Technology developed

Agricultural technology developed in the form of research recommendations for farming community and also for scientific community in the Department of Soil Science are as under:

1. Total 44 (Forty four) Research Recommendations were approved and emerged out till date for the farming as well as scientific community of the South Gujarat agro-Climatic zone out of various research activities carried out in this Department on different crops (Sugarcane, Paddy, Sorghum, Sapota, Pigeon-pea, Highbred Napier grass) crops sequence (Paddy- Sugarcane, Sorghum-Ground Nut-Paddy, Paddy-wheat- Green Gram, Paddy – wheat, Paddy-Paddy) and other aspects (Organic manures, method of nitrogen measurement, preparation of compost and vermicompost, and establishment of relationship of soil salinity with saturated solution). The details of recommendations are giving as under:

Recommendations for farming and scientific community:

1. (1992-93)	Sugar cane growers of south Gujarat Heavy Rainfall Agro climatic zone are advised to apply P_2O_5 @ 125 kg/ha to fresh crop and in first ratoon P_2O_5 @ 62.5 kg/ha
2. (1992-93)	Sugar cane growers of south Gujarat Heavy Rainfall Agro climatic zone are advised to apply P_2O_5 @ 125 kg/ha to fresh as well as first ratoon and @ 62.5 kg/ha to second ratoon. The marginal farmers are advised to apply P_2O_5 @ 125 kg/ha to fresh crop and 62.5 kg/ha to first and second ratoon.
3. (1993-94)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone (AES-III) adopting rabi sorghum-summer groundnut-kharif paddy cropping sequence are advised a aaply 5.0 tones of press mud along with 140 kg P_2O_5 per hectare to first crop of sorghum before sowing in furrow for getting higher yield and monetary return (1:2.54) No more P_2O_5 should be added afterwards. The marginal farmers can return a CBR of 1:2.53.
4. (1993-94)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone (AES-III) are advised to apply zinc @ 5.0 ppm (50 kg zinc sulphate / ha) before puddling o paddy variety Jaya or GR-11 grown in kharif in zinc deficient soil for getting higher yield and net ICBR (1:4:27) and return of Rs. 2729/ha. The marginal farmers can apply zinc @ 2.5 ppm (25 kg zinc sulphate / ha) and can earn a net return of Rs. 1668 per hectare with net ICBR OF 1:5:21.

5. (1993-94)	Sugarcane growers of south Gujarat Heavy Rainfall Agro climatic zone (AES-III) are advised to apply N-P_2O_5 –K_2O @ 250-125 kg/ha to variety Co-8338 for getting higher yield sugar recovery and net ICBR of 1:3.77. The Marginal farmers can apply N-P_2O_5 –K_2O @ 190-95-95 and can earn a net ICAR of 1:3.06. The earlier recommendation of application of P_2O_5 –K_2O @ 250-125 for variety Co.C. 671 is confirmed for variety Co.8338.
6. (1994-95)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone growing kharif paddy in zinc deficient soil and applying zinc sulphate @ 25 for 50 kg/ha need not apply any amount of zinc to succeeding crop of wheat as these treatments showed residual effect on wheat by increasing its yield by 12 and 22% respectively, over control.
7. (1994-95)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone growing sugar cane (without any organic amendments) in soils marginal in available S are advised to add press mud @ 15 t/ha or 100 kg sulphur per hectare at the time of planting through either ammonium sulphate or gypsum to get 15 to 17 % more yield over control.
8. (1994-95)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone are not advised of lime in sugarcane.
9. (1995-96)	Farmer's practice of applying lime in sugarcane and burning of trash of sugarcane were found non-advantageous.
10. (1995-96)	The farmers of south Gujarat Agro climatic zone, growing pigeon pea varieties, BDN-2, Nylon or Bhadbhoot under rain fed conditions in S deficient soil are advised to apply S@ 40 kg/ha through gypsum along with recommended doses of N and P_2O_5 foe getting 19 percent more yield.
11. (1995-96)	Application of pressmud (12 t/ha) in conjuction with pseudomonas inoculation (@2.5 kg/ha) can save 50% of inorganic P fertilizer in sugarcane.
12. (1996-97)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone growing Okra Cv parbhani kranti in soils having low in available N and medium in available P are advised to apply pressmud @ 20 t /ha 15 days prior to sowing and 75 kg N / ha in three equal splits each at sowing and 30 and 60 days after sowing for getting additional income of Rs. 36,776 with a CRB OF 9.77.
13. (1996-97)	Soil Test Based Targeted Yield equation were developed for phosphorous and potassium for sugarcane crop. Doses of P_2O_5 (kg/ha) = 2.24 x T - 3.97 x STV (for available P_2O_5) Doses of P_2O_5 (kg/ha) = 2.64 x T - 3.383 x STV (for available K_2O)
14. (1997-98)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone practicing paddy-wheat sequence in zinc deficient soil are advised to apply 25 kg zinc sulphate / ha at pudding without applying any amount o zinc sulphate to succeeding crop of wheat to get about 14 percent more income.
15. (1997-98)	In AES-III of south Gujarat Heavy Rainfall zone, application of vermicompost @ 5 t / ha (for planted crop) or 2.5 t / ha (for ratoon crop) either

