Rationale of Nation Building via Skill Development of Indian Farmers Soil Test Report

VOL-4

Patanjali Farmer Samridhi Programme

Project proposal ID- RPL/NG1824 Project ID- 2651 TP ID- TP 052292

Acharya Balkrishna



Patanjali Bio Research Institute

Patanjali Food and Herbal Park, Vill. Padartha, Post- Dhanpura, Laksar Road, Haridwar Operational Office: Disha Builiding,Patanjali Yogpeeth Phase-I, Haridwar (Uttarakhand), India Whatsapp No. 8275999999, E-mail: info.pfsp@patanjalifarmersamridhi.com / website: http://www.patanjalifarmersamridhi.com



Foreward

The Patanjali Farmer Samridhi Program (PFSP) is being implemented by the Patanjali Bio Research Institute since 1st September 2018 with the association of National Skill Development Corporation (NSDC) and Agricultural Skill Council of India (ASCI) for imparting training for the job role of Organic Grower and Group Farming Practitioner. The PSFP has successfully completed the training on organic grower of over forty thousand farmers from various states of India and its journey is marked by both achievements and challenges faced during the programme implementation. The PSFP has experimented various agricultural practices and provided a strong commitment on Organic Agriculture focusing on Farmers' Welfare.

This publication is a compilation of soil reports of various districts from across the country in which they experimented with Organic Agriculture and Chemical free farming in their own fields under the programme. The select cases provide insights for the improvement in the income of small and marginal farmers by adopting organic farming practices. The approach adopted by Patanjali to conduct the training and farm experiments in the farmers field under the Farmer to Farmer led extension model also energized and motivated not only the farmers but also the nearby farmers who were able to see the changes during the crop cycle.

I am sure that the soil report studies provide proof of concept for analyzing the cost and benefits from organic farming through reduction of input costs and improved marketing practices being followed by the farmers. This will help to create a strong motivation on organic farming and contribute to the improvement and doubling of farmers' income in various states. I also complement the project team for working in the field and in documenting the cases meticulously.

Burning arappy

Acharya Balkrishna Managing Director Patanjali Bio Research Institute

Acknowledgements

We would like to express our sincere gratitude to Param Pujya Swamiji and Param Pujya Acharya Ji for their blessings in giving continuous encouragement and guiding Patanjali Farmer Samridhi Program. The case studies prepared in this publication inform about the experiences of farmers involved for promoting organic farming in various states of the country.

We are thankful to NSDC (National Skill Development Corporation) under Ministry of Skill Development and Entrepreneurship (MSDE) and Pradhan Mantri Kaushal Vikas Yojana (PMKVY) for providing this ambitious project to Patanjali Bio Research Institute. The support provided by the Agriculture Skill Council of India (ASCI) for training the trainers and in conducting the assessments is also gratefully acknowledged.

The encouragement and support provided by Dr Rishi Kumar, Director, PBRI is duly recognized. We would like to acknowledge the support provided by Mr. Pawan Kumar (CGM), Dr. A.K. Mehta (Director, Horticulture), Mr. Vivek Benipuri (GM), Dr Ram Kumar Shukla for preparing the soil test reports, providing valuable comments and suggestions from time to time.

Last but not the least the farmers associated under the program especially all those who have provided us the soil reports have been extremely cooperative and helpful while sharing their experiences and insights during the implementation of this program and their contribution to promote Organic Farming is sincerely acknowledged.

We are grateful to PRI and PHRD team for contributing in the compilation of various volumes especially Dr. Ved Priya Arya, along with Mrs. Ekta Rokka Thapa and Mr. Shashidhar H.K. from PFSP who contributed to complete the editing and publishing task. The report has been conceptualized, drafted and edited after a thorough review of literature and discussion with experts to shape the documents.

Patanjali Farmer Samriddhi Program team.

Contents

S No	Name	Page
1	Introduction	1
2	Objectives	2
3	Benefits of soil sampling to the farmer	4
4	Rapid soil testing kit (Dharti ka Doctor)	4
5	Soil chemical Analysis	5
6	Test for soil pH and level of acidity	5
7	Test for Soil Organic carbon	6
8	Test for Available Ammonium Nitrogen	6
9	Test for available phosphorus	7
10	Test for available potassium	8
11	Installation process of Dharti ka Doctor app	9
12	Observations and inferences of soil test reports	16
13	Soil Test Report in %	17
14	Andhra Pradesh	19
15	Assam	20
16	Bihar	21
17	Chattisgarh	22
18	Delhi-NCR	23
19	Haryana	24
20	Himachal Pradesh	25
21	Jharkhand	26
22	Karnataka	27
23	Madhya pradesh	28
24	Odisha	29
25	Punjab	30
26	Rajasthan	31
27	Telangana	32
28	Uttar Pradesh	33
29	Uttarakhand	34
30	West bengal	35
31	Recommendations for Soil fertility	36
32	Performance appraisal of Patanjali of Dharti ka Doctor Soil Kit	38

