Lost in the Education Roadmap: Gender Roadblocks from Primary School through Agricultural Vocational Training

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Introduction

Innovation for Agricultural Training and Education (InnovATE) is a USAID-funded project supporting the capacity development of agricultural training and education systems with a focus on vocational, technical, and higher education. InnovATE also examines primary and secondary education to determine capacity development needs. The InnovATE program, implemented by a consortium of US universities led by Virginia Polytechnic and State University and including Pennsylvania State University, Tuskegee University, and the University of Florida, aims to strengthen the range of institutions that train and educate agricultural professionals (InnovATE, 2013).

The InnovATE program takes a "learn, design, train" approach to capacity development. The "learn" component of the program aims to "provide educators and practitioners with good practices and tools that promote agricultural training and education systems development." (InnovATE, 2013). Coupled with this are case studies, needs assessments, action-oriented research, and analytical work necessary to support and foster capacity development in agricultural education. The "design" component of the program "undertakes country scoping assessments that lead to program design recommendations to improve the effectiveness of agricultural training and education." (InnovATE, 2013). The "train" component "will develop materials for training programs that promote new strategies and approaches to agricultural education and training." (InnovATE, 2013).

In support of the "learn" component of the InnovATE program, a series of cross-cutting studies have been commissioned as a basis for identifying gaps in Agricultural Training and Education (ATE) programs in Feed the Future and other low and middle income countries. The aim of the studies is to inform research into ATE capacity development including providing relevant background information, documenting good practice in ATE, and identifying gaps in ATE knowledge within a particular focus area in order to strengthen ATE capacity. A major focus area of the cross-cutting studies is in understanding gender constraints and ensuring gender equity in agricultural development as achieved through ATEs. This paper aims to explore the gender roadmap from primary school through secondary school and vocational school in developing countries to better understand the gender-related gaps in and barriers to agricultural education.

The first section of the paper will describe the key issues in equity, access, and quality of education in primary, secondary and agricultural vocational school through a gendered lens. The second section will give examples of good practices in institutions, regions, or countries that have resulted in positive impacts on gender parity in the educational system, particularly in regards to agricultural education. The final sections will discuss opportunities and recommendations for improving the educational roadmap from

primary school through vocational agricultural education with a focus on gender parity in participation, quality of education, and ultimately equal gendered opportunities to work in the field of agriculture.

Description of the Problem

The adoption of the Millennium Development Goals (MDG) and the Education for All (EFA) goals by nations worldwide in 2000 led to a focus on the improvement of primary school and secondary school enrollment and quality of education. Included in these goals is a specific focus on closing the gender parity gap in all levels of education. Since 2000, the primary school gender parity gap has been closing in every region. In secondary schools, the gender parity gap has been closing in every region except for sub-Saharan Africa which has remained constant at a gender parity index (GPI)[1] of 0.82 in both 1999 and 2010 (UNESCO, 2012).

Although there have been significant gains in narrowing the gender gap, global reports that suggest that gender parity has been achieved in most regions can be misleading, and parity as determined by enrollment rates can mask issues of urban and rural disparities and in the quality of education (FAO, 2005). From primary through tertiary and vocational education issues of gender-bias in curriculum, teacher gender bias, and institutional gender bias prevail, particularly in subjects and fields that are seen as gendered, such as math, science, and agriculture (World Bank, 2012). Analyses of textbooks in Africa, Asia, and Arab countries find consistent issues of gender stereotyping in primary school curriculum and girls directed away from math and science upon entering secondary school (Herz, 2004). The converse is found in some Latin American and Caribbean countries where gender biases in curriculum and teaching practices adversely affect boys (UNESCO, 2012c).

The causes of gender disparities in education from primary through technical vocational education and training (TVET) education overwhelmingly adversely affect females, although as mentioned above this varies some by region and level of schooling. These causes are commonly cited as including issues of safety, distance, sex of instructor, curriculum bias, cost, ability to advance, lack of sanitation facilities, early pregnancy, early workforce entry, HIV/AIDS (in Sub-Saharan Africa), and social norms and responsibilities (WB, 2008; UNESCO, 2012, 2012c). These issues coupled with commonly observed gender norms that push females into gender-stereotyped fields and away from math and science fields, social norms and biases that see agriculture as a "male" field, and perceptions of agriculture as a last-resort field, result in considerable roadblocks for females who wish to pursue agricultural education.

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[1] Gender Parity Index (GPI): Measures relative access to education on a scale of 0-1 with 0 being complete inequality and 1 being complete equality. A GPI between 0.97-1.03 is considered to be at parity. A GPI over 1 is to the advantage of female students, below 1 is to the disadvantage of female students.

The roadblocks preventing young women from studying and entering the field of agriculture are creating a growing problem for food security and agricultural production, particularly in low and middle-income countries (World Bank, 2009). Analyses of agricultural education and training (ATE) institutions and their role in development have found that women "are underrepresented as students, instructors, extension agents, and researchers, and agricultural innovation processes are hardly ever aimed at women" (Bientema, 2006). This is in contrast to evidence that shows that equalizing access to resources could increase agricultural output in developing countries by 2.5-4% - a number that significantly increases when looking at countries Sub Sahara Africa (WB, 2012). "Gender insensitivity in agricultural education, research and development programs is now recognized to be a key factor responsible for the stagnation in agricultural production in many African countries, where food crops are grown mainly by women" (DAFF, 2008).

The loss of women in the education roadmap has significant impacts on agriculture where women make up an estimated 43% of the agricultural workforce (WB, 2012). Gendered differences in education including access to and quality of education, prevent women from accessing employment opportunities in agriculture, constrains women from accessing markets, and prevents increases in agricultural yield. In cases where agricultural institutions seek to increase female employment, gendered differences in education leads to a lack of qualified women – even when women have been shown to be as capable as men at performing job tasks (WB, 2009).

Background

Gender Parity and Participation in Education

Gender biases and barriers persist in education systems worldwide. In some regions such as Latin America and the Caribbean and parts of eastern Asia gendered barriers to school predominantly affect boys. However, in the majority of the world and particularly among the world's poorest children, gendered roadblocks to education overwhelmingly affect girls. This is particularly true in agricultural TVET programs where male students are the primary agricultural students worldwide, due in large part to gendered norms, roles, and responsibilities that prevent women from participating in the sciences and in "male dominated" fields such as agriculture.

In 2000, two sets of worldwide goals related to the development of education and gender were adopted by the world's governments – the Education for All (EFA) goals and the Millennium Development Goals (MDG). The EFA initiative includes six goals: improving early childhood education, achieving universal primary education, increasing youth development programs, improving adult literacy, achieving gender parity in education, and improving the quality of education by 2015. The Millennium Development Goals

also aims to reach its targets by 2015 including MDG 2 which aims to achieve universal primary education and MDG 3 which aims in part to eliminate gender disparities in education.

In total, 108 out of 176 countries have achieved gender parity in primary education and of the 68 countries that have not achieved parity, girls are at a disadvantage in 60 of them (Table 1). The majority of these countries are located in sub-Saharan Africa, East Asia and the Pacific, and Latin America and the Caribbean. The number of countries reporting severe disparities with a GPI lower than .90, indicating fewer than nine girls for every ten boys in primary school, fell from 33 in 1999 to 17 in 2010 (UNESCO, 2012). Notably, of these 17 countries, 16 are low and lower-middle income countries, and 12 are located in Sub-Saharan Africa (Table 1).

In secondary education there are still significant gaps in gender parity with only 60 countries worldwide achieving parity out of 157 countries with available data. Of the 97 countries that have not yet achieved parity, girls are at a disadvantage in fewer than half (43). In low income countries only one country, Kyrgyzstan, has achieved parity out of 23. In middle income countries, 33 have achieved parity out of 88. Regionally, Sub-Saharan Africa reports only two out of 30 countries that have achieved gender parity with 16 of these countries reporting severe gender disparities. In Arab countries three out of 14 have achieved gender parity with four countries reporting severe disparities. East Asia and the Pacific reports six out of 23, South and West Asia zero out of six, and Latin America and the Caribbean 11 out of 33 countries who have reached gender parity in secondary education. At the regional level, gender disparities in secondary education are to the disadvantage of girls in the Arab States, South and West Asia, and Sub-Saharan Africa, while at the disadvantage of boys in Latin America and the Caribbean, and East Asia and the Pacific (UNESCO, 2012).

