



National Centre for Cold-chain Development

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# Newsletter

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## The CEO's Desk



## HIGHLIGHTS 2014

2014 ended as a memorable year for NCCD. After the close of the national elections, we saw the implementation of various significant policies, which reinforced and expanded the support to cold-chain development. The launch of the Mission for Integrated Development of Horticulture (MIDH) in 2014 was a major event for cold-chain development as it brought forth a new set of incentives to drive post-harvest management

& marketing infrastructure as a thrust area for the coming years.

To support the implementation of these policy decisions on cold-chain, NCCD developed the draft of the minimum technical guidelines in May 2014. The draft document was presented for discussions at a



Shri D. K. Jain (AS – DAC) addressing conclave on Tech guidelines

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## INVITATION:

Readers are invited to articulate their ideas, concepts & comments. NCCD Annual Journal will be published in 2015 & scholarly studies are also invited.







conclave, which included State Governments, Central Ministries and Departments; after which the draft was kept in the public domain for comments. With support from CII (FACE & their task force on cold-chain) as well as with inputs from various stakeholders, the final document was eventually tabled to the Standards Committee in December 2014, for approval as the minimal System Standards for use in cold-chain development.

2014 was also the year when we commenced a series of trainings for unemployed youth, for developing skills in the operations of ripening facilities. On local demand and with increasing interest of the participants, this progressed into an entrepreneur development program. Most interestingly, on specific insistence, special sessions were conducted for women self-help groups. This training program on entrepreneurship & operational skill development in ripening chambers, will continue into 2015.



The 2 day session introduces participants to the concept of safe & scientific ripening of fruits, provides guidance on bank loans and subsidy schemes, & ends with one day hands-on-operations at existing ripening facilities. NCCD members Samagra and ICE Centre of Excellence are conducting the curriculum for NCCD, pan-India.

A solitary reefer (refrigerated truck) driver awareness program was conducted in 2014 and with availability of willing resource partners, it is hoped that this will become a regular feature in 2015.



A major event in 2014, was the holding of a week-long international brainstorming workshop on cold-chain development

conducted with APO (Asian Productivity Organisation) and NPC (National Productivity Organisation). Officers from thirteen Asian nations participated.

An impromptu endorsement was received by NCCD from attending delegates; on learning about NCCD interventions & activities, one of the key recommendations from this workshop was that an 'NCCD' also be set up in each delegate country.

Group1: Southeast Asian countries: Cambodia, Republic of China, Fiji, Indonesia, Korea, Malaysia, Philippines, Thailand

Activity step 2	Objectives/features/topics	Target participants	Responsible party/Convenor
Training on technology on CCS	Types of CCS Design and construction of facility Time-temperature	Government, farmer, Coop, Private sector, Academia, Financial institution	Ministry of Agriculture and Cooperatives Local NPC, private sector
Promotion of CCS (fair, convention, event, etc.) year round	To create awareness and benefits on CCS Develop networking	Farmer, government, private sector	APO, government, private sector
Set up the NCCD in each country	To establish and implement CCS in each country	Farmers, private sector	Government

Part of action plan recommendations by foreign delegation

The year 2014 saw further impetus to our collaboration with the Government of France. After extensive planning, a series of cold-chain management courses were held at the Cemafruid Learning Centre. Three delegations from NCCD undertook the course, each a mixed batch of government and private industry officers, each given extensive training covered in 8 modules over a five-day period. NCCD defined the curriculum at Cemafruid and the Government of France supported the programme. We anticipate that with continued support, we may be able to plan and hold more of such trainings in 2015 for our industry members and for development officers from States.



Another unique course developed through NCCD and conducted by the Danfoss Team at their Global Learning Centre has received favour by our members and officers from State Governments. This three-day residential course in Chennai, provides hands on training on functional demo units, imparting knowledge on various energy efficiency technologies used in cold-chain.

The training calendar for this series continues in 2015. Development officers not only from Horticulture departments but also from veterinary sciences and food processing departments from various States took advantage of this opportunity.