	along or in combination with 7.5 or 50 percent recommended dose of N, P_2O_5 and K_2O was not found advantageous.
16. (1998-99)	The farmers of south Gujarat Heavy Rainfall (AES-III) are advised to apply S @ 20 kg / ha as gypsum at the time of sowing to only oilseed crop grown on soils of low to medium available – S in crop sequence viz, kharif paddy – Fallow – Summer green gram or kharif paddy – Rabi mustard- Summer green gram to get higher yield as well as net return.
17. (1999-2000)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone (AES-III) adopting kharif paddy rabi wheat sequence are advised apply only 50% of recommended dose of both N & P_2O_5 (i.e. 50-25 kg/ha for kharif paddy and 60-30 kg/ha for wheat) along with turning of straws for getting sustainable yield and higher net return. Alternatively farmers can also apply 50% of recommended dose of N- P_2O_5 to both paddy and wheat along with either FYM @ 10 t / ha or pressmud @ 10 t / ha to paddy crop only.
18. (1999-2000)	The Sapota growers of south Gujarat Heavy Rainfall Zone – 1 and agro ecological situation – III are advised to apply 5 tons vermin compost (50 kg/tree) + 20 tons FYM (200 kg/tree) for obtaining higher yield which also improve organic carbon status and structure of the soil.
19. (2000-01)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone (AES-III) growing sugarcane are advised to apply recommended dose of P_2O_5 to plant (125 kg / ha) and ratoon (62.5 kg / ha) crop. Alternatively they can apply 31.3 kg P_2O_5 / ha along with 10 tones seasoned press mud to plant crop and only 15.7 kg P_2O_5 / ha to ratoon crop per hectare for getting higher sustainable yield. By this way they can maintained the yield and reduce the dose of inorganic phosphatic fertilizer by 75%.
20. (2000-01)	The farmers of south Gujarat Agro climatic zone – II growing grain sorghum in the soils low in Zn and Fe are advised to apply FYM @ 5 t / ha with recommended dose of N (80 kg / ha) and P_2O_5 (40 kg/ha) to fulfill the Zn and Fe requirement of sorghum crop and to obtain 22 percent more yield with 1:3.39 ICBR. Zn and Fe both @ 5.6 kg/ha in the form of zinc sulphate (25 kg/ha) and ferrous sulphate (25 kg/ha), respectively along with recommended dose of N and P_2O_5 to get 11 percent higher yield and 1:3.77 ICBR.
21. (2000-01)	The sugarcane growing farmers of south Gujarat Heavy Rainfall Agro climatic zone (AES-III) are advised not to apply zinc in their zinc deficienct soil if they are growing sugarcane variety CoN 91132 and following out recommendation of 25 tones of FYM supplemented with 250-125-125 and 300-62.5-125 N- P_2O_5 - K_2O per hectare, respectively for plant and ratoon sugarcane crop.
22. (2001-02)	The Sapota (cv.kalipati) growers of south Gujarat Heavy Rainfall Agro climatic zone and agro ecological situation – III are advised to apply 100 kg FYM / tree before monsoon and after cessation of monsoon for getting higher yield and