Experimenting with farmer led soil testing under PFSP

Introduction

Seventy percent of population in India is dependent on agriculture. The economy is driven by agriculture and agro-based industries. Hybrids and chemical fertilizers were the key factors for the success of green revolution in modern times both globally and in India. Initially, due to exponential increase in crop yield, chemical fertilizers were hailed as the future of Indian agriculture but, a couple of decades later drastic side effects of inorganic chemicals on agrarian lands were observed, such as salinity, drought, barren lands, biomagnification in food chain, nutrient leaching, soil acidity, ground water poisoning and many others. According to Central Economic Intelligence Bureau (CEIC) the average fertilizer consumption of India from 2001-2018 is 123.410 Kg/ha as reported by the Department of Agriculture and Cooperation. The consumption of primary nutrients i.e. Nitrogen (N), Phosphorous (P) and Potassium (K) increased from 112.30 Kg/ha in 2008 to 128.02 Kg/ha in 2018. This trend indicates that more number of farmers are applying NPK year by year. This is a good indication however, ensuring Fertilizer Use Efficiency (FUE) at large is still to be realized. In order to achieve this, balanced nutrient application to crops is a pre-requisite. As Tisdale (1967) states "Soil testing is to the art of crop production what the thermometer is to the medical profession". Soil testing helps to determine the health of farming land, aiding in appropriate and need-based application of NPK and micronutrients. Farmers being unaware of nutrient management apply high doses of Nitrogen without Phosphorous and Potassium and vice-versa. When more N is applied the leaves become green and succulent thus, attracting pests and diseases. In order, to uptake P by plants balanced amount of ammonium forms of nitrogen have to be applied along with phosphorous. Similarly, uptake of Potassium is influenced by balanced addition of other nutrients. Adding excess amount of fertilizers leads to leaching of chemicals into environment & polluting ecological niches, creates sick and barren soils along with other environmental hazards. It also increases the cost of production which hampers the morale of small marginal farmers of India. This is a burning issue as the rate of farmer suicides is increasing year after year.Zero Budget Natural Farming (ZBNF) is the initiative taken by the Government of India to combat this issue wherein, it promises to end a reliance on loans and drastically cut production costs, ending the debt cycle for desperate farmers. The word budget refers to credit and expenses, thus the phrase 'Zero Budget' means without using any credit and without spending any money on purchased inputs like privatized hybrid seeds and inorganic chemicals, 'Natural Farming' means farming with Nature and without chemicals. This is achieved through systematic capacity building of the farmer by improving the skill set and empowering them with need-based knowledge. However, with the ever increasing demand for increasing the productivity per unit area and narrowing the cost benefit ratio has made farmer more sensitive to the qualms posed by soil fertility status, fertilizer management and soil health. Present agricultural production largely depends upon fertilizer consumption to such an extent that one can't assume crop production without application of fertilizers. However, in the last few decades it was evident that increase in fertilizer consumption is not correlated with the crop production instead it depends on FUE. In recent times, few bold farming communities have started using alternatives to chemical fertilizers like Farm Yield Manure (FYM), Bio-fertilizers, concentrated neem cakes, pesticides, Bio-pesticides, Bio-fungicides, microbial consortia and other physical methods to combat production hindrances. An Integrated Nutrient Management (INM) approach tuned to soil fertility levels and crop requirement ensuresFUE. There are number of successful demonstrations of this approach on farmers' fields (Subba Rao and Srivastava, 1998).

Diagnosing the quality of soil and water for their health status and their ability to support for higher level of crop production is an important pre-requisite both for remunerative farming and harnessing the potential of natural resources. To achieve this there are soil testing laboratories installed in every tehsil wherein, the cost of nutrient and water test is minimal so as to benefit the farmers. Improper application of fertilizers either leads to deficiency or toxicity of nutrients crops. Hence, identifying soil fertility status is of utmost importance. One of the major drawbacks of present soil testing system has been the nitrogen recommendation based on qualitative estimation of organic matter. In the light of excessive use of nitrogen by the farmers, in general, there is an urgent need to improve the procedure for nitrogen recommendation by changing the methodology to more quantitative estimation, so is the case with potassium. Soils tested for high level of available potassium are reported to respond positively for added potassium and vice-versa. Promoting soil test laboratories with sophisticated instruments or through efficient portable soil testing kits is the only solution to reverse the trend. In this regard, a study of "Soil Test Based Fertilizer Application" was undertaken with following objectives using a portable soil testing kit.

Objectives:

- One of the objectives of developing a portable soil test kit is to create awareness and realize the importance of soil testing among farming community thereby, knowing the soil fertility status for crop productivity.
- To know the cause for poor fertility of soil through indiscriminate use of different inorganic fertilizers without conducting soil analysis.
- To know the different constituents and parameters of soil fertility status which will affect its fitness for production of crops.
- 4) To know the level of different soil nutrients (Macro, Micro& Trace) and salt concentration.
- 5) Estimation of available nutrients using standard procedures quantitatively and qualitatively by using portable soil test kit.
- Evaluation of efficiency of portable soil testing kit developed by Patanjali Bio Research Institute (PBRI), Haridwar, UK.

A Portable Soil Testing Kit is developed by PBRI (An easy and quick means of soil testing) to facilitate the farmers to test the soil health of their farm holdings on their own. In this regard, there has been a concerted effort in the country to develop farmer-friendly kits so as to enable our farmers to evaluate their field fertility through simple and clear means of testing. Several soil test kits have been developed over years but are yet to become popular due to many reasons. A few among them being the complexity of procedures involved in soil testing at farmer level, interpretation of obtained results, non-availability of back-up technical advice and the cost involved. In a continuing effort to overcome these difficulties, it is more appropriate to have a preliminary level comprehendible soil testing method. The scientists of PBRI have come up with a low-cost soil test kit that can analyze about 25 samples. This newly innovated soil test kit is formulated and fabricated in a simple mode which enables an ordinary illiterate farmer to conduct analysis at field level and apply fertilizers as per soil test values. One can easily diagnose and analyze ρ H, organic carbon, available nitrogen, phosphorus & potassium of his soil by matching it with the corresponding color chart provided in the kit. The data has to be entered in the Soil Test Based Fertilizer Application which in turn, recommends the quantity of fertilizers, nutrients and soil amendments like lime and gypsum to be applied. The results obtained here are only qualitative in nature to have a first-hand insight into nutrient status of soils of farm holdings. This vital information can orient and drive the concerned farmer for better nutrient management options for his/her crop in the field. Jayshankar Telangana State Agriculture University conducted a test by analyzingsoil samples in the university soil science lab and comparing them with soil test kit of PBRI. It was found that the soil test kit is highly efficient with >85% accuracy in comparison with other kits developed elsewhere.





