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Developing the Workforce, Shaping the Future:
Transformation of Madagascar's Post-Basic Education

Annexes to the Main Report

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**Annex Table 1. Public and Private Enrollment by Educational Sub-Sector,
1997- 2006**

Grade level	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Pre-school *	108.947			42.383	45.387	93.168	142.750	132.504	146.284	148.356
Public	1.090						14.690	8.644	8.405	8.706
Private	50.946						128.060	123.860	137.879	139.648
Private (other)	56.911									
Primary	1.892.943	2.018.707	2.208.321	2.307.314	2.409.082	2.856.480	3.366.462	3.597.731	3.698.906	3.835.716
Public	1.468.211	1.571.282	1.708.835	1.808.428	1.892.801	2.274.443	2.715.526	2.916.089	2.983.383	3.102.833
Private	424.732	447.425	499.486	498.886	516.281	582.037	650.936	681.642	715.523	732.883
Junior Secondary	258.934	273.613	287.873	316.390	343.937	356.973	420.592	486.239	581.615	660.448
Public	145.652	151.296	159.504	175.069	193.091	201.357	241.213	281.322	341.441	402.077
Private	113.282	122.317	128.369	141.321	150.846	155.616	179.379	204.917	240.174	258.371
Senior Secondary	61.233	60.597	66.381	66.021	77.655	79.238	88.857	106.595	116.794	127.789
Public	31.217	31.571	35.243	33.716	41.702	42.386	46.664	54.000	56.275	58.712
Private	30.016	29.026	31.138	32.305	35.953	36.852	42.193	52.595	60.519	69.077
TVET **	8.741	10.617	12.088	13.558	14.590	15.880	15.820	17.497	20.957	19.178
Public Junior Secondary	1.380	2.217	2.046	1.875	2.264	3.261	3.610	4.174	5.105	5.223
Public Senior Secondary	7.361	8.400	10.042	11.683	12.326	12.619	12.210	13.323	15.852	13.955
Estimated private sector										34, 250
Higher Education	16.270	17.887	18.227	31.893	31.905	35.476	42.143	44.948	49.734	57.717
Public institutions	16.270	17.887	18.227	21.599	22.607	26.343	31.675	34.746	39.078	45.491
Non-university institutions				442	485	565	746	794	879	980
Distance education				6.891	6.245	5.935	6.457	5.978	5902	6.885
Private institutions				2.961	2.568	2.661	3.265	3.430	3875	4.361

Notes: * Partial count. ** Data excludes apprentices, 2006-07

Source: MEN, 2008b

Annex Table 2. Schools and Teachers by Cycle

	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006
Number of public schools	15,324	15,546	16,346	16,879	18,027
Primary	14,436	14,637	15,420	15,890	16,917
Junior Secondary	780	801	817	875	992
Senior Secondary	108	108	112	114	118
Number of private schools	4,849	5,363	5,858	6,227	6,227
Primary	3,859	4,340	4,740	4,946	5,301
Junior Secondary	739	795	862	980	1,133
Senior Secondary	251	228	256	301	332
Number of public teachers	46,875	49,583	58,550	60,930	70,445
Primary	36,181	38,509	47,320	48,870	57,028
Junior Secondary	8,055	8,390	8,910	9,400	10,603
Senior Secondary	2,639	2,684	2,620	2,660	2,814
% Community teachers					
Primary	n/a	18	28	33	50
Junior Secondary	n/a	n/a	11	12	20
Senior Secondary	n/a	3	5	7	n/a
Number of permanent teachers in private schools	22,656	25,197	29,300	32,300	33,991
Primary	14,555	16,800	16,950	18,270	19,807
Junior Secondary	6,015	6,271	8,950	10,100	10,534
Senior Secondary	2,086	2,126	3,400	3,930	3,650

Source: World Bank, 2007. MEN data.