In 2014, we were very pleased to have had the opportunity to enrol interns at NCCD. Having more of India's youth involved in our activities is definitely an ongoing agenda. Involving the interns closely in our functions, was not only an energising moment for the team at NCCD, but also helped us to disseminate the importance of cold-chain and food logistics among college going youth. We plan to include more interns in 2015, with the aim to build a talent pool of young professional aspirants who have a passion to work at grassroots and the potential to become development leaders. Interns are provided exposure to various thematic functions of NCCD including aspects of research & analysis, technology assessment, mass communication and legal processes involved in the perishable supply chain.







As a key initiative involving stakeholder participation, the RVC (Reefer Vehicle Call-in-centre) was developed. This centre provides transporters of refrigerated goods access to a toll free number to call-in and inform of the bottlenecks faced on the highways. The initiative was launched under the leadership of Hon'ble Minister of Agriculture, Shri Radha Mohan Singh, who also made a surprise call, simulating the angst of a perishable food carrier.

**Hon'ble Shri Radha Mohan Singh**  
Union Minister of Agriculture



launches  
**24 x 7 x 365 Reefer Vehicle Call-in-centre (RVC)**  
**Toll free number- 1800 267 6223**



An e-governance initiative by  
National Centre for Cold-chain Development

*Salient Features*

- Toll free access for refrigerated transporters for recording of complaints about in-transit bottlenecks.
- To help in identifying en-route delays for reefer transporters.
- Complaints received to be centrally recorded for relevant action from state and central authorities.
- To help in long term corrective actions to redress in-transit delays.

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On the occasion, the Hon'ble Minister informed that the RVC will allow for the creation of a database of bottlenecks and their types across the national highways; the response generated from this exercise will help devise long term plans and policies to alleviate bottlenecks.

This project fetched media attention and State Missions were informed to advertise about the toll free number. NCCD member, Carrier Transicold supported this further by distributing information on the RVC to all transport operators in their domain.

While this toll free call-in-centre will continue to operate through 2015, it is remarkable to note that over the last three months, barely a dozen incidents were called-in to register concerns governing refrigerated transportation. This may well be, due to the estimation that very few refrigerated trucks in the country. The actionable plans from this facility relates to users providing relevant inputs and in the future, this toll-free number may progress into service through refrigeration companies, if such needs are also ascertained.

Late in 2014, NCCD commenced a couple of important studies. The first is the assessment of post-harvest loss that occurs in existing supply chain, differentiating the occurrences within and without the temperature controlled supply chain. The study is divided into two groups of crops for a total of 24 fruit and vegetable types from the northern region and is being undertaken with faculty and students of Amity University.

A second study is embarked upon, to evaluate the infrastructure gap, in direct relevance to established market demand. This study is very different from any previous analysis, which were largely focused on storage options of surplus crop production. Whereas, this assessment is aimed on using cold-chain to attend to market connectivity for perishable produce. It is NCCD's belief that interventions planned must address options to sustain delivery to markets, thereby

smoothing episodic production as well to stabilise & sustain the supply lines. Mere hoarding of perishable goods for extended periods does not open any fresh market access. This study is being conducted in partnership with NABCONS, the consulting arm of NABARD.

In 2014, the cold-chain stakeholders were also exposed to the opportunity offered through energy recovery at LNG regasification terminals. NCCD has frequently shared about the concept of reutilising the 'cold' energy that goes waste during regasification stage at LNG receiving facilities. The idea is to translate this option into a gateway for perishable produce, conjoined to a ready source of 'cold'. With interest from stakeholders, this may well lead to the world's first zero CO<sub>2</sub> emission port based cold-chain facility. The other applications and options from recovering 'stranded cold' are cryo-Desalination, power generation, air separation, cryogenic fluid engines, facility cooling, etc. We are anticipating enhanced stakeholder participation in this domain in 2015.

