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Transforming gender relations in agriculture through women's empowerment: benefits, challenges and trade-offs for improving nutrition outcomes

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Topic note

South Asia has had extraordinary economic growth over the last two decades, yet has the highest rate of child malnutrition in the world, with 4 in 10 children chronically malnourished. While agriculture is the main livelihood for majority of rural families in the region, clearly its potential to address undernutrition is not being realised. This we can see from the macro-level neglect of rural areas in targeting investments (agriculture / infrastructure) to adverse prices for agricultural commodities, and the neglect of the agricultural workforce (increasingly feminised) in terms of both skills and returns. Most nutritional interventions do target women though, given their central role in child-care, yet the problem persists. So, what is really missing in our research and analysis, and our policies?

A socially differentiated analysis of women's position, roles and work burdens appears to be absent. Men too are missing from policy discourses on nutrition, though food production and provisioning are central to masculinities in South Asia. These gaps in our understanding must be filled in order to inform policies and programmes in the region and LANSA research programme seeks to do this.

The gender-nutrition-childcare connection in South Asia
Recent research has indicated that the regularity of feeding and care has significant implications for the nutrition and health of children below two years of age (Kadiyala et al 2012) seen primarily as a woman's job.

In South Asia, women are responsible for 'reproductive' activities (childcare; domestic work; health care), in addition to both paid and subsistence 'productive' work. Yet these social norms and expectations are not fixed, they shift through an individual's life-course, but also in response to broader social and structural changes. New production regimes, processes of commodification, migration, price fluctuations, market competition, educational expansion, health provision, and contexts of conflict – can all change the dynamics of gender relations, and consequently, nutritional outcomes (Mitra and Rao, 2016*). These changes all contribute to shaping gender hierarchies and hence deserve due consideration.

In **Afghanistan**, The Ministry of Agriculture, Irrigation and Livestock (MAIL), supported by FAO, has formulated a strategy for 2015-2020 on women in agriculture. It argues that the role of women in the Afghan agricultural sector is a paradox: 1) on the one hand, women are major actors in agriculture contributing more than 40% of the labour force; 2) at the same time, Afghan women are marginalised in relation to control and decisions over productive resources.

The situation of child nutrition is alarming in **Bangladesh** with 36% stunting, 14% wasting and 33% underweight. As an agrarian country it there is a huge potential to improve the nutritional status of women and their children through agriculture. However, there is only limited evidence on how one may influence women in agriculture to address their own health, and the nutrition of their children.

Similar is the case for **India** – a majority of rural women are engaged in agricultural work, and are faced with a harsh trade-off – to work or care for their children. While there are policies for women's empowerment, for supporting women in agriculture and for improving nutrition, there is little synergy between them. LANSA research in India demonstrates that without attention to the reduction of drudgery and the redistribution of women's work and attention to their personal socio-economic wellbeing, outcomes are unlikely to improve substantially.

Emerging findings from LANSA research in **Pakistan** show that women's agricultural work can have positive impacts (through higher incomes) as well as negative impacts (through less time and physical energy available for their own and their children's care) on nutrition. Agricultural workforce is becoming increasingly feminised and evidence shows that children of female agricultural workers suffer from higher levels of malnutrition. However, women's agricultural work remains almost universally underpaid. In addition, certain agricultural activities (cotton picking / livestock rearing) are deemed exclusively 'women's work' and men fail to compensate for increases in women's agricultural labour by providing more care in the household. Although progress has happened with the formulation of the Inter-sectoral Nutrition Strategy, women's work needs greater recognition in agricultural policy, programming and investments.

Opening up discussions online

Leveraging Agriculture for Nutrition in South Asia programme is engaged in cooperation with FAO's FSN Forum in running this online discussion. We invite opinions and encourage discussion on processes, as well as examples of good practice with regard to policy changes empowering women in agriculture, and how these changes altered the woman's nutrition status for the better, and subsequently child nutrition.

You are welcome to contribute to the online discussion live on the FAO website http://www.fao.org/fsnforum/user/register between June 27 and July 15, 2016.

From this e-discussion we would like to explore:

1. How far can policy recognition of women's roles and contributions to agriculture lead to strengthening women's agency, empowerment and in turn nutritional outcomes?

2. Are there experiences / strategies that can help address the issue of women's time?
   a. examples demonstrating the impact of the reduction or redistribution of unpaid care work on nutritional outcomes in agricultural households
   b. Do men, community / state institutions take responsibility for the care of young children, especially during peak cultivation seasons when women's labour is much needed?
   c. How rigid or flexible are social norms when it comes to issues of survival?

3. Are you aware of changes in gender divisions of work, roles / responsibilities in contexts of change (eg: shifts in cropping patterns, technical innovations, the loss of ecosystem services, social and political conflict)? How is the contribution of men to household nutrition changing?

4. What is the link between dietary diversity, women's engagement with agriculture, and access to ecosystem services?

5. For Afghanistan, we want to capture experiences about women's roles in agriculture and agribusiness value chains in order to shape policies and interventions to recognise and support women's contribution to livelihood security.

We need to know more about policies and programmes that enable women in South Asia to manage the competing pressures of agriculture, childcare and household responsibilities, and to identify approaches that improve household wellbeing and nutrition, particularly of young children, and very much look forward to reading your responses.