**Annex Table 3. Average Years of Education of the Employed Labor Force
by Age Group**

	2001		2005	
	Average	Standard Deviation	Average	Standard Deviation
15-19	2.6	2.7	3.2	2.6
20-24	3.8	3.5	3.6	3.1
25-29	4.4	3.7	4.0	3.5
30-34	4.8	4.2	4.3	3.5
35-39	5.2	4.5	4.6	3.7
40-44	4.6	4.5	4.3	3.9
45-49	4.3	4.4	4.0	3.9
50-54	3.6	4.1	3.4	3.5
55-59	3.9	4.3	3.3	3.3
60-64	2.4	3.1	2.6	2.8
Total	4.1	4.0	3.9	3.5

Notes: Calculated from *Enquêtes Prioritaires auprès des Ménages* 2001 and 2005.
Source: Lassibille, 2007.

**Annex Table 4. Earnings Regression – Salary/Wage Earners ^a,
All Sectors, 2001 and 2005**

	2001				2005			
	I	II	III	IV	V	VI	VII	VIII
Male	0.187**	0.146	0.1587*	0.172*	0.122*	0.136**	0.1349** *	0.146**
Experience ^b	0.027**	0.023**	0.025***	0.026**	0.037**	0.037**	0.036***	0.038**
Experience ²	-0.000	-0.000	-0.001*	-0.000	-0.000**	-0.000**	-0.000***	-0.000**
Years of Study	0.087**	-	-	0.108**	0.064**	-	-	0.099**
Education Level ^b								
Primary	-	0.222	-	-	-	0.110	-	-
Primary Incomplete		-	0.068	-	-	-	0.052	-
Primary Completed		-	0.499***	-	-	-	0.279**	-
Secondary	-	0.617**	-	-	-	0.374**	-	-
JSE		-	0.582**	-	-	-	0.310***	-
SSE		-	0.864***	-	-	-	0.538***	-
Higher	-	1.054**	1.217***	-	-	0.988**	1.043***	-
Company Size ^d (No. Employees)								
6-10	0.136*	0.157*	0.124**	0.111	0.178**	0.195**	0.182***	0.146*
11- 50	0.271**	0.319**	0.272***	0.248**	0.215**	0.234**	0.209***	0.169**
50 and over	0.251**	0.277**	0.253***	0.233**	0.340**	0.380**	0.354***	0.287**
Industry Sector ^e								
Public Admin.	0.248*	0.307**	0.2561**	0.135	0.640**	0.756**	0.692***	0.510**
Industry	0.223*	0.194	0.206**	0.195*	0.326**	0.386**	0.366***	0.287**
Energy	0.387**	0.363**	0.386***	0.353**	0.471**	0.491**	0.448***	0.361**
Construction and Communication	0.408**	0.447**	0.379***	0.323**	0.459**	0.491**	0.472***	0.418**
Transport	0.555**	0.513**	0.522***	0.491**	0.525**	0.591**	0.563***	0.468**
Commerce/ Services	0.115	0.112	0.105	0.059	0.117	0.162	0.143*	0.084
Working Hours	-0.000	-0.001	-0.001	0.001	0.006**	0.005**	0.005***	0.006**
Permanent Employee ^f	-0.021	-0.050	-0.022	0.004	0.002	-0.024	-0.008	0.013
Rural Area ^g	-0.047	-0.063	-0.050	-0.050	-0.235**	-0.237**	-0.233***	-0.236**
Province ^h								
Fianarantsoa	-0.326**	-0.320**	-	-0.315**	-0.197**	-0.175*	-0.180**	-0.227**