	income as well as good quality of fruit and improve soil fertility. but this way 50% chemical fertilizer is saved.
23. (2005-06)	Sugarcane (CoN 91132) growers of south Gujarat Heavy Rainfall Agro ecological situation III are advised to take two ratoon crops of sugarcane to fertilize with treated trash ! 10 t/th along with 100% recommended dose of NPK (300-62.5-125 kg/ha) to get sustainable higher sugarcane yield. The marginal farmers can apply 75 percent RDF with 10 t/th treated trash incorporation. Under both the treatment rotational *kharif* paddy also gave higher yield, without any adverse effect on soil quality (Note : for each tone of trash 10 kg single super phosphate + 8 kg urea + 100 kg dung + 1 kg decomposing culture were taken. The slurry should be prepared and pored on trash.)
24. (2005-06)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone – I (AES-III) following paddy-paddy sequence, Var. Jaya,either in *kharif* – summer or summer-kharif on soils having marginal Fe and deficient Zn status are advised to use soil application of micronutrient mixture having Fe-2%, Mn-0.5%, Zn-0.5%, Cu-0.2% and B-0.5% equivalent to govt. notified general grade –V of soil application @ 20 kg ha^{-1} to first crop only at the time of pudding as a basal dose to get higher paddy yield and net return. Alternately, farmers are advised to spray 1% foliar mixture of multi micronutrient formulation having Fe-2%, Mn-0.5%, Zn-4.0%, Cu-0.3% and B-0.5% equivalent to Govt. notified general grade-I (Normal) at 15,30,45 and 60 DAT to get higher paddy yield and net return.
25. (2006-07)	The farmers of south Gujarat Heavy Rainfall zone – AES-III following paddy (k)- paddy (s) crop sequence are advised to apply the fertilizer as per soil test values. When it is not feasible to go for soil testing before each crop, they are advised to apply 100% N and 50% P_2O_5 as per recommendation to both the crop + PSB for realizing higher income.
26. (2006-07)	The farmers of south Gujarat Heavy Rainfall Agro climatic zone – I (AES-III) are advised to apply 100 percent RDF (250-125-125 NPK kg/ha) + 25 percent N through FYM + bio fertilizers (Azotobacter + PSB each @ 2 kg/ha) to plant and 100 percent RDF (300-62.5-12.5 NPK kg/ha) + trash incorporation @ 10 t/th + bio fertilizers (Azotobacter + PSB each @ 2 kg/ha) to ratoon crop for higher cane yield and net income and also for sustaining soil health.
27. (2007-08)	Farmers of south Gujarat Heavy Rainfall zone (AES-III) adopting paddy (*kharif*) – sugarcane crop sequence are advised to cultivate two time with tractor – drawn-cultivator before monsoon followed by just planking before transplanting paddy to get higher yield of sugarcane and net return from the sequence.
28. (2008-09)	Farmers of south Gujarat Heavy Rainfall Agro climatic zone (AES-III) growing fodder hybrid Napier grass (Cv.Co-3) are advised to apply 900 kg N/ha along with 60 kg/ha each of P_2O_5 and K_2O every year for getting higher green fodder yield of Napier grass. They are advised to apply full dose of P and K along with 100 kg N/ha as basal dose. The remaining N is to be applied in eight equal

