look at the priorities for the country in five or six focus areas. A new committee has been set up for spices and culinary herbs, and the team is happy to work in this area as well.

When the team makes any representation to Codex, it has to go with data that is robust and presented in a clear, accurate and precise manner, and which can be universally applied. That is an identified need and requires a lot of effort from all the

stakeholders. Inputs from the developing world are critical. When developing, collating and submitting the data, certain levers can be used. The first one is active participation. From 2007 to 2010 the FICCI Codex Cell participated in many conferences with FSSAI and the Ministry of Food Processing Industries. The next year they insisted not just on active participation, but on effective participation. As a result, one of the representations made from India actually appeared on the Codex website in time. That created the realisation that working in a proactive manner was better than working in a reactive manner. In the present conference, certain discussions will need to be looked at only next year, because standards take five years to develop. Hence when data is being provided, it has to be done keeping the future in mind, when it will actually be made available to governments to be considered for their domestic regulatory enrichments.

Earlier presentations depicted the linkages amongst industry-academia-government in the form of a triangle. Everybody owns responsibility and it is a shared journey. Participation should be carried out in a manner that is important for the consumer and also addresses the trade element. When the FICCI Codex Cell was started, one of the areas where they struggled was to get trade data. It is difficult to get data which is not visible. The present discussions highlighted the fact that studies have been done, and the data can take centre stage during the decision making processes. This marks a move from a reactive to a proactive approach.

Mr Singh proposed setting up of a Network of India Centre of Excellence (NICE) where all these databases could be collated. That will bring solutions to the problem instead of everyone shooting in the dark. There is a lot of work happening in industrial laboratories; there are new innovation areas; scientific institutions and industry are providing new science and technological solutions. It is a challenge to collate all that information. Keeping in mind the emerging risks and emerging scientific issues, it is important to have all that information in one place.

We need to look at the effect of climate. Five or ten years from now, the war will not be on standards; it will probably be on energy. While addressing the issue of waste, clean energy and clean food need to be considered. From the consumers' perspective, health related databases are available; the test is to integrate these databases and collect information that can be made useful to arrive at decisions in terms of food safety.

A total diet survey is a very good tool for impact assessment. The overall dietary exposure must be related to the risk assessment. That will help in decision making. These are very powerful tools, all of which have not been available. Now that data is available from institutions like NDRI, CFTRI, ICAR and NIN, all this data can actually be placed in one location. Mr Singh's suggestion was to host it with the National Codex Cell which is present in FSSAI in Delhi. There is a lot of information which can come from different ministries on subjects that are relevant to food safety. Along with surveillance based data, this is a huge network that will be available for the country's scientists to examine how to prioritise issues and present their case to the

external world. This data will also be very useful for risk management. Ideally, the people or institutions doing risk management shouldn't be doing it. So having all the data in one place, assessed by other competent teams, will actually help. Simultaneously, risk communication material will also emerge.

Who can access this network has to be considered, and industry also needs to participate. For example, an issue arising in Australia can arrive in India one day. We need to be prepared. Risk communication is very relevant. We need robust risk communication tools. In such cases, resources can be drawn from industry and the work can be aligned in order to come to a common position. FICCI, which represents a cluster of other associations, is a big organisation which can take care of the other associations. The FICCI Codex Cell has invited other associations, and they are members of the Cell. Multi stakeholder engagement is important. A lot of data is available from ICAR, ICMR, CSIR, NIN and NBRI, on the ingredients which are now going into functional foods. Data is also available from Indian academic institutes. So if a 'consortium of outputs' could be made available, it will certainly be very useful to use it as an opportunity to go back to Codex and seek corrections in the standards for our purposes. Since Codex follows a consensus based system and tries to understand the developing world's needs, it will certainly examine such inputs.

IT systems can certainly be game changers. These kind of solutions need to be looked at because it may not be possible to have physical meetings all the time. IT systems can help everyone in the country to be connected. FSSAI itself can have an IT enabled tool where all these databases can be available. Anyone should be able to connect to it and look at outputs emerging from other sources. While doing this, peer review is important. Data cannot be just lifted and shifted. It has to be lifted, examined and adapted to meet the requirements of food safety.

Industry generally applies a stage gate process to handle a large number of products, with a project manager whose only responsibility is to coordinate the activity. A similar kind of system could be considered in this case.

In conclusion, the FICCI Codex Cell focuses on seven areas, namely food labelling; food additives; contaminants and toxins; food hygiene; CSE; nutritional foods for special dietary users; and now spices and culinary herbs. These areas will be taken up on the priority in meetings of the FICCI Codex Cell.