Table 1. Gender Parity in Education

Region	Primary Education					Secondary Education				
	Gender parity achieved in 2010		# Countries with GPI lower than 0.90	GPI		Gender parity achieved in 2010		# Countries with GPI lower than 0.90	GPI	
	# Countries	Countries with data		1999	2010	# Countries	Countries with data		1999	2010
World	108	176	17	0.92	0.97	60	157	26	0.91	0.97
Low income countries	9	29	10	0.86	0.95	1	23	14	0.83	0.87
Lower middle income countries	23	49	6	0.86	0.96	12	41	10	0.80	0.93
Upper middle income countries	34	50	1	0.99	1.00	21	47	1	0.98	1.04
High income countries	42	48	0	1.00	0.99	26	46	1	1.01	1.00
Sub-Saharan Africa	16	43	12	0.85	0.93	2	30	16	0.82	0.82
Arab States	6	15	1	0.87	0.93	3	14	4	0.88	0.94
Central Asia	7	8	0	0.99	0.98	5	7	1	0.99	0.97
East Asia and the Pacific	14	23	1	0.83	1.01	6	23	1	0.94	1.03
South and West Asia	4	7	2	0.98	0.98	0	6	3	0.75	0.91
Latin America & Caribbean	18	35	1	0.97	0.97	11	33	0	1.07	1.08
North America & Western Europe	22	24	0	1.01	0.99	16	24	1	1.02	1.00
Central & Eastern Europe	21	21	0	0.97	0.99	17	20	0	0.96	0.97

Source: UNESCO, 2012, Table 1.8

Gender Parity and Participation in Vocational Training

Participation in technical and vocational education (TVET) worldwide is a small percentage of secondary enrollments, remaining at 11% from 1999 to 2010. Low income countries have the smallest share of TVET enrollments at 5% in 2010. Most regions have remained consistent in their TVET enrollments with Arab States seeing a significant decrease from 14% in 1999 to 8% in 2010, Central Asia seeing a significant increase from 6% to 19%, and East Asia and the Pacific seeing a slight increase from 14% to 17% (WB, 2012). Of these regions, only in Latin America and the Caribbean do women make up more than half of TVET enrollments. Most other regions fall between 40-45% of female enrollments in TVET with South and West Asia reporting the lowest percentage at 30%. These numbers remain consistent when looking at upper secondary[2] TVET enrollment, although the total shares of enrollment in TVET (male and female) increases at this level (Table 2).

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[2] Upper secondary school or ISCED 3 (International Standard Classification of Education Level 3) is defined as typically beginning at age 15-16 years after basic/standard curriculum in order to prepare for tertiary education or for skills delivery (UNESCO, 2012).

Table 2. Enrollment in Technical and Vocational Programs by Region

Region	Secondary Enrollment		Enrollment in technical and vocational programs as a % of total enrollment in secondary education			
			Secondary		Upper Secondary	
	MF (000)	%F	MF	%F	MF	%F
Arab States	29,722	47	8	40	18	45
Central & Eastern Europe	30,347	48	20	40	48	40
Central Asia	10,443	48	…	…	…	…
East Asia & the Pacific	163,776	48	17	45	39	45
Latin America / Caribbean	60,365	51	10	53	18	52
North America & Western Europe	61,832	49	13	43	26	43
South & West Asia	143,351	46	2	30	4	30
Sub-Saharan Africa	43,653	45	8	40	17	43

Source: UNESCO, 2012b, Table 6

Gender disparities in access to and quality of vocational education are prevalent as student enrollment in technical and vocational education is typically male-dominated. In 63% of countries (109 out of 172) women more often enroll in traditional secondary school over vocational school. Vocational occupations chosen by women tend to reinforce gender norms and stereotypes, and are typically characterized by fields such beauty, home economics, and care (WB, 2012). Through every level of education women are underrepresented in engineering, science, and service related fields; and overrepresented in education, care, and humanities fields. The study of agriculture is female dominated in only 3% of countries, and male dominated in 74% of countries (Table 3). In some countries there has been an expressed need for an increase in TVET opportunities. For example, Bangladesh seeks to increase female enrollment in technical education by 20% by 2020, and Ethiopia seeks 50% female enrollment by 2015 (Engel, 2012).

Table 3: Gender segregation in field of study

Field of study	Fraction of countries where the field of study is:			# of Countries
	Female dominated %	Male dominated %	Neutral %	
Agriculture	3	74	22	89
Education	84	6	10	97
Engineering, manufacturing, and construction	0	100	0	97
Health and welfare	82	4	13	97
Arts and humanities	55	6	39	96
Science	13	68	20	96
Services	21	59	21	87
Social sciences, business and law	23	16	61	97

Source: WB, 2012, Table 3.1

A 2006 report by Farmers of the Future (Vandenbosch, 2006) states that: "In most post-primary technical and vocational education and training programs in agriculture, there is insufficient examination and discussion of the roles of rural women in agricultural production and rural development. Too little time, if

any, is devoted to gender analysis and addressing the question of how extension work can be carried out effectively with rural women."

Gendered Issues in Participation and Educational Quality in Primary and Secondary Schools

Gender parity in school participation is still an issue in 68 countries for primary education and in 97 countries for secondary education. Girls have the lowest enrollment rates as well as children who are poor, live in rural areas, are ethnic minorities, and live in conflict or post-conflict areas[3] (UNMP, 2005). Gender disparities at the disadvantage of girls are widespread in sub-Saharan Africa, some Arab countries, and in South and West Asia (UNESCO, 2004; UNMP, 2005).The World Bank calls for focusing on the most disadvantaged populations to continue progress towards gender parity (WB, 2012).

Of countries that have achieved gender parity in primary school, the majority have a secondary gross enrollment ratio of more than 50% of girls suggesting a close association between gender parity in and access to primary education and continuation on to secondary school (WB, 2008). "The cumulative effect of disadvantage at the primary level, as well as the obstacles to performance and retention at the secondary level, result in a secondary gender parity index that is significantly lower than at the primary level, higher drop-out levels for girls, and low participation in math and sciences" (World Bank, 2008).

Barriers to education occur on both the supply and demand side of education. On the supply side of education, barriers can be further categorized into institutional, infrastructure, or school-related factors as described in Table 4. Institutional factors refer to policies and decision making at a governmental level that occur indirectly or directly to prohibit students from attending school such as a lack of women involved in decision-making processes and lack of, or poorly enforced, policies prohibiting early marriage, sexual abuse, and discrimination. Infrastructure factors refer to issues regarding the physical school structure such as a lack of basic sanitation facilities or an insufficient number of schools resulting in students having to go greater distances to a school. School-related factors refer to barriers that occur while in the classroom or while traveling to school such as a gender-based violence or gender discrimination by the instructor (UNESCO, 2005; WB, 2008).

On the demand side of education, barriers can be categorized into socio-cultural and socio-economic factors (Table 4). Socio-cultural issues refer to the norms, roles, and responsibilities that prevent a person from attending school such as a traditional view of girls and women's roles in society and at home or socio-cultural norms of early marriage. Socio-economic factors refer to the direct or indirect cost of

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[3] The InnovATE project is preparing a report on agriculture issues in post-conflict environments to be distributed at the 2013 InnovATE Symposium in Washington, DC.

schooling including school fees, poverty, and the need for early workforce entry (UNESCO, 2005; WB, 2008).

Table 4: Supply and Demand Factors Affecting Participation in Primary and Secondary Education

Factors relating to the supply of education	*Factors relating to the demand for education*
Institutional and political factors	**Socio-cultural factors**
• Policies that exclude girls and women • Political instability, social tensions, wars • Absence of clear policies and strategies for the education of girls and women • Under-representation of women in decision making • Weak legislation on the official age for first marriage, sexual abuse and discrimination against girls • Weak legislation on school entry age • Emphasis on enrollment over completion and performance	• Low social status of women and traditional image of the role of women in society • Negative perception of the education of girls and women • Girl's education seen as incompatible with religious or traditional principles • Early marriage and pregnancy • Over-importance given to dowry • Low educational level of parents • Difficulty for educated girls to get married
Infrastructure-related factors	**Socio-economic factors**
• Inadequacy of school infrastructure such as absence of basic sanitation facilities • Distance to school facilities • Lack of secondary facilities and inability to progress • Inexistent or inadequate dormitory facilities	• Poverty of parents • High direct and indirect costs of schooling • High demand for female labor for household and agricultural work • Difficulty in finding work after completing schooling
School-related factors	**Other factors**
• Lack of safety including sexual harassment, gender-based violence, and sexual violence • Gender of instructor and lack of women teachers • Gender bias and stereotypes in school materials and curricula • Discriminatory attitudes of teachers • Exclusion of pregnant girls from school • Lack of school nutrition programs • Lack of girls' schools • Lack of relevance of school curriculum • Student-to-teacher ratio	• HIV/AIDS epidemic • Conflict and post-conflict issues

Sources: *UNESCO, 2005, Box 2; WB, 2008, Table 2.1*

The barriers to participation in primary and secondary education described in Table 4 are represented at some level in all developing countries. For example, fear of gender-based violence and socio-economic and socio-cultural demands for household labor and agricultural labor prevent female students from attending schools that are at too distant from their home or community in every region discussed. This issue disproportionately affects the rural poor and girls. The World Bank calls for building primary schools at a reasonable distance from population centers in order to subsequently improve enrollment at secondary institutions (WB, 2008).

