

## Achievements:

1. Research activities as were / are being carried out in this Department for the benefit of farming community of South Gujarat on different crops (Sugarcane, Paddy, Sorghum, Sapota, Okra, Pigeon-pea, sesamum / mustard, 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) have resulted in emerging out total 42 (forty two) Research Recommendations as for the farming and scientific community of South Gujarat which can be considered as prime achievement. **Subject in brief on research recommendation** for the farming community are giving as under:

Sr. no	Subject in brief on research recommendations	Number of Recommendation
1	Main Subsidiary and micronutrient deficiency in South Gujarat crop	1
2	Recommendation on Sugarcane crop (area---targeted yield,use of sulpher,un-advantageous practice of burning of sugarcane trash, use of FYM, pressmud, Varmi-compost, inorganic fertilizer, inorganic fertilizer )	10
3	Paddy-sugarcane crop sequence ( land preparation for higher yield and income )	1
4	Sorghum - Groundnut – Paddy crop sequence ( Phosphorous fertilizer saving by use of pressmud)	1
5	Paddy – summer groundnut or kharif paddy – winter sesame / mustard – summer green gram crop sequence ( recommendation on use of sulpher)	1
6	Paddy – wheat – green gram crop sequence ( use of potassium fertilizer un-advantageous)	1
7	Application of Zinc sulphate to kharif paddy – winter wheat crop sequence ( Zinc sulphate application only in kharif paddy)	2
8	Pigeon –pea var. BDN-2 ( on use of sulphate ), Pigeon-pea var. Vaishali ( on use of RDF + organic manure application at row)	2
9	Paddy – wheat crop sequence ( on the reduction of use of phosphorous fertilizer to the tune of 50% )	1
10	Application of pressmud on the yield of Okra (Parbhani kranti)	1
11	Paddy – Paddy crop sequence ( on use of Nitrogen and Phosphorus culture)	2
12	Sorghum crop (use zinc – sulphate and Ferrous sulphate)	1

13	Sapota (Organic farming by use 2ermin-compost and FYM)	1
14	Hybrid Napier grass (requirement of nitrogen, phosphorous and potash on Napier grass yield)	1
15	Saturate solution : Establishment of soil EC, of irrigation water ratio	1
16	Speedy process of mapping of nitrogen from sample of soil and plant	1
17	Effect of varying ratio cow dung : Sugarcane trash on production of vermin-compost	1
18	Method of preparation of enriched FYM by using various farm wastes like, gliricidiya, subabul, and sunhemp leaves along with cow dung, rock phosphate, cattle urine, castor cake, FYM, soil in varying proportions using microbial consortium	1
19	Recommendation of Zinc-sulphate to paddy crop	1
20	Maintenance of soil quality by using inorganic fertilizer and various bio-fertilizer	1
21	Maintenance of soil quality by using mulch and raising green manure crops and mixing them subsequently in soil through cultivation	1
22	Use of Bio-compost, poultry manure, castor cake in plant-ratoon sugarcane crop (Var. CO-N-05071) to obtain higher yield, good return and maintenance of soil health	4
23	Effect of laser lever on yield of wheat crop and saving of irrigation water	1
24	Potash status in soil as affected by intensive cropping (paddy wheat– green gram) under medium and high fertility levels with and without application of potash	1
25	Soil resource information for land capability classification and fertility capability classification of six villages situated at hilly undulating terrain of Dang district	1
26	Soil and land restoration planning of six villages of Dang district situated at hilly undulating terrain	1
27	Evaluation of ground water suitability for irrigation in Navsari district	1
	<b>Total</b>	<b>42</b>

**2. Project entitled "Integrated research for research on development process and sustainability of livelihood in selected disadvantaged districts of Gujarat state (NAIP-III) was operated in this Department of NAU from 1<sup>st</sup> April 2008 and was completed in 31<sup>st</sup> March 2014. The objective - wise achievements obtained were brief as under :**

**A) Enhancement of Agricultural Productivity and Profitability through Proper Technological Interventions.**

✓ In order to increase profitability further crops like, soybean, sorghum, ground nut, okra, garlic, water melon, elephant foot, ginger & turmeric were sown under crop diversification activity. The highest net income was obtained under garlic (var. Lal Gojra) with BCR of 2.07 followed by okra (var. Hy-152) and groundnut (var. TAG-37) with BCR of 7.16 and >8.0, respectively.