Dr Jasvir Singh, AVP & Head, SARAN, Kraft Foods

In the starting Dr Jasvir Singh made two important points as under:

(i) We live in highly uncertain times and at a very philosophical level we look for certainty in every aspect of our lives. That's where the role of data emerges. The only thing that gives certainty is hardcore data.

(ii) As a regulatory professional, Dr Jasvir Singh felt that there seems to be a race towards zero in many areas of regulation. That race seems to be speeding up with

every passing day. In such a situation, the role of data, and more important, the role of quality data becomes very important.

Coming from a laboratory background, Dr Jasvir Singh recapitulated some fundamentals that determine the quality of data. Certain quality systems need to be used at the data generation stage itself. He recalled that about a decade back, a committee had been formed under Dr Mashelkar that offered some recommendations about the culture of quality. One of its recommendations was to have a centre for providing certified reference materials. Unfortunately, even after all these years of work, we do not have certified reference providers in India. That is a very basic requirement for ensuring quality in data generation. India does not have any accredited proficiency test providers, which is one of the most important parameters when the data is being peer reviewed. These are definitely big challenges.

When it comes to food regulatory systems, another gap is the absence of a national food safety analysis centre. If a stream of professional risk assessors flows into the system right from ground level upwards, it will ensure that every process being set up goes through quality maintenance and unwanted items will be filtered out. There are three broad areas in this aspect: (i) data generation, where quality systems work; (ii) data management, which is to ensure the availability of data at various centres and to various groups; and (iii) collation of data. Even if data is generated and made available, a gap is felt when we have to take positions on certain issues at a national level, because the data is not sufficiently collated to be able to take a strong national position. This has always been a challenge when dealing with Codex issues, because without data it becomes difficult to take a position.

The other challenge is at a psychological or mindset level. The entire system of recognising science is built around basic research, patents and other impact factors. The very mundane activity of undertaking a survey for an issue of national importance does not feature high on the agenda of the institutes. It does not provide adequate incentive for a scientist. That is a much bigger challenge which needs to be tackled if we really have to create a system which all of us can use for our purpose, be it Codex, domestic regulations or for any other purposes.

During open floor discussions following additional points emerged:

Q1) There is a strong need for

(a) Resource persons

(b) Universities dealing with food science and technology

(c) Good and latest equipment

(d) A strong database.

A1) Ms Kotwal: There is enough number of ICAR institutions that are working on different aspects related to food. The need of the hour, more than creating new universities or institutions, is to strengthen what we have and build in strong linkages between the research institutes.

Dr Srivastava: It is not advisable to recommend a university on food science at this stage. We have a large number of institutions, colleges, divisions, departments and laboratories working on food science. The need of the day is to generate data and have meta analysis of that data. For that, we may have to strengthen their infrastructure, manpower and HRD. We should not spend time and energy on opening new institutes.

Q2) MRL is the maximum residual level and as such is just a figure. It probably may not have any relation with consumption patterns. It can be calculated on the basis of the total intake from different food items.

A2) Responses from the panel:

MRL is very scientific data. It is calculated on the basis of consumption over the whole life span, based on laboratory animal tests. The results of animal tests are extrapolated to humans, assuming a life span of say, 70 years.

It will not be appropriate to just set an MRL without data. That is highly unscientific. The basic premise of risk assessment is data generation, which has to be done very scientifically on different population groups. There are various parameters on the basis of which data has to be generated. Without setting data, an MRL is inappropriate. Codex Alimentarius has done a lot of work, but most of the data is from developed countries, and less from developing countries. Simply copying the Codex standards is not right. It should be reviewed according to the Indian conditions or the conditions of the country which wants to set the standards.

We are harmonising the principles, not the test. The test can be done by any method, but it needs to be seen whether the method is right, and whether it is done in the right place and actually interpreted correctly. All these dimensions are very useful to arrive at food safety limits.

Setting MRLs is very comprehensive and elaborate work, and the work is very transparent. The information is available free of charge to anyone in the world. This information can be downloaded and used by anyone and they can come back to their agencies to participate.

Q3) As many speakers explain, data is available everywhere. In the case of acephate, which is an organophosphate insecticide, it is recommended by ICAR and state agricultural universities on almost all crops, based on data generated over the years. As far as the Insecticide Act is concerned, it is registered for use only on four crops. MRLs for acephate are available only for four crops. Data on acephate is haphazard and nobody is able to produce it in the correct format. It is desired to submit this data to the Act, so that acephate recommendations are expanded to all

other crops, and MRLs set for trade purposes. A lot of data is there but it is almost in wastage form and only appears in annual reports that are never referred to. There is no agency and no institution to take care of the data.

