

# **A Review of Utthan's Mariculture Programme in Bhavnagar- Mahua-Rajula Region**



**Conducted by INREM Foundation, Anand, Gujarat**

**28 August 2013**



## A Quick Review

### Utthan's Mariculture Program in Bhavnagar-Mahuva-Rajula Region

*This Quick Review was under taken by INREM Foundation on the request of Utthan, Ahmadabad. It is needless to say that this Quick Review has an independent view of INREM Foundation. We tried putting forward here the experience we got from our visit to the project area. For the purpose of reviewing we met coordinator, office staffs, technical persons, team leaders engaged in Mariculture program of Utthan at Bhavnagar and Mahuva. We also met some stakeholders of MSVS (Matsyagandha Sarvangi Vikas Sanstha) which is a registered society and a public trust. We travelled in some villages of the project area of Bhavnagar-Mahuva-Rajula region spread in the coastal area of Bhavnagar and Amreli districts from 16 to 19 August 2013. Based on this travel we have presented here a few case studies and our observations. We met the Executive Director and Engineer of CSPC when they came to Mahuva during our visit.*

#### Persons we met during our visit from 16 to 19 August 2013 at different places

SI No.	Name	Designation	Organization
	<b>From Utthan</b>		
1	Pravinbhai Bhikadiya	Programme Coordinator	PLC – Watsan, Bhavnagar
2	Bharatbhai Jambucha	In-Charge	Mariculture, Utthan, Bhavnagar
3	Yuvaraj Gohil	Team Leader	Mariculture, Utthan, Bhavnagar
4	Hirabhai Dihora	Team Leader	Mariculture, Utthan, Bhavnagar
5	Riteshbhai Joshi	Team Leader	Mariculture, PLC, Mahuva
6	Rambhai Oganiya	Technical Person	Mariculture, Utthan, Mahuva
7	Ms Chaitali Jani	Technical Person	Mariculture, Utthan, Mahuva
8	Vipulbhai Joshi	Accountant	Mariculture, Utthan, Mahuva
	<b>From CSPC</b>		
1	Divyangbhai Waghela	Executive Director	CSPC, Ahmedabad
2	Bharatbhai Jani	Engineer	CSPC, Ahmedabad
3	Dharmeshbhai	Consultant Engineer	CSPC, Bhavnagar
SI No.	From amongst Stakeholders	Village	Taluka, District
	<b>Rajula, Amreli</b>		
1	Jesarbhai Bachubhai Chauhan	Chanch Bavliya	Rajula, Amreli
2	Jilubhai Virabhai Chauhan	Chanch Bavliya	Rajula, Amreli
	<b>Mahuva</b>		
3	Rupaiben Veljibhai Solanki	Agtriya	Mahuva, Bhavnagar
4	Gobarbhai Vitthalbhai Bariya	Doyal	Mahuva, Bhavnagar
5	Vintuben Rameshbhai Parmar	Uncha Kotla	Mahuva, Bhavnagar
6	Laxmiben Chhotabhai Parmar	Uncha Kotla	Mahuva, Bhavnagar
	<b>Talaja</b>		
7	Kamuben Bhagatbhai Chudasana	Sartanpar	Talaja, Bhavnagar

### *Traditional to methodical practice*

Life of coastal area people is fragile and wretched. They are continuously in the hands of saline sandy weather of sea; many a time they live in an unpredictable weather – especially the fishers of the coastal area. Gujarat has the longest coastal area of 1600 kms among all other coastal states of India. The fishers hold a very nominal amount of land. Farming of food crops are very much restricted to the crops they need for their daily consumption mainly bajra etc. They do not have much income from crop they produce, as they cannot have much surplus for marketable quantity of these crops after consumption. Therefore the next alternative for their livelihood income is ‘catch’ from the sea in front of them or to migrate time to time with stress.

Catching fish from sea – near or distance is a century old technique and profession among fishers. It is more like the weavers’ play with the looms and their generations continue the art of weaving. Similarly the techniques the fishers use for fishing in the deep sea or in the nearby coastal area are passed on to the next generations. That is how they were living till the new scientific and improved techniques and equipment have reached them. They have started using them for enhancing their income. They learned from these new techniques from the intervention work of PLC (People’s Learning Centre), MSVS and Utthan.

So the people’s knowledge in the traditional fisher family has been enhanced by introducing new technology for increase in income of the fisher family and their total livelihood. Utthan and PLC together did a one-year pilot project (February 2007 – January 2008) of lobster fattening as a supplementary livelihood activity for salinity affected coastal communities – especially for the fisher families. This one-year project was supported by CSPC (Coastal Salinity Prevention Cell, Ahmedabad), which is supported by SRTT (Sir Ratan Tata Trust). They got success in this experiment.

