

# UDP Technology & Rice Yields among Farmer Beneficiaries of Rainfed Lowland Project Area in Myanmar

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# Outline of the Presentation

- Background
- Crop cuts survey
- Gross margin analysis
- Log linear regression & Discussion

# Background

- IFDC's FSI project started in 2014 in Yangon, Bago and Ayeyarwady regions.
- USAID-funded.
- Goal of the project: To improve food security and increase profitability for smallholder farmers by sustainably increasing agricultural productivity.
- How?

Improving yield and fertilizer use efficiency among rice farmers in target area through fertilizer technology viz., urea deep placement (UDP), balanced fertilizer, use of good seeds.

Also strengthening agri-input retailers to improve advisory services for farmers.

# Crop Cuts Survey

- ❖ The aim of the crop cut survey is to measure the impact of the UDP technology on rice yield.

**Table 1. Number of beneficiary farmers & sample farmers in 2016 wet season**

Region	No. of beneficiary farmers in wet season 2016			No. of beneficiary farmers using UDP in wet paddy 2016			No. of collected sample beneficiary farmers		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
Yangon	211	459	670	176	392	568	13	28	41
Bago	169	371	540	160	352	512	12	25	37
Ayeyarwady	167	556	723	117	420	537	10	28	38
<b>TOTAL</b>	<b>547</b>	<b>1386</b>	<b>1933</b>	<b>453</b>	<b>1164</b>	<b>1617</b>	<b>35</b>	<b>81</b>	<b>116</b>



-Two 5x2 meter plots are cut in each farmer field with and without UDP



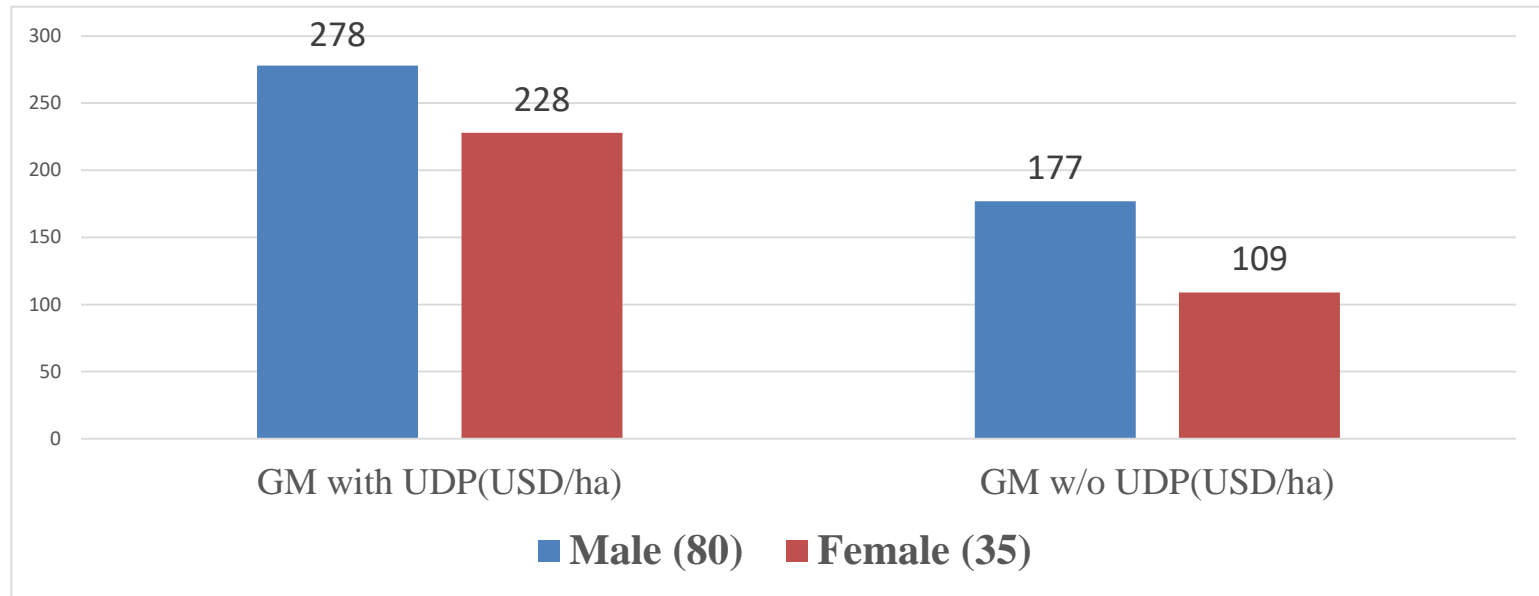
-threshed, weighed and moisture measured  
-calculated at 14% moisture.



