

Intra-household impact of improved dual-purpose cowpea on Women in Northern Nigeria

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Abstract

This study explores the intra-household impact of transfer of improved dual-purpose cowpea from a gender perspective. Increased productivity by IDPC, has increased food, fodder and income availability. The impact of which is linked to the income it has placed in the women's hands. Surplus income has been found to be extremely important in providing food and nutritional benefits to the home, particularly during periods of risk. Most importantly, income generated through the adoption of IDPC has entered a largely female domain, where transfers of gifts and income reserves were passed on from generation to generation. Having meaningful impact towards the social and economic development for the women. However, the technology has strengthened the separation of working spheres between men and women, with the associated seclusion of wives. Future IITA technologies, should attempt from the onset, to use alternatives, existing within the local rubric, to target women, with the aim of expanding their participation and contribution to agriculture with the associated benefits to their families

1.0 Introduction

The intra-household distribution of benefits from increased agricultural productivity depends largely on the relative bargaining power of household members. In the context of asymmetry in gender relations, human capital investments and social welfare are often dependent on the ability of the woman to influence decisions within the household.

Increased income within women's hands can have the potential for egalitarian shifts in the distribution of benefits and influence in decision-making. In addition to this, it is women's control over key economic resources, than mere economic ownership or participation, which is critical to their power within the family. (Hoddinott and Haddad, cited in Quisumbing and Maluccio 2000). When women not only earn but also control the use of their income, they are able to effectively bargain with the implicit threat of withdrawing it from the household economy. It is recognized that women's ability to exercise control over their own earnings depends largely on culture, age, stage (early motherhood).

This likelihood calls for intra-household analysis of the gender-differentiated impact of agricultural programs targeted towards improving agricultural productivity and livelihood outcomes of smallholder farmers in Africa. This paper is based on a qualitative study of intra-household impact of improved dual-purpose cowpea (IDPC) technology from a gender perspective. Impacts were assessed using the sustainable livelihoods framework; namely impact of IDPC on human; natural; financial; social; and physical capital (Adato and Meinzen-Dick 2002). Given that complex social and cultural concepts of perceived and actual contributions are involved, a multidisciplinary approach was adopted. In this case, both qualitative and quantitative approaches were used, in order to understand the impact on women.

This study sought to assess the emic perspective on four questions: (1) Has income increased from implementation of IDPC technology, and if so, who controls the additional income? (2) Has food security and nutrition improved as a result of the adoption of IDPC? (3) What about use of additional income on education? (4) What has the additional income been used for, and who has benefited? (4) How are other benefits from implementation of the new technology distributed within the household, the community and across gender? And (4) What is the impact on gender relations? Finally, the study provides recommendations for future IITA's benchmark areas in Northern Nigeria.

2.0 Asymmetry and Intra-household dynamics among the Muslim Hausa

Among the Muslim Hausa of Northern Nigeria, socio - economic organization is characterized by a complex system of stratification, based on occupation, wealth, birth, and patron client ties. Wealth gives its possessor a certain amount of prestige and power, especially in forming ties of patronage. Status is also determined by ones family ability to contribute to social and religious events, and this in turns influences their ability to participate in wider decision making processes. Gender is strongly molded by the existing patriarchal system, which determines the power relations within the households and the bargaining power of household members through various mechanisms. Key among this is family, marriage, inheritance patterns, wealth and occupation

The fundamental unit of Hausa society is the household compound –(*gida*), headed by a senior male owner of the compound (*maigida*), and often by his adult sons, who are not yet wealthy enough to form their own compounds and whom often engage in farming with the household head in a unique family farming system (*Gandu*). Farming activities are organized among related men within a household compound. In such a system the senior member (household head) organizes production on one or more farms that are used to grow food or feed for the household during the year. This often involves family labor which is usually paid for in cash or in kind; often in the form of grain such as cowpea. Cowpea is grown virtually by all farmers, either for self – consumption, or for sale, the actual ratio for any individual often depending on unforeseeable circumstances and productivity. A rational that is maintained by all farmers who readily justify this in terms of the dire consequences of widespread breaking of this rule.

Occupational specialties such as sewn leather wallets are pursued on a more individual basis. The Muslim Hausa wife is obligated to provide labor for the preparation of food, child care, and general domestic chores. In the seclusion system (seclusion of women to the household) she is not expected to work in the fields or to fetch water. If a husband cannot provide food from his own farm, he must purchase it from the open market for his family; often from the petty trading of women in other households. Wife seclusion is, therefore, a major determinant in the sexual division of labor, resulting in the economic imbalance between the two sexes. Men maintain the household for the benefit of the family unit; women are expected to acknowledge the shelter thus provided by appropriately modest behavior. Households vary in the extent to which women are secluded. Among the elite, full seclusion is the general rule. Partial seclusion or no seclusion also occurs.

