STATUS REPORT

2021-2022

: OFFICE :

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Coconut at a Glance:

Botany:

1)	**Botanical Name**	**:**	*Cocos nucifera* L.
2)	**English Name**	**:**	Coconut
3)	**2n**	=	32
4)	**Family**	**:**	Arecaceae
5)	**Plant Type**	**:**	Monocot, Monoecious

World's Largest Coconut Germplasm at Andaman (India):

Exogining	:-	Tall-70	Medium Tall-2	Dwarf-14	=86
Endogining	:-	Tall-29	Medium Tall-0	Dwarf-11	=40
				Total	=126

Climate Requirement:

1)	**Tropical Plantation crop**			
2)	**Temperature**	**Max**	**:-**	35^0C
3)		**Min**	**:-**	15^0C
4)		**Optimum**	**:-**	25-27^0C
5)	**Rainfall**		**:-**	1000-2500mm
6)	**Humidity**		**:-**	>50-60%

Quality of Irrigation Water:

1) Tolerance up to 11 EC
2) Optimum < 1 EC

Area, Production and Productivity:

	World (2020) (93 countries)	**India (2020)** (17 States)	**Gujarat (2020)** (5 Dist.)
1) Area('000 ha.)	14432.02	2360	27.02
2) Production (million nut)	74580.90	27540	267
3) Productivity (nut/ha)	6062	10120	9879
4) Farmer family (million)	71	14	-

	District	Area (ha)	Production (million nut)	Productivity (nut/ha)
Gujarat	Gir Somnath	8750 (First)	88.91	10125
	Junagadh	5740 (Second)	57.92	10120
	Bhavnagar	4100 (Third)	40.45	10200

Cost of Cultivation:

Sr.No.	Type of Orchard	Cost Rs/ha.	Income
1)	Rainfed	80190	112275
2)	Irrigation	87150	125780

Role of Coconut Development Board:

1) Training organizer on coconut
2) Supply of true to type seedlings
3) Helpful to establish coconut co-operative society
4) Provide 50 % insurance

The coconut palm (*Cocos nucifera*L.) is the most useful palm in the world. Every part of the tree is useful to human life for some purpose or the other. Hence, the coconut palm is endearingly called '**Kalpavriksha**' meaning the tree of heaven. The copra obtained by drying the kernel of coconut is the richest source of vegetable oil containing 65 to 70 per cent oil.

The Coconut tree is a member of the family Arecaceae (palm family). It is the only accepted species in the genus Cocos. The term Coconut can refer to the entire coconut palm, the seed, or the fruit, which, botanically, is a drupe, not a nut. The spelling cocoanut is an archaic form of the word. The term is derived from 16th-century Portuguese and Spanish coco, meaning "head" or "skull", from the three indentations on the coconut shell that resemble facial features.

The coconut is known for its great versatility as seen in the many uses of its different parts and found throughout the tropics and subtropics. Coconuts are part of the daily diets of many people. Coconuts are different from any other fruits because they contain a large quantity of "water" and when immature they are known as tender-nuts or jelly-nuts and may be harvested for drinking. When mature, they still contain some water and can be used as seed nuts or processed to give oil from the kernel, charcoal from the hard shell and coir from the fibrous husk. The endosperm is initially in its nuclear phase suspended within the coconut water. As development continues, cellular layers of endosperm deposit along the walls of the coconut, becoming the edible coconut "flesh". When dried, the coconut flesh is called copra.

The oil and milk derived from it are commonly used in cooking and frying; coconut oil is also widely used in soaps and cosmetics. The clear liquid coconut water within is potable. The husks and leaves can be used as material to make a variety of products for furnishing and decorating. It also has cultural and religious significance in many societies that use it.

Monthly Average Weather data of last 10- year:

Month	Temperature (^{0}C)		Relative Humidity (%) at 8.00 a.m.	Rainfall (mm)	Evaporation (mm)
	Maximum	Minimum			
January	32.3	10.0	53.2	0	4.60
February	35.2	12.2	48.1	0	5.60
March	39.5	16.4	50.4	0	6.38
April	39.7	19.8	57.0	2.2	8.20
May	38.2	22.3	60.5	20.5	7.59
June	37.2	23.1	73.7	132	5.37
July	33.5	22.8	78.4	220.6	3.42
August	33.5	23.0	78.4	143.8	3.68
September	35.8	22.1	78.6	150.3	3.82
October	36.1	16.8	70.3	44	4.78
November	35.3	15.5	56.9	4.5	4.87
December	34.1	11.6	53.0	3.3	4.66
Total				**721.9**	

This farm was started in 1852 by His Highness Late Shree Bhavsinhji of Bhavnagar State having area of 1529 acre. Thus, this farm may be one of the biggest and the oldest farm of our state. In 1947 this farm was handed over to Agriculture Department, Government of Gujarat for extension and nursery activities to bring more and more coastal area under coconut plantation through supplying the best selected coconut seedlings to the growers. In 1972, this farm was transferred to Gujarat Agricultural University to conduct the research activities on coconut and other fruit crop. From 2004 and onwards, this farm belongs to Junagadh Agricultural University.

Mandate:

- To evolve high yielding variety of coconut.
- To find out suitable plant protection measure against coconut pest and disease.
- To determine most suitable and effective, eco-friendly and low cost agronomical practices for the production of coconut and fruit crop.
- To introduce new fruit and plantation crops for the region.
- To supply the true to type planting materials of coconut and fruit crops to the farmers.
- To produce maximum skilled aqua farmers.
- To developed standard culture technique for shrimp farmers in and around.
- To boost aqua production of this district.

Objectives:

- Collection evaluation and maintenance of indigenous and exotic germplasm of coconut and fruit crops.
- To generate germplasm for developing biotic and abiotic stress resistant high yielding varieties of plantation and fruit crops.
- To test and develop new production technology for plantation and fruit crop.
- To produce and distribute seedling of coconut of varieties D x T (Mahuva) among the farmers.
- To develop farming facilities for freshwater and brackish water finfish and shell fish cultivation in saline ground water.
- To develop suitable technology for enhancement of fish and shell fish production in salt affected soil.
- To conduct short term training -cum demonstration on fresh and brackish water Fish/Prawn/shrimp cultivation techniques for fish farmers.

