Synergies or Trade-Off Between Agricultural Growth and Nutrition: Women's Work and Care

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Abstract

Agricultural growth is an important element of overall economic growth and poverty reduction. It is generally presumed that growth in agriculture will also lead to better nutrition through the higher availability of nutritious foods and increased incomes for the poor. Another key linkage between agriculture and nutrition, and one that has not received much prominence in policy, is the health of women and their control over their time and resources. Women's work in agriculture is partly driven by a gendered division of labour across various tasks. Gendered norms are also critical in the provision of care for young children, which is increasingly acknowledged as a key input for improved nutrition outcomes. Agricultural growth which draws women into work without compensating for the demands on their time for their own and their children's care, therefore, may have adverse implications for nutrition. This paper examines the relationship between women's agricultural work and nutrition-related care using the cotton sector in Pakistan as a vantage point. While women's work in cotton (and other similar crops) represents an important source of income for households, there are also significant adverse impacts for their own health and the health and nutrition of their children. Households in some labour arrangements such as share-tenancy have less room for exercising choice in the income-care trade-off. This trade-off needs to receive greater recognition in policy-making if agriculture is to play a positive role in improving nutrition in Pakistan.

1. Introduction

This paper examines the implications of women's work in agriculture and children's nutritional outcomes in Pakistan. Agricultural growth is an important element of overall economic growth and poverty reduction. It is generally presumed that growth in agriculture will also lead to better nutrition through the higher availability of nutritious foods and increased incomes for the poor. Growth, however, might also imply changes in the amount of time and effort women expend in agricultural work. This may have positive outcomes for nutrition if women have access to their own income, but might also have negative consequences if women's agricultural work diminishes their ability to provide nutrition-related care for themselves and their children.

The cotton sector which relies very largely on women's labour, particularly in harvesting (Siegmann and Shaheen, 2008), can serve as a key vantage point for observing the link between women's agricultural work, care and nutrition outcomes in Pakistan. This paper develops a framework for understanding the linkages between women's work in agriculture and nutrition outcomes, and reports on preliminary findings from qualitative research at a site in rural Pakistan.

We first set the context for our research by discussing the problem of under nutrition in Pakistan and why agriculture can play a role in improving nutritional outcomes (Section 2). In Section 3, we introduce a framework for our research and argue that a standard labour supply model in which agents optimize over possible choices between income and leisure provides a useful point of departure for extending our understanding of household decision-making with respect to work and care. We then focus on the concept of care in literature to show that care needs to be recognized as an essential input into nutrition (Section 4). Empirical findings from qualitative research in a cotton-growing region in Pakistan are reported in Section 5. The paper concludes in Section 6 with discussion on how growth in agriculture can be made more inclusive.

2. Context

Pakistan is one of the countries where there is a very high prevalence of undernutrition among women and children. Forty four per cent of children less than the age of five are stunted and wasting among children stands at 15 per cent while one in two mothers are anaemic. There have been no improvements in the state of undernutrition in Pakistan between 2001 and 2011 and in fact some indicators of nutrition have worsened over time (See Table 1).

Table 1: Nutrition indicators in Pakistan

	NNS 2001	NNS 2011
Children under 5 years		
Stunting	42	44
Wasting	14	15
Underweight	32	32
Mothers (non-pregnant)		
Anaemia	29	50

Source: National Nutrition Survey 2011

Public health and nutrition experts are of the opinion that the nutrition problem cannot be solved only through direct interventions such as the provision of micronutrient supplementation and fortified foods and promotion of breastfeeding but there is need to for nutrition-sensitive programmes that address the underlying causes of undernutrition (Ruel et al., 2013). Agriculture is one such 'complementary sector' that has been identified as having the potential to become pro-nutrition. The link or pathways between agriculture and nutrition have been discussed in much detail in literature (Gillespie et al. 2012, Pinstrup-Andersen 2012; Balagamwala and Gazdar, 2013). Agriculture influences nutrition outcomes directly through drivers such as food availability and income generation. In addition to these direct influences, women's work in agriculture can impact nutritional outcomes as mothers are key players in the first 1,000 days of a child's life (from conception till the age of two) which is regarded as the crucial period in an individual's life with respect to their nutritional well-being. Women's work in agriculture can be empowering leading to pro-nutrition income spending but has implications on her ability to take care of herself and her children. Moreover, working in agriculture can have adverse effects on a woman's own nutrition and health.

The linkage between women's work in agriculture and nutrition outcomes is particularly important in the context of Pakistan, not only because of the high levels of undernutrition in the country but also because of the important role played by agriculture in providing employment. Labour force data show that three-fourths of women in the workforce are employed in agriculture and this proportion has increased in the last 10 to 15 years along with a rise in the female labour force participation (see Table 2). The proportion of all women of working age who are employed in agriculture has, therefore, been rising over time. Combined with a fall in male agricultural employment, Pakistan does show features of what has been labelled the 'feminization of agriculture' (de Schutter, 2013).[1]

Table 2: Labour force statistics, by sex

Year	Labour force participation rate (%)		Labour force employed in agriculture (%)	
	Male	Female	Male	Female
2001 – 02	82.7	16.2	37.2	64.5
2003 – 04	82.7	18	37.0	66.6
2007 – 08	82.4	21.8	35.2	73.8
2010 – 11	81.9	24.4	34.7	74.2
2012 – 13	81.1	24.3	32.9	74.9

Source: Pakistan Employment Trends, 2013

Agricultural growth should not be assumed to be gender-neutral and it is possible that a relative increase in women's work is agriculture is a response to technological and intra-sectoral changes within the agriculture. There is evidence from India in the 1980s that female agricultural labour and agricultural growth increased with a rise in cash crop farming (Bennett 1992 cited in Gillespie et al, 2012). An understanding of the linkages between women agricultural work and nutrition is particularly relevant if feminisation is a strong correlate of agricultural growth.

[1] It is possible that the reported increase in women agricultural workers is due to better counting in surveys (de Schutter 2013).

