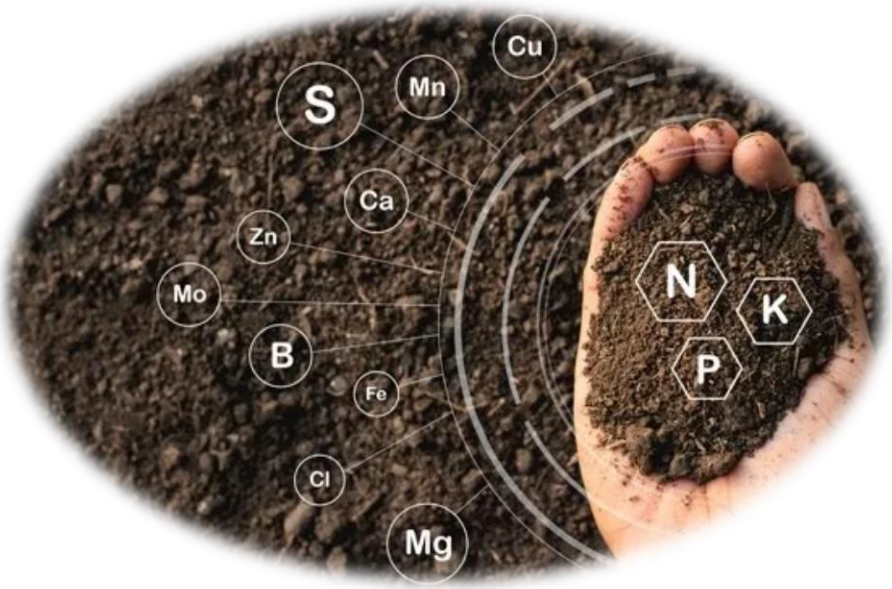
Ministry of Agriculture, Livestock and Irrigation

Department Of Agriculture

Assessment Upon Soil Test Results and Rice Yield Response: Relation Between Organic Matter and Nutrient Status



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Taunggyi, Southern Shan State

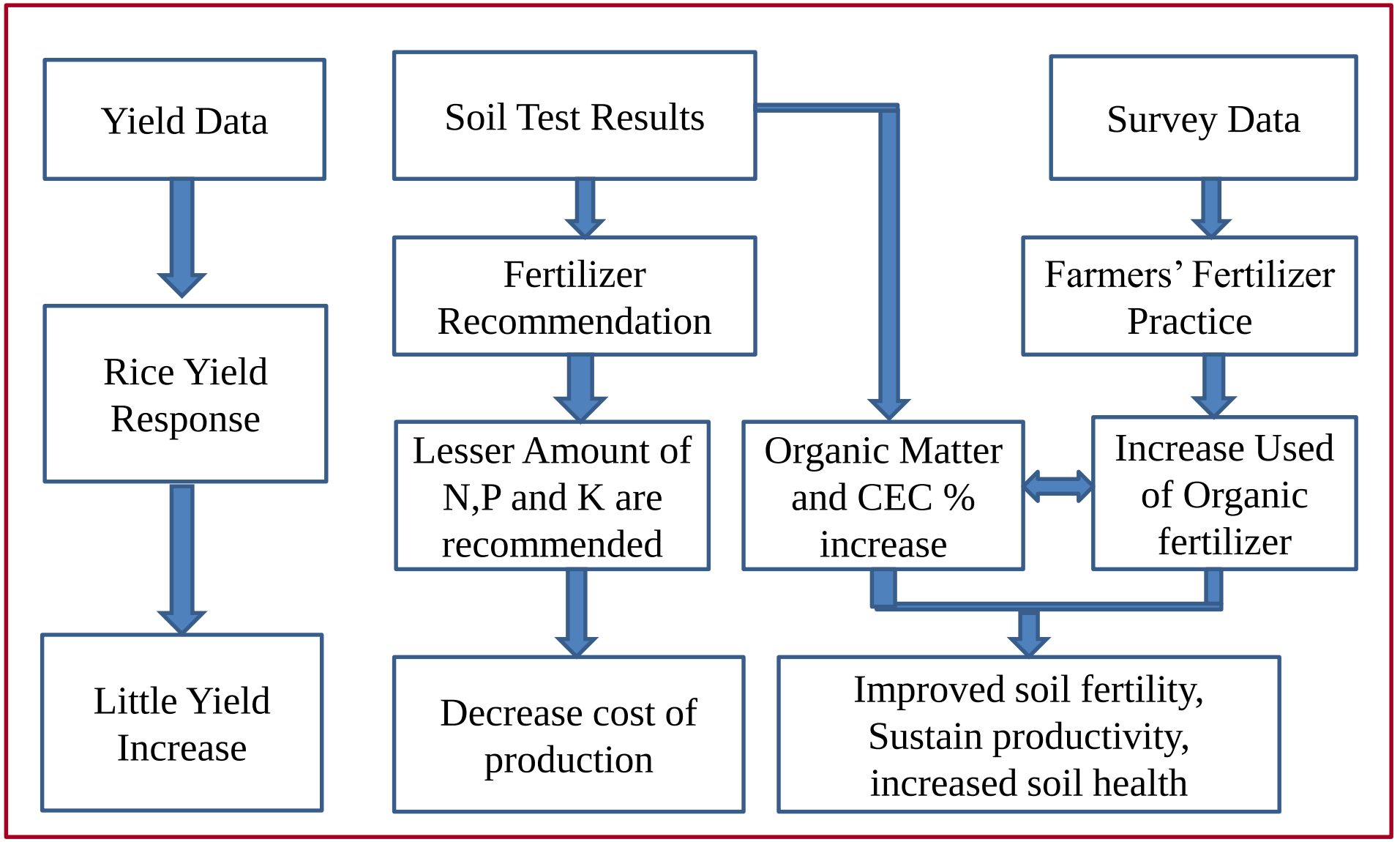
Introduction

- Integrated High Technology Demonstration Village Project had been implemented by Department of Agriculture since 2017
- Purposes of Integrated High Technology Demonstration Village are 5 goals
- Among them, the first and foremost important one is to take consideration soil improvement works
- For soil development, soil sample from IHTDV village and sent them to the soil laboratory, based on soil test results and started to make fertilizer recommendation