INFRASTRUCTURE:

Total area of farm	**:**	581 ha
Farm area shaded under Malan reservoir water	**:**	127 ha
Farm area shaded under Nicol reservoir water	**:**	89 ha
Farm area under Horticultural crops	**:**	150 ha
Area under Agricultural Crops	**:**	12 ha

Area under Problematic soil	:	112 ha
Area under fisheries research	:	75 ha
Area under structure/buildings/pond	:	16 ha
Irrigation Sources**:** Tube well – 18, Nicol & Malan bandhara Channels		

COMPARATIVE EVALUATION OF FARM CONDITIONS:

Sr. No.	**Components**	**Farm Condition**	
		Up to 1975	**At Present (2021-22)**
1	Name of the Agro-climatic Zone	South Saurashtra Agro-climatic zone – VII	South Saurashtra Agro-climatic zone – VII
2	Rainfall	The annual rainfall of this region for the last five years with an average precipitation of 1000-1200 mm.	The annual rainfall of this region for the last five years from with an average precipitation of 800-1100 mm.
3	Soil	The soil of the farm is Medium black to sandy loam in texture, poor in organic carbon, medium in available potash. Most of the micro-nutrients are up to sufficient level in the soil and soil is highly fertile and productive.	The soil of the farm is Medium black to sandy loam in texture, poor in organic carbon, medium in available potash. Most of the micro-nutrients are not up to sufficient level in the soil and soil became saline with poor drainage, less fertile and low productive.
4	Water	Water table was very high and irrigation facility of good quality water was available throughout the year as Malan river was running through the year and well water was also of good quality.	Irrigation facility of good quality water is dependent on rain fall but not available throughout the year as the flow of Malan river is restricted and well water became salty because of ingress of sea water.
5	Well depth	Water level at 12 ft.	Water level at 50 ft.
6	Temperature	Sub-tropical with humid climate, mean monthly minimum temperature varying	Sub-tropical with humid climate, mean monthly minimum temperature

		from 15 ^{0}C to 22 ^{0}C and maximum temperature varies from 23 ^{0}C to 32 ^{0}C.	varying from 22 ^{0}C to 26 ^{0}C and maximum temperature varies from 32 ^{0}C to 37 ^{0}C.
7	Soil properties	Medium black to sandy loam, highly fertile & productive, responsive to fertilizers and not completely saline.	Medium black to sandy loam, poor in fertility & productivity, low responsive to fertilizers and most of the land under cultivation became saline.

REASONS FOR DEGRADATION OF SOIL:

The object to establish this farm was to bring fellow land of coastal area under horticulture crops like mango, coconut, arecanut, chiku, banana, etc. This farm also situated on bank of Malan River, and there was ample source of sweet irrigation water at that time and because of that large area of farm, it was covered under coconut, mango, chiku, areca nut etc. crops. Equable humid climate of coastal area and evergreen with many horticultural orchards in the city and surrounding area this Mahuva city was well known as a Kashmir of Saurashtra. This status was maintained till 1975 and during this time, two dames were constructed on Malan River. But insufficient and uneven rainfall stopped the flow of Malan River which was running throughout the year. This has resulted in acute shortage of irrigation water. As farmers lifted more ground water for irrigation, ultimately resulted in brackish water and now it has become totally saline.

Thus, irrigation water of this area is totally saline (5-12 EC) which resulted great setback on development and yield potentiality of orchard. Crops like mango and arecanut are totally destroyed; only coconut and sapota which are moderately tolerant against salinity are exists with poor bearing and inferior fruit quality. The nearest city and railway station is Mahuva 3 km away and nearest district place and aerodrome is Bhavnagar, 100km away from Mahuva.

IMPACT OF NICOL and MALAN BANDHARA/RESERVOIR ON FARM:

Government of Gujarat, Salinity Control Board, Gandhinagar in the year 2001-2002 constructed Nicol Bandhara (Reservoir constructed by restricting water flow of river to sea) and the reservoir water made available to the farm for irrigation purpose by means of underground R.C.C. pipe lines of 700 meter length. In the same way in year 2009-10, Government of Gujarat, Salinity Control Board, Gandhinagar constructed Malan Bandhara (Reservoir constructed by restricting water flow of river to sea). This led to increase the

irrigation water availability/sources for farm and efforts are under progress to utilize this water for irrigation purpose whenever it is available. Because of this, the water availability is up to February to March, when these reservoir are over flowed (sufficient rain fall). But in case of insufficient rainfall, the water availability is up to December. This led to reduction in mortality of existing palm up to ten per cent and increased the production and improved nut quality; ultimately resulted in annual farm income which is generated through auction of coconut palms of our station. Irrigation facility also increased the nursery production of quality seedlings of coconut. This has also benefited the ongoing research work at this station as planting of different fruit crops could be possible by utilizing the bandhara water in proper way.

Research Recommendations for the Farmers:

AGRONOMY:

- To get vigorous coconut seedling growth, the farmers of South Saurashtra regions are advised to apply 90 kg Nitrogen per hectare in form of urea and 90 kg nitrogen per hectare in form of castor cake in coconut nursery during fifth month after nut sowing (1993).
- After 1 month opening of the inflorescence in cultivar West coast Tall four sprays of 20 ppm 2 – 4 D at weekly interval are recommended to minimized the nut shedding (1995).
- Coconut growers of South Saurashtra are advised to apply 47 liters Water / palm / day in summer (March to June) and 30 liters water / palm / day during winter (October to February) in adult plantation (40 to 50 Years Old) of West coast Tall variety through four droppers / palm at one meter distance from trunk, saves 47 % of water (1996).
- Coconut growers of Saurashtra region are advised to apply irrigation 22 days interval during winter and summer 15 days interval to the 40-50 years old coconut orchard of virility W.C.T. having basin size 4x4 sq. meter or in 2.50 meter radius circumferences. The mulching was not found beneficial in this type of old plantation (1997).
- Sapota growers of South Saurashtra regions are advised to apply 72 liter water / tree / day in summer (March to June) and 52 liter water / tree / day in winter (October to February) in adult sapota tree (15 to 20 years old) through keeping four drippers / tree as it is saving 32.6 % of water without any statistically reduction in yield (2007).
- The coconut growing farmers of South Saurashtra Agro-climatic region are advised to apply half dose of recommended chemical fertilizers i.e. N.P.K. 200-160-750 g per palm per year along with 5 kg castor cake in two equal splits (June & October) to coconut

cultivar West Coast Tall to increase the nut yield with improvement in nut quality and soil fertility (2009).

