Annex 1

Period	EPG Population: 3 076 Municipio: San Felipe del Progreso, State of Mexico	Boye Population: 1 742 Municipio: Cadereyta State: Querétaro	BH Population: 735 Municipio: Tlaltizapan State: Morelos
Agrarian reform and land distribution	*Ejido* founded 1936 Food staples: (maize), wheat Livestock Non-farm male migration to regional and urban construction works	*Ejido* founded in 1920s Food staples: (maize), barley Livestock Recollection and production of *pulque* (an alcoholic beverage made from the sap of an agave cactus) Non-farm male: mule transport, workers in regional public infrastructure works Female: domestic employment in Cadereyta	*Ejido* founded in 1937 Food staples: (maize), cotton, raising draught animals Non-farm male: recollection of fuelwood Wage workers in nearby farms in horticulture
Development with state intervention, 1970-1990	Maize sold to government agency Subsistence Non-farm male: petty commerce in regional cities Female: domestic employment in Mexico City Rural teachers Public programmes: bilingual education; financing and support prices for maize; pig-raising programme	Food staples for subsistence Non-farm male: work in regional infrastructure works. Migration to USA Female: workers in *maquila* factory in Cadereyta Public programmes: improved seed for agriculture; electrification of rural regions.	Maize for subsistence. Sorghum for market; Livestock Non-farm male: agricultural wage workers in region: horticulture and sugar cane Migration to USA Female: domestic employment in nearby towns Public programmes: financing sorghum, livestock
Neoliberal policies 1990-present	Fragmentation of land for inheritance Maize for subsistence Non-farm male: construction and petty commerce in central and north Mexico Female: rural teachers; self-employment in commerce and services Public programmes: *Oportunidades*, *Procampo*	Maize and horticulture for subsistence Livestock Non-farm male: migration to USA Female (young): employment in commerce nearby town Public programmes: *Oportunidades*, *Procampo*, Genetic improvement of livestock	Incipient land transactions for residential purposes Decrease of maize for subsistence Sorghum and livestock Non-farm male: construction, migration to USA Female: local *maquila*, domestic employment in regional vacation homes, start to migrate to USA

Annex 2. Methodology

The data collected in each community is based on quantitative and qualitative research:

- Household surveys were carried out in the three communities during the spring of 2003 with the purpose of capturing the socio-economic characteristics of the household, agricultural activities, non-agricultural activities and participation in local institutions. A total of 20 percent of households were randomly surveyed in each community (a total of 254 households).

- In-depth interviews were conducted with women of two cohorts in order to capture the experience of women (60 years old and above) who in their adult lives had experienced the 'before' and development era with the presence of the State in *ejido* agriculture (1970s- 1980s) and women (from 35-45 years old) who as adults had experienced the change from state-supported 'development' to neoliberal policies. The interviews enabled the livelihood strategies of their households and the individual trajectories of the women to be reconstructed.

- Focus groups were held in each community in order to discuss issues related to the role of women as income earners, responsibilities as spouses of migrants and participation in the community organizations, and how the women perceived changes in gender relations. Women around 35-45 years of age and young married women from 25 to 35 participated in the focus groups. Hence, the focus groups included young women who had entered adult life under neoliberalism.

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Gender wage gaps in rural versus urban areas

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Introduction

In this paper, we provide estimates of the gender wage gap and its determinants for 14 developing and transition economies from around the globe, which collectively represent roughly 11 percent of the world's population. We use one version of the well-known Oaxaca-Blinder decomposition technique (Oaxaca, 1973; Blinder, 1973) to allocate the observed difference in average wages between men and women into an "explained" component (which captures gender differences in human capital and job characteristics) and an "unexplained" component (which captures gender differences in the rate of reward to these characteristics, including the characteristic of gender itself, and which is often loosely identified with wage discrimination). We begin with the question of whether the unexplained male wage premium is systematically higher or lower in rural areas, a question which to our knowledge has not previously been addressed in a multi-country study. We also look at the relation between the gender wage gap and national per capita income, the dispersion of wages around their conditional means, and the degree of occupational segregation by gender.

Our findings and their policy implications may be summarized as follows. First, despite there being various *a priori* arguments, reviewed below, as to why rural and urban gender gaps might differ, we find only a few examples of differences of this kind. The raw (unadjusted, observed) male wage premium was significantly higher in urban than rural areas in three of our 14 countries, and lower in one. After netting out the explained component, there was a statistically significant difference between urban and rural gender wage differentials in just one country. In short, rural wages do not appear to display any greater pro-male bias than do urban wages, which may be encouraging for advocates of increased women's wage-labour employment in rural areas, although these unexplained gaps are still non-trivial, averaging about 25 percent in our sample.

Second, we find a negative relation between both the explained and unexplained portions of the male wage premium and the national level of development (gross domestic product (GDP) per capita, at international purchasing power parity prices). This suggests that economic growth tends to bring convergence between male and female wages. Third, we find some support for the argument that the unexplained component of the male

wage premium depends positively on the level of occupational segregation, a connection emphasized by sociologists (Reskin and Bielby, 2005). In other words, countries and areas in which men and women are found in very different occupations are those for which unexplained wage gaps are largest. Lastly, we find evidence of a relationship between the unexplained gender wage gap and the overall level of unexplained wage inequality. This suggests that where labour market institutions work to reduce overall wage inequality, for example, via minimum wages or the effects of unionization, the unexplained gap between male and female wages is also reduced.

In considering these conclusions, we must be clear about what the various components of the wage gap do and do not measure. The raw (or observed, unadjusted) male wage premium does not measure wage discrimination *per se*, but rather quantifies the wage deficit that women face, given their current patterns of employment and wages, and their current opportunities to acquire formal education and labour market skills. The gap is the result of many social and economic factors; outright wage discrimination aside, we might expect the raw wage gap to be larger in rural areas, if these are characterized by greater educational gaps between men and women, or if rural women workers have less labour market experience in relation to men than have their urban counterparts. On the other hand, higher-paid jobs in manufacturing, in the public sector, and in unionized industries are more often found in urban areas; if these are disproportionately male, then we might expect to see larger gender wage gaps in the cities than in the country side. We can test these contrary hypotheses by first examining the raw wage gap in rural and urban areas; then estimating the gap that remains after adjusting for education and labour market skills; and finally by adding controls for occupation, industry and public-sector employment. Both the degree to which the unexplained component of the gap is reduced, and the factors that explain that reduction, can tell us whether skills deficits or industrial/occupational segregation are the more relevant factors explaining women's lower earnings.

The policy conclusions of these two conclusions are clearly different: if educational deficits loom large, then better access to education for women and girls is of course the remedy, whereas if the segregation of even educated women into low-paying occupations and industries is largely to blame, then changes in social norms, and/or the enforcement of non-discrimination in hiring are required, so that women can gain a foothold in the traditionally male sectors. Another option is to pursue comparable-worth policies that dictate equal pay for men and women, not for identical jobs, but rather for jobs with similar skill demands (England, 1992, Gundersib, 1994).

The remaining unexplained wage gap, after controlling for human capital as well as occupation, industry, regional differences and other factors, is often used as a measure of pure wage discrimination, and indeed the goal of most of the literature in this field is to test for discrimination of this kind: do men and women with identical skills doing identical work, in the same setting, receive different wages? To study this question properly one needs finely detailed data, which are rarely available in developing countries, so that one can be sure that the men and women are in fact doing the exact same job, and in the same establishment.[38] One study of four US cities finds no significant evidence of such "side by side" wage discrimination (Hertz, Tilly, and Massagli, 2001), while another, using a far larger dataset, finds that roughly half of the male wage premium persists even

38 Note that this approach does not address the question of whether men and women are doing different jobs of comparable worth.

when comparing men and women in the same finely detailed occupational categories, and working in the same establishments (Bayard, *et al.*, 2003). This is suggestive of pure sex discrimination in wage-setting, yet to reach this evidentiary standard is beyond of the power of our data.

We may note, however, that such legal sanctions against sex discrimination as exist in developing countries are more likely to be enforced in urban than rural areas. Rural areas might also differ from cities in the extent to which women are confined by custom to low-paying occupations and industries, and in the amount of *overall* wage inequality that is observed. The latter factor is important for the following reason, laid out by Blau and Kahn (2003). If wage-setting norms and institutions (such as unions or public-sector pay scales) compress the overall income distribution, even if by mechanisms that are not sex-specific, this will tend to reduce the gap in average wages between higher- and lower-paid groups. Given that such institutions are likely to be more prevalent in urban than rural areas, we should expect smaller unexplained male wage premiums in the cities.

1. Data

The countries studied are drawn from the Rural Income Generating Activities (RIGA) family of surveys, which builds primarily on World Bank-sponsored Living Standards Measurement Surveys (LSMS).[39] Some 25 such surveys have been standardized to facilitate comparative cross-country analysis at the household level, and have been used for such purposes as studying the role of access to agricultural assets and institutions in determining farming outcomes (Zezza, *et al.*, 2008b) and estimating the impact on poverty of the recent spike in food prices (Zezza, *et al.*, 2008a). This paper draws on a subset of 14 countries, listed in Table 1 and referred to as the RIGA-L datasets, for which the individual-level labour market data have been rigorously cleaned and coded for comparability, as described by Quiñones, *et al.* (2008). All analyses are conducted at the level of the person: when people report having more than one job, the main job held in the most recent period is chosen.[40] Our sample is limited to those between the ages of 15 and 60 for whom earnings data and all other required covariates are available. Note that our data on paid farm employment do not include agricultural self-employment, despite its importance as a source of rural income. This is because the implicit wages associated with family farming are impossible to calculate at the individual level without more detailed data on time use than is generally available.

For our primary analysis, log wages are measured per day, rather than per hour, because hours of work were not always reliably available. Results for the subset of nine of our 14 countries for which hourly wages were calculable were qualitatively similar. It is also worth mentioning that the distinction between "urban" and "rural" is made according to criteria deemed relevant by the local survey team. We defer to these judgments and make no attempt to standardize the definition of rurality across the 14 surveys.

Table 1 lists the countries in each of four regions, the survey year (which ranges between 1995 and 2005), and per capita GDP, at 2005 international purchasing power parity-

39 Two of the surveys incorporated in this analysis are not from the LSMS collection: these are for Indonesia (undertaken by the Rand Corporation) and Bangladesh (undertaken by the Bangladesh Bureau of Statistics).

40 This results in dropping an average of 6 percent of all reported jobs (high 14.3 percent in Ecuador and low 0 percent in Tajikistan). These are secondary and tertiary jobs, which are generally of shorter duration and hence of less importance in terms of income.

adjusted dollar prices (World Bank, 2009). Following this are the numbers of employed women and men in rural and urban areas: sample sizes for these subgroups range from a low of 111 (rural women in Albania) to a maximum of 5 470 (rural men in Malawi).

2. Estimating the gender wage gap

The raw, or unadjusted, male wage premium is simply the difference in observed mean log wages[41] between men and women, calculated separately for rural and urban areas. This is estimated using survey sampling weights, if such exist, so as to recreate representative population means. Standard errors here and elsewhere are calculated to be (asymptotically) robust to heteroskedasticity, and to clustering at the household level, to account for the likely positive correlation in unobserved factors between men and women in the same family.

These wage gaps can then be modelled in a variety of ways. We implement one of many possible versions of the Oaxaca-Blinder equation (Oaxaca, 1973; Blinder, 1973), decomposing the difference in mean log wages for men ($\overline{W}_m$) and women ($\overline{W}_f$) as follows, with separate equations for rural and urban areas:

[1] $$\overline{W}_m - \overline{W}_f \equiv \overline{Z}_m\beta_m - \overline{Z}_f\beta_f \equiv (\overline{Z}_m - \overline{Z}_f)\beta^* + \overline{Z}_m(\beta_m - \beta^*) - \overline{Z}_f(\beta_f - \beta^*)\,.$$

Here $\beta_{m,f}$ are the estimated coefficients from linear regressions of log wages against a set of predictors ($Z_{m,f}$, described below) for men and women separately, while β^* is an estimate of the unobserved parameter vector that would obtain in the absence of wage discrimination. Thus the first term on the right, $(\overline{Z}_m - \overline{Z}_f)\beta^*$, measures that share of the male-female gap in mean log wages that is due to differences in their mean productive attributes (Z), evaluated at non-discriminatory "prices" or rates of return to each attribute. This is commonly called the "explained," or non-discriminatory, portion of the wage gap, although it will of course contain the effects of any pre-labour-market forms of discrimination, such as barriers to girls' education. If Z includes occupational variables, this term will also capture the effects of occupational segregation that limits women to low-paid types of work.

The second two terms reflect the unexplained portion of the wage gap, which is due to differences in the coefficients that apply to male versus female attributes (including the difference in the male and female intercepts). Each of these is expressed as a deviation from the hypothetical non-discriminatory wage structure, so that in principle one can determine both the extent to which men are overpaid, and the amount by which women are underpaid.

There are at least five main problems with this approach, all well-recognized in the literature.[42] First is the fact that the equation ignores pre-labour-market forms of discrimination, such as in access to schooling. As a result, these wage gap estimates

41 Differences in log wages can be interpreted as percentage differences. They have the advantage of symmetry: we can state that the gap between men and women is 20 percent (0.20 in logs) without specifying whether this is the percentage by which men's wages exceed women's, or the percentage by which women's fall short of men's. For large differences, however, this symmetry can be misleading: a gap of 0.50 in logs implies that men earn 65 percent (not 50 percent) more than women, or, equivalently, that women earn 39 percent less than men. Another subtlety is that the "mean log wage" is not the log of the arithmetic mean wage, but rather the log of the geometric mean wage.

42 Other problems, which have been addressed in the literature (Ñopo, 2008) but which we do not address here, include the fact that this decomposition looks only at means, whereas gender differences may vary across the wage distribution, and that the linear model makes out-of-support estimates of counterfactual wages (i.e. predicts wages for people with combinations of attributes that are not actually found in the data.)

should not be viewed as measuring the full array of economic disadvantages that women face. Second is the problem of occupational segregation: if one omits occupational controls one likely exaggerates the degree of wage discrimination *per se*, whereas if one includes them, one may overstate wage discrimination by conflating it with occupational segregation, or discrimination in hiring. This latter problem cannot be solved in any simple way, but the *comparison* of the two specifications is informative. As described below, we will present results from a "basic" specification and compare them with results from an "extended" model that adds occupation, industry and public-sector controls.

Third is a problem of measurement: there are many dimensions of human capital along which men and women may differ, but which are not fully captured in standard surveys. Chief among these is labour market experience: it is well known that the loss of both job tenure and total work experience for parents, usually women, who exit, or defer entry into, the paid labour market in order to raise their children explains a portion of their lower earnings. Underestimates of the male-female work experience gap will lead to overestimates of the male-female unexplained wage gap. Without a complete work history, which few surveys collect, work experience cannot be measured accurately; a proxy is to use information on the lifetime fertility of women (assuming this is exogenous to their potential wages, which is a strong assumption), but such information is also usually not available. Instead, we rely on a count of the number of people resident in the household who are of a younger generation than the woman in question. Our assumption is that each of these sons, daughters or grandchildren may at some time have been a reason for the woman to be out of the labour market. This enters all of our female wage equations as a measure of lost experience; for men the variable is not used, on the assumption that they lost no work experience due to child rearing.

Fourth, is the problem of estimating β^*, the hypothetical non-discriminatory wage structure, which is used to quantify the effects of differences in productive attributes, Z. Oaxaca (1973) noted that one could use either the male wage structure or the female as the reference (corresponding to $\beta^* = \beta_m$ or $\beta^* = \beta_f$) and that the resulting (often very different) estimates should bound the true result. Cotton (1988) argued that one should use a weighted average of the two sets of coefficients, with the weights being proportional to the group shares in the labour force. The argument is that discrimination involves the simultaneous overpayment of the favoured group and the underpayment of the less-favoured group, and that the scope for this over/under payment is dictated by relative shares in employment. If employment is 90 percent male, then the hypothetical non-discriminatory coefficients would be fairly close to the male results, but possibly quite far from the female numbers.

Neumark (1988) developed a widely used alternative that generally yields much lower estimates of the unexplained ("discriminatory") component, estimates which may even lie outside of Oaxaca's two extremes. He posits that employers maximize a utility function which depends not only on profits, and hence on the marginal productivity of labour in each occupation, but also on the ratio of the number of men and women in each type of job. He then demonstrates that under these assumptions the non-discriminatory wage vector, β^*, can be estimated by a linear regression that pools men and women. The problem with this approach is that the model of wage determination – a single homogenous employer who cares only about sex ratios in each occupation – is too simple to serve as a strong theoretical basis for the derivation of the non-discriminatory alternative. Moreover, it often yields counter-intuitive results; namely, that the estimated non-discriminatory rate

of return to a given attribute (say, education) may be higher than the observed rate of return for either men or women. Jann (2008) points out that if discrimination takes the simple form of a difference in the intercepts of the wage equations for men and women, then the pooled equation will yield upwardly biased estimates of the returns to any productive attribute (such as education) which is positively associated with wages, and in which men have the advantage.[43]

Jann then suggests that Neumark's pooled equation be augmented by including a gender indicator variable. As it happens, the coefficient on this variable is mechanically equal to the unexplained component that arises from adopting this approach for estimating β^*. In other words, this version of the Oaxaca decomposition yields the same estimate of the "total unexplained gender effect" as a simple pooled linear regression with a gender dummy variable; however, it retains the advantage of making explicit the share of the wage gap that can be explained by each attribute. This is the approach we use, using the algorithms developed by Jann (2008), and we note that it tends to produce results that are quite similar to the results of Cotton's method, but often significantly different from those of the two more common alternatives (using the male coefficients, or using Neumark's pooled regression results, as the reference wage structure).

In our basic specification (Model 1, in Table III- 2), we include controls for age (entered as a quadratic), years of formal education, marital status, minority ethnic or religious group membership, full versus part-time status, geographic region (usually consisting of a dozen or more district indicators, depending on the country), whether the job in question was a current job or a job held at some point in the past, and our proxy for women's lost labour market experience, discussed above. Our extended Model 2 adds a set of control variables for broad occupation (divided into ten categories), industry (seven categories), and an indicator for public-sector employment.

Sample selection bias is the fifth problem with the Oaxaca decomposition technique. The issue here is that wage discrimination may be better measured not by differences in observed wages, but by differences in wage *offers*; however, these offers will not be observed if the person in question is not working. This could bias estimates of the wage gap that are based only on observed workers, a point that has been made clearly in the case of black-white wage gaps in the United States (Brown, 1984, Neal, 2004) and is also at the heart of concerns about measurement of women's wages that motivated Gronau (1974), and led to the selection-bias-correction model of Heckman (1979).

Unfortunately, the cure is more challenging than the diagnosis. Deaton (1997) notes several difficulties with the Heckman model, which is the usual prescription, and recommends against its use unless selection mechanisms are clear, and all of the model's econometric assumptions are likely to be met, advice which is routinely ignored in much empirical work on this topic.[44] In an extended version of our analysis, available from the corresponding author, we investigated a number of Heckman specifications, and our results seem only to confirm Deaton's scepticism about the model's practical feasibility, rather than to shed any additional light on the question at hand.