Introduction

- Integrated High Technology Demonstration Village Project had been implemented by Department of Agriculture since 2017
- Five main implementation works were proposed to practice especially in IHTDV
- Among them, the first and foremost important one is to take consideration soil improvement works
- For soil development, soil sample from IHTDV village and sent them to the soil laboratory, based on soil test results and started to make fertilizer recommendation

Conceptual Framework



Objective

- To give fertilizer recommendation based on soil test results
- To describe management practices to improve soil fertility in IHTDV village of Taunggyi District
- To evaluate and explain relationship between rice yield and soil nutrients

Problem Statement

- Increased use of chemical fertilizer only
- Little or no use of organic fertilizer
- Lack of knowledge of soil improvement and management practice

Material and Method

- Description of Study Area - 10 villages, IHTDV, Taunggyi District, Southern Shan State
- Experimental period - 2018, 2019, 2020 (Wet season)
- Methods - Both field survey and soil laboratory analysis
- Rice cultivar - Shweyinaye (140 days)
- Detailed features - pH, Total Nitrogen, Available phosphorous, Exchangeable Potassium, Organic matter, CEC

Laboratory Analysis

- The collected samples were dried at room temperature and ground in powdered form and analyzed in the laboratory for the determination of required chemical properties at Soil Laboratory
- The different methods adopted for chemical properties determinations are listed in the table

Methods adopted for the laboratory analysis at Department of Agriculture, Soil laboratory (Shan State)

No.	Parameters Methods	Methods
1	Organic matter (%)	Walkely and Black (Walkely and Black, 1934)
2	Total N (%)	Kjeldahl (Bremner and Mulvaney, 1982)
3	Available P2O5 (ppm)	Olsen's and Bray Method (Olsen et al., 1954)
4	Exchangeable K2O (ppm)	Ammonium acetate (Jackson, 1967)
5	Extractable Ca (ppm)	EDTA Titration (El Mahi, et.al.,1987)
6	Extractable Mg (ppm)	EDTA Titration (El Mahi, et.al.,1987)
7	Available S (ppm)	Turbidimetric (Verma,, 1977)

Farmers' Fertilizer Practices (acre^{-1})

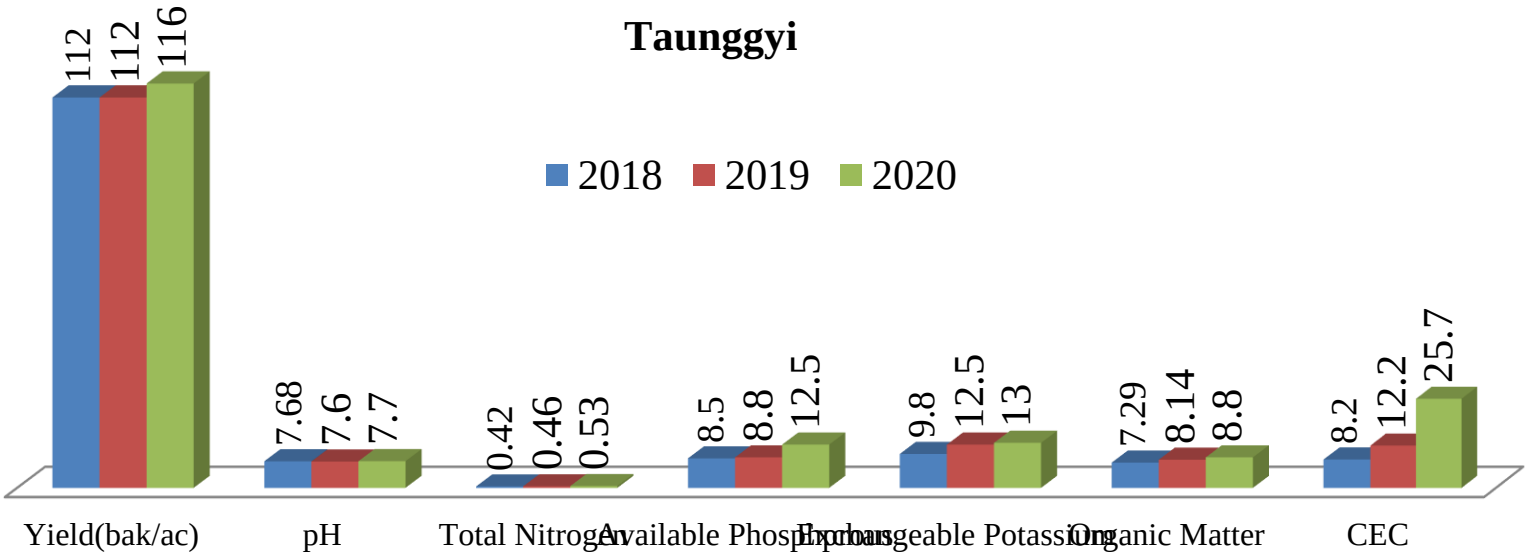
Township	Basal		Tillering		Panicle Initiation	
	Cowdung Manure (bag)	15:15:15 compound (bag)	Urea (bag)	15:15:15 Compound (bag)	Urea (bag)	15:15:15 compound (bag)
Taunggyi	25	1	0.5	-	0.5	-
Hopone	25	1	1	-	-	-
Nyaung Shwe	50	1	0.5	0.5	0.5	0.5
Hsiseng	25	1	0.5	-	0.5	-
Kalaw	20	1	0.5	-	-	0.5
Pintaya	40	-	0.5	0.5	0.5	0.5
Ywangan	40	1	0.5	-	0.5	-
Yatsaut	40	2	0.5	1	-	-
Pinglaung	-	0.5	0.5	0.5	-	0.5
Phekhone	40	1	1	0.5	1	0.5