A3) Dr Srivastava: Theoretically, in India there should not be any pesticide residue in our grains or cereals because India uses only 570 g of active pesticides per hectare as compared to 13 kg/ hectare in Japan, 8-9 kg in European countries and USA. If by using 13 kg/hectare they are free from pesticides, it is not clear why we have such alarming levels of pesticide in our crops. Perhaps farmers need to be educated on choice, timing and usage method of pesticides. This should be taken as priority agenda.

Ms Kotwal: This is one important area in good agricultural practices. However, the FSS Act mandates good agricultural practices post harvest. This point can be raised with the Department of Agriculture.

Q4) There are reports of inferior quality of spices that are affected by aflatoxic and salmonella bacteria. Are these issues affecting exports from India?

A4) Dr Sudarshan: There is nothing like inferior quality. Quality is based on the importer's requirement. There have been cases of contamination of food reported, but action has been taken. The Spices Board has made it mandatory for certain spices to be exported only after getting a clearance report. Sometimes microtoxins may develop during trans-shipment. The Board has taken up surveillance and monitoring of consignments which were reported to be contaminated by salmonella.

Q5) What is the expected total export of spices in FY 2014?

A5) Dr Sudarshan: Sustaining the rate of growth is a big challenge. Sometimes we have a very good crop because of congenial weather conditions. In such cases we become price competitive and can export more during those years. The export target for 2017, i.e. at the end of the Twelfth Plan period is USD 3 billion.

Dr Srivastava observed that one point which has been raised several times in international forums, especially in the International Dairy Federation is that Indian milk is being exported after oxytocin injection which affects its quality. NDRI did very extensive research on this, and Dr Srivastava assured the house that frequent administration of oxytocins does not affect the quality of milk. Its quality and nutritive value is the same as that without oxytocin injection. Even after injecting 250 times the dose of oxytocin, there were no traces of it in milk. Physiologically too, milk is let down only after oxytocin is released from the brain. The calf is not allowed to touch the udder, so no oxytocin is released by the brain. Hence oxytocin is administered externally, and it does not affect the quality, quantity or nutritive value of the milk. Therefore it does not affect consumer health. This has been confirmed with research and sufficient data validation.

Oxytocin is also never absorbed from milk. If it is present in milk, it does not go to the GI tract. Even if it is injected, there is no oxytocin receptor. It acts only at a very specific place during the third trimester of pregnancy and during lactation. This should clear all myths and convince international forums that the milk of India, even after oxytocin injection, is as good as that without it.

At the end of the session Ms Vinod Kotwal summarised by saying that the session set out to find out whether we have enough data, if we have validated data, how do the various bodies connect and take the next step forward. From the discussions, it is clear that there is enough data with various institutes, and we have a very strong, robust scientific network. We need to do meta analysis of the data. The idea of an Network of India Centre for Excellence (NICE) is good. Perhaps the National Food Safety Risk Assessment Centre (NFSRAC) that FSSAI is envisaging can be that body. It would, in any case, require validated data from various agencies to take decisions.

However, this is a long term goal. As an interim measure, we could identify a priority agenda. This can be done keeping the ongoing Codex discussions in view, because any agenda item which has to be initiated in Codex will take, at a conservative estimate, three to four years. The committees considered should be important from the India perspective, and then focus areas need to be identified. After that linkages need to be made with research institutes working in those areas, with cross fertilisation of ideas. There has been a disconnect in letting research institutions know what to focus on. More interaction is needed, and data needs to flow from industry also, because academia will not be working in isolation in this area. The responsibility seems to be falling on FSSAI to coordinate the entire data generation and collation. The National Codex Contact Point will definitely look into it, and also consider the setting up of NSFRAC.

KEY OBSERVATIONS

During workshop following key observations were made by the participants:

1. Effective engagement at Codex level: There are subject matter experts relevant to Codex in developing countries too; they, however, may not have necessarily made the connection for participation in Codex related activities in the country. It is therefore, extremely important to build those linkages for this knowledge to be tapped. It is a challenge around the world to get the research that sits on the shelf into the system.

2. Food Safety - A shared responsibility: Food safety is a shared responsibility between the consumer, food industry, academia and the government.

The government is concerned with food legislation and its enforcement. It is most importantly concerned with the risk assessment, risk management and risk communication. As part of its risk communication strategy, it provides advisories to the industry. The government is also concerned with consumer education and awareness.