**Table 2. Fertilizer amount, total fertilizer cost, and paddy yield for UDP versus non-UDP users**

		Non-UDP	Non-UDP	UDP	Non-UDP	UDP	Non-UDP
		Prilled urea used (kg/ha)	Compound fertilizer used (kg/ha)	Total fertilizer cost (Ks/ha)	Total fertilizer cost (Ks/ha)	Average paddy yield (kg/ha)	Average paddy yield (kg/ha)
Female	Mean	99	82	66450	68847.26	4070	3303
	N	30	10	35	35	35	35
	Std. Dev	56	41	15994.02	38170.54	1019	1025
Male	Mean	121	99	67039.01	83334.92	4608	3846
	N	71	31	80	80	80	80
	Std. Dev	64	36	15882.85	43520.31	1021	928
Total	Mean	114	95	66859.63	78925.64	4444	3681
	N	101	41	115	115	115	115
	Std. Dev	62	38	15848.76	42330.72	1046	986

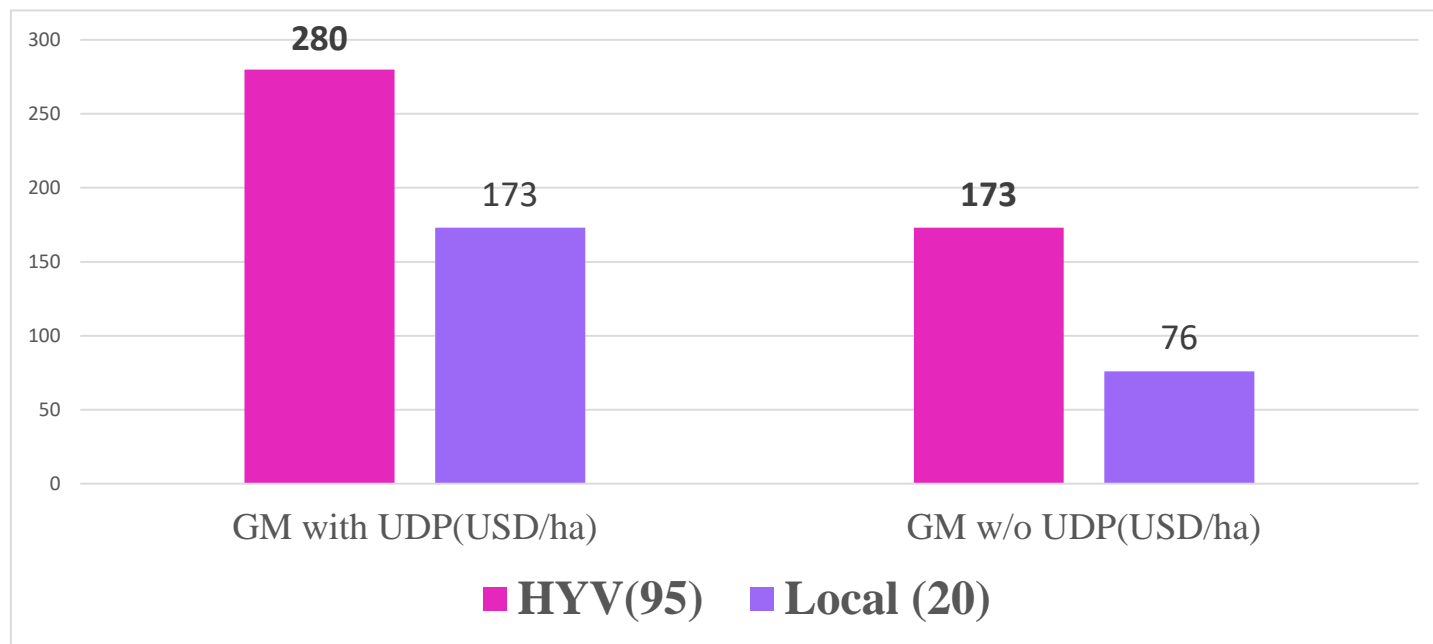
# Gross margin with UDP technology



**Fig. 1 GM of wet paddy by gender**

$$GM = \frac{(TP \times VS/QS) - IC}{UP} \quad (\text{USAID 2013})$$

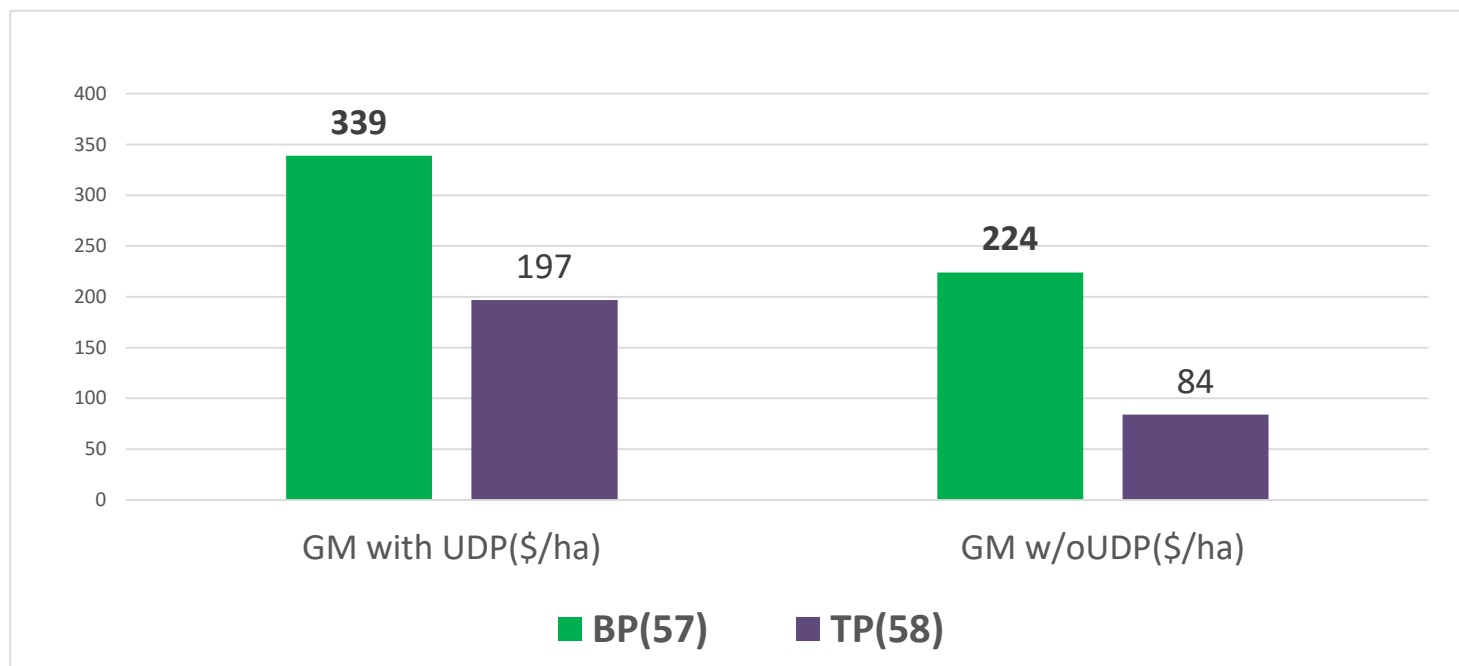
- GM with UDP is higher than NUDP in both male & female
- Due to technology, GM of female increase by 109% & male by 57%



