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PRESENTATION

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Sustainable Food Value Chain

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Sustainable Food Value Chain

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Sustainable Food- Agriculture Value Chain

- The application of the sustainable and inclusive food value chain approach directly links to Climate Smart Agriculture (CSA) and can help to improve performance along the value chain from input supply, to food production, to post-harvest handling and storage, processing, distribution, marketing and retail, consumption and disposal patterns of waste.

- Value is captured and determined by consumers when they buy the product, which trickles down to production and support provider levels. In developing countries middle- man-traders who also act as a wholesaler / take away major portion of income – difference between price paid to farmer and market price paid by consumers.

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The Framework

The sustainable and inclusive food value chain can be defined as:

"Improve current methods of farmers and private players / cooperatives and their successive coordinated value-adding activities that transform raw agricultural materials into food products that are sold to final consumers and disposed after use, in a manner that is profitable throughout the chain. It generates benefits of increased income to individual farmers and society and does not permanently deplete natural resources."

(adapted from FAO, 2013)

Value Chain

There are four major activities which need to be interlinked or parts of value added chain at farmer level

1. Farming Practices – Climate Smart Agriculture Practices
2. Value up gradation – post harvesting by cleaning, grading, packaging & storage and selling at prevalent market price
3. Local level processing and /or producing as per manufacture specification or market demand
4. Collection of waste and its use as fertilizer/biogas

At consumer level :

- It is to reduce excess wastage of food
- Using the waste food to be recycled as fertilizer

Small Farmers – as Key Player

One of the characteristics of the sustainable value chain is its inclusiveness. Value chain development is inclusive of all farmers with focus on the poor - small farmers.

The sustainable value chain framework includes:

- **The value chain actors**: Apart from farmers and manufacturers, these are mainly traders and APMC, government departments, Agro Industries, cooperatives etc.

- **Four core functions or stages**: production (farming), its collection, processing and distribution (wholesale, retail). The collection stage is where basically post-harvest handling and food storage takes place; and

- **Governance structure**: APMC – where the agri-product are sold through auction and the public distribution system & government collection/ purchase depos under MSP

The sustainability of the food value chain revolves around three dimensions.

1. **An economic dimension,** which focuses on activities that each stakeholder like farmer, traders, actor or the service provider provides that is commercially viable (profitable).
2. **A social dimension,** is
   - government initiative to free farmers from clutches local level traders who control farmers and buy at a low price or cartels of traders who control overall supply
   - Organizing farmers into village level groups to market and transport through community initiative or direct provide to manufacturer or retail outlets
   - Award to community to reduce waste
3. **An environmental dimension,** which refers to the sustainable use of agro waste by vermicompost at farmers level, or individual community bio-gas plants and use of urbanities food waste for energy or vermi compost and thereby reduction in green house gases.

Causes of food losses and waste

Food is mostly lost and wasted, because of the way food is:

- produced;
- handled after harvest;
- stored;
- preserved; and
- processed
- Transported

In addition, food is lost and wasted due to people's lack of access to better market as a result of:

- insufficient income;
- forced to make sale to local traders cum money lender
- lack of or inadequate infrastructure, such as roads, railways, waterways, port infrastructure.
- Lack of facility of bulk transport at local level

With the end users – consumers it is due to :

- **how food is stored;**
- **prepared and cooked; in case of vegetable and fruits – how it is sliced and**
- **Wastage due to people buying more food than they need, take more food in their plates than they can eat – leave residue in the plate and finally throw all these in garbage.**

Food production stage

Vegetable commodities and products

- Pre-harvest cultivating and harvesting practices influence the post-harvest life of products due to decisions made regarding what, when and how to plant and when to harvest (FAO, 1998).

- Pre-harvest – this includes selection crop, quality of seeds, cultivation practices, quantity of water, type of soil all affect post-harvest quality, shelf life and post-harvest losses. The selection of crop should be based on soil fertility and farmers should be guided by soil health analysis.

- Good post-harvest practices can also prolong the post-harvest life particularly of fruits and vegetables.

- Sometimes food may be lost due to premature harvesting as farmers may decide to harvest crops earlier, because they are food insecure or need to generate income.

