

# Vulnerability Assessments in Industries



CARRIED OUT

BY



GUJARAT CLEANER PRODUCTION CENTRE

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# GUJARAT CLEANER PRODUCTION CENTRE:



- Gujarat Cleaner Production Centre (GCPC) was established in August 1998 by Ministry of Industries and Mines, Govt. of Gujarat, with the technical support of UNIDO and financial support of GIDC.
- GCPC is one of the 4 regional Cleaner Production Centres of India.

## **Objectives:**

- To create awareness on cleaner production.
- To provide cost effective training on CP to industrial personnel for production assessment and implementation of CP tools.
- To organize and conduct cleaner production Demonstration projects in different clusters of Industries.
- To develop expertise and thus provide consultancy advisory services on cleaner production.
- To create databank and information centre on CP.
- To work as nodal agency for transfer of Cleaner Technology.

# Naroda Industrial Estate



- Naroda is approximately three miles from Ahmedabad town (8 km), near the intersection of **National Highway No. 8 and National Highway 59. Naroda Industrial Estate was Established in 1964 .**
- There are around **Thirty-One types of Classified Industries**, i.e. Dyes, Dye Intermediates, Chemicals, Pharmaceuticals, Engineering, Foundry, Agrochemicals, Textiles, Electronics etc.
- The Estate measures to 337 Hectares and houses 689 plots and 426 sheds.
- There are housing colonies also, to benefits the workers and owners of Industries.
- The Estate is self sufficient with all the infrastructural facilities i.e. Water Supply, Roads, Street Lights, Post Office, Hospitals, Banks, Canteens and a Police station.

# Present Scenario of Climate Change :



- **Increase in temperature:**

Increase in temperature globally: temperature of industries located in Gujarat has always been high in summer compared to average temperature.

- **Change in monsoon pattern:**

Initially monsoon started from south of India to west region of India. But now indications exist that it may change its wandering pattern (hence will have impact on Gujarat).



- **Increase in rainfall during Monsoon:**

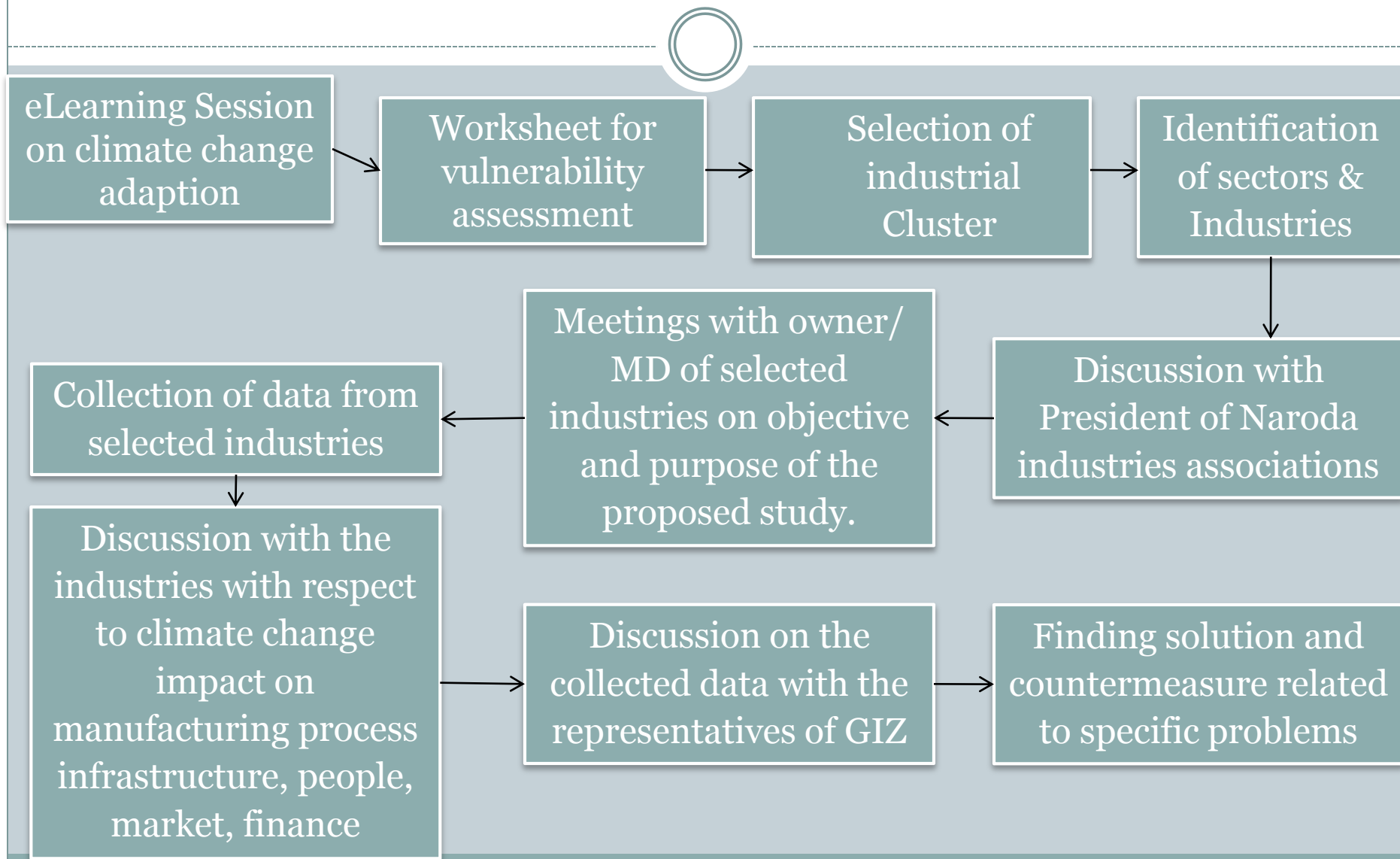
Though duration of monsoon is shortened, heavy and more than average rainfall is observed.