43 Neumark recognized this result, but did not consider it to be a fatal flaw. Our objection is that the assumption that wages are set in a market characterized by a single representative employer, whose preferences depend only on occupational sex ratios, is unrealistic, and that its econometric implications are sufficiently counter-intuitive to warrant scepticism about this approach.

44 See also the discussion in Greene (2003, p. 789).

3. Results

In Table III- 1 we see that, as expected, wage-employment-to-population rates are lower for women than men in nearly all countries, with the exception of Bulgaria. Urban participation rates are, on average, somewhat higher than in rural areas, although not in all countries. Rural levels of education are uniformly lower than in urban areas, but men's and women's education levels are roughly comparable on average: in Latin America women have higher levels of schooling than men, offsetting women's education deficit in most other countries. Male and female shares in agriculture (that is, paid labour in farming), which is a low-wage sector, are also not dissimilar on average.

Table III- 2 presents the raw wage gaps and the Oaxaca decompositions according to our basic Model 1, and our extended Model 2 (i.e. adding occupation, industry and public-sector controls). As expected, male wages are higher than female in both urban and rural areas, in all cases except rural Panama, where women have a significant advantage. (All raw gender wage gaps are significantly different from zero at the 5 percent level or better, except in rural Bulgaria.) However, we see only weak evidence of a pattern in comparing rural and urban wage gaps: the gender gap is larger by a statistically significant margin in urban than rural areas for three countries (Bangladesh, Nepal and Panama, in bold), while the rural gender gap is larger in Tajikistan. On average for the 14 countries, the urban male wage premium is just five percentage points larger than its rural counterpart, and this difference is not significant in statistical terms.

The next columns list the "unexplained" component of the wage gap, according to the basic model. On average this accounted for about 71-72 percent of the total, in both urban and rural areas. In some cases, most notably in Nicaragua and Panama, the unexplained gap was *larger* than the raw male wage premium, indicating that women's attributes predict that they should earn more, not less, than men; this is driven primarily by their higher levels of education, documented in Table III- 1. In three cases (Bulgaria, Nepal and Panama) the unexplained wage gap was significantly larger (favouring men) in urban areas. However, once occupation, industry and public-sector controls are added, only Nepal remains on this list. In Malawi, the male wage advantage was higher in rural areas, but this difference again fades into insignificance in the extended specification of Model 2.

Perhaps the most striking fact of this table is that the addition of the occupation, industry and public-sector controls makes almost no difference to the overall level of the unexplained component, rarely altering it by more than a few percentage points. The reason can be seen in the detailed Oaxaca decomposition results for each country (available from the authors on request). First, the public sector, industry and occupation variables sometimes make *negative* contributions to the explainable male wage premium, implying that at this broad level of aggregation, occupation and industry distributions favour women. Second, where they do make a significant positive contribution, this often comes at the expense of the estimated effect of education or other variables, leaving the total explained component (and hence the total unexplained component) more or less unchanged. This suggests that if industries and occupations are broadly defined as they are here, then industrial/occupational segregation is not driving the male wage premium. As we shall see below, however, at a finer level of disaggregation, we do find some evidence that occupational segregation works against women.

The results in Table III- 2 represent 28 estimates of the unadjusted gender wage gap, and its explained and unexplained components. In Table III- 3, we perform a secondary analysis of these three outcomes, regressing them against an urban dummy variable, as well as national per capita GDP measured at international purchasing power parity dollars (in thousands) at 2005 prices, and a measure of occupational segregation developed by Duncan and Duncan (1955), and given by the following:

[2] $D = \sum_i |(F_i/F) - (M_i/M)|/2$

where i ranges over all non-empty occupation X industry cells, F_i is the number of female workers in that cell, F the total number of employed women, and analogously for M_i/M. To see how the index works, note that if all types of jobs were perfectly segregated, so that each was either 100 percent male or 100 percent female, then for any given i either F_i/F or M_i/M would be zero, and the summation would evaluate to 2 overall, meaning D=1. At the other extreme, if men and women were represented in each job in proportion to their shares in the workforce, the interior of the summation would always be zero, so D=0. In our dataset, D varied between 0.19 (rural Nigeria) and 0.69 (rural Panama), and there was no relation between rurality and occupational segregation. Note that although we have already controlled for occupation and industry in our extended regressions, this measure of occupational segregation is not redundant, since it is defined over the interaction of occupation and industry, which generates a more finely disaggregated list of job types.

In these regressions we also control for the variance of the residuals from the pooled male/female wage equation, i.e. the same wage equation that is used to generate β^*. These residuals measure the dispersion of observed wages that cannot be explained by the pooled model, which includes a gender dummy: hence the residuals are uncorrelated with gender by construction. In all regressions we use weighted least squares to account for the fact that the outcomes are themselves based on regression parameter-estimates, and, as such, come with estimates of their variances which we can use to correct for their heteroskedasticity.

In the first column of Table III- 3 we examine the predictors of the unadjusted male wage premium. No significant rural/urban difference is found (nor is there any significant difference in their simple means without the other covariates). There is, however, a negative relationship between the unadjusted male wage premium and national per capita income (which is also plotted in Figure 1). The coefficients imply that an increase in income of US$1 000 PPP dollars at 2005 prices (roughly the difference between Bulgaria and Panama, or between Nigeria and Indonesia) corresponds to a four percentage-point reduction in the male premium. This is driven by a simultaneous decrease of about three percentage points in the explainable portion of the wage gap (in column [2]) and a one percentage point decrease in the unexplained portion (column [3]). Neither the Duncan segregation index nor the residual variance term appear as significant predictors in the first two columns, but when we model the determinants of the unexplained component, the residual variance term emerges as a positive predictor: more overall wage dispersion, after controlling for all covariates *including gender*, corresponds to a greater unexplainable gap between male and female wages.

In columns [4] through [7], we include the raw (unadjusted) wage gap as a predictor of the unexplained ("discriminatory") component. This allows us to ask whether the size of the unexplained gap *relative* to the overall gap depends on any of our predictors. We see in column [4] that the per capita GDP effect is eliminated. In columns [5]-[7] we drop

the insignificant variables (first urban, then per capita GDP, then both), yielding models with higher adjusted R-squareds, and improved information measures (AIC). In two of these three models, the Duncan index emerges as a positive predictor, providing some support for the argument that occupational segregation does explain a portion of the "discriminatory" component of the wage gap.[45] In all specifications, the residual variance measure retains its significance.

4. Discussion

In a thoughtful review of the gender-wage-decomposition literature, Grimshaw and Rubery (2002, Page 3) make the point that:

While standard decomposition approaches seek to provide a simple overview of the factors shaping the gender pay gap in a particular country, in fact they may obscure more than they reveal because they are unable to incorporate the complexity of institutional and other societal-specific factors in the shaping of the wage structure.

With this caveat in mind, let us see what we can plausibly claim to have learned from this exercise.

First, it is worth pointing out the countries and areas for which the observed (unadjusted) pay gaps are largest. Taking 0.4 as an arbitrary threshold, these would include Bangladesh (rural and urban), Ghana (rural), Indonesia (rural), Nepal (rural and urban) and Tajikistan (rural and urban).

Second, despite the imperfect nature of the unexplained wage gap as a measure of discrimination, it is still worth highlighting those countries for which large wage gaps can not readily be explained away. Urban Bangladesh and Nepal again stand out, but so too do several countries in which the *unexplained* gap is noticeably larger than the raw wage gap, implying that women earn lower wages *despite* having better productive attributes or working in more lucrative industries and occupations. These include rural Nigeria and rural Panama, and, to a lesser extent, Bulgaria and Nicaragua. Results such as these may provide policy ammunition to advocates for women's economic equality in those countries.

Third, as regards the question that motivated our analysis, although we find no systematic rural/urban differences, we do find some significant differences between urban and rural gender wage differentials in some countries. Here, however, the warnings of Grimshaw and Rubery seem on target: interpreting these differences, and their implications for policy, requires a deeper country-specific understanding of the forces at work.

Fourth, the cross-country analysis in Table III-3 has the strength of being based on comparably derived estimates, but the weakness of its small sample size. The finding that occupational segregation does matter for wages is perhaps not surprising, but it is important to observe that it is not a simple matter of, say, women working in agriculture and men working in industry. As in the higher-income countries, occupational segregation occurs at a more disaggregated level, and when it occurs, it widens the gender pay gap. Similarly,

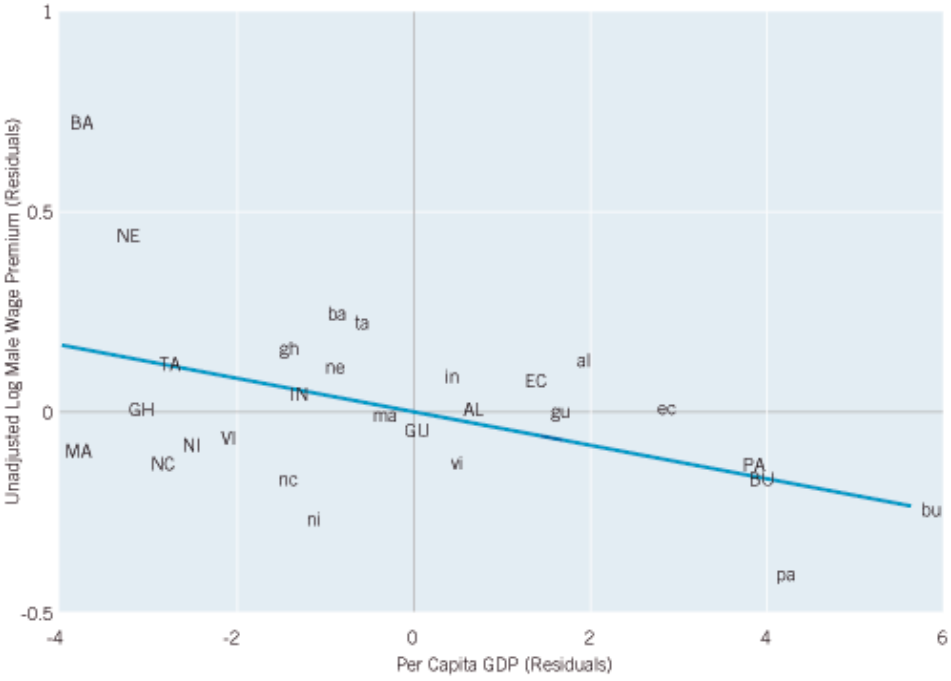
45 We noted, however, that when ordinary least squares were used, rather than weighted least squares, both the size and the statistical significance of the Duncan Dissimilarity Index are reduced.

we are able to extend one of the findings in Blau and Kahn (2003) to the developing world – namely, that wage compression reduces gender wage disparity. This may occur because of institutions such as minimum wages and collective bargaining, which, by raising the lowest wages the most, have the effect of also reducing gender inequality in the workplace.

Finally, the negative relationship between the male wage premium and the level of development echoes a finding in Zweimüller, Winter-Ebmer and Weichselbaumer (2008), whose work is a meta-analysis of 1 440 country-year estimates of the unexplained male wage gap. It is an encouraging finding, but should not be interpreted to imply that male and female wages necessarily, and automatically, converge as economic growth advances.

GRAPH III-2

Unadjusted male log wage premium and per capita GDP



Notes: Based on regression results from Table 3, column 1, plotting residuals after removing effects of other covariates. Uppercase letters are urban estimates, lowercase are rural, and the first two letters of the country are used, except that "nc" is Nicaragua ("ni" is Nigeria).

TABLE III-1

Descriptive Statistics

Region & Country	Year	Per Capita GDP $PPP 2005 prices	Number Employed (Unweighted)			
			Rural		Urban	
			F	M	F	M
Africa						
Ghana	1998	982	229	496	221	558
Malawi	2004	650	3493	5470	390	995
Nigeria	2004	1682	430	1238	368	861
Asia						
Bangladesh	2000	901	433	3429	463	1744
Indonesia	2000	2724	1068	2336	1695	3010
Nepal	2003	926	957	1646	312	749
Vietnam	1998	1448	1332	1921	848	1095
Latin America						
Ecuador	1995	5658	553	1773	1480	2254
Guatemala	2000	3966	850	3080	1596	2566
Nicaragua	2001	2145	413	1351	1138	1750
Panama	2003	8267	642	1997	1745	2313
Eastern Bloc						
Albania	2005	5463	111	559	692	1017
Bulgaria	2001	7348	311	319	1078	965
Tajikistan	2003	1283	1314	1897	473	735
Averages		**3103**	**867**	**1965**	**893**	**1472**

Note: Unless otherwise indicated. all figures are weighted using the survey's expansion weights.
The Bulgarian survey is self-weighting.

	Share of Population Ages 15-60				Years of Schooling				Share in Agriculture			
	Rural		Urban		Rural		Urban		Rural		Urban	
	F	M	F	M	F	M	F	M	F	M	F	M
	0.058	0.143	0.094	0.272	5.2	7.9	8.8	8.8	0.074	0.192	0.027	0.070
	0.313	0.516	0.239	0.514	2.6	3.1	6.3	6.0	0.881	0.741	0.370	0.261
	0.026	0.077	0.077	0.179	5.8	5.3	7.1	6.3	0.275	0.285	0.031	0.037
	0.062	0.483	0.132	0.461	1.9	2.8	3.2	5.5	0.406	0.549	0.022	0.065
	0.166	0.375	0.238	0.455	7.0	8.8	12.2	12.7	0.443	0.358	0.056	0.086
	0.232	0.481	0.173	0.441	1.2	3.5	6.0	8.3	0.909	0.544	0.308	0.099
	0.213	0.346	0.316	0.468	6.1	6.9	9.6	9.8	0.497	0.393	0.024	0.042
	0.181	0.563	0.326	0.595	6.4	5.9	10.8	10.0	0.361	0.577	0.028	0.082
	0.152	0.638	0.374	0.659	3.5	3.5	7.9	7.7	0.338	0.594	0.041	0.118
	0.173	0.518	0.311	0.593	5.2	3.6	9.0	7.3	0.186	0.596	0.026	0.157
	0.212	0.562	0.430	0.597	10.1	7.3	12.4	11.4	0.066	0.508	0.008	0.042
	0.050	0.234	0.243	0.385	11.6	9.9	12.3	11.7	0.052	0.153	0.010	0.025
	0.468	0.472	0.639	0.604	9.9	10.3	12.2	12.2	0.215	0.235	0.013	0.018
	0.274	0.426	0.195	0.364	9.9	11.0	12.0	12.2	0.831	0.675	0.152	0.122
	0.184	**0.417**	**0.270**	**0.471**	**6.2**	**6.4**	**9.3**	**9.3**	**0.395**	**0.457**	**0.080**	**0.088**

TABLE III-2

Summary of Results of Oaxaca-Blinder Decompositions

	Male Wage Advantage		*Signif. Diff.?*	Unexplained Male Wage Advantage (Model 1)		*Signif. Diff.?*	Unexplained Male Wage Advantage (Model 2)		*Signif. Diff.?*
Region & Country	**Rural**	**Urban**	***P***	**Rural**	**Urban**	***P***	**Rural**	**Urban**	***P***
Africa									
Ghana	0.470	0.293	0.112	0.235	0.238	0.985	0.226	0.221	0.973
Malawi	0.334	0.225	0.124	0.163	-0.068	0.018	0.192	0.072	0.199
Nigeria	0.188	0.287	0.402	0.217	0.134	0.605	0.321	0.172	0.322
Asia									
Bangladesh	0.530	0.978	0.000	0.356	0.439	0.310	0.351	0.403	0.510
Indonesia	0.427	0.352	0.151	0.312	0.239	0.248	0.358	0.276	0.194
Nepal	0.402	0.722	0.000	0.168	0.615	0.000	0.170	0.563	0.000
Vietnam	0.181	0.213	0.371	0.190	0.181	0.825	0.149	0.141	0.835
Latin America									
Ecuador	0.319	0.365	0.493	0.283	0.326	0.665	0.304	0.289	0.891
Guatemala	0.295	0.244	0.372	0.222	0.135	0.164	0.279	0.173	0.106
Nicaragua	0.081	0.126	0.373	0.129	0.182	0.442	0.148	0.182	0.652
Panama	-0.145	0.135	0.000	-0.005	0.163	0.010	0.090	0.171	0.256
Eastern Bloc									
Albania	0.390	0.275	0.153	0.321	0.260	0.599	0.188	0.228	0.742
Bulgaria	0.068	0.147	0.138	0.056	0.151	0.095	0.102	0.143	0.506
Tajikistan	0.588	0.452	0.052	0.323	0.427	0.325	0.255	0.386	0.213
Simple Averages	**0.295**	**0.344**	**0.561**	**0.212**	**0.244**	**0.545**	**0.224**	**0.244**	**0.631**

TABLE III-3

Secondary Analyses (N=28 Urban and Rural Estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Unadjusted Gap	Explained Gap (Model 2)	Unexplained Gap (Model 2)				
Urban	0.065	0.033	0.027	0.002		0.007	
	(0.071)	(0.048)	(0.033)	(0.022)		(0.020)	
Per capita GDP ($1000s)	-0.042***	-0.028***	-0.012*	0.003	0.003		
	(0.014)	(0.009)	(0.006)	(0.005)	(0.004)		
Duncan Dissimilarity Index	0.089	-0.022	0.197	0.129	0.131	0.147*	0.157**
	(0.271)	(0.194)	(0.137)	(0.087)	(0.084)	(0.081)	(0.075)
Residual Variance	0.165	0.035	0.166*	0.100*	0.100*	0.106*	0.109**
	(0.180)	(0.123)	(0.086)	(0.056)	(0.054)	(0.054)	(0.053)
Unadjusted Gap				0.369***	0.370***	0.348***	0.348***
				(0.062)	(0.060)	(0.052)	(0.051)
Constant	0.290**	0.142	0.094	0.004	0.004	0.008	0.007
	(0.128)	(0.086)	(0.061)	(0.042)	(0.040)	(0.041)	(0.040)
Adjusted R-squared	0.179	0.201	0.111	0.644	0.659	0.653	0.665
AIC	-17.0	-40.6	-58.9	-83.7	-85.7	-85.2	-87.1

Standard errors in parentheses, calculated using weighted least squares.

*** p<0.01. ** p<0.05. * p<0.1

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Are African high-value horticulture supply chains bearers of gender inequality?

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Introduction

During the past decades, many developing countries have experienced rapid change in their agri-food systems, with increased integration in international markets and rapid expansion of modern food-supply chains (Swinnen, 2007). These modern supply chains comprise the production and trade of high-value produce, usually destined for export to high-income markets or for supermarket retail in high-income urban market segments. Modern supply chains are expanding rapidly across developing regions as global trade in high-value non-traditional agricultural products – such as fresh food and vegetables, fish and seafood products – is increasing sharply and increasingly originating from developing countries[46] (Aksoy and Beghin, 2005) and as supermarkets are spreading rapidly across developing countries and regions (Reardon *et al.*, 2003). The governance of modern supply chains is characterized by the use of high standards to govern quality and food safety throughout the chains, high levels of vertical coordination – including contract farming – in the chains, and a high degree of consolidation of the supply base and agro-industrial processing, whereas traditional food supply chains in poor countries are governed through spot market transactions involving a large number of small traders.