- The nursery growers of south Saurashtra agro climatic zone producing coconut seedlings are advised to grow coconut seed nut in month of June under low cost net house (50 % shed net) to get higher quality seedling and net return as compared to open field (2010).
- Onion growers of South Saurashtra Agro climatic zone having sodic soil and brackish irrigation water condition are advised to apply Gypsum 5t / ha with 50 % recommended dose of chemical fertilizer (N-P-K 37.5-30-25 kg/ha) and Neem Cake 900 kg /ha to get maximum yield and net return of onion cv. Talaja Red (2010).
- Vegetable growers of south Saurashtra Agro Climatic Zone growing Bottle gourd cv. Pusa Naveen under sodic soil and brackish irrigation water condition are advised to apply FYM 5 t/ha along with half recommended dose of chemical fertilizer i.e. 50:25:25, N:P:K kg/ha and Poultry Manure 3.3 t/ha to get maximum yield and net return. (2011).
- Farmers of south Saurashtra region growing Sapota cv. Kalipati are advised to apply full recommended dose of phosphorus and potash (450 g/plant P & K each) along with half dose of nitrogen (11.25 kg castor cake) and 100 g *Azatobacter* per plant during onset of monsoon and half recommended dose of nitrogen i.e. 450 g/plant during October to get higher fruit yield and net return. (2011).
- The coconut growers of South Saurashtra Agro-climatic region are advised to apply full recommended dose of chemical fertilizer (1500, 750, 1500 NPK g/palm) and two dose each of 400 ml of nutrient solution in June and October [10 g urea and muriate of potash each, 5 g zinc sulphate, 2 g Ferrous sulphate, magnesium sulphate, Manganese sulphate and Borexeach,1 g Copper sulphate, 10 g Sodium molybdate and Citric acid each and 460 mg NAA (10 ml Planofix) dissolved in one liter of water] through root feeding to get higher nut yield and net return in coconut cv. D x T (Mahuva) (2011).
- Coconut growers of South Saurashtra Agro-climatic Zone are advised to grow sorghum cv. Gundari for green and dry fodder or maize cv. African Tall for dry fodder purpose as an intercrop in adult plantation of coconut hybrid T x D to get additional net return without decreasing coconut yield (2012-13).
- Coconut growers of South Saurashtra Agro-climatic Zone are advised to grow either multi cut sorghum cv. SSG-59-3 or multi cut Napier grass cv. APBN-1 (hybrid Napier) for green fodder purpose as an intercrop in adult plantation of coconut hybrid T x D to get additional net return without decreasing coconut yield (2012-13).

- Coconut growers of South Saurashtra Agro-climatic Zone are advised to grow sunhemp or dhaincha as green manuring crop in adult coconut plantation (TxD hybrid) for improving soil fertility and to get more yield and net return (2013-14)
- The farmers of South Saurashtra Agro-climatic Zone growing Rabi tomato under sodic soil (pH 7.81, ESP 21.84) and brackish water (EC 4.34- 4.88) condition are advised to apply F.Y.M. (5 t/ha) + ½ R.D.F. (N-P-K, 37.5 + 18.75 + 18.75) + Poultry Manure (3700 kg/ha) for securing higher yield and net return (2014-15)
- The farmers of South Saurashtra agro climatic zone growing Green purpose Coriander in summer season are advised to use 75% White Shed net in low cost shed net house for securing higher yield and net return (2016-17)
- The farmers of South Saurashtra agro climatic zone growing Green purpose Fenugreek in summer season are advised to use 75% White Shed net in low cost shed net house for securing higher yield and net return (2016-17)
- The farmers of South Saurashtra agro climatic zone growing Mango cv. Jamadar are advised to apply chemical fertilizers and Poultry Manure as per following schedule for securing higher yield and net return (2016-17)

Age of tree (Year)	Poultry Manure (kg/plant)	N (g/plant)	P (g/plant)	K (g/plant)
4th year	20	160	64	232
5th year	25	200	80	290
6th year	30	240	96	348
7th year	35	280	112	406

PLANT BREEDING:

- Farmers of South Saurashtra region are advised to grow Gudajali (Dwarf green) variety of coconut for drinking water purpose (1982).
- Hybrid variety (D x T Mahuva) of coconut is released for coconut growers of Gujarat State (1995).
- Hybrid variety (T x D Mahuva) of coconut is released for coconut growers of Gujarat State (2006).

PLANT PROTECTION:

- For effective control of bud rot of coconut, spray Bordeaux mixture 4:4:50 or mancozeb 0.2% in 5 liters of water / palm, first spray is to be carried out before onset of monsoon and 2nd and 3rd spray at the in furred of two months to be applied at one month's interval after 1st spray and remaining 3 sprays month interval (1984).

- For effective mechanical control of rat in coconut orchard use galvanized or aluminum sheet of 30 cm width (20 gauge) belt / bell shape to fix on coconut trunk at 2.5 meter height (1985).
- For effective chemical control or rat in coconut orchard apply bromodeolone 0.005% candy (50 gm/tree) or 2% zinc phosphide (1985).
- For effective control of black headed caterpillar in coconut palm of below and above 15 years age apply, monocrotophose 40% @ 5ml /palm and 10 ml /palm with equal quantity of water, respectively by root absorption method (1986).
- For the control of black headed caterpillar in coconut, spray 0.7% endosulphan or 0.07% phosalone of 0.05% monocroptophose (1986).
- For effective control of scale insect to apply phosphamidon 0.03% or monocrotophose 0.05% by foliar spray or monocrotophose10ml/palm with equal quantity of water through root absorption (1996).
- For effective and economical management of eriophyid mite in coconut, root feeding application of azadiractin 2.5 % @ 15 ml with equal water quantity per palm at two months interval throughout the year is recommended under south saurashtra agro climatic zone (2010).
- For the effective and economical management of Eriophyid mite in hybrid coconut (DxT Mahuva), application of half recommended dose of chemical fertilizer (NPK- 0.750, 0.375, 0.750 kg/palm/year) with 50 kg FYM, 1.5 kg gypsum and 0.075 kg borax per palm per year in June and remaining half dose of recommended chemical fertilizer (NPK-0.750, 0.375, 0.750 kg/palm/year) in October, is recommended under south Saurashtra agro climatic zone (2011).
- It inform to farmers and Scientific community that coconut eriophidmite damage was higher in summer and lower in winter**,** higher damage covered in dwarf green variety and less damage covered in west coast tall (WCT), In hybrid variety higher damage found in D x T as compared to T x D.