In-house, with the start of 2014, our team strength size expanded, this newsletter was conceived & launched and we changed location of our functional office. Our newsletters received favourable response from our readers, from seniors and students, and we wish to thank all of you who wrote in with your commendations. In 2015, we seek to translate our newsletters into various vernaculars. NCCD also started community interaction pages, on Facebook and on Google+. By the close of this very hectic year, we unfortunately also faced some staff attrition. We keep an eye out for both experienced and fresh talent willing to contribute to cold-chain development.

During the course of the year, some States requested NCCD to directly intervene on specific project based tasks, which were not feasible due to resource constraints at our end. It is therefore significant to highlight that all States were requested to nominate NOCCDs (Nodal Officers for Cold-chain Development), to liaise and expedite cold-chain initiatives undertaken. Most of the States have assigned NOCCDs and this will bring greater and much needed focus at the State level on cold-chain development. The list of NOCCDs is regularly updated on the NCCD website. Besides nodal officers for cold-chain matters, the States will also be developing technical committees to streamline collaborate on technical matters.

One of the interesting interactions with the State nominated officers, resulted in a successful cold-chain movement of Malda Mangoes in June 2014. Whereas previous attempts at long haul supply by road, from Malda to Delhi, had not met success, with NCCD inputs on post-harvest handling, the 20 day Mango mela in Delhi Haat received fresh & good quality fruit. More details can be read in the June-14 newsletter.



The above is a summarisation from among a few of the various activities and initiatives undertaken by NCCD in 2014. Those, which I particularly wished to highlight for the benefit infrequent readers, although our regular readers will have stayed abreast through the monthly editions of this newsletter.

This year has been good for NCCD, barring a few hiccups, and the support provided by our well-wishers is motivating & heartily appreciated. I personally thank all of you and sincerely hope that your support also transforms into a flood of contributions to this newsletter, something which we have not seen forthcoming. I earnestly request readers to write and share knowledge and experiences, not necessarily on cold-chain alone, but also in related aspects of management, health & nutrition, technology evolution, human-interest stories & apprehensions - ideas & suggestions too are always welcome.

With this farewell to 2014, we wish you a wonderful 2015.

-Pawanexh Kohli



## 2014 NEWS SNIPPETS

In July 2014, Finance Minister announces ₹ 5000 crore corpus for 2014-15 as Warehousing Infrastructure Fund. This translates into a low interest fund through NABARD, accessible to private entities for developing cold-chain infrastructure including storage, vehicles, pack-houses, etc.



In November 2014, another ₹ 2000 crores fund launched through NABARD for low interest funding of food processing facilities. Both funds can be availed by developers at interest rates linked to NABARD PLR – effectively 300 to 400 basis points lower than available through commercial banks.

Mission for Integrated Development for Horticulture (MIDH) launched, subsuming all previous interventions by the Ministry of Agriculture for horticulture development. MIDH declares Post-Harvest Management and Infrastructure as thrust area; rationalises the subsidy program and adds multiple cold-chain components to expand support under this centrally sponsored scheme.



India's cold-chain witnesses the first IPO (Initial public offering) in September 2014 by Snowman Logistics, a company dedicated to cold supply chain. The IPO is oversubscribed 60 times and shares quickly double from an issue price of ₹ 44-47, taking its market cap to ₹ 1600 crores. Snowman intends to use funds to expand pan-India capacity.

In October 2014, Kishore Biyani's Future Group announces plans to acquire Brattle Foods for approximately ₹ 125 crores. Brattle Foods is a start up logistic firm, established 4 years ago by three Harvard graduates. In October, another cold-chain player, Gati-Kausar raises ₹ 150 crores from a minority stake sale to Private Equity investors.

November 2014, Danfoss India, a subsidiary of global Danish corporate - launches its new manufacturing facility in Chennai. Refrigeration components and other products to be made in India for Asia-Pacific region.

NCCD launches multiple training programs for entrepreneurship development for fruit ripening chambers and for capacity building in cold-chain management and technologies.