The emergence and spread of modern food-supply chains in developing countries has given rise to a broad discussion on the overall welfare implications. On the one hand, the expansion of modern supply chains has significant potential for increasing agricultural profits, raising rural incomes and alleviating rural poverty (Swinnen, 2007). On the other hand, modern supply chains have been contemplated to have adverse development effects and exacerbate existing inequalities in rural areas because the poorest farmers are either excluded from the chains or exploited by large, often multinational, companies dominating the chains (Key and Runsten, 1999; Reardon *et al.,* 1999). Empirical studies on these issues have come to diverse conclusions, and the welfare impact of the growth in modern supply chains remains a controversial issue.

However, the emergence of modern supply chains is profoundly changing the way food is produced and traded in developing countries, with important effects for rural households in these countries. As women play an extremely important role in agriculture in poor countries, the modernization of food supply chains entails important gender implications as well. There is a large gap in the literature: the gender effects of high-value agri-food trade and modernization of supply chains remain an almost unexplored issue

46 The share of developing countries in total exports of high-value non-traditional commodities (including fruits, vegetables, flowers, fish and seafood products) increased from 21 percent in 1980 to 41 percent in 2000 (Aksoy and Beghin, 2005).

(Fontana *et al.*, 1998). Dolan (2001) points to the fact that women farmers are disadvantaged in contract-farming schemes in the Kenyan horticulture sector. Barrientos, Dolan and Tallontire (2001, 2003) indicate that women farm workers are exploited in the South African deciduous fruit sector. Although these studies give valuable insights into specific gender-related aspects of modern supply chains, there is a need for a more general view on gender implications of modern supply chains and for quantifying the effects.

In this paper, we analyse how women are specifically affected by the emergence and spread of modern supply chains. We conceptualize the various channels through which women are affected. We also collect and discuss existing empirical evidence and add new survey-based evidence from two studies of high-value horticulture supply chains in Senegal in an attempt to quantify specific gender effects. Our focus is mainly, although not exclusively, on high-value horticulture supply chains in sub-Saharan Africa (SSA). This is of particular relevance because horticulture supply chains have been most affected by processes of globalization and modernization and because SSA is the developing region where gender inequality is most pronounced.

The paper is structured as follows: in the next section we develop a conceptual framework and identify several key gender-related issues of modern supply chain growth; in section three we present two original case studies used throughout the paper, including details on primary data collection; in section four we assess the implications of modern supply chains for intra-household allocation of resources and control over income; in section five we discuss the implications of modern supply chains for rural labour markets and, in particular, the feminization of these markets and gender discrimination in these markets; in a final section we summarize our conclusions and identify several unresolved issues and areas for further research.

1. Conceptual framework

The conceptual framework, depicted in Graph III-3, integrates insights on how modern supply chains are governed and how, depending on the governance structure, rural households benefit directly from modern supply chains. The framework enables us to make an adequate assessment of intra-household and gender issues in modern supply chains. It is important to note that, in order to keep the analysis focused, we analyse only the direct effects of modern supply chains and ignore possible spillover effects through indirect and more complex causal linkages.[47]

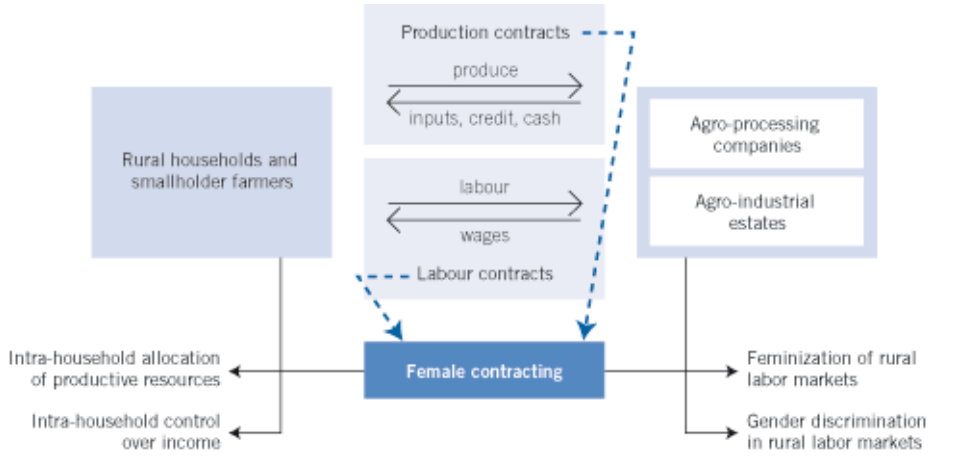
1.1. Supply chain governance

The modernization of food supply chains entails important structural changes. First, modern supply chains, such as fresh fruit and vegetable (FFV) export supply chains and supermarket-driven fresh food chains, are increasingly governed through stringent food standards, both public and private. Second, modern supply chains usually entail a certain degree of consolidation and the involvement of agro-industrial firms or large buyers. Third, rather than being based on spot market transactions, modern supply chains entail

47 In our analysis, we focus only on the supply-side effects and ignore direct consumption effects of modern marketing chains. This is a reasonable approach in this first attempt to better understand gender implications of modern supply chains, but one should bear in mind that consumption effects might be important, e.g. by improving access to a wider variety of products (Minten and Reardon, 2008).

GRAPH III-3

Conceptual framework on the direct gender-related effects of modern supply chains



varying levels of vertical coordination at different nodes in the chains. This is most apparent in the form of contract farming between agro-industrial firms or food distributors and primary producers. In the most extreme case, primary production is completely vertically integrated in upstream processing and trading activities. Fourth, vertical coordination in modern supply chains often involves some kind of market interlinking; most commonly the provision of inputs and credit to farmers by food companies in return for supplies of primary produce under contract-farming arrangements (Swinnen and Vandeplas, 2007).

There are large variations in the degree of supply base consolidation, the extent of agro-industrialization, the level of vertical coordination and the occurrence of market interlinking across countries and sectors[48] (Swinnen and Maertens, 2007). These variations determine how rural households are affected. First, farm households are affected through the production and marketing of high-value produce in contract-farming schemes with agro-industry. Farmers generally gain from participation in such contract-farming schemes through enhanced access to inputs, reduced production and marketing risks, improved technology and productivity, and ultimately higher incomes – which has been empirically demonstrated by various authors (Birthal *et al.*, 2005; Gulati *et al.*, 2007; Minten *et al.*, 2009). Second, if high-value supply chains are characterized by large-scale, often vertically integrated estate production, or if labour-intensive post-harvesting and processing are needed – e.g. because of increased requirements for sorting, grading, washing, and labeling – local households gain through employment and labour market effects. Empirical studies have demonstrated that the poorest households benefit especially through such employment effects (Maertens and Swinnen, 2009; Maertens *et al.*, 2008; McCulloch and Ota, 2002; Barron and Rello, 2000).

48 An overview of different governance systems in modern supply chains is given in Dirven (1996) for Latin America and in Swinnen (2005) for Eastern Europe and the former Soviet Union.

1.2. Intra-household and gender issues

There are two channels through which rural households are directly connected to and gain from high-value supply chains: product markets (contract-farming); or labour market (agro-industrial employment). A first important intra-household issue is whether there are gender differences in who is contracted[49] by the agro-industry, either as part of a production contract or as part of a labour contract. Such gender differences may affect the allocation of productive resources – including land, labour, and capital – in the household and the intra-household control over incomes.

In a unitary household framework, these issues would not matter and the sole question would be the impact on total household income. However, individual household members likely have different preferences and do not necessarily pool resources (Ellis, 1998). It has been observed that income controlled by women has a superior development impact because such income is more likely to be associated with improved child nutrition and increased spending on children's education, health care, etc. (Quisumbing and Mc Clafferty, 2006). Therefore, in a collective household framework, participation of women in modern supply chains and women's control over income derived from them matters, as they could be positively associated with broader development goals.

Second, the growth in modern supply chains has been associated with increased rural employment opportunities, especially where high-value production is organized around large estate farms and where labour-intensive post-harvest handling and processing are required. This raises issues concerning the degree of feminization in these rural labour markets and the existence of gender discrimination. Feminization of labour markets in developing countries is generally perceived as a favourable gender impact, as labour market participation is positively correlated with women's well-being, increased women's economic independence and enhanced empowerment, which are in themselves important objectives of gender equality (Quisumbing, 2003; Zhang *et al.*, 2004). In addition, women's control over income in the household is strongly determined by women's access to labour markets and paid employment (Quisumbing, and Mc Clafferty, 2006).

However, women are generally found to be disadvantaged in rural labour markets. Cultural, social and religious norms often prevent women from taking advantage of off-farm opportunities and working outside the home and the family farm (Lanjouw and Feder, 2001; Haggblade *et al.*, 1988). Women, especially in African rural societies, are more often concentrated in subsistence food crop production, household maintenance activities (such as fetching water and fuelwood), and low-return off-farm economic activities inside the home (such as food processing, pottery and weaving) than in wage labour outside the house (Lanjouw and Lanjouw, 2001; Quisumbing and Mc Cafferty, 2006; Woldehana, 2005). Moreover, even if women are able to participate in rural labour markets, they might be disadvantaged because of gender discrimination in wages and work conditions, as has been empirically documented in some studies (Canagarajah *et al.*, 2001; Lanjouw and Feder, 2001). Feminization and gender discrimination in labour markets have mostly been addressed in urban markets and manufacturing sectors, while insights from rural sectors are very limited (Fontana *et al.*, 1998; Zhang *et al.*, 2004). A focus on modern supply chains and resulting female employment in high-value agro-industrial production and agro-processing might remove this sectoral bias in gender studies.

49 Contracting is defined here in a broad sense and can mean an oral short-term agreement as well as a signed formal contract extending over a longer period of time.

Within the depicted framework, we address a series of gender-related issues such as gender difference in contract farming and agro-industrial employment, feminization of rural labour markets and gender discrimination in these markets.

2. Case studies and data

To empirically document and quantify the gender implications of the spread of modern supply chains, we use insights from two case studies of high-value horticulture export supply chains in Senegal. Horticulture exports from Senegal to the European Union have increased dramatically, from 4 800 tonnes in 1997 to almost 25 000 tonnes in 2006; green beans and cherry tomatoes are the main crops, each accounting for about one-third of total exports (Maertens and Swinnen, 2009). The two studies cover the main horticulture zones and export crops in Senegal: the area "*Les Niayes*" from where over 90 percent of exported beans originate; and the "*Senegal River Delta*" area from where almost the entire volume of tomato exports originates.

We organized extensive primary data collection at different levels of the supply chains. Data include: interviews with horticulture experts, farmers' organizations and village representatives; quantitative interviews with exporting companies; and a large and comprehensive household survey. Additional information on data collection, sampling design and survey strategy is described in Maertens and Swinnen (2009) and Maertens *et al.* (2008).

The two supply chains differ substantially in certain governance aspects. The tomato supply chain is dominated by one multinational company organizing the complete production and export of cherry tomatoes from the *Senegal River Delta* area. The company – a subsidiary of a French holding company with food production and distribution affiliates in a number of countries in Africa, Europe and Latin America – started investing in horticulture production and trade in Senegal in 2001. The export tomato chain is completely vertically integrated and local smallholder suppliers are completely excluded. The multinational holding company aims at high-standards production and is certified by different schemes including EurepGAP, the British Retail Consortium, the Ethical Trade Initiative and Tesco's Nature Choice.

Contrarily, the bean supply chain involves several exporting companies in the *Niayes* region and is based partially on smallholder contract farming and partially on vertically integrated agro-industrial production. Companies in this sector increasingly seek compliance with stringent EurepGAP standards. As part of their compliance strategy, some companies started their own integrated estate production. This has caused a profound shift in the governance structure of the bean supply chain, with the share of procurement from local smallholder suppliers decreasing from 95 percent in 1999 to 52 percent in 2005.[50]

50 Similar observations on supply chain restructuring have been made in other studies as well, for example, by Jaffee (2003) for Kenyan vegetable exports, by Minot and Ngigi (2004) for FFV exports from Cote d'Ivoire, and by Danielou and Ravry (2005) for pineapple exports in Ghana. Usually, increasing food standards are mentioned as the main driving forces of these changes.

3. Participation in modern supply chains and intra-household effects

3.1. Women's participation in modern supply chain

3.1.1. Contract farming

Women farmers are mostly excluded from contracting with agro-industrial firms for the delivery of high-value produce, although there are some examples of successful integration of women as contracted parties in contract-farming schemes.[51] For example, Dolan (2001) observes less than 10 percent of women farmers in smallholder contract-farming schemes in the Kenyan FFV export sector, and Eaton and Sheperd (2001) found that in large contract-farming schemes involving many thousands of farmers in China, contracts were exclusively with men. Also, Porter and Philips-Horward (1997) report that in sugar contract schemes in South Africa, the majority of contractors are men.

Our data on the bean export sector in Senegal are in line with these findings. We find that only one out of the 59 contracted bean farmers is a woman. Also our interviews with the exporting French bean companies confirm that they are strongly biased towards men in selecting contracted suppliers.

The reasons mentioned for this exclusion of women contractors relate to their limited access to productive resources. Women in developing countries are generally disadvantaged in their access to productive resources such as land, capital and credit, and in access to information and technology (Temu, 2005). The preference of food companies to contract with men is driven by companies' need to secure access to land and labour for a guaranteed supply of primary produce (Dolan, 2001). Women are excluded because they lack statutory rights over land and because they have less authority over family labour compared with their husbands and male siblings. In the case of vegetable supply chains in Senegal, women also lack claims to irrigation water and infrastructure – crucial inputs for bean production in the *Niayes* region – which further disadvantages them in contracting with the export industry.

3.1.2. Agro-industrial employment

Agro-industrial estates and agro-processing companies often employ a large number of workers. This is documented for the case of horticulture exports in SSA (see Table III-4). The figures show that in many poor SSA countries, thousands of people are employed in the horticulture agro-industry. Part of this employment might concern urban jobs in processing units and pack houses, but the lion's share is rural employment.

In sharp contrast to high-value contract-farming, there is no bias in favour of men in the labour market effects of modern supply chains. In fact, the data in Table III-4 show that a large share of the thousands of employees in the SSA horticulture agro-industry is female. From our own studies in Senegal, we find that 90 percent of the agro-industrial employees in the bean sector and 60 percent in the tomato sector are female. Also, in other countries, the share of female labourers in the FFV agro-industry is particularly high; for example, in the flower industry in Kenya and Uganda (75 percent) and the fresh vegetable sector in Zambia (65 percent).

51 This mostly concerns examples from small individual contract-farming schemes. For example, Plantconsult (2003) reports a successful contract-farming scheme in the export vegetable sector in Kenya where the majority of the 160 smallholder farmers involved in the scheme are women.

TABLE III-4

Employment in the horticulture export agro-industry in selected Sub-Saharan African countries

Country	Commodity	Year of survey	Number of employees in the FFV agro-industry	Share of female employees
Cameroon	Banana	2003	10.000	
Cote d'Ivoire	Banana & pineapple	2002	35.000	
Kenya	Flowers	2002	40,000 - 70,000	75%
	Fruits & vegetables		2.000.000	
Senegal	French beans	2005	12.000	90%
	Cherry tomatoes	2006	3.000	60%
Uganda	Flowers	1998	3.300	75%
Zambia	Vegetables	2002/03	7.500	65%
	Flowers	2002/03	2.500	35%
South Africa	Decicuous fruit	1994	283.000	53%

Source: Arias (2003) for Cameroon; Minot and Ngigi (2004) for Cote d'Ivoire; own calculations from case studies for Senegal; Smith et al. (2004) and Barrientos et al. (2001) for Zambia and flowers in Kenya; Jaffee (2003) and Lambert (2002) for fruits and vegetables in Kenya; Danson et al. (2004) and Barrientos et al. (2000) for South Africa.

The preference of agro-industrial firms to hire women has to do with the delicate work in harvesting and handling fresh produce for which women are more adept. For example, in the bean sector in Kenya, female farmers were found to do a much better job in harvesting, leading to substantially higher profits (Kimenye, 2005).

3.2. Intra-household allocation of resources

Rural households participating in modern supply chains through product market channels allocate (part of) their land, labour and capital resources to the production of the high-value commodity under contract with the agro-industry. Hence, high-value contract-farming has direct implications for the allocation of productive resources within the household. It has been argued that contract farming, and the exclusion of women from contracts, could give rise to intra-household conflicts over the allocation of land and labour resources between contract requirements and women's priorities with regard to food production (Sing, 2002). The reallocation of land and labour resources to high-value commercial production might result in decreased access to resources for women farmers engaged in subsistence food production, and ultimately lead to the deterioration of the food security situation of rural women and children (Baumann, 2000).

Convincing and quantitative evidence on this issue is lacking. What is available from descriptive studies is mixed and yields no consensus. Several authors point to the fact that, while men control the contracts as contracting party, the majority of the farm work done on contracted plots is performed by women as family labourers, thereby replacing labour from food production. For example, Porter and Philips-Horward (1997) observe that in 70 percent of the cases of sugar contract-farming in South Africa, the principal farmer working year-round on the sugar cane plots is a woman. Sing (2002) reports that women end up working longer hours than men in

vegetable contract-farming schemes controlled by male farmers in the Indian Punjab. Eaton and Sheperd (2001) observe that in a large contract-farming scheme involving thousands of farmers in China, women perform the bulk of the work, although they are completely excluded from signing contracts themselves. They also report cases where contracted tobacco production in East Africa conflicts with the cultivation of basic food crops by women farmers. Dolan (2001) argues that specifically the growth of high-value horticulture supply chains has been detrimental for rural women in Kenya because land and labour resources that were traditionally used by women to cultivate vegetables for home consumption and sale in local markets have been appropriated by men for export vegetable production under contract.

Other studies do not find evidence that a reallocation of productive resources to high-value contract-farming leads to intra-household conflicts and adverse food security effects. Minten, Randrianarison and Swinnen (2009), although not explicitly addressing gender issues, find that high-value vegetable contract-farming in Madagascar leads to improved productivity in food (rice) production through technology spillovers, thereby improving the availability of food in the household and shortening the lean period or 'hunger season'.

Our analysis from the bean export sector in Senegal also suggests that gender conflict over land and labour resources is quite limited. Beans are exported from Senegal to the EU only during the off-season (November-April) and households only allocate part of their land and labour resources to contracted bean production and only during a confined period, which does not coincide with the main agricultural season when staple food crops and other subsistence crops are cultivated.

3.3. Intra-household control over income

The general pattern in modern supply chains is that women perform a large share of the work, either as family labourers on contracted plots controlled by men or as hired workers in the agro-industry. Yet women's control over income resources in the household is strongly correlated with women's access to labour markets and paid employment (Quisumbing, and Mc Clafferty, 2006). Therefore, the way households benefit from modern supply chains, through product-market channels or labour-market channels, and the way woman are employed, as family farm workers or as hired agro-industrial employees, has major implications for the intra-household control over the income derived from these activities.