Thanking you in advance!
Lead Facilitator: Nitya Rao, India research & overall Gender crosscut lead, LANSA
Co-facilitators: Nigel Poole, Afghanistan research, LANSA
Barnali Chakraborthy, Bangladesh research, LANSA
Haris Gazdar, Pakistan research, LANSA

**Mitra, A and N. Rao (2016) Families, farms and changing gender relations in Asia. In FAO and MSSRF (eds.) Family farming: Meeting the zero hunger challenge. Academic Foundation, New Delhi*

Contributions received

1. Kuruppacharil V. Peter Peter, World Noni Research Foundation, India

"Feminisation of agriculture" is now frequently used as men move to cities for better livelihood. Kerala the southern state of India has shown the way for women empowerment through more involvement in agriculture and related activities. "Self Help Group" has emerged as a viable and socially accepted group. There are even all women farming green armies getting involved in waste disposal, sowing, transplanting, weeding, fertilizing, irrigation, harvesting and post harvest handling including value addition. There are also problems of liquor addition among men which leads to disharmony in families. Kerala has more women than men. There are matriarchal systems followed in a few Hindu and Muslim sections. The very famous court pronouncement giving equal right to sons and daughters to inherited property has further made women important partners in development. The Kerala Agricultural University has established A CENTRE FOR GENDER CONCERNS which conducts research on women empowerment. There are even women climbers to harvest coconuts from 30 feet tall trees. The success story of Poultry raising by self help group is worth study. There are public canteens run by women only.

2. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

Thank you Dr Peter for your contribution. The Kudumbashree programme in Kerala has indeed encouraged groups of women farmers to undertake collective farming. While such policy recognition clearly support's women's empowerment, do any of the studies undertaken by KAU you mention specifically focus on food security and nutritional outcomes? Do migrant men contribute incomes to their families, or is a large percent spent on liquor? Secondly, while women are clearly involved in all the activities from planting to post-harvest processing, do they receive any support in terms of improved inputs or equipment to help reduce the drudgery and time involved in some of these activities?

3. Elvis Njabe, Denmark

Woman and food security

Food Security depends on some basic pillars like agricultural production, economics and nutritional status for its complement. The involvement of women dates since ancient agriculture before the industrial revolution. However there are enormous constraints like social, cultural and economic aspects.

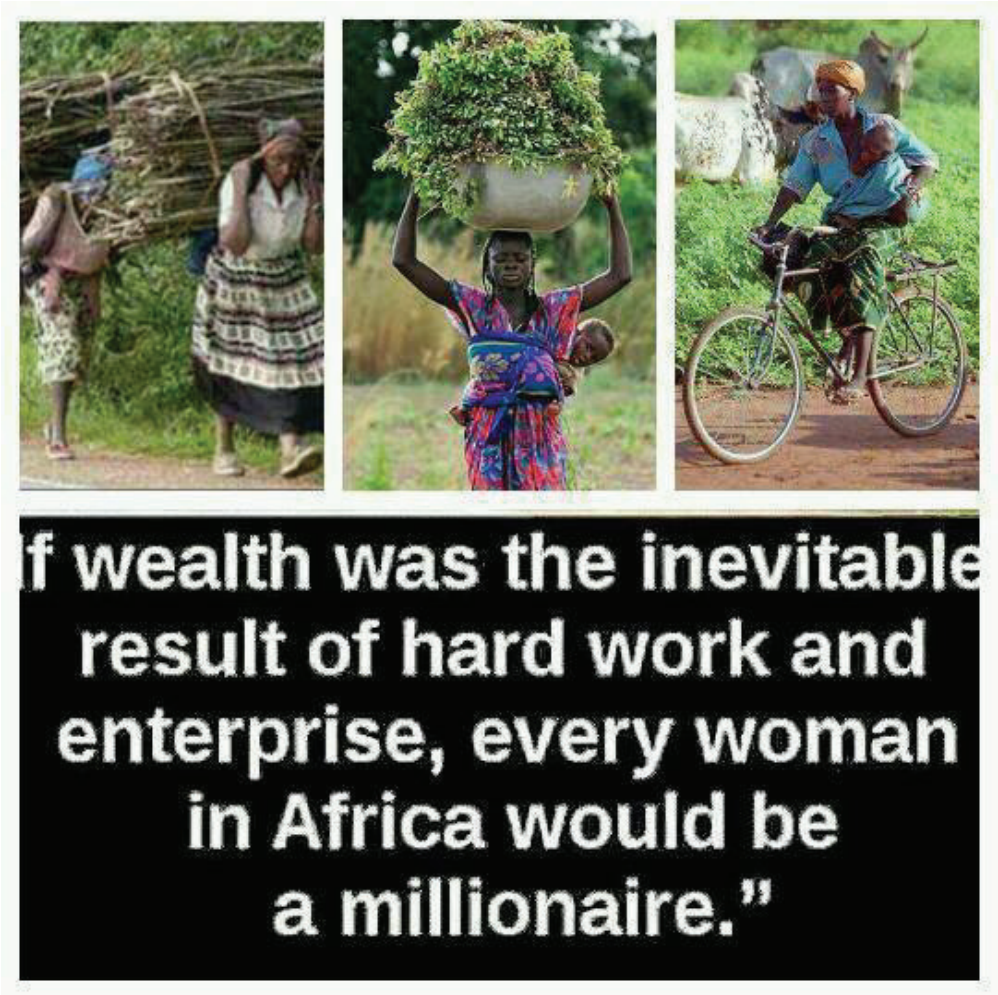
Statistics shows that in a region like Sub-Saharan Africa, 80% women are involved in processing food crops, providing household water and fuelwood and about 90% are involved in hoeing and weeding of farmland. Notwithstanding the good gender agricultural policies and programmes that are in place, the strong cultural stigma of women's land rights, educational level and access to agro-credit, still stand as great limiting factors.

