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National Centre for Cold-chain Development

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Newsletter

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The CEO's Desk

Our June edition informed you about workshops held in the States of Haryana and Punjab. Since that writing, two more workshops were held in Hoshiarpur and Ludhiana. Interactions with cold-chain users and other stakeholders in these regions were very forthcoming. The workshops continued to disseminate information on regional solutions & develop a greater understanding on the newly launched schemes, in regards to cold-chain infrastructure.

Guwahati (Assam), witnessed a National Cold-chain Summit, organised by ICC, on 11th and 12th July 2014. The two day summit included a field visit into Meghalaya and focussed on cold-chain opportunities in the North Eastern Region (NER).

In July, NCCD also participated in a global debate at the Cool & Clean summit, in London to deliberate on food losses and environment friendly technologies that could also serve cold-chain as viable energy saving solutions.

This month also saw the return of the first delegation of trainees from Cemafroid and the dispatch of the second batch. A briefing on the training is hosted on the NCCD website. A second series of front line training at the Danfoss Global Learning Facility in Chennai, was also commenced in the closing week of June. Both courses are intensive and adapted to Indian backdrop. The course participants include a mixed group of both government officers and industry members, promoting healthy interaction and harmonised understanding between industry and government stakeholders. All participants are provided a certificate on successful completion of the course.

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OP-ED INVITATION:

Article submissions from readers will be nominated by the editorial team as Op-Ed topics. Readers are invited to articulate their ideas & concepts.

CII's Task Force on cold-chain, Chaired by Shri P. Ravichandran, President of Danfoss (India), has partnered with NCCD and is activating meetings to collate industry inputs for revising the extant standards on cold-chain infrastructure. These standards are applicable when requesting government support. Thereafter, CII will also contribute in refining the standards that apply to newly added scheme components. CII will be organising a National Summit on Cold-chain where these would be released. We look forward to similar proactive interface with more NCCD members and other industry associations & chambers.

-Pawanexh Kohli

Reduce cooling loads, save Energy — **Thought of the Month**

Most air conditioned offices, homes, clubs try to maintain a chilled ambience by setting the room temperature between 21° to 22°C.What if the temperature set point was raised a couple of degrees to 24°C? Did you know that every increase of 1°C can save up to 10% of the running cost of your AC unit. Why not dress appropriately for the season instead of adjusting the room temperature to our dress code? A couple of degrees of adjustment will save the country large amounts of electricity, save you a lot of money and make you environmentally friendly. Go green, raise your AC a few degrees, reduce your carbon footprint.

EVENTS & WORKSHOPS

In July, NCCD participated in a few discussions and workshops on matters that ranged from sustainable energy alternates to infrastructure development and policy interventions.

A cold-chain summit was held in Guwahati, in collaboration with MoFPI. The event was inaugurated by Gen. V.K. Singh, Minister Development of North-eastern States and addressed by Shri Nilamani Sen Deka, Agriculture Minister Assam.

This cold-chain summit was also highlighted by the presence of Shri Siraj Hussain, Secy MoFPI and Addnl Chief Secy of Assam, Shri Vinod K. Pipersenia.

NCCD presence was amplified through a large contingent of its industry members, all proudly sporting the NCCD logo on their lapels. Each discussion panel had a NCCD partner, discussing various initiatives taken.

Pluss Polymer, Adani Agrifresh, Lamilux, Samagra Agribusiness, National Vegetables & Fruits Storage, Alfa Laval India, Danfoss India, Blupith, Amity University, ACR Project Consultants, Carrier Transicold, Crystal Logistics and others were among the NCCD members who acted upon the NCCD communique on this summit. The summit organisers ICC, had earlier arranged a day's field trip into Meghalaya which was not ventured into the North eastern region. The event triggers off a series of interactions between the states and the industry to fast track development work.

Earlier in the month, a workshop was held in Punjab at Ludhiana's Agriculture University. This one was the third in continuance of a series planned and initiated in June with the State Horticulture Mission. This series of workshops is to spread awareness to stakeholders on the support mechanisms in place for developing and modernizing cold-chain facilities. Alongside, technical solutions are discussed and Punjab plans to do a comprehensive study.