Violence towards girls in school has been identified as a major barrier to school attendance in many parts of the world:

"Sexual harassment of girls and women ranging from verbal to rape, physical abuse and violence, is another significant barrier to their participation and progress through all levels of education. Sexual harassment is particularly feared when girls and women are travelling to or from school, especially in rural areas, or during classes. Consequently, parents may refuse to send their daughters to school if they are required to live away from home, if they are to study under male instructors or attend mixed-gender classes. In countries experiencing conflict, women's participation and progression in education suffers to an even greater extent due to sexual harassment." (Mangheni, 2010)

The issue of violence in schools and in traveling to schools is significant and can affect boys as well as girls – particularly in Latin American and the Caribbean and parts of East Asia. "Studies from various countries including Mongolia, Seychelles, Thailand, Jamaica, Trinidad and Tobago, and Australia showed that boys are also likely to receive greater physical punishment /violence both at the hands of teachers and peers" (UNESCO, 2012c).

Gender insensitivity and bias in school curriculum is a common barrier to education. Negative teacher attitudes towards students can detrimentally impact participation and performance for both boys and girls. For example, in parts of sub-Saharan Africa girls are perceived as less intelligent, soft, and incapable of performing well in math and sciences; while in parts of Latin America and the Caribbean boys are seen as lazy, aggressive, and less intelligent than girls. Both negative attitudes and stereotypes have negatively affected students (WB, 2009; UNESCO, 2012; 2012c).

Dropping out of school due pregnancy is an issue in many countries, worldwide, and these girls rarely return to school. "In the Plurinational State of Bolivia, Colombia, the Dominican Republic, Haiti, Nicaragua and Peru, teenage mothers have an average of 1.8 to 2.8 fewer years of education than other girls and are fourteen times as likely to drop out of school" (UNESCO, 2012). In some countries such as Botswana, Malawi, Namibia, Swaziland, and Zambia, girls are excluded from school during pregnancy and are often not permitted to return to school at all. Work must be done to remove the barriers to schooling for pregnant girls and mothers.

There are a few of gendered barriers affecting participation in school worldwide. The next section will discuss regional gender issues from primary through vocational education focusing on issues that are particularly relevant for that region.

Regional Gender Issues from Primary through Vocational Education

Arab States

School participation has improved throughout the Arab states where enrollment in primary school increased by 19% from 1999-2010, enrollment in secondary school increased from 59% to 69%, and the number of out of school children decreased by 40%– one of the largest regional gains (UNESCO, 2012). Despite these gains, one in five students in the Arab states have not completed primary school and one in five students lack basic skills (UNESCO, 2012). Gender parity in education has improved in all Arab states with some making significant gains such as Yemen with an increase in gender parity from 0.56 in 1999 to 0.82 in 2010. However, gender parity at the primary school level has not been achieved in Algeria (0.94), Djibouti (0.90), Egypt (0.91), Morocco (0.94), Sudan (0.90), Tunisia (0.93), or Yemen (0.82) (UNESCO, 2012).

At the secondary level female participation varies widely. The female transition rate to secondary education is low in some areas such as Djibouti (64%), Mauritania (31%), Lebanon (91%), Morocco (80%), Syrian Arab Republic (95%), Algeria (92%), and Tunisia (87%). Gender parity has not been achieved in Egypt (0.96) and Saudi Arabia (0.95); and severe gender disparities exist in Djibouti (0.80), Mauritania (0.85), Sudan (0.88), and Yemen (0.62). However, in several countries the GPI at the secondary level indicates a disparity that favors women including Jordan (1.06), Lebanon (1.12), Palestine (1.08), Qatar (1.21), and Tunisia (1.06), in part attributable to early labor force entry by young men (Rugh, 2002; UNESCO, 2012).

Enrollment in TVET programs as a share of secondary enrollment varies in the Arab states with numbers as low as 1% in Palestine and as high as 18% in Egypt. The countries with a higher share of TVET participation include Egypt at 18% increasing to 51% at upper secondary levels, Kuwait at 15% increasing to 27% at upper secondary levels, and Lebanon at 15% increasing to 27%. Female participation in TVET programs is

Table 5. Enrollment in Technical and Vocational Programs by Region in Select Arab States

Country	Enrollment in technical and vocational programs as a % of total enrollment in secondary education			
	Secondary		Upper Secondary	
	MF	%F	MF	%F
Algeria	10	35	12	55
Bahrain	8	13	17	13
Djibouti	4	41	12	41
Egypt	18	43	51	45
Jordan	4	38	15	38
Kuwait	15	42	27	45
Lebanon	15	42	27	45
Palestine	1	35	6	35
Syrian Arab Republic	4	40	21	40
Tunisia	12	35	11	30

Source: UNESCO, 2012b, Table 6

low across Arab states with the highest participation in Egypt at 43% of enrollments and the lowest in Bahrain at only 13% of enrollments. These low female enrollments persist at the upper secondary level with the exception of Algeria where women make up 55% of enrollments (Table 5).

The gendered barriers to primary and secondary education include all of the factors listed in Table 4 above. Some issues particular to the region include traditional and religious rules and norms, male-bias in policies, curricula that reinforces gender roles and stereotypes, lack of transportation and school facilities for girls, and boy-preference in school attendance at the household level (Rugh, 2002; Prokop, 2003; Roudi-Fahimi, 2003). Additionally, poverty-related issues to school participation disproportionately affect girls (Sika, 2011).

In several Arab states female participation in education is believed to defy traditional household roles and religious beliefs, and girls are often kept at home to perform household activities (Sika, 2011). Female education is thus "impeded by the existence of traditional norms and cultural beliefs, at the core of which are inhibiting religious values that impede female education. A popular belief still prevailing among scholars and laymen alike is that Islam, as the dominant religion of the region, prohibits women's education, as was the case in Afghanistan under Taliban rule" (Mehran, 2003). Where girls and women are able to attend school the curriculum reinforces traditional gender roles. For example, according to a 2004 UNESCO report the ministry of education in Saudi Arabia states that: "'The aim of girls' education is to bring her up in a sound Islamic way so that she can fulfill her role in life as an ideal wife and good mother, and to prepare her for other activities that suit her nature, such as teaching, nursing and medicine" (UNESCO, 2004). Curriculum bias is found in several Arab states including Saudi Arabia, Oman, and Yemen where girl's curriculum focuses on health, nutrition, and family planning (UNESCO, 2003; Sika, 2011).

Gender disaggregated data on the barriers to TVET participation is unavailable. Reports detailing issues in TVET and higher education institutions cite issues such as poor skills delivery – particularly in communication, language, technical, and sector-related skills; a lack of alignment with the demands of the economic sector; overrepresentation of students in humanities and social sciences fields and significant underrepresentation in science and engineering fields; and gaps between educational output and labor market demands (Rugh, 2002; Prokopo, 2003). These issues combined with poor quality of education have led to high levels of jobless graduates. In dealing with this issue, governments have focused on male employment over female employment which is considered to be part of the reason why a focus on gender sensitive education policies is weak in this region (Rugh, 2002; Mehran, 2003).

There is a need to increase technical and vocational institutions in Arab states to enlarge the pool of workers with practical skills, particularly in agriculture. The Arab economy depends in large part on traditional primary commodities even though agriculture is not a large percentage of every country's GDP. A focus on improving the gendered barriers to education in primary and secondary school and a regional focus on agricultural TVET institutions is essential in Arab states where "women are overrepresented in smallholder farming and agricultural labor, indicating limited economic opportunities for rural girls and women" (UNESCO, 2012 – FAO-2010). Although the share of women's participation in agriculture varies by country with numbers as high as 50% in Egypt, Morocco, Somalia, and Turkey and as low as 4% in the United Arab Emirates, men's share of agricultural labor is decreasing while women's is increasing. Northern Africa is the only region where women's employment in agriculture saw an increase from 28.4% in 1997 to 31% in 2007, while male participation dropped from 19.6% to 12.5% over the same period (UNDP). However, as the female share of agriculture continues to increase, removing barriers to participation in education – particularly sociocultural barriers – will be essential in ensuring food security in Arab countries.

Latin America and the Caribbean
Regionally, Latin America reached gender parity in primary education in 1999 and has remained consistent at a GPI of 0.97 from 1999-2010. However, several countries within this region have not yet reached gender parity at the primary level including Chile (0.95) and Suriname (0.95) in South America; Belize (0.91) and El Salvador (0.95) in Central America; and Antigua and Barbuda (0.92), the British Virgin Islands (0.94), the Dominican Republic (0.88), Saint Lucia (0.96), and Saint Vincent/Grenadines (0.93), in the Caribbean (UNSECO, 2012).

In secondary education the only country that has not yet achieved gender parity is Guatemala with a GPI of 0.93. In contrast, 18 countries in Latin American and the Caribbean have GPIs that strongly favor female students including Argentina (1.12), Colombia (1.10), Guyana (1.11), Paraguay (1.05), Suriname (1.23), and Venezuela (1.10) in South America; Costa Rica (1.06), Honduras (1.23), Mexico (1.07), Nicaragua (1.10), and Panama (1.07) in North and Central America; and the Bahamas (1.05), Barbados (1.09), Bermuda (1.18), the Cayman Islands (1.13), Dominica (1.09), the Dominican Republic (1.12), and Trinidad and Tobago (1.07) in the Caribbean (UNSECO, 2012).