Within their separate worlds, men and women are free to pursue their own economic activities as long as the above mentioned obligations are met. Men engage in contract labor; the farming of cash crops such as cotton or groundnuts; trading in cloth, kola nuts, or other general items of trade; or transportation; or they may start their own businesses within the wider economy. Women’s economic activities consist mainly of trade between compounds, resulting in what has been called the honeycomb trade in Hausaland, with many busy little cells of sheltered women involved in a wide but relatively hidden, network of trading relationships with one another (Hill, 1969;

Schildkrout, 1982, Renee, 2004). Women also process crops within the compound, and much of this work is remunerated.

Because women are expected to be wives and mothers and to remain secluded within the compounds of their husbands, little value is placed on formal western education. Although females' understanding of the Koran and the basic tenets of Islam are deemed important, if girls are schooled at all, most attend only a Koranic school under the tutelage of a local scholar for a short period of time. Separation and seclusion from the outside world are most important while a woman has a reproductive potential. Respectability requires that this reproductive potential be under appropriate male control. After menopause, control of reproductive potential is no longer important, and women are allowed much greater freedom; with some becoming much more active in the wider economy, occasionally amassing significant wealth (Coles, 1990; Schildkrout, 1986).

Within the household, a husband has no control or right to the woman's income and neither can he oblige her to contribute to the upkeep of the household. It is the husband's duty to provide all the grain and meat (as well as firewood) required by his dependents, and to give his wife a daily sum in cash (*Kudin cefane*) for the purchase of other ingredients, which are usually bought from other secluded wives. If a husband cannot provide for his dependants from his own granaries, then it is his duty to buy the necessary grain himself or to provide cash. In many instances, women have reported lending to their husbands at an interest, or selling grain to their husbands at planting season— all to provide meals they share with the husband

A Hausa compound is typically constructed with high mud brick walls and is entered only through a small entry hut (*zaure*) that opens onto the street and in which the compound head greets visitors (Moughtin, 1985 and 1964). The composition and number of individuals living in a compound as well as their relationships to one another are often fluid and changing (Trevor, 1975). Compound activities are under the direction of a male head.

3.0 Improved Dual Purpose Cowpea Breeding Program

The leguminous crop cowpea (*Vigna unguiculata* [L.] Walp.), a popular crop in West Africa, brings about multiple benefits to the rural communities. Its grains are a major food for rural and urban households, source of cash when sold raw or processed into various products. Women carry out the processing of cowpea, therefore, cowpea plays a critical role in their empowerment. Cowpea fodder is a source of protein for animal feed, and is easily stored and sold during the dry season for additional cash. Healthy livestock in turn produce more manure for the sustainability of crop production. In emergency cases, livestock serve as a quick source of cash. Cowpea fixes atmospheric nitrogen and contributes to soil fertility for the benefit of subsequent cereal crop in the rotation. It also acts as a trap crop that stimulates the suicidal germination of *Striga harmonithica*, a parasitic weed for cereals that can cause up to 100% loss of cereals yields.

Despite this popularity and its multiple roles in the farming systems, productivity levels in farmers' fields remain low, typically below 500 kg/ha. Some of the constraints are high pressure from pests and diseases, poor management practices, lack of inputs, inefficient extension services, etc. In order to address some of these constraints, the

International Institute of Tropical Agriculture (IITA), in collaboration with farmers and other partners from NARS and other CG centers, developed a basket of technological options that include high yielding crop varieties, improved dual purpose (grain and fodder) varieties, new crop spatial arrangements that alternate rows of cereals with those of cowpea, and in combination with a minimum use of external inputs. Dissemination of improved cowpea varieties started in 1993, beyond the initial experimenting villages, with the assistance of the state extension services in Kano and Kaduna States of northern Nigeria. In 2004, an adoption and impact study was undertaken to assess the rate of adoption and to explore the intra household impact of improved cowpea varieties using formal and participatory approaches.

3.1 Study area

The study was conducted in Kano and Kaduna states in northern Nigeria, each representing one of two agro-ecological zones: the northern Guinea savanna and the Sudan savanna. These agro-ecological zones lie between latitudes 8° and 13.5°N. Mean annual rainfall ranges from 500 mm in its northern fringes to 1600 mm along its southern boundary. Rainfall is unimodal and allows 75–180 days growing period across the north-south gradient. Major cereals grown are sorghum and millet in the dry semi arid and maize in the Guinea savanna (Okike 2001).