3. Research framework

Nutrition measurement – as practiced widely, using rates of child stunting and wasting – is exclusively focused on one element of the well-being (physical health, with complementary implications for cognitive ability) of one set of household members – namely children. More expansive approaches to nutrition measurement also incorporate micro-nutrient adequacy levels. The population of interest sometimes extends from children to adult females, and their Body Mass Index (BMI) and micro-nutrient levels. Current consensus that chronic under-nutrition (stunting and impaired cognitive ability) is critically and irreversibly determined within the first 1,000 days of conception implies that this aspect of well-being is entirely dependent on the health and choices of other individuals in the household (Horton, 2008). There are also strong inter-generational effects which are passed on through the mother's health status (Black et al., 2008, Black et al., 2013).

The assumption that a household maximizes well-being subject to its constraints is a conventional approach to modelling nutrition as well as other aspects of well-being. The focus on the household rather than the individual is necessitated by the fact that children are unable to make decisions on a wide range of matters which concern their well-being, and that such decisions are taken by adults within the household. There are, of course, many ways in which analysts have aggregated individual well-being to the household level – including bargaining, cooperation, and an altruistic dictator making decisions in the interest of each individual member (Becker, 1981, Sen, 1990).

There are also different interpretations of well-being. Conventional economic theory uses the concept of preferences or utility to define an individual's (or household's) objective function. This suggests an exercise in making choices over available alternative courses of action in the pursuit of maximizing the attainment of something that an individual (or household) has reason to value. We use the term 'well-being' here to draw attention to physical and mental health, cognitive and social ability, as well as relational issues such as the ability to take decisions. While all of these issues might, notionally, be covered under 'utility', this term is generally taken to convey choice-making on the part of equally empowered individuals differentiated only by their preferences and budget constraints.

Many different models of household structure and the behaviour of adults have been used in the literature to justify the key assumption which is of interest to us here: households or adults within households have some reason to regard the well-being of children as an important objective. One influential approach is to think in terms of a nutrition production function (Behrman and Deolalikar, 1988). This has been used widely to empirically test the relative importance of various 'inputs' such as food consumption, household income, education, health-seeking behaviour, ecological factors, and care practices.

Care practices such as ante-natal and post-natal visits, child immunization, and breast-feeding have figured prominently in empirical studies of the determinants of nutrition outcomes. There has been relatively little attention in the literature, however, to the allocation of time allotted to care work across household members (refer to Section 4). The main area of research where intra-household allocation of time has been studied systematically is with regard to a household's supply of labour. Conventional labour supply models are based on the assumption that households optimize in the allocation of available time resources into income-earning activities (labour) and leisure. Modifications of these models to explicitly incorporate the allocation of care time are useful for our purposes.

The focus on care, in intra-household time allocations, allows for a more grounded understanding of gendered divisions of work. If care is primarily seen as women's responsibility – partly due to biological, and party cultural reasons – we expect to see a male-dominated labour market. How do we interpret women's work participation, and particularly increasing trends as implied by the feminization of agriculture thesis? There are several possibilities. First, there is a thesis of the distress sale of labour by women (Kabeer, 2012). If the household faces a decline in its income due to exogenous factors – say loss of male members, or the lowering of real wages – more adult time may need to be supplied as labour in order to maintain resources for well-being. In this case, women's appearance in the workforce would signify a household's response to adverse exogenous shock by shifting its overall time allocation away from care and leisure towards work. Second, women start to work (or work more) due to demand for labour (exogenous), and the availability of remunerative opportunities (Kabeer, 2012). In this case, households are likely to be sacrificing care time for higher income – which may in turn lead to pro-nutrition consumption.

The basic model, with household-level optimization over the allocation of work and care time is relatively simple but has the virtue of identifying exogenous and endogenous factors. The model also allows for a range of variations based on alternate assumptions regarding key aspects of behaviour.

- We can drop the assumption that household allocation decisions are taken in the overall interest of well-being maximization, and introduce the assumption that women care more about nutrition than men.

- Assumptions about information as well as salience can be relaxed to ask
    - how well informed people are about the value of care time
    - whether and to what extent the salience of cash income in relation to the long-term benefits of nutrition lead to sub-optimal choices

- Labour supply and demand may not be anonymous in the sense that there might be gendered entitlements or specializations – driven by 'culture' with respect to particular crop types, and technologies

4. Literature review

4.1 Care

"Care is the provision in the household and the community of time, attention and support to meet the physical, mental and social needs of the growing child and other household members" (ICN, 1992 cited in Engle et al., 1999). Care depends not only on the availability of resources at the household level, but also on education and knowledge, and the physical and mental health of the caregiver, the time dedicated to care, and the agency of the caregiver. Resources and support at the community-level also determine the quality and level of care. Care behaviour may vary across communities as social groups or cultures might hold different priorities and beliefs concerning children's well-being. With respect to nutrition, care activities can be divided into six types (Engle et al., 1999):

- care for pregnant women including the provision of adequate food, necessary health care and rest

- breastfeeding and complementary feeding i.e. the transition from a breast-fed diet to an adult food
- preparation of food
- hygiene
- health-seeking practices
- psychosocial care, that is, providing affection to child and support her psychological and social development

Care, in effect, is the bringing together of resources, knowledge and time dedicated to an individual other than oneself. It is not just the quantity of care that matters for nutrition but also its quality (Glick, 2002). For example, feeding practices that would lead to good nutrition outcomes would involve the time and attention of a mother (or a caregiver), but also appropriate knowledge about feeding such as giving a child age-appropriate foods, and the ability to be able to access these foods. While 'caring behaviour' is one of the inputs in the widely used nutrition production function, empirical studies of determinants of nutrition have not paid much attention to measuring care. In some studies (Garett and Ruel, 1999), mother's education is used as proxy for care but as the definition of care discussed above shows that that many factors apart from a mother's educational achievements may determine the quantity and quality of care provided.

4.2 Agricultural work versus care time

Although evidence on the relationship between agricultural work and care is limited, it suggests that women's work in agriculture may be an important determinant of care for children. A study in Bolivia finds that women's time dedicated to agriculture is one of the main barriers to improving infant and young child feeding practices and that even when women do have the knowledge of pro-nutrition feeding practices, they do not have the time to adopt these practices (Jones et al., 2012). Women working in agriculture may often rely on other household members to provide care for their children but the quality of this care may be poor. However, Headey et al. (2011) find that there is no difference between care given by a mother and care given by others on wasting and only a moderate connection is found with respect to stunting.