Make 'V' shape pit and take soil from the base 15-20 cm deep as shown in Fig. 2

Make 4 parts of soil and take only 2 parts diagonally as shown in Fig. 3

Soil testing is usually carried out as part of a program, consisting of four phases:

- 1. Soil sampling
- 2. Sample analysis
- 3. Data interpretation and
- 4. Soil management recommendations.

In developed countries, soil tests are more commonly carried out in laboratories. For smallholder farmers in remote rural areas, field-testing kits may be more appropriate, but they are not yet widely available and also require training to correctly interpret results.

The benefits of soil sampling to the farmer are:

- Establish the current nutrient status of the soil to provide the basis for future strategies. Indicate the ameliorants required to correct a soil's possible physical and chemical property imbalances.
- Determine factors that may be limiting crop and pasture production.
- Identify opportunities to improve farm profitability through efficient soil fertility management.
- Develop an appropriate nutrient plan for the farm based on productivity targets.
- Monitor the progress of nutrient strategies over time and indicate any need to fine-tune inputs.
- Determine the better fertilizer form &/or application method to suit particular situations.
- Assists in the planning the process through improved budgeting of farm financial resources.

RAPID SOIL TESTING KIT (Dharti ka Doctor)

Soil testing kit is developed to determine the available nutrient status of soil by rapid test methods. With this new system of soil testing, a farmer can test his own soil as often and, in as many places as he feels necessary, and after gauging the need of his soil, he can apply the fertilizers as required. The present mode soil testing in laboratories usually takes few days and sometime weeks and the farmers may have to travel long distances to submit the soil sample.

The soil testing kit available in the market in India is a box that contains the following components:

- A booklet that describes the methods for determination of pH, organic carbon, available phosphorus, available potassium, ammonium and nitrate as well as interpretation results. Also, it describes the procedure for collection of soil sample, liming, functions and deficiency symptoms of nutrient elements etc.
- 2) Reagents
- 3) Color chart
- Testing operates- scoops, syringe, beakers, and graduated test tubes with test tube stand, wash bottle, filter paper, droppers, spoon, and funnel.

Glass marking pencil, glass rod etc.

This soil testing kit can easily be transported to the field and soils may be tested there. In soil testing kit the names of reagents are coded in written. Instead, they are marked by numerical number. This soil test kit and its operational procedure are being described for easy understanding.

Soil chemical Analysis

Soil pH is a measure of the acidity and alkalinity of a soil, which affects the availability of plant nutrients to crops and activity of soil microorganisms. Mostly nutrients are available between pH of 6 to pH of 7. Soil acidity exerts an adverse effect on crop growth. Measurement of soil pH alone is not enough to characterize the acid soils. Exchangeable acidity and aluminum in soils coupled with soil pH will be a true representation of actual acidity in soils. Therefore, three easy tests are being given below which can be performed in exactly 10 minutes time to diagnose the problem of acid soils.

A. Test for soil pH and level of acidity

- 1. Take 2 gm soil sample in mixing tube with the help of spatula.
- 2. Add 5 ml of distilled water with the help of measuring cylinder and shake up to 1 minute.
- 3. Filter this mixture in the test tube with the help of filter paper and funnel.
- 4. In the filtrate and 1-2 drops of ρH soil tester (Reagent) and stir until the color is produced.
- 5. Now, match the developed colour with the standard ρH colour rating chart and note the result.

1	DISTILLED WAT
नी REAGENT पीएम रीजेंट	
	· Baseria

DENOMINATION	pH Range
Acidic Soil	<6.4
Neutral Soil	6.5 to 7.5
Alkaline Soil	7.5 to 8.5
Strongly Alkaline Soil	>8.60

5.8 10.0 7.8 9.0 5.6 7.6 8.9 7.4 5.4 8.8 5.2 7.2 8.7 5.0 7.0 8.6 4.8 6.8 8.5 4.6 6.6 8.4 4.4 6.4 8.3 8.2 4.2 6.2 8.0 4.0 6.0

ph rating chart

B. Test for Soil Organic carbon

- 1. If the soil sample is moist, then dry before the test
- 2. Take 1 gm soil sample in mixing tube with the help of spatula
- 3. Take 10ml Organic-A with the help of measuring cylinder
- 4. After that take Organic-B with the help of measuring cylinder, shake and keep it in the test tubstand.
- 5. After 15 mins filter through the filter paper in the test tube
- 6. Now match the developed colour with the organic carbon colour rating chart and note the result.



C. Test for Available Ammonium Nitrogen:

- 1. Take 2 gms of soil sample in mixing tube with the help of spatula
- Add 5 ml Nitro-1 from soil nitrogen tester with the help of measuring cylinder and shake upto 1 minute
- 3. Filter this mixture in the test tube with the help of filter paper and funnel
- 4. In the filtrate, add 1-2 drops of Nitro-2 and shake until the colour is produced.
- 5. Now match the developed colour with the standard nitrogen rating colour chart and note the result.



D. Test for available phosphorus

1. For testing available Phosphorous in the soil, first prepare Phos-4.

Preparation of Phos-4: Add 2 ml (20 drops) of Phos-2 in the test tube, add a pinch (very small quantity) of Phos-3 in the test tube with the help of side corners of spatula. After homogeneous shake, Phos-4 is ready to use.

- 2. Take 2 gms of soil sample in mixing tube with the help of spatula.
- 3. Add 5 ml Phos-1 from Soil Phosphorous tester with the help of measuring cylinder and shake it upto 1 minute.
- 4. Filter this mixture in the test tube with the help of filter paper and funnel.
- 5. Again add 1-2 drops of already prepared Phos-4 and hold till the blue colour is produced.
- 6. Now match the developed colour with the standard Phosphorous colour rating chart and note the result.