However, what do policy makers do with this cultural stigma of women having certain rights and access?

Kind Regards

NJABE

Yaounde- Cameroon



4. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

Thanks Dr Njabe, could you clarify what the gender agricultural policies and programmes are? If they provide women recognition as farmers, then they should contribute to also changing social norms and cultural stigma that invisibilise women's contributions? Within the discussions on unpaid care work, the 3 Rs framework is now the major demand within feminist advocacy. The first step is to recognise women's work. If this is adequately done in policy, the other two, namely, reduce and redistribute, could potentially follow. In the case of agricultural work, this would involve developing appropriate tools and technologies to support and reduce women's work.

5. Paul Rigterink, Potomac Technical Advisors, United States of America

I am working with the agriculture engineers at the University of Cordoba in Monteria Colombia to start a video training program called "Success in Cordoba and Uraba". In this program we will make videos of extremely poor Colombian citizens who have made a successful first step out of poverty using better agricultural procedures. It is expected that international development personnel will help write the

video scripts. Examples of the videos we will make include videos of people who have doubled their income using better cassava planting procedures developed at the University of Cordoba, videos of people who have successfully overcome the technological hurdle of producing 3-10 chickens to producing 50-1000 chickens, and videos of people who have successfully overcome the technological hurdle of producing 1-5 pigs to producing 15-50 pigs. These videos will be distributed to 20 municipios in Cordoba (there are 30 but the 10 agriculture engineers only work in 20) so that other campesinos can do use the same ideas. In these You Tube vocational videos we expect to capture experiences about women's roles in agriculture and agribusiness value chains in order to shape policies and interventions to recognize and support women's contribution to livelihood security.

6. Md. Sirajul Islam, BRAC, Bangladesh

We all know that food is any substance consumed to provide nutritional support for the body. It is usually of plant or animal origin, and contains essential nutrients, such as carbohydrates, fats, proteins, vitamins, or minerals. The substance is ingested by an organism and assimilated by the organism's cells in an effort to produce energy, maintain life, or stimulate growth. Historically, people secured food through two methods: hunting and gathering, and agriculture. The primitive method of securing food was dominated by men. But when agriculture came to action in securing food the role of women were obvious. We all know that the women is the pioneer of agriculture. But in country like Bangladesh in a men dominating households and societies these role seldom recognized. Earlier women were more engaged on post harvest activities but recently they are very much engaged in on farm activities like seeding/transplanting, intercultural operations and harvesting. Very often women engagement in agriculture is treated as household work and thus gets less recognition. Even in the paid labour there exists huge wage differences between men and women. Since nutrition cannot be achieved without agriculture, the role and contribution of women in agriculture must be evaluated. This lead in changing the societal norms and traditions.

7. Sangeetha Rajeesh, LANSA Consortium, MSSRF, India

Dear Paul, I really like that you capture video footage and are able to use the same to shape policies and gain recognition for the intervention. Would you be able to share some Youtube links, as well as some documented success stories of the kind of policy impact you have had please? Look forward!

8. Joan P. Mencher, CUNY, Emerita Professor, United States of America

I have been working on women's involvement in agriculture in India for close to half a century. My intensive work has been primarily in South India, especially in Kerala and Tamil Nadu. One issue that I find left out of most discussion has to do with cultural attitudes towards women being allowed to make use of animal power, and more important for the present, their being allowed to use implements (such as some of the new ones being devised for sRI agriculture,) and women loosing work in agriculture as soon as implements to help do the work are introduced. I have published before on this, but am really struck by this right now. While I have been supporting the use of SRI/SCI approaches over the past 10 years, I have been really horrified that the moment implements come on the scene, then men claim the right to do the work women have been doing from time immemorial. I refer especially to weeding or the equivalent etc. I can wrote more about this, but first need to know if I can join the group writing ion this issue, and what kind of articles or information you want. While the women I knew best, especially the

Dalit women liked working in the fields, certainly they were aware if the pains they had from doing this work. Still, it has meant a great deal to them. I have been told that ih Andhra Pradesh (and maybe in Telangana) women are allowed to use implements but I need to check this out further. Certainly in Kerala and Tamil Nadu they have not been. They have been able to manage their competing tasks quite well, especially with the help of both the elderly and even by bringing small children with them to sleep under trees. The women who do agriculture have always been clear that they do not want to give it up, unless they have access to other well-paying work. I would be glad to send you some iof my many articles and materials on this, but first I want to know what would be helpful. One thing I do know is that apart from areas where the daughters (even dalits) have SSLC degrees and can get factory employment by commuting to nearby factories, they might be willing to give up agriculture, but not elsewhere. I am preparing a paper for a meeting in November on this issue. Above all, they do not want outsiders (including the elites) or even (their own men) making their decisions about work for them. I was last in one of the tamil nadu areas where this is happening in February of 2015, but I also do manage to keep in touch with people there. Often some of the poorer women have even asked me to be their spokeswomen for them. My former assistant, who runs an NGO in northern Tamil Nadu is on the ground and can speak on the behalf of the female agricultural labourers not only in this area but in all of the rice producing areas of Tamil Nadu. The Organization she has founded is GUIDE and her name is Vasantha. She is a mature woman with considerable experience on this issue.

I am a retired Professor of Anthropology from the City Un. of New York and have lived in India for over 20 years scattered in one month to two year segments. I first started in 1958. I expect to be back in India next winter.