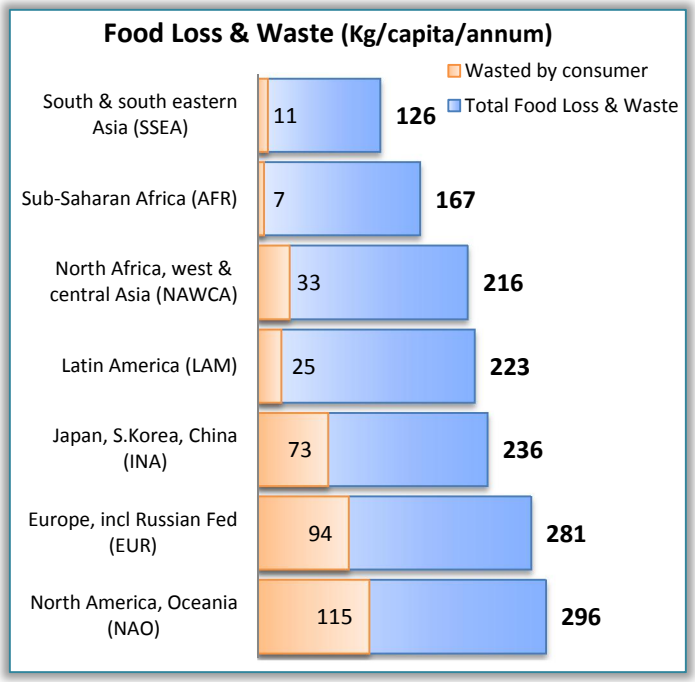
Another eye-opener meeting was on Kisan Mandis, the first of which is expected to come up in Delhi, to serve as a market, of the farmers, by the farmers and being enabled by Small Farmers Agribusiness Consortium (SFAC).

COLD-CHAIN INSIGHTS - IV

Pawanexh Kohli

A High Level Panel of Experts on Food Security and Nutrition (HLPE) was established by FAO in 2010 as the science-policy interface of the UN Committee on World Food Security (CFS). This month, on 3 July 2014, the HLPE published a report #8 titled "Food losses and waste in the context of sustainable food systems". At its onset, the report states that accurate estimates of losses in the food system are unavailable, though it reiterates that best evidence at hand indicates that global food waste stands at 1/3rd of production. It goes on to state that myriad approaches to defining food losses and waste are confounding.

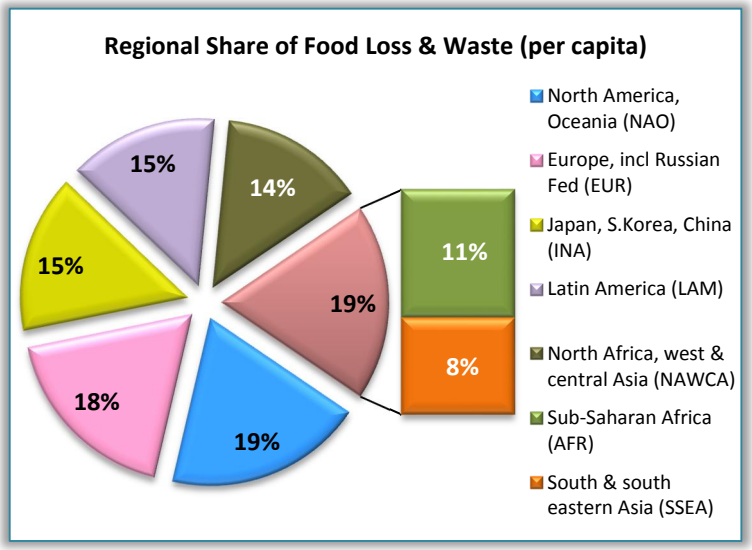
For the referenced report, the following definitions are used. Food Loss and Waste (FLW) is "a decrease, at all stages of the food chain from harvest to consumption, in mass, of food that was originally intended for human consumption, regardless of the cause". Some key phrases here is "in mass" and "for human consumption". Let us no longer speak of loss in value et al, and limit the discussion to loss in mass, and let us not attribute trimming, de-podding, pre-harvest culling, etc. as food loss, at least not until technology arrives to manufacture leaf shavings into human food.



Food Loss & Waste (FLW) has **two distinct components** – food loss occurring **before consumption** and food waste occurring **at consumption** level. Consumption level is inferred as in the hands of the consumer. Therefore, losses are attributed to the post-harvest supply chain and waste ascribed to the consumer.

There is also loss through degradation of quality attributes of food, and it is proposed to define that independently, under other metrics subject to perception, nutrition aspect, etc.

In reviewing this report, it is evident that overall, on a per-capita basis, much more FLW occurs in the industrialised world than in developing countries. South/Southeast Asia which includes India, is the most economical with its FLW. In fact this region, on a per capita basis incurs only half as much FLW as most of the rest of the world.