E. Test for available potassium

1. For testing of available Potash in the soil, first prepare Potash-3.

Preparation of Potash-3: Add 2 ml (20 drops) of Distilled water in the test tube and then add a pinch (very small quantity) of Potash-2 in test tube with the help of side corners of spatula. After homogeneous shake Potash-3 is ready to use.

- 2. Take 2 gms of soil sample in mixing tube with the help of spatula.
- 3. Add 5 ml Potash-1 with the help of measuring cylinder and shake upto 1 minute.
- 4. Filter this mixture in the test tube with the help of filter paper and funnel.
- 5. In the filtrate, add 2-3 drops of Potash-3 and shake until the colour is produced.
- 6. Now match the developed colour with the standard Potash colour rating chart and note the result.



After soil testing use "Dharti ka Doctor" which is available on play store.





Upload the "Dharti ka Doctor" app as per instruction and fill personal information. After that fill the soil test report namely pH, organic carbon, nitrogen, Phosphorus and potash in app on the base of soil test color chart.



← Land Details					
Khasra Number	13				
Ownership Type Inherited From Ancestors					
Ownership Name SK Sharma					
Select Field Type	Semilrr	igated	•		
Field Area	1.5	Acre	•		
Irrigation Source Tubewells			•		
	Save				

← Khasra no. 13				
Season		Rabi		•
Date Of Sowing		15/11/20)19	
Select Crop Group		Cereal		•
Crop		Wheat		•
Area	1.0		Acre	•
Crop Yield	18.0	1	KG	•
Seed Expenses		Rs.1500		
Fertilizer Expenses		Rs.2000		
	Save	•		

÷	Upload Image				
Season	Get Fertilizer Recomendation				
Date Of Sowing			15/11/2019		
Select Cr	Select Crop Group			Cereal	
Crop			Wheat		•
Area		1.0		Acre	Ŧ
Crop Yiel	d	18.0	I	KG	*
Seed Exp	enses		Rs.1500		
Fertilizer	Expenses		Rs.2000		
Save					



Select Farming Type					
Organic	~				
Test Report Of PBRI Kit	۲				
Nitrogenous Color Chart					
141 - 280	Low				
Phosphorus Color Chart					
<5	Very Low				
<5 6 - 10	Very Low Low				
<5 6 - 10 11 - 17	Very Low Low Moderate				
<5 6 - 10 11 - 17 18 - 25	Very Low Low Moderate Moderate High				
<5 6 - 10 11 - 17 18 - 25 26 - 35	Very Low Low Moderate Moderate High High				







Select Farming Type	
Organic	~
Test Report Of PBRI Kit	۲
Nitrogenous Color Chart	Choose color
Nitrogen Colo	or Chart
50 - 140	Very Low
50 - 140 141 - 280	Very Low Low
50 - 140 141 - 280 281 - 420	Very Low Low Moderate
50 - 140 141 - 280 281 - 420 421 - 560	Very Low Low Moderate Moderate High
50 - 140 141 - 280 281 - 420 421 - 560 561 - 700	Very Low Low Moderate Moderate High

← 🗘 Organic Fertilize	ers
Bio Fertilizers	
Nitrogenous Fertilizer Azotobacter	Select 💌
Phosphatic Fertilizer PSB	Select 💌
Potassic Fertilizer KMB	Select 👻
Organic Manure	
Organic Input	
Compost	
FYM (Gobar ki khad)	•
Jivamrit	
Green Manure	
Oil Cake	
Neem Cake	-

← 🗏 Report	109
Azotobacter	
0.4 L	
PSB	
0.4 L	
КМВ	
0.4 L	
JIVAMRIT	
200 L, 3 Times	
Jaivik Khad	
32.0 KG	
PROM	
60 KG	

← Khasra no. 14				
Season		Kharif		•
Date Of Sowing		15/7/20	19	
Select Crop Group		Cereal		*
Crop		Paddy(Dł	naan)	•
Area	1.0		Acre	•
Crop Yield	42.0)	KG	•
Seed Expenses		Rs.1500		
Fertilizer Expenses		Rs.1500		
	Save	e		

[11]

÷	Upload Image				
Season	Get Fertilizer Recomendation				
Date Of Sowing			15/7/2019		
Select Cr	Select Crop Group			Cereal	
Crop			Paddy(Dh	iaan)	•
Area		1.0		Acre	•
Crop Yiel	Crop Yield			KG	*
Seed Expenses			Rs.1500		
Fertilizer	Expenses		Rs.1500		
Save					

← 🗳 Soil	Report				
Chemical 👻					
Test Report Of PBRI	۲				
Nitrogenous Colo	r Chart				
141 - 280		Low			
Phosphatic Color	Chart				
6 - 10		Low			
Potassic Color Ch	art				
151 - 200		Moderate			
Organic Carbon C	olor Chart				
0.51 - 0.75		Moderate			
pH Color Chart					
6.8		Moderate			
	Next				

Chemical Fertilizers	
Nitrogenous Fertilizer	
Urea	•
Major Nutrient Fertilizer (NPK)	
DAP	•
Phosphatic Fertilizer	
SSP(Singal super phosphate)	-
Potassic Fertilizer	
MOP(Murate of Potash)	•
Requirement: Nitrogen: 64.5, Phosphorus: 102.325, Potassium: 59.75	
Next	

← 🗏 Report	POF
DAP	
18:46:0	62.5 Kg
MOP(Murate of Potash)	
	58.4 Kg
Urea	
	112.6 Kg
SSP(Singal super phosphate)	
	77.0 Kg

🗧 🐣 Soil	Report	
INM_MIX		-
Test Report Of PBRI Kit		۲
Nitrogenous Colo	r Chart	
141 - 280		Low
Phosphatic Color	Chart	
11 - 17		Moderate
Potassic Color Ch	art	
151 - 200		Moderate
Organic Carbon C	olor Chart	
0.51 - 0.75		Moderate
pH Color Chart		
6.4		Low
	Next	

← 🕹 Chemical Fertilizers	
Nitrogenous Fertilizer	
Urea	*
Major Nutrient Fertilizer (NPK)	
DAP	
Phosphatic Fertilizer	
SSP(Singal super phosphate)	*
Potassic Fertilizer	
MOP(Murate of Potash)	*
Requirement: Nitrogen: 157.66, Phosphorus: 88.81, Potassium: 87.57	
Next	

Required NPK report appears on the screen.