9. Hira Iftikhar, University of Agriculture Faisalabad, Pakistan

To have a better future ahead as a society and country there is need to create gender equality. Women being most vulnerable group in South Asian region need to be empowered. As most of our economy depends on agriculture and women had played vital role in field yet have been unrecognised. In University of Agriculture Faisalabad, there programs being launched for women empowerment and gender sensitization in which rural women are being focused in terms of agribusinesses, health and sanitization, education and malnutrition issues.

10. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

Thanks Joan very much for your comments and queries. I have followed your work in south India for several decades, and your 1988 paper in the collection edited by Dwyer and Bruce, A Home Divided, remains one of my favourites. The insights from that paper are still relevant today and pertinent to this discussion. While women contribute most of their income to household needs, including nutrition, why do gender wage gaps persist in agriculture? Secondly, as you rightly point out below, agricultural work remains more compatible with child care and domestic work than factory work. In recent research in Coimbatore district, I found that younger women did prefer working in factories for a few years, but had no choice but to give this up, at least temporarily, following the birth of a child. In the absence of reliable and good quality child care, reproductive work gets prioritised.

I am really struck by your comments on animal power and small implements, and how these lead to a displacement of women's labour. I would really appreciate if you could share any insights/research/papers on this theme, including on SRI. There have been few recent studies on gender

divisions of labour in agriculture and how these are changing, except for the reporting of a general feminisation in the context of male migration. I would have thought that in the absence of men, investments in tools and technologies would increase, but from your comments it sounds as if when technologies are introduced, particular activities may be commoditised and performed by men for a wage, rather than by women farmers, who in India are still recorded as 'unpaid household workers'.

Your work on control of decision-making also sounds very interesting. I too found that women want to control decisions in relation to farming and have developed their own ways of resistance if they are forced into something they don't want to do. The forms of influence vary with context - in North India I found women doing the work and making the decisions, yet attributing these to men, in order to maintain a facade of male control in a patriarchal context. Please do share some of your recent work on control over decisions as well as the role of implements and animal power in shifting divisions of work in agriculture.

A final point in response to your comment on managing agriculture and childcare. While clearly agriculture is more flexible than other forms of paid work, it was interesting to find during a recent study of Kudumbashree groups in Kerala, that women with young children were largely excluded from these groups. Perhaps they are not able to fulfil the labour commitments at the allocated times by the group, though they do manage their own farms.

11. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

Really happy to hear about the initiatives taken by the Agriculture University at Faisalabad. I think it is very important for agriculture graduates to be sensitised to gender differences in roles and needs and respond to them. Joan Mencher has raised an important issue about small implements and animal power. We need to understand why a strong cultural taboo remains and how this can be changed? With women having the major responsibility for farming, we need to make sure that their work and contribution are recognised by policy-makers and extension workers. At the same time, we need to try and develop technologies and tools that can reduce the drudgery of their activities in farming. We also need to develop technologies to reduce the drudgery of domestic work and free up some time for child care and nutrition.

12. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

It seems important to advocate for a recognition of women's contributions to agriculture, in fact, for women as farmers, in all of South Asia, including Bangladesh. This really seems like a first step to ensure that women then have equal access to benefits and services in their own right. Such policy change will not happen without our collective advocacy. In India, a few years ago, the Women Farmers' Entitlement Bill was introduced by Professor M.S Swaminathan as a private member's bill in Parliament. This was however not taken up. There is now a network of over 70 women farmers' organisations across the country, called Makaam, which is in the process of drafting a revised bill, with support from UN Women and the National Commission for Women. Legal recognition will at least provide a basis for claiming these rights. Given women's central role in agriculture, this needs to be prioritised.

13. Mebit Kebede, Jhpiego Ethiopia, Ethiopia

Dear Facilitators,

I would like to share my experience and though focusing on question # 4, what is the link between dietary diversity, women's engagement with agriculture, and access to ecosystem services?

As we all know, agricultural livelihoods affect nutrition of individual household members through multiple pathways and interactions. Among the multiple pathways, the following three pathways in particular are viewed as potentially promising entry points for improving nutritional status of smallholder household members through enhancing diet quality:

- Food production (Diversifying production to include nutritious fruits, vegetables and animal products)
- Agricultural income (Improving smallholder commercialization to generate income to purchase a healthier diet)
- **Women's empowerment** including the decision-making power related to income, time, labor, assets, and knowledge or preferences of female which enable them to improve their purchasing decisions, healthcare decisions, family planning decisions, and spousal communication. Since this discussion is focused on transforming gender relations in agriculture through women's empowerment, let me focus only on the role of the third pathways to improve household dietary diversity score (HDDS) based on evidence.

A study conducted by Jenifer Coates and Tina Galante in Ethiopia to assess production diversity and women empowerment revealed that for male headed households, the result shows that each 1, 000 birr of additional agricultural income was associated with 0.04 food group increase in HDDS ($p<0.01$). The coefficient on the interaction of female households headship with total agricultural income was significantly positive, at 0.07, meaning agricultural commercialization had a larger effect on household dietary diversity for female headed household ($P<0.010$) .

The same study also disclosed that female asset ownership and literacy were much stronger and significantly associated with dietary diversity than were agricultural income or production diversity. Female assets ownership was associated with a significantly higher probability of the consumption of roots, vegetables, oils/fat, sugar/honey, and meat (all significant at $P<0.05$, or less) whereas female literacy was only found to be significantly associated with a 48% increase in pulse consumption ($P<0.05$)

Impact Assessment of Yekokeb Berhan Program (USAID Funded Program implemented in Ethiopia) also revealed that the proportion of target beneficiaries (mostly female household head) that eat three plus meals per day has increased from 49% at baseline to over 78%, while non-target beneficiaries were more likely to have only two meals per day.

