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AGRICULTURAL EXPERIMENTAL STATION
YAMAGUCHI PREFECTURAL GOVERNMENT.

Res. Division
4-5-Y
File No.

SUBJECT: Manurial Effect of Compost

TO : Mr. Colehour, NR, CCAR

The attached report is an extract of researches conducted to determine the manurial effect of compost. It is, however, limited to obtained results only and data pertaining to methods and time of application as well as the efficiency promotion are deleted.

Yours respectfully,

A. Asami

Y Ozaki, Mitsuo
Chief Research Engineer

Y/sn/tb

File Index

No. 2

I. Name of project: Relative effect of compost in accordance to its quantity.

a. Object of research: To determine the effect of compost and its influence on soil fertility and the crop.

b. Duration of research: 1937 to 1941 inclusive

c. Scale of research: 2 plots of segregated experimental field of 1 tsubo each.

d. Crop tested and ~~into~~^{its} variety: "Hikari" variety of paddy rice.

e. Subdivision of plots and quantity of fertilizer.

Classification of Section	Quantity of Essential Ingredients per "Tan" (Unit: "kan")				Remarks
	Nitrogen	Phosphoric acid	Potash	Lime	
100"kan" compost	2,000	1,700	1,200	10,000	All are basic manures and given in one application. Lime given when ploughed, however, none given during the Previous crop.
200"kan" compost	2,500	1,900	2,400	10,000	
300"kan" compost	3,000	2,100	3,000	10,000	
400"kan" compost	3,500	2,300	3,600	10,000	
Inorganic(Sulphate) fertilizer. No compost	2,000	1,500	2,000	10,000	

f. Average results obtained for the 5-year period:

Classification of Section	Stem Length in cm.	No. of Heads	Crop Yield per "tan"			Index of un-polished rice in in-organic fertilizer sect. based as 100	Yield increase per 100 "kan" ("kan")
			wt. un-polished rice ("kan")	Volume of un-polished rice ("koku")	wt. of Straw ("kan")		
100"kan" compost	74.6	15.7	91.3	2,218	145.1	110	8.5
200"kan" compost	74.7	14.9	100.1	2,437	148.0	121	8.6
300"kan" compost	74.4	16.8	94.6	2,295	155.7	114	3.7
400"kan" compost	73.2	17.5	97.4	2,361	159.4	118	3.6
Inorganic(Sulphate) fertilizer. No compost.	72.4	14.6	82.8	2,012	140.5	100	

g. The manurial effect of compost can readily be recognized from the above chart. Combined application of compost enabled production increase in comparison to the section restricted only to inorganic fertilizer. Especially noticeable were the results obtained in the sections given 100 to 200 "ken" of compost. The increase in crop production is positive with the increase of compost, subject however to the Law of Diminishing Return.

II. Name of project: Relative effect of compost in accordance to its quantity.

- a. Object of research: To determine effect of compost in accordance to its quantity at a newly established experimental field.
- b. Duration of research: 1942 - present
- c. Scale of research: Field experiment consisted of 2 plots of 1 "tsubo" each.
- d. Crop tested and their varieties: Paddy rice, "Norin 37;" and naked barley, "Hyogohedaka."
- e. Subdivision of plots and given quantity of fertilizer.

Classification of Section	Quantity of Essential Ingredients per "Tan" (Unit: "ken")				Remarks
	Nitrogen	Phosphoric acid	Potash	Lime	
Non-compost	2.00	2.00	2.00	50.00	Composts were completely drilled in for the rice crop. For the barley crop, compost not exceeding 200 "ken" were used for top-dressing and the remainder drilled in.
100"ken" compost	2.50	2.20	2.60	30.00	
200"ken" compost	3.00	2.40	3.20	30.00	
400"ken" compost	4.00	2.80	4.40	30.00	
600"ken" compost	5.00	3.20	5.60	30.00	

f. Result obtained (average for 1942 - 1943):

(1) Paddy rice:

Classification of Section	Stem Length (cm)	No. of Heads	Crop Produced per "tsubo"			Index of un-hulled rice in the no-compost section based as 100	Yield increase per 100 "kan" compost (in "momme")
			Total weight ("momme")	Weight of straw ("momme")	Weight of un-hulled rice ("momme")		
Non-compost	88.6	14.1	1,041	585	462	100	-
100"kan" compost	88.0	15.4	1,160	658	491	106	29
200"kan" compost	87.9	15.0	1,147	626	512	111	25
400"kan" compost	91.1	14.6	1,199	707	481	104	5
600"kan" compost	91.4	15.8	1,306	733	562	122	17

(2) Barley:

Classification of Section	Stem Length (cm)	No. of Heads	Crop Produced per "tsubo"			Index of grain in the no-compost section based as 100	Yield increase per 100 "kan" compost ("momme")
			wt. of Heads	wt. of Stem	wt. of Grain		
Non-compost	88.1	12.1	221	140	153	100	-
100"kan" compost	90.3	14.9	344	153	182	115	24
200"kan" compost	92.1	12.8	253	162	199	126	21
400"kan" compost	97.2	14.6	241	167	215	136	14
600"kan" compost	96.1	14.1	279	183	222	141	11

g. As per above chart, the effect of compost on barley and paddy rice had enabled increase in production in comparison to the section restricted solely to inorganic fertilizer. Especially noticeable were the results obtained in the sections given 100 to 200 "kan" of compost. The production increase of crops are positive with the increase of compost, subject however to the Law of Diminishing Return.