The consumers' has a responsibility to educate themselves and also educate others. Safe food practices are not only relevant to industry or large manufacturers; but pervade the whole continuum of farm to fork. Hence, safe food practices must be followed even at home.

Industry is concerned with food manufacturing practices, and other good practices like transport and hygiene. Retail manufacturers, hotels and caterers are also concerned with good practices. Quality assurance and control on processing have to be followed strictly.

Academia does the basic research, but some resources can be allocated for application based research, which may be relevant to industry as well may be directly applicable to public health related issues; they can play an important role by conducting community need assessment and identifying gaps.

A robust food safety system must be in place, and such a system is generally not static. It has to evolve to address current and emerging challenges.

There remains an ongoing need to continuously develop high quality risk surveillance and risk assessment capability with respect to food borne hazards. Such an approach has to be a systems approach, encompassing the whole food chain, benefitting the consumer and the food producer, and above all the country's international repute. In the advent of an outbreak everybody must know their roles

and responsibilities because time is of the essence. The reaction must be swift and effective.

3. Harmonisation with Codex standards: The important *mantra* today is the harmonisation of national standards with Codex at large. Some modifications may be needed on the general Codex standards to fit domestic national requirements. As a principle food safety standards must be based on science and risk assessment.

4. Faster response from the Regulators to promote innovation: Both food safety and innovation need to be protected, and expediting the review of new technologies, those tend to be more efficient safer than old ones, would promote both food safety and growth of the sector.

5. Building indigenous research capability: Academia should increase aptitude for applied and need-based research; develop skill sets and professionally competent human resources; and increase social consciousness.

Industry should support academia in developing technology and adopt indigenous technology, instead of pursuing overseas technology. Human resources in the industry should also be trained to take up research locally.

6. Parity in Data Reporting: Data reporting should have one common language across various scientific and government bodies within our country. There is no single ministry identified as the nodal ministry to give data standards that all government bodies must follow. It is extremely important to have an apex body to coordinate the data collection in a harmonised manner.

7. Need to do Meta analysis of the data: It is clear that there is enough data with various institutes, and we have a very strong, robust scientific network. The challenge is to collate the data and bring all of it on one platform so that standards can be developed on a scientific basis. We need to do Meta analysis of the data.

8. Culture of Quality in Data: Some fundamentals that determine the quality of data need to be used at the data generation stage itself. We do not have certified reference providers in India. India does not have any accredited proficiency test providers, which is one of the most important parameters when the data is being peer reviewed.

RECOMMENDATIONS & ACTIONS

Following key recommendations/suggestive actions emerged from the workshop:

1. Need of more Academia-Industry-Government Interaction: Wherever possible, academic research bodies should be included in trade review delegations so that they become aware of the problems and will be able to include them in their research agendas.

The government can play the role of facilitator in organising frequent interaction between the academia, industry and government by creating more platform/opportunities including regular seminars, workshops and subject specific discussions.

The academia can also contribute in the Codex related activities by giving their comments/ sharing data on various agenda points electronically.

2. Superior traceability and safety processes: There should be networks similar to GrapeNet established for fisheries, mangoes, and other commodities which should be connected to the national food control system.

Codex Alimentarius has done a lot of work with most of the data from developed countries and less from developing countries. At times such data may not be representative to domestic scenario. India has 17% of the world's population and India, China, Pakistan and Bangladesh constitute more than 40% of the world's population. Hence the standard for safety of food has to be determined in this region because of different food patterns and habits.

3. Central agency to validate the methods of analysis: Good laboratory practices should be made compulsory for all food and referral laboratories and there should be regular interaction between industry, academia and the government. The need is for a central agency which will basically set up protocols for data sharing, quality and sharing mechanisms between the laboratories.

4. Need of Research on MRLs: There are no MRLs fixed for specific spices and other commodities. Many times this is seen as a technical barrier to trade by the industry.

At times published papers mention the types of contaminants in food, which are below the MRLs and create unnecessary panic. The risk and adverse effects must be assessed before publishing such data.

5. Setting up Network of India Centre of Excellence (NICE): The coordination between various research institutes on the kind of work that they are doing is lacking. Even if data is generated and made available, a gap is felt when we have to

take positions on certain issues at a national level, because the data is not sufficiently collated to be able to take a strong national position

The need of the hour, more than creating new universities or institutions, is to strengthen what we have and build in strong linkages between the research institutes. There is a need of setting up of a Network of India Centre of Excellence (NICE) to coordinate the entire data generation and collation. It was suggested that National Codex Contact Point (NCCP), which is with FSSAI could explore the possibility of taking up this role.

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