These findings tell us agriculture programs that empower women and enable them to have greater control over asset and other decision-making will likely see improved dietary diversity. Therefore to enable women in South Asia to manage the competing pressures of agriculture, childcare and household responsibilities to improve household wellbeing and nutrition, programs and policies better to be designed to improve Economic opportunities of women focusing on:

- Improving women's access to financial services
- Promoting a savings culture

- Building women's capacity to better select and manage their economic enterprises and resources
- Increasing women's incomes and ability to create assets

14. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

Thank you very much for the insights from Ethiopia, Dr Kebede. Please could you also share the paper you mention, or provide references? It would be interesting to understand in more detail why female headed households are doing better in terms of dietary diversity score. Is it because of a smaller household size? Are they male absent households? What are the processes and mechanisms through which better outcomes are being achieved? This can be very useful for our own practice.

15. Joanna Kane-Potaka, ICRISAT, India

There is much activity around digital agriculture, with one of the key technologies being the use of mobile devices to bring better information to rural communities.

But rarely do I see the gender angle being mentioned with the digital revolution and the huge gender bias in digital technologies.

Internet users in India were 71% male and 29% female, as of Oct 2015. Mobile penetration rates for women are 28% while they are 40% for men.

A week ago I visited 2 villages. As usual a large group gathered and were very polite an engaging. In the first village I asked who had mobile phones. All the men put up their hands clasping their phones. Not one women had a mobile phone. When I asked about this they said they could not afford to own more phones – so obviously the men had first rights to the access to information and communications.

However I was inspired in the second village where I met extremely active Self Help Groups and the vast majority of the women had mobile phones and some even smart phones.

My point is to bring the dimension of the digital technologies and the digital divide into solutions as the new technologies can give access to important knowledge in health and nutrition and connecting this to agriculture.

16. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

Digital technologies provide a powerful tool for sharing and accessing information, including on health and nutrition. There seems to be a lot of diversity even between villages in one area, Joanna, from your experience, is this right? Are there divisions of caste or class that mediate access to mobile phones and indeed to information? Are there particular groups where women are not allowed to go to the markets, for instance? In Puducherry, I found women freely using mobile phones to contact wholesaler suppliers of pulses and tamarind at a time when prices were high to see if they could benefit from some form of collective/wholesale purchase. We definitely need more research and understanding of the role digital technologies can play, but also specific constraints that restrict women's access and use. Please do share any papers you may have done on this theme.

17. Bhavani R Vaidyanathan, M S Swaminathan Research Foundation, India

Adding on to the point made by Nitya on gender sensitization of agriculture graduates, engendering the curriculum of agriculture universities will be a good starting point and has to be actively pushed for. The M S Swaminathan Research Foundation and Kerala Agricultural University had collaborated on preparing course material on these lines more than a decade ago: However, uptake is proving to be a slow process.

Another area is policy for women in agriculture, taking into account the multiple roles they play on the farm and on the home front. Government officials responsible for delivery of entitlements related to agriculture at the village level have to be gender sensitive.

The title to land is in most cases in the man's name. A woman farmer in spite of shouldering a lot of the work on the land, cannot get access to agriculture schemes in her name. In the process, widows of farmers who commit suicide are oftentimes left at a loose end.

A Women Farmers' Entitlement Act is very much needed.

18. Paul Rigterink, Potomac Technical Advisors, United States of America (second contribution)

Dear Sangeetha

You may find the ECHO Tropical Video Series (Part 2 of 6) - Grafting Tropical Fruit Trees and Avocados to be useful. It can be found at https://www.youtube.com/watch?v=7BbSjTVEDCc, click on the > in the far right hand column of the uploads area to get to the video. You can also do a search using keywords Colombia, Youtube, papaya, Cordoba

For a success story see article "Colombia launches new project to boost papaya exports", Campesinos de Cordoba exportan papayas a Canada"

19. Barnali Chakraborty, facilitator of the discussion, Research and Evaluation Division of BRAC and LANSA, Bangladesh

It is important to realize how far the women themselves value their involvement in agriculture to achieve better nutrition. In Bangladesh it is mostly found that women are although engaged in producing local vegetables, fruits or poultry rearing in their homestead, they hardly count it as an important pathway to contribute to their income or nutrition. Even men who act as the key decision maker in such a context less often acknowledge or realize the importance of women's contribution in this process. It is important to understand those of the social factors through undertaking rigorous research to help in generating guidelines for context relevant policies.

20. Mar Maestre, Institute of Development Studies, United Kingdom

Dear all,

I just completed research on unpaid care work dynamics and market systems programmes. While it didn't target nutrition directly, the implications of the research are clearly linked to it. We have identified the key factors that often undermine women when unpaid care work is heavy, excessive or invisible, within value chain programmes, and the consequences for both the agriculture value chain

and for women of not addressing these. Unpaid care can intersect often with agriculture or nutrition related programmes or policies through impacts on time, mobility and agency:

· Time: the more that women increase or decrease time in one sphere directly affects the time available in others.

· Mobility: some women's responsibilities can limit their mobility and ability to, for example, find stable employment.

· Agency: if unpaid work is not seen as contributing, it can lead to women's limited control over resources or undermine their self-esteem.

Our research highlighted the need to address the problematic aspects of care provision if we are to generate sustainable changes that support women's economic empowerment. We also explored tools to understand this, and more importantly, strategies to address it, highlighting the potential of using systems thinking to facilitate change following participatory processes.