Overall, in Latin America and the Caribbean boys are at a disadvantage in 64% of countries, a pattern that has persisted in the Dominican Republic and Venezuela since 1999. The bias towards girls in secondary education in this region is strongly influenced by boys early entry into the labor force. In Honduras, one of the countries with the highest gender disparities, 60% of boys aged 15-17 were engaged in economic

activities with 82% not active in school, compared with 21% of girls engaged in formal labor of which 61% were not in school (UNESCO, 2012).

In Latin America, the TVET share of secondary enrollments is 10% of total secondary enrollments increasing to 18% at the upper secondary level. This number varies widely within the Latin American sub-regions. In Central America the TVET share of secondary enrollments are as high as 46% in Honduras, and reach as high in upper-secondary enrollments as 82% in Honduras and 87% in Guatemala. Within this same sub-region, enrollments are significantly lower in Belize, Costa Rica, Mexico, Nicaragua, and Panama at less than 16% of secondary enrollments.

Latin America boasts seven of the top ten countries worldwide with the highest percentage of female enrollments in vocational education including Mexico, Nicaragua, Dominican Republic, Colombia, Ecuador, and Honduras (Rodgers, 2006). Throughout the Central American sub-region the female share of TVET enrollments is near or at parity and is to the advantage of females in El Salvador, Honduras and Mexico in secondary enrollments and in Honduras in upper-secondary enrollments (Table 6). In South America, TVET enrollments are highest in Suriname (46%), Chile (23%), and Ecuador (22%) and are less than 10% of enrollments in Argentina, Brazil, Colombia, Guyana, and Venezuela. The female share of these enrollments is lowest in Argentina (38%), Guyana (43%), and Suriname (47%) and is to the advantage of

Table 6. Enrollment in Technical and Vocational Programs by Region in Selected Countries in Latin America & the Caribbean

Region/Country	Enrollment in technical and vocational programs as a % of total enrollment in secondary education			
	Secondary		Upper Secondary	
	MF	%F	MF	%F
Central America				
Belize	4	50	18	50
Costa Rica	15	50	18	52
El Salvador	18	52	55	52
Guatemala	27	51	87	51
Honduras	46	56	82	58
Mexico	16	56	9	47
Nicaragua	16	49	44	49
Panama	16	49	44	49
South America				
Argentina	8	38	21	38
Brazil	6	57	14	57
Chile	23	48	37	48
Colombia	8	54	28	54
Ecuador	22	52	52	52
Guyana	7	43	14	23
Paraguay	10	50	24	51
Suriname	46	47	63	61
Venezuela	5	50	16	50
Caribbean				
Antigua / Barbuda	7	48	8	76
Aruba	16	37	24	40
Cuba	27	38	53	40
Dominican Republic	4	62	7	62

Source: UNESCO, 2012b, Table 6

females in Brazil (57%), Colombia (54%), and Ecuador (52%). In the Caribbean, Cuba has the highest

TVET enrollment at 27% and females are at a disadvantage in all reported countries in the region except for the Dominican Republic (62%) at the primary level and Antigua/Barbuda at the upper secondary level (76%) (UNESCO, 2012b).

Agricultural TVET programs in Latin America are less common than institutions in the commercial and industrial sectors such as electricity, manufacturing, and textiles. Gendered barriers to agricultural TVET participation are largely centered on the perception of agriculture as a male-dominated field, with female students directed towards care and service industries. Female students who participation in agricultural TVET programs are typically found in fields that reinforce traditional gender roles such as nutrition, food processing, and home economics (WB, 2009).

The gendered roadblocks to education in Latin America and the Caribbean include all of the issues listed in Table 4 above, although significant gains have been made in the region. Regional issues affecting boys' participation include early workforce entry, social pressure to drop out of school, and teacher bias favoring girls. Regional issues affecting girls include early marriage and pregnancy, household labor and care responsibilities, and gender mainstreaming towards "feminine" fields and away from science, engineering, and agricultural fields.

The lack of male participation in school is partially caused by early workforce entry, particularly in poor households where boys are withheld or withdrawn from school to work. "In Latin America the fact that girls' enrollment often exceeds boys' enrollment may reflect the higher opportunity cost of boys' time (working in the fields or in the streets). This illustrates the need to shape specific interventions based on local conditions" (UNMP, 2005). A lack of male role models in the home and at school, low academic expectations for boys, discrimination and bias towards male students, and teaching methods and practices that disengage boys are all considered to be reasons for poor male attendance in school in this region (UNESCO, 2012). In some Latin American countries, female teachers outnumber male teachers in secondary school leading to what some to believe to be a cause of boy's disengagement in education (UNESCO, 2012). This is particularly discussed in Brazil and Jamaica where 75% of teachers are female. Other evidence suggests that the sex of the teacher is less important than gender sensitivity and the ability to engage both female and male students. For example, in Jamaica and Trinidad and Tobago teachers overwhelmingly expect girls to perform better in school than boys, and boys are more likely to receive corporal punishment and violence at the hands of teachers and peers (UNESCO, 2012c).

In some Latin American and Caribbean countries education is increasingly perceived as a female pursuit which is creating a social crisis in which boys are pressured to drop out of school (UNESCO, 2012c).

This exacerbates issues of underachievement in Latin America that have been attributed to gang and street culture. High incidence of crime, drug abuse, narcotics trafficking, violence, and some of the highest murder rates in the world are in part attributed to boys' disadvantage in education. "Although it is difficult to establish direct and definite linkages, engagement in youth violence, easy access to guns and drug related job opportunities appear to be both a cause and impact of boys' disadvantage in education" (Barker, 2012; UNESCO 2012c).

Recent research suggests that in Latin America and the Caribbean, reductions in gender issues that adversely affect girl's education, movement towards middle-income economies and increased time in school suggest that efforts should be focused on the gendered nature of the classroom and how this affects participation rather than a focus on who is able to access schools (Barker, 2012). "Thus, as more children are in school, attention must now move from the macro-structural issues that keep children out of school to the dynamics of the classroom and the family and the community that determine if children excel in and stay in school, which in turn interact with gender norms in the classroom, home and community" (Barker, 2012).

Although in Latin America and the Caribbean trends in primary and secondary education favor girls, it is important to note that the most vulnerable girls are, as elsewhere in the world, likely to drop out of school due to the cost of education, sexual harassment and exploitation, early pregnancy, and the need to help care for the household (Barker, 2012; UNESCO, 2012). For example, more than one in ten girls aged 15-19 in Latin America are pregnant or are already mothers forcing them to drop out of school. Social stigma and the absence of financial, psychological, and educational support prevent the return of mothers to school even in countries where they are encouraged to return (UNESCO, 2012).

Sub-Saharan Africa
Sub-Saharan Africa reduced the number of out-of-school children by 13 million between 1999 and 2008. However, out-of-school numbers also increased by 1.6 million and sub-Saharan Africa now accounts for half of the world's out of school children. This trend will continue to be a critical issue as two-thirds of the population of sub-Saharan Africa is under the age of 25. Twelve countries in sub-Saharan Africa have a gender parity index below 0.90 indicating severe gender disparities. These are Central African Republic (0.725), Chad (0.729), Angola (0.813), Cote d'Ivoire (0.833), Niger (0.837), Eritrea (0.838), Guinea (0.838), Cameroon (0.862), Democratic Republic of the Congo (0.867), Benin (0.871), Mali (0.882), and Togo (0.899) (UNESCO, 2012). In sub-Saharan Africa poverty is a major barrier to secondary school attendance: only 10-30% of the poorest 40% of students enter secondary school. In Benin, Burkina Faso,

Guinea, Niger, Mozambique, and Madagascar only 15% of rural girls complete primary school (WB, 2008).

Quality of education continues to be an issue in primary school in sub-Saharan Africa. For example, in Malawi 34% of children do not reach grade four and only 5% reach minimum learning levels in primary school. These problems persist despite increasing enrollment and decreasing the gender gap. The pupil-teacher ratio worsened in sub-Saharan Africa where an estimated two million additional teachers are needed to reach universal primary education. From 1999-2010 the primary school pupil-teacher ratio rose from 42:1-43:1 which is the highest ratio in the world (UNESCO, 2012).

Gender differences in secondary education are significant in sub-Saharan Africa. In Benin, Cote d'Ivoire, Ethiopia, Guinea, Mali, and Togo fewer than 40% of new entrants into secondary school are female. The causes for this vary from disparities in access to education, persistence through primary school, disparities in the transition rate from primary to secondary school (WB, 2008).