- ✓ Under seed production activity with Ground nut (Variety TAG 37) the percent increase in income (Rs/ha) over normal crop is about 41.27%.
- ✓ Low cost green house (LCGH) activity has proved to be a successful venture for higher crop profitability [Rs 9500-17000/unit (50 sq. mt.)/annum] through raising seedlings of various vegetable crops like methi, amaranthus, chilli, tomato, brinjal, coriander, cabbage, etc.
- ✓ Animal husbandry, being essential components of livelihood apart from Agriculture in these tribal villages, activities on scientific animal husbandry (health care camps, AI, nutrient-rich-feed) were performed which increased avg. milk yield/animal/year from 400.25 to 608.90 lit. (139.55%) in buffaloes, from 250.23 to 308.51 lit. (35%) in goat.



### **Animal Health management through organization of Animal Health care camp and through supply of nutrient rich feed**

#### **B) Management of Natural Resources**

- ✓ Out of 847.27 ha sloppy land levelling activity suitable for this activity, were completed in 32.50 ha (92.86%) to check soil erosion, enhance soil moisture storage, crop intensity and possible alteration of cropping pattern. Through this crucial activity had increased in crop productivity and cropping intensity to the tune of 15-20%, soil moisture storage increased to about 17-22% with reduction in erosion to about 55-60% and thereby made certain areas possible for other / high value crop cultivation.



#### **Soil conservation activity**

- ✓ Rain water harvesting and arresting activities through development /construction work of small farm pond, temporary check dam (TCD), *Jalkund*, repairing of check dams and water storing tank, open well digging had found to increase ground water level and access of soil moisture and water to crop which resulted in increased area under crop

(10-16%) and average crop production by around 210 kg/ha with an average BCR of this activity of 13.84%.



**TCD**



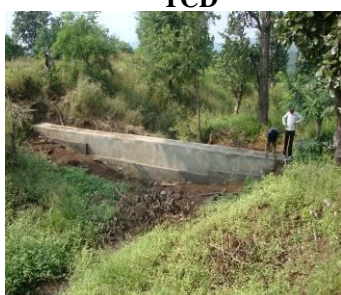
**Water Tank**



**Small Farm Pond**



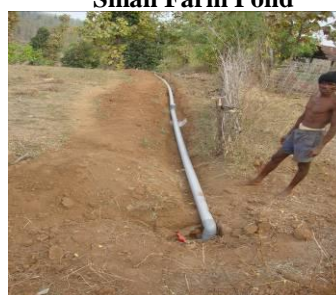
**Harvested rain water**



**Repairing of Check Dams**



**Pipeline installation for irrigation**



**MIS (Sprinkler)**

✓ Afforestation of tree plants, grasses and plantation of other fruit crops (mango, sapota, custard apple, cashew nut, etc.) involving 937 farmers were undertaken as a measure to check soil erosion and also as a future source of income.



**Plantation of Horticultural Plants**



**Planting of Vetiver grass and Bamboo saplings for soil erosion control**

✓ Vermicomposting activity had contributed to the improvement of livelihood of tribal people through generation of income of Rs 4183/unit /annum.



**Vermi beds**



**Vermicompost**



**Compost pit**



- ✓ MIS Activity in the approved villages particularly in Chikhalda cluster proved to be highly pay off intervention in terms of increase in avg. area (7.65 ha) and net avg. income from crop (3521 kg/ha).



**Sprinkler Irrigation**



**Nursery Raising in LCGH**



**Soil Analysis in Laboratory**

### **C) Employment Generation through project activities, Agro Processing/Value Addition, Storage, Packaging, Transport and Marketing**

- ✓ About 10,000 man-days were created for the tribal farmers and women in carrying out different activities of the project like, Renovation of check dams, repairing of motor foundation structure, digging of farm ponds, making of various types of field bunding, installation of irrigation pipe line, works during camps, shibir, demonstration, etc and the remuneration received by farmers through employment helped in improving their livelihood.
- ✓ 50 % families of the approved villages under project are covered under 20 SHGs. The cumulative savings of these SHGs is currently Rs 138323/-. SHGs are involved in activities on Internal Loaning and Income Generation Activities (IGA) like, vermicompost and compost preparation, vegetable and forest nursery raising, oil extraction, making of *besan* /flour and grinding of spices.
- ✓ The SHGs members prepared 32400 kg of vermicompost and earned Rs 108750/- out of that. Apart from that they earned Rs. 36000/- from nursery raising.