December 2014, NCCD Technical Committee approves System Standards for cold-chain infrastructure. Earlier, in September NCCD was honored to receive the Agriculture Leadership Award.

RVC (Reefer Vehicle Call-in-centre) is launched in September 2014, a global first to allow users to record concerns faced enroute, when transporting refrigerated products.

MNRE launches scheme for installing grid connected solar power on rooftops of warehouses. Cold-chain facilities now have support for alternate energy installations through MIDH or MNRE.

May 2014, the EU (European Union) bans import of Alphonso mangoes, snake gourd bitter melon, taro plant and eggplant from India; fruit flies were detected in shipments. APEDA makes efforts to improve market linked post-harvest handling practices of Indian exporters.

In March 2014, Russian Railways Logistics launches the lengthiest rail service for cold-chain goods. Refrigerated rail containers carried cargo from Chongqing to Duisberg, the transit required crossing 6 nations over 16 days.

In October 2014, Brazil publishes their latest Dietary Guidelines for its citizens. The guidance recommends its citizens prefer fresh whole food consumption, decrying use of processed foods. This approach requires more handling of fresh produce and places greater demand on the farm-to-fork cold-chain in Brazil.

In December 2014, plans to grow lettuce on planet Mars were announced. Frozen spinach seeds will be sent in a dome like payload in 2018. Using solar power they would be thawed on arrival and temperature controls will maintain 21°C to 24°C in the dome where spinach would be grown aeroponically (without soil). Having a 45 to 60 day cycle, photos of the growing spinach would be telecast to the public. At the end of the experiment, the heater would switch to full power to exterminate all life in the payload. Imagine the cold-chain to bring this spinach fresh to Earth!

## BRAZIL'S DIETARY GUIDELINES



On 5th October 2014, the Government of Brazil published the new *Dietary Guidelines* for the Brazilian Population. In print, the document in Portuguese (152 pages, illustrated) is being distributed throughout the country. These replace the previous Guidelines issued in 2006.

The formulation of these guidelines included two national meetings involving researchers, health professionals, educators, and representatives of civil society organisations from all regions of Brazil, and also regional meetings in the 26 Brazilian States and the Federal District. In draft, the *Guidelines* were subjected to public consultation, which resulted in 3,125 responses from 436 participants, including from universities, public bodies, professional representative organisations, the private sector, and from health professionals and individual citizens.

The purpose of these guidelines is to protect and improve the health and well-being of people, families, communities and society as a whole, now and in future. Attention to the prevention of increasingly important public health problems in Brazil such as obesity, diabetes, and other chronic diet-related diseases is one of the considerations. The information released by the Brazilian authorities states that the recommendations issued in the *Guidelines* are based on evidence from different sources, including experimental, clinical and population studies, and also on natural experiments implied in the selection and adaptation of dietary patterns evolved over many generations.

The *Guidelines* distinguish between natural & minimally processed foods and food products, between products used to season & cook foods and prepare fresh meals and ready-to consume products, and also between processed and ultra-processed ready-to-consume products.

The *Guidelines* explain the following four central recommendations:

### **1. Make natural or minimally processed foods the basis of your diet**

Natural or minimally processed foods, in great variety, mainly of plant origin, are the basis for diets that are nutritious, delicious, appropriate, and supportive of socially and environmentally sustainable food systems.

### **2. Use oils, fats, salt, and sugar in small amounts for seasoning and cooking foods and to create culinary preparations**

As long as they are used in moderation in culinary preparations based on natural or minimally processed foods, oils, fats, salt, and sugar contribute toward diverse and delicious diets without rendering them nutritionally unbalanced.

### **3. Limit the use of processed foods, consuming them in small amounts as ingredients in culinary preparations or as part of meals based on natural or minimally processed foods**

The ingredients and techniques used in the manufacture of processed foods – such as vegetables in brine, fruits in syrup, cheeses and breads – unfavourably alter the nutritional composition of the foods from which they are derived.