- **Late start and shift of Monsoon:**

Shifted from 25 June to 15 July

*The state is earthquake prone, in addition to its long coastal industrial belt (Dahej – PCPIR) makes the state even more vulnerable to CC, resulting in adverse impacts on supply chain for the industries.*

# Methodology:



# Sector Assessment Grid:



MSME Sector	Sensitivity					Environmental Impacts		Total Combined
	Water Use	Energy Use	Value Chains	Strategy	Total	I	Total (=I*2)	
<b>CHEMICAL, DYES &amp; INTERMEDIATES</b>	8	8	10	10	36	10	20	56
<b>ENGINEERING INDUSTRY</b>	1	10	1	1	13	1	2	15
<b>TEXTILE</b>	6	6	10	10	32	4	8	40
<b>CERAMIC</b>	1	10	10	1	22	1	2	24
<b>VEGETABLE OIL</b>	1	6	10	10	29	1	2	31

# Assessment Grid:



## Assessment Water/Energy

1

Average: moderate for some enterprises, rising costs/shortages of some effect on overall output in the long-run

2

Slightly above average: moderate for most enterprises, rising costs/shortages have an effect on overall output within 5 years

Rising costs: 7% / year 4

Somewhat high: high impacts for some, moderate for most; rising costs/shortages of considerable effect on overall output within 3 years

Shortages:3-5 times/year  
for 1 day 6

High: high impacts for most enterprises, rising costs/shortages of high effect on overall output within 3 years

8

Very high: high impacts for all enterprises, rising costs/shortages severely endanger most enterprises within 3 years or sooner

10

Severe: high impacts, survival of all enterprises at stake in case of rising costs/shortages within 3 years or sooner

## Assessment Value Chains:

1

Inputs from not more than 2 suppliers, no agricultural produce necessary; production of end product; simple logistics

2

Inputs from not more than 4 suppliers, no agricultural produce necessary; production of intermediate product but simple logistics

4

Inputs from not more than 7 suppliers, no agricultural produce necessary OR production of intermediate product and somewhat complex logistics

6

Inputs from more than 7 suppliers; agricultural produce necessary but simple logistics

8

Inputs from more than 7 suppliers; production of intermediate product OR highly complex logistics

10

Inputs from more than 7 suppliers; OR use of agricultural produce; OR highly complex logistics



### Assessment Strategy:

Impacts: Rising temperatures, effects on production facilities (physical assets) and business operation

- 1 Climate change impacts of little effect on production facilities and operation processes; no effects on characteristics and demand of products
- 2 Climate change impacts of some effect on production facilities and operation processes; little effect on characteristics and demand of products
- 4 Climate change impacts of direct effect on production facilities and operation processes; some effect on characteristics and demand of products
- 6 Climate change impacts of direct effect on production facilities and operation processes; characteristics of products need to be reassessed; demand of products likely to change in the long-term
- 8 Climate change impacts of high effect on production facilities and operation processes; demand of products likely to change within 5 years
- 10 Climate change impacts necessitate change of production facilities and operation processes; demand for products likely to change in next 3 years

### Environmental Impacts

- 1 No use of toxic/environmentally harmful substances; no impacts to be expected in case of extreme weather event
- 4 Use of some environmentally harmful substances; some environmental impacts to be expected in case of extreme weather event
- 6 Use of some toxic and environmentally harmful substances; some environmental/health impacts to be expected in case of extreme weather event
- 10 Intense use of toxic and environmentally harmful substances; severe environmental/health impacts to be expected in case of extreme weather event



# Case Studies....

# M/s. Prem Industries (Textile Sector)



- M/s. Prem Industries is a small scale textile industry located at Naroda engaged in the manufacturing of suiting materials.
- Company has major source of raw material from neighbor industry and locally. Sometimes they are also importing raw material from China and Korea.
- Company relies on Gujarat Electricity Board for power supply.
- Company dependent on GIDC water supply scheme for water source.