**Fig. 2 GM of wet paddy by variety**

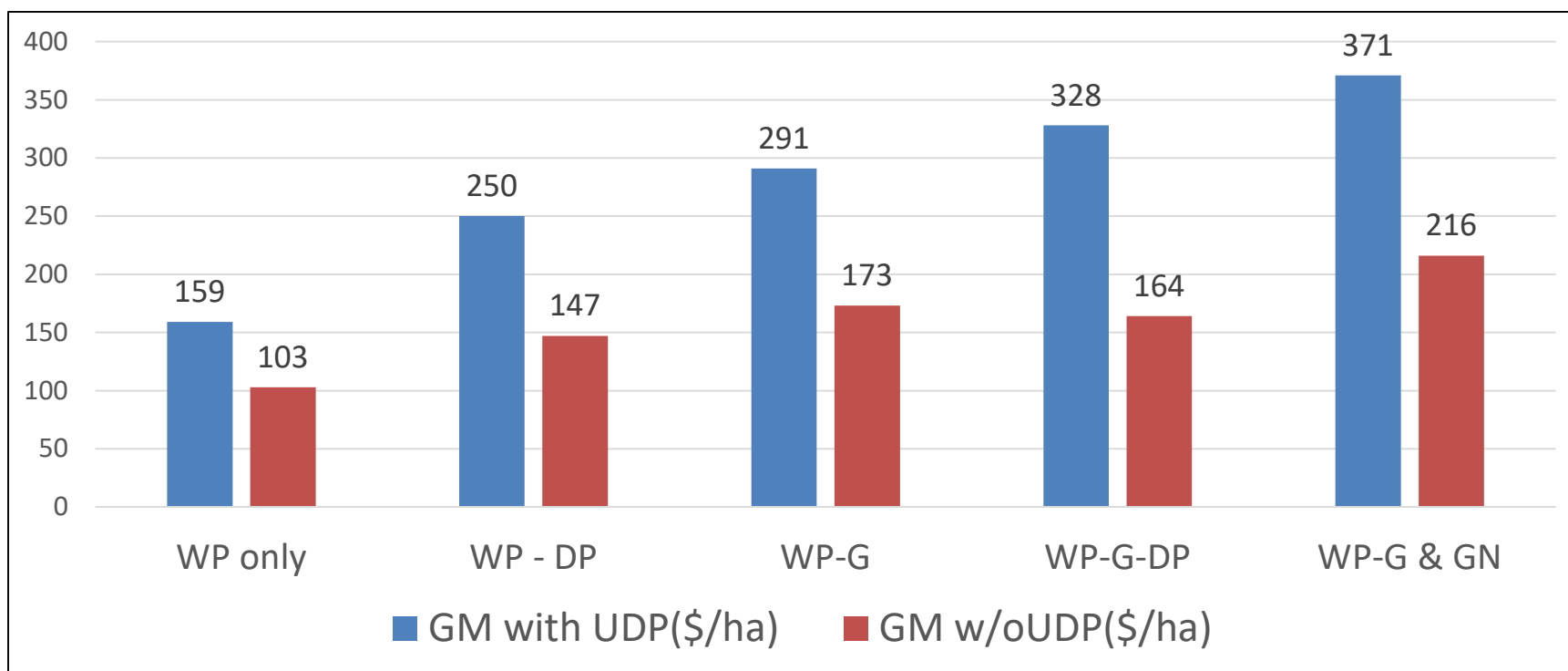
- GM with UDP is higher than NUDP in both HYV & local variety
- Due to technology, GM of local increase by 126% & HYV by 62%





**Fig. 3 GM of wet paddy by cultural practice**

- GM with UDP is higher than NUDP in both BP & TP
- Due to technology, GM of TP increase by 134% & BP by 51%



**Fig. 4 GM of wet paddy by cropping pattern**

- Due to technology, GM increased by 54% in WP, 70% in WP-DP, 68% in WP-G, 113% in WP-G-DP & 72% in WP-G-GN

# Log linear regression

**Table 3 Summary of explanatory variables**

Continuous variable	Unit	N	Mean	Min.	Max.	Std.D.
Paddy price	Kyats/kg	115	237.45	222.74	269.08	12.92
Prilled urea price	Kyats/kg	115	428.47	393.47	484.44	17.19
Number of total crops grown	Number/year	115	1.94	1.0	3.0	0.535
Harvested paddy land	hectares	115	3.79	0.61	20.24	3.20
Yield difference bet. with & w/o technology	MT/ha	115	763.35	-917.49	2436.92	585.43
Harvesting machine cost	Kyats/ha	115	47048.00	0.00	136000.00	53097.70
Number of labor used	Number	115	11.57	0.00	49.40	10.30
Dummy variable		N	Mean of UDP yield	Min. of UDP yield	Max. of UDP yield	Std.D. of UDP yield
Male	MT/ha	80	4.607	1.93	6.75	1.021
Female	MT/ha	35	4.070	2.42	5.94	1.01
HYVs	MT/ha	95	4.603	1.93	6.75	1.024
Local variety	MT/ha	20	3.687	2.42	5.20	0.799

$$\ln(Y) = \beta_0 + \beta_1 \ln(x_1) + \beta_2 \ln(x_2) + \beta_3 \ln(x_3) + \beta_4 \ln(x_4) + \beta_5 \ln(x_5) + \beta_6 \ln(x_6) + \beta_7 x_7 + \epsilon_i$$