### **4. Avoid ultra-processed products**

Because of their ingredients, ultra-processed products – such as packaged snacks, soft drinks, and instant noodles – are nutritionally unbalanced. As a result of their formulation and presentation, they tend to be consumed in excess, and displace natural or minimally processed foods. Their means of production, distribution, marketing, and consumption damage culture, social life, and the environment.

Extracts from "Dietary Guidelines for the Brazilian Population"





One Golden Rule is stated in the *Guidelines*, to remember and follow: Always prefer natural or minimally processed foods and freshly made dishes and meals to ultra-processed products.

In other words, prefer water, milk, and fruits instead of soft drinks, dairy drinks, and biscuits. Do not replace freshly prepared dishes (broth, soups, salads, sauces, rice and beans, pasta, steamed vegetables, pies) with products that do not require culinary preparation (packaged soups, instant noodles, pre-prepared frozen dishes, sandwiches, cold cuts and sausages, industrialised sauces, ready-mixes for pies), and stick to homemade desserts, avoiding industrialised ones.

The final chapter of the *Guidelines* identifies obstacles that may impede following their recommendations. These include the supply and cost of natural or minimally processed foods, lack of knowledge of cooking and other culinary skills, the time required to prepare and enjoy fresh meals, and the incessant marketing of ultra-processed food products. Citizens are asked to be critical of all forms of advertising and marketing of food products. The chapter also shows how these obstacles can be overcome by people personally and acting as citizens.

The principles adopted in shaping these *Guidelines* are, that diet is more than intake of nutrients; diets derive from socially and environmentally sustainable systems and recommendations need to be in tune with their time; diet has complex relationship with population and reliable information must broaden autonomy in food choices.

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Though these guidelines have been recently released by Brazil, the immediate effect of the stated recommendations is visible in various comments and observations posted on the web, by reviewers worldwide. Receiving a thumbs up from critics, the simplicity and sound logic is lauded by many.

The recommendations in these guidelines are not new to India, where traditional food items and snacks like *tikkis* and *samosas* generally score better than instant convenience products, even when of similar salt or sugar content. Family elders in India frequently profess the importance for whole fresh food and a culture for consuming freshly prepared foods has largely persisted. A reading of the Indian version, namely, Dietary Guidelines for Indians (DGI) developed in 2011, also articulates a similar advice to eat fresh foods.



The indication is, that there is clearly a growing global understanding that consumption and supply of fresh whole food items is core to healthy living. The uninterrupted farm-to-fork cold-chain is the only known mode that can deliver a supply of natural food while reserving freshness; specially in our modern world where farms are increasingly remote from high density population centres. The majority of fresh farm harvest requires temperature controlled delivery systems to ensure market reach, both in quantity and quality. The most critical aspect for perishable whole (fresh) food is effective market linkage (a directed flow of produce to consumption centres). Food processing will still continue to play a key role, but by stepping in where the cold-chain fails to fulfil fresh sales. Our smart cities will need to develop food distribution systems to match such future needs, having a fresh food supply chain system with associated cold-logistics.

Globally, the fresh food trade is a back bone of the cold-chain and these fresh food consumption can apply only with meaningful use of uninterrupted farm to fork logistics. The application of cold-chains not only fetches fresh food to consumers, ensuring constant demand for farm produce but in doing so also assures continued and sustainable livelihood for the farmers.

## ORANGES



### Some factoids about Oranges, संतरा, नारंगी

The word orange is rooted in the Sanskrit नारङ्ग (nāraṅga), which reached European languages through Persian (nārang) and Arabic derivatives (nāranj) into French (auran). The colour name came from this fruit and first recorded English use of orange as a colour was in 1542. A variety of the non-climacteric citrus genus, Orange primarily refers to the sweet orange *Citrus x sinensis*, but is often used to refer to other citrus species such as Bitter orange, Mandarin orange, etc. The mandarin orange is said to have originated in 4000BC in southeast Asia, spreading to India, where the sweet orange hybrid originated. The Portuguese merchants are presumed to have introduced the plant to Europe. Brazil produces a third of the world's oranges, with India ranking 4<sup>th</sup> in production after USA and China.