The TVET share of secondary education in sub-Saharan Africa is low at 8% of secondary enrollments in 2012. In most countries in sub-Saharan Africa enrollment in TVET programs has fallen (WB, 2008). However, this number varies widely in the region with some countries showing higher enrollments in TVET as a percentage of secondary enrollments including Angola (43%), Cameroon (20%), the Democratic Republic of the Congo (20%), Mali (12%) and Rwanda (12%). The percentages increase at the upper secondary level with percentages as high as 73% in Angola, 59% in Ethiopia, 41% in Rwanda, and 40% in Mali. In all of

Table 7. Enrollment in Technical and Vocational Programs in sub-Saharan Africa

| Country | Enrollment in technical and vocational programs as a % of total enrollment in secondary education | | | |
| | Secondary | | Upper Secondary | |
	MF	%F	MF	%F
Angola	43	33	73	35
Burkina Faso	4	46	18	49
Burundi	5	36	19	37
Cameroon	20	37	…	…
Cape Verde	3	48	7	48
Central African Republic	4	38	7	48
Chad	1	38	4	44
DRC	20	33	33	33
Eritrea	1	45	1	45
Ethiopia	8	44	59	44
Gambia	10	48	24	48
Ghana	3	44	9	44
Guinea	2	44	7	43
Kenya	…	58	1	58
Lesotho	2	79	2	59
Madagascar	4	36	14	34
Mali	12	41	40	41
Mozambique	5	34	8	37
Niger	1	14	6	16
Rwanda	12	50	41	50
Sao Tome & Principe	2	47	15	47
South Africa	6	43	10	43
Uganda	7	43	21	47

Source: UNESCO, 2012b, Table 6

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sub-Saharan Africa the female share of enrollment in TVET programs is under 50% with the exception of Kenya and Lesotho, where 58% and 79% of TVET enrollments are women in at the secondary level and 58% and 59% at the upper secondary level, respectively (Table 7).

Issues such as lack of relevance of TVET programs in meeting labor market demands, low quality of curriculum and educational outcomes, lack of standards, ineffective skill delivery, and cost of schooling have contributed to under-enrollment in TVET programs (WB, 2008). "TVE institutions in [sub-Saharan Africa] continue to fall short in assessments of their relevance to economic and social needs, their effectiveness in delivering skills, and their cost and efficiency" (Johanson, 2004).

The majority of TVET institutions in sub-Saharan Africa are focused on industrial and service occupations with fewer institutions serving the needs of the agricultural sector. In the past ten years enrollment in agricultural TVET programs has been decreasing at all levels. Many agricultural institutions in sub-Saharan Africa are directed at providing employees for governmental positions which have been decreasing with the decentralization of governments and the hiring of fewer civil service employees. Additionally, funding for agricultural TVET programs has steadily been decreasing in favor of higher education, the curriculum is obsolete and irrelevant in relation to the economy, institutions are lacking appropriate staffing, and interest in agriculture as a career is declining (WB, 2007).

In some African countries, agriculture is a required component in school. Botswana, Ghana, and Malawi require agriculture classes at the junior secondary level and Botswana, Ethiopia, Ghana, Kenya, Lesotho, Namibia, Nigeria, South Africa, Swaziland, Uganda, and Zimbabwe offer agricultural education as an option in upper secondary school. However, there is some discussion on the relevance of the agricultural curriculum as many secondary students do not participate in farming after secondary school (Vandenbosch, 2006).

The gendered barriers to education persist from primary education through vocational education and include all of the supply and demand factors discussed in Table 4 above. Some of these issues are discussed in more detail below.

Where safety is cited as a barrier to participation in sub-Sahara African schools, girls are overwhelmingly affected and may experience violence on the way to school or on school grounds. Sexual harassment, aggression, and violence are concerns with families reluctant to send girls long distances to schools. For example, Ghana, Malawi, and Zimbabwe report high levels of sexual aggression from boys in primary and secondary school and from teachers in secondary schools (UNICEF, 2004). In Cameroon, 27% of

girls surveyed reported having had sex with a teacher (UNMP, 2005). Gender-based violence in schools in sub-Saharan Africa includes sexual aggression, rape, intimidation, abuse, assault, bullying, corporal punishment, psychological abuse, and forced labor (Wilson, 2001). "School-related violence in developing countries takes place in the context of inequality and specific cultural beliefs and attitudes about gender roles, especially concerning male and female sexuality, a pattern of economic inequality, and in some instances significant political unrest and violent conflict" (Wilson, 2001).

The distance to a school in sub-Saharan Africa continues to be a barrier to education, particularly in secondary schools. This exacerbates safety issues due to the risk of traveling to school in unsafe areas, as discussed above. Additionally, the cost of travel to school including time away from family responsibilities and the cost of boarding at secondary institutions are barriers affecting girl's participation in secondary school, particularly. The World Bank identifies a need to increase the amount of secondary "day" schools, or local schools, in sub-Saharan Africa to reduce issues of non-attendance due to distance and boarding issues at secondary institutions (WB, 2008).

The HIV/AIDS epidemic has had a detrimental effect on girl's participation in school, although the full effects of the HIV/AIDS epidemic on school participation are unknown. Those affected the most by the epidemic are youth who live with HIV/AIDS, children orphaned by the epidemic, and people who must care for sick family members. In 1999 it was estimated that 1.01 million children were living with AIDS accounting for 0.44% of the population under age 15. "Young women are particularly vulnerable, accounting for more than 60% of all young people living with HIV, and 71% of all young people living with HIV in sub-Saharan Africa"(UNESCO, 2012).

In secondary institutions particularly, issues of sexual maturation in female students, including sanitation and hygiene and early pregnancy, can be a major barrier to participation. Lack of affordable sanitary materials for menstruation and lack of hygiene facilities for girls at secondary schools cause girls to be absent for much of the school year (Southerland, 2008; WB, 2009). Parents' fear of early pregnancy prevents many secondary-aged girls from attending school, particularly where distances to schools are great (UNICEF, 2004). When girls do get pregnant at an early age they are often expelled from school, and even in areas where girls are encouraged to return after pregnancy such as in Guinea and Malawi, parents fear sending girls back to school for fear of more pregnancies and ridicule (UNICEF, 2004; Southerland, 2008).

Early marriage and removing girls from school in order to perform household tasks – including agricultural tasks, also are barriers to education at the secondary level (Southerland, 2008). This is

coupled with sociocultural barriers such as a lower significance placed on women's role in the workforce, where women are expected to fulfill domestic roles rather than achieve a high level of skills or an academic expertise (Southerland, 2008).

Women who participate in TVET programs in sub-Saharan Africa are typically concentrated in service sector jobs such as secretarial, hair dressing, health care, and hotel work, while men are typically enrolled in industrial and agricultural fields (Davis, 2007). Access to TVET centers in sub-Saharan Africa is difficult for poor and rural students as most TVET institutions are centered in capitol and large cities (World Bank, 2008). "Enrollment patterns are distorted by gender, with females receiving far fewer opportunities than indicated by their important role in agricultural production" (WB, 2007). Women are not encouraged to focus on the sciences in secondary school and are frequently gender mainstreamed into other fields (Davis, 2007).

Overall, women account for one out of every five students who study agriculture in sub-Saharan Africa. In Ethiopia, women account for only 11% of enrollments and 9% of graduates from agricultural TVET institutions in 2005. In that same year women accounted for only 6% of agricultural TVET instructors. "There are considerably more male teachers, trainers and learners than female teachers, trainers and in post-primary agricultural education and training in sub-Saharan Africa. There is a very urgent need to motivate women to attract them to teaching and training in agriculture" (Vandenbosch, 2006). The agricultural TVET curriculum in Ethiopia is male-focused and has no gender-specific career tracks. After entering the workforce female students must defy traditional social norms by working alongside or under male counterparts, who are often senior in age, further discouraging women from interest and participation in agricultural TVET programs due to the social constraints associated with working with men – particularly older men (Davis, 2007; WB, 2007).

Central Asia

In central Asia gender parity in primary education has been reached in all countries except for Tajikistan with a GPI of 0.96, up from 0.93 in 1999. Uzbekistan experienced a decrease in GPI in this period from 1.00 to 0.97 moving it near the mark for gender disparate. (UNESCO, 2012). Similarly, gender parity in secondary education has been reached in most Central Asian countries with the exception of Tajikistan which has remained at the 1999 level with a GPI of 0.87. Mongolia, however, has closed their GPI that was overwhelmingly to the advantage of girls in 1999 at 1.26, to a GPI in 2010 of 1.07 (UNESCO, 2012).

Enrollments in TVET programs as a share of secondary enrollments in Central Asia are low in Armenia, Kazakhstan, Kyrgyzstan, and Tajikistan at less than 7% of enrollments. Mongolia and Azerbaijan have

the highest enrollments at 10% and 17%, respectively. At the upper secondary level TVET enrollments are slightly higher with the highest enrollment in Azerbaijan at 44%. Female participation in TVET programs is low in correspondence with those countries that have low overall participation in TVET programs, at 30% of enrollments or less. Similarly, Azerbaijan and Mongolia boast the highest female enrollments at 51% and 47% of TVET enrollments (Table 8). Similar to other regions, female TVET students are typically enrolled in female stereotyped professions such as nursing, teaching, seamstress, and secretarial fields (Ubaidullaieva, 2004; Jayaweera, 2013).