3.2 Sample design and data collection

In an effort to focus strategic and diagnostic research for generating technologies targeted at specific recommendation domains, IITA has delineated and characterized selected villages within a benchmark site in the northern Guinea savanna zone of Nigeria essentially on the basis of resource use intensity for agricultural production and the underlying influences of human population density and access to market (Manyong et al. 1996). As a rule, areas with fewer than 150 persons/km² were regarded as low population locations while the market access was defined in terms of travel time to the nearest wholesale market on a year-round basis (Brunner et al. 1995, cited in Kristjanson et al. 2001).

Population pressure and market access are the two most important “drivers of change” or agricultural intensification and adoption of improved technologies in West Africa. The varieties of cowpea grown and their role in the farming systems and livelihoods depend mainly on three socio-economic factors – human population density, livestock population density, and access to a wholesale market (for obtaining farm inputs and for sale of produce) (Kristjanson et al. 2002). Based on these stratification variables, four socio-economic domains have been identified (Manyong et al. 1996): ¹These four domains have an influence on the livelihoods of the women.

¹ LPLM – low human population density (usually defined as less than 150 people per square kilometer due to the particularly high population density found throughout Nigeria) and low market access (lack of year-round road access to a wholesale market) (Kristjanson et al. 2002); LPHM – low human population density and high market access; HPLM – High human population density and low market access; HPHM – high human population density and high market access. Accordingly, the study areas were stratified into these four resource use domains that share similar opportunities and constraints.

In order to establish a sampling frame for the selection of representative samples of farmers, an initial exploratory field survey was conducted to identify all villages growing IDPC in Kano and Kaduna states. From the 101 villages in Kano and 27 villages in Kaduna, which were actually growing IDPC; 4 villages from Kano (in view of the fact that Kano is a major cowpea producing state), and 2 villages from Kaduna were randomly selected from *each* resource use domain. A total of 24 villages growing ICP were randomly selected from the two states out of 101 villages in Kano and 27 villages in Kaduna.

With the assistance of extension staff, enumerators, and farmers in the village; lists of farmers living in the respective villages were drawn up. Regardless of their status as adopters or non-adopters, 20 farmers were randomly selected from each of the selected 24 sample villages. Therefore, the survey data were collected from a total of 480 household heads, their wives, and children.

The wives of the sample household heads were interviewed and anthropometric measurements of children between the ages of 12 – 84 months were taken. Household level surveys were used to collect data on socio-economic characteristics, crop production and cropping systems, varietal adoption and diffusion process, and benefits and constraints of IDPC. As one of the objectives of the study was to assess the impact of IDPC on intra-household relations, data were collected from both the head's of households and their spouses (i.e. wives).

4.0 Results

4.1 Adoption

The results indicate that about 79% of the sample farmers in Kano and 61% in Kaduna have adopted improved cowpea varieties. About 80% of the cowpea land was planted to improved varieties in both states. The study revealed that improved varieties occupied about 20% of the total land cultivated by the sample households in Kano and about 14% of the land cultivated by the sample households in Kaduna. Of the total population interviewed, only 20% of the farmers were female farmers, majority of whom were to be found in Kano.

4.2 Diffusion

Farmers are the main sources of *information* and seed of improved cowpea varieties. About 65% of adopters in Kano and 29% of adopters in Kaduna got information about their preferred varieties from other farmers. About 42% of adopters in Kano and 34% of adopters in Kaduna got seed of their preferred varieties from other farmers.

For female farmers, the source of *information* was largely from other farmers within the same village. It was not clear if these other farmers were male or female farmers. Source of the improved cowpea seed for these women was from other farmers in the same

village and the market. The most common reason cited for abandoning a variety was poor grain yield. Source of labor for the women was mostly from the family and was a mixture of both males and females.

4.3 Yields and incomes

Male adopters in Kano obtained considerably higher yields (1166 kg/ha) than non-adopters who obtained only 498 kg/ha. This represents a 134% increase in yields brought about through adoption of improved cowpea varieties. In Kaduna, adopters also obtained higher yields (1129 kg/ha) than non-adopters who obtained 652 kg/ha. This represents a 73% increase in yields associated with adoption of improved varieties. An increase in yield means an increase in income, food and fodder

The average land size was less than an acre for female farmers. Most of this land was inherited from their family i.e. father or husband. Over 80% of these women reported that the decision whether to farm or not to farm was made largely by the household head.. It was not possible to gauge the increase in income before and after the adoption of IDPC from this group due to the sheer secrecy among the women.