Then in the next year CSPC extended again their support to Utthan to carry out the same mariculture practices for one year in a larger area covering 10 villages during August 2009 to September 2010, earlier it was the pilot study in 2 villages. This time they introduced crab fattening also along with lobster fattening, when they found that the capital investment of lobster fattening pits was recovered by one year’s production.

It was found that the economics of pit-culture lobster is more attractive than that of cage culture for lobster. Apart from this, there are indications that mud-crab fattening will be an equally viable livelihood activity. The activity is presently seen as a supplementary activity to seashore fishing. However, it also has the potential of providing year round livelihood options for fishing communities and thereby arresting ‘stress’ or ‘push’ migration. PLC-Coastal has established an institutional support by organizing a registered body of MSVS (Matsyagandha Sarvangi Vikas Sanstha) on 13 October 2009.

Utthan has a tradition of establishing new institutions in their curriculum since long. They have in their history of making institution like ‘Pravah’, ‘Mahiti’ and PLC and now MSVS. All are registered as independent society now under State’s Societies Acts and similarly the MSVS was also registered as a society and as a public trust in 2009. It has a separate governing body with President and trustee members.

### *Technology mix*

The basic work of the MSVS is to introduce better systematic technology for mariculture of fattening lobsters and mud crabs. Mariculture is a specialized branch of practicing aquaculture which includes cultivation of marine organisms for food and other products in the open sea, especially in gulf and estuarine areas in seashore. The traditional aquaculture of coastal habitats was very 'rudimentary'. They used to get baby catches of prawn etc and put them in small holes like pits and used to sell them when grown to a size of roughly 100 gms or sometimes consumed as their own food. They even did not know the high value market of lobster.

This practice is known as "pagadiya" – as they go by walk in to sea bed up to a distance of 2-3 kilometres towards sea from the shore. There they fix a long net of 100-200-500 feet with 3-5 feet height by piercing wooden poles in the sand bed. The poles are fixed at a distance of 6-7 feet. The net and wooden poles are their investment for catching baby lobster 10, 20 or 50 grams size and some wild fishes. These poles do not go for more than 2 years as saline water spoils the portion that goes inside the sand. The price of required quality net is Rs 400/- per kg and 1 kg covers about 15 feet length; so if they have to cover about 500 feet length then they have to invest approximately Rs 13000/-. This net is not for catching seeds of lobster or crab. This is for their regular pagadiya catches. They sell other catches keeping the lobster or crab seeds for rearing of fattening. The lobster or crab seed has no cash cost to the fishers – except their labour time and onetime cost of net and wooden poles. But those are mainly used for other catches.

The padgadiyas need a license of permission for catching fish from sea from the state's fisheries department. This license is renewed every year. The license fee for selling purpose is Rs 55/- per year. The license fee for netting fish is Rs 155/- for 3 years. The license fee for boat and registration fees of boat are for 3 years, which varies according to size of the boat and energy used for boat.

The intervention work MSVS has several aspects – (1) site selection for ideal site, (2) proper pit size, (3) optimum number of baby lobster for a pit, (4) maintaining right temperature, (5) rearing or fattening them up to a marketable table size, (6) maintaining salinity and Ph condition of water, (7) food to be given, and (8) lastly where to market for getting higher value of product.

If all these are to be pushed in their old traditional practice the fishers are to be trained properly for building their capacity. It is really a hard work to push all these ideas to people who do not have any knowledge of "3Rs" – read, (w)rite and (a)rithmetic – its need a dedicated grass root level of workers who can facilitate to modify their old traditional practices towards new systematic practices. Utthan has done this facilitation work at grass root level through MSVS and for that those fishers are earning more than 3 to 4 folds of income only by this mariculture. They take 2 or 3 cycles of production in year from lobster pits and crab tanks.

*This Review aims to see*

- (i) the basics of the pits/tanks, (ii) its investments, (iii) its uses, (iv) its capacity of earning money, (v) its benefits to the participants, (vi) and try to find out is there any multiplier effect in there 'home economy'.

This will be done by meeting several families, gathering experience from them and shall put them in cases.