Table 8. Enrollment in Technical and Vocational Programs in Central Asia

Country	Enrollment in technical and vocational programs as a % of total enrollment in secondary education			
	Secondary		Upper Secondary	
	MF	%F	MF	%F
Armenia	2	26	6	25
Azerbaijan	17	51	44	51
Kazakhstan	7	30	24	30
Kyrgyzstan	3	27	15	27
Mongolia	10	47	29	47
Tajikistan	2	15	11	15

Source: UNESCO, 2012b, Table 6

South and West Asia

Since 1999 there have been major improvements in gender parity in primary education in South and West Asia. Bangladesh, Bhutan, India, Iran, Nepal, and Sri Lanka have all achieved gender parity since 1999. The Maldives decreased in gender parity from 1.01 in 1999 to 0.96 in 2010. Notably, gender parity is far from being reached in Afghanistan and Pakistan though there have been significant improvements with a jump from 0.08-0.69 and 0.67-0.82 from 1999 to 2010, respectively (UNESCO, 2012).

Gender parity in secondary education varies widely in the region with Bangladesh (1.13) and Bhutan (1.04) reporting secondary enrollment at the advantage of girls. In contrast India reports a gender disparity of 0.76, and Afghanistan (0.51), Iran (0.86), and Pakistan (0.76) report severe gender disparities at the disadvantage of girls (UNESCO, 2012).

Few countries have data available on TVET enrollments in secondary education. In those countries that reported, Iran is the only country with a significant amount of TVET enrollments at 10%. Afghanistan, Bangladesh, India, and Pakistan report less than 4% of secondary enrollments as TVET programs.

Table 9. Enrollment in Technical and Vocational Programs in South and West Asia

Country	Enrollment in technical and vocational programs as a % of total enrollment in secondary education			
	Secondary		Upper Secondary	
	MF	%F	MF	%F
Afghanistan	1	32	5	32
Bangladesh	4	21	9	21
India	1	25	2	25
Iran	10	34	17	34
Pakistan	4	42	10	42

Source: UNESCO, 2012b, Table 6

These enrollments increase slightly in Iran to 17% and in Pakistan to 10% at the upper secondary level. Gender parity in all countries' TVET programs is very low with only 21%-42% participation (Table 9).

The gender barriers to education vary widely in this region with issues affecting both female and male participation. In very poor households barriers such as the cost of sending a female student to school versus the need for girls to perform household tasks adversely affects female participation in education. Strong son preference, lack of available schools, poverty, lack of mobility, early marriage and negative parental social status for postponing marriage, social norms and responsibilities, and a lack of female teachers are all issues affecting girls, particularly in rural areas (Ota, 2007; Khan, 2012; WB, 2012). Household labor responsibilities and social norms that concentrate girls' work in the household and on unpaid activities, while boys' work is associated with monetized labor, are a barrier to education in many South Asian countries. Parents show preference for boy's education in order to have a comparative advantage for labor (Khan, 2012; Jayaweera, 2013). This is further reflected in low female labor force participation where women make up only 35% of the formal workforce (WB, 2012b).

A lack of mobility exacerbates these issues where social norms require women to stay within the household compound in some areas of South Asia, and where transportation is not available to women. Women and girls in these areas are considered caregivers and are expected to follow codes of honesty and honor. Lack of mobility affects the poorest quintile the most where it is reported that only 57% of women have decision making power to visit relatives, increasing to 71% in the richest quintile (WB, 2012). In addition to mobility issues affecting girl's ability to participate in school most teachers are male, particularly in secondary school, which discourages parents from sending their daughters to school. Countries that have attempted to increase the number of female teachers have had difficulties in doing so due to the social norms that also keep adult women at home (Khan, 2012).

In some South Asian countries, schools are sex-segregated such as in Afghanistan, Pakistan and Bangladesh. In these instances girls are able to attend school but limited resources are twice as likely to be directed towards boys' schools as girls' schools (Jayaweera, 2012). In Afghanistan, where nearly 6% of schools have been burned down due to terrorism, girls' schools are frequently a target of violence. This has led to persistent low participation in education with enrollments virtually nonexistent in some regions (UNICEF, 2009). However, despite Afghanistan's low GPI and continuing issues for girl's education, enrollment nationally has increased dramatically with over 1.9 million girls enrolled in school where under Taliban rule there were virtually none (UNICEF, 2009).

East Asia and the Pacific

Gender parity in primary education has been reached in the majority of East Asia and the Pacific Islands with disparities persisting in the Solomon Islands (0.94), Tonga (0.95) and Vietnam (0.93); and severe disparities persisting in Cambodia (0.87), Laos (0.85), and Papua New Guinea (0.86) (UNESCO, 2012).

Similarly to Latin America, trends in secondary education in East Asia and the Pacific show gender disparities at the expense of boys in 57% of countries, eleven of which are low and middle income countries including the Cook Islands (1.20), Fiji (1.09), Malaysia (1.11), Micronesia (1.07), Myanmar (1.06), Nauru (1.20), the Philippines (1.08), Samoa (1.14), Thailand (1.08), and Vietnam (1.09). Gender disparities at the expense of girls are found in Cambodia (0.90) and China (0.93); and severe gender disparities in secondary education are found in Laos (0.83) (UNESCO, 2012).

There are few countries in East Asia and the Pacific that report enrollment in TVET programs as a share of secondary enrollments. Of those reporting, Macao, Fiji, Malaysia, and Timor-Leste report low TVET enrollments at less than 6%. Higher enrollments are reported in China at 21% increasing to 46% at the upper secondary level, Indonesia reporting at 17% and dropping to 1% at the upper secondary level,

Table 10. Enrollment in Technical and Vocational Programs in East Asia and the Pacific (Middle and Low Income Countries)

Country	Enrollment in technical and vocational programs as a % of total enrollment in secondary education			
	Secondary		Upper Secondary	
	MF	%F	MF	%F
China	21	45	46	45
China, Macao	3	44	7	44
Fiji	2	31	7	31
Indonesia	17	42	1	42
Malaysia	6	43	15	43
Thailand	15	43	36	43
Timor-Leste	6	44	14	44
Vanuatu	10	39	28	37

Source: UNESCO, 2012b, Table 6

Thailand at 15% increasing to 36%, and Vanuatu at 10% and increasing to 28%. The female share of TVET participation is low across the region at a percentage between 31% and 45%, with the greatest participation in China (Table 10).

In Indonesia, women represent only 12.9% of agricultural TVET enrollments compared to 94% of tourism, 64.9% of business, and 52.9% of craft and artisanal enrollments (Gillen. 2013). This is similar in the Pacific Commonwealth Islands where female TVET participation is overwhelmingly based in care, secretarial, and home economics fields (Neal, 2011). The choice by most women to pursue "female" fields is reinforced by a perception that some technical fields, such as agriculture, fall within the male domain; that women are not suitable for technical jobs that require physical exertion; lack of awareness of

training opportunities; lack of encouragement by the family and culture to enroll in vocational programs outside of "female domains; and that women are "soft" and should stay within fields suitable for domestic and care-giving roles. "Gender ideologies in many [East Asian and Pacific] countries limit the knowledge of the diversity in career options among girls" (Gillen 2013).

Good Practices

Gendered roadblocks to education and constraints for women in accessing to agricultural inputs, training, and assets have been identified by many developing countries as major issues affecting food security and development – particularly for women (WB, 2009). In some countries, efforts have been made to remove or improve the roadblocks that prevent students from pursuing and participating in agricultural education. The following section gives examples of some of the practices that have resulted in positive improvements in removing or improving gendered biases in education.

Primary and Secondary Interventions

Issues that prevent participation in primary and secondary education occur on both the demand and supply side of education. These barriers, as well as the interventions, can vary by world region, by country, and within country borders depending on the context. However, there are several interventions that have been shown to be successful in addressing some of these issues across countries. A list of potential interventions is given in Table 11 and discussed below.

Table 11. Barriers to Education and Interventions in Primary and Secondary School

BARRIERS TO EDUCATION	INTERVENTIONS
Factors relating to the supply of education	
Institutional and political factors	
• Policies that exclude girls and women • Political instability, social tensions, wars • Absence of clear policies and strategies for the education of girls and women • Under-representation of women in decision making • Weak legislation on the official age for first marriage, sexual abuse and discrimination against girls • Weak legislation on school entry age • Emphasis on enrollment over completion and performance	• Implement and enforcement of laws and policies including: school entry age, marriage age, sexual abuse and discrimination • Increase women participating in government through quotas or other incentives • Create and enforce national gender strategies for education focusing on participation and quality of education • Create information campaigns focused on changing attitudes towards the benefit of education for both girls and boys
Infrastructure-related factors	
• Inadequacy of school infrastructure such as absence of basic sanitation facilities • Distance to school facilities • Lack of secondary facilities and inability to progress • Inexistent or inadequate dormitory facilities	• Decrease distance to schools: increase availability of girls-only schools where culturally appropriate, provide locally based "day" schools for both primary and secondary school • Reduce or eliminate the cost of boarding at secondary schools where local schools are unavailable • Provide safe lodging at secondary schools where local schools are unavailable • Provide alternative access to education through night and distance classes • Improve sanitation facilities, particularly for girls