4.4 Livelihood capital assets

Farming household heads assessment of changes in their household and productive assets and human capital investments following the introduction of improved cowpea revealed that farmers who have been cultivating improved cowpea have acquired a range of assets and have made investments in education and health care. The incomes obtained from the sale of improved cowpea enabled about 24% of the adopters in Kano to make human capital investments in the form of health care and about 16% of them in the form of education of their children. Further, about 33% of adopters acquired goats, 30% bought sheep, 17% bought bicycles and radio, and about 36% bought clothes. In Kaduna, 20% of adopters constructed metal-roofed houses, 19% bought bicycle, and 55% bought clothes. Adopters in Kaduna also acquired productive assets out of IDCP incomes: about 20% bought goats, 19% bought cows, and 16% bought land.

5.0 IDPC technology and intra-household impact

Renewed interest in intra-household allocation of welfare has been ongoing in recent years, with the realization that slight differences in intra-household allocation of scarce resources can have dramatic consequences on child, female nutrition, morbidity and mortality (Haddad and Hoddinott ,1994).

Recent studies have rejected the hypothesis that households are unitary, and indeed have demonstrated that consumption among household members varies systematically with their relative contributions and control over such resources i.e. their ability to bargain with the implicit threat of withdrawing these resources. Bargaining power has four determinants: control over resources; influences that can be used; interpersonal networks; and value systems found within the community. Factors that can influence the bargaining process include education, skills and knowledge, the capacity to

acquire information, personal networks and membership into organizations or groups. Basic attitudinal attributes that affect bargaining power include self-esteem, self-confidence, emotional satisfaction, and bargaining skills. Several studies have found the bargaining model useful in measuring impacts (Haddad and Hoddinott, 1991, Naved 2000, Quisumbing 2000)

This study confirms previous findings using the bargaining model. The Muslim Hausa household is not a unit that links families in subsistence agriculture, in which a household head can call on the labor of junior men and women within the household to work on the farm with *no direct* remuneration. Households among the Muslim Hausa are non - corporate in most functions, meaning that the household is not a production or a consumption unit and has no conjugal fund linking husband and wife as one financial unit. Relations of production are largely extra household with women being mobile homes through divorce and re-marriage. Thus measures of impact of improved agricultural production on men and women and children is linked to the separation of their economic spheres and spaces.

A gender differentiated study of the household, has been particularly useful, given that women's contribution to the creation of market value products still remains socially invisible due to their absence at the point at which the value of such products are realized. Impact disaggregated by gender has provided useful data, on how IDPC in contributing income through higher productivity, has altered the lives of women in their household setting, revealed how individual women have responded creatively to these external pressures in fashioning satisfactory lives for themselves and their daughters. The impact of which in turn influences the course that younger women will follow later, thus having an impact on the course of economic development and the path of social change.

5.1 Impact of increased income from IDPC

This section, discusses the avenues through which income has increased among the wives of adopters, as a result of IDPC adoption, based on data collected during household and focus group discussions.

The techniques used for data collection included key informant interviews (KII), focus group discussion (FGD), case studies, trend analyses, impact flow, historical profile. Triangulation among various qualitative techniques was used to validate the information gathered. Although this report attempts to present the emic perspective of the women, the conclusions are based on a synthesis of this the data with the understanding and analysis of the researchers. Similar studies have used similar techniques in eliciting data on impact of increased of agricultural technologies on women (Naved, 2000).

Exact amount of income generated by the women in processing the IDPC, or as provided for by the household head (*Kudin Cefane*) were found *not* to be useful. For several reasons: Severity of price fluctuations rendered it unnecessary to have valued cowpea grain *and hence*, income within the household in some arbitrary way, based either on prices at the time of harvest or at the time of processing and marketing. Certainly such statistics would have been useful, however, given the extreme seasonal fluctuations of farming and economic activities in Northern Nigeria comparisons would have had to be made against an exceptional year's worth, bringing in the error of enshrining a particular year as exceptional or normal. Income expenditures would also have meant breaking up the household into 'cooking pots' rather than separation of

spheres, and hence the gender approach. Such a technique and data would not have captured the meaningful impacts of IDPC on women, during the different stages of the household, and women's life etc.

It is also doubtful whether reliable statistics would have been obtained because of the extreme secrecy that surrounds various transactions, for example in the petty trading, and the re-sale of grain for 'own production'. We found qualitative approaches useful for a society where husbands and wives are often kept ignorant of their spouses' economic affairs and with extreme secrecy on exact amounts on expenditures. In addition to this, daily food consumption of adopters and non-adopters would have been very interesting, but even so it is doubtful whether their value would have been justified given the enormous labour in their collection. Any inquiries would have had to be on a sample basis, whereas one of the very great advantages of our approach was that everybody was included.