<table>
<tr><td></td><td>splits after each cutting, besides the application of FYM @ 20 t/ha every year as common practice.</td></tr>
<tr><td>29.
(2008-09)</td><td>Farmers of south Gujarat are advised to prepare nutrient-rich organic fertilizer by using cattle dung and sugarcane trash at 70:30 ratio.</td></tr>
<tr><td>30.
(2009-10)</td><td>Farmers of south Gujarat can prepare enriched organic manure 40-50 days through microbial consortium composting process using cattle dung,waste/by-product of wheat, pigeon pea and Indian bean, leaves/twings of gliricidiya, subabul and sunhemp, rock phosphate, animal urine, castor cake, FYM and soil by adopting following ratio of raw materials.
<table>
<tr><td>Quality of enriched organic manure</td><td>Ratio and Raw materials</td><td>C:N ratio</td></tr>
<tr><td>First Grade</td><td>50:25:5:10:5:3:2 {cattle dung : (leaves/twings of Subabul + Sunhemp + gliricidiya) : Rock phosphate : animal urine castor cake : FYM : soil}</td><td>12.5</td></tr>
<tr><td>Second Grade</td><td>50:25:5:10:5:3:2 {cattle dung : (waste/by-product of Pigeon pea + Indian bean) : Rock phosphate : animal urine : castor cake : FYM : soil}</td><td>14.7</td></tr>
<tr><td>Third Grade</td><td>50:25:5:10:5:3:2 {cattle dung : (waste/by-product of wheat straw) : Rock phosphate : animal urine : castor cake : FYM : soil}</td><td>22.5</td></tr>
<tr><td>Fourth Grade</td><td>100% cattle dung (control)</td><td>26.0</td></tr>
</table></td></tr>
<tr><td>31.
(2012-13)</td><td>1) Preparation of vermicompost :
Farmers of south Gujarat specially those cultivating banana are advised to utilize banana pseudo stem for preparation of quality vermicompost by mixing it with cattle dung in the ratio of 1:1 (w/w) = cattle dung : banana pseudo stem (chopped to 2 to 3 cm size) with addition of 5% rock phosphate through process of partial decomposition of raw materials by decomposing culture for one month and subsequently by vermicomposting through use of earthworm (Eurdrilus enginae) for about 2 month to obtain superior quality vermicompost with C:N ratio of 16:1 and total N,P and K content of about 2.4%, 1.4% and 0.7% respectively. Further, farmers are advised to make alternate layers (5 to 6 layers each with 6 to 7 cm depth) of cattle dung and banana pseudo stem.</td></tr>
<tr><td>32.
(2012-13)</td><td>2) Preparation of compost
Farmers of South Gujarat specially those cultivating banana are advised to utilize banana pseudo stem for preparation of good quality compost (with about C:N ratio of 18.8:1 and total N,P and K content of about 2.1%, 1.6% and 0.8% respectively) by mixing it (banana pseudo stem chopped to 2 to 3 cm size) with cattle dung in the ratio of 1:1 (w/w) with addition of 5% rock phosphate and completely saturating with " spraying solution of microbial consortium " consisting Lactobacillus sp., Rhodopseudomonas sp. and Sacchromyces sp. for quick process of microbial decomposition of raw materials for 53-55 days i.e. in</td></tr>
</table>