- It may also happen that harvesting is undertaken too late or that losses occur during harvesting due to damage and/or spillage.

Good agricultural practices and rules of harvesting

- Good agricultural practices involve adequate soil management, selection of crop which soil fertility can support, use of certified seeds, management of weeds, crop protection and maintenance of crop hygiene.
- The latter involves the collection and removal of decaying plants, fruits and weed that can lead to infections in vegetables and fruits, which may result in post-harvest losses and waste.

The basic rules of harvesting with the aim to get the crops in the best possible condition to the market are:

- harvest during the lowest temperature of the day: early morning or late afternoon;
- do not harvest produce when it is raining or when there is dew, when the produce is wet it is more likely to decay as well as it is more vulnerable to damage; and
- make sure to protect the harvested produce from sunlight if it cannot be immediately transported.

Livestock production and dairy products

- Losses and waste in the livestock and dairy production sector may occur due to various reasons. During livestock production, losses and waste may occur due to poor feeding or diseases, e.g. swine fevers, tick-borne - which may lead to animal death.

- During dairy production, losses and waste may occur due to poor milking techniques, illnesses, infection or diseases, which have a negative impact on milk production (FAO, 2011b; FAO, 2011d).

- It is important have closed container for milk when it is taken sale to centre – open vessel spills over and makes losses.

- Good livestock production and dairy farming practices include proper management and housing, nutrition (adequate and nutritious) of feed and water, milking hygiene and animal health through vaccinations and drugs

Post-harvest handling and food storage stage and food processing stage

Vegetable commodities, livestock and dairy products and fish commodities

Food losses and waste of crop, livestock and fish products at the post-harvest handling & storage stages and at the processing stage may occur due to:

- spoilage, as a result of lack of or inadequate cooling facilities and lack of adequate infrastructure for transportation;
- spillage, contamination, and degradation are a result of poor and inadequate handling during transport and storage. They are also due to processing, such as during washing, peeling, slicing and boiling of fruits, vegetables.
- inadequate preservation of the products;
- packaging, as a result of damaging due to use of poor quality containers.

(FAO, 1989; Parfitt *et al., 2010; FAO, 2010b; FAO, 2011d)*

Good post-harvest handling and storage practices

A variety of practices and technologies are available for reducing post-harvest losses related to post-harvest handling and storage. Good handling practices in order to avoid mechanical damages include ensuring that:

- Bags are not too full if they need to be stacked on top of each other;
- Bags are not dropped or thrown;
- produce is not directly put on the soil, in particular soil with a high moisture content;
- containers and field containers are clean;
- the produce is not brought into contact with oil, gasoline or chemicals that should not be applied;
- produce is largely kept in the shade to reduce the temperature of fresh produce;
- produce is field packaged, which reduces costs by improving the speed of post-harvest handling and reduces losses and waste

(FAO, 1989)

Other possible interventions to reduce food losses include:

- immediate transportation after harvesting of crops, and landing in the case of fish;
- using improved preservation and processing techniques including threshing and solar drying of produce;
- using low cost and efficient storage and cooling structures; and
- using practices, i.e. pasteurization and milk processing into cheese and yoghurt, to maintain product quality and extend post-harvest life.

Market access constraints: physical, structural, information and organization

Constraint	Disadvantaged areas
Physical	Poor roads, high transport costs, perishable goods, low value/weight produce.
Structural	Asymmetry of market relations: cartels of traders, agro-processors or marketing boards whose market power allows excess profit shares.
Skills, information and organization	Lack of understanding of how markets operate, lack of information, lack of relevant skills.

Case Studies

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Creating the New McCain

McCain is an International Food Multinational Company. It selected Gujarat for its potato operations about 14 years back.