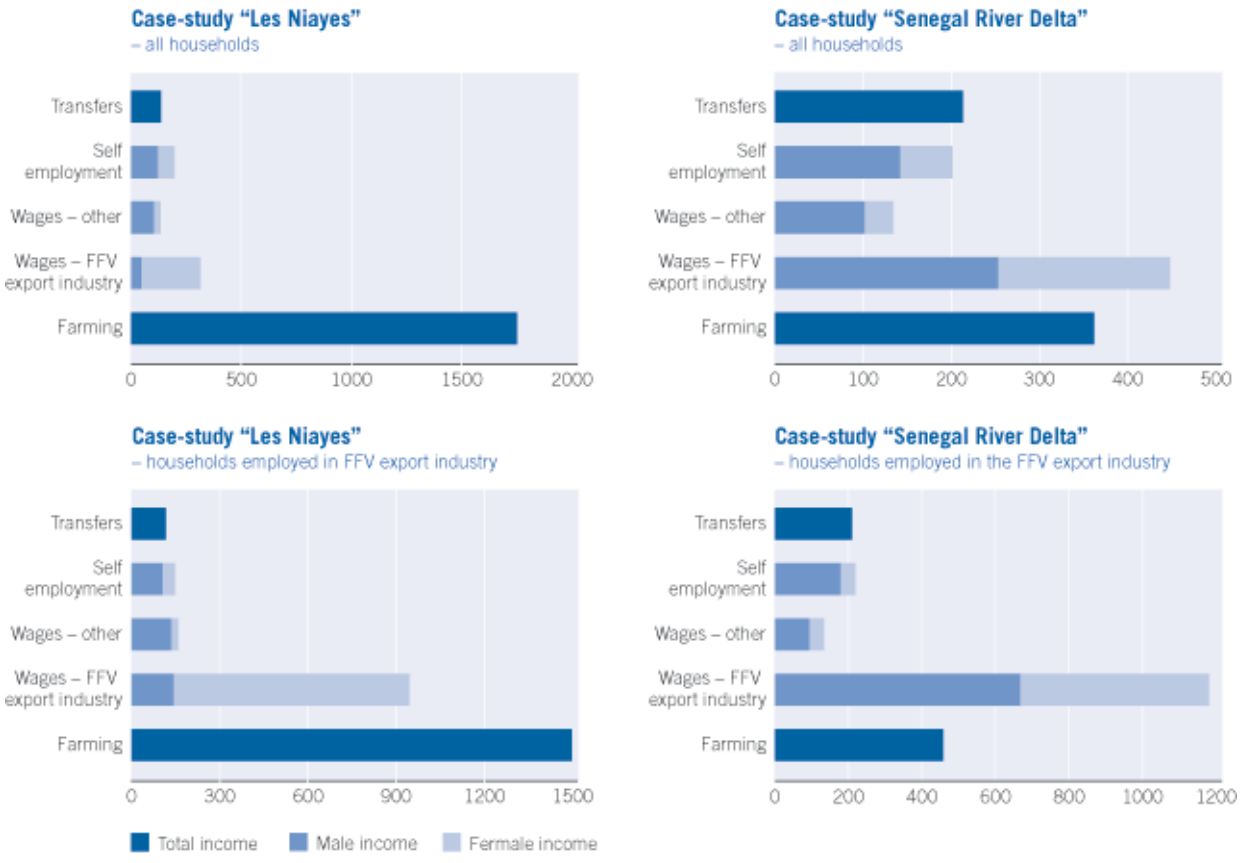
As men are mostly the contractors who deal with the contracting firm, they also receive and therefore directly control the income derived from high-value contract-farming. Women performing the bulk of the work on contracted plots often do not reap the full benefits of their labour, as family work is often unpaid or inadequately remunerated. The share of the income derived from contract farming that is controlled by women depends on women's bargaining power in the household. So, while contract farming in general may be beneficial for producers, the benefits are largely controlled by men and are not directly awarded to women family farm workers. This has been empirically observed in several cases: for example in vegetable contract-farming in India (Sing, 2003) and China (Eaton and Sheperd, 2001). In her case study on Kenyan horticultural exports, Dolan (2001) reports that the intra-household resource conflict arising because of vegetable contract-farming mainly comes down to a conflict over the use of the increased income generated.

Contrarily, women employed in agro-industrial companies benefit more directly. In this case, women are themselves the 'contracted party' in the labour agreement with the companies and directly receive the cash wages. These wages earned outside the family farm are not only received directly by the women workers themselves but are also more directly attributable to their labour, which increases their bargaining power over that income (Zhang *et al.*, 2004). Moreover, women's wage income can add importantly to total household income, which might further improve the decision-making position of women in the household, benefit their economic independence and enhance their empowerment.

Graph III-4 presents total household income from different sources and documents the importance of female-generated and -controlled wage income from modern supply chains in Senegal. Where possible, we distinguish between male- and female- generated income.[52] An important share of the income derived from wages earned in the horticulture agro-industry pertains to women, and these wages contribute importantly to total

GRAPH III-4

Sources of household income in two case-study regions in Senegal



Source: Own calculations from survey data.

52 The data do not allow distinguishing between male and female income for income derived from the own farm and for transfers. In addition, farm input data are not detailed enough to distinguish income from contract-farming from other farm income.

household income. In the *Niayes* area, wages earned in the bean export industry make up one-third of household income for those households involved in agro-industrial employment, and 85 percent of these wages pertain to women. In the *Senegal River Delta* area, 45 percent of the income derived from employment in the tomato export industry pertains to women, and this agro-industrial employment has become the major source of income in the region. These figures indicate that the growth in modern supply chains in these regions has contributed importantly to increasing female-generated cash income.

Household income is calculated as yearly income for the 12-month period prior to the survey. "Farming" includes income from cropping and livestock rearing and is calculated taking into account total production, the cost of variable inputs including hired labour, and the depreciation of machinery and equipment. "Wages-FFV export industry" includes income from wages earned in the French bean/tomato export agro-industry. "Wages-other" includes income from all other wage employment. "Self-employment" includes income from non-farm family businesses and is calculated taking into account revenue, costs of variable inputs and depreciation of machinery and equipment. "Transfers" includes public and private transfers such as subsidies and remittances.

4. The effect of modern supply chains on rural labour markets

4.1. Feminization of the rural labour force

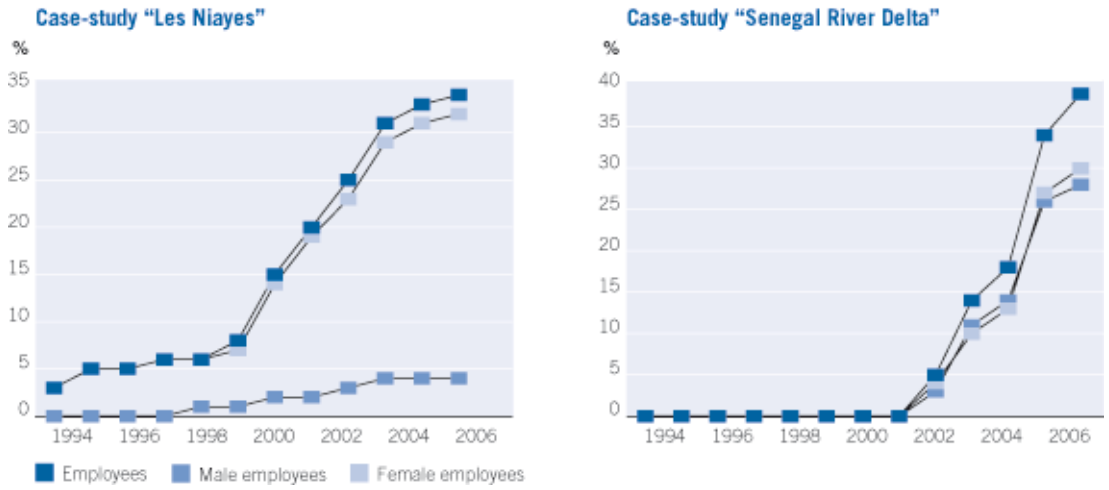
The discussion above reveals that the growth in modern supply chains in developing countries has been associated with growing female employment in the emerging rural agro-industries and important contributions of female wages to household income. These labour market effects are specifically important because off-farm employment opportunities for rural women in developing countries are often lacking, while female wage employment is positively associated with women's well-being and broader development goals. The extent to which modern supply chains contribute to the feminization of the rural labour force and raising women's off-farm employment opportunities is therefore an important concern.

Based on survey data for Senegal, we can measure the importance of the observed gender and labour market effects. First, we find that in both study regions, almost one-third of rural households have women who are currently employed in the horticulture agro-industry (Graph III-5). In the *Niayes* area, female employment in the bean export industry increased from less than 10 percent of local households in 1999 to more than 30 percent of households in 2005. Similarly, in the *Senegal River Delta* area, the share of households having women employed in the tomato export industry increased sharply after 2001 (when tomato export activities in this region started) and reached about 30 percent in 2006. In this case, male employment is almost as high as female employment, while in the *Niayes* region male employment in the horticulture agro-industry represents less than 5 percent of households.

Second, apart from the emerging modern agro-industry, off-farm employment opportunities for women are found to be very limited. More than 90 percent of women employed in bean-exporting companies indicate that before they started this employment they had never worked outside the home and household farm. Similarly, in the *Senegal River Delta* area, only 11 percent of households have women household members working

GRAPH III-5

Household participation in female and male employment in the horticulture agro-industry in two case-study regions in Senegal



Source: Own calculation from survey data.

as off-farm wage labourers outside the tomato export industry (compared with 22 percent for male household members). This is also reflected in the income figures presented in Graph III-4. In both research regions, the wages earned in the agro-industry are much more important than any other type of income from off-farm and non-farm activities, and this is especially so for women's income.

4.2. Gender discrimination and ethical standards in rural labour markets

4.2.1. Gender discrimination

Despite the fact that wages earned by women might contribute significantly to household income, increase their economic independence and foster further development goals, critics of the feminization of labour markets argue that labour markets themselves are bearers of – and even reinforce – gender inequality (Casale, 2004; Barrientos *et al.*, 2003). Gender discrimination in labour markets most importantly comes from wage differences between male and female workers but also from differences in job security, working conditions, etc. Some studies find evidence of lower wage rates for women compared with men in rural off-farm jobs in developing countries (Canagarajah *et al.*, 2001; Lanjouw and Feder, 2001).

Previous studies on high-value horticulture production indicate that these supply chains contribute to gender inequality because of discriminatory practices in the labour market (Barientos, McClennegan and Orton, 2000; Barrientos and Kritzinger, 2004). Based on interviews with agro-industrial workers in horticulture supply chains in Kenya, South Africa and Zambia, Barrientos, Dolan and Tallontire (2001, 2003) claim that: women receive lower wages than men; that women have temporary, seasonal and casual jobs while men hold the fewer permanent jobs; women are more often unemployed during the winter months than men; and women's employment is characterized by longer hours, no social protection, job insecurity, informal relations and poor working conditions.

They conclude that in the African horticulture agro-industry, firms shift the risk of production onto women workers through adjustment of employment levels and driving down employment costs of flexible, informal and low-paid female labour.

Based on our survey of hundreds of workers in the bean and the tomato agro-industry, we come to different conclusions. Table III-5 summarizes some characteristics of the working conditions for male and female workers in both supply chains, including their average daily wages. First, in the tomato export industry in the *Senegal River Delta* there appears to be some gender bias in the allocation of permanent positions in favour of males: 28 percent have permanent positions, while women have only 2 percent. However, in all other aspects we do not find female discrimination. There are very few male employees in the bean agro-industry in the *Niayes* region and these male employees are – just as the female employees – all casual or temporary workers.[53]

Second, we find no significant differences in the daily wages of female and male temporary employees in either of the case studies. We even find that female wages are somewhat higher than male wages in the *Niayes* case study – on average 1 365 FCFA per day versus 1 197 FCFA per day – but the difference is not significant. However, permanent employees have wages that are 70 percent higher than those for temporary and casual labourers. This indicates that differentials in wages relate to differences in the type of employment and associated differences in responsibilities within the job rather than to gender discrimination.

Third, we find that among temporary employees, women are working on average around five and one-half months per year in the horticulture agro-industry, while for men this is slightly higher (about seven months). These observed differences are less pronounced than previous observations in the literature and are not necessarily related to the use of female casual labour for low-cost flexible labour adjustment by agro-industrial firms. An alternative explanation is that women themselves choose to allocate their labour to off-farm employment more flexibly, in order to accommodate their household chores. In both Senegal case studies, we observe that several women of the same household[54] often take turns working in the agro-industry and staying at home for housekeeping and child care.

In summary, our data show that while, in one case, there is some gender bias in the allocation of permanent positions versus casual jobs, there is no other evidence of wage differentials between male and female agro-industrial employees in high-value supply chains. This is an important finding as the available empirical evidence indicates that, in general, rural labour markets do entail gender discrimination in wages.

4.3. Ethical standards

A possible explanation for labour markets in modern supply chains being more gender-neutral than rural labour markets in general relates to the use of high standards in these supply chains. Many export chains are subject to strict ethical standards and codes of conduct that are meant to improve poor working conditions and abolish gender discrimination. There is a difference in the degree to which private certification schemes

53 The lack of permanent employees in our sample is due to the fact that all of the exporting companies are relatively small family-run companies in which the permanent positions are filled by family members who are not included in our sample of rural farm-households.

54 We need to note that our Senegal household samples concern extended households with on average 16 members. Also, almost half of the household heads in the samples (48 percent) have two or more wives.

TABLE III-5

Employment conditions for female and male labourers in the horticulture agro-industry in two case-study regions

		Case-studies			
		Les Niayes		Senegal River Delta	
		Female workers	Male workers	Female workers	Male workers
Number of workers in the sample		221	14	305	196
Share of workers					
casual/temporary workers		100%	100%	98%	72%
permanent workers		0%	0%	2%	28%
Daily wages (FCFA)					
temporary workers	(mean)	1 365	1 197	1 648	1 686
	(median)	1 225	1 050	1 700	1 700
permanent workers	(mean)			2 400	2 566
	(median)			2 400	2 400
# of months (temporary workers)	(mean)	5.32	7.64	5.59	6.51
	(median)	5	6.5	4	5.5

Source: Own calculations from household survey data

incorporate such ethical standards. For example the Ethical Trade Initiative includes provisions on ethical codes of conduct – including provisions on forced labour, child labour, gender and racial discrimination, freedom of association, working hours, labour contracts, living wages – while EurepGAP certification concentrates on food quality and safety standards, and does not explicitly stipulate codes of conduct and refers to national legislation for certain ethical issues such as working hours and minimum wages. Although it has been argued that the effectiveness of codes of conduct in improving (female) workers' conditions is limited[55] (Barrientos *et al.*, 2003), compliance with stringent ethical standards and certification schemes such as the Ethical Trade Initiative might reduce gender discrimination in high-standards supply chains and improve working conditions and wages. Compliance with stringent ethical standards might contribute to explaining the observation that in our Senegal studies, daily wage rates in the tomato agro-industry – controlled by one multinational company that is certified by the Ethical Trade Initiative – are 20 to 40 percent higher as compared with the bean export industry, where no explicit ethical standard is used (Table III-5).

55 The main arguments are that ethical standards fail to address the complex needs of informal workers, for whom the conditions of employment are often worse, and that the environment in which supply-chain governance – including standards – is shaped is not gender-neutral and fails to address women's reproductive work (Barrientos et al., 2003).

Conclusion

A key result from this study is that the growth in high-value agricultural production and the spread of modern supply chains across developing countries can be associated with direct beneficial effects for rural women and reduced gender inequalities in rural areas. The arguments and evidence reviewed in this paper suggest that gender effects of the growth in modern supply chains differ strongly depending on whether rural households participate through product markets or through labour markets. Women benefit more and more directly from agro-industrial production and the creation of employment in these agro-industries than from smallholder contract farming. This calls for a shift in policy thinking from the mere promotion of smallholder contract farming (to assure an equitable distribution of the gains from high-value agricultural trade) towards integrating insights on labour market effects and employment policies, including the use of labour standards and the fight against gender discrimination.

However, important questions and unresolved issues remain. There is, for example, no conclusive evidence on the link between high-value contract farming and food security at the household level. In addition, the indirect effects of increased female employment outside the household and the family farm are poorly understood – for example, the effects on intra-household decision-making power and child education. There is also a need for more empirical evidence on issues of gender discrimination in rural labour markets and modern supply chains.

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Gender dimensions of rural employment in agriculture and public works programmes Experiences from South Africa: Differentiated pathways out of poverty

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1. Introduction

1.1. Background

Persistent poverty, unemployment and underemployment remain major challenges facing developing countries (World Bank, 2002; Mashiri *et al.*, 2008). In remote rural areas, where low levels of access to higher-order rural service centres further inhibit formal and informal employment opportunities, finding ways in which to address poverty and unemployment is all the more challenging (ILO, 1999; IFAD, 2001; Liversage & Carpano, 2002). At the same time, development projects that seek to enhance the provision of basic services are being implemented in many rural communities under conditions of limited financial resources, especially in areas where low population densities render investing in basic infrastructure costly.

Generating and extending beneficial and non-exploitative opportunities for employment is an enduring way to tackle poverty (FAO, 2004). Strategies that have been employed to reduce poverty and improve livelihoods for developing communities include:

- economic growth with expected trickle-down in the long term;
- social safety net programmes that offer short-term relief but have only a limited impact in alleviating poverty in the long term; and
- linking employment programmes explicitly to economic growth, for example by introducing employment concerns into mainstream investment policy.

The emphasis has been on the first two approaches. However, the latter approach can, if implemented effectively, address both the short-term income-generation needs of poor communities and economic growth in the long term. A typical example of this strategy is the adoption of community-based labour-intensive methods in basic infrastructure provision, such as investment in access roads, irrigation works, community markets, low-income housing and schools (Riverson *et al.*, 1991; ILO, 1999; World Bank, 2002, 2003; FAO, 2004). For most rural areas, infrastructure development tends to be the fulcrum that anchors sustainable development endeavours. The choice of the infrastructure sector as a catalyser for pro-poor growth is grounded on several factors. Infrastructure is crucial for investment and economic growth in other sectors, and the relative weight of this sector

in the overall economy is relatively high, especially in developing countries (Tajgman & Jan de Veen, 1998). Often, upwards of 70 percent of public investment is channelled into this sector (World Bank, 2002). In this context, local and international experience has lauded the potential of community-based public works programmes to simultaneously provide jobs, alleviate poverty, build local capacity, create community assets, reduce the cost of construction and maintenance and improve infrastructure (Department of Public Works, 1997; Mashiri *et al*., 2005).

A broad review of rural women's location within local and global norms and patterns of poverty highlights the need to ensure that the employment benefits that can accrue from infrastructure investments do not perpetuate gender inequality and gendered patterns of poverty through the exclusion or exploitation of women (ILO, 1992, March *et al*., 1999; Kehler, 2001, World Bank, 2002, Shackleton & Mander, 2005, May, 2006, Venter & Mashiri, 2007, Buiten, 2007). Traditional perceptions that women are not 'appropriate' employees within labour-intensive and technical sectors also need to be proactively challenged. It is intriguing to observe that poor rural women in developing countries are almost always tasked with many labour-intensive forms of work on a daily basis, such as the collection and transport of heavy loads of water and wood, as well as agricultural work. The term 'employment-intensive' is used by the ILO to describe a competitive technology where optimal use is made of labour as the predominant resource in infrastructure projects, while ensuring cost-effectiveness and safeguarding quality (ILO, 1999). Given that a key resource among the poor is their own labour, employment-intensive initiatives offer a sure way in which government can directly contribute to addressing poverty.