5.11 Has income increased income from IDPC?

There was consensus among the spouses of adopters that income had increased as a result of the increased productivity of improved cowpea varieties. Additional income was made available to them by the household head (*Kudin cefane*) from the sale of grain. This income was used to expand or initiate petty trading activities, for example the sale of Islamic caps, salt, leather products etc. Additional grain, available to them within the household was used to increase productivity of bean cakes for sale, a common activity among Muslim Hausa women. Some of the grain within the household which was saved over from the previous season by the women, was re-sold to the household head, during planting season, a common practice between husbands and wives.

"I have noticed that after the last two harvests, there was additional grain within the household, and the amount of cash he gives me had increased. For me, I had additional income, with which I was able to invest in my petty trading. Additional grain available to the household, I processed into bean cakes (Kosai), and the rest I resold to my husband during the next planting season, for a price. Many women in this area whose husbands have adopted cowpea have been able to do the same. I was also able to purchase a small wheelbarrow, with which my children can use to transport goods for neighbours, to the nearest tarred road for a small price."

Magajiya Fada, Kayawa village, Eiwa Local Government Authority, Kaduna state

The extent to which women are able to benefit from IDPC in contributing to their income is also linked to settlements. Women living in dispersed settlements, or LPLM live under different circumstances. Petty trading, between villages or to nearby markets was low. For such women, increased labor demands in harvesting of IDPC was the only opportunity for petty trading. Laborers mean more persons willing to buy processed foods from them.

The plot size has not changed and is still small. But the labor has increased because more relatives have been called in during the last 3 growing seasons to work on the

cowpea grains. And I was also involved, after a while my husband begged me to start cooking and taking to the farms during harvesting, and I then put a small fee for other farmers to buy from me. This has boosted my income considerably. Normally, poor women like we cannot be under full seclusion, and this brings some shame, in terms of acceptability. But the income I have earned has boosted my respectability. I now feel that I am able to support my husband better. In terms of access to health facilities, and education, I have not seen much change, but in terms of nutrition, we are eating much better. And also we have better relations with other farmers and relatives and this is very important during difficult periods as we have people we can fall back on”
Salima Audu Bada Tiga village, Eiwa Local Government Authority, Kaduna state

Uses of increased income by the women

- Food security and nutrition?

For the Hausa, the food situation within the household has two distinct periods and is a reflection of the difficulties in maintaining consistent food consumption patterns:

Matsala refers to the food situation in a household where produce is inadequate and lasts only 3-5 months after harvest. Adjustments in the daily quantity and quality of meals start shortly after harvest, around January. From January onwards, two meals are generally consumed, reduced to one around May.

Tararrabi refers to the situation in households where produce lasts 8-9 months after harvest and the families' concerned start adjusting the number and quality of meals around April/May. Shortly after harvest, breakfast comprises left over *tuwo* (maize meal) from the previous night, supplemented by porridge and cowpea bean cake. Lunch comprises dishes made from a cereal and cowpea mixture. Dinner, the main meal for most families, consists of *tuwo* with a local soup made from dried and ground okra (*kubewa*), baobab leaves (*kuka*) or roselle (*yakua*). Fish or occasionally meat may be added. Milk is often consumed at lunch as an accompaniment to millet and sour milk drink (*fura da nono*).

During difficult periods, young women intensify petty trading activities. Income accrued by women during food insecure periods, including income from livestock sales, goes towards supplementing family food stocks. Where several generations coexist in a household, the older women often assist the men to purchase additional cereals, while younger women enhance family food stocks by purchasing soup ingredients from their petty trading activities. Income generated by men alone is inadequate to maintain meal frequency and quality and women often are the main contributors.

IDPC was reported as having a positive impact. Increased productivity meant increased grain reserves for sale and for consumption. Unearned income from the household head (*Kudin cefane*) from the sale of IDPC, was used to purchase additional foods or held in reserves such as livestock which would be disposed off during food insecure periods. *Kudin cefane* - from the sale of grain, by the household head, also assisted the women to

start up petty trading, or expand existing activities, which were important during difficult periods. Such activities generated more income, which enabled the household women to purchase foods on the market.

I can only report for our household. I am able to purchase different foods during difficult periods, the women in this household are still able to afford vegetables especially tomatoes for our food preparation. We can afford different types of meat. This is special because we normally could not afford such food.