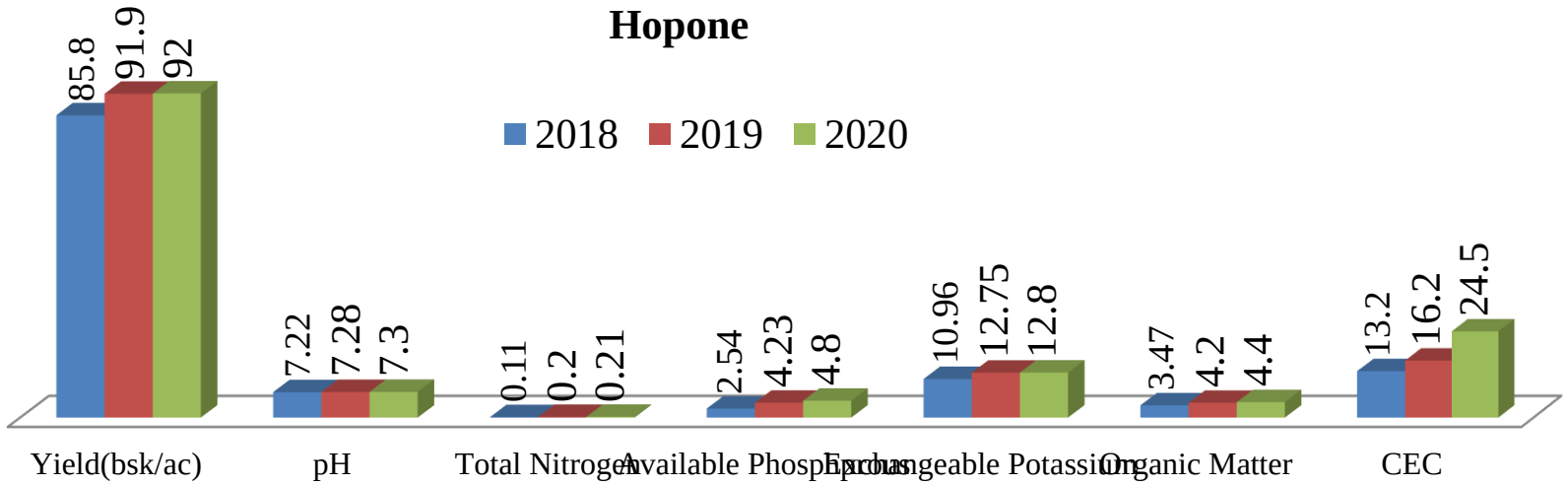
- Cowdung Manure and 15:15:15 compound - Basal
- Urea and 15:15:15 compound- Tillering and Panicle initiation

Fertilizer Recommendation by DOA

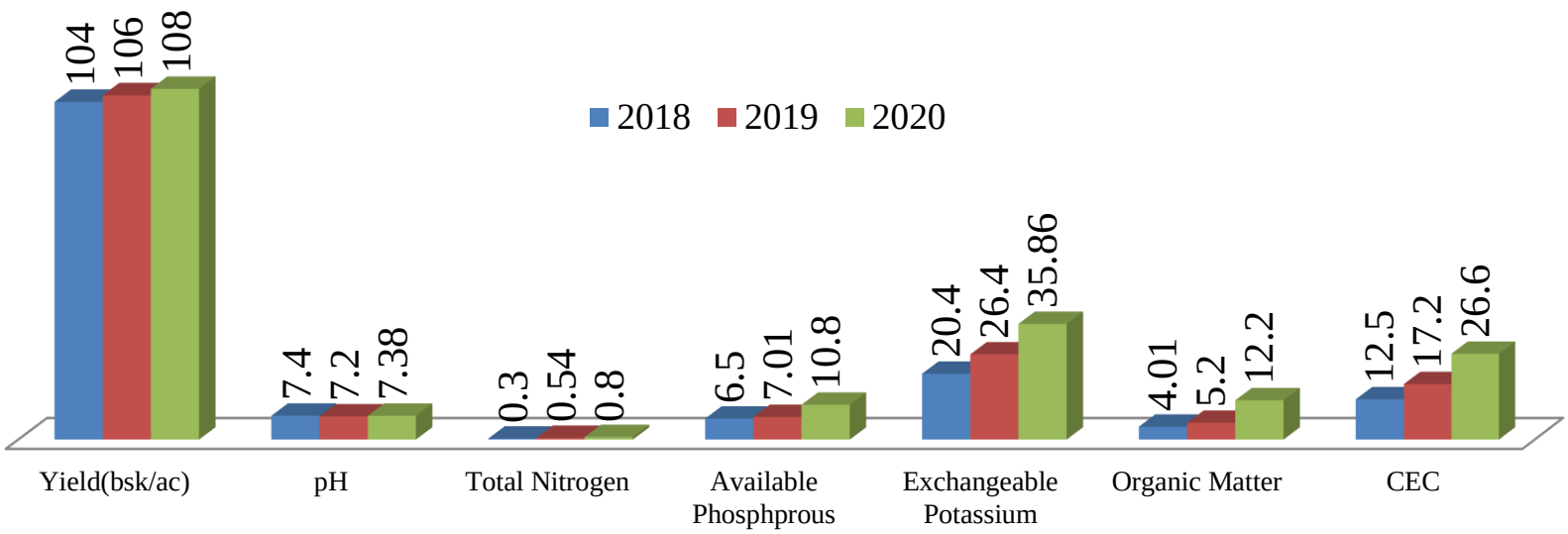
Township	2018 (kg/ac)			2019 (kg/ac)			2020 (kg/ac)		
	Urea	T-super	Potash	Urea	T-super	Potash	Urea	T-super	Potash
Taunggyi	49.32	15.78	43.82	48.32	14.78	41.82	44.32	14.20	40.82
Hopone	54.25	17.36	45.35	52.25	16.36	42.35	45.32	17.36	41.35
Nyaung Shwe	49.32	17.36	40.82	42.39	16.36	43.35	40.39	15.78	40.82
Hsiseng	54.25	17.36	45.35	43.32	15.36	42.35	41.32	17.36	40.82
Kalaw	49.32	17.36	45.35	42.39	15.78	41.35	42.39	15.78	40.82
Pintaya	59.19	17.36	49.89	52.19	15.78	45.89	44.39	15.78	43.35
Ywangan	54.15	15.78	49.89	52.25	17.36	45.35	49.32	15.78	43.35
Yatsaut	54.25	17.36	45.35	46.32	17.36	40.82	43.32	15.78	39.82
Pinlaung	54.25	15.78	45.35	52.25	15.78	40.82	49.32	15.78	39.82
Phekhone	54.25	15.78	45.35	51.25	15.78	40.82	49.32	15.78	39.82