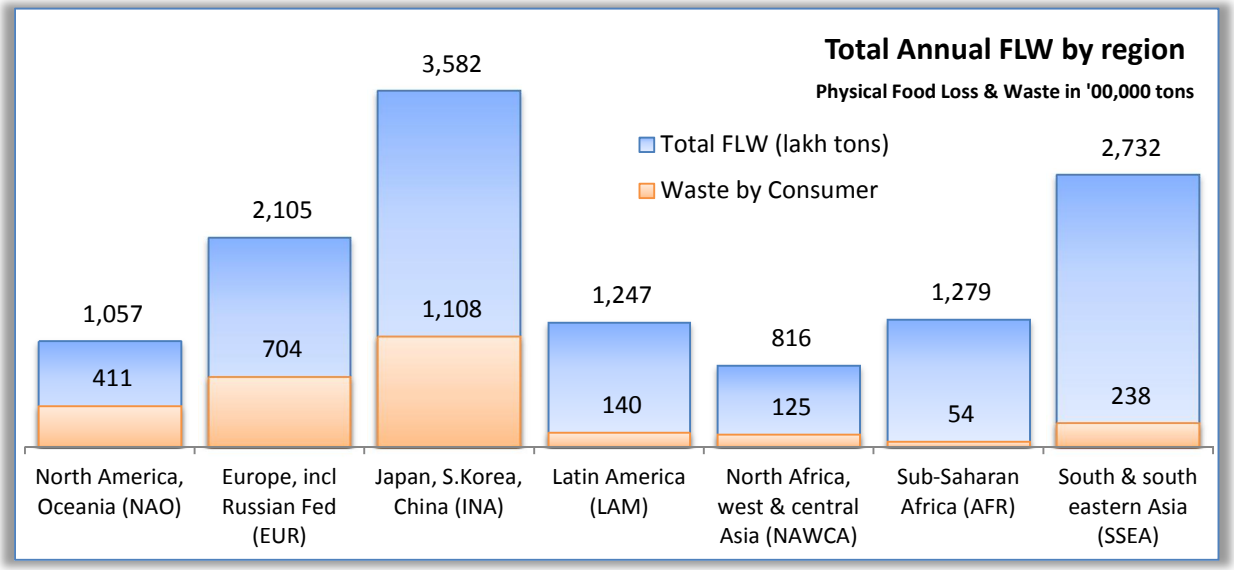


It is to be understood that this relates to "physical" loss & waste. FLW does not factor in loss in value (though physical loss also adds to value loss) - value in the food supply chain generally accumulates with each series of logistical activity and transaction. Therefore, when we hear talk of value loss it can make sense only when considering a specific value point in its relation. For instance, at the recent Guwahati summit, when enquired if it was true that we lose 40% of produce in value; the response is that this maybe incorrect and the value loss can be more than 100%. If Rs 5 of input cost is sold at Rs 50, then truly, the physical loss would translate into a notional value loss of Rs 45 i.e.

HLPE, 2014. Food losses and waste in the context of sustainable food systems. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome 2014.

900% of the input costs. In considering accumulated value along the chain, the correlation would depend on multiple value variables, basis where and when in the chain the actual loss occurred… effectively, the physical loss (in mass) has multiple value points ascribable. If we consider only the input value (total at-harvest cost), then quantifying the physical ought to suffice as the basis for most developmental purposes.

South & south eastern Asia having the lowest per capita FLW is not cause for celebration. When we factor in the heads or population count, this region ranks number two in quantity terms (chart below indicates lakh tons per annum). What is heartening, is that in regions where tradition and cultural



habits accommodate an existing respect for food and its worth, it may be is easier for such societies to grasp upon some minimal changes that can further reduce FLW in their region.

The primary causes of food losses and waste in low-income countries are largely linked to the shortfall in the infrastructure, management and technical resources - for harvesting, post-harvest handling and supply chain managing. An efficient supply line necessitates appropriate packaging and marketing systems as well as coordination at transactional levels. In developed countries the losses are attributed to similar supply chain breaks, a lack of coordination in the logistics, as well due to farmer buyer strictures. The far larger ratio of waste that occurs is due to consumer behaviour and apathy. This could stem from marketing influences. coercing buyers to procure more than they need.