**The Table below shows the technical information of the practice**

<b>Basic technical information of the practice</b>			
<b>for Lobster Pits</b>		<b>for Crab Tanks</b>	
Selecting site		Selecting site	
Ideal site		Ideal site	
Pit size – Choice (1) – l x b x h	8 x 6 x 4 ft	Tank size – Choice (1) – l x b x h	25x15x5 ft
Pit size – Choice (2) – l x b x h	10 x 7 x 5 ft	Tank size – Choice (2) – l x b x h	50x30x5 ft
Baby/seed size gm	20 -50-100gm	Baby/seed size gm	50-150 gm
For one lobster required space 2-2.5 sq ft	approx 20-24 lobster in pit Choice (1) and about 28-30 in Choice (2)	In Choice (1) max =  In Choice (2) max =  Average 2 baby seeds per sq ft	400 no. of 50 gm  700 no. of 50 gm
Food to give	Tiny fresh wild fish	Food to give	Microbes in mud and fresh tiny fish
Marketable size each lobster	150 – 200gms	Marketable size each crab	200 gm
Time takes to reach to marketable size – depends on the starting seed size	4 months for 50gms to reach 150-200gms	Time takes to reach to marketable size = Quantity after 3 months 150gm each	60 kg
Total weight of 20 seed is 3kgs at marketable size of 150 gms @ Rs 600	Rs 3000	Gross sale @ 200 per kg	Rs 12000
They can take min 2-3 cycles in year from one pit – people have more than 3 pits	Approx  Rs 1800 if 3 cycles taken	They can take min 2-3 cycles in year from one tank	Approx Rs 60000 if 3 cycles taken
Less preparation cost		High construction cost	

## **Basic Technical information of the practice**

The basic technical information has been summarized in the above table.

### Lobster pit and its ambience

#### *Site Selection*

Site selection for both lobster and crab is a complex issue. The lobster and crab are two different species, but both live in saline brackish water. There are certain common natures among them and certain differences are there. So they need two different treatments for rearing to fattening.

Lobsters do not like to live in strong hard rock wall or floor. They also cannot live in mud too. The floor of the pit is just has a normal hardness of sands of sea. Its sites should be chosen in between high and low tide area since the water of the pits needs to be changed by the flow of the high and low tide for maintaining standard salinity in the pit. The pit should be covered by small size net fixed by nails against soil of the shore. This net would not allow the lobsters to go away out of the pit while high tide comes.

They need salinity up to a range 24 – 30 ppm; temperature between 22 – 24 degree Celsius; PH should not be more than 7.5 maximum; and oxygen should be 5.5 ml in water.

For all these requirements Utthan has provided training to the MSVS members and given proper instruments for measuring these units in proper time. For example – Refractometer for measuring salinity, thermometer for temperature, PH paper, Turbidity meter etc.

Therefore the fisher members have been trained to learn this basic complexity of management of pit for getting better production. Utthan employed technical expert from village level knowledge person who can communicate with fishers and also from subject trained person who can provide scientific information and knowledge. We have come to know from members that they very happy to got the training. A few of them know how to operate all the testing equipments.

While digging the pit, care should be taken that the soil taken out from the pit should not come back inside the pit by high tide. In that case the floor of the pit will come up and the height will be less. Even if it is filled by any means – they have to dig again and hence the labour cost of digging will be high. If the baby lobsters are there inside then they have use the stocking pit for their temporary stay.

One pit of 8 x 6 x 4 feet dimension takes 7 days to dig by 2 persons and labour fees Rs 200 per day per person. This is an approximate account given by bare-foot level technical person of Utthan. In case if the stone found during digging after 2-3 feet of digging they have to change the location and the whole labour work goes tounsuccessful. So again they have to dig it, and again a labour-day will be accounted and the cost of labour increases. So the site of the pit is to be chosen such a way that in high tide water will come inside the pit but the catches should not go out of the pit.

For their food the much tiny fish are put in side the pit. This way the small 50 gm weight lobster grow to 150 to 200 grams in two and half months. These size of lobsters have high demand in the market, the sell price is Rs 600-700 per kg.

#### Maturing time and space

Size of the pit depends on how many juvenile lobsters are to be put and of what size. It is said that about 2.25 to 2.50 square feet area would be good for one lobster that is, space should be allocated according to the matured size of the lobster. It is not that the smaller is the size of the juvenile one, more number of lobsters can be put in the same space. The size of baby lobster can be of 20, 50 or 100 grams. If the baby size is of 20 gms the it will take about 7 months to grow up to table size of 150 to 200 grams; if the baby size is 50 gms it take 4 – 4 ½ months to reach 150-200 gms and if it is 100 gms the it would about 2 months to reach for a marketable size. In general, it is found that they grow 15-16 gms in weight per month.

#### The food the like

The food is to be given manually since they are captive now in a pit, so they cannot find their own food. The best food is, live tiny wild fish which are not sold in the market. They are available while netting, sometime they get from the deep water fishing.

#### Market linkage

They used to sell 150-200 grams size lobster at about Rs 200/- per kg at local market. They used to go to Una and other places for selling. They used to go by cycle taking lobster in a packed ice box to the nearby market. In Una area the fishers were heckled by the wholesale buyers of that locale. And fishers were cheated also. The buyers used to say that the lobsters were not good; some lobster were dead though were not, etc. This entire alibi of whole sellers for buying at cheaper rate was their trick. Then Shri Rambhai the technical person of Utthan made a different trick for treating a lesson. He organized MSVS member fishers and stopped movement of fishers and supply of lobster to those wholesale buyers of Una etc markets. After a few months those wholesalers came to Mahuva for buying lobster from villages. The trick worked well. Rambhai knew the larger market of lobster and its price. He had to face lots of trouble at time from members. But ultimately Mahuva's fishers won. Those buyers now come regularly up to villages of Mahuva and pay much higher price of Rs 700 to Rs 800 per kg for lobster. Thus the income of fishers went high even up to 5 folds in some cases.