Results and Discussion

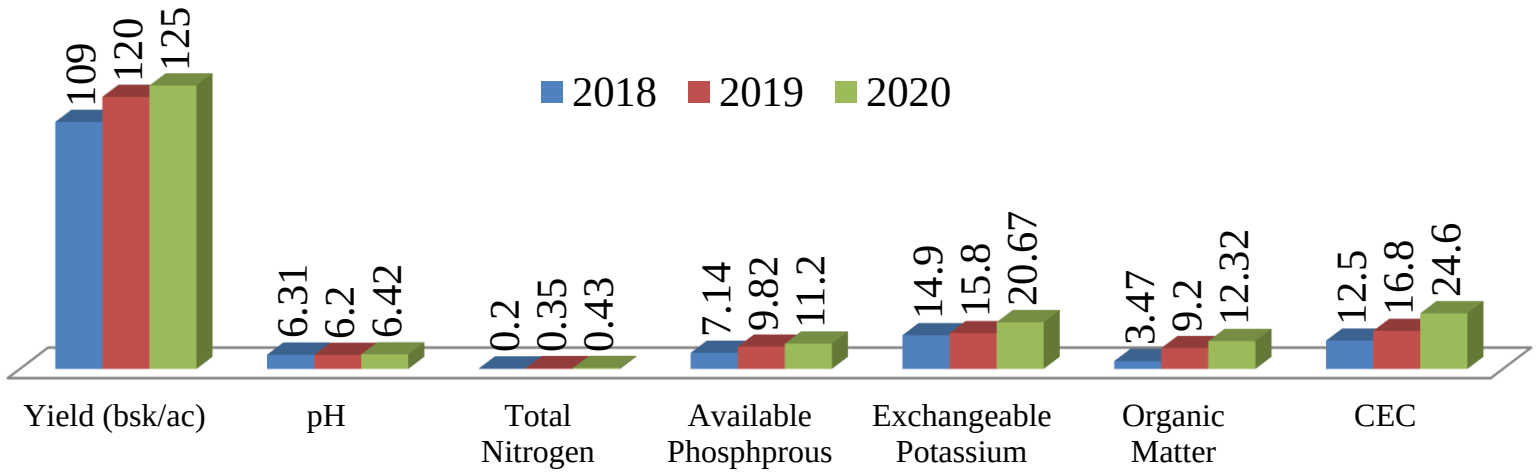


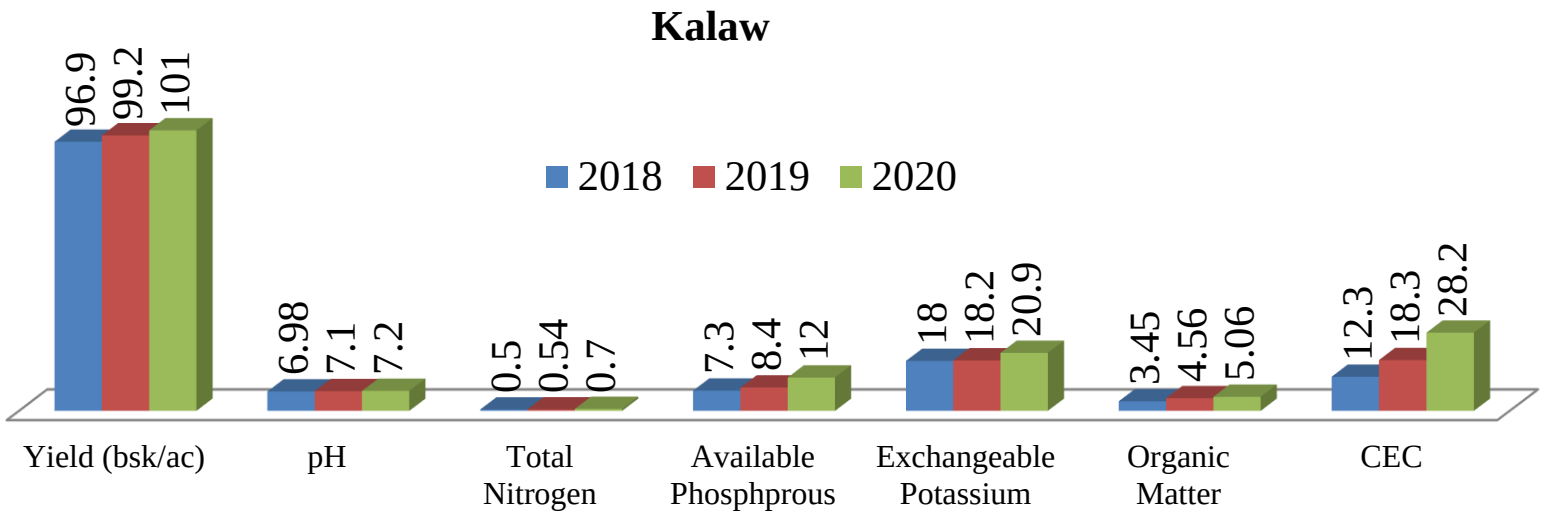


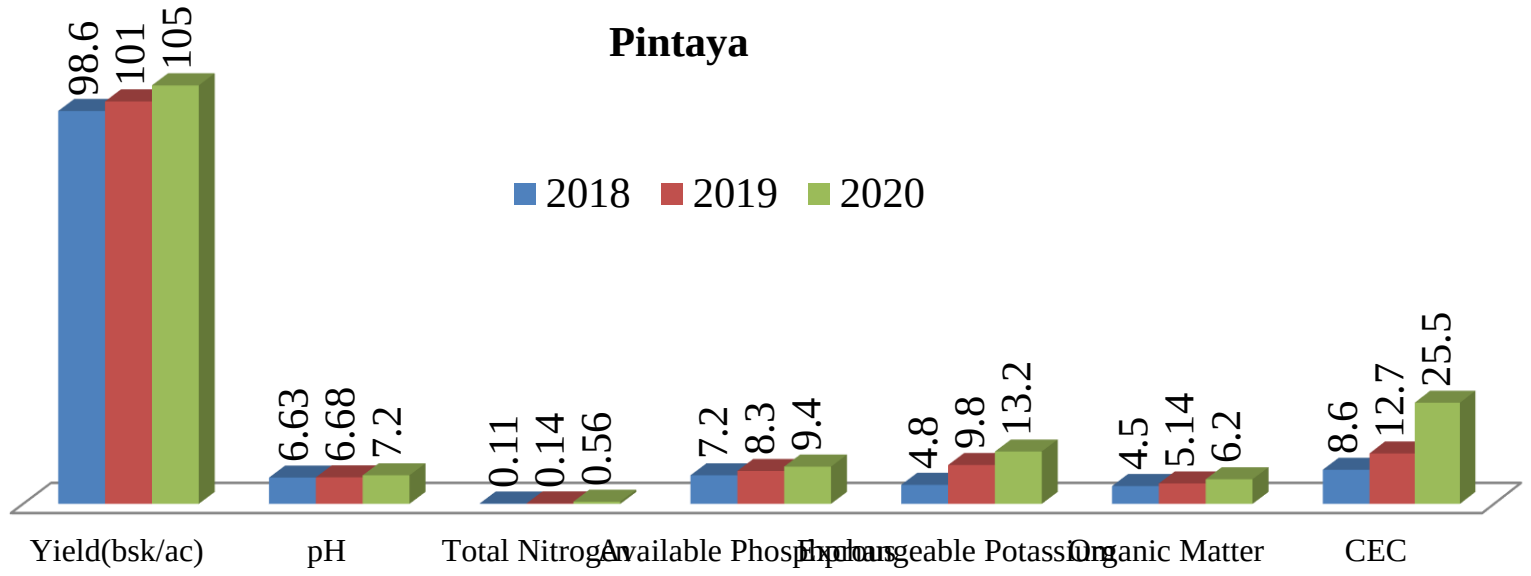
Nyaung Shwe

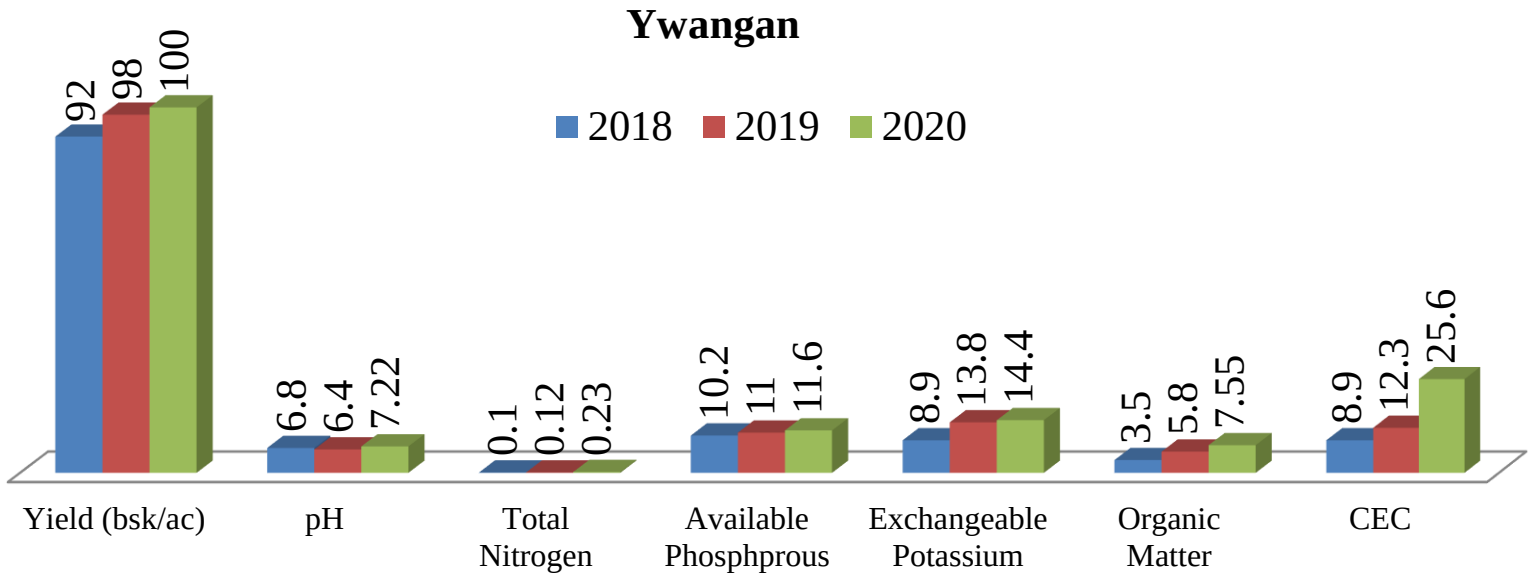


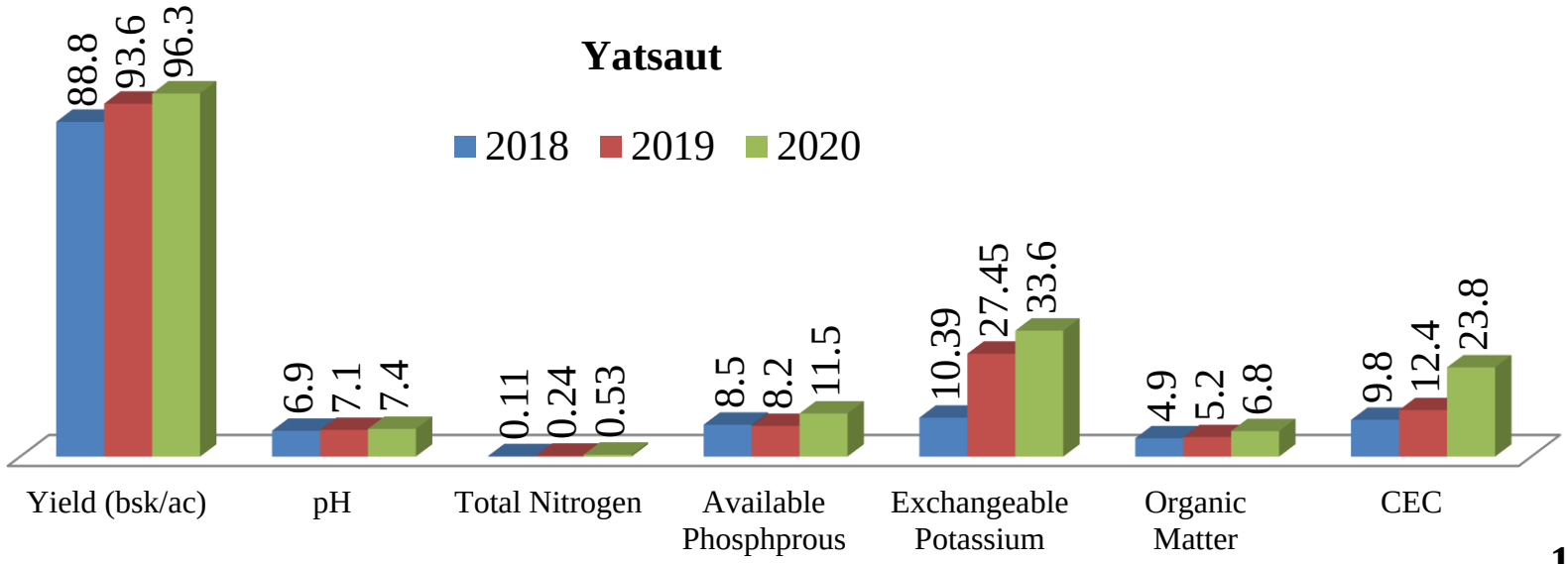
Hsiseng

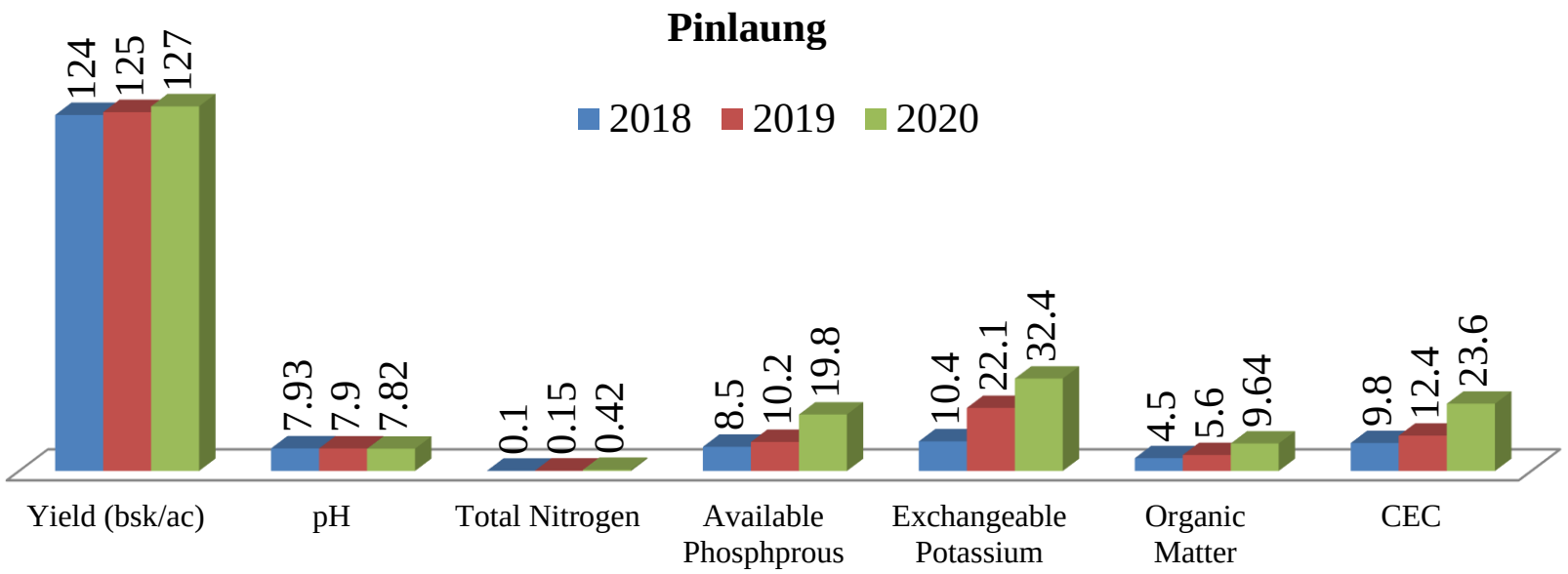