"Dharti ka Doctor" app provide three option for cultivation-

- a. Chemical base farming
- b. Mix (INM) base farming
- c. Organic farming

After selecting of type of farming select available chemical fertilizer, bio-fertilizers and organic manure than find report.

Required quantities appear in screen.

The method describes for determination of pH, organic carbon, available phosphorus, available potassium, ammoniac nitrogen in Dharti ka Doctor Booklet.

Dharti ka doctor booklet is printed in 12 Indian languages.

This soil testing kit can easily be transported to the field and soils may be tested there.

In soil testing kit the names of reagents are coded in written and identified by different color. Instead, they are marked by numerical number. This soil test kit and its sample procedures are being described for easy understanding.

Test results:

The testing of soil was conducted in 18 states of India, covering over 6320 farmers during 2019-20 in different cropping seasons i.e. Rabi and Kharif on following parameters:

Soil pH

➢ Soil organic carbon

- ➢ Soil available nitrogen
- Soil available phosphorous
- Soil available potash



Customer Support Ph: +91XXXXXXXXXX

Report Number: STR/UK/E16843/04418 Report Generated At: 05/02/2020 09:57:36



Heartly Welcomes you as a Annadata Farmer

Customer Details : Name : Sanjeev Sharma Father Name : Shri SK Sharma Mobile No : 8541262514 Address : Aalipura Village : Aalipura District : Hamirpur State : UTTAR PRADESH Description : Khasra No : 14 Farm-Type : Irrigated Farm-Area : 1.0 Acre Farming Type : Chemical Crop Type : Cereal Crop : Paddy(Dhaan) State : UTTAR PRADESH

Your Village and Your Land

Geo-fencing of Village

Geo-fencing of Field





Your soil testing report are as follows-

Soil Test Report (05/02/2020)

As per the testing of your soil with Dharti Ka Doctor(Soil Testing Kit) The nutrients present in your Farm are as followed:

	alues
1 Nitrogen 21	10.0 kg
2 Phosphrous 7.5	.5 kg
3 Potash 15	55.0 kg
4 Organic Carbon 0.7	7 %
5 pH 6.8	.8



2. Soil testing has been done by the farmer before organic farming, his report is attached-

Sr.	Soil-Parameters	Values
1	Nitrogen	210.0 kg
2	Phosphrous	14.5 kg
3	Potash	155.0 kg
4	Organic Carbon	0.7 %
5	pH	6.4

Observations and inferences of soil test reports (State-Wise)

1. Overall observations:

A total of 6320 soil samples were tested by the trainer farmers using the soil testing kit (DKD) in specific locations covering 18 states of AP, Bihar, HP, Rajasthan, Punjab, Odisha, Assam, Chattisgarh, MP, Delhi NCR, Haryana, Jharkhand, West Bengal, Karnataka, Uttarakhand, Telangana and UP where the farm labs were established. The soil testing was done for soil pH, Organic Carbon, Nitrogen, Phosphorus and Potassium and the same is presented in Table 1. The observations were as follows:

a) Soil pH: The soil pH was found to be normal in more than 70% of the samples collected from the locations covered whereas acidic soils were found in 23 % of the samples.

b) Organic Carbon: The Organic Carbon was found to be normal in 46% of the samples and in case of 42% of the samples the organic carbon was found to be lower. In case of locations in HP the Organic Carbon was found to be higher probably due to mountain soils.

c) Nitrogen: The soils of 38% of the overall farmers reported that their soils are having Nitrogen in medium range whereas 55% of samples revealed less availability of Nitrogen. The Nitrogen availability has been observed to be significantly lower in case of locations in Jharkhand, West Bengal, Karnataka, Haryana, Odisa, AP, Assam, MP and Bihar.

d) Phosphorous: Phosphorus content was found to be lower in case of 53% of the samples and normal in 40% of the samples but in case of locations in AP higher levels were detected.

e) **Pottasium:** The potassium content was found to be on the higher side in 45% of the samples and this is due to high sample size of UP, NCR, AP where the soils are naturally high in Potassium. The locations in Rajasthan, WB, MP, Odisha and Assam had lower content.

2. Inferences:

The farms where soil tests were normal (medium range) in case of all the parameters i.e. pH, OC, N, P and K need not to be probed further but in cases where the values are found to be on higher or lower side need to be further probed and testing by trainer farmer in the second season as well to be done. The reduced Organic Carbon in 55% of the samples needs to be improved and needs immediate intervention as the compost availability is less/scant and the Nitrogen requirement is not met fully from the compost. Patanjali is taking up an education/communication program for the farmers under which the farmers are being re-sensitized on adoption of Good Agricultural Practices and reinforce the concept of Organic Farming and need to maintain healthy soils. The specific package of practices to be adopted in case of less or higher values is also being communicated.