Women with young children end up having to decide between giving up work, reducing time spent on childcare, or taking their children to work (Kent and MacRae, 2011). The latter ensures the presence of the mother to provide care but could have negative implications for a child's health and nutrition as he or she would have to spend the day in the field. With regards to agricultural interventions, the impact on neglect of care is mixed (Bold et al., 2013). In Nepal, the adoption of a cash crop that required increased hours of agricultural labour reduced the time spent by women on childcare but had no effect on time dedicated to leisure (Paolisso et al., 2001). In India, a study found that a mother's participation in agricultural activities had negative effects on her child's health (Bhalotra et al., 2010, cited in Gillespie et al., 2012) while Berman et al. (1997) found that despite a rise in income, women's paid employment reduced expenditure on healthcare as the opportunity cost of time used in seeking healthcare increased (cited in Gillespie et al., 2012). However, Headey et al. (2011) fail to find evidence that women employed in agriculture spent less time on childcare compared to women working in other sectors.

When testing the relationship between women's work and childcare practices, existing literature identifies several considerations that should be taken into account. The age of a child may have an effect on the relationship between work, childcare and nutrition (Ukwauni and Suchindran, 2003). A child of breastfeeding age may require more care time (from the mother) and so the link between care and

nutrition for this age group may be stronger than for older children. Similarly, it has been found that children of weaning age need more attention (Leslie, 1988) since at that age children are making the transition from breastfeeding to consuming an adult diet which necessitates feeding them specially-prepared meals at frequent intervals.

The type of work that women are involved in may have differing effects on care and nutrition as well. While informal work is thought to be more compatible with childcare than formal employment as there is more flexibility with work and the possibility of taking the child to work, empirical evidence on this subject is mixed. The nature of informal employment may matter. For example, women working in agriculture may not want to take their child to the field as the child is exposed to the weather and to chemicals such as pesticides (Glick, 2002). Similarly, the amount of work a woman does may determine the magnitude of the effect of work on nutrition outcomes. The intensity - heavy versus light loads -and the duration of work - full-time versus part-time - have to be considered as well.

The relationship between women's work and children's nutrition outcomes may not be one-way – maternal employment may not necessarily be a determinant of child's nutrition but could be an outcome of it if women seek more work because there children have a poor nutritional status (Leslie, 1988). Conversely, a woman with a malnourished or ill child may choose to stay at home to take care of the child rather than go out to work (Glick, 2002). There could also be unobserved effects in the form of women's abilities that affect both nutrition of children and a woman's work status (Glick, 2002).

4.3 Other aspects of care

Empowerment of women has been measured directly through specific questions about decision-making and bargaining power of women within the household and the community. It has also been measured indirectly through proxies such as income, education, age and in relation to men through variables such as differences in female-male, age at marriage, income status and education, age difference between spouses. A number of studies have empirically tested the relationship between a woman's level of empowerment and nutrition outcomes of her children using different measures of empowerment. There appears to be a strong association between the empowerment and nutrition (see Bold et al., 2013 for a review of studies). Within agriculture, a recent study using an index measuring women's empowerment in agriculture finds that women's autonomy in production and women's work in agriculture improves diet diversity and reduces incidence of stunting (Malapit et al., 2013). However, in this study women's work includes 'productive' and 'domestic' tasks and not just agricultural labour. But women's work may not always be empowering and could have negligible effects on her decision-making role. Empowerment depends on whether she does paid work or not, and on whether she enjoys effective control over the income or the produce. Cash crop adoption, for example, may increase male control on production especially if division of labour is such that men are responsible for all market-related activities.

A closely related issue is the effects of agricultural work on women's own health (Gillespie et al., 2012). Care is determined not only by the time dedicated to it, but also by the capacity of the caregiver (Engle et al., 1999). Women's work in agriculture requires high levels of energy expenditure which can affect the quality of care provided. Women's work productivity can be adversely affected by the time and effort expended in care activities. This was found in a study in Zambia where women chose piece work over the more remunerative alternative of cultivating their own land because the latter activity was physically laborious (Kent and MacRae, 2010).

5. Empirical approach

5.1 Methodology

Women's work in agriculture has begun to receive recognition in employment data in Pakistan (see Section 2). While women play an important part in virtually all agricultural sub-sectors, there are some crops and tasks in which their contribution is widely acknowledged. Cotton is one such crop, and the harvesting of cotton (or cotton-picking) is regarded as almost exclusively women's work. Cotton is one of the largest cash crops in Pakistan and forms the basis of much industrial activity and export. Cotton is grown on almost a third of total cropped area during the *kharif* (summer) season (Agricultural Census Organisation, 2012) and around half of Pakistan's exports are connected to cotton e.g. yarn and textiles (Economic Survey of Pakistan 2013-14). There have been continuous technological changes in cotton farming with the introduction of more productive varieties. Moreover, cotton and textile lobbies are influential in shaping agricultural, industrial, fiscal, and trade policies. Cotton is grown in some of the most productive agricultural regions – central and upper Sindh, and southern Punjab – which also happen to have relatively high rates of poverty and malnutrition (Balagamwala and Gazdar, 2013). Cotton-growing regions and women's work in cotton, therefore, are promising areas of research for our study of women's agricultural work and nutrition.

Our empirical focus on cotton-growing regions does not mean, however, that we examine women's work in cotton alone. Cotton is a promising vantage point for an analysis of women's agricultural work more generally. Cotton-growing regions of Pakistan are mostly in the canal-irrigated flood plains where the summer cotton crop usually complements a winter crop of wheat – the main staple food in the country. Other crops are grown too, and these regions sustain an active livestock economy focused on dairy production. Women's agricultural work, therefore, is not restricted to cotton-harvesting as they work throughout the agricultural cycle on other crops and on livestock.

In order to analyse the link between women's agricultural work and nutrition in cotton-growing regions, qualitative fieldwork was conducted in a rural site straddling a number of distinct settlements in June 2014. This site consisted of the administrative village or *Deh* RB[2] and a number of settlements in neighbouring administrative villages in *Taluka* Shahdadpur, District Sanghar of the Sindh province which is known for cotton growing.[3] Our selection of this site was based on the fact that the Collective for Social Science Research had conducted extensive fieldwork in this location since 2001, and we had prior knowledge of social and economic conditions in these communities.