			0.305***					
Toamasina	-0.139	-0.100	-0.092	-0.115	-0.038	-0.012	-0.022	-0.083
Mahajanga	0.105	0.159	0.141	0.125	-0.068	-0.040	-0.056	-0.119
Toliara	0.046	0.066	0.047	0.039	-0.225	-0.215	-0.219	-0.263
Antsiranana	0.365**	0.417**	0.394***	0.378**	0.266**	0.288**	0.272***	0.195*
Education – Job Qualification								
Employee Under-Educated	-	-	-	0.202*	-	-		0.319**
Employee Over-Educated	-	-	-	-0.321**	-	-		-0.208**
Lambda ⁱ	-0.046	-0.230	-0.142	-0.064	-0.136	-0.141	-0.129	-0.053
Constant	9.894	10.438	10.184	9.801	9.583	9.720	9.694	9.255
R ²	0.43	0.40	0.426	0.44	0.45	0.44	0.445	0.46
Number of Observations	2838	2838	2838	2838	3784	3784	3784	3784

Notes to Annex Table 4

Calculated from *Enquêtes Prioritaires auprès des Ménages* 2001 and 2005.

*= significant at 10%; **= significant at 5%; ***= significant at 1%.

a/ Salary/wage earners, 15 to 64 years. The specifications are such semi-logarithmic; adjustments are weighted. The models adjust for selection bias using the results of the model of choice of employment sector (see Table A6 of Lassibille, 2007).

b/ Difference between the age of the individual (-6) and the number of years of study.

c/ Compared to an employee with no education.

d/ Compared to an employee of a company with 5 or fewer employees.

e/ Compared to an employee of the agricultural and the transport sectors including the communications.

f/ Compared to a contractual employee.

g/ Compared to an employee of a rural area.

h/ Compared to an employee of the province of Antananarivo.

i/ Selection term.

Source: Lassibille, 2007.

Annex Table 5. Earnings Regression – Salary/Wage Earners ^a, Industrial Sector, 2005

	I	II	III	IV	V
Male	0.068**	0.068**	0.093***	0.113***	0.102***
Experience ^b	0.013***	0.012**	0.013***	0.016***	0.018***
Experience ²	-0.000	-0.000	-0.000	-0.000	-0.000
Years of study	0.056***	0.055***	0.074***	-	-
Education Level ^c					
Primary	-	-	-	0.154**	-
Secondary	-	-	-	0.320***	-
Higher	-	-	-	1.093***	-
Education Level (Detailed)					
Primary	-	-	-	-	0.143**
Secondary (General + Tech/Voc)	-	-	-	-	0.237***
Secondary – Technical	-	-	-	-	0.465***
Secondary – Vocational	-	-	-	-	0.685***
Higher	-	-	-	-	1.090***
Company Size ^d (No. of Employees)					
20-99 Employees	0.046	0.045	0.040	0.029	0.020
99 Employees and over	0.205***	0.198***	0.190***	0.239***	0.216***
Industry Sector ^e					
Food and Drink	-0.353**	-0.368**	-0.288*	-0.073	-0.109
Tobacco	-0.535***	-0.528***	-0.493***	-0.313*	-0.320*
Textiles	-0.353**	-0.371**	-0.261*	-0.033	-0.054
Clothing	-0.341**	-0.357**	-0.269*	-0.087	-0.115
Leather	-0.276	-0.284	-0.217	-0.086	-0.132
Wood	-0.304*	-0.311*	-0.220	-0.040	-0.089
Paper and Plastic	-0.170	-0.176	-0.118	0.018	-0.060
Printing	-0.301*	-0.311*	-0.227	-0.040	-0.118
Chemistry	-0.012	-0.022	0.055	0.186	0.125
Metallurgy	-0.317*	-0.335**	-0.273*	-0.105	-0.188
Machine and Equipment	-0.109	-0.113	-0.005	0.213	0.117
Furniture	-0.135	-0.156	-0.068	0.122	0.049
Construction	-0.165	-0.162	-0.154	-0.041	-0.057
Permanent Employee ^f	0.186***	0.190***	0.184***	0.137**	0.130**
Enterprise Type ^g					
Private Company	0.411***	0.417***	0.328***	0.132	0.147
Single Proprietorship	0.249**	0.250**	0.162	-0.042	-0.034

Partnership	0.287*	0.298*	0.206	-0.096	-0.071
Other	0.275***	0.282***	0.186*	-0.002	0.007
Has Undergone Training ^h	-	0.077**	-	-	-
Employee Over-Educated	-	-	-0.426***	-	-
Constant	11.859	11.865	11.726	12.122	12.186
R ²	0.30	0.30	0.34	0.39	0.42
Number of Observations	1628	1628	1628	1672	1672

Notes to Annex Table 5

Estimated from Investment Climate Assessment Survey 2005.