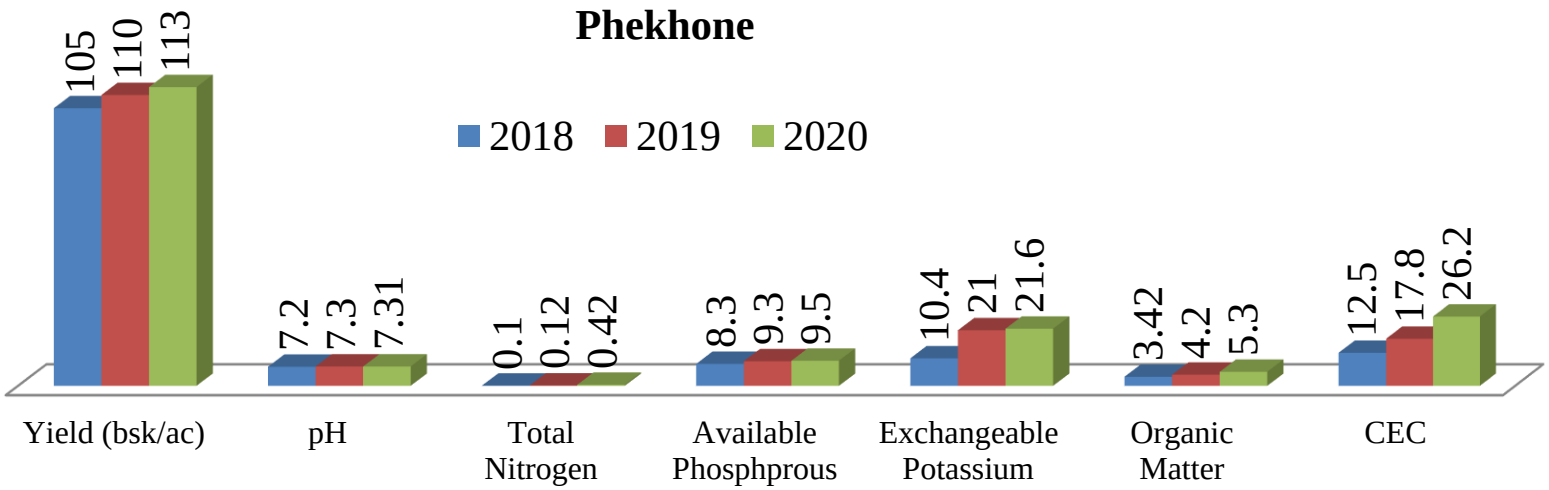

Kalaw
2018
2019
2020
96.9
99.2
101
6.98
7.1
7.2
0.5
0.54
0.7
7.3
8.4
12
18
18.2
20.9
3.45
4.56
5.06
12.3
18.3
28.2
Yield (bsk/ac)
pH
Total Nitrogen
Available Phosphprous
Exchangeable Potassium
Organic Matter
CEC


Pintaya
2018
2019
2020
98.6
101
105
6.63
6.68
7.2
0.11
0.14
0.56
7.2
8.3
9.4
4.8
9.8
13.2
4.5
5.14
6.2
8.6
12.7
25.5
Yield(bsk/ac)
pH
Total Nitrogen
Available Phosphorus
Exchangeable Potassium
Organic Matter
CEC


Ywangan
2018
2019
2020
92
98
100
6.8
6.4
7.22
0.1
0.12
0.23
10.2
11
11.6
8.9
13.8
14.4
3.5
5.8
7.55
8.9
12.3
25.6
Yield (bsk/ac)
pH
Total Nitrogen
Available Phosphprous
Exchangeable Potassium
Organic Matter
CEC


Yatsaut
2018
2019
2020
88.8
93.6
96.3
6.9
7.1
7.4
0.11
0.24
0.53
8.5
8.2
11.5
10.39
27.45
33.6
4.9
5.2
6.8
9.8
12.4
23.8
Yield (bsk/ac)
pH
Total Nitrogen
Available Phosphprous
Exchangeable Potassium
Organic Matter
CEC