Therefore from to marketing is a very tricky matter. In our visit we found that in this mariculture enhancing project the “people's knowledge” and “theoretical knowledge” have been bonded very well, which has given a reinforced foundation for the future of mariculture practice among the coastal fishers of Bhavnagar-Mahuva-Rajula region of Gujarat.

#### Crab tank and its ambience

The crabs fattening or rearing brought very recently among the MSVS members, when it was found that the fishers were grown enough to manage lobster. Earlier small mud-crabs of 10-20 grams size were sent back to sea or just used to left from the net, as they did not know its market

value. The crab seed, the baby crabs, are freely available in this location of Mahuva. Therefore there is no cost for seed for rearing crabs.

A proper tank is to be made in a proper site in the higher location of the shore. The tank should be constructed in such a place where high tide water should come and tank should be filled by high tide water and the water should go away after the tide. So the site should be in higher altitude in the sea shore.

The ideal size of the tank should be 25x15x5 feet or 50x30x5 feet depends on the number of crabs one wants to rear or fatten in the tank. There should be 2 or 2.5 baby crabs per square foot in the tank – because they need space to move. The crabs are cannibals, so there should not be wide difference in sizes means ages of crabs, then the bigger one will eat the smaller – and that has happened in one of cases we visited.

The bed of the tank should be made concrete; and one foot height of mud should be at the bottom. And 1½ feet height of sea water should be inside the tank and above the mud bed; rest of height should be kept open and covered by small net on the top. There should be an outlet at the bottom for clearing water; and another outlet at the top level of water for draining excess water and maintaining water level. The level of salinity is to be maintained, so the water should be changed every 15 days. This happens by high and low tides.

Stocking tank is used while cleaning the main tank. The crabs are transferred temporarily to the stocking tank.

Sometimes by pressure of high tide the wall is broken. A care should be taken for that. We saw such cases of broken walls but this year's monsoon is longer than the normal years that may be one of the reasons they could not repair properly. This is one of the vulnerabilities of this kind enterprise that is the risk of this project. One has to consider this point while assessing the project.

The walls are made of bella stone available from Una side. They are to carry from Una or from some other places. However this stone is good for making the wall of the tank. Probably is good for using in the saline atmosphere as we saw that this stones are used for domestic walls also. Engineers can say about this better. There are 3 stages of costs are involved to bring bella stone up to the site of tank construction; (1) cost of each stone or in brass measure, (2) cost of transport up to village, and (3) cost of carry from village point to the sea shore site. We did not go in to the very details of this stage -wise expenses of the MSVS members, who are responsible for constructing their own tank for crab fattening.

The construction of 25 x 15 x 5 ft size tank requires 7 days, if 6 persons are working; one of them would be skilled labour whose labour charge is Rs 400 and the others 5 persons get Rs 200 as assistant to the main person.

#### Time taken to grow up to table size

The 50 gm baby size takes 2-3 months to grow up to 150 gm which fetches Rs 200 per kg. So 2 to 3 cycles of production can be taken from one tank.

## Market link

Like lobster they have made the market linkage and now the fishers are getting good price per kg. The price goes high up to Rs 250 at the village level sometimes. Many members have earned Rs 36,000 in year.

## **The changes in the ‘home economy’ among the member-fishers of MSVS**

The program is supported by CSPS and SRTT – it arranged that 60% of the total expenses will be borne by CSPS and SRTT and rest 40% will be borne by the beneficiary, which will be contributed as labour contribution of the beneficiary. The labour contribution is calculated according to the market value of labour.

We had talked in details with 7 fisher-members of MSVS from different villages (see table above) to understand their changes in ‘home economy’ which should have been contributed towards improvement of their family income by this relatively new source of income from mariculture.

## Regarding measurement

Everyone followed the recommended design of pits and tank and construction procedure etc thoroughly. Some might have spent a little more than the approximate budget given to them and some of them have spent less than the budgeted one. Out of the 7 members we met, 4 members (57%) spent less than the budgeted expenses; 2 members (29%) spent more than the budgeted expenses; record of one was not found in the MB (Measurement Book) list.