FISHERIES:

- Fish Farmers are recommended to incorporate three Probiotics *Lactobacillus subtilis* (15x107cfu/g) +*Bacillus subtilis* (10x107cfu/g) +*Sacromycescerevisiae* (10x107cfu/g) in the ratio of 4:3:4@ 3% in fish feed to obtain higher growth, nutritive value and survival rate of *Labeorohita* in rearing pond.

- Shrimp farmers who is willing to culture *Fenneropenaeusmerguiensis*)Banana shrimp) shrimp in their pond are recommended to adopt pond bottom, having combination of sea sand + mud (50:50) with approx. 6 inch sediment thickness, to obtain better growth and survival rate.
- The brackish water shrimp growing farmers are recommended to stock *Littopenaeus vannamei* shrimp seeds @ 25 pc/m^2 to obtain better survival, growth and economical return.
- Shrimp farmers are recommended to stock *Litopenaeus vannamei* shrimp seeds @25 pc/m^2 to obtain better count, good individual shrimp weight, higher survival rate and higher harvesting biomass with low FCR and more profitability.
- Fish farmers culturing Tilapia (*Oreochromis mosambicus*) are recommended **to** utilize dried shrimp sludge as feed @10% of fish body weight along with 5% self-formulated shrimp feed (SFSF) of 30% protein content to obtain better growth, survival rate with low production cost.

AWARD RECEIVED:

- This station won the Sardar Patel Research Award for the development and release of Coconut Hybrid D x T (Mahuva) variety in 1997.

CERTIFICATE:

- Fisheries Research and Training centre has being certified & registered vide no. GJ-II-2016 (761) by Coastal Aquaculture Authority of India, Chennai for SPF *Litopenaeus vannamei* / *P. monodon* commercial/ research aqua farming.

Research Recommendations for Scientific Community:

- From the survey of five districts of South Saurashtra and South Gujarat region, it was observed that only 14.29 % farmers are growing hybrid coconut varieties (D x T and T x D) and 63.81 % farmers preferred seedlings from nursery of university as well as horticulture departments of state Government. While, 38.10 % farmers are growing coconut as per recommended spacing and 50 % farmers follow recommended dose of fertilizers. It was also observed that only 10 % farmers adopt the recommended irrigation practices and none of the farmers is using drip irrigation and plant protection measures in their orchards. Therefore, it is suggested that the extension functionaries are required to motivate the farmers to adopt recommended cultivation practices for coconut (2011).

❖ **Transfer of Technologies**:

The technologies developed at this research station is being disseminated to the various extension agencies, N.G.O's, farmers and students by Organizing trainings, farmers day / agri. fair at the station, by participating in the ' Krushi Mela ', farmers days, world soil health day and Agri. Exhibition organized by University or other agencies and to farmers during visit of this station. Through TV, Radio broadcasting, literature, press note, personnel / spot field diagnosis and letter etc the extension activities is carried out.

❖ **Shrimp species availability:**

The Fisheries scientists are suggested that at Mahuva area cultivable shrimp seeds are available in scanty catch composition of *Metapenaeus kutchensis* followed by *Fenneropenaeus merguiensis, F. indicus* and *P. monodon* with peak during month of Sept. to January whereas at Jafrabad scanty catch composition of *F. merguiensis* followed by *Metapenaeus kutchensis, F. indicus* & *P. monodon* during April to May are available.

ON GOING EXPERIMENTS (2021-22):

1) Research in fruit crops – (B.H.-5014):

Horticulture:

i. Efficacy of different insecticides against Eriophyid mites (*Aceria guerrenonis* Keifer) infesting Coconut Cv. D x T

Bio-control:

i. Studies on seasonal activity *Opisina arenosella* W. and its parasitism.

2) Scheme Center of Excellence for Soil & Water Management Technology (B.H. 12101/04):

i. High Density Planting of Sapota under saline soil

3) Scheme Establishment of New Research Center on Onion Crops Sub-Center-Mahuva (B.H. 12931):

i. Evaluation of Biocontrol agent and its combination against disease complex of onion.

4) Scheme strengthening of research in plantation and fruit crops (B.H.12586)

i) High density planting in Mango cv. Kesar

ii) Evaluation of coconut (*Cocos nucifera* L.) genotype

iii) Effect of Biofertilizers on Seedling Growth and Biochemical Changes of Coconut (*Cocos nucifera* L.)

iv) Management of bud rot disease in coconut nursery.

5) Establishment of Aqua Based Research and Training Centre in Coastal Saurashtra at Mahuva (B. H. 12016): Nil

Future Thrust:

1) Develop biotic and abiotic resistant variety
2) Develop dwarf and early variety
3) Value addition
4) Replanting & rejuvenation of orchard
5) Increase productivity through quality planting material
6) Increase production of hybrid seedlings
7) Followed organic farming
8) Cover orchard with micro irrigation systems
9) Honey bee rearing to induce pollination
10) Fresh fish brood stock development can be taken up.
11) Organic fish and shellfish farming.
12) Fresh water cage farming will be designed and installed in Nikol bandhara.
13) Hatchery development for shrimp variety can be taken up.
14) Construction of commercial aqua ponds and mass experimental trial can be taken up.
15) Rain Water Harvesting by making farm pond/ small check dam and canal construction.
16) Establishment of field gene bank of indigenous/exotic germplasm of plantation and fruit crops for future breeding.
17) Introduction of new fruit/plantation crop adapted to problematic land. Screening of available germplasm of plantation and fruit crops like Coconut, Aracanut, Mango, Sapota, Guava and Ber for problematic land.
18) Development of model for water harvesting, organic farming and reclamation of the problematic soil.
19) To develop sustainable and low cost Integrated Pest, Disease and Nutrient management model for plantation and fruit crops.
20) To establish processing and value addition unit.
21) To find out irrigation technique and methodology for use of saline water in plantation and fruit crops without affecting the yield.
22) Strengthening of nursery activities and supply of good quality planting materials.