This paper not only explores both the direct and indirect benefits, but it also investigates the extent to which community-based rural road maintenance and agriculture development projects can be used as tools to empower women, the elderly, children, youth and the unemployed to work towards attaining sustainable rural livelihoods (Department of Public Works, 1997). It also addresses gender dimensions of the projects.

1.2. Methodology

A mixed-method approach was employed to assess the experiences and impacts of the *Siyatentela*[56] (Mpumalanga Province), *Gundo Lashu*[57] (Limpopo Province), *Zibambele*[58] (KwaZulu-Natal Province) and *Sakha Isizwe*[59] (Province of the Eastern Cape) labour-based routine road maintenance programmes, and the *Siyazondla*[60] (Province of the Eastern Cape) rural household agriculture programme in the context of a sustainable rural livelihoods approach. While the *Siyatentela* programme is dealt with extensively, a rapid appraisal of similar programmes in KwaZulu-Natal, Limpopo and Eastern Cape provinces was conducted to improve the depth and representativeness of study findings and recommendations.

In terms of the main case study, *Siyatentela*, both qualitative and quantitative methods were employed. The approach was centred on a 'before and after' cross-sectional survey of more

56 A Swati word meaning "doing it for ourselves"
57 A TshiVenda word meaning "victory is ours"
58 A Zulu word meaning "doing it for ourselves"
59 A Xhosa word meaning "we are building a nation"
60 A Xhosa word meaning "we are taking care of ourselves"

than 80 percent of *Siyatentela* participants to independently evaluate programme impacts. Key informant interviews (with regional managers, road superintendents/supervisors and ward councillors), focus group discussions, physical observations, assessment of project records, participatory road surveys with *Siyatentela* road maintenance gangs and household interviews with beneficiaries were employed to solicit information.

2. Labour-based routine rural road maintenance and household agriculture development

2.1. Overview

In order to break poverty cycles in the medium to long term, various provincial departments of roads and transport in South Africa have employed a mixed-contract approach (individual, household, contractor) with the common aim of increasing beneficiary numbers in efforts to push back the frontiers of poverty. The poorest of the poor, especially women-headed households, are identified and selected by communities to participate in the programmes.

2.2. Transport infrastructure construction and maintenance: Case study profiles

Generally, community members from all programmes (depicted in Table III-6) believe that the projects have opened up their areas[61] for development and expanded the community horizons with regard not only to understanding developmental issues pertaining to their areas, but also with respect to perceiving and acting on economic opportunities. While, on average, all projects share the strength of creating alternative pathways out of poverty, they also share a weakness in that these alternative pathways are not couched within the ambit of an overarching strategic framework. In addition, because these pathways are externally prompted, they often have limited shelf life without continuous support from government or donor agencies. Table III-6 provides a summary of the common and divergent project issues that relate to the major rural labour-based project experiences in South Africa.

2.3. Siyazondla agriculture and food production: Case study profile

The Eastern Cape Department of Agriculture, in collaboration with the Accelerated and Shared Growth Initiative of South Africa: Eastern Cape and Eastern Cape Socio-Economic Consultative Council, have been engaged in a process of seeking to transform agriculture production systems, livelihood patterns and human development. The process, supported by donor organizations, is part of a broader effort to tackle poverty, create employment and build the capacity of local communities.

The approaches are broadly referred to as Agrarian Transformation and Food Security pillars of the Provincial Growth and Development Plan (PGDP), which has created programmes such as Massive Food Production, *Siyazondla* Homestead Food Production, Comprehensive Nutrition Programme and Integrated Agricultural Infrastructure Programme. However,

61 Limpopo Province (e.g. Giyani, Njelele, Musina & Mutale), Province of the Eastern Cape (e.g. Port St. Johns, Qaukeni, King Sabata Dalindyebo, Ntabankulu & Nyandeni), KwaZulu-Natal Province (e.g. Ugu, Nkonkobe & Sisonke)

in the context of this paper, the focus is on *Siyazondla* homestead food production. One woman participant from the Eastern Cape provided the following testimony:

"…Some of the women in my community including myself have started a vegetable farm with the help from the Siyazondla Homestead Food Production programme. Now we grow our own food and sell vegetables too. We use the money we get from selling vegetables to pay schools fees for our children and buy their school uniforms. I do not

TABLE III-6

Experience of labour-based routine road maintenance in South Africa

Parameter	Zibambele	Gundolashu	Sakha Isiziwe
Programme champions	KwaZulu-Natal Provincial Department of Transport	Limpopo Provincial Government Roads Agency Limpopo (RAL) International Labour Organization (ILO) Department for International Development (DFID) Department of Labour	Eastern Cape Department of Roads & Transport
Programme thrust	Labour-intensive rural road maintenance to improve access roads, create local jobs and alleviate poverty	Address backlogs in rural road infrastructure and create jobs in order to improve rural livelihoods	Community-based transportation programme Create new work and business opportunities for disadvantaged communities
Programme targeted beneficiaries	Unemployed youths, adults, women, persons with disabilities, and the elderly in rural areas	Workers from communities located within 4 km of respective road corridors	Targets poorest of the poor (mainly women-headed households)
Contract description	Household-based rather than individual focused	Traditional client-contractor-consultant relationship	Household-based rather than individual-focused
Working conditions	Flexible 60 hours of work per month	Normal industrial working conditions i.e. 8 am – 5 pm	Normal industrial working conditions i.e. 8 am – 5 pm
Equipment and materials	Wheelbarrows, picks, shovels, machetes, slashers, gloves, traffic cones, safety boots, vest reflectors	Appropriate mix of labour-based and high-technology methods and equipment use	Appropriate mix of labour-based and high-technology methods and equipment use
Stipend/ wages	R450 – R1 200	Market wages and reward compensation for employees	Market wages and reward compensation for employees
Type and scope of work	<400 vehicles per day (road surface cleaning and verge maintenance covering areas between 500m – 800m road sections i.e. approximately 7 000m^2) <400 with more than 15% heavy vehicles (verge maintenance – grass cutting, weeding, drain cleaning & litter removal covering areas between 500m each side of the road i.e. approximately 7 000m^2) >1 000 vehicles per day (no Zibambele contractors used)	Rehabilitation and maintenance of roads in all levels of classification	Use the Kenyan Lengthman model to allocate and measure labour inputs/outputs ratios
Training and skills transfer	Technical and maintenance skills Social skills	Life and basic entrepreneurial skills Landscaping/kerb laying Scaffolding Supervisory skills Farm business management Computer skills	Skills acquisition through empowerment of communities Road construction and maintenance skills and theory and experience

want to think how difficult our lives could be without such programmes. It means families would have to traditionally depend on absentee husbands who have migrated elsewhere to look for employment. In fact, we are learning a lot from the programme and from each other, since some of us have only been subsistence farmers all our lives…" (extract of an interview with a woman-headed household, 22 September 2008 in Tsolo, Eastern Cape).

Parameter	Zibambele	Gundolashu	Sakha Isiziwe
Support services	Acquisition of identity documents, opening bank accounts, organizing them into credit unions and savings clubs and investing savings into other productive activities	Construction Industry Development Board (CIDB) contractor profiling, registration and development	Programme linked to the contractor grading system of the construction industry development board (CIDB) Support SMMEs Sakha Isizwe Learnership Programme
Programme outcomes	95% of contracts awarded to women-headed households	Each trained contractor has an average annual turnover of R5 million 267 km of roads rehabilitated and 142 km gravelled 24 km sealed at a cost of R70.7 million 24 contractors trained. 13 contractors (54%) are female, 70% of all trainees are youth 8 engineering consultants trained 10 RAL staff trained in LBM management More than 59 272 training days provided so far 895 627 worker days created in the employment of 3 139 workers as follows: 1 697 workers (54.1%) female, 1 326 workers (42.2%) youth, 18 (1%) disabled	1 995 households contracted (2006/07) Used in urban renewal (Motherwell & Ngangelizwe) Integrated Sustainable Rural Development (Umzimkhulu) Learnership programme has recruited 100% historically disadvantaged individuals, 100% youth and more than 60% female learner contractors. 220 temporary jobs have been created within this programme This programme has created access to finance, thus facilitating development of financial track-records for the learners through ABSA (a commercial bank)
Strengths	Skills transfer and training model Community employment and local economic development Integrated rural development approach Flexible working conditions and use of project equipment Targeting the indigent especially women-headed households	Comprehensive governance institutional strengthening model Small and medium enterprise contractor development programme Employ local communities within a 4 km road corridor radius	Capacity building and development Learner skills development Local transportation system improvement
Weaknesses	Top-down initiative Lack of a clear model for transfer and sustainability beyond government funding Lack of a clear strategy on exit options for pursuing alternative pathways out of poverty	Excludes members from beyond 4 km road corridor radius Government-driven (top down) Lack of a clear strategy on exit options for pursuing alternative pathways out of poverty	Government-driven (top down) Lack of a clear strategy on exit options for pursuing alternative pathways out of poverty

TABLE III-7

Summary of Siyazondla project impact in the Eastern Cape Province

District	Projects (number)				No. of households	Budget R	% spent
	Clinic Garden	Home Garden	School Garden	Community Garden			
Alfred Nzo	22	570	38	10	727	2.0 million	55
Chris Hani	11	500	15	7	830	3.0 million	35
O. R. Tambo	8	741	11	10	3 460	4.0 million	61
Ukahlamba	1	757	3	2	764	2 million	88
Total	**86**	**6 323**	**130**	**43**	**10 266**	**11 million**	**57**

Source: Cabinet Lekgotla, 2007

Table III-7 suggests that a substantial number of rural dwellers are being offered and are enjoying alternative pathways to addressing poverty owing partly to programmes such as *Siyazondla*.

Although no full-scale impact assessment of the programme has been conducted, the preliminary assessment indicates positive benefits. These include:

- assistance with the establishment of gardens (at clinics, homes, schools and in communities);
- provision of seed capital and starter packs for agriculture production such as farming implements (e.g. wheelbarrows, forks, spades, rakes, watering cans) and production inputs (e.g. seeds and seedlings, fertilizer, insecticides);
- provision of infrastructure (e.g. irrigation pipes, garden fencing, harvesting equipment);
- linkage to marketing, skills and knowledge transfer systems and a land-care programme (beneficiary communities have successfully organized themselves into collective buying and marketing structures, which could be the cornerstone for agrarian transformation);
- provision of opportunities for growth (e.g. the programme provides exit and migration pathways to graduate from subsistence to small-scale commercial farming through the *Siyakhula* food production component).

Overall, the *Siyazondla* programme is currently the highest contributor to local sources of income (DoA, Province of the Eastern Cape, 2008). However, some commentators have labelled the massive food programme a 'failure'. This is premised on the weak rural agro-logistics infrastructure support system, a lingering perception that beneficiaries appear to continue to associate development with receiving handouts from government, late 'no till' planting season because of challenges of mobilizing inputs such as seed, fertilizer and equipment, the dysfunctional land care programme as evidenced by the continued visible soil erosion, and poor access and information support systems. What is clear from these contestations is that sustainable agricultural transformation is a process and not an event. The programme is thus being continuously improved.

3. Siyatentela rural road maintenance programme

3.1. Siyatentela case study overview

The Mpumalanga Department of Roads and Transport (MDORT) implemented the *Siyatentela* employment-intensive routine rural road maintenance project with the purpose of not only cutting the cost of road maintenance and improving road conditions, but also as part of a much broader initiative to take advantage of the government's extended public works programme (Mashiri *et al*., 2008). The *Siyatentela* programme, which was modelled on the relatively well-known *Zibambele* programme in KwaZulu-Natal, targets women in indigent households, especially women-headed households. These women are identified through a consultative and rigorous screening and verification process involving many stakeholders, including local political and traditional leadership, to ensure that the households most in need are included.

The programme commenced very modestly in the 2005/06 financial year in Ehlanzeni District Municipality in the Mpumalanga Province, with a budget of R300 000 and employing ten women. It has since expanded to all of the three districts that constitute the province, with a budget of R1.5 million towards the end of the 2005/06 financial year and employing 55 women. *Siyatentela* now employs 544 women maintaining 272 km of rural roads in Ehlanzeni, Gert Sibande and Nkangala districts. Largely because of its apparent success, the provincial government has sought to scale up the programme to serve more poor households and, at the same time, service more community assets in the form of rural roads. In 2008, plans and projects to increase the programme budget to R10 million per year were at an advanced stage. However, in order to upgrade this programme from R1.5 million to R10 million, there was a compelling need for MDORT to undertake an independent impact assessment of the programme. The outcome of the study has provided MDORT with adequate empirical evidence to arrive at an informed decision to scale up the programme.

3.2. Siyatentela case study findings

3.2.1. Siyatentela contracts and employment frameworks

Siyatentela awards renewable 12-month contracts. Although an individual signs the contract, in order to break the cycle of poverty in indigent households, *Siyatentela* 'employs' the household rather than an individual, thus ensuring continuity should anything befall the original woman employed. Depending on skill and experience, participants earn weekly stipends of between R600 and R1 500. *Siyatentela* contracts women to maintain the drainage system and road signs, ensure good roadside visibility, maintain the road surface, and clear the road of litter and noxious weeds. While on paper each woman employed is allocated half a kilometre, the actual length depends on the nature of the terrain; the more difficult the terrain, the shorter the length of road. Overall, the employed women work in groups of ten to maintain a 5 km stretch of road close to their homes. Participants work two days per week with a maximum of 64 hours per month. *Siyatentela* encourages flexible working hours, thus allowing participants ample time to deploy their labour elsewhere.

"…Since the women work only two days a week, we have been encouraging them to start small gardens at home. Some of them are now doing brisk business selling vegetables to other programme beneficiaries and to the community at large..." (Project supervisor – February 2008).

3.2.2. Training, knowledge and skills transfer

Participants were technically trained on road maintenance and life skills over the duration of their contract.

"…Before the project, we did not know anything about drainage. Now we know what it means to have a good drainage system as well as how to maintain such drains. We are now in a position to undertake similar work when new opportunities arise, using skills we have acquired through Siyatentela. In addition to basic road maintenance training, we have also received additional training in life skills, gardening, how to run and manage small enterprises such as a poultry or piggery project and HIV/AIDS awareness. This kind of training has made us better people than what we were before we joined the programme… " (Project participant – February 2008).

Siyatentela also helps women to open bank accounts, establish savings clubs and invest some of their savings in other productive activities. Participants indicated that training improved their skills and capacity to confidently work on the project. They now employ maintenance skills learned in the project in their homes and community.

3.2.3. Livelihoods and income use: Entrenching the rural private sector

The communities in which the *Siyatentela* programme is operating are largely dependent on subsistence agriculture based on small pieces of land or home gardens growing mostly maize and horticultural crops. A small number of households rely on both formal and informal employment and mixed, largely subsistence farming.

About 80 percent had a total monthly income of between R601 and R1 500. However, while 20 percent of households interviewed depend solely on income from the *Siyatentela* project, all salary incomes reported by respondent households derive from the project largely because these are the most indigent households. Indeed, interviews from all project sites indicated programme beneficiaries were grateful and appreciative of this intervention.

"…This project has really helped us a lot and now we can earn our own money for use in the home. We certainly hope and would like the project to continue strongly into the future, bringing more women like me into its fold…" (extract from testimony of one of the women involved in the Siyatentela programme – February 2008).

3.2.4. Wage use by households participating in Siyatentela

Upwards of 80 percent of the money earned from the project is used for food, clothing, school fees, agricultural inputs, medical fees and household assets. In this way, income earned on *Siyatentela* benefits the whole household.

"…When women get their wages, they buy food and other needs for the family while men would most probably use the money to drink beer and play lotto..." (key informant interviewee – Siyatentela foreman – February 2008).

Just over 50 percent of the respondents also reported that they use the money for burial society contributions, a significant cost burden within many households and part of fostering a sense of dignity for households and communities, especially given the HIV/AIDS pandemic that has not exhibited any signs of relenting.

Income earned flows into different geographic economies, which, to some extent, has an impact on local economic stimulation. A total of 12 percent reported that their entire income is used only within the local community, and the majority use their wages in both the local community and in other rural service centres and towns.

Upwards of 60 percent of respondents use their wages to procure goods and services locally and in the nearest rural service centre, as aptly described in a focus group discussion:

"…We are making wise use of the wages we earn on the project. We have assisted each other in acquiring basic household goods that we did not possess before being employed on the project, including refrigerators, television sets, radios, electric stoves and other items of value. We have also used our wages to construct and improve our assets such as houses. This has certainly brought a sense of pride and achievement to our families and the community at large. These achievements are unlikely ever to have happened without the project..." (Focus group testimony, February 2008).

Since participants often open bank accounts into which the government pays their wages, some of the women contractors spent their wages in distant rural service centres and towns with banking facilities. This represented some leakage of funds that could have been employed to stimulate small business in programme areas. A partial remedy could involve enabling the women to access their wages in their local areas, which could confine their purchases to essentials that can be acquired locally.

3.2.5. Social capital

Project participants felt that the deliberate affirmation and involvement of women through the *Siyatentela* programme is a positive development given that women often single-handedly fend for their families with meagre resources (Mashiri *et al*., 2008). In addition, access to income and the formation of voluntary associations such as savings clubs has broadened participants' social networks. This is succinctly illustrated by one participant's testimonial:

"…I used to live in a makeshift plastic shack. My family and I were used to going for days without a decent meal. We were surviving on our neighbours' generosity. I had never had a brand new pair of shoes in my life, nor travelled beyond the village, let alone visiting a big city like Nelspruit. I had never had a bank account in my life. Thanks to Siyatentela, I now have a proper roof over my head, a bank account, go to town at least once every month, have all these many people and friends I can talk to…" (extract of an interview with a project participant – February, 2008).

The setting up of investment clubs to facilitate the pooling of resources for procuring a variety of household assets is indeed a prime example of community development in practice. Furthermore, these social capital gains contribute in some part to addressing strategic gender needs (e.g. transforming existing subordinate relationships between men and women such as power and control, legal rights, equal wages and gender division of labour), thereby challenging existing social formations that shape gender inequality (March *et al*., 1999).

3.2.6. Impacts of improved road maintenance

The results of the survey indicated that the number and ownership of motorized and non-motorized vehicles increased after the road was upgraded and subsequent routine maintenance provided through the *Siyatentela* programme. In addition, public transport availability improved – especially buses and minibus taxis. A total of 37 percent of the interviewees were of the opinion that vehicles using the *Siyatentela* roads had increased (although not verified by a 'before and after' count). In addition, a variety of public transport modes became available to ferry passengers to the main centres, in contrast to the 'before' situation when mostly buses and light delivery vehicles with higher clearance constituted the public transport modes.

In terms of local women's perceptions of the impact of the road upgrading and routine maintenance on access to other services, the overwhelming evidence suggests a positive correlation between the improved roads and easier access to socio-economic opportunities such as education, health, police and social networks. The improved roads also allowed better response times of emergency vehicles (ambulance and police). For example, more than 80 percent of the respondents indicated that access to educational, health and police facilities had improved.

3.2.7. Other experiences and perceptions of women employed in the programme

Most women reported that they walk to the *Siyatentela* project roads, which takes 33 minutes on average (with a few exceptions requiring more than an hour). The loosely constituted women's groups do not entertain leadership positions to ensure that all the women are equal and putting in an honest day's work; this thwarts the emergence of divisions among them.