	<i>Stakeholders we met from</i>			<i>Construction cost</i>
	<i>Name</i>	<i>Village</i>	<i>Taluka, District</i>	
1	Jesarbhai Bachubhai Chauhan	Chanch Bavliya	Rajula, Amreli	Less than estimated
2	Jilubhai Virabhai Chauhan	Chanch Bavliya	Rajula, Amreli	Less than estimated
3	Rupaiben Veljibhai Solanki	Agtriya	Mahuva, Bhavnagar	More than estimated
4	Gobarbhai Vitthalbhai Bariya	Doyal	Mahuva, Bhavnagar	Not Available
5	Vintuben Rameshbhai Parmar	Uncha Kotla	Mahuva, Bhavnagar	More than estimated
6	Laxmiben Chhotabhai Parmar	Uncha Kotla	Mahuva, Bhavnagar	Less than estimated
7	Kamuben Bhagatbhai Chudasana	Sartanpar	Talaja, Bhavnagar	Less than estimated

There is continuous raining in this long monsoon and water level reached high, frequent high and low tide were present, hence the lobster pit have been covered by sea water. So one cannot see the pits and therefore cannot take the measurement. It would be better to go after 15 days of completion of monsoon for taking measurement of sites.

This project has covered 19 different small and big villages in the coastal area. The total population of all these villages is 3540 according to the information we gathered from the office of Utthan (not from Panchayat). There are total 632 families in these villages including 411 ‘pagadiya’ families. Numbers of families involved in lobster fattening are 118 and crab fattening families are 284. According to Rambhai total pits for lobster completed 160 and total tanks for crab completed 34. Let us now see how far these 7 families got benefits from this project.

### No poaching in this area from pits and tanks

Very interestingly there is no complaint of any poaching from any one of the fishers. And they all take care of each other's pits and tanks. This is contrary to the inland culture fisheries in many states of India as this reviewer has the experience from his work on inland small ponds fisheries.

### Training

We have come to know that technical and awareness training were given sufficiently well to the MSVS members. The reflections of their intensive training have been seen in their work and knowledge.

However they may need some more training in administration, accounting procedure, some financial procedure etc. which they are lacking still. This we guessed from our discussion with some members.

### **Stakeholders:**

1. Jesarbhai Bachubhai Chauhan of Chanch Bavliya, Rajula, Amreli

We talked to Bachubhai. He showed his old thatched house opposite to his present pucca house. He spent Rs 60,00,00 for making his pucca house. The house is equipped with concrete pillars and brick walls. He has an old motorcycle (Rs 30,00) recently purchased. Before starting this mariculture they used to migrate for labour work in Surat and doing farming work in cotton plucking. They were not specialized in this farming work, even though they had tried for their livelihood. Now they do not migrate and doing better work in deep sea-water fishing also. He owns a small fishing boat (Rs 1,00,000) also.

MSVS members are found to be well organized as they trust their leader very well. The leader goes to town and gets the other members license renewed. The members give Rs 30 to Rs 50 more than the actual license fees depending on the types of license, as service charges. These service charges include the expenses of the leader's bus fares etc. This shows the trust on the members which in turn shows how well knitted is the organization at the lowest level.

Bachubhai can sign his name in Gujarati. He showed this skill of writing on the field note book of this reviewer. Bachubhai's son could not go to school, but he sends his children to village school. He wants his children should go to higher school also. So Bachubhai is happy to listen from his son that his grand children would be well educated one day in the future.

They go to shop to the city of Rajula during Dewali. When asked about their present clothing pattern, they expressed that would like to go for better clothings at least for their children and grand children. They have one tank of crab and a number of lobster pits besides their traditional pagadiya work. There is cell phone for every adult member in Bachubhai's family.

## 2. Jilubhai Virabhai Chauhan of Chanch Bavliya, Rajula, Amreli

Jilubhai is the neighbor of Bachubhai and has family relation. Jilubhai also stays in a pucca house. They have all most all utensils made of stainless steel. Their old thatched house is all most broken now and dilapidated. They do not use old house now. They use it as store place.

Their children are found in good dress and well combed hairdo. They all go to school.

They have one tank of crab and a number of lobster pits besides their traditional pagadiya work. Here also they have cell phone to all members.

Chanch Bavliya, Rajula, Amreli has the ideal sea shore for lobster and crab fattening culture, said the trained technical persons of Utthan Ms Chaitali Jani.

## 3. Rupaiben Veljibhai Solanki of Agtriya, Mahuva, Bhavnagar

This village Agtriya of Mahuva, Bhavnagar is situated on the hard rock, particularly the site of pits of lobster and tanks of crab we saw. The may be of basalt in nature. Rupaiben's house is situated about 10 feet height from the tanks and pits she owns. She lost her husband Veljibhai a few years ago keeping behind his very small 4 sons and 3 daughters. She had a very hard life at that time. Then Utthan came and taught her how to do the pits more efficient for getting better product and sell them in a higher price. Rambhai taught her well.