The qualitative fieldwork consisted of a series of unstructured key informant interviews, group discussions and individual case studies. These interactions probed the complete range of issues identified in our research framework. In particular, we sought to establish the main milestones in the annual agricultural cycle, technological changes in cotton farming, the deployment of resources such as land, irrigation water and labour through the crop cycle, the organisation of cotton harvesting, norms and behaviour with respect to the 1,000-day period of a child's life, perceptions about the implications of women's agriculture work, particularly in cotton harvesting, for their own health and for the nutrition of their children, the impact and uses of women's cash income from cotton-harvesting as well as the official cash transfer programme (the Benazir Income Support Programme of BISP). Our informants and

[2] Village names have been annonymised to protect the identity of respondents

[3] Sanghar is the largest cotton-growing district of the Sindh province in terms of cotton acreage and output (Agricultural Statistics of Pakistan 2011, Pakistan Bureau of Statistics).

case studies were purposively selected to reflect the perspectives of women and men, variations in household assets and occupations, and caste, religious, and ethnic heterogeneity, in seven distinct settlements in the fieldwork area.

5.2 Description of fieldwork site

Our fieldwork covered seven settlements of various sizes – ranging from RB which has around 200 households, to two hamlets of share-cropping tenants consisting of four families each. Some of the settlements like RB are linked to the sub-district headquarters by paved road, while access to others such as the relatively large village KD (with around 80 households) is only possible through an unpaved track which becomes unusable when there is heavy rainfall. Although there are government schools in the larger settlements, it was uniformly reported that these functioned poorly with low teacher attendance, particularly in girls' schools. None of the settlements has any public health facility, though there are small private clinics run by paramedics in two settlements. There is, however, coverage by government Lady Health Workers (LHWs) in all of the settlements except for the two small hamlets of share-cropping tenants. LHWs advise women on health issues, particularly those relating to reproductive health. There is a trained birth attendant in village RB, but not elsewhere. None of the settlements, even the larger ones, have any public sewage infrastructure. In the larger settlements most homes have access to latrines even if in some cases these are rudimentary communally-designated spaces. Village RB is relatively well-served in terms of drinking water, with a government-run water filter plant. In other settlements residents use groundwater which is brackish in some cases. All of the settlements, including the smaller hamlets, are connected to electricity supply. No settlement has a gas connection and firewood and dried dung are the main cooking fuels.

Settlements are closely associated with patrilineal kinship groups. The larger settlements are sub-divided into fenced compounds which consisted of close relatives. Our fieldwork covered three settlements dominated by the Khaskheli kinship group. The Khaskhelis are thought to be descendants of house-servants and serfs of the former rulers of Sindh. The Khaskhelis have gained a measure of upward mobility and some of them have become landowners. A majority, however, do not own land and work as share-cropping tenants or labourers. The two small hamlets of share-croppers are populated by members of the Bheel ethnic group. Bheels are officially classified as Scheduled Caste Hindus and are known to be vulnerable to extreme forms of labour exploitation such as bonded labour by virtue of their status as a religious minority and members of a historically marginalized caste. According to virtually every criterion, the Bheels are poorest and most food-insecure kinship group in our fieldwork site. Another historically marginalized group that we encountered during the course of the fieldwork, and found to be food-insecure, was an Odh family – traditionally regarded as a semi-nomadic which now specializes in earthwork construction. We also visited one settlement which was predominantly inhabited by the Baloch Rind kinship group and another where the dominant group was Khichi. The Rinds, some of whom now own land, are mostly share-croppers and labourers but with far greater political voice and autonomy compared to the Bheels. The Khichi settlement includes a number of small and medium landowners as well as sharecroppers.

There are strong gender-based norms in our fieldwork site, as in other parts of rural Pakistan, concerning virtually all dimensions of social and economic activity. Spatial organization or the division of public from private domains is closely associated with norms relating to the access of men and women to various spaces. In most rural settlements the private domain excludes men who are not close relatives. Women's access to public spaces, such as markets, urban centres, and government offices is usually mediated through male family members. These norms are widely understood even if they are

frequently observed in the breach. They strongly influence, nevertheless, opportunities available to women for economic activity and social interaction. Asset ownership, particularly the ownership and control over land, also follows strong gender norms, with few women exercising effective property rights independently of male family members.

Agriculture dominates the economy across the fieldwork site, but there are variations across settlements in their reliance on non-agricultural incomes. Around 80 men from RB – a village with a population of some 200 households – are migrant workers in Karachi. This is a relatively recent phenomenon. In 2001 not a single person from the settlement worked in Karachi.[4] There are men as well as some women across the settlements that have public sector jobs as teachers, policemen, soldiers, and health workers. An important new source of income in the fieldwork site is a government cash transfer programme (the Benazir Income Support Programme) which provides 3,300 rupees (US$33) every three months to women in poor households.

The main crops in the fieldwork site are wheat (December to April) and cotton (May to November). There is a limited amount of vegetable farming and rice is sown on land of lesser quality alongside cotton in the summer. Land is also set aside for fodder cultivation and most households own some farm animals. The main focus in the livestock sub-sector is on buffaloes for dairy. Farming is entirely dependent on surface irrigation as the groundwater is brackish and unsuitable for agricultural use. Land ownership in the fieldwork site is highly unequal, as is the case in the province generally. There are several landlords with holdings in the hundreds of acres who dominate the agrarian economy and local politics. While a majority of the households do not own land they farm as sharecropping tenants. Many other landless households are engaged in the agricultural sector as labourers. Between the large landlords and the landless there is a significant segment of self-cultivating households who might own anywhere from 1 to 20 acres.

The agricultural economy in the fieldwork site has witnessed many of the technological changes which have occurred in the country and the province as a whole. New seed varieties have led to yield increases in virtually all major crops. A salient change in the last ten years or so has been the introduction of 'hybrid' cotton varieties which have led to significant improvements in yield, and also in patterns of labour use.