A total of 85 percent of the women received a one-day on-the-job training covering the actual work they need to perform as well as an introduction to the philosophy of and rationale for road maintenance.

A total of 93 percent of respondents stated that training improved their skills and capacity not only to work in the *Siyatentela* programme, but also to employ their newly learned skills elsewhere, for example in their homes – building water drains, cleaning gutters, removing litter around their households and keeping the home neat and tidy.

3.2.8. Key project-related challenges identified by the women

- Twenty percent of the women respondents were worried by the irregular payment. Given the crucial importance of stable employment in enhancing women's socio-economic position and reducing poverty, this issue was discussed with the relevant authorities and ways in which to improve the situation were identified.
- Twelve percent of women respondents walked distances of between 2 km and 5 km to reach their work stations – a cumbersome exercise indeed.
- Nine percent of the women respondents suggested that their remuneration be revised to between R1 000 and R1 500 per month.
- Seven percent of the women respondents complained about the lack of adequate tools and uniforms. They argued that working with inadequate tools and incomplete

uniforms was not only hazardous, but also encouraged inefficiency and circumvented the recognition that derives from wearing a complete uniform.

- Seven percent of the women respondents complained about having to burn unpleasant and at times explosive or dangerous materials (often dumped with the rubbish along the road) without the benefit of masks and eyeglasses as protection against dust, fumes, glass and other dangerous materials.
- Five percent of the women respondents said that working conditions needed improvement. They observed that it is hard to work in inclement weather and with the dust resulting from their work and passing vehicles.
- Five percent of the women respondents indicated that balancing paid employment and child care was a challenge. However, this was also mitigated to some extent by the flexible times that they work.
- Some women expressed their fear of the threat of rapists and thugs when walking to and from work and while working on the roads.

The question of occupational health, both in training and in the provision of adequate protective gear, clearly needs to be addressed. In terms of the problems associated with the threat of rape and assault, project supervisors resolved to have the women work in groups. However, this was not entirely successful.

"…The original arrangement was that each woman would work on a 500 m stretch of the designated road and because of these problems (such as rape, thieves, snakes, etc.) we decided that they should work in groups. This would assist them in defending each other or calling for help in case of any attack. However, this didn't work well with some groups, as some women complained that some of their co-workers were not working hard enough..." (Supervisor from Albert Luthuli Municipality, March 2008).

3.2.9. Suggested changes to the programme by respondents

A total of 31 percent of the women respondents suggested increases in pay, timely payment and the opportunity to increase work hours in order to earn more as ways in which the programme would be improved. The latter is a sensitive issue, given that there is a tension between the need to spread the opportunity to earn income to more households, which implies allotting fewer hours per household, and the need to improve the income of those already working and therefore depriving others of the chance to engage in paid employment.

Without exception, the consensus from all women was that *Siyatentela* programme was beneficial for participating households. They also felt that the programme as currently constituted was indeed fair in targeting women only. They argued that women often bear, sometimes single-handedly, the poverty burden, and that it is women who are generally expected to provide for their families. However, given that households that do not have women are currently not considered for the project, some of the key informants interviewed felt that there were also men and youths in dire need of such opportunities to earn income, especially orphaned youths. They argued that while women may often be those with the greatest need, there is a need to reassess the selection criteria for the project to respond to other patterns in terms of poverty and vulnerability in rural areas.

4. Recommendations and conclusions

4.1. Recommendations

The common thread that runs through *Zibambele, Gundo Lashu, Siyazondla, Sakhi Isizwe* and *Siyatentela* transport and agriculture programmes is the relatively significant positive impact they have had on improving rural livelihoods in KwaZulu-Natal, Limpopo, Eastern Cape and Mpumalanga provinces of South Africa. The need to scale them up can not be overemphasized. Given that these types of programmes are management-intensive, it is important to grow a cadre of skilled overseers to enable enhanced outcomes. However, challenges exist particularly with regard to dire shortages of skills in science, engineering and technology to assist with technology and skills transfer. In addition, funding constraints are bound to severely truncate the rate and pace of scaling up and replication that may be desired. Furthermore, the lack of standard datasets for evaluation often makes it difficult to engage in direct comparisons across programmes. The main recommendations to ensure success in the scaling-up process include:

- developing a strategic approach and plan to scaling up;
- establishing a sustainable management information system;
- generating a communication strategy (including employing existing success stories such as *Siyazondla, Gundo Lashu, Sakha Sizwe* and *Siyatentela* as models);
- putting in place a systematic monitoring and evaluation programme.

4.2. Concluding remarks

Women, children and youth comprise a significant proportion of the indigent population in rural South Africa and can be instrumental in breaking the poverty cycle. Empirical evidence from the *Siyatentela, Zibambele, Siyazondla, Gundolashu* and *Sakha Isizwe* case studies as well as other similar projects suggests that, besides creating employment opportunities for those least able to compete on the job market, bolstering women's incomes, productivity and empowerment is pivotal in positively transforming the rural socio-economic landscape in favour of sustainable livelihoods.

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The consequences of labour out-migration on income, rice productivity and gender roles: Synthesis of findings in the Philippines, Thailand and Vietnam

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1. Introduction

Around 70 percent of the population in Southeast Asia lives in rural areas and depends on agriculture. However, the share of agriculture in gross domestic product has declined, agricultural labour productivity growth is decreasing and productivity gaps remain wide. Low product prices and high input prices have also made agriculture less attractive. The result: low growth in agriculture and lower incomes for the people dependent on it. Although agriculture, especially rice farming, is still the largest employer, its capacity to generate new employment is falling. In East Asia, Southeast Asia and the Pacific, it now has less employment potential than industry or services (UNESCAP, 2008). Out-migration from rural areas is now increasingly becoming an important livelihood strategy and escape out of poverty. Migration is a safety net against income shortfalls because of crop failure or low productivity created by drought or floods. In addition to deteriorating employment opportunities at home and better prospects in urban areas, the increased mobility of the population from the rural areas is also a result of improved communication and road networks (Deshingkar and Anderson, 2004).

Policy-makers are often concerned that out-migration of labour from agriculture might reduce crop production and endanger food security. On the other hand, remittances may facilitate on-farm investment or relieve credit constraints that impeded farmers from buying fertilizer or other key inputs. The unresolved question concerning migration and agricultural production is whether remittance incomes enhance production enough to compensate for the reduced availability of male or female labour in any specific setting and improve intra-household welfare (better education of children, reduction in women's workload, empowerment of women, etc.). Although there have been numerous studies on migration, what has not received much attention is how this process affects the family members left behind, especially women. According to Hugo (1993), migration has potentially far-reaching effects on household structure by increasing the incidence of female-headed households through sex-selectivity of migration. However, although there has been much talk about the "feminization" of agriculture and increasing female-managed farms because of increasing male migration and participation in non-farm work, data that support this contention are patchy and anecdotal. The reduction in the

supply of male family labour because of participation in non-farm work and migration will have repercussions on the management of the farming systems, rice production and intra-household welfare, particularly on women's roles and responsibilities. There are knowledge gaps in relation to the effects of migration on gender roles. There is a need to anticipate the likely implications of this trend and to prioritize research and policy interventions that can improve the well-being of members of farming households, especially of women farmers who are left to manage the farms.

In this paper, we are especially concerned with improving the understanding of migration's contribution to the livelihoods of rice-farming households and its effects on women left behind to manage farms.

The specific objectives of this research are to:

- determine the incidence and patterns of work-related migration in major rice-based farming systems in the Philippines, Thailand and Vietnam;
- assess the contribution of remittances to household income and of migration to rice productivity and the labour participation of men and women in rice production;
- examine the key constraints faced by women in managing farms;
- identify training needs and technology solutions to overcome these constraints;
- recommend gender-responsive policies and women-friendly rice-related technologies which can provide rural livelihood opportunities and empower poor rural women.

This paper is divided into six sections. Section two discusses the methodology for achieving the objectives. Section three presents the research findings and section four provides examples of training activities that can enhance women's technical knowledge and skills. Section five presents a summary and conclusions. Finally, section six provides recommendations to help women from farming households which have male migrants.

2. Methodology

To address the five objectives, this study used a number of methodologies. It is important to note that in this study, migration is defined as the move or change in residence of an individual (rather than an entire family) for a continuous period of three months or longer. Labour movement within a village and other villages for employment on a daily, weekly or monthly basis was classified as non-farm activity.

Literature review. A review of literature on migration, agricultural productivity and gender roles was conducted separately in the Philippines, Thailand and Vietnam. Secondary data and information on the study areas (districts and villages) were gathered.

Selection of study sites. The study sites were selected in consultation with local government agencies. The selected study sites in the Philippines were Pangasinan, Bulacan and Bicol, which are located in Luzon Island. In northeast Thailand, villages in Khon Kaen and Udonthani, which represent rainfed and irrigated rice production systems, were selected. In Vietnam, the study was conducted in villages located in Vinh Phuc province in North Vietnam, and in Tien Giang, Long An and Ben Tre provinces of the Mekong Delta in South Vietnam. Except for North Vietnam, which represents irrigated areas only, selected

villages in South Vietnam have both rainfed and irrigated rice production systems. All of the study villages grow rice during the wet season. Farmers who have access to irrigation facilities grow two to three crops of rice per year. Vietnam has the highest rice-cropping intensity index but has the lowest rice area (less than one hectare). The average rice area in the Philippines and Thailand is less than two hectares. A household has about five to six family members. Other non-rice crops are grown during the dry season, depending upon the availability of residual moisture or limited irrigation.

Data collection. A rapid rural appraisal and census of farming households in 48 villages in Thailand, 46 in the Philippines and 42 in Vietnam were conducted to determine the incidence of individual migration in rainfed and irrigated villages. Village-level information included the characteristics of the village, typologies of households (social differentiation), agriculture-related information, proximity to a labour market, occurrence and nature of participation of family members in farm, off-farm and nonfarm work and other migration-related information.

Focus group discussions with key informants were conducted to elicit perceptions on migration and its consequences on agriculture and family welfare.

Extensive household surveys were also conducted. Villages were selected based on the rapid rural appraisal. Households were selected through proportionate sampling according to the number of households in a village. The number of households with and without migrants that participated in the survey was 831 in Vietnam, 830 in Thailand and 813 in the Philippines. A structured pre-tested questionnaire was used, made up of two parts: Part one includes farm-household information, migration-related information, perceptions on the impact of out-migration on crop production and livestock, amount of remittances received from male and female migrants, disbursement of remittances, sources of household income, amount and value of assets and land ownership. Part two includes agricultural information and labour use by gender in major rice operations. Descriptive analysis was conducted by comparing and analysing differences between households with migrants and without migrants.

Identification of constraints of women left behind. Principal women whose husbands migrate were interviewed to identify constraints they faced in managing their farms. To overcome these constraints, technology and training needs were listed and prioritized by the research team for implementation.

3. Findings

3.1. Incidence of migration

We hypothesize that more people from rainfed villages migrate to other areas due to several 'push' factors such as higher risks in crop production, unemployment resulting from low cropping intensity and low productivity, and poor infrastructure facilities. Results show that migration occurs not only in the rainfed but also in the irrigated production ecosystems. But migration is more prevalent in the rainfed villages. The incidence of migration is higher in northeast Thailand than in the Philippines and Vietnam. In Thailand, 63 percent and 54 percent of the households from the rainfed and irrigated villages, respectively, have at least one migrant. In the Philippines and Vietnam, about a quarter of the households have one or more migrants. The factors that have impacts on

TABLE III-8

Incidence of migration

Rates of out-migration	Thailand		Philippines		Vietnam	
	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated
HMR	63	54	26	22	24	20
MMR	34	26	20	22	25	34
FMR	23	20	34	21	13	5
Total households	**1 197**	**789**	**3 062**	**2 861**	**462**	**2 668**
Total adult males	**2 433**	**1 546**	**728**	**1 361**	**1 039**	**5 394**
Total adult females	**2 467**	**1 637**	**754**	**1 433**	**1 047**	**5 486**

Source of data: rapid rural appraisal and census of farming households, 2004.

Household migration rate (HMR) = number of farming households with at least one adult migrant divided by the total number of farming households in the area (sample size).

Male migration prevalence rate (MMR) = number of adult male migrants in the area (sample) divided by the total number of adult males in the area (sample).

Female migration prevalence rate (FMR) = number of female migrants in the area (sample) divided by the total number of adult females in the area (sample).

migration in Vietnam are population and employment pressure, industrialization and urbanization. However, industrialization and urbanization have not only taken place in the big cities; this process has also occurred in many other different localities. In northeast Thailand, riskiness in farming due to unreliable rainfall distribution, drought, unemployment and poverty are factors which push the members of the farming population to the cities and other rural areas. In the Philippines, education and social networks are two of the pull factors, while unemployment, low wages, low profitability in farming and lack of infrastructure facilities are some of the reasons why people leave their villages for 'greener pastures'. The interest to leave the country is not only limited to the elderly but is also found among children, who wish to work abroad someday (Asis, 2006).

Our findings also reveal that the rate of male migration is higher in the rainfed than in the irrigated villages in Thailand and the Philippines. Female migration rates are higher in the rainfed than in the irrigated villages. Across countries, the prevalence of female migration is highest in the Philippines, followed by Thailand and then Vietnam.

3.2. Patterns of migration

Based on the extensive farm household surveys in the Philippines and Thailand, a higher proportion of adult sons and daughters migrate than their fathers. A similar trend is found in South Vietnam. We expect that rice productivity remains the same and labour out-migration will not affect the family labour supply. In contrast, in North Vietnam a higher proportion of principal males migrate than sons, while the principal females are left behind to manage their farms in addition to their household and child care responsibilities.

The migration pattern based on the place of destination depends on the availability of jobs in the place of destination. A higher proportion of the migrants in Thailand and Vietnam are engaged in rural-to-urban migration than rural-to-rural migration. In contrast, international migration is most prevalent in the Philippines, particularly migrants from

the rainfed villages. In Vietnam, rural-to-urban migration is more prevalent among farming households from the rainfed villages. In contrast, in the irrigated villages, an almost equal proportion of the migrants work in the rural and urban areas. International migration in Vietnam is nil.

Migrants leave their villages for better employment and income opportunities. In the Philippines, a higher proportion of the international male migrants than female migrants are employed in the service sector (e.g. airplane, ship, cargo) and factories. Male migrants are employed in the Middle East, Korea, Taiwan and other countries. On the other hand, female overseas workers are employed as domestic helpers, caregivers and factory workers in Italy, the Middle East and Singapore. Migrants prefer to work overseas because they receive higher remuneration and benefits than in their own countries.

In Thailand, almost half of the male and female migrants are engaged in farming in their villages, but only about 10 percent of them are hired in agricultural jobs and about half of them are employed in unskilled jobs at their new work place. Slightly more than one-fourth of them work as salespeople in stores.

In South Vietnam, male migrants work as hired agricultural labourers, factory workers, construction workers and masons in cities, as hired fishermen in sea fishing, and in shrimp or squid catching in other provinces. Women work mainly in factories, in waste trading and small trading, as hired labourers in rice farming, as sand-boating workers, domestic helpers, and factory workers, or in other industrial areas near rural areas.

3.3. Contributions of remittances to household income

Every year, rice farmers who grow rice under rainfed conditions are faced with uncertainty and risk. Rainfall distribution is highly variable and unpredictable. Drought occurs during the vegetative phase of rice growth, which causes losses or low yields. This situation is exacerbated by the predominance of marginal and small landholdings. Consequently, farming households derive their livelihood from diverse sources of farm income (rice, non-rice, livestock, rental fees from land, animals and machines), off-farm activities (income from wage labour on other farms) and non-farm activities (employment activities within and outside their villages without changing residence). In income analysis, remittances are most often classified as non-farm income. However, since this research focuses on income from out-migration, remittances were disaggregated from non-farm income.

Table III-9 shows the share of the different sources of livelihood and average household income. Average household annual incomes of households with migrants are almost twice those of households without migrants in the Philippines and Thailand. In Vietnam the incomes are almost the same. Remittances from migrants comprise a significant share of the total household income in the three countries. The share of remittance income is highest in the Philippines (59 percent) mainly due to international migration. In Thailand and Vietnam, remittances are 38 percent and 36 percent, respectively, where rural-to-urban migration is more prevalent (brought about by rapid industrialization and transportation facilities). Remittance earnings compensate for lower income from rice in the Philippines and Thailand. On the other hand, in Vietnam, remittances compensate for lower income from other crops and lack of other non-farm income opportunities within the villages. It is interesting that households without migrants have much larger sources of non-farm income than migrant households in all three countries. However, the data do not indicate whether non-migrant households develop non-farm livelihood activities

TABLE III-9

Share of different sources of income
(percent) and household income per year

Source of income	Thailand		Vietnam		Philippines	
	WM	NM	WM	NM	WM	NM
	(n=268)	(n=295)	(n=304)	(n=346)	(n=321)	(n=349)
Remittances from migration	38		36		59	
Cash income from rice	12	19	37	49	17	36
Cash income from other crops	16	21	2	1	a	
Off-farm	4	8	2	4	2	2
Non-farm	21	45	10	25	20	57
Capital gains from land and non-land assets	1	1	a	a		a
Income from livestock	8	6	13	21	2	5
Total	**100**	**100**	**100**	**100**	**100**	**100**
Annual household income (USD)	**2 541**	**1 842**	**1 411**	**1 306**	**2 857**	**1 512**

WM - with migrant; NM - no migrant; a - less than 1%

because they can not engage in migration, or they do not wish to migrate because they have a satisfactory range of farm and non-farm income sources. Nonetheless, these findings reveal that migration is a routine livelihood strategy of poor farming households, helping them to smooth seasonal income fluctuations and earn extra cash to meet contingencies or increase disposable income, particularly in the rainfed villages.

Off-farm income refers to the income obtained by male or female household members from wages paid in cash or wages in kind by working as hired labourers in different farm operations in other farms. Non-farm income refers to income received by family members by working within and outside the villages without a change in residence. Earnings classified under non-farm income include those from retirement pensions, buy-and-sell small businesses and services and other earnings from household members who commute daily for non-farm jobs.

3.4. Contributions of remittances to household welfare

The contributions of remittances to household welfare depend on the amount of remittances sent by migrants to their families. Migrants allocate their earnings for their personal expenditures in their place of destination and send the rest to their families. Migrants from the Philippines send the highest amount (about US$200 per month) while Thai migrants send less than US$100 per month. Vietnamese migrants send the lowest remittances, at less than US$50 per month. As mentioned earlier, international migration is prevalent in the Philippines, rural-urban in Thailand and Vietnam. Thus, we expect remittances to have greater positive outcomes on family welfare in the Philippines than in Thailand and Vietnam.

How are remittances used by farming households left behind? It has been widely observed that the investment of remittances into productive uses is limited, and consumption spending is greater. But this is not necessarily a problem as consumption can include a variety of uses which may have a positive impact on well-being and multiplier effects in the economy. Based on this study, remittances are mainly used for food and other daily expenditures, particularly in the Philippines and Thailand.