*= significant at 10%; **= significant at 5% ; ***= significant at 1%.

a/ People employed. The specifications are such semi-logarithmic; adjustments are made heteroskedasticity.

b/ Real experience since entering the workforce.

c/ Compared to an employee with no education. The secondary education category includes general, technical and vocational education.

d/ Compared to an employee of a company with fewer than 20 employees.

e/ Compared to an employee of the mining sector.

f/ Compared to a contract employee.

g/ Compared to an employee of a public sector company.

h/ Compared to an employee who has not attended any training before the survey.

Source: Lassibille, 2007.

Annex Table 6. Estimated Stochastic Production Frontier Models ^a, 2004

	I		II		III		IV		V	
	Average	Coeff.	Average	Coeff.	Average	Coeff.	Average	Coeff.	Average	Coeff.
Dependent Variable = log value added										
Labor (log)	3.64	0.884** *	3.64	0.869** *	3.63	0.900** *	3.54	1.125** *	3.54	1.079** *
Capital (log)	5.74	0.212** *	5.74	0.200** *	5.76	0.135** *	5.56	0.075* *	5.56	0.081* *
Sector (agro-industry = 0)										
Textiles, apparel	-	-	0.27	-0.131	0.27	0.048	0.29	-0.266	0.29	-0.394
Wood and furniture	-	-	0.25	-0.329*	0.24	-0.471**	0.24	-0.467*	0.24	-0.469*
Paper and printing	-	-	0.02	0.213	0.02	0.319	0.01	-1.128*	0.01	-1.025*
Chemicals and pharmaceuticals	-	-	0.07	0.653**	0.07	0.646**	0.07	0.257	0.07	0.144
Metallurgy and machinery	-	-	0.05	-0.262	0.06	-0.485**	0.06	-0.423	0.06	-0.404
Non-metal and plastic	-	-	0.03	-0.353	0.04	-0.409	0.03	-0.840*	0.03	-0.799*
Others	-	-	0.13	-0.192	0.14	-0.194	0.13	-0.392	0.13	-0.426^
Innovative company	-	-	-	-	0.32	0.674** *	0.32	0.593** *	0.32	0.592** *
Female workforce (%)	-	-	-	-	31.97	-0.008**	31.3	-0.007*	31.3	-0.006^
Education level of employees (years)	-	-	-	-	-	-	8.443	0.088*	8.44	0.082*

Provides internal training									0.31	0.331**
Constant	-	2.137	-	2.384	-	2.678	-	1.563	-	1.694
$\text{Ln}\sigma_v^2$	-	-0.161*	-	0.243**	-	0.374** *	-	-0.441	-	-0.501
$\text{Ln}\sigma_u^2$	-	1.045** *	-	0.963** *	-	0.928** *	-	-0.930	-	-0.890
Wald chi ²	-	274.72* **	-	307.44* **	-	362.91* **	-	332.36* **	-	349.23* **
Number of observations	152	-	152	-	150	-	117	-	117	-

Notes: ***=significant at 1% ; **= significant at 5% ; ^=significant at 10% ; ^=significant at 20%

a/ Stochastic production function with semi-normal distribution and heteroscedastic variance (variance depending on the volume of sales)

Source: Lassibille, 2008, using an ICA survey data.