While food waste contributes to increased demand and thereby feeds supply side needs, food loss leads to a lowered access to food leading to food insecurity. Any logistics (perishables) expert would inform you that countering transportation losses, better described as in-transit (to consumer) losses, are the most critical and crucial to any solution. This includes excursions from control, during the loading, unloading, put away and pick up operations. Where other delays manifest enroute, the perishable inventory in motion is put at greater risk (to physical mass and end value realisation). Any delay also shortens marketable life and hastens the lead-up to loss. The losses that happen in the food chain, during pre-conditioning stages, enroute or distribution, can of course, be worked upon to resolve or mitigate. But what if there is a lack of such a chain of activities to start with…

In cases where no supply side logistics exists, it almost always means that food loss will occur – the surplus produced will perish before it can be consumed. A shortfall in the availability of services that can deliver to consumer is a zero gain situation. Of course, this relates to goods that perish with time.

Given that many smallholder farmers are the producers of perishable food items, a delivery mechanism to consumers has an immediate and beneficial impact on their livelihoods. This in turn would mean a reduction in food losses. Strengthening of the cold-*supply*-chain has clear advantages. This may also require encouraging small farmers to collectively upscale and the facilitating of their marketing. There are many roles to be played, by both the public and private sectors.

Food Loss: pre-consumer, post-harvest, in-transit | **Food waste:** post-retail, consumer-end, post-monetisation

Sustainable Cold-chain Infrastructure Op-Ed

Article by Shri Nagahari Krishna L.

Cold-chain is an essential component in ensuring an efficient supply chain network. Post-Harvest infrastructure is a vital link of the agriculture supply chain to minimize the moisture losses and prevent any bio-chemical change by keeping the product cool. Cold-chain includes critical post-harvest management practices used to prolong shelf life and preserve quality of fruits and vegetables. While cold storages are established in a few pack houses, market yards and some airports, the available capacity is substantially low particularly at the farm level.

Also a number of Mega Food parks Pack Houses Collection centres, with packing sorting grading facilities are coming in near future which also requires a sound foundation of cold storage facilities across the country. When we talk of Cold Chain it is predominantly towards addressing two important areas i.e Food Security and Food Loss and then amongst the challenges Land Cost, Energy demand and the high Operating Costs.

Food Security

As India's population increases, meeting future demand for food while responding to the stresses placed on the food system due to the changing dietary preferences, resource competition, and climate will present significant challenges. This would change the way we farm, harvest, store, transport, process, distribute and consume food. These changes will be a major determinant on how we will live in the 21st century.

While increasing productivity to ensure food security will be important, equally important would be the connections between the farmers and the different markets of consumptions. This would be directly related to economic development of the regions as the middle class (whose numbers increase by the day) will require new food systems. This can be met only with the right kind of rural-urban supply chains.

Losses

While we do look at increasing the productivity and the supply chain it is equally important to also note the food lost, as not every apple produced reaches the fork. While there could be different levels of percentage of loss that studies refer to, we need to take note that this loss is not just about the physical produce but also of the efforts expended for production, including the input resources such as energy, water… By improving food handling we are not only ensuring that the challenge of food security is met but also reduce the carbon footprint.

It is apparent that this loss can be reduced through the efficient cold chain system from the point of harvest to the point of consumption. As for technologies, there are already many mature technologies available which can be either adopted or modified to suit Indian conditions.

Even if we are able to reduce 50% of the losses or wastage from the current levels we would have added substantially to the income of the farmer, income to the exchequer and created rural employment.

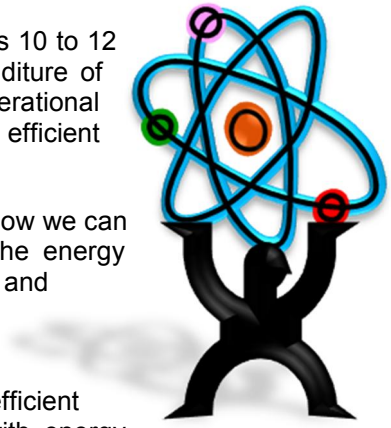
Through some visits to farms, cold stores etc… we can see that establishment of pack houses with sorting, grading, packaging and other facilities, also creates employment for the youth in these places.

A central pack house with capacity of handling around 1000 MT/day with associated farm collection centres would create employment for close to 5000 people i.e. direct and indirect. Even if we establish a pack house for 2 to 3 districts together we will require about 10 pack houses in a state like Tamil Nadu. This in turn means we would be creating opportunity for employment of approx. 50,000 individuals.