Rupaiben now is the leader in a Mahila Self Help Group. She is very courageous we found. She lives in front of the wide sea all most alone in her home, as most of the children live in her village home. When asked about how much quantity she had to give to the 'people of power' as bribe who used to come for supervising their pits and tanks, particularly from the police department. She narrated a story how she "treated" a police officer who used to asked frequently some kilos of lobster. After that occasion the police officer never harassed her.

Now her all children are going to school and help her in pits and tanks work. This time one wall of her tank was broken two times by the very heavy rains and high tide. However she had repaired once, and next also she will manage from her own saving. She will not ask support from MSVS or Utthan, because she understands that she had been given once at beginning of the construction.

Her regular good earning compare to earlier income and organizing capacity gave good sense of self confidence to do much better in future, particularly to enrich her children education. She does not eat any lobster or crab, but all her children eat. She prepares for them. Thus a good nutritious food is available to her children. Her sea shore house is partly pucca. We did not see her village house.

## 4. Gobarbhai Vitthalbhai Bariya of Doyal, Mahuva, Bhavnagar

This is a case of how this small opportunity helped family who was in negative income and was thinking to leave the village for some opportunity.

Gobarbhai cannot see properly. How his eye sight has gone weak is not known. Like Rupaiben they also live near to sea shore, about 10 feet high from the sea level. Gobarbhai has 4 sons, 1 daughter and his wife in the family. He has to manage food for these 7 persons. He read up to 3<sup>rd</sup> standard. He has 2½ bigha of land in village. The village house is far from the sea shore house. His piece of land does not produce sufficient crop that can complete food this family throughout the year. His brother looks after that land. He needs more income. He lives in the common property land in a small house. The house is still kachchha. Panchayat might have given an unwritten permission for his stay. In this house they have to buy drinking water at Rs 200/- for 500 litres which goes for 10-12 days. This is their extra expenses.

He has 25 lobster pits. He earned more than Rs 30,000 last year from these pits. Recently he has started constructing tanks for crabs. It is still under construction. His elder son goes to a diamond firm and earns a daily wage of Rs 100/-; the boy earned about Rs 2000-5000/- extra this year.

They had a huge debt of Rs 20,000/- taken at the rate of 3% per month, which they could give back now. He is expecting future income from lobster Rs 20000/- and from crab Rs 20,000/- and from 'pagadiya' about Rs 10000/-; so total may be about 50,000/- in the next year. It may be more he feels!

The elder son goes to school also. The wife of Labhuben is now happy and doing all domestic work and managing pits etc. Once she left home out of poverty and bad behaviour of Gobarbhai. They now purchase green sabji, eat fish. Thus their minimum nutrition is being covered. Happiness comes through sufficient income and less stress of poverty.

##### 5. Vintuben Rameshbhai Parmar of Uncha Kotla, Mahuva, Bhavnagar

The Ucha Kotla village is situated really in an *ucha tekra* (high place) at the very end of the land. The sea must be at 100 feet down. The tides – high and low, are frequent here and with higher current. The 'pagadiyas' go deep in to the sea when there is low tide mainly after monsoon. They fix their net with poles along the sea stretching sometimes up to 4-500 feet. They work in night also for this fixing long net. The family of Rameshbhai has 35 pits of lobster; but 31 of them are under the high tide sea water when this reviewer visited. They have 2 tanks for crabs; but those 2 tanks were also filled with sand and mud of high tide when this reviewer visited. It always advisable to visit after monsoon if one has to see this mericulture practices properly in the coastal areas. So this reviewer could not see any pit of lobster during his visit. Of course some tanks of crab have been seen, as they are located in a higher place of the sea shore.

All these pits were filled with silt. They will clear the silt after 20 days when sea will be calm enough. The cleaning will take 2 days if 4-5 persons work 3-4 hours a day.

They said that in this location lot of 'Bombay Duck' (locally known as "Bumbla") fish are available. This fish gives very high price to fishers.

Smt Vintu Rameshbhai is a member of the Kamal Matsya Mandal (KMM) of Ucha Kotla. She is very brave and spirited lady. She talks very fast. She has the quality and talent of being a leader in the village. Other than her knowledge of fisheries in sea, which she practices, she has the capacity to prohibit the 'habit of drinking liquor' in home and later in the village. She herself used to make 'deshi daru' in home and sell it to village people. She was earning Rs 200 to 300

per evening. One fine morning she decided to “stop it” and she “did stop it” and closed down the business in her home and outside.

The Kamal Matsya Mandal has 17 members. The 35 pits and 20 tanks were dug with a mutual understanding of labour exchange among the members. Some members exchanged their labour for nailing the net fixing and logs in far away from shore for their ‘pagadiya’ activities. The price of log of 6-7 feet height is rs 7/- per log. The logs can be used for about 2-3 years as the saline water spoils the portion which remains inside sand. The net is tied on these logs or members (*khutla – khiliya* in local words) and stretched up to 4-500 feet. The price of this net is Rs 400/- per kg that has length of 15 ft, so they have to buy 30 kg net, spending about Rs 12,000/- for covering 500 feet stretch. Sometime they buy more for future use as they said this time they have purchased Rs 25,000/- worth of net.