- ✓ Activity on poultry with selected farmers had shown its huge scope for promotion as there was an average income increase/ farmer/annum was Rs 1913/- with an increase in egg production of 33.33%. Similarly, goatry activity had also shown huge prospects, as there was an increase in avg. income/farmer/annum was Rs. 2238/- with an increase in milk production of 42.85%.

#### **D) Empowerment through Capacity building and Skill Up-gradation.**

- ✓ Trainings were organized from time to time at University Main campus/ Research Stations/ TDC and other places in approved villages in order to improve skill and know – how in relation to agriculture and allied field of tribal farmers /farm women. The special emphasis was given on natural resources conservation and management, package of practices of field and vegetable crops including SRI technique for rice, use and application of bio-fertilizer, low cost green house techniques, animal health care, goatry, poultry and use of modern farm equipments / tools, including MIS system.



**Technology Dissemination Center (TDC)**



**Training at TDC**



- ✓ Vocational Training on Artificial Insemination (AI) was imparted to two graduate persons at CRS, Urulikanchan for 45 days from the clusters of NAIP 3. Upto the reporting period, 46 tribal girls were trained on sewing works and 20 sewing machines were provided from the project at nominal charge basis for their earnings. Training on “Repair and maintenance & field operation” and “Basic wood work” were given separately to ten tribal boys at Bilimora, ITI campus. Another training on “landscaping and gardening” were imparted to 10 tribal boys for six months at NAU, main campus, Navsari.



- ✓ 1725 numbers of farmers/farm women were benefited through exposure-cum-learning visit organized at different centers of NAU, including KVK, Waghai and other places, of which 157 numbers of farmers/farm women were especially exposed to *Krushi Mela*, held at NAU campus, Navsari for three days during 2010.
  - ✓ 857 number of farmers were educated on package of practices and technologies on different aspects related to Agriculture, Horticulture and Animal Husbandry through on campus training while, 1228 number of farmers were involved in off campus training.
3. During the year 2014-15 One Ph.D student and Two M.Sc (Agri.) students carried out their research work in this Department and secured their Degree in the discipline of Soil Science and Agricultural Chemistry.
  4. During the year 2014-15, two recommendations for scientific community were approved.
  5. So far 46 no. of research papers have been published in different National and international journals out of research work done in the Department. However, during

the year 2014-15, total 9 research papers have been published (details are given in Appendix-I).

6. So far 48 no of research papers have been presented in National and international conference / seminar / symposium (details are given in Appendix-II).
7. So far six booklets were published in vernacular (Gujarati) from this Department under NAIP-III (details are given in Appendix-III).
8. So far 47 no. leaflet / folder were prepared in printed form (Gujarati version) from this Department under NAIP-III (details are given in Appendix-IV).
9. During the year 2014-15, total 27046 numbers of samples (soil +water + plant etc.) received in the laboratory from farmers, students and other agencies for analysis of multiple parameters. Analysis was completed and required advisory services were provided to concerned party as per schedule.
10. Process standardization for extraction of lycopene and tomato seed oil from tomato processing waste obtained as bio-product.

## **11. Awards / Prizes received by Department / Staff**

1. Sardar Patel Agricultural Research – first Award for outstanding contribution towards Agricultural Developmental Research & Technology Advancement in the field of Agronomy & Soil Science – conferred for the year 1997-98 by Department of Agricultural and co-operation, govt. of Gujarat.
2. K.P.Deshmukh Memorial Prize conferred by The Deccan Sugar Technologists' Association, Pune for the year 1997-98
3. Vasantdada Patil Memorial Prize K.S.Kale Memorial Prize and J.S. Huja Rotating Shield given by The Deccan Sugar Technologists' Association, Pune for the year 1998-99
4. K.P.Deshmukh Memorial Prize given by the Deccan Deccan Sugar Technologists' Association, Pune for the year 1998-99
5. D.S.T.A. first prize conferred by The Deccan Sugar Technologists' Association, Pune for the year 1998-99