Oranges contain vitamin-C, fibre, potassium and choline, all which are good for the heart. Vitamin-C, found in abundance in most citrus, helps the skin fight effects of pollution and sun damage, and is said to improve overall texture of skin. The high fibre helps people with diabetes, and the helps control obesity. Rich in vitamin-A and other compounds, oranges can prevent age-related macular degeneration of vision. On the other hand, oranges should be consumed in moderation as in some cases excess may lead to diarrhoea, nausea, vomiting, heartburn, bloating or cramps, headaches, insomnia, or kidney stones.

#### Orange Respiration rate:

❖ @ 5°C: 2 - 4 ml CO<sub>2</sub>/kg·hr

❖ @ 10°C: 3 - 5 ml CO<sub>2</sub>/kg·hr

❖ @ 15°C: 6-12 ml CO<sub>2</sub>/kg·hr

❖ @ 20°C: 11-17 ml CO<sub>2</sub>/kg·hr

Oranges have comparatively low respiration rates compared to greens and other fruits; hence associated cargo heat load is lesser. Precooling to 5 °C helps bring down respiratory rates almost 10 times and helps extend its keeping life.

#### Orange Storing:

- ❖ Oranges do not improve in taste or colour once picked, so there's no need to wait for the fruit to ripen. At temperatures between 3°C to 9°C, oranges will keep for three to eight weeks. Some cultivars can be stored longer at 1°C whereas some others do better at 9°C.
- ❖ Note: avoid freezing temperatures as whole oranges do perform well on freezing because of the compound, limonin. This is a pungent substance which becomes more pronounced below zero temperatures, imparting its bitterness in the fruit.
- ❖ Oranges produce <0.1 µl/kg.hr of ethylene at 20°C. Exposure to 1-10ppm ethylene for 1-3 days at 25 °C can be used for degreening oranges. This has no effect on their deterioration rate.
- ❖ Post-harvest room-cooling is effective for optimal keeping quality for winter oranges. Use forced air cooling in warmer seasons (>20°C).
- ❖ Post-harvest life potential 1-2 months is possible and can extend to 3 months in optimal conditions. However, cold-chain is optimally used for transporting in quality and once at retail end, temperature control is not necessary - shelf life of a 3-7 days is common.
- ❖ Low oxygen (controlled atmosphere) storage or transport is not advantageous. Safe packaging, good handling and high humidity levels are more beneficial focus areas.

Oranges are commercially prevalent in juice form, as a common breakfast diet. A common trend is to prefer it freshly juiced. Orange rind is also processed to flavour teas and other dishes.







## FISH FARMS

Fish farms or aquaculture farming is catching on in a big way in India. This is because of rising health awareness and a demand for fish meat. New catch is being developed in hinterland fish ponds, the idea being that a long term source of alternate food and earnings can be developed in our farm lands.

The whole idea of modern fish farming is to enhance productivity, thereby the supply and therefore commercial returns to the farmers.

This typically pans out by stocking more fish per square metre than is feasible in nature; to get higher harvest volumes off the same piece of real estate. Very much like we employ high density planting techniques for vegetable and fruit crops. A surface area that in the natural environment would allow for about 1,000 fish could typically stock 30,000 fish in a fish pond.



But it is not that simple, nothing ever is! Fish breathe and breed in water, which means the pond needs a supply of food and oxygen. Their bodily refuse also needs to be handled or they'd die in their own waste (*much like we need to care for the air and earth we pollute through over population*). When populating a fish farm, planning for the oxygen needs of the fish takes importance. Lack of proper oxygen levels in a fish pond is one of the main reasons for poor fish quality and pond deaths.

Fish breathe in the oxygen, that is naturally diffused into the water. Oxygen dissolves in the water from two sources; primarily aquatic plants and from air (atmosphere) which is in contact with the water surface. This means that in artificial ponds, with less aquatic plant life, its oxygen retaining capacity is primarily related to the surface area available, which comes in contact with atmospheric air.