The report is not published yet, but it will offer a range of pathways for programmes to facilitate changes to address problematic aspects of unpaid care work, including how to influence norms, through a combination of short- and longer-term changes that contribute to the long-term vision. A key recommendation is to combine interventions to directly address unpaid care, with others that support changes in the agricultural value chain to adapt to existing care responsibilities can be an effective approach. There are successful programme examples that show how, by combining short-term changes or 'quick wins' (e.g. increased recognition of care or adapting market activities to care) with longer-term changes, the underlying constraints can be addressed, even those that seem challenging, such as influencing social norms.

You can find more information about our work here: https://beamexchange.org/practice/research/womens-economic-empowerment/unpaid-care-work/ or contact me, as we will publish the report very soon.

21. Kuruppacharil V. Peter Peter, World Noni Research Foundation, India (second contribution)

The Centre for Gender Concerns Kerala Agricultural University and Centre for Development Studies have done pivotal studies on Women Self Help Groups. The web site of KAU and CDS carry research result on the women self help groups. The livelihood security along with high purchasing power have made members of self help group independence in exercising even their much valued franchise during elections. There are many members in local government who are also members of women self help groups. Many are important opinion makers. The women self help groups are provided by power tillers, threshers, weed cutters, bailers, coconut climbers and even computers for accounting etc. They are involved in programmes like backyard poultry, kitchen gardens, nutrition gardens and now in organic farming. They are also involved in food processing industry. Care of the aged, family nursing and now in many areas which were in men's domain. Each police station in Kerala is provided with a women legal counsellor to render legal help to needy women clients. Wearing of uniforms to make them distinct has added positive power for distinction and separate identity. All above facts have not transformed the traditional role as a dependant of men.

The migrant labourers are highly welcome to Kerala especially in agriculture. MATHRUBHOOMI a Malayalam News Paper has written in its editorial pages the contributions to Kerala Economy. Migrant labourers do not drink liquor as compared to local Keralites. Bans work during Sundays in cities where

migrant labourers make sizeable number. There is study on migrant labourers in Kerala. One bad event here and there are only aberrations in social life. Please see the article in MATHRUBHOOMI on line.

22. Hira Iftikhar, University of Agriculture Faisalabad, Pakistan (second contribution)

Malnutrition in women escorts to economic losses for families, communities, and countries because malnutrition reduces women's ability to work and can create ripple effects that stretch through generations. Even if it's not realized, women serve as back bone of farming sector in Pakistan. It is of great importance to ensure optimal health of women especially during pregnancy and lactation. Women at child bearing age need protein, iron, and other micronutrients to meet the body's increased demands. But usually they suffer from iron deficiency anemia, protein energy malnutrition, iodine deficiency; they have low serum calcium, Vitamin D and Vitamin A levels. As a result to that, not only their lives are endangered but malnutrition poses a variety of other threats to them. It weakens women's ability to survive childbirth, makes them more susceptible to infections, and leaves them with fewer reserves to recover from illness. Increase the problems of maternal morbidity and mortality. More than that the infants born to them are at higher risk of malnutrition and their lives remain in danger as well. To eradicate factors causing malnutrition in women, first step should be to empower women at family and community level and to make their community family members realize the importance of their health and nutrition status.

23. Ramani Wijeshinha-Bettoni, FAO, Italy

Hello, re. the questions, especially Q2, I would like to bring two hopefully useful sources to your attention:

1. FAO just finished a 5-year research and advocacy initiative (the IMCF project, http://www.fao.org/nutrition/education/infant-and-young-child-feeding/en/), whose aim was to explore the relationship between agricultural diversification, food security and nutrition education and nutritional outcomes of young children. The project assessed at community level the impact on young children's diets and nutritional status of linking agriculture and nutrition education. The research was carried out in Cambodia and Malawi, by following two FAO food security projects which added on a nutrition education component. The research component was led by Justus Liebig University, Germany, in collaboration with Mahidol University in Thailand for the Cambodia project and Lilongwe University in Malawi.

The lessons learned have been compiled into a document, which includes the experiences of other UN organizations, NGOs and academic institutions doing similar work. The resultant document is meant for programme planners and managers working to ensure that agricultural production and raised incomes have a greater chance of being translated into improved nutrition outcomes for families in low-income countries, with a specific focus on improving the nutrition of children aged 6–23 months. (http://www.fao.org/fileadmin/user_upload/nutrition/docs/education/infant_feeding/Programme_Lessons.pdf)

I would like to highlight one point from the above programme lessons, which I don't think I've seen mentioned yet on the forum. In order to see nutrition outcomes, projects will need to target families with young children. The FAO projects found that despite best efforts, the overlap between households that received the food security intervention and those receiving the nutrition education component was very low. Targeting in both Cambodia and Malawi projects focused on households that are traditionally eligible for agricultural support, i.e. male farmers, established female farmers or male and female

members of farmers' cooperatives. So families with young children were not automatically included. Despite being a FS project, availability and access to nutritious, affordable foods remained a major constraint for adequate complementary feeding practices, highlighting the urgent need for food systems diversification.