6. Bharat Jyoti Award and certificate of Excellence to Dr. Amaresh Das, Research Scientist (Soil Science) in 2008 by Indian International Friendship Society, New Delhi.
7. Honorary Fellowship of International Society for Ecological Communications to Dr. Amaresh Das, Research Scientist (Soil Science) in 2008.
8. Fellow of Hind – Agri – Horticultural Society (FHAS) to Dr. Amaresh Das, Research Scientist (Soil Science) in 2008 by Hind Agricultural Society, Muzaffarnagar (U.P.).
9. Bharat Shiksha Ratan award to Dr. Amaresh Das by Global Society for Health & Educational Growth, New Delhi in 2011.
10. Bharat Excellence Awards and Gold medal (Certificate of Excellence and Certificate of Felicitations) to Dr. Amaresh Das, Research Scientist (Soil Science) in 2015 by Friendship Forum, New Delhi.
11. "Global Indian Pacific Gold Star Award" to Dr. Amaresh Das, Research Scientist (soil Science) by Global Society for Health & Educational Growth, New Delhi in 2015.
12. "Award for Research Excellence" was conferred on Dr. Amaresh Das, Research scientist (Soil Science) by "Indus Foundation, Hyderabad" in 2015.
13. "Eminent Scientist" Award conferred by Samagra Vikas Welfare Society, Lucknow to Dr. Amaresh Das, Research Scientist, Soil Science, N.A.U. Navsari in 2017.

## **Appendix - I**

### **Published Research Papers in various national and international journals :**

1. Trivedi, B. S. Gami, R. C. and Patel, J. M. (1990) Assessment of available S in soils of S. Gujarat. Paper presented in "National Seminar on Recent Development in Soil Research held at Udaipur on Dec. 22-25 1990 Abst. No. c 72 p.46
2. Nautial, P. H., Trivedi, B. S. and Gami R. C. (1991) Effect of moisture, Temperature and moist heating on available of K in soils having different texture. Paper presented in "National Seminar on Advances in Soil Science Researches" held at Dapoli on Dec. 12-15, 1991 Abst. No. C 25 PP. 24.
3. Patel G. G. and Trivedi, B. S. (1991) Studies on transformation of P in three clayey soils of S. Gujarat. Paper presented in "National Seminar on Advances in Soil Science Researches" held at Dapoli on Dec. 12-15, 1991 Abst. No. C 14 PP. 21.

4. Trivedi, B.S., Gami, R.C. and Patel, K.G. (1994). Standardization of method for determining available sulphur and its critical limit for low land paddy. *GAU Res. J.* 20 (1): 35-41.
5. Trivedi, B. S., Dadhania, S. M. and Dalwadi, M. R. (1994) Targeted yield approach through soil test crop yield correlation studies for phosphorus, "Phosphorus in Gujarat Agriculture" PP 84-89
6. Dalwadi, M. R. and Trivedi, B. S (1994) An integrated soil test crop yield method for fertilizer N recommendation in sugar cane. Paper presented in Indian Society of Soil Science Dimond Jubilee National Seminar on "Development in Soil Science-1994" held at New Delhi from 28-11-94 to 1-12-94. Extended summaries PP 134
7. Trivedi, B.S., Patel, G.G. and Gami, R.C. (1995). Delineation of Soils of South Gujarat Districts for available Sulphur and Iron. *Micronutrient News*. Val. IX No.1.
8. Trivedi, B.S., and Patel, K.G. (1995). Scope of recycling of farm waste. In organic farming for sustainable crop production in Gujarat. Part II review papers. pp.33-43. Mimeographed by Navsari Chapter of Indian Soc. Agron. GAU, Navsari.
9. Trivedi, B. S., Gami, R. C. and Padhiayar, G. M. (1995) Studies on relationship between EC at different soil water ratios and  $EC_s$  in soil series of S. Gujarat, *GAU Res. J.* 20 (2): 30-34
10. Trivedi, B. S., Patel, K. G, Gami, R. C. and Naik, P. L. (1995). Effect of calcium amendments on sugarcane yield and on soil physical properties. Presented in "National Symposium on "Strategies to enhance sugar productivity" held at Lucknow on 14-16 Oct. 1995 Abstr. No. 30.
11. Patel, H. S., Trivedi, B. S., Naik, P. L. and Gami, R. C. (1995) "Organic Farming in Sugarcane" Paper presented in state level seminar on "Organic Farming for sustainable Crop Production in Gujarat" held at Navsari on 5-4-1995 by Navsari Chapter of Indian Society of Agronomy PP 46.
12. Trivedi, B.S., Gami, R.C., Patel, G.G. and Patel, K.G. (1996). Fertility of sugarcane growing South Gujarat Soils: II. Secondary and Micronutrients. *Proc. 45th Ann. Conv. D.S.T.A., Pune*. Part-I, pp A93-A101.