23) Till date farm has near about 100 ha. of problematic soil and priority is given to reclaim the same using appropriate measures in the next five years.
24) Planting of mango and coconut will be done in 20 ha. land.

Obstacles:

1) Low man power
2) Saline/Sodic Soil and Water
3) Water scarcity in summer season
4) Problems of wild animals.

ON GOING RESEARCH PROJECTS:

At present there is eleven research projects are being implemented as main center, with one schemes on Onion as a sub research centre for testing of different varieties in multi-location trial centre. Apart from this, two projects of RKVY are also approved and implemented at this station. The details of the research projects are as under.

DETAILS OF ONGOING RESEARCH PROJECTS (2021-22):

Sr. No.	Project Name	B.H.	Starting Year	Objectives
1	Research in Fruit Crops (Non Plan)	5014	1985	- To find out most suitable and low cost production technology in fruit crops.
2	Strengthening of Agro meteorology at JAU (Sub Center) (Plan)	12907	1999	- Establishment of Weather Laboratory at Coastal area for recording weather parameters.
3	Establishment of new centre on Onion Crop (Plan)	12931	2001	- To find out appropriate low cost production technology for onion. Varietal testing for onion and garlic.
4	Centre of excellence for soil and Water Mgt. technology (Sub Centre) (Plan)	12101-04	2005-06	- To determine most effective and low cost water harvesting and irrigation system.
5	Mega Seed Production	18804-03	2006-07	- Production of good quality planting materials and supply to the growers.
6	Strengthening of research in Plantation and Fruit Crops. (Plan)	12586	2008-09	- To find out suitable inter crop for coconut, Introduction of new fruit crops, in situ collection and conservation of Fruit/plantation crops Germplasm.
7	Agro Based I.T.I. for Bhavnagar District. (Plan)	12116-00	2011-12	- Training to farmers for use of micro irrigation system and storage and value addition of Onion.
8	Establishment of Aqua Based Research and Training centre in coastal area of Saurashtra. (Plan)	12016-00	2011-12	- Research and Training on Fisheries.

Seed /Quality Seedling Production (2011-12 to 2020-21)

Sr. No.	Name of Crop/Varieties	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
1	**Groundnut (kg)**										
	1) G.G.2 (Breed.)	-	-	-	-	-	-	-	-	-	-
	2) G.G.7 (Breed.)	-	-	-	-	-	-	-	-	-	-
	3) GAUG.10 (Br.)	-	-	-	-	-	-	-	-	-	-
	4) G.G.20 (Gen.)	2410	-	-	-	-	-	-	-	-	-
2	**Wheat (kg)**										
	Lok-1 (General)	4990	-	-	-	-	-	-	-	-	-
3	**Coconut Seedling (No.)**										
	1) Dwarf Green	4224	4600	12729	57385	11780	14669	5250	18499	8176	4483
	2) D x T (Mahuva)	1238	3815	4943	10255	4860	2215	2406	7401	14629	8784
	3) Others cv.	2392	8913	7783	12980	9565	6208	12143	27076	28181	24646

Significant Achievements: Year 2011-2021

1: Establishment of Elite Seed Farm:

To fulfill the demand of hybrid coconut a project Under RKVY 2009-10, "Establishment of Elite Seed Farm for Coconut D x T (Mahuva) seed nut Production" for large scale production of D x T (Mahuva) seed nut and seedlings successfully established at this station. Under this project total 1570 plants of coconut cv. Dwarf Green as female and 700 plants of coconut cv. West Coast Tall as Male has been planted during July-2011 and protection has been done by means of cement pole, barbed wire and galvanized iron wire chain link. It is estimated that this farm will produce more than 50,000 hybrid nuts per year from year 2019 and onwards.

2: Farm Development and Farm Protection:

Land Development activity was started from year 2009 and the aim was to bring out the waste land under cultivation. Total 125 ha. of land was made favorable for cultivation by removing babool kant and leveled using dodger and other machineries. Along with this, farm protection activity started and all opened area was protected by means of digging an open canal, cement pole, barbed wire and galvanized iron chain link to avoid problems of wild animals. Near about 6 km boundary area protection has been done and remaining near about 6 km boundary area protection will be done as early as possible.

3: Development of new plots

3.1 Vrajvadi

Hybrid coconut D x T (Mahuva) was famous among farmer community and high demanding cultivar right now. To fulfill the demand of farmers, mother block of green dwarf variety has been developed having around 1700 plant in 3.5 ha area. From this mother block, D x T seed nut was collected and used to raising D x T seedling for the farmer**.**

3.2 Coconut Museum:

Coconut museum was built in the front of main office. In this museum, different types of coconut cultivar have been planted for live demo purpose. Different eight cultivar like D x T hybrid, T x D hybrid, Green Dwarf, West coast Tall and F2 planted.

3.3 West Coast Tall Plot:-

WCT is our indigenous varieties having excellent tolerance against salt and water scarcity but due to tallness, this variety become less preferable by the farmers. To conserve this indigenous cultivar, we have prepared plot having 1500 West Coast Tall plant. It also help to naturally cross pollinate our ellite seed farm.