Soil Test Report in % (Total number of sample = 6320)						
	N P K OC pH					
LOW	52	54	18	43	24	
MEDIUM	41	40	41	46	70	
HIGH	7	6	41	11	6	







Soil Test Report								
ANDHRA PRADESH								
N P K OC pH								
LOW	245	0	0	253	0			
MEDIUM	10	119	91	0	247			
HIGH 0 136 164 2 8								
	255 255 255 255 255							



Soil Test Report								
ASSAM								
N P K OC pH								
LOW	43	49	45	43	29			
MEDIUM	39	11	39	41	55			
HIGH 2 24 0 0 0								
	84 84 84 84 84							



Soil Test Report								
BIHAR								
N P K OC pH								
LOW	124	45	104	43	24			
MEDIUM	6	85	26	87	106			
HIGH 0 0 0 0 0								
	130 130 130 130 130 130							



Soil Test Report								
CHATTISGARH								
N P K OC pH								
LOW	31	31	7	34	32			
MEDIUM	45	45	25	39	45			
HIGH 1 1 45 4 0								
	77 77 77 77 77 77							



Soil Test Report								
DELHI NCR								
N P K OC pH								
LOW	213	333	0	173	51			
MEDIUM	291	171	113	331	453			
HIGH	0	0	391	0	0			
	504	504	504	504	504			



Soil Test Report								
HARYANA								
N P K OC pH								
LOW	285	138	132	307	9			
MEDIUM	25	171	167	3	299			
HIGH	0	1	11	0	2			
	310	310	310	310	310			



Soil Test Report								
HIMACHAL PRADESH								
N P K OC pH								
LOW	52	31	1	0	28			
MEDIUM	76	95	74	41	122			
HIGH	22	24	75	109	0			
	150	150	150	150	150			



Soil Test Report								
Jharkhand								
N P K OC pH								
LOW	353	352	286	222	255			
MEDIUM	108	122	191	170	183			
HIGH	16	3	0	85	39			
	477	477	477	477	477			



Soil Test Report								
KARNATAKA								
N P K OC pH								
LOW	268	294	111	139	296			
MEDIUM	82	132	292	162	10			
HIGH	143	67	90	192	187			
	493	493	493	493	493			



Soil Test Report								
MADHYA PRADESH								
N P K OC pH								
LOW	33	52	38	13	106			
MEDIUM	150	174	135	174	114			
HIGH	47	4	57	43	10			
	230	230	230	230	230			



Soil Test Report								
ODISHA								
N P K OC pH								
LOW	172	143	125	185	180			
MEDIUM	142	181	223	175	172			
HIGH	46	36	12	0	8			
	360	360	360	360	360			



Soil Test Report								
PUNJAB								
N P K OC pH								
LOW	41	13	3	46	20			
MEDIUM	57	87	64	53	92			
HIGH	14	12	45	13	0			
	112	112	112	112	112			



Soil Test Report								
RAJASTHAN								
N P K OC pH								
LOW	38	75	81	63	1			
MEDIUM	69	38	30	47	84			
HIGH	6	0	2	3	28			
	113	113	113	113	113			



Soil Test Report								
Telangana								
N P K OC pH								
LOW	106	204	0	0	40			
MEDIUM	109	16	140	0	143			
HIGH	5	0	80	220	37			
	220	220	220	220	220			



Soil Test Report							
UTTAR PRADESH							
N P K OC pH							
LOW	1223	1423	176	968	355		
MEDIUM	1237	1069	761	1573	2183		
HIGH	129	97	1652	48	51		
	2589	2589	2589	2589	2589		



Soil Test Report								
UTTARAKHAND								
N P K OC pH								
LOW	83	196	12	194	78			
MEDIUM	119	6	181	5	124			
HIGH	0	0	9	3	0			
	202	202	202	202	202			



		Soil Tes	t Report			
		West	bengal			
	Ν	Р	K	OC	рН	
LOW	8	8	6	10	4	
MEDIUM	6	6	8	4	9	
HIGH	0	0	0	0	1	
	14	14	14	14	14	



Recommendations for improving and sustaining soil fertility after receiving the test reports for Organic Carbon, Nitrogen, Phosphorus and Potash

Recommendations	are	per	ha.
-----------------	-----	-----	-----

Fertilizer name	Unit	Low	Medium	High	Remarks
Azotobacter	liter	1	0.5	0	Basal application or upto 45 days after sowing after mixing with 50 kg FYM
Bio NPK	liter	1.25	1	0.75	Basal application or upto 45 days after sowing after mixing with 50 kg FYM
Compost only	MT	35	25	8	Basal application
Compost & green manuring	MT	18	12	0	Basal application
Jivamrit	sprays	3-4	2-3	1	Application to be done in 15-30 days after sowing on the base of crop
Jaivik khad	Kg	180	100	0	Basal application
PROM	Kg	200	120	120	Basal application
Neem cake	kg	1250	500	0	Basal application after mixing with 50 kg FYM
VAM	Kg	12.5	12.5	12.5	Basal application or upto 30-45 days after sowing after mixing with 50 kg FYM
PSB	liter	1.00	0.75	0.75	Basal application or upto 60 days after sowing after mixing with 50 kg FYM
КМВ	liter	1.00	0.75	0.75	Basal application or upto 45 days after sowing after mixing with 50 kg FYM

Note:

- 1. Green manuring to be done using crops like dhaincha, sanai etc.
- 2. Suitable crop rotations to be followed by farmers

Lime to be applied to attain desired soil pH (t/ha)										
Soil pH as per test	Desired soil pH									
	5.6	6.0	6.4							
6.7	0	0	0							
6.6	0	0	6.25							
6.5	0	6.25	4.25							
6.4	0	2.75	5.50							
6.3	0	3.75	6.75							
6.2	2.50	5.00	8.00							
6.1	3.50	6.00	9.25							
6	4.25	7.25	10.50							
5.9	5.25	8.25	11.75							
5.8	6.25	9.25	13.25							
5.7	7.00	10.50	14.50							
5.6	8.00	11.50	15.75							
5.5	9.00	12.75	17.00							
5.4	9.75	13.75	18.25							
5.3	10.75	15.00	19.50							
5.2	11.75	16.00	20.75							
5.1	12.50	17.25	22.25							
5	13.50	18.25	23.50							
4.9	14.50	19.25	24.75							
4.8	15.50	20.75	26.00							