One of the major reasons why we need these pack houses cum collection centres is to ensure that every Horticulture produce reaches the table. This missing link has been brought to the forefront of policy thinkers and industry, thanks to efforts by NCCD. In case of Bananas, if we estimate conservatively about 20% loss on an annual production of 9 Million tonnes we are losing 2700 Crores in rupee terms in Tamil Nadu. (INR 15/- per Kg Banana is the value used). With appropriate post-harvest care and market connection, originating with pack-houses, this figure will reduce.

Securing Energy

However while the technologies exist to build this infrastructure, one of the major challenge that still persists is the electricity costs in these cold chain. The existing challenges of electricity in rural areas results in predominant reliance being on Diesel generator sets.



A cold Storage of 5000 MT capacity requires a capital expenditure of Rs 10 to 12 crores (including land). This can require an annual operational expenditure of upto Rs 1 crore. In a normal cold store 10 to 15% of the annual operational expenditure is on electricity costs. Through appropriate use of energy efficient technology we can reduce this electricity cost by 30%.

It is hence important that we address this issue of energy demand and how we can find solutions for this. Implementing Sustainable Solutions to meet the energy security needs of cold chain technologies is crucial for development and delivering a more food secure world. This will not only ensure food security/food wastage but also avoid additional damage to climate.

Some of the options available to us are to use more energy efficient technology in the new cold stores, modernise existing cold stores with energy efficient or latest technologies. Increasing the adoption of renewable energy for cold chain such as solar and also work towards development of new technologies which recover waste energy.

Here, NCCD has again highlighted these aspects and Government has taken initiatives towards incentivising such solutions. Additionally in this budget there are specific allocations for creating of Agri-Infrastructure, Scientific Ware-Housing and other such initiatives. There are also specific initiatives being undertaken by some States for modernization of existing Cold Stores.

With the Government offering support, the industry must now make the next move. As an Industry we should work towards assisting in this modernization of cold stores and at the same time the new warehouses/pack-houses which will be built across the country need to adopt the latest technologies not only in terms of equipment but also in the way they consume energy.

Skill Development.

Lastly one of the areas that both Industry and Government will have to work together is in reducing the Skill gaps or capacity building for the Cold Chain Sector. While we do have technicians and professionals who are currently installing and commissioning the new projects, we will require skill sets to be developed for the rural jobs that will be created once this infrastructure is set up.

There are efforts being undertaken individually both by Government and Industry to address the capacity building requirement. NCCD and Danfoss are already collaborating on a technical level on this matter. However there would be need for more efforts required as we move forward including by the industry at large.

About the Op-Ed author

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Opinions expressed in this article are those of the author. NCCD may not always concur with the Op-Ed contents. Danfoss India, is a Category-C participating member of NCCD.

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Graphics by NCCD

Pakistan on Indian cooperation in cold-chain *(July-2014)*

Pakistan High Commissioner to India Abdul Basit met Food Processing Minister Harsimrat Kaur Badal and said India can cooperate in development of cold chain sector in Pakistan. "...at the moment Pakistan is working on developing cold chain for our agriculture produce... that is one area where we can cooperate," Basit told PTI after the meeting.

Jammu drug stockists raided.. not maintaining cold-chain

Officials of Drugs and Food Control Organisation (DFCO), Jammu conducted checks of various wholesale establishments after reports that proper cold chain was not maintained. The operations at the establishments of two firms were suspended till such time the firms report satisfactory compliance with respect to cold-chain provisions.

Internship

NCCD, inter alia, aims to develop a talented pool of Young Professionals (YP) with a passion to work at grassroots and the potential to become development leaders. For this end, an internship opening was introduced to provide exposure to youth in different thematic operations of NCCD, on-the-job disciplines, strengthen their understanding of the perishables supply chain and cold-chain industry and prepare them for future public service opportunities. In mentoring and cultivating tomorrow's leaders, we help them to acquire requisite skills as well as competency to contribute to government policy initiatives as well as develop a cadre of experienced professionals serving in this sector. The budding YPs learn about technology, agribusiness, marketing, supply chain infrastructure, and associated policy work. YPs are drawn from diverse disciplines like management, social work, agriculture, engineering, marketing, finance, HR, law, mass communication etc. We are proud to present the thoughts of our first set of interns.

Intern Blogs

My Experience in NCCD as an Intern

By Bikram Mehra, Intern (June-July 2014)

I am pursuing MBA from Guru Nanak Dev University at Amritsar, when I sought opportunity to serve as an Intern in the National Centre for Cold-chain Development (NCCD). NCCD had recently initiated a Young Professional Internship program and I was the first intern to join up.

