EFFECTS OF WEEDING METHODS IN COMBINATION WITH COMPOST APPLICATION

The following data are from trials (N = 240) on farmers' fields in the village of Anjomakely on the high plateau, about 18 km south of the capital Antananarivo, elevation about 1,200m. Blocs I and II have relatively good (clay) soil; Block III has relatively poorer (loam) soil. The research was carried out by Hery Zo Oriot NDRIANTSOAVINA, a graduating student in the Faculty of Agriculture at the University of Antananarivo for his thesis (*memoire de fin d'ètudes*) under the supervision of Prof. Robert Randriamiharisoa, with financial support from a grant from the Rockefeller Foundation through CIIFAD.

Some observations from the data:

1. **Use of the rotating hoe has quite a beneficial effect on tillering and yield** compared to the use of other methods of weed control. Even **two weedings** with the hoe gave **about 20% more yield** compared with manual weeding. Doing three or four weedings added considerably more. **Four weedings with the rotating hoe doubled yield, adding almost 4 t/ha,** compared with doing just manual weeding. This makes use of the rotating hoe a very cost-effective investment.

2. **Use of a herbicide is less effective** than *weeding twice with the rotary hoe*. Moreover, there is limited effect from using the **rotating hoe together with a herbicide**, probably because of its adverse impact on soil microbes. This explanation needs to be established with field measurements, however.

3. **Mulching and use of *sesbania*** do not add much to yield overall, on average, although they do give **about 20% more yield with application of just 2 t/ha of compost compared with 3 or 6 t/ha when used on poorer soil than when used on better soil** (Bloc III results compared with Blocs I and II). This looks a little strange at first, but it supports the hypothesized effect of "incitement" of biological activity being sufficient and effective with **small amounts of biomass addition**. The information provided did not give details on the mulching and *sesbania* treatments, so we need to know more about these before drawing more conclusions.

4. Reinforcing the importance of **soil aeration** is a comparison of how **additional weedings with the rotating hoe** affect the difference in **effect between 2 t/ha of compost and 6 t/ha**. With just **two weedings**, we don't see much difference between the yield results (5.157 vs. 5.141 -- tillers are 20.3 vs. 20.7). But with **three weedings**, there is some difference but not much (5.891 vs. 6.307 -- tillers are 22.3 vs. 23.7). But with **four weedings**, we see a big difference (6.987 vs. 7.844 -- tillers are 25.0 vs. 28.7). Thus, although we conclude from the data that using 6 t/ha of compost does not give much more yield than 2 t/ha on average (5.175 vs. 5.119 t/ha), when we do **more soil-aerating weedings with the added compost**, there is a marked difference -- almost 1 t/ha. This may explain why Ralalason gets such huge response (21 t/ha) with huge applications of compost (~40 t/ha), because he is doing both very careful water management and excellent soil-aerating weeding.

5. Observation 3. is more relevant in light of observaton 5. When using herbicides, which have surely an adverse effect on soil microorganisms, the soil aeration through rotary-hoe weeding does not have much effect in general -- 5.300 vs. 5.125 t/ha average across all treatments. However, **comparing use of more compost plus soil aeration on poor vs. better soil** (better presumably meaning already more soil microbial presence and activity), we see that although the rotating hoe treatment does not add yield in poor soil (5.061 vs. 5.125 t/ha, the yield is actually lower with use of the rotating hoe), **soil aeration does raise yield** with 6 t/ha compost (5.567 vs. 4.998 t/ha) -- more than 1/2 ton per hectare.

COMPOST APPLI-CATION (t/ha)	Manual Weeding (Control)	Weeding 2x by Rotating Hoe	Weeding 3x by Rotating Hoe	Weeding 4x by Rotating Hoe	Use of Herbi-cide 2,4-D.	1x by Rotating Hoe + 2,4-D	Mulch-ing	Use of *Ses-bania*	Average for All Methods
		Number	**of**	**Tillers**	**per**	**Plant**			
6 tons									
Bloc I	18	28	34	40	26	30	22	25	**28.5**
Bloc II	18	25	26	28	17	22	13	17	**18.6**
Bloc III	8	9	11	18	7	9	9	12	**10.4**
Ave.	*14.7*	*20.7*	*23.7*	*28.7*	*16.7*	*20.3*	*14.7*	*18*	***19.2***
3 tons									
Bloc I	16	23	27	31	24	24	16	18	**22.4**
Bloc II	16	28	28	31	15	23	17	20	**22.3**
Bloc III	11	11	12	13	7	7	6	9	**9.5**
Ave.	*14.3*	*20.7*	*22.3*	*25*	*15.3*	*18*	*13*	*15.7*	***18.1***
2 tons									
Bloc I	16	25	28	31	25	29	18	22	**24.3**
Bloc II	16	26	28	32	16	26	12	15	**21.4**
Bloc III	10	10	11	12	8	12	7	11	**10.1**
Ave.	*14*	*20.3*	*22.3*	*25*	*16.3*	*22.3*	*12.3*	*16*	***18.6***
AVE.	**14.3**	**20.6**	**22.8**	**26.2**	**16.1**	**18.2**	**13.3**	**16.6**	**18.6**
		Number	**of**	**Tons**	**per**	**Hectare**			
6 tons									
Bloc I	4.165	6.973	8.568	9.758	6.783	7.121	4.641	4.236	6.531
Bloc II	4.879	6.664	7.854	8.568	6.783	6.902	5.212	7.021	6.735
Bloc III	1.618	1.785	2.499	5.206	1.428	2.678	1.547	1.309	2.259
Ave.	*3.554*	*5.141*	*6.307*	*7.844*	*4.998*	*5.567*	*3.800*	*4.189*	*5.175*
3 tons									
Bloc I	4.284	7.021	7.378	9.758	7.616	7.388	4.641	4.236	6.540
Bloc II	5.474	7.081	8.211	9.520	5.950	6.816	3.451	4.987	6.436
Bloc III	1.190	2.678	2.856	4.998	1.250	1.612	1.333	1.250	2.146
Ave.	*3.469*	*5.593*	*6.148*	*8.092*	*4.939*	*5.272*	*3.142*	*3.491*	*5.041*
2 tons									

Bloc I	5.474	6.189	7.378	9.044	6.926	6.426	5.950	5.474	6.608
Bloc II	4.760	6.783	7.259	8.333	6.783	6.664	5.664	5.236	6.435
Bloc III	1.904	2.499	3.035	3.557	1.666	2.094	1.666	2.094	2.314
Ave.	*4.046*	*5.157*	*5.891*	*6.978*	*5.125*	*5.061*	*4.427*	*4.268*	*5.119*
AVE.	**3.750**	**5.297**	**6.115**	**7.638**	**5.021**	**5.300**	**3.790**	**3.983**	**5.112**
Index	**100**	**141**	**163**	**204**	**134**	**141**	**101**	**106**	
Increase	(in kg)	1,547	2,365	3,888	1,271	1,550	40	233	