4: Strengthening of Irrigation facilities:

As this center is mainly working on plantation crop like coconut and other horticultural crops like mango and sapota, "irrigation facilities throughout the year" is the pre requisite for establishment of new planting and maintenance of existing old plantation. Because of Nikol and Malan bandhara (reservoir), there is increase in water availability surroundings to the farm. Hence intensive efforts have been made to utilize this water for irrigation more conveniently. After doing preliminary survey, some points are identified which will supply irrigation water by lifting throughout the year from the reservoir water depending on rain fall. Construction of canal, sump and near about 1000 m network of pipe line was planned and being used to get irrigation water throughout the year easily, economically and permanently. Apart from this, care has been taken for water conservation and water harvesting by making farm pond. In newly planted plots drip irrigation systems installed to save water. During 2020-21 dig out of one pond near elite farm is planned.

5: Produce skilled aqua farmer's:

Fisheries Research and Training centre has initiate in 2011-12 with culturing shellfishes and training cum demonstration. Total 8 brackishwater pond, out of that 4 ponds are of 0.1 ha whereas another 4 ponds of 0.17 ha, whereas freshwater ponds are concern, total 8 ponds, each pond of 0.22 ha. This centre has conducted total 15^{th} five days training programme and certified total 580 trainees. From total around 32% of the trained entreprenure / aqua farmers, almost 185.6 no of participant has constructed their own shrimp culture business or either in partnership firm or rendering their service as technical persons to aqua farming business.

In the year 2017-18 Hon'ble Collector, Bhavnagar district has allotted around 200 hectors of Govt. kharland / wasteland to active fish farmers/ entrepreneur's, among the total, Fisheries Research and Training Center, JAU., Mahuva station fourteen (14) selected trainees were allotted 3.5 hectors Govt. khar-land/person (total 49 hectors) for shrimp farming purpose at Kotda and Jaswantpara village of Bhavnagar district by the ORDER from the Collector office, Bhavnagar.

In the year 2019-20, our research station has produce 117.5 kg of *Litopenaeus vannamei*in 0.012 ha achieving max. & min individual wt of 31.3 g to 22.3g, whereas in freshwater aquaculture pond, due to COVID-19, market demand was held up and hence we could not harvest our produce Catla, Rohu, Mrigal and Magur fish from the pond.

EXTENSION ACTIVITIES (2021-22):

S. No.	Particular	Date	Place	No. of Attendee	Faculty
1	Lectures in khedut shibir organized by ATMA Bhavnagar	01-01-2021	Mota Ashrana, Ta. Mahuva	50	G. S. Vala V. S. Bambhaniya
2	Lectures in khedut shibir organized by Pidilite Ind. Ltd.	01-01-2021	Galthar, Ta. Mahuva	50	G. S. Vala V. S. Bambhaniya
3	Honeybee training organized by Modhr dairy Amreli	06/01/2021	ARS, Mahuva	60	Dr. G. S. Vala V. S. Bambhaniya V. R. Ahir
4	Lectures in khedut shibir organized by ATMA Bhavnagar	08-01-2021	Thordi, Ta. Mahuva	30	G. S. Vala V. S. Bambhaniya
5	Honeybee training organized by Modhr dairy Amreli	10/01/2021	ARS, Mahuva	60	Dr. G. S. Vala V. S. Bambhaniya
6	Certificate course on pesticide management	01-07-2021 to 30-09-2021	ARS, Mahuva	40	All staff
7	Farmer training, NFSM (OS & OP)	28-07-2021	Vejodari Ta. Talaja	50	V. R. Ahir T. K. Mandaviya
8	Farmer training, NFSM (OS & OP)	04-08-2021	Juna Padar Ta. Jesar	50	Dr. G. S. Vala T. K. Mandaviya
9	Farmer training, NFSM (OS & OP)	13-07-2021	Pithalpur Ta. Talaja	45	V. R. Ahir V. S. Bambhaniya
10	Farmer training, NFSM (OS & OP)	23-07-2021	Akhegadh Ta. Mahuva	60	Dr. G. S. Vala V. S. Bambhaniya
11	Farmer training, NFSM (OS & OP)	14-07-2021	Ratol Ta. Mahuva	35	V. S. Bambhaniya R. D. Kapadiya
12	Farmer training, ATMA project- kheda	13-09-2021 to 15-09-2021	ARS, Mahuva	50	All Staff
13	Lecture in RAWEP	12-10-2021	ARS, Mahuva	20	V. C. Dodiya

14	Certificate course on pesticide management	01-10-2021 to 31-10-2021	ARS, Mahuva	90	All staff
15	Farmer training, ATMA project	18/11/2021	Junapadar	35	V. S. Bambhaniya
16	KrishiRath	18/11/2021	Jeser to Bila	1000	V. S. Bambhaniya
17	KrishiRath	19/11/2021	Sendarada to Katpar	1000	V. C. Dodiya
18	KrishiRath	20/11/2021	Thaliya to Trapaj	1000	T. K. Mandaviya
19	Farmer training, ATMA project-Junagadh	23-12-2021 to 25-12-2021	ARS, Mahuva	50	All Staff
20	RAWEP Student, JAU, Junagadh	04-10-2021 to 31-10-2021	ARS, Mahuva	41	All Staff
21	READY Industrial Tour of 8th semester B. Tech- FPT student, AAU, Anand	27-12-2021 to 28-12-2021	ARS, Mahuva	48	All Staff
22	Honeybee training organized by Mother dairy Amreli	28/12/2021	ARS, Mahuva	60	Dr. G. S. Vala V. S. Bambhaniya
23	Three Month Certificate Course on Pesticide Management under the guidance of NIPHM, Hyderabad	01/01/2022 to 31/03/2022	ARS, Mahuva	54	All Staff
24	One day Khedut Sibir on “Scientific farming of Horticultural & vegetable Crops” organized by Pidilite	22/02/2022	ARS, Mahuva	80	T. K. Mandaviya & V. S. Bambhaniya
25	Gopnath Cluster Workshop organized by Costal Salinity Prevention Cell, TATA Trust- TALAJA	14/03/2022	Gopnath village	250	T. K. Mandaviya

HRD PROGRAMME (2021-22):