That is the immediate change I have noticed in my household. It is small but it is as a direct result of improved cowpea varieties'
Safiya Yusuf. Rirnaye Raki Village, Bichi Local Government Authority, Kano

"..previously, we had to eat pap (porridge) during the early planting season, when we had no cowpea grain, and we had to spend cash to purchase seeds on the market for our crops. Now we can afford rice and occasionally some meat and milk. Now during the dry period (crisis period), we may go without fish or meat, but not without some rice or vegetables, I am even able to add extra cooking oil in the food."
Ade Idanan Santa Rago, Bichi local Government, Kano

"My household has not been growing improved cowpea varieties because we have had no access to fertiliser and my husband is poor; but we have noted that some households growing improved cowpea varieties in 2003 season. What I can say is that I have heard that the women in the areas growing improved cowpea varieties are able to change their diet and also have grain and food in stock throughout the year. They are also able to meet the household needs more easily"
Wife of non adopter - Zulai Sale Malikanch Ikara Local Government Authority, Kaduna

During the focus group discussions, a list of indicators that the women felt represented good health, nutrition and welfare. Against this the IDPC technology was assessed. Among these indicators selected to represent changes brought by IDPC on adopter households were: healthy skin without rashes, physically active plump children, children able to attend both Islamic and formal western education schools, children able to communicate and understand.. These perceptions and income invested in food security and nutritional values tested against anthropometric data.

The results were calculated under three groupings of households: two years of adoption of improved cowpea (ADOP2), three years of adoption (ADOP3), and four years of adoption (ADOP4).

Table 1. Nutritional status of children (2 years adoption dummy or ADOP2)

	Z scores		
	WAZ	HAZ	WHZ
Adopters	-0.97	-2.09	0.31

Non-adopters	-1.13	-2.09	0.12
Level of Significance	NS	NS	NS

Table 2. Nutritional status of children (3 years adoption dummy or ADOP3)

	Z scores		
	WAZ	HAZ	WHZ
Adopters	-0.90	-2.19	0.47
Non-adopters	-1.17	-2.00	-0.02
Level of Significance	NS	NS	***

Table 3. Nutritional status of children (4 years Adoption dumm or ADOP4)

	Z scores		
	WAZ	HAZ	WHZ
Adopters	-0.75	-2.20	0.52
Non-adopters	-1.19	-2.04	0.06
Level of Significance	***	NS	*

Noted: * -P<0.01; -P<0.10; NS – Not Significant**

Overall, the average Z scores are within the ranges of a good nutritional status. No significant differences were observed between children of adopters and those of non adopters for all the Z scores for ADOP2. One significant difference (WHZ) was observed for ADOP3 and two significant differences were observed (WAZ and WHZ) for ADOP4.

The implication of these results is that children were found to be in a good nutritional status. This is consistent with perceptions by wives of adopters. These results *may* show that that as sustainable adoption occurs over time, differences are being observed between children of adopters and those of non adopters. .

- Use of income on education

Among the Muslim Hausa, relative importance of formal education is low, particularly for the female child. Young children often assist their mothers in petty trading between households and only undergo Islamic tutoring. For the few who are able to get formal education, it is the male child who is granted the first priority. While the female child is expected to assist the mother in household chores, and at the onset of puberty, be married off.

Some wives of adopters still reported that they were able to contribute to formal educational costs of their children, often male.

'We have managed so far to have additional income, which has boosted our ability to take our children to both formal and Islamic schools.'

Ade Idanana, Santa Rago, Bichi local Government, Kano

However, education was not a priority household expenditure pattern among the women. Perhaps because of the role played by their children in petty trading and overall existing social norms.

Use of increased income on health needs?

For Muslim women in Northern Nigeria, access to modern health facilities is largely inhibited by the prevailing social norms of wife seclusion. And this has in turn an effect on the health care of young children. A clear indicator of this is the high maternal mortality ratio greater than 1,000 maternal deaths per 100,000 live births. Illiteracy; marriage at an early age often compound the situation, and many women and children are under directly harmful traditional medical beliefs and practices. The convergence of all of these factors has resulted in one of the worst records of reproductive health for women, and, younger children, in the world (Renee. 1996).

Increased income from IDPC only contributed to meeting of health care needs of young women and children. And this was by offering them a choice of modern or traditional, with the modern being sought after only in extreme cases, where the latter failed.