Through this internship I wanted to understand the tangency between the theoretical framework of policy making and actual public policy making and implementation. As a new comer to the field of cold-chain, my understanding on the concepts were limited and this quickly became clear. I realised that domain understanding is needed before any good policy can be developed. My first step was to understand what was really cold-chain. In doing this, I am now motivated to learn even more about this nationally important sector.

I did share a common perception, previously, that people in the public sector would have those stern faces and be very routine in their jobs. But I was proven wrong. At NCCD I got chance to interact with highly experienced team members, who are striving to contribute to the nation's development. It was an eye opener to see such high level of motivation and enthusiasm.

No doubt I was quite nervous at the beginning, but I overcame my anxiety and gave my best. We do hear people lamenting about their internship experiences not doing much but I my internship at NCCD has been a motivating and fruitful experience. During my internship, I learned how to work against impossible deadlines, how to analyse databases, how to express concepts and learned of many new happenings. All this has enhanced my knowledge and cleared many internal doubts.

This period also provided me with an opportunity to hone my public speaking skills. I got exposure of State level government workshops and site visits. One other memorable experience was that I witnessed how workshops were planned and conducted and it was eye-opening I would say, in terms of scale, manpower and prior preparations needed. All such preparations would be done internally and it was a learning for me to be part of such a cohesive environment.

This chance to learn in a fast paced organisation with an inspired and focused team is a great boost to start your career! There were also regular dialogue sessions with the mentors, which made us interns feel that our opinions are valued and made me feel as a contributor. Working in a high work pressure work environment has encouraged me to do more for my future career.

I thank team NCCD for giving me this opportunity and am motivated to further enhance a career in Cold-chain in coming future. I am keen to spread the word about cold-chain in my college and my city.

Shri Bikram Mehra is a B.Com graduate, now pursuing an MBA from Guru Nanak Dev University in Amristar. He has also cleared his Chartered Accountants Common Proficiency Test (CA-CPT) and keen to leverage his proficiencies and learnings for greater national good.

Intern Blogs

Cold-chain and Youth

By Angad Singh, Intern (June-July 2014)

Just like all general public, I thought cold stores were only used for storing ice-creams, some vaccines, etc. In fact I always thought cold-chain meant a chain of cold stores. But after I started my internship with our country's National Centre for Cold-chain Development (NCCD), my entire impression was changed and a new understanding came into light.

I now realise that the cold cold-chain is an essential series of logistical activities that all perishable fruits, vegetables, meats, other foods and medicines must go through, if they are to be a part of a country wide supply chain. I realised that this need is critical as a lot of food does not reach the users, despite high production in India. I realised that the cold-chain is for making short lived food items travel from producer to end consumer by enhancing the selling life for that duration. I learnt that this was not simple as each food item can have very distinct parameters and controls to maintain its freshness and quality.

The cold store, also known as refrigerated warehouse in America, is only that part of cold-chain where food can be stored in cold temperature from where it can be sent onwards. I have understood that a cold store is only one piece of the puzzle which has other more important pieces. But if other parts are missing it can all be a wasted effort. Most importantly, I learnt that the cold-chain is a very important part of food security and important to our countries future well-being.

In India, farming is the largest profession (60%) and this makes cold-chain a very necessary part of India's future economy, to bring value to its producers and to fulfil demand of its consumers. But in comparison of the food produced, specially horticulture, our cold-chain management has a long way to develop, even though we already have a very large and good cold-chain for many other uses.

Cold-chain needs energy and this is currently in short supply. Yet, we are lucky to have many alternate options, like- bio-gas, solar energy, geo-thermal energy and even new things like liquid air which can be used in cold-chain in various combinations. Practically, the Indian market is wide open for this industry – a vast majority of our population are vegetarian and eat fruits and vegetables, this is the segment that has the least development of cold-chain. This is a huge opportunity and the next growth area for India.

I also was never aware of the high levels of support our government gives for this sector, in form of incentives like subsides and knowledge sharing. The head of NCCD kept everyone always working and learning and I am glad and thankful I got a chance to intern at NCCD. It was a great experience to share a month among some very hardworking and motivated people.

I sincerely feel our youth can advance much in cold-chain area for which dedication, innovative ideas and hard work is the master key. Youth can give their contribution by creating India's first big brand for agriculture and horticulture or by maximising the count of producer-owner type entrepreneurs. This is no doubt also an opportunity for Indian youngster to maximise value as price of fruits, vegetables rapidly increase nowadays. Technology advances can be a sign of growth in this area. Youth can explore this industry through giving ideas to preserve food, improvement in packaging style, etc. which can help improve cold-chain development.