## Specific problems related to climate change:



- In 1997, company faced heavy flood in Naroda area because of overflow of Dharoi dam, so it affected on their raw material and product transportation.
- Due to heavy rainfall company have to stop production as company has the permission of discharging limited amount of water in any season.
- Extreme weather will give trouble in transportation of raw material and other logistics thing necessary for production.



- Highly energy consuming process affected with supply of energy outage and in that case it might also stop production.
- Workers efficiency is dependent on the working temperature, so there is possibility in decrease of productivity because of rise in temperature.
- Climate change impacts (like heavy rain fall etc) on cotton crop affect availability/price – to hedge against price rise / shortage in supply of cotton, cotton stocks are built, putting a strain on company's cash flow.

# Assessment Result for three impacts



<b>Impact on / Risk Potential</b>	<b>Rise in Temperature</b>	<b>Heavy Rainfall</b>	<b>Flood</b>
<b>Building / Location</b>	Low (Indirect)	Medium (Direct)	Medium (Direct)
<b>Processes</b>	Low (Direct)	Low (Indirect)	Medium (Indirect)
<b>Logistic and Stock</b>	Low (Indirect)	Medium (Direct)	<b>High (Direct)</b>
<b>People</b>	Medium (Direct)	Medium (Direct)	<b>High (Direct)</b>
<b>Market</b>	Low (Indirect)	Medium (Indirect)	Medium (Indirect)
<b>Finance</b>	Low(Indirect)	Medium (Indirect)	Medium (Indirect)

## M/s. J. B. Industries (Dyes & Dye Intermediate Sector)



- M/s. J. B. Industries is a small scale dyes and dye intermediate industry, engaged in manufacturing of DASDA, PNTOSA, DNSDA, OBA having installed capacity of 250, 700, 720, 200 MT/ Annum respectively.
- Company having power connection from Gujarat Electricity Board.
- Company dependent on GIDC water supply scheme for water source.
- Company located at high rise area so company premises are less affected by climate change effect e.g. Temperature rise or heavy rain.
- Company manufacturing process is sensitive to water and energy supply and shortage of either can effect on production which is clear from the fact that water and energy rates have doubled in last 10 years.

# Specific Problems related to Climate Change:



- During September 2011, company faced shortage of CNG, because of heavy rain at Adani plant, Hazira.
- In 1997, company faced heavy flood in Naroda area because of overflow of Dharoi dam, so it affected their raw material and product transportation.
- Delivery/ Production schedule affected by heavy rain situation.
- **Changing climate can effect on production:**
  - ✓ Impact on Purity of the product: During high temperatures purity is high while in winter purity is low.
  - ✓ But: Chilling plant efficiency lower in case of higher temperature



- ✓ Workers efficiency is lower in high temperatures.
- ✓ Maintenance problem increases like oiling, greasing during higher temperature.
- ✓ Air Conditioning system requires more time to get desired temperature in higher temp condition, so it lowers the efficiency.
- ✓ Increase in temperature can also negatively affect survival of bacteria used in secondary treatment of Effluent Treatment Plant, lowering its efficiency.

# Assessment Result:



<b>Impact on / Risk Potential</b>	<b>Rise in Temperature</b>	<b>Heavy Rainfall</b>	<b>Flood</b>
<b>Building / Location</b>	Low (Indirect)	Medium (Direct)	Medium (Direct)
<b>Processes</b>	<b>High (Direct)</b>	Low (Indirect)	High (Indirect)
<b>Logistic and Stock</b>	Medium (Indirect)	Medium (Direct)	<b>High (Direct)</b>
<b>People</b>	<b>High (Direct)</b>	Medium (Direct)	<b>High (Direct)</b>
<b>Market</b>	Low (Indirect)	Medium (Indirect)	Medium (Indirect)
<b>Finance</b>	Low(Indirect)	Medium (Indirect)	Medium (Indirect)

# M/s. Shree Western G & C Industries



- The Company was established in 1967 with 50 employees as a manufacturer of groundnut edible oil and as a supplier of groundnut HPS to exporters.
- Now it is dealing in pungent and non-pungent mustard oil and sesame oil (Til) both by cold process (kachi ghani) and hot process (expllers), castor oil and coconut oil are the other products of company. All its products are marketed in brand name "APPU" all over Gujarat & Mumbai. All the products are approved by Govt. AGMARK.