Thus they catch tidal sea fish etc. which are stuck in the net. They get small baby lobsters and crabs here in this catch which are their regular seed for pits and tanks. The rest of the catch they sell in the market or use for their regular food. If luck is good one can get a good catch and fetch good money for the day – as prawn sells at Rs 200 per kg and other small wild fish at Rs 150 per kg.

Ramesh’s father used to work in diamond industry in Surat as migrant, but they are hailing from Uncha Kotla; their root is here in this Uncha Kotla village. They gradually settled here back when they got this idea from Utthan’s MSVS. Ramesh’s father came back and settled in village permanently. After Vintuben took the decision of abandoning liquor from home, the family gradually started taking a new avenue. They also got this idea of lobster and crab fattening which enhanced their capacity to earn more.

This Unch Kotla village is famous for Ma Chaminda Devi’s Temple. This mandir of Mataji brings thousands pilgrims every year to the village.

Rameshbhai and Vintuben are living in a joint family with Ramesh’s parents, grand father and brother Dinesh. They have 3 daughters and 1 son; son is youngest – 2½ years. All 3 daughters go to school and they spend Rs 1200/- per year as tuition fees. The boy will to go to school late. There are 4 mobile phones in home. They go for shopping to Nicha Kotla or to Mahuva.

Vintuben brought a good quantity of gold when she came to Ramesh’s home after marriage. Unfortunately they had to sell all her gold for repaying loan and meeting home expenses. Now she has purchased all most same quantity of gold back last year. They declared that their income went up by selling lobsters and crabs to bigger market at a higher price. This had been easier by the market linking of prawn and lobster – this was done by Utthan’s intervention. Crab came later – whose income has started recently. Here we should say that this family was aware of the “worth of the technology” – so they started raising their income even before Utthan came. However after arriving of Utthan’s enhanced technology, they have been benefitted faster as they told specifically.

When her husband thought to buy a used motor cycle, Vintu did not agree. Ramesh later bought a new Honda motor cycle worth Rs 50,000/- .Vintu used to save daily Rs 100/- for buying the new motor cycle. Vintu is from Doyal village. They often used to go to Surat for working in sugarcane fields. Nine years ago they had Rs 2.5 lac loan now they do not have any loan – all

they have repaid. She manages the family in such a way that out of annual income Rs 2,00,000/- she saves Rs 80,000/-.

Vintu keeps her 2½ year old child under lock and keys in her room, when she goes for fixing net in the far away sea with Ramesh. It takes 4-5 hours to return home in the night.

When this reviewer asked her what prompted her to all these to become brave and etc. she said flatly, “*mari magaj ni demaak phirao aave*” and she immediately takes her decision if she understands that she is right.

The story of Vintu does not say that money can do all. It is along with money how one likes to live and in what life style. Probably that might have possible with her by better exposure and she has chosen the better path. However she has turned the whole family’s life with good amount of income in hand, otherwise this turn would have been difficult.

#### 6. Laxmiben Chhotabhai Parmar of Uncha Kotla, Mahuva, Bhavnagar

We went to see Chhotabhai to about his experience with new technology of enhancing lobster fattening in his areas. He was not there at that moment. Laxmiben Chhotabhai is a member of 13 – member Chamunda Matsya Manda. This Mandal has 23 pits of lobster and 1 tank of crabs. Out of 23, Chhotabhai has 3 pits of his own. He earns Rs 2000/- in a year from these pits. He has less interest in fattening of lobster, because his main earning is from migration. He and his family earn about Rs 1,00,000 from their work in migration – in Surat and Rajkot. There they do mainly cotton plucking work and other agricultural labour work. Plus they have their own land income of Rs 20,000 annually from lease.

Chhotabhai keeps paper clippings as his hobby. If there is any important news for the benefit of people around him please tell us. He is very well informed person in the village. His family is definitely in higher income bracket. His house is very well decorated and ornamented also. His wife has very heavy gold ornaments which they often use.

In this family the influence of lobster income is very less.

#### 7. Kamuben Bhagatbhai Chudasana of Sartanpar, Talaja, Bhavnagar

Talaja has of big clusters of pits for lobster and tanks for crabs. Talaja taluka is in between Mahuva and Bhavnagar, both ways distance is more or less same – about 40 or 50 kms; densely populated, near to Alang port.

Sartanpur has 12000 population according to panchayat, census report says 17,000 population. There are 6000 fisher families; of which 400 are ‘pagadiyas’. There are 3 MSVS mandals, namely – (1) Ramapur Machchha Paprash Mandal with 24 members; (2) Apat Navara Machchha Paprash Mandal with 16 members; and one SHG mandal of women. The membership fees is Rs 111/- for MSVS.