School-related factors	
• Lack of safety including sexual harassment, gender-based violence, and sexual violence • Gender of instructor and lack of women teachers • Gender bias and stereotypes in school materials and curricula • Discriminatory attitudes of teachers • Exclusion of pregnant girls from school • Lack of school nutrition programs • Lack of girls' schools • Lack of relevance of school curriculum • Student-to-teacher ratio	• Create and enforce national gender strategies for education focusing on participation and quality of education • Implement and enforcement of laws and policies including: school entry age, marriage age, sexual abuse and discrimination • Provide oversight and safe reporting mechanisms for students to report school violence • Create information campaigns focused on changing attitudes towards the benefit of education for both girls and boys • Eliminate the direct cost of schooling such as school and uniform fees • Eliminate indirect cost of schooling through programs such a conditional cash transfers, food rationing, free school lunch, and school vouchers • Provide alternative access to education through night and distance classes • Provide incentives and support for pregnant students and mothers to return to school including: conditional cash transfers, food rationing, and free or reduced-cost health care programs • Redesign curriculum to meet the needs of the labor market to increase marketability of graduates • Redesign school curriculum to eliminate gender bias • Train teachers in gender sensitive teaching practices and methodologies • Improve student-to-teacher ratios and provide parity in teacher gender • Provide role model programs aimed at keeping at-risk students in school
Factors relating to the demand for education	
Socio-cultural factors	
• Low social status of women and traditional image of the role of women in society • Negative perception of the education of girls and women • Girl's education seen as incompatible with religious or traditional principles • Early marriage and pregnancy • Over-importance given to dowry • Low educational level of parents • Difficulty for educated girls to get married	• Implement and enforcement of laws and policies including: school entry age, marriage age, sexual abuse and discrimination • Create and enforce national gender strategies for education focusing on participation and quality of education • Create information campaigns focused on changing attitudes towards the benefit of education for both girls and boys
Socio-economic factors	
• Poverty of parents • High direct and indirect costs of schooling • High demand for female labor for household and agricultural work • Difficulty in finding work after completing schooling	• Eliminate the direct cost of schooling such as school and uniform fees • Eliminate indirect cost of schooling through programs such a conditional cash transfers, food rationing, free school lunch, and school vouchers • Redesign curriculum to meet the needs of the labor market to increase marketability of graduates
Other factors	
• HIV/AIDS epidemic	• Provide alternative school access such as night or distance classes • Provide incentives and support for students who are caring for sick family to attend school through conditional cash transfers, food rationing, and free or reduced-cost health care programs

Sociocultural and Political factors

Sociocultural and political factors are the most difficult to change and include issues such as early marriage and non-enforcement of marriage age laws, lack of enforcement of school entry ages, negative perceptions of girls education, absence of policies focused on girls' education, under-representation of

women in decision making roles, and policies that exclude girls and policies. Interventions in these areas focus on changing social perceptions through strategies such as information campaigns to sensitize parents to the benefits of girls' education; increased focus on women's participation in political processes; enforcing laws on school entry age, marriage age, and sexual abuse and discrimination; and creating and enforcing national gender strategies for education.

Infrastructure

School infrastructure issues are a common barrier to education. Evidence shows that decreasing distance to schools, creating "day" schools rather than schools that require boarding, providing girls with private and clean sanitation facilities, constructing schools for girls in regions where girls and boys are culturally separated in schools, and providing students with night and distance classes improve access to education (UNMP, 2005; WB, 2008, UNESCO, 2012).

Reducing distance to schools and safe passage in traveling to school is essential to improving school participation. "Research in such diverse places as Ghana, India, Malaysia, Peru, and the Philippines indicates that distance matters for all children, especially for girls" (UNMP, 2005). Local schools have been shown to increase enrollments in Egypt, Indonesia, and in several African countries. In Egypt, girls enrollment increased 23% and boys enrollment 18% after a campaign to construct local rural primary schools (UNMP, 2005). The construction of girls-only schools has been successful in improving access to education for girls in regions where it is culturally inappropriate for girls and boys to comingle in school, such as in Pakistan, although attention must be paid to gender bias in curriculum in these schools (UNESCO, 2012).

Improving sanitation facilities has been effective in reducing dropouts among adolescent girls, where the presence of toilet facilities allows girls the privacy to manage their menstrual cycles in private (WB, 2008). "Lack of latrines, especially separate latrines for girls, was identified as the worst school experience for girls…. Privacy issues relating to sanitation are a major factor forcing girls out of school" (UNMP, 2005). A UNICEF study conducted in Bangladesh from 1994-1998 showed that the presence of water and sanitation facilities increased girls' attendance by 15% (WB, 2005).

School-related factors

Interventions at the school level include: ensuring that curriculum is relevant, refrains from gender stereotyping and bias, and is gender sensitive; training teachers in updated teaching methodologies, in gender responsiveness, and in gender-sensitive teaching practices; increasing same-sex teachers, and providing role models for students. Ensuring the safety of students at school is a major issue that must be

resolved in most regions. Providing second chances for students to return to school, alternative schooling options, and allowing pregnant girls and mothers to return to school are also effective policies in increasing access to and participation in education.

Reducing stereotyping in curriculum and encouraging students to take an active role in their education is important in keeping both boys and girls interested and participating in school (UNMP, 2005). Gender sensitivity training for teachers, training in gender-sensitive teaching practices and methodologies, and increasing the gender parity of teaching staff are interventions that can improve student participation (WB, 2009; UNESCO, 2012; 2012c).

The use of role models can be an effective method of keeping girls in schools, particularly in areas where male teachers dominate and where female participation in school is culturally considered to be less valuable (FAO, 2009). A project in Cambodia targets girls prior to secondary school age and provides them with role models and volunteer counseling to encourage them to remain in school. The classroom teacher informs the female volunteer counselors when girls are absent from school and the volunteer visits the home to help the family identify ways to overcome gendered barriers to school participation. "The home counseling initiative is meeting with considerable success. Evaluation studies indicate that many girls return to school after having experienced home counseling with their parents" (FAO 2009). Similarly, the need to provide role models in areas such as Latin America and the Caribbean, where female teachers dominate and frequently are reported to be biased against boys, has been identified as an important intervention to ensure that boys remain in school in these regions (UNSECO, 2012c).

Battling violence towards women must occur on several fronts including instituting and enforcing policies at the national to the school level that protect girls and women from violence and impose justice on the perpetrators of violence. At the school level safe reporting mechanisms must be instituted in which girls can report violence, informal support networks should be established for girls to discuss issues in a safe environment, teachers must participate in gender and sexual misconduct training, and negative cultural perceptions of women must be addressed through information awareness raising campaigns (UNESCO, 2004; Mangheni, 2010). Although violence directed at girls is a major issue worldwide, violence towards boys has also been identified as an issue in schools in regions such as Latin America and the Caribbean and parts of East Asia where education is dominated by female teachers and students. Attention must be paid at every level of schooling from primary through vocational programs to ensure that both girls and boys can learn in a safe space.

Worldwide, girls drop out of school due to pregnancy and in many cases are unable to return due to economic issues, difficulty in attending traditional classes, and in many cases due to social biases and constraints. In Zambia, efforts to conduct trainings to change the attitudes of local students and teachers against girls' re-entry into school after pregnancy decreased opposition from parents from 53% to 25%. Similarly, prior to the training 69% of teachers were against school re-entry and afterwards 84% were supportive. In addition to emotional support, financial, policy, and academic support must be offered to pregnant girls and mothers to ensure their return to school (USAID, 2012).

Socioeconomic Factors

Elimination of school fees and addressing the indirect cost of schooling improves access to education for both girls and boys. "Reductions in schooling fees erode the need for families to differentiate educational investments across children. The free primary education programs launched across Sub-Saharan Africa, for instance, increased student enrollments 68 percent in the first year in Malawi and Uganda and 22 percent in Kenya (WB, 2012)." Reducing indirect costs to education through conditional cash transfer programs or voucher programs, has been shown to be effective in increasing participation in schools by reducing the need to keep children home for labor activities and reducing the effect of financial shocks on student dropouts. This has been particularly effective in the PROGRESA/OPPORTUNIDADES program in Mexico, and in programs in Colombia, Ecuador, and Nicaragua (WB, 2012), and is showing some small positive benefits in Kenya (UNESCO, 2012).

School lunch programs and take-home food ration programs have been shown to be particularly effective in increasing school attendance and performance, worldwide. Food programs can improve girl's attendance in school by reducing the need for girls to stay home for unpaid or paid labor purposes, reduces the indirect cost of education, and in some cases may overcome sociocultural traditions, such as beliefs that girl's education is less valuable by providing a tangible benefit in sending girls to school. Take home rations have been particularly successful in Niger where basic food rations such as rice and vegetable oil were distributed to households who sent girls to school. The more girls that a family sent to school the larger the amount of food rations which were dispersed during times when agricultural production were low. In some areas of Niger, girl's attendance in school increased by 75% after implementation of the food ration program (FAO, 2005).