	about 35 days less time as compared to duration for preparation of vermicompost. Further, farmers are advised to make alternate layers (5 to 6 layers each with 6 to 7 cm depth) of cattle dung and banana pseudo stem saturated with " spraying solution of microbial consortium". **Procedure for preparing "spraying solution of microbial consortium" from stock solution:** It involves two steps. Firstly for multiplication of microbial population, 1 lit stock solution consisting *Lactobacillus sp.*, *Rhodopseudomonas sp.* and *Sacchromyces sp.* is mixed with 2 lit molasses or 2 kg jaggery and 17 lit of water. The prepared solution is kept in an air tight clean plastic container leaving no air inside the container. Then the container is stored in shade, away from sunlight at ambient temperature. Gas once in 24 hours. When whitish layer of yeast start to appear on surface of the solution after 7-10 days with a pleasant smell and pH drops below 3.5, the solution is ready. In the 2nd step, 500 ml of above prepared solution is mixed with 300 g of jaggery and 30 lit of water in a plastic bucket for preparation of about 30 lit of "spraying solution of microbial consortium".
33. **(2013-14)**	Sugarcane growers of South Gujarat Heavy Rainfall zone (AES-III) are advised to grow sugarcane variety CON 05071 and fertilized the crop with either biocompost @ 15 t/ha or poultry manure @ 5 t/ha or castor cake @ 2 t/ha or castor cake @ 2 t/ha along with 125 % recommended dose of nitrogen -312.5 kg/ha in plant nad 375 kg/ha in ratoon crop (100% recommended dose of phosphorous and potash, 125-125 kg pk/ha in plant and 62.5-125 kg/pk in ratoon crop respectively alond with acetodactor 2 kg/ha as soil application) for getting highest cane yield, net erture and sustaining soil health. (In collaboration with MSRS,NAU,Navsari)
34. **(2014-15)**	Under south Gujarat Heavy Rainfall Agro climatic zone for rice (kharif)-rice (summer) crop sequence with inorganic fertilizer in combination with various organic manure like, FYM, castor cake, pressmud, poultry manure it has been observed that application of press mud @ 5 t ha^{-1} + ½ recommended dose of NPK to kharif rice or FYM@10 t/ha-1 + ½ recommended dose of NPK to kharif rice is superior for maintaining higher soil quality with respect to soil organic Carbon status and micro-aggregated stored organic carbon. However, for maintaining comparable soil organic carbon status, higher macro-aggregate and aggregate diameter, Castor Cake @ 1 t/ha-1 + ½ recommended dose of NPK to both Kharif and summer rice may be applied.
35 **(2014-15)**	**Research recommendation for scientific community:** Under South Gujarat Heavy Rainfall Agro climatic zone for paddy-green manure-summer ground nut or paddy-Rabi castor-continue or paddy-sorghum-green gram crop sequence, it has been observed that paddy-castor-continue sequence with residue incorporation with 25% higher dose of RDF under minimum tillage system is superior for maintaining good soil quality in respect of higher organic carbon status and higher macro-aggrigrates. However, for maintaining higher micro-

	aggrigrate stored organic carbon either of the cropping system with conventional tillage under mulch application with recommended dose of fertilizer may be adopted.
36 (2015-16)	The farmers of South Gujarat Agro climatic zone growing pigeon-pea under rainfed condition are advisd to apply the recommended dose of fertilizer and FYM @ 7.5 t/ha or bio compost @ 7.5 t/ha before monsoon through band placement for higher yield of pigeon-pea net return. (In collaboration with NARP,NAU,Bharuch)
37. (2015-16)	The farmers of South Gujarat Heavy Rainfall Agro climatic zone (AES-III) growing wheat under irrigated condition are recommended to adopt precision land leveling technique with laser leveler device to prepare their land maintaining a slope of 0.15% to obtain higher yield of wheat along with additional water saving through application of six irrigation each 50 mm depth over those under traditionally leveled fields require six irrigations each of 60 mm depth. Further, once the sloppy land is developed it will be effective for three years.
38. (2015-16)	**Research recommendation for scientific community:** Sugarcane growers of South Gujarat Heavy Rainfall zone (AES-III) are advised to apply inorganic fertilizers based on soil test values of their field before planting of sugarcane for getting higher cane yield and net return. **Based on field soil analysis data N,P,k and micronutrient fertilizes to be applied as below:** If the available soil N is 0-140,141-280,281-420,421-560,561-700 and >700 kg/ha N fertilizer respectively to be applied. If the available soil P_2O_5 is 0-10, 11-20,21-30,31-40,41-55 and >55 kh/ha then 187.50,156.25,125,125,93.75 and 62.5 kg/ha P_2O_5 fertilizer respectively to be applied. If the available soil K_2O is 0-100,101-150,151-200,201-250,251-300 and >300 kg/ha then 187.50, 131.25, 125, 125,93.75 and 62.5 kg/ha K_2O fertilizer respectively to be applied. In case of soil Available micro-nutrients: **Iron** : for <5 ppm apply 50 kg/ha ferrous sulphate in every three years. **Manganize** : for <5 ppm apply 10 kg/ha manganize sulphate in every three years. **Zinc** : for <0.5 ppm apply 50 kg/ha zinc sulphate in every three years. Copper : for <0.2 ppm apply 5 kg/ha copper sulphate in every three years. (In collaboration with MSRS,NAU,Navsari)
39. (2016-17)	**Research recommendation for scientific community:** Rice-wheat-green gram cropping sequence was found sustainable even after 28 crop cycles without addition of potassium in soil, but there was depletion of about