# Table 4 Results of the log-linear multivariate regression

Independent variable	B <sup>a</sup>	$\Delta Y\%^b$	Std.B	t	VIF
Constant	8.032*		4.466	1.799	
Lagged paddy price ( $X_1$ )	0.067	0.066	.417	0.160	1.145
Lagged prilled urea price( $X_2$ )	-1.233**	-1.219	.575	-2.148	1.803
Yield difference bet. with UDP & without UDP( $X_3$ )	0.098***	0.097	.028	3.480	1.128
Wet paddy harvested land( $X_4$ )	-0.048*	0.047	.028	-1.726	1.132
Total crop grown/year ( $X_5$ )	0.358***	0.356	.080	4.498	1.722
Harvest machine cost( $X_6$ )	0.027	0.026	.048	0.586	1.164
Total labor used ( $X_7$ )	0.015	0.0149	.023	0.630	1.715
Gender (Male=1, Female=0)	0.126**	32.53	.044	2.835	1.071
Variety (HYV=1,Local=0)	0.045	11.45	.067	0.679	1.345
N=115					
Adjusted R <sup>2</sup> = 0.566					
F value = 8.839***					

<sup>b</sup> UDP yield changes due to a 1% increase of  $X_i$  by  $100 \cdot (1.01^B - 1)$  & due to value of  $D_i$  shifting from 0 to 1 by  $100 \cdot (e^B - 1)$

# Discussion

- **UDP yield \_ positive relationship with number of crops grown per year, technology gap and gender of rice farmers.**
- **Inverse relationship with price of urea fertilizer and harvested area.**
- **Crop intensification should be promoted to increase farmers income and affordability of input costs for paddy in low land rain-fed area (WP only received the lowest GM).**

# Discussion

- **Focus on promoting the use of efficient soil and fertilizer management technologies, such as UDP and promoting balanced fertilizer application (to reduce tech. gap).**
- **Increase in price of urea fertilizer and area allocated for rice resulted in yield reduction, implying lack of purchasing power among farmers for additional input use.**
- **Lastly, increase access to technologies and participation by women farmers in extension programs for greater benefit.**



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	Gender	UP	TP	QS	VS	IC	GM \$/ha	% GM increase
UDP	Male(80)	8.02	37763	30684	3882	2544	278	57.1
	Female(35)	3.34	13192	11686	1522	956	228	109.0
NUDP	Male(80)	285.46	1126429	919832	115510	90918	177	
	Female(35)	140.18	448543	358816	45816	41966	109	

	Variety	UP	TP	QS	VS	IC	GM \$/ha	% GM increase
UDP	HYV(95)	9.64	44592	36795	4690	2983	280	61.9
	Local (20)	1.72	6363	5575	714	517	173	126.4
NUDP	HYV(95)	344.56	1331979	1078593	135539	107756	173	
	Local (20)	81.07	242993	200055	25787	25128	76	

	Practice	UP	TP	QS	VS	IC	GM \$/ha	% GM increase
UDP	TP(58)	5.98	26415	21189	2746	2246	197	134
	BP(57)	5.38	24540	21181	2659	1254	339	51
NUDP	TP(58)	209.93	760709	600866	77315	80315	84	
	BP(57)	215.71	814263	677782	84011	52570	224	

	Cropping pattern	UP	TP	QS	VS	IC	GM \$/ha	% GM increase
UDP	WP-DP(24)	2.18	9301	7663	994	660	250	70
	WP-G(60)	6.39	31042	25502	3203	2057	291	68
	WP-G&Oil(1)	0.08	445	356	41	21	371	72
	WP only(20)	1.94	6548	5793	745	533	159	54
	WP-G-DP(10)	0.85	3976	3411	460	258	328	113
NUDP	WP-DP(24)	114.41	413395	319011	41445	36845	147	
	WP-G(60)	198.72	789145	634330	78542	63392	173	
	WP-G&Oil(1)	3.97	17085	13668	1583	1122	216	
	WP only(20)	57.17	162307	138986	17691	14778	103	
	WP-G-DP(10)	51.38	193039	172652	22063	16745	154	