In the Philippines, next to food expenditures, families spend the remittances on children's education and farm inputs. For migrant parents, providing an education for their own children is a priority. Because of strong family ties, unmarried female migrants are expected to pay for the education of other close relatives, including nephews and nieces. Migrants also take care of the health care needs of ageing parents, since public health in the Philippines, particularly in the rural areas, is considered to be quite poor and the costs of medicines too high. A study on Filipino migrants in Italy (INSTRAW, 2008) revealed that it is the investment of remittances in agricultural production that has offered greater food security to remittance-receiving households. This is due in part to the fact that remittances allow farmers to purchase the necessary inputs (e.g. fertilizers, pesticides), pay for irrigation expenses, pay for hired/contractual labourers or purchase livestock. This permits farmers to stock the rice requirements for a year, particularly farmers with rainfed plots who harvest only once in a year.

In Thailand, remittances are also used for repaying debts, purchasing farm inputs and paying for children's education. A study in Khon Kaen province (Aimimthan *et al.*, 2002) reveals that migrants had to pay high interest rates in paying off debts to recruitment companies. More children or dependents in migrant families were enrolled in school than before due to remittance earnings.

In Vietnam, families in the South spend their remittances on food and farm inputs while those from the North keep much of the remittances as savings for future investments, and less so for food expenses. In general, once the basic needs of the households with migrants are met, construction or renovation of a house is generally a common investment, as is the purchase of consumer durable goods.

3.5. Out-migration and rice productivity

The effects of labour out-migration on rice productivity can be mixed. On the one hand, migration might reduce labour supply and farm output. Farm output can later increase if the absence of some family members is compensated by the reinvestment of remittances on farm inputs or by helping ease cash and credit constraints. The performance of a crop can be attributed to many factors, such as the environment, quality of land, labour, capital and managerial ability of the farmer. Effective farm management depends on the education of the farmer, experience, technical knowledge, access to inputs, incentives and family support. Rice productivity itself is influenced by many factors, such as varieties used and crop and resource management practices. If remittances come on time, the farmers can use the available cash to purchase inputs and hire additional farm labour to complete the labour requirements on time and also relieve female family members from drudgery.

To assess the effects of out-migration on rice productivity, we compared the average rice yields of households with and without migrants by production systems (rainfed and irrigated) during the wet season. Results revealed that households with migrants have higher average yields than those without migrants during the wet season for the

irrigated villages included in the study, except in Thailand. These yield differences are statistically significant. In the rainfed villages, average rice yields are almost the same between the two groups. However, these differences are not statistically significant. Thus, based on these comparisons of average yields between the two groups, out-migration did not lead to a reduction in rice productivity. In the rainfed villages in Thailand and Vietnam, households with migrants use more family than hired labour. Family members left behind take over the field operations and farm management responsibilities.

3.6. Out-migration and workload of men and women left behind

What happens to women's workload when men migrate? Palmer (1985) cited many issues for women left behind, one of which is the increase in the work burden of women, depending on who is left behind. In Thailand, principal females had been engaged in their traditional tasks as unpaid workers and as managers with a limited budget, arranging for hired labourers and borrowing money from private lenders. Thus, migration did not change their participation in field activities. However, the principal females revealed that their work burden and farm responsibilities increased. They had to manage the day-to-day farm activities and make crop management decisions aside from household management when their husbands worked outside the villages for extended periods.

In Vietnam, the labour contributions of principal females increased. In addition to managing all operations, they also look for labourers to hire during peak cropping operations. During peak cropping season, wage costs increase and hired labourers are difficult to find. To cope with this problem, women exchange labour with women from other households. The important activities that increase wives' workload when husbands leave are irrigating the fields, dredging field canals, applying fertilizer and spraying pesticides and transporting paddy sacks from the fields to their house and to the market. Thus, the farm managerial responsibilities of the principal women increased due to the migration.

3.7. Constraints faced by women left behind in managing farms

When principal female members left behind were asked whether they had encountered problems in managing their farms, at first they said they had no problems since they had long-term experience in farming. However, after building a rapport with them during the interviews, they said that they faced several constraints in managing their farms and great pressure to maintain rice yields due to the absence of their husbands. They feel the stress in allocating the limited budget for the household, farm inputs and other major expenditures such as children's education.

In the Philippines, they complained of high costs of inputs (seeds, chemicals, hired labour, irrigation) and a low paddy price, especially during the harvest season. They are especially concerned about improving post-harvest practices, which is their domain. Similarly, in Thailand, they complained about the high costs of fertilizer and herbicides to control weeds, especially in direct-seeded plots. They also had problems with snails, which damage young rice seedlings; low yields due to drought; and a reduction in paddy area because of increasing area cultivated for other crops (sugar cane, eucalyptus, cassava). The costs of chemical fertilizer ranged from 45-55 percent of the total costs of farm inputs in this study (with and without migrants) in both irrigated and rainfed villages.

In Vietnam, they complained of a lack of capital to pay for hired labourers and cash to buy material inputs since remittances were small. They also complained of high costs of inputs such as seeds, chemical fertilizer and pesticides. The high costs of inputs can be addressed by improved crop management techniques through rice technologies. However, based on the in-depth interviews in the study villages, the women do not have access to information on improved crop management techniques, particularly in relation to reduced use of inputs without reducing rice yields. They rely on their neighbours (and input dealers) for information on the use of inputs and pest management.

4. Enhancing women's technical knowledge and skills

Based on the above-mentioned constraints, the research teams organized several training programmes that focused on efficient use of inputs in rice production. In these training activities, the invited participants are mainly the women *de facto* heads of households among the households with migrants. However, in the Philippines, several husbands who were present in the village during the time of the surveys participated in the training. A series of village classes were conducted on improved rice production management, with a focus on improving farmers' rice seed health practices. Extension guides on "Improved Seed Health Improvement Practices" were distributed to the agricultural extension officers and participants. After the training, the participants compared the selected (healthy) seeds with the unselected seeds in their own plots. This gain in knowledge led to yield gains of 5-10 percent.

In Thailand, the team organized field trips and training courses for women on technologies which can reduce the cost of chemical fertilizers and herbicides. Staff from the Land Development Department and experts from the Faculty of Agriculture, Khon Kaen University trained the women, their husbands who migrate on a seasonal basis and village committee members on the production and application of liquid biofertilizer and bioinsect repellant using local herbal plants to control weeds in the fields. For the first time, the women were direct recipients of training courses designed to address the constraints they face in managing the farms, especially when their husbands are away for long periods. After the training, they gained more knowledge and information on how to better manage rice production from seed to seed, use inputs more efficiently and reduce costs, which are necessary in making sound decisions.

In Vietnam, the research team organized a series of training programmes at the three study sites on the onset of the wet season. Women received technical knowledge on integrated pest management and the three "Rs" (reduce seeds, reduce fertilizer and reduce pesticides), and were provided with seeds of new varieties. At the rainfed sites, the women used to grow long-duration rice varieties. However, after the training they shifted to short-duration (i.e. three-month) varieties. They also reduced the amount of insecticide sprays, fertilizer and seeds. They were able to save 350 000 to 400 000 dong/ha (US$22-25) because of the reduction in the cost of inputs. Average yields increased from four to five tonnes/hectare. In the irrigated villages, the women are already growing short-duration varieties. However, after the training they reduced the amount of urea, increased the dosage of potassium, and reduced the number of insecticide sprays and seed rates. Yields increased during the wet season.

5. Summary and conclusions

This migration study was based on surveys of farming households with and without migrants in the Philippines (813), Thailand (830) and Vietnam (831). Our findings reveal that the incidence of migration is highest in northeast Thailand (63 percent). In the Philippines and Vietnam, about a quarter of the farming households interviewed have at least one migrant. In the Philippines and Thailand, a higher proportion of adult sons and daughters migrate than their fathers. In contrast, in North Vietnam a higher proportion of fathers migrate than sons, while the mothers stayed behind to take over their field work responsibilities and management of the household and farm. Average household annual incomes of households with migrants are almost twice those of households without migrants in the Philippines and Thailand. In Vietnam, average household incomes between the two groups are almost the same.

Remittances from migrants comprise a significant share of the total household income in the Philippines (59 percent) mainly due to international migration. In Thailand and Vietnam, remittances are 38 percent and 36 percent, respectively, where rural-to-urban migration is more prevalent (brought about by rapid industrialization and transportation facilities). Remittance earnings compensate for lower income from rice in the Philippines and Thailand. On the other hand, in Vietnam remittances compensate for lower income from other crops and lack of other non-farm income opportunities within the villages. Remittances are mainly spent on food and daily expenditures, children's education, farm inputs (hired labour, material inputs) and debt repayments.

In Thailand, principal females continued to contribute significantly in field activities. In Vietnam, labour out-migration resulted in fluidity in gender roles as the principal females who were left behind took over the tasks traditionally done by the principal males, such as irrigating the fields, preparing the dikes, applying pesticides and hauling farm products. In contrast, in the Philippines, the principal females withdrew from field activities and are more engaged in managing their farms and non-farm income-generating activities. Rice yields among migrants did not decline; thus migration led to positive consequences on production.

In all three countries, women's farm managerial responsibilities increased with migration. They will play greater roles as farm managers in the future, unless rural development takes place and reduces the outflow of rural labour. Agricultural research and extension institutions can play an important role by enhancing the technical knowledge and skills of women, especially of female *de facto* heads of households. These can be effective strategies in increasing rice productivity, ensuring family food security, and alleviating poverty in a context of out-migration.

6. Recommendations

To help women from households with male migrants increase farm production and improve livelihoods, the following needs to be addressed:

- Principal females left behind to manage the farms should be included in participatory research dealing with rice-variety improvement and associated crop management technologies which can reduce costs of production. They should also be direct beneficiaries of agricultural extension services.
- Government assistance to agriculture and agricultural microcredit should be channeled through women to effectively reach the entire household.
- Programmes that combine technical with organizational and leadership skills are effective in building social capital. Thus, research and development workers should facilitate the formation of women's groups to sustain adoption of different income-generating activities. One strategy would be to train rural women as local agricultural extension workers who can transfer their knowledge to other women.
- Women should be given opportunities for technical education that can build their entrepreneurial skills for self-employment and wage employment.
- The value chain of farm products should be studied to identify opportunities for enhancing women's roles in marketing and dissemination of information.

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Assessing the impact of gendered labour markets in the rural Philippines

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1. Introduction

Are different types of resources within the household associated with different household welfare outcomes? Does access to economic resources accrued through paid off-farm labour have a different effect on children's well-being? Does the identity of the earner of labour income affect household welfare and household members differently? This study aims to provide an insightful contribution to the literature by addressing these questions in a rural, developing-country context. Specifically, this paper aims to assess the relationship between women's participation in paid off-farm activities and children's welfare outcomes such as nutritional status.

This issue is particularly relevant in rural environments where non-agricultural activities have become increasingly important as an *ex-ante* mechanism to diversify risk and reduce vulnerability. The average share of non-farm income in rural households' total income is about 40 percent in Latin America (Reardon, Berdegue and Escobar, 2001), 35 percent in Asia and 45 percent in Africa (Reardon *et al.*, 1998), and it is estimated that about 36 percent of the rural workers in Latin America, 25 percent in Asia and 11 percent in Africa are employed in rural non-agricultural activities (Haggblade *et al.*, 2002). Diversification into non- agricultural employment has a gender dimension as well; women's participation in non-agricultural activities is high and has been increasing substantially over time. Out of the total number of workers employed in non-farm activities, 25 percent in Africa, 27 percent in Latin America and 20 percent in Asia are women (Haggblade *et al.*, 2002). These estimates do not include part-time or seasonal activities, which suggest that the importance of women's participation in non-farm activities may be even higher.

In addition to the increasing importance of women's participation in non-agricultural activities, off-farm work has other characteristics that distinguish this type of income-generating activity from other types of labour, particularly for women. Off-farm work represents a more stable source of income than farm work since it is not as seasonal and volatile as agricultural work, and it is usually associated with greater control over earnings by the income earner (income from agriculture is usually perceived as the household's income rather than a particular individual's income); however, it is rather inflexible since it requires women to spend a certain number of hours working outside the home and usually limits the mother's ability to perform caregiving activities herself.

Hence, because of the growing importance of non-agricultural activities in rural settings, the increasing participation of women in these activities, and the particular characteristics associated with this type of labour, this analysis will focus on testing the relationship

between women's employment in non-agricultural activities and children's well-being in the rural Philippines. This country provides an interesting setting in which to examine the gender dimensions of labour and employment because it is a relatively egalitarian society with respect to gender roles (Bouis and Peña, 1997, Estudillo, Quisumbing and Otsuka, 2001 and Quisumbing, Estudillo and Otsuka, 2004). However, despite the generally gender-egalitarian nature of Filipino society, there are marked differences in men's and women's labour market participation, as well as sector of employment. In January 2008, while the labour force participation rate of men was much higher than women's (78.5 percent vs. 48.4 percent), the unemployment rate of women (6.7 percent) was lower than men's (7.8 percent).[62] Occupational segregation is also evident: in 2006, 68 percent of the population employed as professionals and 64 percent of clerks were women, while about 85 percent of the workers employed in agriculture were men.[63] In fact, the number of women employed as government officials, clerks, professionals and service workers was higher than that of males from 2001-2006, while the number of women employed in agriculture was significantly lower than men for the same period of time. This shows that women's participation in non-agricultural activities is of great importance in the Philippines.

This paper is structured as follows. Section two reviews the literature devoted to testing the relationship between women's access to economic resources and children's welfare. Section three briefly describes the data used in this analysis. Section four explains the empirical approach and section five reports the main findings. Finally, the conclusions and policy implications are discussed in section six.

2. Women's access to economic resources, labour participation and household well-being

There is now substantial empirical evidence showing that women's access to economic resources is beneficial to household members and particularly to children (Thomas,1990; Hoddinott and Haddad,1994; Phipps and Burton,1998). However, does women's access to paid off-farm income have the same effect? Unlike the studies that assess the relationship between women's access to physical resources and children's well-being, there is no clear consensus in the literature about the effect of women's paid work on children's welfare (Glick, 2002). In general, this ambiguity is attributed to the presence of two opposite effects associated with paid employment: there is a positive effect because of an increase in household income associated with mothers' paid work, which we will call the *income effect;* and there is a negative effect because of a decrease in the amount of time allocated to unpaid housework, particularly to child care (Popkin, 1983), which we will call the *time effect*. Thus, the net effect of women's paid employment on household welfare is uncertain and depends on whether the effect of time or income dominates and the context in which it is being analysed.

The empirical evidence portrays this ambiguity through the diversity of results. Some studies such as Popkin (1983) in the Philippines, Sonalde and Jain (1994) in India and Wandel and Holmboe-Ottesen (1992) in Tanzania find that women's work does not have

62 National Statistics Office: http://www.census.gov.ph/data/sectordata/2007/lf070126.htm

63 See http://www.phil-lmi.dole.gov.ph/lmi/philLMI_2.htm and http://www.phil-lmi.dole.gov.ph/lmi/apec-lmi/d06_001to027_emp_occ_sex.html for Philippine labour market information.

a significant effect on children's welfare. Other studies, such as those conducted by Lamontagne *et al.* (1998) for Nicaraguan households and Vial and Munchnik (1989) in Chile, find that women's work has a positive effect on children's welfare. These results contrast with Chutikul (1986), who finds that women's work in the formal sector is related to child malnutrition in Thailand, or Rabiee and Geissler (1992), who find that, despite having a higher socio-economic status, children with mothers who work more than three hours per day away from home face lower levels of nutrition than children with mothers who work less than three hours per day in Tagengokey, Iran. Similarly, Alderman (1983) finds that the hours that women spend in paid work are associated with lower levels of children's welfare in Peru. The inconclusive evidence about the relationship between women's access to resources obtained through paid labour and a household's well-being suggests that it is essential to understand the gendered patterns of employment in different economic sectors, the types of employment performed by women, and the intensity of their labour. This paper attempts to draw from both threads of the literature in order to understand whether women's participation in paid off-farm activities affects household welfare differently than other types of labour.

3. The data

In order to test the hypotheses presented in section two, this study uses a unique longitudinal data set that was collected in Bukidnon province in Northern Mindanao, Philippines, by the International Food Policy Research Institute (IFPRI) and the Research Institute for Mindanao Culture, Xavier University (RIMCU).[64] This data set consists of two waves of data that were collected 18 years apart. The first wave of data was collected in four rounds which were conducted four months apart in 1984-1985 and initially included 510 households, of which 448 were interviewed in all four rounds. These households were selected using stratified random sampling among corn and sugar producers with at least one preschool child (five years of age or younger). The second wave of data collection, conducted in 2003-2004, was designed to interview all traceable original respondents, a maximum of two split households located in the same village (households of non-co-resident children from parents of the original sample), and at least one household formed by children from the sample of original parents but who had migrated outside the village.[65] The second wave of data provides information on 311 households (61 percent of the original households), 261 split households and 231 migrant households. The second wave of data was collected in 2003 for the original and split households and in 2004 for the migrant households. However, because we are interested in looking at demographically similar households (i.e. households with preschoolers), we will not use the information collected on the original parents in 2003, most of whom no longer have preschoolers. Only the households of the children from the original parents are included (split and migrants). After dropping the households without sons or daughters five years old or younger, as well as children with non-feasible z-scores, we have a final sample of 382 households and 618 children in 1985, and 294 households with 415 children in 2003.[66]

64 See Quisumbing and McNiven (2005) for a detailed description of the 2003-2004 data and sample design.

65 Budgetary constraints prevented tracking all migrant children, so the team tracked children who had migrated to other areas in rural Bukidnon, nearby areas of Davao and Cotabato (adjacent provinces), urban centres in Bukidnon, and Cagayan de Oro, the major metropolitan centre of Northern Mindanao, located in the province of Misamis Oriental.

66 In 1985, 29 children (4.4 percent) did not have biologically feasible z-scores. In 2003, 11 children (2.6 percent) did not have biologically feasible z-scores.

In general, the households in our sample are poor households who allocate most of their labour to agricultural activities, particularly sugar and corn cultivation. They are large households with very few facilities in their dwellings. On average, mothers from these households are younger and more educated than their male counterparts and seem to be moving away from agricultural employment to obtain jobs as salespersons, housemaids, bookkeepers, etc. Despite the higher levels of education, women seem less likely to participate in paid non-agricultural activities than men.

We found that parents had very different labour participation patterns between the two periods. In 1985, about 28 percent of the mothers participated in paid non-agricultural activities (wage activities or non-agricultural owned business) while 34 percent participated in paid agricultural activities. In 2003, we find that 28 percent of women participated in paid non-agricultural activities and only 14 percent participated in paid agricultural activities. In 1985, 46 percent of the fathers received non-agricultural wages and 71 percent received agricultural wages, while in 2003, 62 percent of the fathers received non-agricultural wages and only 37 percent received agricultural wages. For both periods, men are more likely to be employed in either activity. Since paid non-agricultural activities include individuals who perform wage work or work in family business, we find that in both periods, a greater percentage of mothers work in non-agricultural family-owned business while most of the male heads of households participate in non-agricultural wage activities. Regarding the occupations performed by gender in 1985, 16 percent of the women were teachers, 10 percent were municipal officials, 12 percent were agents or salespersons, 10 percent were beauticians and 2 percent were housemaids. Men were mainly employed in construction (10 percent), carpentry (8 percent) and as bus drivers (5 percent). In 2003, we find that women are mainly employed as salespersons (16 percent), teachers (18 percent), municipal or government officials (12 percent), bookkeepers (9 percent) and housemaids (6 percent), while men are mainly employed as bus drivers (13 percent), carpenters (9 percent), security guards or military (9 percent) and cab drivers (7 percent). With respect to earnings from waged non-agricultural activities, we can not reject the hypothesis that women and men earn the same annual or hourly non-agricultural income in 2003 or 1985. However, there is some evidence suggesting that in 2003, men allocate more hours to these types of activities than women.