Lime application for acidic soil pH correction

Recommendations for Gypsum application for alkalinity on basis of soil pH

pH value	Gypsum to apply to attain desired soil									
	Gypsum MT/ha	FYM MT/ha	Crop rotation							
10.7	12—15	0	Rice-Wheat							
10.7	6-7	10-15	Rice-Wheat							
9.5	10-12	0	Rice-Wheat							
9.5	5-6	8-10	Rice-Wheat							
8.5	35	0	Multiple crops							
8.5	23	6-8	Multiple crops							
8	1.5-2.0	0	Multiple crops							
8	1.0-1.5	3-4	Multiple crops							

Recommendation Source: ICAR



भाकृअनुप - भारतीय चावल अनुसंधान संस्थान राजेन्द्रनगर, हैदराबाद - ५०० ०३०. तेलंगाना राज्य ICAR - INDIAN INSTITUTE OF RICE RESEARCH (Formerly Directorate of Rice Research)



RAJENDRANAGAR, HYDERABAD - 500 030 TELANGANA STATE, INDIA.

Dr. Brajendra Principal Scientist, Soil Science ICAR-Indian Institute of Rice Research, Rajendranagar, Hyderabad,India Mobile-9177210995, 8247820872, ,(040)-24591293

Subject: Performance Appraisal of Patanjali's "Dharthi Ka Doctor" (Soil kit)

Dear Practioners/followers/soil test technicians/progressive farmers/users

The Patanjali's "Dharthi Ka Doctor" (Soil kit), has been comprehensively demonstrated/validated/tested in my lab and in several regions of India by me in all farmers programmes, where I participated and also in various scientific forums. The results speak for themselves. It has removed the need of electricity or sophisticated equipments and tools and the need of even big technicians to perform soil testing. Such is the ease of doing soil testing by this kit, that even a layman and a simple villager can perform his own farm soil testing with little exposure and demonstration. The results for some of the important soil test parameters such as soil organic carbon, available NPK instantly and insitu/ on the farm will go a long way in inculcating a firm believe in farming community that they can do themselves the very important soil testing. This has a tremendous power/potential to empower millions of farmers across India. It is very heartening to know that Patanjali is taking care of such initiative.

I strongly recommend the use and widespread use of this kit. I myself regularly do my lab analysis with this kit and also demonstrate to various farmers visiting our institute and lab on daily basis. The results are fuelling huge interests and use among the farming communities. I am extremely excited About the Patanjali's "Dharthi Ka Doctor" (Soil kit), being one day becoming the most important friends of the farmers in India. I wish all the best to all people associated with such initiative.

Scappy

Phone : 040-24591258 (Admn) 040-24591241 (PMEC) 040-24591291 (TTT) website http://www.drritar.org Fax : 040-24591217 Off. : 040-24591218 Email : pdrice@drritar.org



भाकृअनुप-भारतीय कदन्न अनुसंधान संस्थान ICAR - INDIAN INSTITUTE OF MILLETS RESEARCH



To whomsoever it may concern

Myself and Dr. Swarna Ronanki, Scientist (Agronomy) have seen the demo of the "Dharti Ka Doctor" soil kit. The analysis with this kit is very simple, fast and the kit is easy to carry to the fields. The kit can be used to estimate 5 parameters (organic carbon, pH, N, P and K) within 30 minutes and does not require any power for operation and farmers can use in their fields for estimation of basic soil fertility parameters.

B. Gangaiah Principal Scientist (Agronomy)

Swarna Ronanki Scientist (Agronomy)

राजेन्द्रनगर, हैदराबाद, तेलंगाना, भारत / Rajendra Nagar, Hyderabad - 500 030. India. दूरभाष/Phone : +91-40-24599300 / 303 फैक्स्/Fax : 040-24599304, ई-मेल/E-mail : millets.icar@nic.in वेवसाइट / Website : www.millets.res.in ICAR-Indian Institute of Millets Research Rajendranagar, Hyderabad 500 030

05-02-2020

To whomsoever it may concern

My self and Dr. Swarna Ronanki, Scientist (Agronomy) have seen the demo of the "*Dharti Ka Doctor*" soil kit. The analysis with this kit is very simple, fast and the kit is easy to carry to the fields. The kit can be used to estimate 5 parameters (organic carbon, pH, N, P and K) within 30 minutes and does not require any power for operation and farmers can use in their fields for estimation of basic soil fertility parameters.

(Swarna Ronanki) Scientist (Agronomy)

B. Co pain 5.2-2020.

(B. Gangaiah) Principal Scientist (Agronomy)



PROFESSOR JAYASHANKAR TELANGANA STATE AGRICULTURAL UNIVERSITY DEPARTMENT OF SOIL SCIENCE & AGRICULTURAL CHEMISTRY COLLEGE OF AGRICULTURE, RAJENDRANAGAR, HYDERABAD-500030

Dr. G. PADMAJA PROFESSOR & HEAD

Mobile No. : 9866976067 E-mail : <u>padmaja.gandavarapu@gmail.com</u>

To whom so ever it may concern

Date: 06.01.2020

We have tested the soil samples of different farmers in Telangana State with the help of "Dharthi ka Doctor" soil kit supplied by Patanjali Bio Research Institute, Haridwar and the same soil samples were analyzed in the laboratory of Department of Soil Science and Agricultural Chemistry and similar range of values were found which were comparable and reliable. It was also noticed that the analysis with soil kit was very simple and very fast and saves time and will be very useful to the farmers to test the soil samples at their field itself with >85% accuracy. This Soil kit does not require any power and is easy to carry to the farmer's field and is very economical as cost of analysis per one parameter costs less than Rs 10/- and all the five parameters(organic matter, pH, N, P & K) can be estimated with in half an hour time.