Pinlaung
2018
2019
2020
124
125
127
7.93
7.9
7.82
0.1
0.15
0.42
8.5
10.2
19.8
10.4
22.1
32.4
4.5
5.6
9.64
9.8
12.4
23.6
Yield (bsk/ac)
pH
Total Nitrogen
Available Phosphprous
Exchangeable Potassium
Organic Matter
CEC


Phekhone
2018
2019
2020
105
110
113
7.2
7.3
7.31
0.1
0.12
0.42
8.3
9.3
9.5
10.4
21
21.6
3.42
4.2
5.3
12.5
17.8
26.2
Yield (bsk/ac)
pH
Total Nitrogen
Available Phosphprous
Exchangeable Potassium
Organic Matter
CEC

Results and Discussion

		Yield (bsk/ac)	pH	Total Nitrogen (ppm)	Available Phosphorous (ppm)	Exchangeable Potassium (ppm)	Organic Matter(%)	CEC(%)
Taunggyi	2018	112	7.68	0.42	8.5	9.8	7.29	8.2
	2019	112	7.6	0.46	8.8	12.5	8.14	12.2
	2020	116	7.7	0.53	12.5	13	8.8	25.7
Hopone	2018	85.8	7.22	0.11	2.54	10.96	3.47	13.2
	2019	91.9	7.28	0.1	4.23	12.75	4.2	16.2
	2020	92	7.3	0.21	4.8	12.8	4.4	24.5
Nyaung Shwe	2018	104	7.4	0.3	6.5	20.4	4.01	12.5
	2019	106	7.2	0.54	7.01	26.4	5.2	17.2
	2020	108	7.38	0.8	10.8	35.86	12.2	26.6
Hsiseng	2018	109	6.31	0.2	7.14	14.9	3.47	12.5
	2019	120	6.2	0.35	9.82	15.8	9.2	16.8
	2020	125	6.42	0.43	11.2	20.67	12.32	24.6
Kalaw	2018	96.9	6.98	0.5	7.3	18	3.45	12.3
	2019	99.2	7.1	0.54	8.4	18.2	4.56	18.3
	2020	101	7.2	0.7	12	20.9	5.06	28.2
Pintaya	2018	98.6	6.63	0.11	7.2	4.8	4.5	8.6
	2019	101	6.68	0.14	8.3	9.8	5.14	12.7
	2020	105	7.2	0.56	9.4	13.2	6.2	25.5

Results and Discussion

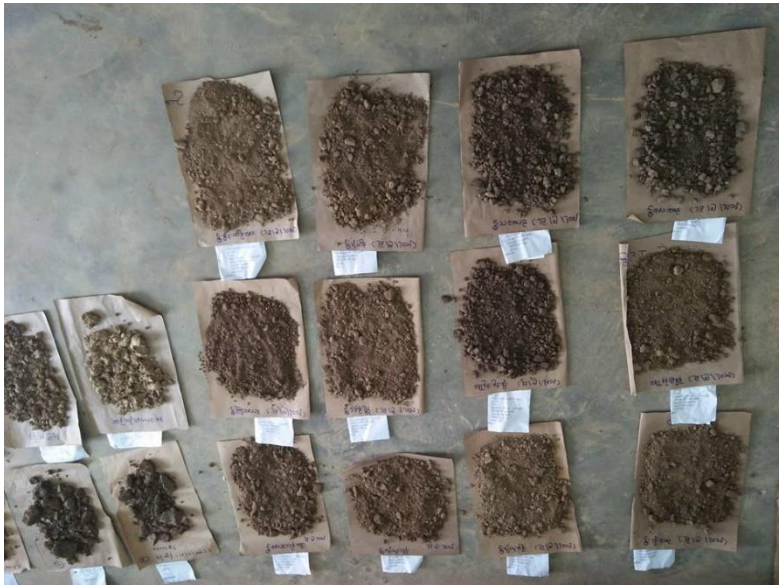
		Yield (bsk/ac)	pH	Total Nitrogen (ppm)	Available Phosphorous (ppm)	Exchangeable Potassium (ppm)	Organic Matter (%)	CEC (%)
Ywangan	2018	92	6.8	0.1	10.2	8.9	3.5	8.9
	2019	98	6.4	0.12	11	13.8	5.8	12.3
	2020	100	7.22	0.23	11.6	14.4	7.55	25.6
Yatsaut	2018	88.8	6.9	0.11	8.5	10.39	4.9	9.8
	2019	93.6	7.1	0.24	8.2	27.45	5.2	12.4
	2020	96.3	7.4	0.53	11.5	33.6	6.8	23.8
Pinlaung	2018	124	7.93	0.1	8.5	10.4	4.5	9.8
	2019	125	7.9	0.15	10.2	22.1	5.6	12.4
	2020	127	7.82	0.42	19.8	32.4	9.64	23.6
Phekhone	2018	105	7.2	0.1	8.3	10.4	3.42	12.5
	2019	110	7.3	0.12	9.3	21	4.2	17.8
	2020	113	7.31	0.42	9.5	21.6	5.3	26.2

Conclusion and Recommendations

- According to yield data, although yield responses were not significantly increased it was noticed that lesser amount of chemical fertilizer were used according to fertilizer recommendation based on soil test results
- Examining on soil test results N,P and K were not significantly increased but organic matter content and CEC% were found to be dramatically increased during three year
- Add more compost and organic matter made by DOA and as organic matter rises so does yield

- It could be suggested that to raise awareness of importance of organic manure application especially in Shan State soil, to educate application of both organic and inorganic fertilizer rather than using chemical fertilizer only

Performance Record



THANK YOU