1998~2012 Breakthroughs

- Zeroing in on Gujarat – Prime Growing Area
- Zeroing in on Varieties, suitable for Gujarat farmer & French Fry.
- Transforming storage practices – high temp CIPC stores
- Transforming irrigation practices – drip & sprinkler
- Introduced contract farming
- Breakthrough High Altitude Seed Program
- Breakthrough Growing Practices introduced

1998~2013 Breakthroughs

- Flat Bed planting (Size & Yield)
- Cut-seed planting (Size)
- System Based Fertilizer application
- Introduction of long tuber variety
- Initiated Pvt. Breeding program for process grade potato
- The first bulk and box storage of Gujarat
- Extended storage life of Process grade Potato

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Harvesting and Storage

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First Bulk Potato Storage of Gujarat

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Our focus has been on Contract farming. This is a win : win situation for the farmers and McCain.

To The Contract Growers

- Exposure to world class mechanized agro technology
- Obtains an assured up front price and market outlet for this produce.
- Crop monitoring on a regular basis. Technical advice, free of cost at his doorstep.
- Supplies of healthy disease free seeds
- Remunerative returns
- Agri. technology spreads to other crops and to farmers who are not under “Buyback farming”.

To McCain.

- Uninterrupted and regular flow of raw material.
- Clarity on prices in advance
- Minimizing the unproductive middlemen.
- Builds long term commitment improvement in quality.
- Dedicated supplier base.
- Traceability of product.

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What does it mean to fr?

- From 100% flood irrigated potatoes to 100% drip and sprinkler irrigated potatoes and from 100% hill planting to 100% bed planting.
- Yield gains up to 40%, increased growers' profitability.
- Water saving up to 40% (4480000 Cubic meter-McCain growers) for 3500 ac/1400 ha. And we can imagine water saving for 800000 ac/320000 ha
- From 25% QSR grade to 65-90% QSR grade
- Unlocked the hidden potential of processing French Fries in India.

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JAOL Current Farmers Support Programmes
Jayant Agro Ltd., Banaskantha, Gujarat

Objective

To make farmer aware about scientific farming of castor seeds and value added Agri-produce to realize

- Maximum return from farming and
- Achieve sustainable livelihood.

The Chairman JAOL's vision to make farmers – stakeholders in real sense and support them to achieve better quality of life.

Capacity building programme for scientific cultivation of castor including selection of quality seeds, balance use of fertilizers based on Soil Health Analysis

Guidance about harvesting

- Time
- Method

Grading
Cleaning
Sorting
} of castor seeds

To realize maximum value of castor seeds .JAOL has interacted with over 500 farmers .

Value Added Agriculture

- JAOL is purchasing castor seeds at farmers' door step
- It provides them price of the day which is prevalent in the market
- It provides bags for packaging and cleaning equipment
- It assists farmers to form group – village association so that a truck load of seeds can be sent
- Farmers have got price of castor seeds which prevalent in Deesa Market in their own village

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Moderately literate village woman manages a scientific cattle farm of 225 HF cows

Among all the agricultural activities, cattle farming provides handsome returns on investment of about 35% with a payback period of only 3 years i.e. one can recover the investments in assets from the earnings of the asset, keeping the asset intact.

A moderately educated women Mrs. Kantaben Ramjibhai Chaudhari of Bapupura, Ta-Mansa, Dist- Gandhinagar digested this business principle through her smart self understanding. She learnt some tricky lessions of cattle farming, which is a community based profession of Chaudhari community in Gandhinagar, Mehsana, Sabarkantha and Banaskantha in Gujarat. They are the centres of white revolution parallel to Anand and Kheda districts.

She has constructed a low-cost cattle shed on scientific basis for 225 HF cows. The roof tops, roof-heights, open walls with free flow of air, slope of RCC flour towards drain and sufficient clean water supply are provided on scientific standards.

She procures about 25 liters of milk per day per cow during the lactation period which is nearing to the highest standard of milk production. Total milk production increased from Rs. 2.45 lacs liters in 2011-12 to Rs. 2.92 lacs in 2012-13. She earns the returns of about 25% to 30% on the investments.

She encourages other men and women to go for such cattle farming business the way she has followed.

She earned the Award of 'Sagar Samrat' awarded by Mehsana District Cooperative Milk Union Federation for her remarkable success.