Understanding of such an industry to school level students, parents, peers is a way to expand such awareness. So, as more numbers of cold-chain arise and with more food safety and security, Indian economy rises and I wish that everyone see the opportunity in a positive manner and make India proud of being largest agriculture based country.

Shri Angad Singh is pursuing Bachelors of Management Studies (BMS) a 4 year professional degree course from Delhi University (DU) and is a student of Shaheed Sukhdev College of Business Studies. In 2012, he was awarded 2nd prize at the Dr. K.L. Garg Memorial Interstate Blind Chess Tournament .

CAMEL MILK

Some factoids about Camel Milk.

Camel's milk is said to be an 'acquired taste', yet many people around the world depend on it.

Its composition is closer to human milk than cow's milk. Camel milk tastes slightly saltier than cows' milk, is three times as rich in Vitamin C and known to be 10 times richer in iron, more unsaturated fatty acids and B vitamins.

It also contains immunoglobulins, other protective proteins and enzymes, and these help fight serious diseases like cancer, HIV / Aids, Autism, Alzheimer's and Hepatitis B. The milk is said to have many other healthful properties and also claimed to be an aphrodisiac. Studies in India show it also contains higher insulin levels, helping diabetic patients by reducing reliance on insulin injections.

Camel milk is potent with vitamins which clean out the body, externally and internally. Just drinking the milk is said to yield a healthy complexion. A natural source of Alpha-Hydroxy acids – known to plump the skin and smooth fine lines with its anti-aging and antioxidant properties. As the story goes, Queen Cleopatra was a big fan of camel milk and used to bathe in the stuff. Camel milk soap is now sold in many parts of the world as a beauty and anti-ageing option.

Camel milk cannot be made into butter in the traditional method, Churning must happen at a higher temperature of 20-25°C. The milk can readily be made into yogurt. Butter or yogurt made from camel milk can have a very faint greenish tinge.

Estimated global camel milk output is estimated at 5.3 million tons, although this may be a conservative estimate. Lactating camels each produce between 1,000 and 12,000 litres of milk for anywhere between 8 and 18 months.

Camel Milk Properties:

- Camel's milk is generally opaque white. It has a sharp taste, and sometimes it can be salty. The taste generally depends on the type of fodder and availability of drinking water.
- The pH of camel's milk ranges from 6.2 to 6.5 and the density from 1.026 to 1.035. Both density and pH are lower than those of cow's milk.
- Camel milk Butter melts at above 42°C, a few degrees higher than normal butter.
- When maintained at 2 to 5 °C, it lasts for 8 to 10 days.
- The above is applicable when the milk is pasteurized (heat treated), bottled and finally cooled at 4°C.
- Usual conditions for value added products such as camel milk gulab jamun, kaser kulfi, peda, barfi, etc.

Bikaner-based National Research Centre on Camel (NRCC) has approached the Food Safety and Standards Authority of India (FSSAI) to authorise sale of camel milk.

Globally, camel milk is fast gathering superfood status. Camel milk is featured in more than 40 whole food stores in California, a pint bottle costing $16 to $18 (Rs 2200 a litre).

NCCD GLOSSARY OF COLD-CHAIN

Our CEO, Mr. Pawanexh Kohli, explained his take on Standards and the need to ensure that they promote Indian innovation, leaving room for experimentation and indigenisation in the cold-chain.. guidance need not be a deterrent.

"Standards" are casually understood as predetermined design specifications that apply to equipment and infrastructure, that are mandatory and regulated, with the aim to direct and harmonise applications and services. This is a highly generic understanding and actually incorporates Policy, Standards, Guidelines and Protocols.

Policy: high level statements, describes vision, scope, compliance - To set direction and emphasis, strategic in nature, and needs standards (in language and measures) to define & develop the guides & procedures. Eg.-equal opportunity policy.

Standards: low level mandatory controls, to define the policy to ensure consistency of understanding & implementation - A statement reached through consensus, which clearly identifies the desired outcome. It includes definitive measures of which the simplest examples are metrics of mass, time, temperature, etc.; standard kilogram, second, °C, metre, direction (north, south, etc.), colour codes. Standards can also be a low level result oriented delineation of processes, products, activities but entrusts the details to guidelines and protocols. Standards are used for testing and audits to compare the subject for expected results, to certify compliance. Standards always state reference points, instil metrics, to ensure uniform compliance of policy. Eg.-defining opportunity.