1. T. K. Mandaviya has participated in the online workshop cum training on "Edible insect and non-conventional foods as a nutrient pack and livelihood security" organized by the College of Horticulture and Forestry, Central Agricultural University (Imphal), Pasighat, Arunachal Pradesh, funded by National Mission for Himalayan Mission Studies, (NMHS), MoEF, GBPNIHESD, Almora, held on 27th to 29th January, 2021.
2. V. C. Dodiya has participated in the Global Virtual-Summit on "Management of Degraded Lands for Restoring our Earth" organized online by International Soil Conservation Organization (ISCO), India held on 22nd April, 2021.
3. T. K. Mandaviya has participated in the International Webinar on "Role of Legumes and Pulses in Sustainable Cropping System of Hot Arid Zone", organized by Swami keshwanand Rajasthan Agricultural University, Bikaner on July 17, 2021.
4. T. K. Mandaviya has Participated in the online national training on "Mushroom Entrepreneurship-An initiative towards Atmanirbhar Bharat" organized by the College of Horticulture and Forestry, Central Agricultural University (Imphal), Pasighat, Arunachal Pradesh, held on 4th January, 2021.
5. V. C. Dodiya has participated in the National webinar on Sustainable Organic Farming: Techniques and Certification" organized by the Department of Agronomy in collaboration with AICRP on Pigeonpea, Tripura Centre, College of Agriculture, Tripura, India held on 17th & 18th May, 2021.
6. V. C. Dodiya has participated in the National level virtual seminar on "Health of Mother Earth – Conservation of Ecosystem and Biodiversity for Sustainable Development" jointly organized by All India Women's Conference, New Delhi and Junagadh Agricultural University, Junagadh, India held on 4th June, 2021.
7. V. C. Dodiya has participated in the one day virtual National webinar on "Statistics for Food Security and Promoting Sustainable Agriculture" organized by Department of Agricultural Statistics, N. M. College of Agriculture, Navsari Agricultural University, Navsari, India held on 29th June, 2021.
8. V. C. Dodiya has participated in the one day virtual National webinar on "Recent Advances in Production Technology and Value Addition of Coconut" jointly organized by All India Coordinated Research Project (Palms) and ASSPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, India held on 9th August, 2021.
9. Dr. A.S. Kotiya has participated and delivered ORAL presentation on a paper "Economic assessment of *Litopenaeus vannamei* (Boone, 1931) culture with different stocking density in earthern pond during monsoon season along Saurashtra region of Gujarat coast" Organized by Agribusiness Potential in North Eastern Region with Special Reference to Tripura (NESFA) during 8-9th Sept. 2021.
10. V. C. Dodiya has attended International Virtual Workshop on "Soil carbon for sustainable crop production and soil health management 2021" held on 5th October, 2021.
11. V. S. Bambhaniya has attended training on Govermnet e-Market (GeM) portal at JAU, Junagadh held on 19th November, 2021.

12. V. R. Ahir and T. K. Mandaviya have attended seminar on "Maintenance of the quality and safety of Horticultural and Food crops through biological control of pests and disease" organized by NAU, Navsari held on 30th December, 2021.

PUBLICATION:

1. Mandaviya, T. K., Ahir, V. R. and Bambhaniya. V. S. (2022). Mushroom ni Vagyanik Kheti Padhdhti. Krushi Prabhat. p 13.
2. Mandaviya, T. K., Ahir, V. R., Bambhaniya. V. S. and Kachchdiya, N. M. (2022). Onion dehydration: Mulyavardhan ni ek agvi rit. Krushi Prabhat. p 17.
3. V. C. Dodiya, G. S. Vala and H. J. Senjaliya (2021). Effect of different shade net on performance of fenugreek (*Trigonella foenum-graecum* L.) in summer season. *Current Horticulture* **9**(1): 63–64.
4. Kotiya Anil S, KH Vadher (2021) Comparing the most preferred feed for Mud Spiny Lobster *Panulirus polyphagus* growth in pit culture at intertidal area of Akatariya (Mahuva) coast. Journal of Survey in Fisheries Science, **7(2):** 143-160.
5. Kotiya Anil S, KH Vadher (2021) Effect of Different Stocking density on growth survival of *Litopenaeus vannamei* (Boone, 1931) in summer crop in province of Gujarat state, *India. J. Exp. Zoo. India*, 24(1); 261-275.
6. Kotiya Anil S, KH Vadher (2021) Effect of Different Stocking density on growth survival of *Litopenaeus vannamei* (Boone, 1931) in summer and monsoon crop in province of Gujarat State in *India. Journal of Survey in Fisheries Science,***7(3):** 71-99.
7. Vala. G. S., V. C. Dodiya, T. K. Mandaviya and Bambhaniya. V. S. (2020). Influence of Integrated Nutrient Management on Various Growth Attributes and Yield of Mango (*Magnifera indica* L.) cv. Jamadar. *Int. J. Curr. Microbiol. App. Sci*. 9 (06): 1591-1596. doi: https://doi.org/10.20546/ijcmas.2020.906.196
8. Mandaviya. T. K., Vala. G. S., Dodiya, V. C. and Bambhaniya. V. S. (2020). Ambani vyagnanik kheti. Krushijivan. 629
9. Mandaviya. T. K. (2020). Review on Impact of Climate Change on Plant Diseases. Agriallis E-newsletter. 2 (10)
10. Kotiya A.S, KH Vadher (2020). Effect of different stocking density on *Litopenaeus vannamei* cultured during monsoon season on carcass composition at province of Gujarat states in India. *Journal of Entomology and Zoology Studies*. 8**(2):** 1264-1279.