‘ I am 15 years of age. And I have started my own petty trading of salt, bean cakes from Cowpea and other grains. And I trade with the nearby shopping area with the help of my co-wives children. I am grateful for any additional income that IDPC has brought to this household. It has helped me start up my own petty trading. My experience is that I was expecting my first child, and I was in labor for as long as two days. In the end my brother’s, took whatever earnings I had made, and rushed me to the nearby hospital in Wudil. I lost the child, but I was able to be fixed by the doctor. I cannot say that IDPC has done much in terms of health care in this area, but when there is an emergency, any additional income in womens hands, is a big security’ Baita village, Wudil local government, Kano

- Impact of increased income on intergenerational transfers?

Intergeneration transfer of resources between women and their daughters is a common practice among the Hausa Muslims. The ability of which heavily depends on the success of their petty trading activities. Surplus income from petty trading as a result of IDPC, was held in reserves such as livestock (mostly goats), and enamel dishes (*Kwano*), which are then handed down to their daughters in preparation for their future married lives. Such transfer of wealth to the daughter has the wider impact of assisting young women start up their own independent economic activities, as well as increasing their ability to influence decisions within the household. In the event of divorce, which is a common occurrence, such women leave the marital home alone (leaving children behind, who would otherwise assist them in petty trading). And cash in such reserves assist them to start up once again, in a new marriage, or back in their parent’s home.

IDPC, by contributing to the income generating activities of the women, has reinforced the intergenerational transfers between women.

“You see, most of the income that women earn, is used within the household. But I must tell you of a very important practice. We, particularly as older women, invest the money in kwano, when our girls are starting to mature. When my daughter gets married, I will hand over these dishes to her, and she can survive on such assets. Young girls are not allowed to trade or be involved in farming or petty trading. They must wait until they are older before they can be allowed to contribute actively within the household. In the event that she is divorced, or is unable to have children, she can still have a reserve, until she joins a household with co-wives and their children. It is very important for us women to help our children. And in my opinion and I think the other older women agree, any increased income within the woman’s hands, particularly older women, has a contribution for the next generation. And IDPC reinforced this. ”
Aisha Garba, Senta Rago, Bichi Local Government Authority

IDPC, by providing a base within which women can start up or increase their income generating potential, has provided income with which they are also able to purchase gifts for weddings, naming ceremonies, for other women. This is seen as cementing bonds between women (*Adashi*). As such acting as a safety net during times of hardship, when such favours would be reciprocated.

“In terms of participation of women, there has not been much change at the household level, but at the community level, there are better relations for the women because extended families are assisted, and this means more peace and respect. When your in-laws and fellow neighbors are helped, you have built yourself a bridge over a difficult period in the future. And in this process women are able to participate in the decision making in which neighbor and family issues are concerned. That is the only notable change I have seen in our few households growing improved cowpea varieties ”
Hauwa Liman, Rimaye Rak Bichi Local Government Authority, Kano

- More income, more savings? more collective action?

In villages around Kano, where women have been able to expand their income through IDPC, and due to proximity to markets and densely populated settlements (corresponding to the HPHM socioeconomic domain), women have been able to start up credit groups. For some women, membership into existing groups is gained through the ability to afford monthly contributions. For others, women have come together to organize their income into joint savings and credit groups. Some credit groups are ran between secluded women, based on trust, and linked through their children. For others, the women are allowed by their husbands, under appropriate conditions to meet with other women, and discuss activities and contributions. Such credit groups or ‘merry go round’ groups (as they are commonly referred to) are important in starting up further income generating projects.

“We are now able to have little money which we contribute to a common pool among the women in this ward, this money is then used either for community activities, or is handed over to member per member per month. This means that we all contribute an equal amount, and each month, a member will receive the sum of it, and the next month another person and the next. We also have our own little groups in which we sew woven Islamic caps together. There is also one group where they were able to buy a sewing machine, and they together are working on selling Islamic wear such as kaftans. You know our culture only allows women to be within the village, and but we are now working together.”

Focal Group Discussion, Badume, Bichi Local Government Authority

One wife of a non adopter had this to say on her observation of spouses of adopters.

The wives of adopters have access to large social networks through the petty trading business and self help women’s groups that they started the additional income that IDPC has brought to them. As for my household, we have not grown it because the household head feels that it is too risky to plant, and needs a lot of inputs, which we simply cannot afford.

Su Waiba Nadabo Malikanchi Ikara Local Government Authority, Kaduna

5.2 Increased income on Women’s status and Gender relations

Data on gender relations was obtained by questioning both women and men about gendered ideologies and behavioral roles, an estimation of their relative power – defined as control over significant resources, in a socio-cultural and historical setting, and the changes that have occurred with IDPC. The seclusion of women, and the strict separation of male and female spheres, did not necessarily imply bad gender relations or subordinate status of women. Previous studies have found that, where distinctive ideologies of men and women occur, a balance of power most likely is present, and gender relations are often good. Beyond the increase in income, as a significant resource, and the influence this has on decision-making dynamics within the household. We wanted to understand, what influence did IDPC have on other resources, with which women could use in to influence the outcome of their and their childrens livelihoods.