Our fieldwork site has also experienced a number of shocks related to environmental and institutional fragility which are present more widely. There have been conflicts, some of them violent, around the ownership and control of land and irrigation resources. The main source of irrigation water serving the lands of RB and surrounding villages was shut off for two years (2012 and 2013) due to a tribal conflict among upstream water users. This conflict was finally resolved and irrigation supplies resumed in 2014. Prior to this conflict, in 2011, the fieldwork site, along with much of Sindh, suffered from flooding due to torrential rainfall which destroyed crops and led to the loss of livestock to disease.

5.3 Agricultural economy and women's work

Cotton harvesting is the most conspicuous activity in terms of women's agricultural work. But women's work is important in virtually every other aspect of the agricultural economy. There are gendered norms around certain agricultural tasks but not others. Ploughing, field preparation and sowing (wheat) are activities exclusively carried out by adult males. The same is true of on-farm water management, and

[4] This is based on a survey conducted in the settlement by the Collective for Social Science Research in 2001.

the application of fertilisers and pesticides to crops. While there do not appear to be strong gendered norms around weeding, collecting fodder and caring for livestock, these activities are mainly carried out by women and children rather than adult males. Wheat harvesting is carried out by families – men, women and able-bodied children – and makes a major contribution to a household's annual consumption of the staple.

Cotton harvesting is almost exclusively seen as women's work, and the exceptions underline the association of this task with "lesser masculinity". Boys who might have taken part in cotton harvesting begin to distance themselves from this work, particularly in the company of older men. Bheel men take part in cotton harvesting alongside women family members while the dominant Muslim men were often heard saying that it was somehow demeaning to work as cotton harvesters alongside women. Muslim women, when asked about this gendered norm, simply referred to this division as part of tradition (*rivayat*).

The cotton harvesting season begins in late July and goes on till mid-November in our fieldwork site. There are usually 4 to 6 rounds of cotton-picking from a single plant, with intervals of 8-12 days between each picking. There can be considerable variation in the harvesting period of neighbouring fields, depending on the precise date of sowing and application of other inputs. The cotton crop cycle is usually closely correlated with the wheat crop in the same field. Farmers have a leeway of around a month in wheat sowing, and the sooner a field is required for wheat the earlier its cotton-picking cycle will be brought to closure. The introduction of new 'hybrid' crop varieties in cotton in the last ten years or so is thought to have led to an increase not only in yield but also in the frequency of picking. The older variety, commonly used in our fieldwork site, required only two pickings in the entire season.

A vast majority of older girls (mostly from aged 10-12 years onwards) and adult women in our fieldwork site took part in cotton harvesting. In addition, a large number of women from the town (Shahdadpur) travelled together every day to take part in cotton picking in this area. There are broadly three types of arrangements through which women work in cotton picking. First, a small number work only on own family farms or on farms of close relatives. Second, women from sharecropper tenant families work not only on their own farm but also on farms of other tenants for the same landlord. Third, there are *jamadar*s (or labour contractors) who organize teams of women and take prior bookings from farmers for the supply of workers. The three arrangements have some common features. The actual work is carried out in teams, as segments of fields that are ready for harvesting are marked out for harvesting on a particular day by the farmer or the *jamadar*. Women's work, however, is accounted for individually in terms of the weight of cotton harvested. Children or younger siblings who work alongside an adult woman might be treated as contributing to that particular woman's account, but the idea of individual piece-rate work is strongly established. It was reported that even women who work on their own family farms maintain separate accounts of cotton harvested. Rates of remuneration also appear to be standardized across types of labour arrangement – it was reported that in the preceding season 300 rupees (US$ 3) were paid for every *maund* (40 kilograms) of cotton harvested.[5]

While women in the first arrangement (harvesting on the family farm) may have some amount of flexibility in the number of days worked during the season, for most women, and particularly those belonging to sharecropper households and those mobilized by a *jamadar* it is expected that a full-day's work will be supplied every day. The normal work day goes from 8 in the morning to 5 in the evening

[5] There are deductions from the women's accounts of 2 kg per *maund* – 5 per cent – to account for wastage. So, in effect, a woman has to harvest 42 kg to be paid for 40 kg.

with a one-hour break for lunch. For most women harvesters, therefore, the supply of labour during the cotton-picking season seems to be a binary choice between working virtually every day for around three months and not working at all. In fact, for women belonging to sharecropper households there may be limited choice even with respect to whether or not they would take part in cotton harvesting. These households are reported to be under considerable pressure from landlords to supply as much labour as possible for cotton harvesting on a priority basis to fields owned by the landlord. The landlord has additional leverage in these cases because the sharecropper household depends on him for work and food security through the annual cycle, particularly the wheat crop.

There are several reasons for the demand for continuous labour during the cotton season. As we have noted above, new cotton seed varieties are higher yielding and allow for multiple harvests from a single plant. For farmers, cotton represents ready cash income and they are keen to realize this income as quickly as possible. Delay in harvesting leads to a decline in the quality and weight of the harvest. The fear of theft was also cited by many informants as a reason why a crop of high value cannot be left standing for very long. Towards the end of the season farmers are keen to complete the harvest in order to prepare the land for the wheat crop. A number of features of the labour arrangements around cotton picking are associated with farmers' need for an assured supply of continuous labour. The farmer pays an advance to a *jamadar*s to ensure that he will engage some minimum number of workers when needed. The *jamadar* uses this cash to make small advances (of around 2,000 rupees each) to women workers who are then obliged to commit their labour to him. There are also *jamadar*s, mostly men but also women, who specialize in bringing women workers from nearby urban localities for cotton harvesting.

The farmers' requirement for a secure and steady supply of labour has implications for women workers. While women from sharecropper households are already under pressure to work continuously, women mobilized by *jamadar*s come under similar pressure once they have taken advances and committed their labour. Non-compliance would earn a great deal of social opprobrium and foreclose future work opportunities. Women report that they can only take time off in cases of emergency relating to their own health or the health of their children. There is little sympathy for time off for what might be regarded as less serious contingencies.

While the pressure to supply continuous labour might be onerous at times, in general the cotton harvest is regarded as a season of economic well-being. A woman's income during this season depends on how much cotton she picks, and there can be great variation in this, depending on ability and stamina. Many women report that the amount of cotton a woman picks is a manifestation of her *majboori* or need. The more desperate she is for cash income the more hours she puts in, and the harder she works. The weight picked can range from 20 kilograms to 60 kilograms a day, and we heard of women who harvest as much as 80 kilograms in a day. Some women, therefore, can earn between 15,000 to 25,000 rupees (US$ 150 to US$250) in the season.