13. Trivedi, B.S., Patel, K.G. and Patel, L.K. (1996). Effect of nitrogen and phosphorus levels on sorghum varieties grown in semi-rabi conditions. *Annals of Arid Zone* 35 (2): 129-132.
14. Trivedi, B.S., Patel, H.S., Patel, K.G. and Naik, P.L. (1996). Sulphur fertilization in sugarcane. *Proc. 45th Ann. Conv. D.S.T.A., Pune*. Part-I, pp A84-A86.
15. Trivedi, B. S., Gami, R. C., Bhatt, P. M., and Padhiayar, G. M. (1996). Fertility of sugarcane growing soils of South Gujarat soils: I macronutrients, *Proc. 45<sup>th</sup> Annual Convention of D. S. T. A., Pune, Part I, PP A87-A92*.
16. Trivedi, B. S., and Desai, R. M. (1996) Studies on some chemical aspects in soils of Gujarat. In "Soil Research in Gujarat Agriculture- A compendium, Anand Chapter of Indian Soc. of Soil Sci. PP 15-22.
17. Trivedi, B.S., Gami, R.C. and Patel, G.G. (1997). Effect of Zn on grain yield and Zn uptake by lowland rice in South Gujarat. *International Rice Research Notes (IRRI)* Vol. 22 (1): 33.
18. Trivedi, B.S., Patel, H.S., Patel, G.G. and Naik, P.L. (1997). Effect of Farm yard manure, Pressmud and Phosphate Solubilising Bacteria *Proc. 46<sup>th</sup> Ann. Conv. D.S.T.A., Pune, Part I, PP. A 165 – A 170*.
19. Trivedi, B.S., Patel, H.S., Patel, G.G., Naik, P.L. and Gami, R.C. (1997). Studied on Fertilization through Vermicompost in Sugarcane. Paper presented in Workshop on 'VERMITICHNOLOGY' organized by Anand Chapter of ISSS and Arise Auroville held at Anand of Navember 21, 1997. PP. 35 – 39.
20. Trivedi, B.S., Desai, R.M., Patel, K.G. and Patel, G.G. (1998). Integrated nutrient management research in Gujarat. *J. Guj. Soc. Agron. Soil Sci.* 1:1-6.
21. Trivedi, B. S., Desai, R. M and Dalwadi, M. R. (1998) Targeted yield equation based fertilizer recommendation for sugarcane growing in South Gujarat. *Proc. 47<sup>th</sup> Annual Convention of D. S. T. A., Pune, Part I PP A119-A126*.
22. Trivedi, B. S. and Desai, (1999). Yield target equations benefits and limitations. *Proc. 48<sup>th</sup> Annual Convention, 1999, D.S.T.A., Pune, PP A213-A220*.
23. Trivedi, B.S. Patel, K.G. and Patel, G.G. (2002). Role of farm waste in integrated nutrient management. Paper presented in state level seminar held at Navsari on 19-