By cycling the pond water surface, we need to artificially effect greater water-air surface contact. This happens naturally when winds blow over a water surface or in flowing rivers. In modern fish farms with high fish density per acre, this needs to be done by using water pumps that gently cycle the surface water multiple times in a day, vertically cycling the pond surface, and so allowing for more oxygen to dissolve and sustain life in the pond. Such circulation also allows oxygenated water to reach fish eggs, necessary when breeding fish. This is also why wide shallow ponds are better than deep ones with the same surface area. Circulation also disallows build-up of surface floating plants which would otherwise effect to reduce surface area contact with fresh air.



Oxygen also serves the purpose to feed aerobic bacteria – very necessary – as these convert the fish waste and other detritus into safe by-products. Commercial aquaculture requires safe practises aimed at ensuring harvest is fit for long haul market linkage.

By following good production practices, the yield from the pond will be more viable and valuable at consumer end. Other important factors to consider are proper segregation of water run-offs, separation between ponds, feeding cycles, separate life-cycle ponds and waste management.

Having good quality fish harvest, helps cold-chain to effectively service the onward linkage to markets. Fresh fish (that which is not blast-frozen) is transported in the cold-chain at close to 0°C without any special process. In this case, the cold-chain retains the whole fresh quality for upto a week or more, by retarding the enzymatic chemical reactions in the tissue, as well any deterioration by external microbial load. The fish that is transported to market after undergoing deep freezing procedure (thereafter kept at < -18 °C), can last its freshness for durations up to many months, provided there is no temperature excursion in the cold-chain. The fish that is processed into other forms using additives and other ingredients, also require the deep frozen cold-chain for logistics connectivity. Using actively cooled refrigerated transport is important to safe guard health concerns of consumers.

In all cases, having a healthy harvest, which relates to fish keeping practises, enhances the holding time, flavour and value of fish meat.

## LUMINARY SPEAK IN 2014

NCCD was honoured to feature the following luminaries in 2014 editions of this newsletter.



Hon'ble Union Minister  
Shri Radha Mohan Singh

Transport is lifeline for farmers; ease the bottlenecks in food movement



Hon'ble Minister of State  
Shri Sanjeev Kumar Baliyan

Cold-chain is a key bridge between farmers and consumers



Secretary (A&C)  
Shri Ashish Bahuguna

NCCD has contributed significantly in redefining cold-chain concepts



Secretary (DAHDF)  
Shri Anup Kumar Thakur

Appreciate ardent efforts by NCCD to promote effective solutions



Secretary (MoFPI)  
Shri Siraj Hussain

NCCD should guide all endeavours for strengthening cold-chain



Additional Secretary (A&C)  
Shri Dinesh Kumar Jain

Commend NCCD for focusing on the challenges in cold-chain sector



Member Planning Comm.  
Shri Saumitra Chaudhuri

Make every effort towards inter-State flow of fresh farm produce



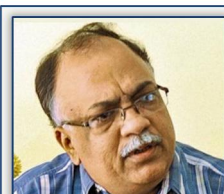
Chairman - NABARD  
Shri Harsh K. Bhanwala

NABARD looks forward to close working with NCCD on projects



MD - SFAC  
Shri Pravesh Sharma

Cold-chain offers opportunity to expand the market reach of FPOs



Joint Secretary (DAHDF)  
Shri Sanjay R. Bhoosreddy

There is constant demand for cold-chain; the market is ready



Joint Secretary (A&C)  
Shri Sanjeev Chopra

Require having strategic focus on flow of goods, than static storage

To read complete opinions and interviews, ask for the previous editions of NCCD newsletters.



**“Wishing all our Readers a Thriving and Glorious New Year”**



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### Editorial Management

Chief Executive's Office

Editor & Critique: *Pawanexh Kohli*

Mentor Director: *Sanjeev Chopra*

### Contributors of the month

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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.