Although these amounts are less than what an able-bodied man might earn over a similar period (around 3 months) from manual labour, they are significant for a number of reasons. Women normally do not have access to the casual labour market and cotton harvesting is one of the few activities that can be a source of independent cash earning for them. It was reported across the board that cotton harvesting accounts are maintained for individual women (plus their children who might assist them) and that women are paid individually for their work. This is quite unlike other agricultural tasks such as wheat harvesting or weeding for which the beneficiary is the entire household. Other activities which earn cash income for women – besides formal sector employment and the government cash transfer

programme – are sewing and livestock rearing. Rates of remuneration of the former (home-based) activity are far lower than cotton-picking. In the case of livestock some animals might be individually owned by a woman and she may realize the value once they are sold. The milk produced by these animals, however, is for the entire household.

For some sharecropping households women's earnings in the cotton harvest represent a lifeline and not additional income. Women from these households reported that they use their cotton earnings to procure basic kitchen supplies such as cooking oil, sugar and tea – their stock of the main staple is already assured from the wheat harvest. For many of the others, however, there is a clear sense that income from cotton harvesting can be and is used by the women themselves for their personal consumption or on expenditures which they prioritise. Women buy gold or jewellery for themselves or for their daughters' trousseaux. They purchase new clothes for themselves and their children, as well as non-food household consumables such as soap and shampoo. It was also widely reported that women purchase livestock – mostly goats – as a form of saving and investment.

Women's cotton harvest income contributes to pro-nutrition consumption choices in a number indirect ways. For sharecropping households as well as extremely poor households for whom the cotton harvest income is a lifeline, the absence of this income might result in greater food insecurity. In other households where women report using the income to add to their savings, it is possible that the final use of savings might be with respect to higher pro-health and nutrition expenditures.

There may be small but significant features of empowerment associated with women's income from cotton harvesting. The fact that an individual woman's work is recognized and counted is a departure from the convention of compounding women's work and economic contribution with that of the household in general.[6] We came across some evidence of women's bargaining power around the cotton harvest. While women from sharecropper households are vulnerable to unfair deductions from their wages, it was widely acknowledged that other women workers cannot be shortchanged.[7] Women concurred with the view expressed by farmers and *jamadar*s that delays in making payments might result in the withdrawal of labour which the latter wish to avoid. We also heard about specific instances of collective action and bargaining. *Jamadar*s reported that they were often upbraided and publicly humiliated by women in cases of delayed payments or suspicion of inaccurate accounting. Women of one of our fieldwork settlements (RB) had succeeded in improving their terms of remuneration – in addition to the piece-rate they receive part of their mid-day meal as well as two servings of tea compared with just one serving of tea given to other women.[8] In the same village women had been contributing from their earnings over the last three years to a fund for a new place of worship which was predominantly used by women.

Other seemingly innocuous actions might also signal deviations from patriarchal norms. In women's conversation about their work in the cotton harvest there was frequent mention of *shauq* – a concept that encompasses enjoyment and fulfilment – in contrast to *majboori* (need). Part of *shauq* was clearly referenced to women's ability during the cotton season to work outside in groups, occasionally at some

[6] Studies of women's empowerment through formal sector paid work have shown that the official recognition of individual identity is regarded as a significant advance (Khan 2014).

[7] There were also complaints about delays and unfair deductions in payments on the part of women from marginalized groups such as Bheels and Odhs, some of whom were not sharecroppers.

[8] All women bring their own bread as well as chilies, salt and molasses as accompaniments. Women from RB are supplied cooked vegetables by the *jamadar*.

distance from home. Those who were known as particularly efficient and quick cotton-pickers took pride in their ability. There was almost heroic mention of these individuals by other women as well as men. The fact that income from cotton harvesting is used by women to visit urban markets to purchase jewellery and clothes is itself a departure from past practice when even such shopping was done for women by men. One *jamadar* reported that women working in his team pooled money on pay day (around once a fortnight) to prepare a special meal where chicken was served instead of the usual fare of vegetables and bread.[9]

5.4 Care

In some dimensions of care, women and children in our fieldwork site face common conditions which are determined by ecological factors such as the availability of clean drinking water, general sanitary conditions, and physical access (due to remoteness) to high quality health services. There are other elements of care which depend on household-specific constraints and individual preferences and priorities which might vary greatly within the fieldwork site. As we have shown above there are significant inequalities within the site with respect to income, assets, food security and education. There may also be group-based differences in care preference and behaviour of various kinship groups which might be bearers of distinctive cultural patterns and practices. How women's agriculture work, particularly in the cotton harvest, affects care varies across individuals, households and groups. It is possible, however, to describe norms and actual behaviour with respect to some of the dimensions of care which have been highlighted in existing work on nutrition.

The summary of the literature on care and nutrition in Section 4 identified six broad dimensions of care as being particularly relevant to children's nutritional outcomes including care for pregnant women, breastfeeding, complementary feeding, food preparation, hygiene and health-seeking practices and psychosocial care. As we have shown above, harvesting is time-intensive during the cotton season. Given that women are crucial to all six dimensions of care – due to biology as well as social norms – there is a strain on the availability of care within the household simply because of pressing time constraints. For two dimensions of care – care for pregnant women and breastfeeding – the effect of cotton-picking goes beyond the availability of time. While we probed all dimensions of care in our qualitative fieldwork, these two dimensions were prominent both in our queries and in the perceptions of our informants.

Besides being intensive in the use of time, cotton-picking is also a physically intensive task which involves working while standing under the sun all day. Workers need to cover long distances by walking to and back from cotton fields. It is likely that this work is more energy-intensive compared with other activities carried out by women in fieldwork site on a regular basis. There are some indications of increased food consumption during the season. Employers provide one serving of sweet tea a day to most women – though some women receive two tea servings as well as part of a mid-day meal. Women also report eating a little more at home – typically around 25 per cent more – than usual when they work in cotton-picking. It is not clear whether or to what extent the extra energy expenditure is compensated by these supplements to the normal diet.