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A Tribal woman entrepreneur combats against the pitiable situation of malnutrition through value addition of agro product NAGALI

The problem of malnutrition in general and that of rural poor children in particular has become an eye-opener for the politicians and local leaders. One tribal woman of Vaghai, Ta-Ahva, Dist- Dang, Mrs. Bhartiben Chhitubhai Patel brought a remarkable solution to this problem through the development of value – adding agro product – Nagali. She is only 12th standard pass, but she possesses creative ideas and their practical applications required for an entrepreneurial skill development.

She identified an agro product “Nagali” and found that this product possesses rich nutritive contents. Through its processing, she added value and made it available to rural population at an affordable price.

The nutritive contents of Nagli and its uses:

- High carbohydrates and low fat : This is most suitable for people who intend weight losing and fattiness.
- It is rich in calcium : It strengthens the bones. Thus, it is useful to children and aged people.
- It has little cholesterol contents: It provides nutrition and prevents the blood pressure and heart attacks.
- It contains less sugar contents: It is useful to the diabetic patients
- It has rich iron contents: It is very useful to patients with leukemia and poor properties if red cells in blood.
- It improves quality and quantity of milk of breast – feeding mothers. Thus, it prevents the malnutrition of poor children of rural population.
- The green –grass possesses high nutritive contents. It can be used as a cheap and valuable cattle feed.

Nagali Value Addition:

Instead of a raw-use of Nangali, it can be used as a value adding inputs in the agro based food processing industries as under:

- It adds into the existing food stock with a diversity
- It can be used in the making of the following food – items
  - Biscuit
  - Nan-khatai
  - Sukhadi
  - Ladu
  - Chakari
  - Papad
  - Dhosa

Thus, a moderately educated tribal rural woman provides an encouragement for the woman entrepreneurship in general and for the women of rural areas in particulars. She opines that the creative thinking on the available opportunities can create miracles for smoothening the agonies of the human sufferings.

Moringa Farming – Drumstick Tree

Moringa farming - Commonly known as Drumstick tree

Place – Kunjrao - Anand

Name of Farmer - Shri Dipen Shah (Mo. – 972772977)

Value of drumstick as a health food contains nutrients, antioxidants, antiinflammatory, amine acid etc.

Needs little water, marginal fertilizer, high yield of pods

Soil can be grown rainfed, semi-arid, arid areas – a drought resistant tree

Photo two photos from presentation

A part from Drumstick, leaves used as salad. Drumstick can be converted into powder. There is Gum secretion on the tree which is used as a Ayurvedic medicine.

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Moringa can be planted by seed or by stick

Seed planted moringa's fruit are plucked easily

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Cleaning and wax coating of moringa pods

Drying of moringa leaves

Name : Zinzala Ramesh D.
Taluko : Kamrej
District : Surat

Mr. Zinzala Ramesh D. earned the B. Sc (Agri) degree from Gujarat Agriculture University, Navsari in 2000 with first class. He initially started his carrer in a private company as field officer supplying agro inputs. After 8 years of job he then decided to start his own business unit. He started his business unit as a partnership firm in March, 2010.

Considering the importance and growing use of organic manure, his company decided to manufacture and supply the organic manure. They have developed a standard quality of organic manure packed in standardized bags with a brand name of “Vardan”. They are not only involved in marketing the organic manure as a substitute to chemical fertilizers but also arrange demonstration of it’s use and benefits before the farmers groups and the farmers club. Largely farmers have rated their products well and given positive feedbacks. Vardan brand today is well appreciated in 7 districts of South Gujarat covering more than 5,000 farmers.

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Successful farmer of cluster bean (Guar Gum) cultivation on Kheda District of Gujarat, Income Rs. 9.00 lacs

Name of Innovative farmer	:	Parsotambhai V.Patel (Mo. 9426386550)
Village & Taluka	:	Gothaj, Mehmadavad
Dist.	:	Kheda
Area	:	10.0 ha
Total income	:	9.0 lakh (Rs.0.9 lakh/ha)
Rate	:	Rs. 15000/ Qt.