Name of the products:

- **Mustard Oil**
- **Groundnut Oil**
- **Sesame Oil**
- **Caster Oil**
- **Coconut Oil**

## Specific problems related to climate change:



- Company's production process is not very sensitive to rise in temperature but it affects workers efficiency leading to decrease in productivity.
- **Heavy rain fall has impact on transportation of raw material and product.**
- Monsoon pattern, heavy and less rain directly effects local harvests – and indirectly, the manufacturing of oil and cake from agriculture seeds (in such case less oil content seeds make lower quality of oil)
- **Company is very sensitive to impacts on price of seeds.**

# Assessment Result:



<b>Impact on / Risk Potential</b>	<b>Rise in Temperature</b>	<b>Heavy Rainfall</b>	<b>Flood</b>
<b>Building / Location</b>	Low (Indirect)	low (Direct)	Medium (Direct)
<b>Processes</b>	low (Direct)	Low (Indirect)	low (Indirect)
<b>Logistic and Stock</b>	Low(Indirect)	Medium (Direct)	High (Direct)
<b>People</b>	<b>High (Direct)</b>	Medium (Direct)	<b>High (Direct)</b>
<b>Market</b>	<b>High (Indirect)</b>	<b>High (Indirect)</b>	<b>High (Indirect)</b>
<b>Finance</b>	Low(Indirect)	Medium (Indirect)	Medium (Indirect)

# M/s. Shivshakti Ceramic Industries



- M/S Shiv Shakti Ceramics Industries is a small scale industry located at Naroda Industrial Estate in Ahmedabad.
- Company manufacturing Ceramic Crockery product like Cup and Saucers with installed capacity of 975 ton/ annum and average production of 900 ton/ annum with 312 working day/ year.
- Company's total water requirement is 1.5 Kl/ day provided from GIDC water connection which is continuous supply.
- Company have CNG connection from Adani, Hazira.

## Specific problems related to climate change:



- During September company had shortage of CNG, because of heavy rain at Adani plant, Hazira.
- Raw material is affected by moisture content in atmosphere.
- The ceramics industry is a highly energy intensive because firing process require 1000 °C to 1200 °C temperature in each batch.
- Moisture content in atmosphere reduce drying efficiency hence required more energy input.

# Assessment Result:



<b>Impact on / Risk Potential</b>	<b>Rise in Temperature</b>	<b>Heavy Rainfall</b>	<b>Flood</b>
<b>Building / Location</b>	Low (Indirect)	low (Direct)	Medium (Direct)
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<b>Market</b>	Low (Indirect)	High (Indirect)	Medium (Indirect)
<b>Finance</b>	Low(Indirect)	Medium (Indirect)	Medium (Indirect)

# M/s. Milestone Tubes Pvt Ltd.(Engineering Sector)



- Milestone Group is incorporated in 1983 with Iron Powder manufacturing facility.
- Milestone Tubes Pvt Ltd introduce as manufacturer of Stainless Steel Tube & SS/MS Hollow Sections, MS Hollow Sections since 1991 and catering the major industries in Western India. Company produce maximum Hollow Section of 215mm x 215mm x 6.30mm.
- The company does not rest on producing tubes only but has established capacity to produce a variety of tubular forms as well as external finishes to meet special requirements of customers.
- Company have total automation system for processing of raw materials and is depended on raw material suppliers for continuous working.
- Metal processing industry not much sensitive for water supply. Company have own bore well for water requirement.

## Conclusions:

- Although Climate Change is highly relevant and widely being discussed in media and society, adapting to it is **far away from enterprises priorities**, work routine and mindset(especially MSME).
- **But simple adaptation measures are already taken**, as industries have to adapt naturally, intuitively to changing environments.
- **CCA requires very individual approaches** as industries are differently exposed to climate change impacts, sector wise but also regionally and locally.
- Also, **adaptive capacity to deal with CC vary widely from company to company.**
- **Awareness, Research and Development** and Demonstration is required to prepare industries for the challenges to cope with Climate Change in the long run.



CCA will be in a first phase **more reactive** on changing environments caused by extreme weather events:

- **Production patterns might change** due to extreme weather events
- **Logistic chains** will require different approaches with respect to transport and storage.
- **Local topography will play a major role for companies** to be either relocated or better prepared to deal with CC.
- **Norms, technical standards,** requirements for construction of industry buildings and sites will change to cope with CC.
- **Rain water harvesting technique** which is mandatory for industries in some states requires a different capacity approach.

## Outlook:



In the short and mid-term the following areas should be incorporated into planning adaptation measures:

- ❑ Development of an integrated waste management system starting from collection to treatment and usage of waste.
- ❑ Development of a proper drainage system which can deal with sudden surge of water due to extreme weather events.
- ❑ Development of planning tools to incorporate CCA into future establishments and sites.



Thanks.....



For Any Query.....

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