2. A paper we (FAO nutrition education group) wrote a few years ago: Wijesinha-Bettoni R., Kennedy G., Dirorimwe C. & Muehlhoff E. (2013) *Considering Seasonal Variations in Food Availability and Caring Capacity when Planning Complementary Feeding Interventions in Developing Countries*. International Journal of Child Health and Nutrition, 2, (4), 335–352. It looked at how seasonal pressure on women's time negatively impacts cooking and caring practices and intra-family food distribution (in addition to looking at the impact on seasonal food availability). The paper was based on experiences from FAO food and nutrition security projects in Afghanistan, Cambodia, Laos and Zambia which began with formative research using Trials of Improved Practices. In the discussion, some practical ideas for incorporating coping strategies for dealing with seasonal effects when planning such food and nutrition security interventions are presented.

Best wishes,

Ramani

24. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

Look forward to the report Mar and to learn from the successful examples you mention. Recognising and addressing unpaid care work is clearly central to addressing the issue of malnutrition in South Asia, as despite new technologies as well as a host of nutrition interventions including take home rations, unless women have the time to cook and regularly feed the young child, the problem is unlikely to disappear. We often tend to look for technical solutions, rather than addressing the social issues including norms that tend to reproduce existing inequalities.

25. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

Thanks Ramani for raising the very important point around seasonal variations. In some senses, given the seasonality of agriculture, this should be obvious, but it is quite often overlooked. In some new LANSA research in India we are finding similar results. During peak agricultural seasons, the time available for cooking and caring declines substantially, creating energy deficits in both adults and children. Thanks for the reference to your paper.

26. Akmal Nazir, University of Agriculture, Faisalabad, Pakistan

I have different opinion regarding the topic under discussion. It is totally wrong if we only talk about women empowerment of families linked with agriculture, a totally bogus idea. It is the whole family that is neglected and must get care. Here the education can play an integral role, because what we can see that the situation is entirely different for well-educated group of people and the women are automatically empowered and well respected in society. This is the responsibility of the government to launch a sound program for education, prosperity and well-being of families linked with agriculture. They should be given different incentives/subsidies to make their lives comfortable. There many more

to write about different policies for uplifting the whole families… but the point is we must first decide that whether we're interested in just women empowerment or rather in uplifting the whole family.

27. Mohammad Jafar Emal, IFAD/RMLSP/MAIL, Afghanistan

Dear FSN-Moderator,

Please find attached herewith an Article "Study on Creation of Other Income Sources from Backyard Poultry Production in Afghanistan.

This project has reached the poor rural women, the main target, who benefited in terms of income, food security, social and economic empowerment. The additional income generated through the sale of eggs, pullets and old stock had immediate positive impacts for the rural women beneficiaries that are practicing the improved backyard poultry management. With the help of Women Poultry Associations beneficiaries are able to sell their products and generate extra income that is used for domestic needs and creation of other income sources.

Best regards

Jafar Emal, National Poultry Advisor,

IFAD/RMLSP/MAIL, Kabul, Afghanistan,

Attached document "Backyard Poultry Development in Balkh and Jauzjan: Study on Creation of Other Income Sources from Backyard Poultry Productions" in Annexe 1

28. Amna Akhtar, Collective for Social Science Research, Pakistan

Women's unique role as mothers and care-givers, coupled with their marginalization in South Asian societies makes for a compelling case for empowering women to improve the nutrition and well-being of entire households. Evidence shows that women earners are likely to make more pro-nutrition consumption choices for the households. However, usually women have limited agency and decision making authority in the household where a woman's income may be entitled to the household. For women's income to be a factor in influencing consumption choices and nutrition outcomes, there needs to be acknowledgement within the family that a particular income stream does belong to a woman. Therefore it is important to recognize and acknowledge the contribution of women's paid work in the household which in turn may also have empowerment effects for the woman.

29. Paul Rigterink, Potomac Technical Advisors, United States of America (third contribution)

In 2003 I worked with the Afghan Project personnel in Freemont California to develop ways on increasing thw income of women in Afghanistan. Our discussions centered around my paper on poultry production. See "Doubling the Income of Africa's Poorest Farmers" at my website at https://sites.google.com/site/PaulRigterink / We also discussed the use of home canning. See "A Plan for Improving Food Security in Afghanistan" at my website

Subsequent to our discussions the Afghan Project personnel were able to help convince the FAO Poultry Development Service, USAID, the World Bank etc to start a major number of backyard poultry projects (0-50 chickens) in Afghanistan. Unfortunetly, they were not able to convince these agencies to develop

followup plans so that the women could fully take advantage of modern poultry technology. Followup plans would include descriptions of how to raise 50-500 chickens (family farm size) and how to raise 500-10,000 chickens (commercial farm size) (the technology is slightly different as described in my poultry paper above. Policy personnel need to establish a policy that Afghan women raising poultry should be introduced to the technologies for raising 200 and 1000 chickens. The differences in the stages of establishing a commercial poultry farm need to be fully explained to Afghan women. Afghan women raising 1000 chickens will have a lot more control of their lives because they will have much more control of the purse strings of their family.

Attached document "Doubling the Income of Africa's Poorest Farmers" in Annex 2

30. Nitya Rao, facilitator of the discussion, School for International Development and LANSA, India

Poultry has the potential for both enhancing women's incomes and improving nutritional outcomes. Thank you very much for the information around poultry, especially the Women's Poultry Associations, in Afghanistan. The Associations have an added advantage potentially of giving both visibility and legitimacy to women's income contributions. How far they retain control over these incomes needs however to be examined.