We recommend that this Soil kit be used by all farmers in their fields to determine their farm Soil Status and take timely remedial measures to promote Soil health.

Dept. of Soil Science & Agril. Chemistry College of Agriculture Prof. Jayoshankar Telesgenz Store Agriculture University Rejendraneger, Hyderabad-500 030. Telangena State. Data Showing the Comparision of values for different soil parameters by Soil Test Kit and by Laboratory Analysis

					•						
S. No.	Sample No.		Wit	h Soil Test	Kit			With L	aboratory	Method	
		Hq	Z	Р	К	00	Hd	z	Α	K	00
-	1	7.2	Medium	Very High	Medium	0.5	7.46	438	61	292.5	0.43
2	2	7.0	Medium	Very High	Medium	0.5	7.32	461	72	360.0	0.58
3	3	7.0	Medium	Very High	Medium	0.5	7.38	472	82	425.5	0.55
4	4	7.2	Medium	Very High	Medium	0.5	7.41	481	86	461.3	0.61
5	5	7.2	Medium	Very High	High	0.5	7.43	486	92	506.3	0.68
9	9	7.0	Medium	Very High	Medium	0.5	7.28	468	74	371.3	0.58
7	7	7.2	Medium	Very High	Medium	0.5	7.31	474	78	461.3	0.63
8	8	7.4	Medium	Very High	Medium	0.5	7.68	478	81	450.0	0.48
6	6	7.4	Medium	Very High	Medium	0.5	7.73	460	76	360.0	0.43
10	10	7.4	Medium	Very High	Medium	0.5	7.81	468	80	427.5	0.42

G. Jader J. Jader J. Jacob PROFESSOR & HEAD Dept. of Soil Science & Agril. Chemistry College of Agriculture Frof. Inyrchankar (Blangma State Agriculture Frof. Inyrchankar (Blangma State Agriculture Frof. Inyrchankar (Blangma State Agriculture) Rajendranegar, Hyderæbed-500 030.



PROFESSOR JAYASHANKAR TELANGANA STATE AGRICULTURAL UNIVERSITY College of Agriculture, Rajendranagar, Hyderabad - 500 030. T.S.

Dr. Seema Associate Dean Phone : 040-24014573; 24015011, Extn. 360 Email : ad_ca_rnagar@yahoo.com

To whom so ever it may concern

Date: 04-02-2020

We have tested the soil samples of different farmers in Telangana State with the help of "Dharthi ka Doctor" soil kit supplied by Patanjali Bio Research Institute, Haridwar. The same soil samples were analyzed in the laboratory of Department of Soil Science and Agricultural Chemistry and the results of both the methods were comparable. The analysis with soil kit was simple, fast and saves time and will be very useful to the farmers to test the soil samples with >85% accuracy. This kit does not require any power and is easy to carry to the farmer's field and is very economical as cost of analysis per one parameter is less than Rs. 10/-. Further, all the five parameters (organic matter, pH, N, P & K) can be estimated within half an hour.

We recommend that this soil kit be used by the farmers in their fields to determine the soil status and take timely remedial measures to promote soil health.

gen

Associate Dean ASSOCIATE DEAN College of Agriculture, PJTSAU Rajendranagar, Hyd-30.

Data Showing the Comparision of values for different soil parameters by Soil Test Kit and by Laboratory Analysis

		-												mistry	lfniversity 0.030.		
./.	OC	0.43	0.58	0.55	0.61	0.68	0.58	0.63	0.48	0.43	0.42		- cha	R & HEAD	Agriculture Mate Agricture yét rabec 500 na Stale.		
y Method	ara	292.5	360.0	425.5	461.3	506.3	371.3	461.3	450.0	360.0	427.5		G. Indu	PROFESSO	College of therker biorgens rarea apor. N Tetanya		
Lahorator	Avar	61	72	82	86	92	74	78	81	. 76	80			Dept.	Prof. Jayn Rejer		(m)
With	Available	438	461	472	481	486	468	474	478	460	468						Aniore
	Hd	7.46	7.32	7.38	7.41	7.43	7.28	7.31	7.68	7.73	7.81		09	9	80,]	B.F.
	0C	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	HIGH	$\langle \mathcal{N} \rangle$	5	~ ~	ledu	1 to the
Kit	K	Medium	Medium	Medium	Medium	High	Medium	Medium	Medium	Medium	Medium	6	90	9	0.8	3	Brye.
h Soil Test	Р	Very High	/ery High	nediu	80-5	25.55	20-2										
Wit	N	Medium	Medium V	Medium	C.	08	Ą	4									
	Hq	7.2	7.0	7.0	7.2	7.2	7.0	7.2	7.4	7.4	7.4	mo	280	SZ	120		
Sample No.		-	2	3	4	5	9	7	8	6	10	1	X	V	V .		
S. No.		-	2	3	4	5	9	7	8	6	10		2.5	P. O.C	. 1221.		
													AVC	Ava	Dra	6	

.



ICAR-National Bureau of Plant Genetic Resources

Regional Station, Rajendranagar, Hyderabad 500 030, India. Tel: 040-24015478: Fax: 040-24014072 E-mail: <u>nbpgrhyd@yahoo.com</u>



Dated. 05.02.2020

Dr B Sarath Babu Principal Scientist & Head

To whosoever it may concern

I and our scientists have seen the demo of the "Dharthi Ka Doctor" soil kit. The analysis with this soil kit is very simple, fast and easy to carry to the fields. The kit can be used to estimate 5 parameters (organic matter, pH, N, P & K) with in 30 minutes and does not require any power for operation and farmers can use in their fields for promotion of soil health with low cost.

(B. Sarath Babu)