[9] A similar celebration is reported for cash transfer beneficiaries who go to Shahdadpur town to collect their money from banks and then have a picnic in a public park where they order a meal from a local restaurant. This too is in contrast with the conventional practice of exclusively male public socialization.

The work environment has other health hazards such as hand injuries, and breathing difficulties due to the presence of dust, cotton fibre and pesticide residue in cotton fields. There are, therefore, direct implications of cotton-picking for women's own health and nutritional status – which are important in their own right, as well as contributory to children's health and nutrition.

Care for pregnant women

Fertility rates in Pakistan are among the highest in the world, and rural areas including rural Sindh have higher fertility rates than their urban counterparts.[10] There is evidence, however, of fertility decline and changing family size preferences.[11] We found reflections of both, relatively high fertility as well as change, in our fieldwork site. In one settlement of 130 households (village GH) where the local Lady Health Worker (LHW) maintained regular records, there had been 17 births in the past year. Women in the fieldwork site generally stated that they wanted to stop having children after the birth of 5 or 6 children. Many reported having had tubal ligations after the sixth child, and others reported having received contraception injections from the LHW. Another conspicuous change was the increasing referral to modern medical services for delivery as well as ante-natal and post-natal care in Shahdadpur – something that was facilitated by local paramedics. The exposure to modern services was associated in the fieldwork site with awareness about recommended reproductive health practices.

Actual behaviour seems to be highly correlated with the household's income as well as access to a reliable intermediary with modern health services. Government medical facilities in Shahdadpur currently enjoy a good reputation – another change from the past – and are available at subsidised prices. There are significant incidental expenses, however, such as transportation costs and informal service charges which can act as barriers to the very poor. The advice of a reliable intermediary – a local paramedic, or a well-informed woman neighbour or relative – is also seen as important for gaining effective access to public health facilities.

The variation in the use of recommended practice can be illustrated using the cases of two women from RB who both gave birth in the last three years. Both belong to relatively poor landless households. Laiqa has six children and all of them were delivered in the government hospital in Shahdadpur. During her last pregnancy she had regular medical check-ups and two ultra-sound scans. She gave birth to twin daughters who received their first set of inoculations at the hospital. Laiqa returned to the hospital for post-natal check-ups. She claims that she tries to follow medical advice in terms of dietary practices. Laiqa is exceptional in that she is familiar with the medical services available in Shahdadpur and is on first-name terms with doctors and paramedics. She frequently accompanies other pregnant women for their deliveries and helps to navigate their cases through hospital procedures. The second woman, Saleha, is the wife of a sharecropper tenant. She also has six children. Her last child, a daughter, was delivered at home by the local trained midwife. Saleha received ante-natal immunizations from a paramedic. She did not consult a doctor or a formal health facility. While she was aware of dietary recommendations for pregnant women (for example consuming fresh fruit) she claimed that she was unable to follow up on her knowledge due to resource constraints.

[10] The total fertility rate in urban areas of Pakistan is 3.2 compared to 4.2 births per woman in rural areas. Sindh has a higher fertility rate compared to the average fertility rate in Pakistan (Pakistan Demographic Health Survey. 2012-13)

[11] The total fertility rate declined from 5.4 births per woman in 1985-90 to 3.8 births per woman in 2010-12

In general women as well as men report that pregnant women have the same diet as other adults in the household. While most informants are aware of medical advice that a pregnant woman should not undertake physical work in the last trimester, the main trigger for special treatment of any type – with respect to diet, medical attention, or rest – is the manifestation of a specific problem with the pregnancy. Women who fall ill, become particularly weak, or suffer extraordinary discomfort or pain in the course of the pregnancy are exempted from work. Regular household and agriculture work can be physically demanding, and it is only in exceptional cases that women stop carrying out these activities until just before delivery. Ideas about the resumption of normal physical work vary. While a number of informants report that women should refrain from physical work for at least forty days after delivery, the common period of complete rest is only around a week.

There is recognition of the fact that work on the cotton harvest is more arduous and hazardous for the health of the woman and foetus than ordinary household and agricultural work. Some men acknowledge that in ideal conditions a pregnant or lactating woman should not work in cotton harvesting at all. It is also widely accepted, however, that women will work at least in the first two trimesters before stopping. Cases of individuals who worked till the day before delivery are known and cited, mostly by men, as examples of strong women. Women cite these same cases as those driven by *majboori* (need).

Breastfeeding

Norms regarding the resumption of work in the cotton harvest after delivery are closely linked to the second dimension of care, namely breastfeeding. Awareness in our fieldwork site about the period of exclusive breastfeeding appears to correspond well with the exposure individuals have to modern health services. Many of the respondents stated that there needed to be exclusive breastfeeding for the first six months of the infant's life. The extent to which this was reflected in actual practice varied. A number of Bheel women admitted to giving water to their infants who were as young as two months old. We also heard different accounts of when complementary foods might be introduced. The willingness of an infant to accept a complementary food seemed to be a common criterion, regardless of specific age. In other words, parents were willing to try out complementary feeding even before the end of the first six months. Breastfeeding, nevertheless, is the norm because alternatives such as infant formula are too expensive for most households.

Infant feeding practices are driven, at least in part, by parents' understanding of what the child can tolerate. It was reported, for example, that goat's milk which can be fed to older infants, is unsuitable for younger ones because it gives them indigestion. Although some women reported giving water to their infants, it is also commonly believed that water leads to "thinning the blood" of the child. Feeding times are generally responsive to the infant's crying.

Most informants understood that there is a trade-off between a woman work and her child's health. Some women were able to articulate this trade-off and act upon it. A woman from a landowning household in KD explained that she does not go for cotton-picking because any income she might earn there would be cancelled out by extra medical expenses of her child falling ill. She felt that the probability of a breastfed child taking ill was high if the mother was not close at hand. There were other women too who felt that cotton-picking compromised their ability to breastfeed their children. Different periods were mentioned, mostly depending on the economic circumstances of the household, as the time that needed to be taken off cotton-picking ranging from a week to two years.