.. Name of project: Research relative to fertilizing ingredients.

a. Object of research: Assessing quantity of natural replenishment of fertilizing ingredients and checking effects of lime and compost.

b. Duration of research: 1947 — present

c. Scale of research : Field experiment consisted of 1 plot of 3 "tsubo".

d. Crops tested : "Hyogo" naked barley (note: sweet potatoes grown during summer without any usage of fertilizer).

e. Subdivided plot and given quantity of fertilizer:

Classification of Section.	Quantity of Essential Ingredients in "Kan"					Remark
	Nitrogen.	Phosphoric Acid.	Potash.	Lime.	Compost.	
Non-fertilized section.	-	-	-	-	-	200 "kan" compost drilled in per "tan" for the compost-added sections.
Lime manure only.	-	-	-	15.00	-	
Nitrogenous manure only.	2.50	-	-	15.00	-	
Phosphoric manure only.	-	2.00	-	15.00	-	
Potash manure only.	-	-	2.00	15.00	-	
Compost only.	0.08	0.20	0.40	15.00	-	
Phosphoric and potash manures.	-	2.00	2.00	15.00	-	
Nitrogenous and potash manures.	2.50	-	2.00	15.00	-	
Nitrogenous and phosphoric manures.	2.50	2.00	-	15.00	-	
3 necessary ingredients of manures.	2.50	2.00	2.00	-	-	
4 necessary ingredients of manures.	2.50	2.00	2.00	15.00	-	
5 necessary ingredients of manures.	2.58	2.20	2.40	15.00	100.00	

f. Results obtained (1948 - 1949):

(1) Without application of compost:

Classification of section.	Stem length. (cm)	No. of heads.	Crop yield per 2 "tsubo" (unit: "monme")			Index of 3 essential ingredients section based as 100
			Head weight.	Stem weight.	Grain weight.	
Non-fertilized section.	53.6	15.1	174	78	130	24
Lime manure only.	48.3	13.9	159	80	118	22
Nitrogenous manure only.	44.8	15.3	150	98	105	20
Phosphoric manure only.	47.7	18.0	222	110	170	32
Potash manure only.	59.4	17.8	267	138	209	39
Compost only.	62.8	19.0	313	152	236	44
Phosphoric and potash manures.	59.5	17.1	255	122	207	39
Nitrogenous and potash manures.	62.5	19.3	428	224	310	58
Nitrogenous and phosphoric manures.	36.9 *	21.5 *	183	123	86	16
3 essential ingredients of manures.	77.8	39.6	729	501	532	100
4 essential ingredients of manures.	85.3	37.3	831	635	608	114
5 essential ingredients of manures.	92.8 *	39.0 *	984	644	687	129

* denotes 1948 results only. 1949 figures unavailable due to "lying down" of stem and head.

(2) With added compost:

Classification of section.	Stem length. (cm)	No. of heads.	Crop yield per 2 "tsubo" (unit: "monme")			Index of 3 essential ingredients section based as 100
			Head weight.	Stem weight.	Grain weight.	
Non-fertilized section.	63.0	17.9	198	93	149	22
Lime manure only.	66.1	20.1	320	211	232	34
Nitrogenous manure only.	86.7	23.8	736	475	560	33
Phosphoric manure only.	67.7	16.2	312	151	239	36
Potash manure only.	62.1	16.7	315	169	245	36
Compost only.	69.6	16.8	356	182	299	44
Phosphoric and potash manures.	65.7	15.9	277	149	217	32
Nitrogenous and potash manures.	85.3	26.1	687	463	520	77
Nitrogenous and phosphoric manures.	76.2	29.4	736	505	533	79
3 essential ingredients of manures.	94.4	33.5	891	650	673	100
4 essential ingredients of manures.	96.4	38.7	813	674	691	103
5 essential ingredients of manures.	94.8	39.4	1,100	696	753	112

In the research, the natural replenishments of fertilizing ingredients especially so with the potash, were found to be extremely low. Basing 100 for the 3 essential ingredients section in the non-compost category, the non-potash recorded 16; non-nitrogenous, 39; and non-phosphoric, 58.

However, the tendency greatly differed in the case when compost are added. Basing 100 for the 3 essential ingredients section, the sole nitrogenous manure section had shown 83, indicating high manurial effect of potassium phosphate from the compost; and against 32 for the non-nitrogenous section, the non-phosphoric and non-potash sections was 77 and 79 respectively, which indicated the manurial effect of potash to be the highest in the manurial ingredients of the compost, followed by its phosphoric and nitrogenous effects.