To examine the impact of women's participation in off-farm activities on children's welfare, we use anthropometric measures as a measure of preschooler well-being. Outliers with z-scores above or below what is biologically feasible were not included.[67] Some of the descriptive statistics on four main anthropometric measurements (z-scores) of children who are five years old or younger, calculated using the World Health Organization (WHO) growth charts and methodology (WHO, 2007; WHO, 2008),[68] show some evidence suggesting more favourable outcomes for girls in 1985 where girls have significantly higher z-scores than boys. These differences were particularly strong for the children who were less than two years old in 1985. However, for the 2003 sample, we cannot reject the null hypothesis that girls and boys have on average the same z-scores, since none of the t-tests of difference in means between boys and girls is significant. This preliminary assessment of means between girls and boys confirms the low levels of gender inequality in anthropometric measures in 2003.

67 Children with weight for height or a body mass index below -5 or above 5; children with weight for age below -6 and above 5; children with height for age below -6 or above 6.

68 The z-scores were calculated using the STATA programme: WHO Child Growth Standards, STATA igrowup package and macros.

In general, four conclusions can be drawn from this preliminary analysis. First, women's and men's participation in paid agricultural activities was reduced drastically from 1985 to 2003. Second, there has been a slight decrease in the percentage of women who participate in non-agricultural activities, which is mainly caused by a decline in the percentage of women who allocate their labour to non-agricultural businesses. Third, there has been an increase in the percentage of individuals in non-agricultural wage activities; however, the percentage increase in women's participation is rather small compared with men's. Fourth, there do not seem to be any significant differences in the annual or hourly earnings from non-agricultural waged activities between men and women.

4. The econometric approach

Mothers' participation in off-farm work can affect children's well-being through two opposing pathways: the time versus the income effect. If the first effect is stronger, then we should see a negative and significant effect of women's participation in paid non-agricultural activities on child welfare. On the other hand, if the income effect dominates, it is expected that women's participation in paid activities would increase the amount of financial resources available for the household members and particularly benefit children. However, there are two main issues that need to be considered when estimating the effect of women's participation in paid non-agricultural activities on children's well-being. First, mothers' participation in the labour market might be endogenous as well as correlated with the outcome under consideration. Women with healthier children might be more inclined to join the labour force, while women with ill children might be obliged to stay home providing care to those children. Women may also be pushed to work in paid activities if the household's expenditures are higher for any particular reason, including medical expenses for sick children. Second, some unobservable characteristics might influence both labour participation and children's health. If this is the case, then estimating a regular ordinary least squares (OLS) regression with women's participation as an independent variable might generate biased estimates. Hence, to assess the relationship between women's participation in paid non-agricultural activities and children's well-being, we use an Instrumental Variable approach similar to Angrist (2000), where the first stage will estimate the determinants of women's participation in non-agricultural activities by using a Linear Probability Model (LPM) and the second stage will estimate the effect of women's participation in paid activities on children's well-being.

Instruments are variables that affect women's participation in non-agricultural activities that do not have a direct effect on child welfare outcomes. The instruments used to identify women's participation in non-agricultural activities are the amount of land owned in hectares, the percentage of women working in non-agricultural wage activities in the community and the distance to the closest "*poblacion*" or community centre. We use land owned as an instrument because having access to large amounts of land might encourage women to engage in agricultural activities, and therefore may increase the probability of their participating in unpaid agricultural activities. Additionally, this variable is exogenous to children's health outcomes because once the amount of land *cultivated* by the household is controlled for, the amount of land owned should not have a direct effect on children's anthropometric scores other than by affecting the probability of their mothers' participation in paid activities. The percentage of women working in the neighbourhood is a proxy for social norms. A higher percentage of women working in non-agricultural wage activities suggests that it is socially acceptable for women to participate

in these types of activities, and may increase the willingness of women to work outside the home. At the same time, a greater percentage of women working in non-agricultural wage activities influences the demand for women's labour because employers might feel more comfortable when hiring women since it is socially acceptable for them to employ them. The percentage of women working in the community may also be capturing the "horizontal transmission" of bargaining power (Agarwal, 1997). Finally, if the household is located close to the centre of the community, where the economic activity is high, women might have more opportunities to be employed outside agriculture.

Once the first stage is estimated using an LPM, the predicted values are incorporated in the second stage that analyses the relationship between women's participation and children's well-being. Equation 1 captures this relationship:

$$W_{ji} = \gamma + \delta L_{wi} + \theta_1 \sum X_{ji} + \theta_2 \sum HH_{ji} + \theta_3 \sum Y_{ji} + \theta_4 \sum M_{ji} + \theta_5 \sum G_{ji} + \varepsilon_2 \quad (6)$$

Where,

W_{ji} is a vector of anthropometric measures used to proxy for children's well-being (z-scores): weight for height (WHZ), body mass index (BMI), weight for age (WAZ) and height for age (HAZ);

γ is a constant term;

W_{wi} is the probability that the mother i is participating in paid non-agricultural activities (an endogenous regressor);

X_{ji} is a vector of the child's specific characteristics (age, gender, whether the child is the youngest or the oldest);

M_i is a vector of individual specific characteristics of the mother (age, education, weight, height);

HH_i is a vector of household demographic characteristics (household size, percentage of children between 0-5 years old; percentage of children between 6-15 years; percentage of adults between 16-55 years old; and percentage of adults older than 55);

G_i is a vector of dummy variables for each municipality;

Y_i is a vector of economic and housing characteristics of the household (total land cultivated, durable assets, farming assets,[69] having cement floor and having access to toilet);

ε_2 is the error term; and

θ_1, θ_2, θ_3, θ_4, θ_5 are the coefficients to be estimated.

The effect of women's participation in paid non-agricultural activities is captured by the θ_1 coefficient. Specifically, the income hypothesis would be corroborated if θ_1 is positive and significant. Then, we could argue that women's participation in paid non-agricultural activities has a positive effect on children's well-being because of its positive effect on income. On the other hand, if θ_1 is negative and significant, we would corroborate the time restriction hypothesis where it is presumed that children whose mothers work in these types of activities have lower z-scores because the mothers' unavailability of time restricts them from performing housework activities such as child care.

69 The measures for access to durable and farming assets are calculated by using factor analysis.

5. Results: assessing children's well-being

Since we are estimating these equations separately for each time period (1984-85 and 2003-04), some variations need to be made to assure the exogeneity of the instruments as well as to control for differences in social and economic contexts in each time period. For the parent sample (1985), our instruments are distance to the "*poblacion*" and the percentage of women working in non-agricultural wage activities in the community. When the amount of land owned in round 1 was included, the variable was not significant and reduced the joint significance of the instruments. Therefore, we did not include it as an instrument for this sample of households. For the 2003 sample, which is made up of households formed by children of those parents interviewed in 1985, we included the amount of land purchased before marriage or inherited by women, and the percentage of women working in off-farm wage activities in the neighbourhood as instruments. Since the surveys conducted in 2003 for split households and 2004 for migrant households were collected in only one round, it was not possible to use land owned by the household as an instrument during this period, as this might be endogenous to women's participation. However, the amount of land purchased before marriage or inherited from their parents is exogenous not only to participation in non-agricultural paid activities but also to marriage dynamics. Land inherited by women may also capture an exogenous source of wealth that can increase their bargaining power within the household. On the other hand, the distance to the nearest "*poblacion*" was not included because it might be endogenous to women's participation in paid non-agricultural activities. As mentioned, the economic and social circumstances in 2003 are completely different from those in 1985. Many of the households surveyed migrated to nearby urban communities, suggesting that the intention to look for better opportunities including labour prospects might be one of the primary reasons for migrating. This was not the case for the sample surveyed in 1985, when both land and labour markets were thinner and location was almost predetermined. The instruments used pass the tests of relevance, validity and over-identification.

The first stage estimation for the sample of 1985 respondents using LPM demonstrates that the percentage of women participating in agricultural wage activities in the community increases the probability of the mother being involved in paid non-agricultural activities, supporting our hypothesis that in communities where it is socially acceptable for women to work or where there is a local demand for female labour, women are more likely to participate in paid non-agricultural activities. On the other hand, distance to the centre of the community or "*poblacion*" decreases the probability that the mother participates in paid non-agricultural activities. These results confirm that women who are located closer to the centre of the community have more opportunities to obtain a job in this sector, probably because the supply of this type of jobs is higher. Also, since most of the non-agricultural jobs are located in the "*poblacion*", mothers who live closer face lower transaction costs when traveling to their jobs. Hence, it becomes more attractive for them to supply their labour in paid activities. For the 2003 sample of adult children of the 1985 respondents, we also find that the percentage of women working in the neighbourhood positively influences women's participation in paid non-agricultural activities. In addition, land that is either purchased before marriage or inherited also increases the probability of their participation in paid non-agricultural activities. The impact of land could occur through several pathways. Exogenously acquired land could improve women's bargaining power within the household, making them more likely to allocate their labour in paid non-agricultural activities. On the other hand, women with larger landholdings can

decide to hire workers to cultivate their land, rent their land to others or give it to their husband for cultivation while they allocate their labour to the non-agricultural labour market. Other variables such as mother's education and mother's age have a positive effect on women's participation in paid non-agricultural activities.[70]

The second stage estimations examine the impact of mothers' participation in non-agricultural employment on those daughters and sons in households with both parents present. These results are presented in Table III-10 for the 1985 sample and Table III-11 for the 2003 sample (see Annex). In 1985, the results indicate that mothers' participation in paid non-agricultural activities does not affect children's well-being. None of the coefficients that capture women's participation in non-agricultural activities are significant for any of the z-scores used as dependent variables. The absence of statistical significance of the coefficient of mother's participation might be due to the offsetting impacts of the time and income effects. However, the results presented in Table III-11 show that for the younger generation, mother's participation in non-agricultural activities has a positive significant effect on weight for height and body mass index, suggesting an increase of about 1.4 and 1.5 points, respectively. However, mothers' participation in non-agricultural activities does not appear to affect height-for-age, which is an indicator of long-term nutritional status, nor weight-for-age, which captures both short-term and long-term effects. These results suggest that women's participation in paid non-agricultural activities has a positive influence on short-term nutritional status, but may have an insignificant impact over the long term. Nevertheless, these results indicate that mothers' participation in non-farm work has become an important and positive influence on children's well-being in recent years. This is interesting since it corroborates the importance of women's work on children's welfare. Overall, these findings allow us to reject the hypothesis that, in this specific context, women's participation in the labour force has a negative effect on children's well-being.

70 Due to space limitations, the significance of other explanatory variables is not discussed here. First-stage estimates are available from the authors upon request.

6. Conclusions

This paper examined the impact of women's participation in paid labour activities on children's well-being. The results provide evidence rejecting the hypothesis that women's paid employment has a negative impact on child nutritional status. For the earlier sample, women's participation in off-farm activities did not affect children's anthropometric outcomes, while for the later sample, the statistical evidence suggests that women's participation in off-farm paid activities benefits their children. We also provide evidence that intergenerationally transmitted wealth affects children's welfare. Land purchased before marriage or inherited by women has a positive significant effect on women's participation in off-farm paid activities. Grandparents can therefore affect grandchildren's health outcomes by bequeathing land to their daughters. The ability of women to inherit land in the Philippines demonstrates the importance of an underlying social and legal framework that allows women to inherit land. Our results also provide support for the hypothesis that social norms, proxied by the percentage of women working in off-farm wage activities in the community, influence the well-being of children by increasing the probability of women's participation in off-farm activities. These two results confirm the importance of vertical transmission of bargaining power from parents to daughters as well as the horizontal transmission of social norms from other women in the community to mothers (Agarwal, 1997).

Women's participation in off-farm paid activities can be considered as an important pathway out of poverty in rural areas, not only because of their direct contribution to family incomes, but also because of the positive impact on child nutrition. Previous studies have demonstrated that health and nutrition in childhood affect educational attainment and economic productivity in adulthood. Women's participation in paid off-farm activities emerges as an important tool that can be used to enhance children's present and future well-being through improved nutrition. Policies that reduce barriers to women's participation in the labour force, whether through increasing the acceptability of women working outside the home or providing affordable quality child care, can help women take advantage of opportunities to both earn incomes and invest in the human capital of the next generation.

Annex

TABLE III-10

Assessing children's well-being (1985)

	(1) Weight for Age	(2) Height for Age	(3) Body Mass Index	(4) Weight for Height
Endogenous regressor				
Mother's participation in non-ag. activities	0.160 (0.718)	0.055 (0.923)	0.001 (0.999)	-0.101 (0.847)
Mother's characteristics				
Mother's education	0.015 (0.471)	0.014 (0.562)	0.015 (0.476)	0.023 (0.296)
Mother's age	0.015 (0.098)*	0.024 (0.016)**	0.001 (0.943)	0.003 (0.790)
Child's characteristics				
Male	-0.132 (0.098)*	-0.180 (0.051)*	-0.053 (0.574)	-0.165 (0.073)*
Age	-0.613 (0.000)***	-1.147 (0.000)***	0.211 (0.127)	-0.103 (0.481)
Age Squared	0.093 (0.000)***	0.185 (0.000)***	-0.042 (0.103)	0.020 (0.454)
Eldest child (1 if eldest child)	-0.128 (0.342)	-0.003 (0.985)	-0.139 (0.382)	-0.177 (0.258)
Youngest child (1 if youngest child)	-0.207 (0.079)*	-0.449 (0.002)***	0.025 (0.842)	-0.057 (0.643)
Demographic characteristics of the household				
Household size	-0.082 (0.001)***	-0.103 (0.001)***	-0.019 (0.491)	-0.023 (0.416)
% children 0-5	-0.513 (0.340)	-1.212 (0.051)*	0.307 (0.628)	-0.142 (0.831)
% children 6-15	-0.185 (0.666)	-0.177 (0.737)	0.053 (0.914)	-0.145 (0.772)
% elderly (>55)	-0.452 (0.655)	-0.914 (0.341)	0.246 (0.825)	0.047 (0.967)
Economic characteristics of the household				
Toilet (1 if having a toilet)	-0.109 (0.344)	-0.129 (0.348)	0.025 (0.853)	0.001 (0.996)
Cement (1 if having cement floor)	0.045 (0.777)	-0.111 (0.557)	0.177 (0.324)	0.124 (0.512)
Farming assets	0.084 (0.118)	0.100 (0.152)	0.039 (0.554)	0.042 (0.518)
Durable assets	-0.089 (0.269)	0.093 (0.477)	-0.157 (0.091)*	-0.124 (0.192)
Land cultivated (Log/hecs)	0.000 (0.983)	0.035 (0.037)**	-0.032 (0.052)*	-0.037 (0.040)**

Parents' anthropometric measurements				
Mother's weight	0.042 (0.000)***		0.028 (0.000)***	0.033 (0.000)***
Father's weight	0.032 (0.000)***		0.027 (0.005)***	0.029 (0.003)***
Mother's height		0.057 (0.000)***	0.004 (0.669)	0.009 (0.384)
Father's height		0.050 (0.000)***	-0.039 (0.000)***	-0.034 (0.001)***
Community fixed effects	Yes	Yes	Yes	Yes
Constant	-3.649 (0.000)***	-16.442 (0.000)***	2.381 (0.192)	1.014 (0.628)
F-statistic of instruments' joint significance	11.89	11.41	11.83	11.83
Anderson Test (Identification / Relevance)	26.16	24.48	26.15	26.15
Hansen J Test (chi-2)	0.002	0.3	0.27	0.18
Observations	616	618	616	616

Robust p values in parentheses; Community Fixed Effects included; *significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' estimations

TABLE III-11

Assessing children's well-being (2003)

	(1) Height for Age	(2) Weight for Age	(3) Body Mass Index	(4) Weight for Height
Endogenous regressor				
Mother's participation in non-ag. activities	-1.169 (0.127)	0.193 (0.749)	1.547 (0.040)**	1.384 (0.055)*
Mother's characteristics				
Mother's education	-0.002 (0.952)	-0.007 (0.774)	-0.018 (0.538)	-0.013 (0.657)
Mother's age	0.033 (0.092)*	0.001 (0.940)	-0.028 (0.111)	-0.021 (0.234)
Child's characteristics				
Male	-0.028 (0.840)	-0.036 (0.733)	0.010 (0.944)	-0.038 (0.781)
Age	-0.394 (0.010)**	-0.206 (0.070)*	0.077 (0.580)	-0.100 (0.475)
Age squared	0.038 (0.216)	0.002 (0.931)	-0.035 (0.208)	-0.005 (0.845)
Youngest child (1 if youngest child)	-0.198 (0.388)	-0.031 (0.845)	0.064 (0.756)	0.071 (0.718)
Eldest child (1 if eldest child)	-0.014 (0.949)	0.121 (0.460)	0.100 (0.653)	0.123 (0.577)

Demographic characteristics of the household				
Household size	-0.034 (0.547)	-0.031 (0.495)	-0.027 (0.639)	-0.024 (0.687)
% children 0-5	-2.340 (0.022)**	0.043 (0.961)	2.095 (0.083)*	1.995 (0.093)*
% children 6-15	-1.753 (0.046)**	-0.031 (0.968)	1.488 (0.156)	1.230 (0.239)
% elderly (>55)	-1.296 (0.347)	0.672 (0.653)	2.293 (0.302)	2.013 (0.336)
Economic characteristics of the household				
Toilet (1 if having a toilet)	0.294 (0.158)	0.121 (0.482)	-0.078 (0.720)	0.005 (0.982)
Cement (1 if having cement floor)	-0.104 (0.542)	-0.230 (0.064)*	-0.200 (0.209)	-0.203 (0.199)
Farming assets	-0.026 (0.822)	-0.177 (0.032)**	-0.249 (0.032)**	-0.244 (0.029)**
Durable assets	0.317 (0.005)***	0.078 (0.327)	-0.130 (0.180)	-0.112 (0.233)
Migrant households	1.321 (0.000)***	0.670 (0.000)***	-0.243 (0.193)	-0.093 (0.614)
Land cultivated (Log/hecs)	0.021 (0.325)	0.044 (0.002)***	0.043 (0.024)**	0.048 (0.012)**
Parents' anthropometric measurements				
Mother's height	0.039 (0.001)***		-0.017 (0.086)*	-0.013 (0.176)
Father's height	0.007 (0.251)		-0.002 (0.742)	-0.001 (0.895)
Mother's weight		0.026 (0.000)***	0.027 (0.002)***	0.027 (0.001)***
Father's weight		0.017 (0.012)**	0.012 (0.069)*	0.014 (0.033)**
Constant	-6.914 (0.002)***	-2.626 (0.003)***	0.647 (0.748)	-0.492 (0.805)
F-statistic of instruments' joint significance	12.25	9.51	12.25	12.25
Under-identification Test (Kleibergen-Paap)	25.7	21.45	25.34	25.34
Hansen J Test (chi-2)	0.66	1.02	0.1	0.04

Robust p values in parentheses; Community Fixed Effects included; *significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' estimations

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