Guidelines: recommended non-mandatory controls. Are normally the best practises in the language of standards - Intended to advise on action / application / deployment. Systematically derived, these help decision making. Can be future looking, temporal, seeking in nature which are often discretionary in usage. When made mandatory, guidelines are internal and localised. They are open to evaluation and can be easily amended, but can also lead to the developing of new standards or protocols. Eg.- guidelines to draft policy & procedures, a website or letter template, task timelines, roadway or footpath, how to allocate or measure an opportunity.

Protocols: the framework or step-by-step procedures to follow to ensure compliance with policy, standards and guidelines. Control over outcome is the purpose, the result is measurable and includes standard metrics - Compliance with established procedures is mandatory to ensure regularity and accuracy. Egs. office timings, driving on left side of road overtaking on right, stop at zebra crossing, code of conduct, filing an equal opportunity report.

Ground reality (*cold-chain*): 'Standards' (*colloquially*) is a mix of all above understood terms – though essentially they are guidelines for localised implementing schemes, to simplify control.

It is recommended that for cold-chain development purposes, instead of the usual method of interpreting equipment designs (stipulating insulation material, thickness or compressor loads), there be clear focus on defining desired outcomes. For example, the insulation requirement can be defined basis a unit cubic volume of enclosed space, which when at a quantified temperature differential from ambient, exhibits a limited change in internal temperature within a range in time. [Eg., 1 cubic metre enclosure at a 40°C in/out differential, does not heat up more than 1°C/hour].

Similar model can define a standard for compressors – as a measure of the capability to pull down a unit volume against a temperature differential within a fixed time measure. Such standards will pose clear, measurable outcome based targets to innovators and inventors, and promote indigenisation. While NCCD is tasked with the *standard* guidelines for scheme implementation, consensus will be worked upon and arrived at to set these outcome based Standard measures too.

LUMINARY SPEAK

Dr. Sanjeev Kumar Baliyan, Hon'ble Minister of State (Agriculture and Food Processing)

You hold dual portfolio encompassing two ministries, both of which have interest in cold-chain development. What recommendations do you have for the cold-chain sector?

Cold-chain plays multiple roles across different user needs. The common assessment is that cold-chain development must be in a holistic fashion, such that it promotes agri-business and gives impetus to building market linkage. While the needs of the food processing industries may lean more towards securing raw material supply for its manufacturing lines, in horticulture cold-chain fulfils a more immediate need of directly bridging farmers with consumers, the infrastructure requirements are similar and cold-chain connectivity is of essence to both. There is clear need for convergence and coordination between all stakeholders and more private industry participation is looked forward to. We are here to support and my recommendation to them is to grab the opportunity before it too late.

More than 70% of our cold-chain developed in the form of potato stores. Your opinions on this please?

Potatoes cold stores are the fore runners to India's cold-chain. One of my first interactions, within a fortnight of taking charge was with stakeholders of the Federation of Cold Store Association of India at Agra. They have expressed concerns as many facilities are ageing and need modernising. All possible support will be extended to them and they must take advantage of the modernisation components in the schemes of the Ministry of Agriculture. While potato cold stores will continue to serve an important role, there is a need to also focus on developing cold-chains for other kinds of products. This will include improving transport connectivity as a thrust area, by road and rail and even on water ways. Many food processing factories are being set up and that will also generate a greater need for cold-chains. On the other hand we have little of the necessary cold-chain packing houses at farm level to prepare fresh farm produce for the cold-chain. I know NCCD is guiding various corrective actions on this and States must support this.

Yes Sir, and we are also highlighting the need to develop cross regional refrigerated transportation.

As I just said, transportation that links farmers and markets is to be a priority item for cold-chain. Renewed impetus on road and rail infrastructure will help in your future development plans.

In the Budget, special attention was given to Agri-Infrastructure and Price stabilisation. Your comments?

Price fluctuations can be drastic, more so in case of perishables and semi-perishable produce. The way out is cold-chain as it counters perishability and helps maintain as steady a supply chain as practicable. Additionally, produce that may not have a ready market, can be stored or can feed food processing units. So collectively, with science and technology of cold-chain we have the benefit of being able to buffer the supply lines against lean periods. Cold-chain would seem to be a solution that falls under the overall scope of both these strategic announcements.

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NCCD is an autonomous body set up by the Government of India with the aim to facilitate cold chain development across all user segments through policy intervention, capacity building and standardisation. NCCD has participation from private industry, policy makers, knowledge partners and government agencies.