IV. Name of project: Determination of manurial effect of various natural manures.

- a. Duration of research: 1937 (summer) - 1940 (winter)
- b. Scale of research : Field experiment consisted of 2 plots of 1 "tsubo" each.
- c. Crops tested : Rice, "Hikari"; and naked barley, "Kochinko No. 4".
- d. Experimental plot and fertilized quantity:

Classification of Section.	Quantity of Essential Ingredients per "tan" (unit: "Kan")				Remark
	Nitrogen.	Phosphoric Acid.	Potash.	Lime	
Non-fertilized.	-	2.500	2.500	10.000	All fertilizer applied at once as base manure. Lime used only for rice and applied at the time of ground-breaking.
Fish refuse liquid.	2.000	2.500	2.500	10.000	
Rabbit dung.	2.000	2.500	2.500	10.000	
Domestic fowl excrement.	2.000	2.500	2.500	10.000	
Farmyard manure.	2.000	2.500	2.500	10.000	
Composted dust.	2.000	2.500	2.500	10.000	
Composted rice straw.	2.000	2.500	2.500	10.000	Composted culm used for barley crop.
Composted bambusa veitchii.	2.000	2.500	2.500	10.000	

Composted Sea-weeds.	2.000	2.500	2.500	10.000
Composted duck-weed.	2.000	2.500	2.500	10.000

e. Results obtained (average for 1937 - 1940):

(1) Paddy rice.

Classification of Section.	Plant Height (cm)	No. of Head.	Crop Yield per "tan"			Yield increase over non-nitrogenous section.	Yield comparison based on Fish-refuse-liquid section as 100
			Wt. of unpolished rice. ("kan")	Volume of unpolished rice. ("Koku")	Weight of straw. ("Kan")		
Non-fertilized.	67.3	11.5	63.9	1.564	107.6	0	0
Fish refuse liquid.	70.8	15.7	84.2	2.060	154.2	0.496	100
Rabbit dung.	70.9	13.8	82.8	2.032	132.2	0.468	94
Domestic fowl excrement.	72.6	16.0	88.3	2.155	149.8	0.591	119
Farmyard manure.	70.1	12.9	77.5	1.889	127.7	0.325	66
Composted dust.	69.8	12.8	75.6	1.855	132.9	0.291	59
Composted rice straw.	71.4	13.2	78.8	1.828	139.8	0.264	53
Composted bambusa veitchii.	68.3	12.2	69.2	1.692	125.4	0.128	26
Composted sea-weeds.	69.9	13.1	80.0	1.959	125.6	0.395	80
Composted duck-weed.	69.5	12.7	92.1	1.947	128.2	0.383	77

Int. Sec. Division

File No. A-5-G

SANIN DAILY

June

HOW WILL IT AFFECT? ELIMINATION OF FERTILIZER DISTRIBUTION CONTROL

The government unofficially decided to eliminate completely, even to the headquarter organizations, the Fertilizer Distribution Kodans as of the end of July. Correlatively this will abolish the distribution and price phase of the fertilizer control, and would mean that the government will not conduct any operation in regards to the demand and supply adjustment or price adjustment. The effects of this to the local farmers were surveyed.

VERY CONVENIENT TO FARMERS, COUNTER MEASURE DEPT FOR FERTILIZER WITHIN THE FEDERATION OF PURCHASE AGRICULTURAL COOP ASSOCIATION

On this the Ken Fed. of Purchase Agri. Coop. Assn. (hereafter written as Agri. Coop. Assn.) who holds an actual of 94.5% of the distribution registration of the farmers, in as much that they would be getting 20 million yen handling commission, no dangers of any stock piling possibilities through handling fertilizers, are trying to see their way through the precarious management by solely handling the retailing of fertilizers. In order to find some outlets they are at the present making preparations to receive by setting up a temporary fertilizer counter measure department so that business could be absorbed the instant the Kodans are eliminated. Therefore it will not in any way hamper the purchasing of fertilizers by the farmers at the instant of decontrol. Rather, varying from the hitherto set up of distribution, it would allow them to obtain fertilizer at any time they please and any amount that they please. Consequently the farmers are showing their agreement to the coming dispositions.

The problem lies, however, in the monetary spheres. Regarding this point the results of the consultation held between the Ken Agri. Coop. Assn. with the all Japan Agri. Coop. Assn. are:

a. The Ken Agri. Coop. Assn. when buying up fertilizer from the all Japan Agri. Coop. Assn. will obtain a promisory bill of exchange guaranteed of payment by the Ken Fed. of Credit Agri. Coop. Assn. and obtain the money from the Central Depository Bank of the AF; between the Ken Agri. Coop. Assn. and local cooperatives a credit transaction; the farmers will make the payment by the agricultural bill of exchange or their banking. This being the procedure, no anticipation is had for any refusal cases arising from lack of money.

File Index

No. 1

By Roy Izumita