Sartanpur is on the Shatrunjaya River near to port town and Palitana famous for Jain temple. Sartanpur is the birth place of Gujarat’s well known poet Narsinh Mehta. There are around 30 ancient Buddhist caves.

There are many pits of lobster but all were under sea water due long monsoon and high tide was going on, hence we could not see any pits in this village also.

However we saw a series of 8 standard size tanks of crabs. All of them are well maintained. Members are very cooperative among themselves. If one comes to visits his/her tank, s/he visits others neighbouring tanks also, and if any care to be taken for the tank s/he informed the concerned person. They also bring materials for tank construction at a time together so the transport costs get divided among the members. They had to incur extra labour charge this time when they carry the bella stone as they got the truck up to the village main place. Then they had to carry by another tractor for a distance of more than a kilometer to the site near the shore. So cost of transport from Una to Sartanpar separate and from Sartanpar to site cost is separate.

The 8 tanks are in series in the sea shore which is common property of the state or of the port depart department. When asked about the security of the construction on common property they told that government cannot give the land on sea shore on lease; but ADM Rajkot and DM of Jamnagar and officials from fisheries department visited this place. They did not put any adverse comment on their sincere endeavour for increasing in income by good means. The whole effort is not only for income only but for good and nutritious protein food to the future generation of the locale too.

Their crabs fattening practice started only 2013 February. They were not well experienced at that time and did not get or take timely advices from the technical persons, so they could not get proper profit. They had put more baby crabs than they should have kept. Also did not supervise frequently, so some crabs grew big faster than the other one. Crabs are cannibals so big one ate many of the smaller one. Some of them died also. The bigger size did not good price as they are not tasty like the smaller one. Hence they got less production and remaining smaller sizes got sold at lower price. Further in this village the crab price Rs 100 less than other places, they said – as the crab production are more than other places, so they do not get good market price. Next time they will be more cautious and will take experts' advice.

However they have deep sea fishing income in general.

The village has good opportunity for school education. There are 4 schools – 2 government and 2 privately organized. Students go to Bhavnagar for higher education only 50 kms away. Over all outer look of the village is comparatively good and people are gentle in behaviour, cooperative and friendly. Probably a legacy of heritage of literary poet, religion etc. still working.

## Conclusive remarks

- This mariculture program is a brilliant up scaling attempt for future sustainable income for the poverty stricken coastal fishers
- A natural risk is inbuilt in the up scaling of this program, since it is open to all sorts of 'open' environment – like water quality, weather, marine life and geology
- A very good source to increase income of fishers in a faster way with minimum investment compare to its return of many folds. However some of them are so much below poverty level that 4-5 folds increase in income in a year would not show much of their improvement in 'home economy' – it would take a longer time
- If MSVS members are properly trained, making them strong enough to fight against the open market and if good savings motive is being created among the members, then very soon these members would be able to open up their own cooperative company, instead of depending on donors for initial seed money – the program may aim for that
- The fattening or rearing of lobster and crab has given a good source of high faster income with a minimum investment and minimum training for caring the products as they are all from the fisher's community
- The larger quantity of products of lobster and crab from the pits and tanks has also given a very good source of high protein for the future children of the local people for their good health
- This intervention has given opportunity to the fishers community going for better education, better clothing, and better life style; plus they have become acquainted with modern technology like using cell phone, motor driven boat, and two wheelers
- People facing common natural hazards in coastal areas are coming together for solution and becoming cooperative among themselves for the common cause of solving hazards and trying for enhancing income. A unique place and practice that there no poaching in whole of pits and tanks area – rather they take care of the co-fisher's pits and tanks.
- The intervention is helping to create coastal social capital which would grow more in near future
- This up scaling of mariculture is helping to reduce 'stress' or 'push' migration among the coastal fishers. Many of them stop going for migrating work to far of districts of Gujarat for farm or non-farm labour in recent time

## *Some important points about this review*

*After reaching the location we found that all the pits of lobster were covered under high tide of sea water. We could not take any physical measurement of any pit of lobster. In fact we could not see properly any lobster pit except the location of the pit. The pits were covered by sea water and*

*most of them were partly filled with sand and mud as they generally situated at a lower area near to sea. The long spell of monsoon in this year is also one of the reasons for pits getting filled partly with mud.*

*We could see tanks of crabs of the stakeholders we met as they were visible, since tanks are constructed at a higher side of the sea shore. All those tanks were made according to recommended design and materials as informed by the stakeholders and the technical persons.*

*However this is not the right time to take measurement of pits and tanks when monsoon is in its full swing. The best time for taking measurement as local people told us would be at least 15 days after the monsoon is over.*