Agricultural Vocational Education Interventions

The gendered issues affecting access to vocational education mirror those affecting participation in primary and secondary education, particularly in regards to female participation. For example, a survey of Ethiopian agricultural TVET programs finds that: "Low female enrolment and higher than average

attrition at [agricultural] TVET colleges is attributed to weak academic background, adverse social conditions, physical violence, a curriculum that does not adequately address gender issues and an extremely low number of female instructors to provide support and serve as role models" (Vandenbosch, 2006) – all of which are issue affecting participation in primary and secondary education as discussed in Table 4. As such, interventions targeted at increasing participation in primary and secondary education (Table 11) will be particularly valuable in addressing may of the issues faced by students in accessing agricultural education – particularly female students who are dramatically underrepresented in this area. In addition to the demand and supply side interventions discussed above, interventions targeted specifically at women's access to agricultural education are necessary to reduce the gendered roadblocks preventing women from participating in agricultural vocational education. The World Bank "Gender in Agriculture Sourcebook" (2009) outlines key issues in agricultural education and the actions needed to address these issues. These issues and interventions are listed in Table 12 and discussed below.

Table 12. Barriers to Education and Interventions in Agricultural Vocational School

BARRIERS TO EDUCATION	INTERVENTIONS
Perception of women's role in agriculture	
• Perception of agriculture as "male" domain • Traditions, customs, and norms hinder participation • "Man-to-Man" practices in extension and training that do not address the needs of women • Institutional limitations to women's participation in agricultural training	• Research and report on the benefit of female participation in agricultural fields, particularly to the political sphere • Implement and enforce legal mandates allowing access to agricultural education institutions • Implement and enforce quotas to provide access to agricultural education for female students • Create information campaigns focused on changing attitudes and raising awareness towards the benefit of science and agricultural education for both male and female students • Provide programs aimed at encouraging girls to participate and excel in science, math, and agricultural courses • Provide localized agricultural education programs and/or distance education programs for women and girls located in remote areas or where mobility is limited
Opportunities for agricultural education	
• Lack of access to and quality of primary and secondary education, particularly in regards to literacy skills • Lack of prerequisites for agricultural programs including science courses • Lack of awareness of agricultural programs as a career path	• See Table 11 • Provide programs aimed at encouraging female students to participate and excel in science, math, and agricultural courses • Create information campaigns focused on changing attitudes and raising awareness towards the benefit of science and agricultural education for both male and female students
Cost and infrastructure	
• Lack of infrastructure targeted at female students including boarding and sanitation facilities • Cost of education	• Decrease distance to schools • Reduce or eliminate the cost of boarding at secondary schools where local schools are unavailable • Provide safe lodging at secondary schools where local schools are unavailable • Provide alternative access to education through night and distance classes • Improve sanitation facilities, particularly for girls • Eliminate the direct cost of schooling such as school and uniform fees • Eliminate indirect cost of schooling through programs such a conditional cash transfers, food rationing, free school lunch, and school vouchers • Provide scholarships, financial aid, and grants for female students pursuing agriculture at vocational institutions

Learning environment	
• Lack of safety including sexual harassment, gender-based violence, and sexual violence • Gender of instructor and lack of women teachers • Discriminatory attitudes of teachers	• Create and enforce national gender strategies for education focusing on participation and quality of education • Implement and enforcement of laws and policies including: marriage age, sexual abuse and discrimination • Provide oversight and safe reporting mechanisms for students to report school violence • Redesign school curriculum to eliminate gender bias • Train teachers in gender sensitive teaching practices and methodologies • Improve student-to-teacher ratios and provide parity in teacher gender • Provide role model programs aimed encouraging female students to enroll in and finish agricultural education programs
Curriculum	
• Gender bias and stereotypes in school materials and curricula • Lack of relevance of curriculum in particular regards women's roles and contributions to agriculture • Poor teaching methodologies including lack of practical experiences, appropriate technologies, and approaches that are relevant to the needs of women	• Redesign school curriculum to eliminate gender bias • Train teachers in gender sensitive teaching practices and methodologies • Improve student-to-teacher ratios and provide parity in teacher gender • Provide role model programs aimed encouraging female students to enroll in and finish agricultural education programs

Sources: *UNESCO, 2005, Box 2; WB, 2008, Table 2.1; WB, 2009, Module 7*

The first issue outlined is recognizing women's roles in agriculture, and removing obstacles to fulfilling them. This includes changing the perception of agriculture as a male-dominated field by quantitatively and qualitatively valuing women's contribution in agriculture, providing support for women in remote locations including through extension workers and transport systems, and the establishment and enforcement of legal mandates for equal schooling in primary and secondary levels and for vocational training (WB, 2009).

The second and third issues suggested in the "Gender and Agricultural Sourcebook" involve providing opportunities for agricultural education. This includes strengthening girls' access to education and women's access to literacy programs, the creation of culturally appropriate agricultural classes targeted to women that would allow them to fulfill science requirements for education, and providing role models and counseling to promote agriculture as a viable career for both men and women. In accessing educational opportunities female students should have appropriate facilities including sanitation and child care facilities. Campaigns in secondary schools to promote agriculture as a career for women, a focus on increasing girl's enrollment in science classes in secondary schools, providing scholarships, and encouraging parents to visit school facilities are all methods that could improve the perception of agricultural education as a viable field for women (WB, 2009),

The fourth issue concerns the learning environment and the need for faculty and staff to provide a non-discriminatory environment for students. This may involve actions such as providing gender training for staff, enforcing policies aimed at eliminating sexual harassment and gender-based violence, and supporting policies that address HIV and AIDS issues. The fifth issue is to revise the curriculum for

agricultural education institutions to ensure the curriculum is relevant to the needs of women and their roles in agriculture. This may also be done by including gender issues in agriculture courses, including gender training for educators and students, (WB, 2009).

Challenges for which InnovATE may offer assistance

The gender roadmap from primary school through secondary school and vocational training in developing countries has many gender-related potholes, ditches, and roadblocks to agricultural education. The InnovATE program aims to address these problems through a "learn, design, train" approach to capacity development. The following section details ways in which the InnovATE program through USAID funding and support may work with governments and institutions to address the gendered gaps to agricultural education.

Learn

The "learn" component of the InnovATE program aims to "provide educators and practitioners with good practices and tools that promote agricultural training and education systems development." (InnovATE, 2013). InnovATE can work with governments, institutions, and stakeholders to:

- Conduct gender analyses to determine the role of women in agriculture and their educational needs.
- Determine the demand for and supply of agricultural education, particularly in regards to girls' participation in secondary and TVET education.
- Identify gendered barriers to education from primary education through secondary and vocational education.
- Conduct gender analyses to determine the effectiveness of school curriculum in meeting the gendered needs of all students, particularly in regards to agricultural education.

Design

The "design" component of the InnovATE program "undertakes country scoping assessments that lead to program design recommendations to improve the effectiveness of agricultural training and education." InnovATE can work with governments, institutions, and stakeholders to:

- Develop recommendations and plans for eliminating gendered barriers to education.
- Design culturally appropriate gender training for teachers from primary through secondary and vocational education to improve teaching practices and gendered biases in the classroom.
- Develop recommendations for adapting curriculum to meet the demands for agricultural education and ensure curriculum meets the gendered needs of students.

Train

The "train" component of the InnovATE program "will develop materials for training programs that promote new strategies and approaches to agricultural education and training" (InnovATE, 2013). InnovATE can work with governments, institutions, and stakeholders to:

- Develop and promote culturally appropriate gender training for teachers from primary through secondary and vocational education to improve teaching practices and gendered biases in the classroom.

- Develop awareness raising campaigns to promote agricultural education as a viable career for both women and men and to value the role of women in agriculture.

Conclusion

There are many gendered roadblocks preventing both male and female students from accessing education from primary school through secondary and vocational school. Removing the barriers to access in primary and secondary school must be addressed if qualified students are to participate and excel in agricultural education at vocational and higher education institutions. In agricultural vocational programs, women particularly face gendered roadblocks due to the perception of agriculture as a field for men even though much of the agricultural labor in the world is done by women and the associated social norms and constraints that prevent women from pursuing education in science and agriculture. In addition to focusing on the gendered supply and demand barriers that affect participation in primary and secondary education, steps must be taken encourage women and girls to pursue science and agriculture courses and educational programs.

Although this paper has primarily focused in the gendered roadblocks to education, further attention must be paid to quality of education. This will include issues such as availability of qualified teachers, teaching methods, appropriate skills transfer, and the relevance of the curriculum to the labor market. Additionally, barriers continue to exist in the ability of women to participate in the formal labor market, particularly in male-dominated fields such as science and agriculture (World Bank, 2012). Attention must be paid not only to participation in and quality of education, but also in the ability of women to enter the labor force to utilize these skills.

> *"In the last decades AET institutions have suffered from neglect as resources have declined and less attention has been paid in general to educational institutions, their functioning, human capital development, and facility management. Women have been increasingly underrepresented at all levels of AET institutions, from postsecondary to tertiary and higher education... International concern over the environment, natural resource management, health care (HIV and*

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AIDS as well as chronic ailments such as malaria and malnutrition), and women's empowerment have brought special impetus to intersecting discussions of agriculture, rural development, poverty reduction, and livelihood strategies in rural and urban spaces. Many of these discussions have cast new light on gender issues in agriculture, given women's central role in household food security, health, and nutrition. Clearly, AET institutions must address gender issues on many different levels if they are to develop human resources to address new realities in agriculture and development."

– Gender in Agriculture Sourcebook, World Bank, 2009

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