Annex Table 7. Public Expenditures on Education by Sub-Sector (Ariary)

(In Ariary millions)	2002	2003	2004	2005	2006	2007
Recurrent Expenditure						
Pre-school	-	-	-	-	-	624
Primary	65336	70985	88918	122271	129472	147623
JSE	18242	28275	24632	37389	40009	46643
SSE	9838	11415	11403	18089	19379	19122
TVET	4331	4510	7970	9137	8123	10187
Higher	21324	19576	26285	35000	52607	52833
Administration	17168	21737	37773	43078	29035	63895
Total	136239	156499	196981	264964	285391	340927
Capital Expenditure						
Pre-school	-	-	-	-	-	1868
Primary	3975	7277	47922	100298	98040	106010
JSE	399	836	2250	3586	379	1796
SSE	907	614	0	4125	2099	4832
TVET	727	668	763	1168	98	493
Higher	8300	14383	5608	14243	7892	6270
Administration	12654	25713	12689	0	753	1427
Total	26961	49509	69232	123420	109261	122696
Total Expenditure						
Pre-school	-	-	-	-	-	2492
Primary	69311	78262	136840	222569	227512	253633
JSE	18641	29111	26882	40975	40388	48439
SSE	10745	12029	11403	22214	21478	23954
TVET	5058	5178	8733	10305	8222	10680
Higher	29624	33959	31893	49243	60498	59103
Administration	29822	47467	50462	43078	29788	65322
Total	163200	206007	266213	388384	387886	463623

Notes: 1. Executed budgets (commitment basis.) 2. 2007 data are provisional. 3. Higher education includes scientific research.

Sources: 1. For 2002-2005, MEN, 2008b. *Rapport d'Etat du Système Éducatif National Malgache*. 2. For 2006 and 2007, MEN, 2008a. *Mise en œuvre du plan Éducation Pour Tous- Bilan annuel 2007*. Annex 1. 3. Exchange rates from World Bank Global Development Finance online database.

Annex Table 8. Public Expenditures on Education by Sub-Sector (USD)

(In USD millions)	2002	2003	2004	2005	2006	2007
Recurrent Expenditure						
Pre-school	-	-	-	-	-	0.3
Primary	47.8	57.3	47.6	61.0	60.4	78.8
JSE	13.4	22.8	13.2	18.7	18.7	24.9
SSE	7.2	9.2	6.1	9.0	9.0	10.2
TVET	3.2	3.6	4.3	4.6	3.8	5.4
Higher	15.6	15.8	14.1	17.5	27.7	28.2
Administration	12.6	17.6	20.2	21.5	13.6	34.1
Total	99.7	126.4	105.4	132.3	133.2	181.9
Capital Expenditure						
Pre-school	-	-	-	-	-	1.0
Primary	2.9	5.9	25.6	50.1	45.8	56.6
JSE	0.3	0.7	1.2	1.8	0.2	1.0
SSE	0.7	0.5	0.0	2.1	1.0	2.6
TVET	0.5	0.5	0.4	0.6	0.0	0.3
Higher	6.1	11.6	3.0	7.1	3.7	3.3
Administration	9.3	20.8	6.8	0.0	0.4	0.8
Total	19.7	40.0	37.0	61.6	51.0	65.5
Total Expenditure						
Pre-school	-	-	-	-	-	1.3
Primary	50.7	63.2	73.2	111.1	106.2	135.3
JSE	13.6	23.5	14.4	20.5	18.9	25.8
SSE	7.9	9.7	6.1	11.1	10.0	12.8
TVET	3.7	4.2	4.7	5.1	3.8	5.7
Higher	21.7	27.4	17.1	24.6	28.2	31.5
Administration	21.8	38.3	27.0	21.5	13.9	34.9
Total	119.5	166.4	142.4	193.9	181.1	247.4

Notes: 1. Executed budgets (commitment basis.) 2. 2007 data are provisional. 3. Higher education includes scientific research.

Sources: 1. For 2002-2005, MEN, 2008b. *Rapport d'Etat du Système Éducatif National Malgache*. 2. For 2006 and 2007, MEN, 2008a. *Mise en œuvre du plan Éducation Pour Tous- Bilan annuel 2007*. Annex 1. 3. Exchange rates from World Bank Global Development Finance online database.