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Successful farmer for Horticulture crop:

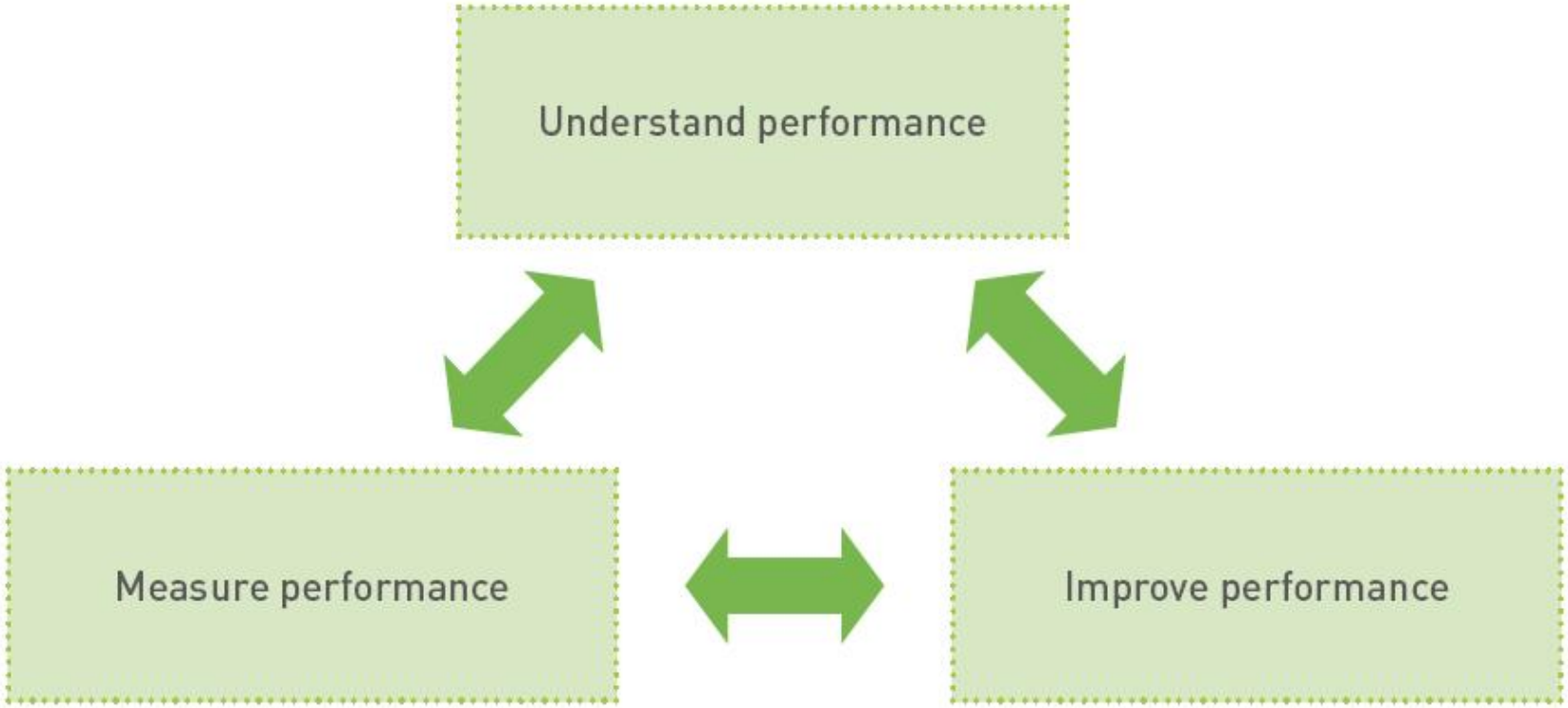
High Tech Dutch Rose Farming in Gujarat

Name of Innovative Farmer	:	Narendrabhai N.Patel
Village & Taluka	:	Kosindra, Daskroi
Dist.	:	Ahmedabad
Total cost	:	Rs. 0.81 crore/1st year
Total production	:	20 lakh flowers/year
Selling rate	:	(Rs. 2.50 /flower)
Income	:	50.00 lakh/year
Total income/4years	:	Rs. 2.00 crores
Net income/4 years	:	Rs. 2.00-0.81=1.19 crores
Net income/year	:	Rs. 29.75 lakh