- 08-2002 on integrated nutrient management in rice / sugarcane based cropping system, organized by Indian Society of Agronomy and GAU. pp 31 – 43
24. Trivedi, B.S. Kaswala, R.R and Patel, K.G. (2002). Some plant species for development of coastal wasteland. Paper presented in seminar held at Navsari on 12 - 09 - 2002 on development of Gujarat's wasteland and its problem, organized by Navsari Chapter of GAAS. pp 48 - 53
25. Patel, C.L., Patel, M.N., Patel, G.G., & Patel, K.A., (2006) Sustaining sugarcane production through integration of nutrient sources in sugarcane based cropping system. 54<sup>th</sup> Ann. Conv. D.S.T.A., Pune, Part I, PP. A 91 – A 96.
26. Desai, R.M., Patel, G.G., Patel, T.D. and Das A. (2009) Effect of Integrated Nutrient Supply on Yield, Nutrient Uptake and Soil properties in Rice - Rice Crop Sequence on a *Vertic ustochrept* of South Gujarat. *J. Indian Soc. Soil Sci.* 57 (2):
27. Patel, G.G and Das Amaresh (2009). Chemical Composition of Pressmud and Biocompost in relation to their Use as Organic manure and Possible Effect on Soils. *J. Indian Soc. Soil Sci.* 57 (3):382-84
28. Das Amaresh (2010). Organic waste recycling for nutrient management in Organic farming. In Compendium of Invited Papers & Abstracts, State Level seminar on “Organic Farming for Environment Safety and Agriculture Sustainability” pp 27 to 35, held at NAU, Navsari, during 5 & 6 March, 2010
29. Das Amaresh and Ansari Md. Zuber (2011) Effect of varying land uses on important soil properties and their co-relation with organic carbon in soils of Navsari Agricultural University, main campus, Navsari (Gujarat). *Asian J. Soil Sci.*, 6(2):124-131
30. Das Amaresh and Patel G.G (2011). Conversion of farm wastes/by-products into enriched compost through use of Microbial consortium. *Asian J. Soil Sci.* 6(2):195-199
31. Patel G.G, Bafna, A.M & Das Amaresh (2011) Effect of Integrated Nutrient in fresh yield and uptake of sugarcane plant and ratoon crops and soil properties in *Vertic ustochrept* of south Gujarat, *Indian sugar* vol. LX1 (iv) : PP 31-43
32. Das Amaresh and Patel G.G (2012). Quality comparison of vermicompost prepared from sugarcane trash and paddy straw mixed with cattle dung through process of

- partial decomposition and subsequent vermicomposting *Indian Sugar*, Jan. issue, PP 33-40
33. Das Amaresh (2012) Essentiality of Agro-forestry based farming systems in Dang District of Gujarat for Livelihood security of Tribal farmers and environmental resilience--- An experience with six villages. In proceedings of National seminar on Agroforestry: An Evergreen Agriculture for Food Security and Environmental Resilience, PP 137 to 158, held at NAU, Navsari during 2 to 4 February, 2012
34. Das Amaresh, N.N. Chaudhari and V.D. Maheriya (2012) Eco-restoration planning of Land of Sodmal village of Dang District of Gujarat through development of Agriculture and Agroforestry system. In proceedings of National seminar on Agroforestry: An Evergreen Agriculture for Food Security and Environmental Resilience, PP 85 to 92, held at NAU, Navsari during 2 to 4 February, 2012
35. Das Amaresh and Patel G.G (2012). Dynamics of soil organic carbon, Bulk density and Water stable Aggregates in relation to yield of Rice-Rice crop Sequence as affected by exclusive Inorganic and Integrated nutrient management practices. *Indian J. Agrophysics*
36. S.T. Shirgire, S.G. Savalia Amaresh Das and G. K. Gaikwad (2013) . Physico-chemical properties of soils from Jamnagar district of Gujarat and their better management for favorable crop growth. *Bioinfolet* .Vol 10 (4): 1405-1409
37. Das Amaresh (2013). Essentiality of integrated farming systems approach in combination with natural resources management for sustainable livelihood. In “Natural Resources Management in backward districts of India: Issues and challenges” (edited by Chaturvedi, A., Patil, N.G., Hajare, T.N. and Singh, S.K. on NAIP national workshop held during 21-22 February 2013 at NBSS & LUP, Nagpur), pp 87-96.
38. R.D. Shinde, Amaresh Das, S.T. Shirgire and G.K. Gaikwad (2014). Physico-chemical properties of selected surface soils of Sarvar village of Dangs district - A case study. *Eco. Env. & Cons.* 20 (2): 683-686
39. Patel, V.A., Das Amaresh, Shirgire S.T. and Gaikwad, G.K. (2014). Carbon status in soils of research farms of Navsari Agricultural University (GUJARAT). *Bioinfolet* Vol 11(2B):549-552