The availability of an alternate care-giver is an important factor in a woman's ability to join the cotton harvest. Several arrangements were reported in the fieldwork sites. Some women with young infants who reported working in the cotton season said that they only go to fields close to their homes. There was a sense that *jamadar*s and landlords facilitated this choice of location. These women said that they returned home two to three times during the working day to breastfeed their infants. Some women and men said that infants are left in the care of the fathers who carry them to the mother at feeding time. In fact, there are no fixed feeding times for these infants. Men admitted that they take the child to the mother only when the child cries and cannot be otherwise placated. Women also take their infants to the field, along with an older child, place same under a shade, and feed them periodically. Some women reported leaving their children behind with women relatives who were not going for cotton-picking, usually grandmothers. In some cases, these caregivers were compensated by the working woman for taking care of her child in the form of a gift of cash or clothes.

There are various perceptions in the fieldwork site about the effect of cotton-picking on a woman's ability to properly feed her infant. A number of women claimed that the physical burden of the work reduces a woman's ability to produce enough milk, and that the milk is not as nutritious or healthy as it ought to be. Women working under the summer sun must drink a lot of water, and it is thought that this comprises the quality of breast milk. It is also commonly believed that the working mother's milk is "hot" and can cause indigestion to the child. A more tangible concern is that feeding in cotton fields takes place in unhealthy conditions as the mother is unable to ensure hygiene.

5.5 Implications for nutrition

Our findings from qualitative research in a cotton-growing area of Sindh confirm the hypothesis that there is a trade-off between income and care at the household level. Adult household members are aware that women's work in agriculture (cotton-picking in this case) can compromise their own health and nutrition as well as that of their infants and children.

The allocation of time between work, care and leisure is a major element in the trade-off. Cotton-picking is a time-intensive activity and prevailing labour arrangements make it difficult for workers to negotiate flexible work duration or hours. This has implications for nutrition because of gendered norms regarding work and care. Cotton-picking is seen, almost exclusively, as women's work, and for a household to benefit from it women members must supply the labour. At the same time, virtually all key dimensions of care, even those which are not directly linked to women biologically continue to be seen as primary responsibilities of women. Working in cotton-picking and taking part in care activities such as food preparation and ensuring hygiene are equally implicated in loss of masculinity. While men are seen to step up while women are away in covering some household and agricultural tasks normally undertaken by women, their contribution continues to be marginal. Working women report having to return home from a long day in the cotton fields and then cooking the family meal. Other females – older women and girls – who might otherwise replace able-bodied women in these activities are themselves required for cotton-picking. There is evidence of women's empowerment in some areas – both, associated with cotton harvesting, as well as others. This has not translated, as yet, into significant changes in gendered norms of work and care.

The trade-off between income and care is experienced and exercised differentially by individuals and households with different incomes, asset endowments, contractual obligations, understanding of care-nutrition linkages and ability to access public goods and services. The better-off and those who own land have greater flexibility in the rural context. Some sharecroppers, particularly those from socially

marginalised groups who are dependent on their landlords for protection and food security, have the least amount of autonomy with respect to their allocation of work time. In-between groups such as small landowners, and sharecroppers and labourers who are not particularly dependent on landlords, display more heterogeneity in terms of their income-care choices.

The greater exposure to modern health services has created awareness among women and men across income groups of recommended reproductive health and nutrition practices. While some of the recommended practices are cited as ideals, there are local norms about women's work during the first 1,000 days since conception. These norms, however, are interpreted in a fluid manner and actual behaviour is understood to be a compromise between ideals, norms and resources. It is well understood that cotton-picking adversely affects the health and nutrition of the woman and the child, but also thought that pregnant and lactating women who work, do so because of economic need which is linked to ensuring food security. Care behaviour, in any case, is often driven not by norms but in response to specific needs of an individual. A pregnant woman might be exempt from work not because she is pregnant but if she is known to be ill. Similarly, an infant of a working mother is not likely to be fed at fixed intervals, but when the alternate care-giver is no longer able to placate the child.

Technological changes in cotton production are associated with the rise in the demand for women's work in agriculture over the last decade or so. There is anecdotal evidence from qualitative research of increases in both the number of women working as cotton harvesters as well as the amount of labour time that a working woman supplies.

6. Conclusions

This paper examined the link between agricultural growth and nutrition as it operates through intra-household choice with respect to employment and care. Women's agricultural work occupies a central position in this regard at least in the cotton-growing regions of Pakistan. We believe that the approach to agriculture-nutrition linkages proposed here can be applied more widely to crops other than cotton, not only in Pakistan but in the South Asia region and beyond. While women's work in cotton (and other similar crops) represents an important source of income for households, there are also significant adverse impacts for their own health and the health and nutrition of their children. Households in some labour arrangements such as share-tenancy have less room for exercising choice in the income-care trade-off.

While we have not examined the sources of agricultural growth, we have shown how any drivers of growth – say, agricultural or infrastructural investments, new technologies, new cropping patterns, higher intensity in resource use – might have an effect on the key development objective of improving nutrition. The transmission from growth to nutrition improvement is neither smooth nor linear. Our findings suggest that in the presence of a strongly gendered division of labour and care provision, there can be a trade-off between growth and nutrition. Gender and class-based inequalities can make the trade-off particularly strong. Growth in itself may not always increase opportunities for women, particularly those whose families face economic deprivation and social disadvantage, to make pro-nutrition choices with respect to work and care. The possible trade-off between growth and nutrition needs to receive greater recognition in policy-making if agricultural growth is to play a positive role in improving nutrition in Pakistan.

How can agricultural growth have a greater positive impact on nutrition? The main implication of this paper is that women's empowerment with respect to their work-care choices would be a key determinant of whether and to what extent any growth that takes place is inclusive and pro-nutrition. What kinds of changes and policies might lead to agricultural growth that is more inclusive with respect to women's empowerment and nutrition improvements? Are there alternative cropping patterns which might offer greater flexibility to women and men in terms of income-care trade-offs which affect nutrition? How might social protection programmes be modified to allow for more pro-nutrition choices on the part of women and men? Can redistributive interventions in land or other resource transfers alter the bargaining position of some of households with the most nutritionally-vulnerable women and children? Are there possibilities for social mobilization for pro-nutrition work and care norms, and for improvements in women's terms of work in agriculture?

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