Step-by-step approach for chain actors to improve their performance along the sustainable and inclusive food value chain

The three steps are visually outlined below in Figure

Step-by-step approach for how to improve performance along the sustainable and inclusive food value chain



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Step-by-Step approach

Step 1: Understand performance – Identify gaps and bridge them

- Farmers pre-harvest and post harvest – practices
- Farmers cooperative, self help groups – how they operate and can be activised
- Producers – how they process – what kind of product they need
- APMC – how auctions are conducted
- Transport – mechanism – quality of trucks, tempos
- Information about what consumer wants – like big potatoes, bhindi
- Market price information – to farmers & consumers
- Difference between the prices at village level and price paid by consumers and identify reasons thereof and identify who fixes market price
- Cold-storage – godown – domestic storage practices
- Bank – financial support – against pledged goods

Step 2: Improve performance

- Develop realistic strategy in consultation of all stakeholders – being together under one umbrella for upgrading activities and multilateral partnerships.

- Develop a workable implementation plan for the upgrading activities and multilateral partnerships

Step 3: Measure performance

Measure the impact once the plan is introduce in terms of economic, social and environmental intended outcomes:

- Measure the impact of the development strategy in terms of its economic, social, and environmental outcomes in relation to the vision developed under step 2.

In this way, the impact assessment then contributes to understanding the performance of the chain in a continuous development cycle.

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Conclusions

We have discussed an important areas in developing food security – which most often neither given importance or measured in terms of impact. In reality it can add to farmers income by 5 % to 25% and it can add to food availability by 5% to 20% which very significant contributions.

The sustainable and inclusive food value chain approach focuses on three sustainability dimensions – economic, social and environmental— which are directly linked to three pillars of CSA. This approach can contribute to CSA by helping to identify interventions at every stage of the food value chain to enhance the performance of the chain.

Through understanding, improving and measuring performance, waste streams that occur along the food value chain can be analysed. This includes not only reducing food losses and waste, but also looking at reusing and recycling food stuffs that still have an economic value as they can serve other uses, such as reusing waste for human consumption or animal feed, as compost or to generate energy. This not only provides economic benefits, but also social (i.e. employment generation) and environmental benefits.

This approach not only include farmers and agri. administration – but needs crucial support from Rural Development and Food & Civil Supplies Department and Trade Associates.

Other areas where public intervention may be needed include awareness raising, agricultural research and development as well as capacity building support in order to help smallholders adopt more sustainable practices that are climate smart and help consumers to reduce, reuse or recycle their waste.

Furthermore, we have outlined a step-by-step approach of how chain actors can analyze their interventions along the sustainable and inclusive food value chain with the aim to improve their performance in all three sustainability dimensions—economic, social and environmental.

About NCCSD

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Background

NCCSD is the outcome of the deliberations that took place during an International Conference on “Global Warming, Agriculture, Sustainable Development & Public Leadership” which was organized at the Gujarat Vidyapith – Ahmedabad in March 2010 by the International School for Public Leadership (ISPL) along with other organizations. In a Round Table Meet at New Delhi in April, 2010, presided by Prof. M S Swaminathan and Justice B P Singh, it was felt that a special organization needs to be created to follow up ideas and it was decided to setup "National Council for Climate Change, Sustainable Development and Public Leadership” (NCCSD). The NCCSD was registered under Bombay Charitable Trust Act 1950 Rule-29-No. E/19344/Ahmedabad as Public Trust on 17th September 2010.