40. Ganesh K Gaikwad, A. Das and Viralkumar A. Patel (2014), Physico-Chemical Properties and Sulphur Status of Soils Under Sugarcane Ecosystems of Valsad Area (South Gujarat). *Trends in Bioscience*, Vol. 7(22): 3712-3716
41. Das Amaresh, S. T. Shirgire and V. R. Ghadage (2014), Boosting Crop Yield, Animal Husbandry Activities and Natural Resources Management Through Integrated Research Approach For Sustaining Socio-Economical Status of Tribal Farmers. *Impact: International Journal of Research in Applied, Natural and Social Sciences*, Vol.2 (11):43-56
42. Das Amaresh and Shinde D. Rajkumar (2014). Soil Resource Characterization, Land Capability and Suitability of Soils in Hilly Undulating Terrain - A case study. *International Journal of Agricultural Science and Research*. Vol.4 (6): 171-184
43. Patel Jiteshkumar B. and Amaresh Das (2015), Assessing Toxic Metals Contamination in Soil, Water And Plant Bodies around an Industrial Belt *Impact: International Journal of Research in Applied, Natural and Social Sciences*, Vol.3 (2): 5-20
44. Ganesh K Gaikwad, A. Das, D. G. Jondhale, P. B. Adsul and Ajeet Puri (2015), Status of DTPA- Extractable cationic micronutrients and sulphur in soils under sugarcane ecosystems of Valsad area (South Gujarat). *Multilogic in Science (An International Journal)*, Vol.IV (XII): 185-187
45. Ganesh K Gaikwad, Amaresh Das, Anand Gore, P.B.Adsul and Ajeet Puri (2015), Status of physico-chemical properties of soils under sugarcane ecosystems of Gandevi area (South Gujarat). *Multilogic in Science (An International Journal)*, Vol.V (XIII): 31-33.
46. Zambare, S.S. and Amaresh Das (2015). Evaluation of irrigation water quality in relation to their possible adverse effect on soil, crop vis-à-vis environment for agricultural use. *Eco. Env. & Cons.* vol. 21(4) : 2001-2006.
47. Patel Jiteshkumar B. and Amaresh Das (2015). Assessment of irrigation water quality from various sources in surrounding area of vapi industrial complex, Valsad (India) in relation to adverse effect on soil *Impact : International Journal of Research in Applied, Natural and Social Sciences*, vol.2(1) :1-7.

48. Amaresh Das, G.G.Patel and M.C.Patel (2015), Comparison of compost quality prepared from cattle dung, plant wastes and other substrates by use of microbial consortium. *J. Indian soc. Soil.* 63 (2) :238-241.
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50. Amaresh Das & S.S.Zambare (2016), Seasonal variation in salinity / sodicity development in soils of Navsari District (Gujarat) as influenced by varying quality of irrigation water. *Impact : International Journal of Research in Applied, Natural and Social sciences*, vol.4 (6):1-12.
51. Kumar Shrvan, Das Amaresh and Chinchmaltpure Anil R.(2016). Evaluation of underground water quality of Bara tract of Bharuch district (Gujarat). *International journal of agriculture sciences*, volume 8(54):2923-2925.
52. Ruplal Prasad and Amaresh Das (2017). Status of Available Phosphorus, Potassium and Micronutrients and Their Co-Relations in Surface Soils of Undulating Terrain of Dangs District (Gujarat). *International journal of agriculture sciences*, volume 9(3):3694-3699
53. Mitul Saxena, Amaresh Das and Saurav Choudhury (2017). Chemical fractionation of Zinc and its relationship with important properties of rice grown soils . *International Journal of Chemical studies.* 5 (4):1205-1211
54. Amresh Das, G.G.Patel & M.C.Patel (2017) Transforming plant wastes along with cattle dung and other Substrates into Organic Wealth through Partial Decomposition and Vermi Composting. *International Journal of Agricultural Science and Research (IJASR).* 7(4):441-446.
55. Kumar Shrvan, Das Amaresh and Chinchmaltpure Anil R.(2016). Soil properties and available sulphur variability under irrigated and rainfed cotton in Bara tract of Bharuch ,Gujarat .*J. Soil and Water conv.* 15(4): 296-301, 2016
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## **Appendix - II**

### **Research paper presented in national and international Seminar, Symposium, congress etc.**

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## Appendix - III

**Details of Printed booklets prepared in vernacular (Gujarati) from this Department on various aspect as below for enrichment of knowledge of tribal farmers under NAIP-III**

1	Booklet	Scientific farming OF Mango (in Gujarati )
2	Booklet	Scientific farming of Crops and Animal Husbandry (in Gujarati )
3	Booklet	FAQs- Frequently Asked Questions (in Gujarati)
4	Booklet	(Soil And Water Conservation and Judicious Use (in Gujarati)
5	Booklet	Scientific farming of horticultural crops (in Gujarati)
6	Booklet	Scientific Animal Husbandry as supplement of agriculture based livelihood (in Gujarati )