11. Kotiya A. S., Vala, G. S., Kachhadiya N. M., Ahir, V. R. and Dodia, V. C., 2019. Spawning of Spiny Lobster Panulirus polyphagus in the Tanks in Laboratory Condition: A Success Story. Agrobios Newsletter,18(1): 138-139.
12. Kotiya Anil S. and Vala Ghimbhirsinh. (2019). Effect of Borassus Flabellifer Sap (Toddy) on Shellfish Culture Water pH. Agrobios Newsletter,18 (4): 133-134.
13. Kotiya Anil S. (2019). Culture of Scylla serrata (Forskal) in Polythein Lining Pond Bottom. Agriculture & Food E-newsletter.
14. Kotiya A.S, KH Vadher, AJ Bhatt and Dave TH (2019). Comparison of proximate composition level in Litopenaeus vannamei cultured in various Stocking density during summer crop in province of Gujarat states in India. Journal of Entomology and Zoology Studies. 7(5): 59-72.
15. Kotiya A.S. (2021). The importance of liming to pond bottom soils and its effect on aquatic species. Recent approaches in sustainable agriculture development and food security, crop management, forestry, food technology and environmental balanced production enhancement by Mahima Research Foundation and Social Welfare, Varanasi. pp: 160-165, ISBN:978-81-943375-4-6

Agricultural Research Station, JAU, Mahuva, Dist. Bhavnagar

Office Staff Position as on 01-05-2022

Sr. No.	Name of Post Sanctioned	No. of Post Sanctioned	No. of post Cancelled	No. of post exist on 1/5/22	No. of Post Filled	No. of Post Vacant
B.H. : 5014 Research in Fruit Crops (Non Plan)						
1	Assoc. Res. Sci.	1	0	**1**	1	0
2	Asstt. Res. Sci.	1	0	**1**	1	0
3	Agril. Officer	3	0	**3**	2	1
4	Agril. Supervisor	2	1	**1**	1	0
5	Agril. Assistant	6	1	**5**	4	1
6	Head Clerk	1	0	**1**	0	1
7	Senior Clerk	1	0	**1**	1	0
8	Junior Clerk	2	0	**2**	1	1
9	Tractor Driver	2	1	**1**	0	1
10	Peon	1	0	**1**	1	0
11	Mali/Watch man	2	2	**0**	0	0
12	Guard	3	2	**1**	1	0
13	Farm Labour	8	8	**0**	0	0
14	Khet Majdoor	57	48	**9**	9	0
15	Goval	1	1	**0**	0	0
16	Security guard	10	6	**4**	4	0
	Total	**101**	**70**	**31**	**26**	**5**
B.H.: 12586 Strengthening of Research in Plantation and Fruit crops (Plan)						
1	Res. Scientist	1	0	1	0	1
2	Asstt. Res. Sci.	4	0	4	1	3
3	Agril. Officer	3	0	3	3	0
4	Agril. Assistant	1	0	1	1	0
5	Mali /Peon 2+1	2+1	3	0	0	0
	Total	**12**	**3**	**09**	**05**	**04**
B. H.: 12116 Agro Based ITI (Plan)						
1	Associate Professor	1	1	0	0	0
2	Agri. Officer	1	0	1	1	0
3	Agri. Asstt.	1	0	1	1	0
	Total	**3**	**1**	**2**	**2**	**0**

Agricultural Research Station (Fruit Crops)
Junagadh Agricultural University, Mahuva, Dist. Bhavnagar.

Statement showing Expenditure (Rs.) of last ten years (2011-12 to 2020-21)

Sr. No.	Year	Budget Head												Total (Rs.)
		5014	5002	12931	12101-04	18804-03	12586	9510-J13	18004-10	12116	12016	12907	18004-16	
1	2011-12	13806987	1933773	295212	274053	256236	6471014	1640000	1376631	199901	1378362	-	-	27632169
2	2012-13	11778565	-	289711	303416	314345	6872341	-	-	1935809	1545803	-	-	23039990
3	2013-14	14220842	-	359232	388335	207424	8896678	-	-	1442125	1611835	-	-	27276194
4	2014-15	12637886	-	1639676	999608	232062	6459324	-	-	1893631	2276798	199870	-	25738855
5	2015-16	133311756	-	599999	569996	28000	6356227	-	-	2720706	33999948	301707	-	27859501
6	2016-17	11857573	-	1095493	539712	355130	7197337	152760	-	2556602	2093489	429189	-	26277285
7	2017-18	14816448	-	556745	399721	256442	10514010	290270	-	2994963	1691417	199044	-	31719060
8	2018-19	15303131	-	599931	1173313	1085660	9016370	-	-	5532397	1785884	139832	97500	34734018
9	2019-20	15188421	-	555873	581724	2609399	9808416	-	-	2881044	1475979	153313	-	33254169
10	2020-21	14011760	-	712197	454493	3086107	8414376	-	-	1628579	1354914	134922	-	29797348

Statement showing Income (Rs.) of last ten years (2011-12 to 2020-21)

Sr. No.	Year	Budget Head												Total (Rs.)
		5014	5002	12931	12101-04	18804-03	12586	9510-J13	18004-10	12116	12016	12907	18004-16	
1	2011-12	921848	43075	7206	4166	669717	1400	1723456	-	-	-	-	-	3370860
2	2012-13	760108	-	-	-	385259	-	1932036	-	13010	-	-	-	3090413
3	2013-14	1783936	-	-	97919	270875	100085	-	-	-	4800	-	-	2257614
4	2014-15	1534503	-	-	-	452850	-	-	-	13150	5037	-	-	2005540
5	2015-16	1558313	-	-	-	1440075	-	-	-	-	-	-	-	3040882
6	2016-17	2120799	-	-	-	728802	36117	507992	-	11550	6726	-	-	3411986
7.	2017-18	1784972	-	-	-	826358	349070	892028	-	156280	88792	-	-	4097500
8	2018-19	2775075	-	21420	-	3401967	273490	279074	-	245320	103250	-	-	7099596
9	2019-20	3286828	-	63615	-	3678321	675770	1670725	-	110100	41330	-	-	9526689
10	2020-21	5139188	-	-	-	4126137	807780	14457751	-	54350	50	-	-	11573280

Note: Income and Expenditure are up to “March End” for the respective year.

ACHIEVEMENTS:

VARIETIES RELEASED/RECOMMENDED and IRRIGATION CANAL CONSTRUCTION

DWARF GREEN 1982

D X T (MAHUVA) 1995

T X D (MAHUVA) 2006

NICOLBANDHARA CANAL 2001

Coconut germplasm at ARS, Mahuva

High density planting in Mango (3ha.)

Elite farm seed production

Coconut seed production

Farm Development work

Training under NFSM scheme at ARS, Mahuva

Independence day celebration at ARS, Mahuva

8th semester student visit at ARS, Mahuva under RAWEP Programme

National Service Scheme Activity at ARS, Mahuva

Three Month Input Dealer Certificate Course Inauguration

Certificate Distribution Program at ARS, Mahuva