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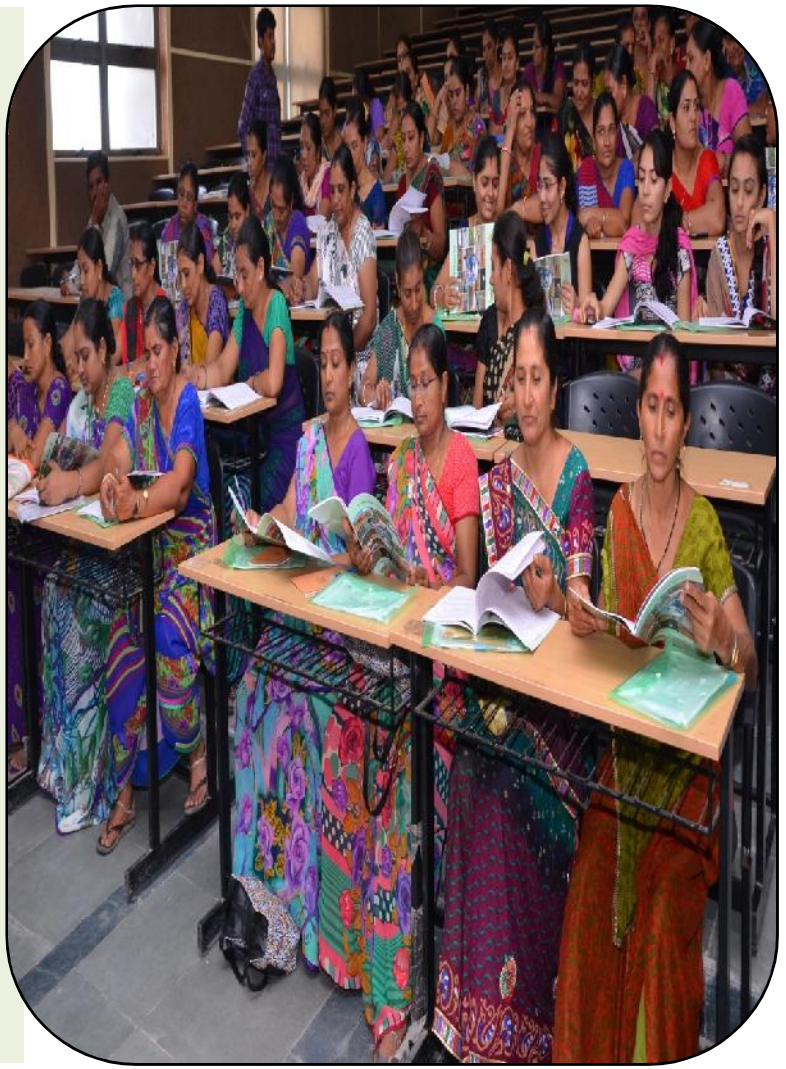
OBJECTIVES

- Facilitate and carry out action for climate change mitigation and adaptation; interlinking agriculture, sustainable development and rural development
- Foster and leverage public leadership to achieve the goals of such an integrated approach &
- Strengthen the knowledge economy.
- The Council may establish State level units, associate with other likeminded organizations at International and National level. Initiate locally relevant action integrating local knowledge and leadership and technology to sustain action.



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MISSION

- Act as premier organization at the national level
- Disseminate information that will enable action at ground level
- Suggest policy framework to tackle impacts of global warming and climate change.
- Promote Climate Smart Agriculture through integrated approach.
- Promote appropriate and efficient use of “Knowledge Economy” to promote conservation and sustainable use of natural resources

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WHAT WE DO?

- NCCSD is organizing Inter-action Meet and Think-Tank Meet for policy formulation and sensitization on issues related to farmers with their participation.
- NCCSD is organizing Interactive and Capacity Building to Farmers with focus on local level leaders, young farmers and women farmers.
- It is train to young faculty members and students on Leadership and Climate Smart Agriculture.
- NCCSD is conducting action research work for developing communication modules including guidebook, posters and documentary films for farmers.
- NCCSD is sensitizing State and Central Government on important policy issues which concern farmers. It is also taking up similar issues with UNFCCC and UN at international level
- NCCSD is publishing books on important issues related to farmers and agriculture.


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ON


શ્રી ભૂપેન્દ્રસિંહ ચુડાસમા
આણંદ કૃષિ યુનિવર્સીટી, આણંદ
"આબોહવા બદલાવ અંગે
AAU


Group
Understanding and
Developing Synergistic
Policy
UN CLIMATE CHANGE CONFERENCE
LIMA COP20 CMP10


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National Council for Climate Change
Soil Health Management
Natural Resource Manage

Thank You

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