Matsayi mace is an important aspect in building positive gender relations and maintaining the respect – *mutunci* and dignity – *daraja* of women. *Mutunci* – is considered a significant resource for women, on which their self esteem and dignity (*daraja*) – depends, conveying a force of moral authority in certain situations, and which is controlled by the women themselves. It is defined in relation to the woman’s situation and the significant resources women control, as i. position post, meaning the household, with economic activities for women being undertaken within the home
ii. Status, often acquired through participation and contribution to the wider family and
iii. The woman’s proper place, meaning, shielded away from the ‘evil eyes of the male’. For this reason, it is strongly linked to the separation of working and economic spheres, of men and women, through the seclusion of women – *auren kulle*. Any impact on gender

relations, and empowerment of women, would have to be understood in relation to *Matsayi Mace*.

The impact of IDPC on gender relations, was linked to the reinforcement of the seclusion and separation of economic spheres. By enabling women to contribute to the family's welfare, through the petty trading within the confines of the home, women felt that they could gain the respect associated with *Matsayi Mace*. Conflicts often arise within households, when the man's and woman's inability to provide a sufficient livelihood, forces the woman out of seclusion, to work on fields, which exposes her community shame. While this shame is often molded on the tenets of Islam, seclusion has become an economic symbol of wealth. Women often ask for divorce, on the grounds of poverty, and inability to maintain her economic activities in a separate sphere.

Poorer households, implies partial seclusion. And a progression towards full seclusion and the maintenance of *Matsayi Mace*, was a major indicator of the impact of IDPC. *Mutunci* – or the respect acquired by a woman who is able to maintain her home while in seclusion, was seen as a significant resource for women, as the resulting feelings of dignity – *daraja*, was an important tool in influencing decision making within the marriage, family and wider community.

From this aspect, the wives of adopters felt that the technology had contributed to the welfare of women, and towards positive gender relations.

‘ Very few women in this area, who are not in full seclusion can admit it. A woman's place is in her home. She is safe there and will not put herself at risk by affecting her own respectability. She can contribute to her family, and no one will know that it is the wife who provides more. There are off course women who are not happy within their husbands home, and if their parents are dead, they may choose to remain, and not ask for divorce. IDPC has given women something that they can control and use to influence decision making. And that is the sense of respectability that is associated with seclusion. Not everything is based on money.

Mariya Liman, Fako, Minjibir Local Government Authority, Kano

There are off course some who want to maintain their respectability, but still are fighting for personal autonomy. For them, the increase in income, through adoption of technologies such as IDPC, may assist them in their quest. Simply because they can choose to move away from their village.

Alima Tbello, zonal extension agent, Kano National Agricultural Research Agency

6.0 Conclusion:

IDPC was developed to address productivity issues on farmers fields, with no gender considerations, as far as technology adaptation to the needs of women. Increased productivity, however, has increased food, fodder and income availability. The impact of IDPC on intra-household welfare is linked to the income it has placed in the women's hands, from cash for household goods (*kudin cefane*) to petty trading of bean cakes, and

the expansion of petty trading. Surplus income has been found to be extremely important in providing food and nutritional benefits to the home, particularly during periods of risk. Most importantly, income generated through the adoption of IDPC has entered a largely female domain, where transfers of gifts and income reserves are passed on from generation to generation. Having meaningful impact towards the social and economic development for the women.

The study of IDPC has provided insights into the community, that could be considered when disseminating information about new technologies, or in encouraging wider participation of women in agriculture. The honeycomb trading, may provide a meaningful avenue through which information on agriculture could be passed on. The use of women's credit groups, could provide an interesting avenue in raising credit or holding cash, in the form of grain/seed reserves.

Re-interpretation of the social or religious 'constraints' could be done in order that new gender roles, within the rubric of particular contexts may provide an opportunity for women to participate more widely in agriculture. The seclusion system can be understood either as status or prestige, or on the liabilities on women's control and access to other resources and material goods. Future IITA technologies should target women, beyond maintaining their seclusion and separation of work spheres. And the culture does provide opportunities where technologies, could bring women, out and active in other spheres of agriculture. Seclusion of the heart – *kulle zuci* – could provide such an opportunity, in which women are able to participate without restrictions on personal autonomy – while 'behaving in a manner that is befitting their status (Callaway 1987, cited in Renee, 2004).

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