39 % and 36% of source-K (HNO3 soluble K) in surface soil (0.0-22.5 cm) and sub-surface (22.5-45.0 cm) layer, respectively at the end of 28 crop cycles.

Recommendation for application of nitrogen fertilizer based on soil available nitrogen

Category	Application of nitrogen (Kg/ha)	Recommendation
Very low	< 140	Apply 50% more over recommended dose
Low	141 - 280	Apply 25% more over recommended dose
Normal	181 - 420	As per recommended dose
Normally high	421 - 560	As per recommended dose
High	561 - 700	Apply 25% less over recommended dose
Very high	> 700	Apply 50% less over recommended dose

Recommendation for application of Phosphorus fertilizer based on soil available Phosphorus

Category	Application of phosphorus (Kg/ha)	Recommendation
Very low	< 10	Apply 50% more over recommended dose
Low	11 - 20	Apply 25% more over recommended dose
Normal	21 - 30	As per recommended dose
Normally high	31 - 40	As per recommended dose
High	41 - 55	Apply 25% less over recommended dose
Very high	> 55	Apply 50% less over recommended dose

(In collaboration with Department of Agronomy, NMCA, NAU, Navsari)

40. (2017-18)

Research recommendation for scientific community:

Soil resource information for land capability classification and fertility capability classification of six villages situated at hilly undulating terrain of Dang district

Under Heavy Rainfall Agro- climatic Zone of Dang following measures are suggested for possible improvement in yield of paddy, gram, groundnut, finger millet, pigeon pea, sorghum and vegetables grown on 0 to 5 % sloppy land and mango, cashew nut and other horticultural fruit crops grown up to 8 % slope:

1. Erosion must be controlled through making bunds / field bunds to restore nutrient rich surface soil considering slope of land and improve soil moisture.

2. Planting / sowing should be done at onset of rains with small flush of N to avoid limiting factor of moisture during dry spell. Further, N must be added in split to increase its efficiency under heavy rainfall situation.

3. Care must be taken in regard to source and method of P fertilizer application to combat medium to high P-fixation capacity of soils.

4. Organic carbon content of soil regularly be assessed and in certain cases low organic carbon containing soil must be replenished by locally available organic materials/manure. Further, available K insoil should be assessed frequently and in case of soils with low ability to supply soil K due to poor retention should be improved by frequent application of K fertilizer.

41. (2017-18)

Research recommendation for scientific community:

Soil and land restoration planning of six villages of Dang district situated at hilly undulating terrain

In order to minimize erosion, washing out of nutrients in upper soil and also to increase moisture conservation for improving yield of different crops grown in Sarvar, Sodmal, Kalamkhet, Motidabdar, Daguniya and Chikhalda villages of the Dang district of heavy rainfall zone, following different soil conservation measures are suggested:

Soil conservation measures	Length (m) or No. required					
	Villages					
	Sarvar	Sodmal	Kalamkhet	Motidabdar	Daguniya	Chikhalda
Stone Bunding	4472 m	1010 m	1237 m	258 m	18969 m	1751 m
Soil + Stone Bunding	30213 m	21739 m	12092 m	167 m	28778 m	735 m
Field Bunding (by soil)	21184 m	19546 m	4646 m	21 m	5295 m	7479 m
Making outlet through wire waste	87 no.	23 no.	2 no.	-	1 no.	-
Gully Plugging	44 no.	10 no.	7 no.	-	1 no.	-
Gabion structure	8 no.	1 no.	31 no.	-	-	-
Masonry Foundation Outlet	142 no.	99 no.	10307 no.	90 no.	145 no.	-
Horticultural fruit plant	12784 no.	9784 no.	11250 no.	868 no.	6434 no.	2367 no.
Forest tree	25910 no.	14080 no.	1237 m	1390 no.	13986 no.	1751 m