## Appendix - IV

**Printed Leaflet / folder prepared from this Department on various crops and Animal husbandry for enrichment of knowledge of tribal farmers under NAIP-III**

1	Folder/ Brochures	Scientific farming method of watermelon
2	Folder/ Brochures	Scientific farming method of Tomato
3	Folder/ Brochures	Cashew : A Horti cultural crop of International importance
4	Folder/ Brochures	Scientific farming method of Papaya
5	Folder/ Brochures	Scientific farming method of Okra
6	Folder/ Brochures	Profitable farming method finger millet
7	Folder/ Brochures	Importance of minerals in Animal feed
8	Folder/ Brochures	Profitable Scientific farming method of kharif Rice

9	Folder/ Brochures	Care of female animal during delivery and care of new born animal
10	Folder/ Brochures	Scientific farming method of spine guard
11	Folder/ Brochures	Soybean farming
12	Folder/ Brochures	Scientific farming method of Brinjal
13	Folder/ Brochures	Scientific farming method of Custard apple
14	Folder/ Brochures	Raise crop in low cost green house during off-season and earn higher income
15	Folder/ Brochures	Soil analysis and Soil Health Card
16	Folder/ Brochures	Nursery and Important crop production Business and importance of nursery raising in vegetable farming
17	Folder/ Brochures	Value addition in vegetables and scientific farming method in cucurbits
18	Folder/ Brochures	Scientific farming method of vegetables
19	Folder/ Brochures	Irrigation through Drip -sprinkler system
20	Folder/ Brochures	Scientific farming method of Ground Nut
21	Folder/ Brochures	Niger Farming
22	Folder/ Brochures	Care of milking animals (in Gujarati)
23	Folder/ Brochures	Overview Of Progress (Two Years Of NAIP-III In Dangs)
24	Folder/ Brochures	Control of worm affected disease of animals in south Gujarat
25	Folder/ Brochures	Importance of seed treatment in pulse crop, purpose, methods and results
26	Folder/ Brochures	Care and food management of pregnant and dry cow-buffalo
27	Folder/ Brochures	Rain water storing and harvesting in <i>rain fed</i> agriculture
28	Folder/ Brochures	Scientific farming in pigeonpea
29	Folder/ Brochures	Soil Health care by organic fertilizer
30	Folder/	Successful farming- know about irrigation water quality

	<b>Brochures</b>	
31	<b>Folder/ Brochures</b>	<b>Take care for Sustaining Soil productivity</b>
32	<b>Folder/ Brochures</b>	<b>care of soil Health through bio- and organic fertilizer</b>
33	<b>Folder/ Brochures</b>	<b>Method of compost fertilizer preparation in short time</b>
34	<b>Folder/ Brochures</b>	<b>Farming of <i>kharif</i> paddy</b>
35	<b>Folder/ Brochures</b>	<b>Making of different food- items from sorghum</b>
36	<b>Folder/ Brochures</b>	<b>Stem red rot, it's effective control in pigeon-pea</b>
37	<b>Folder/ Brochures</b>	<b>Ideal goat husbandry</b>
38	<b>Folder/ Brochures</b>	<b>predators in Animal husbandry and it's importance</b>
39	<b>Folder/ Brochures</b>	<b>Method of Preparation of vermi- compost</b>
40	<b>Folder/ Brochures</b>	<b>Low -cost green house and preparation of Nadep compost</b>
41	<b>Folder/ Brochures</b>	<b>Spreading of disease in animals, vaccination, care of milching animals and care for calf</b>
42	<b>Folder/ Brochures</b>	<b>Daily feed for animals, production of hygiene milk and means for higher production of milk</b>
43	<b>Folder/ Brochures</b>	<b>Plant protection though bio-control</b>
44	<b>Folder/ Brochures</b>	<b>Reason for dropping of flower of fruit in mango and its control</b>
45	<b>Folder/ Brochures</b>	<b>Soil conservation and water storing/ harvesting</b>
46	<b>Folder/ Brochures</b>	<b>Method of preparation of vermiwash and its utility</b>
47	<b>Folder/ Brochures</b>	<b>System of Rice intensification</b>
48	<b>Folder/ Brochures</b>	<b>Disease pest management in Mango &amp; Cashew-nut</b>