42 (2020-21)

Research recommendation for scientific community:

Evaluation of ground water suitability for irrigation in Navsari district

In pre monsoon season, the percentage of surveyed samples were found falling in no restriction to medium restriction category of irrigation water followed the order of Vansda (70%) > Chikhli (60%) > Khergam (50%) > Gandevi (50%) > Jalalpore (40%) > Navsari (40%).

- In post monsoon season, the percentage of groundwater samples under no restriction to medium restriction category of irrigation water mostly decreased and followed the order of Navsari (65%) > Vansda (45%) > Khergam (30%) > Jalalpore (20%) > Gandevi (15%) > Chikhli (5%).
- Overall in Navsari district, 52.49 % and 29.99 % of surveyed samples were found falling in no restriction to medium restriction category of irrigation water during pre and post monsoon respectively.

43. (2021-22)

Evaluation of ground water suitability for irrigation in Navsari taluka (15.2.3.47)

• The Navsari taluka's groundwater was neutral to alkaline. The high salinity could be attributable to a stronger water-rock interaction, such as mineral dissolution and evaporation concentration functions.

• Among cations, strong alkalies predominate over alkaline earth metals, exhibiting a pattern of Na+ > Mg++ > Ca ++ > K +. While anions are dominated by bicarbonates > chlorides > sulphates > nitrate > boron ≈ fluoride > bromide. The groundwater was found to be of the Na-HCO3 type.

• Prior to the monsoon, the bulk of groundwater was classified as moderately or severely restricted for agricultural purposes. However, following the monsoon, a large amount of groundwater was limited to a low to moderate degree. As a result, seasonal changes have had a major impact on groundwater composition, as irrigation water quality indicators improved during the post-monsoon period (November 2019) compared to the pre-monsoon period (May 2019).

44. (2023-24)

Research recommendation for scientific community:

Status of different forms of nitrogen, potassium and sulphur in soils of Navsari district of South Gujarat

From the overall surveyed samples analysis, available N (30%, 61.67% and 8.33 %) and available S (30%, 48.33% and 21.67 %) were found under low, medium and high category respectively while available K_2O was found 25 % and 75 % under medium and high category respectively. Taluka wise, highest values of various fractions of nitrogen, potassium and sulphur are as under:-

Fraction of Nitrogen :-

Available N (kg /ha)		NO3-N (mg kg^{-1})		NH4 - N (mg kg^{-1})		Total N (mg kg-1)	
0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm
Vansda Taluka		Khergam Taluka		Navsari Taluka		Vansda Taluka	
840.45	815.36	92.40	58.80	114.80	100.80	1036	924

Fraction of Potassium :-

Available K_2O (kg /ha)		WS-K (mg kg^{-1})		HNO_3-K (mg kg^{-1})		Non Exch. (mg kg^{-1})		mineral K (mg kg^{-1})		total K (mg kg^{-1})	
0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm
Jalalpore Taluka		Vansda Taluka		Vansda Taluka		Vansda Taluka		Khergam Taluka		Khergam Taluka	
1612.82	1484.22	91.60	75.70	2952.80	3200	2151.52	2633.73	10447.20	11943.60	11960	13310

Fraction of Sulphur :-

available S (mg /kg)		WS-S (mg kg^{-1})		adsorbed S (mg kg^{-1})		sulphate-S (mg kg-1)		non sulphate-S (mg kg-1)		total S (mg kg-1)	
0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm
Gandevi Taluka		Vansda Taluka		Vansda Taluka		Vansda Taluka		Khergam Taluka		Khergam	
34.25	26.21	12.17	10.67	7.97	7.56	19.41	15.36	139.60	146.97	301.19	292.91