It is true that in poor, rural households, whole families are nutritionally disadvantaged and not just women. The objective therefore is indeed to improve the wellbeing of the entire household and not just women within it. How can this be done? I think several strategies have been suggested in the discussions on this forum so far. An important one is to recognise and acknowledge women's contributions to agriculture and the generation of household incomes. Such recognition could be used to strengthen their legal entitlements to inputs and services, and also enhance their agency and say in household decision-making. Second, in most of South Asia, culturally and socially women are responsible for domestic and care work, including cooking and feeding the family. A second strategy is therefore to ensure that they have sufficient time for these tasks, without stretching their working day too much. This could involve the provision of fuel and energy, drudgery-reduction technologies, access to clean drinking water, sanitation and health services etc. It could also involve a more equitable sharing of tasks between men and women in households. Thirdly, we need to make sure that women too receive fair returns for their work contributions. Gender wage gaps in agriculture often disadvantage women workers, and this needs to be corrected.

31. Zhanhuan Shang, School of Life Sciences, Lanzhou University, China

Suggestions for Transforming gender relations in agriculture through women's empowerment: benefits, challenges and trade-offs for improving nutrition outcomes

Prof. Zhanhuan Shang,

School of Life Science, Lanzhou University, Gansu province, 730000, China,

My suggestions for exploring more way to make more benefit to improve women's nutrition, is that 1) make the special part of financial benefit from carbon trade by country government, FAO, UNEP or others organization, that because women make more contribution for carbon sequestration and maintain carbon balance in the rural area, which need more business accounting of gender's contribution of carbon management in the world. 2) We should make special department or organization to carry the special carbon fund for women's carbon compensation from carbon trade-off

in worldwide. 3) A Collaborative project worldwide should be planned to survey the gender's contribution for carbon management to make the women's benefit involve into carbon business.

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Attached document "Role of Tibetan Women in Carbon Balance in the Alpine Grasslands of the Tibetan Plateau. A Review" in Annex 3

32. Nigel Poole, facilitator of the discussion, University of London and LANSA, United Kingdon

I was excited to see the two contributions concerning Afghanistan and poultry production for women. They seem to present contrasting experiences, so it would be good to hear more:

Comment to ***Paul Rigterink***: it seems that the first stage of your proposal was implemented. How successful was it? Can you comment further?

Secondly, I am more intrigued by the failure in implementation of the subsequent large-scale proposals. Can you say why the ideas were not carried forward? Lots of other questions spring to mind about such initiatives:

- Who were the women targeted?
- What level of resources was given, and was lack of resources a reason for not adopting the large-scale production initiative?
- What level of complementary services and training was provided?
- Were markets for poultry products easily accessible?
- Did policy makers have other priorities?

And fundamentally, did the concept transfer well from Africa to Afghanistan? I have conducted some policy research among food system stakeholders in different parts of Afghanistan and found that they are aware of the importance of considering ideas from other countries, but that projects cannot easily be copied from countries where the contexts differ.

Thanks also to ***Mohammad Jafar Emal*** for sharing your article on backyard poultry production. I was impressed that poultry production was seen as one element of an agricultural growth strategy, and not the only solution; and then, that income gained was reinvested in other economic enterprises and thus multiplied among individuals, households and in the local economy – at least to some extent.

In the introduction you have pointed out important technical factors which make poultry production a suitable enterprise. What do you think, Paul?

Can I ask another couple of questions: was location near to Mazar an important factor for success in Balkh? How successful was the project in Jauzjan and more remote areas?

And more importantly for this forum, please can you explain in greater detail about the level of control that the women beneficiaries had over production, marketing and reinvestment of the income?

Are there any other experiences out there that will help us to understand more about the potential and limitations for poultry production among women?

Many thanks

33. Brad Wilson, United States of America

80% of the "undernourished" are rural, (as is 70% of LDC population,) from the rural half of the world, and in many places about half of them are farmers. So paying farmers fairly is a key to family farms, to support for all family members, and keeping them together as a family. What we've had instead are global farmers subsidizing everyone else.

In many places, cheap crop prices are also driving down livestock prices, (a huge part of global farm income, especially for the poor,) as livestock leave farms to giant animal factories, that are subsidized by farmers, (by cheap feed prices). So this hurts resource conserving crop rotations and contributes to climate change.

In these ways, global farmers are colonized by "megatechnic" (Lewis Mumford, The Myth of the Machine,) agribusiness. Through cheap prices farmers are forced to subsidize the agribusinesses that exploit them. The corporate and political issues, where global farmers are exploited, must be considered as context for these women's issues. Unfortunately, most countries are weak in global agriculture, and can't have much impact on prices.

Free markets (neoliberalism) chronically fail for farm products, so that's the economic problem. It can be fixed politically with supply management and adequate ("living wage") minimum Price Floors, as has been advocated by the WTO Africa Group (https://zcomm.org/zblogs/wto-africa-group-with-nffc-not-ewg-by-brad-wilson/), La Via Campesina (https://zcomm.org/zblogs/via-campesina-with-nffc-support-for-fair-farm-p...), European leaders (https://zcomm.org/znetarticle/impact-of-gatt-on-world-hunger-by-mark-rit...) and in the US (as in the first two links in this sentence). In global supply management, supply reductions are needed, (even as reserve supplies are maintained, to be triggered by Price Ceilings). At the same time, many regions, such as Africa, need a larger share of global production, (greater yields and production). Fair prices can go a long way in making that happen. Fair trade agreements are also needed, not free trade, (as the latter is based upon the free markets that chronically fail for farmers).

Women's issues need to be brought together with these larger issues, this larger economic and political context. We see some of that with the women who have won the Food Sovereignty Prize (http://foodsovereigntyprize.org/fs-prize/). In the West, the women of #FarmJustice (https://zcomm.org/zblogs/the-women-of-farm-justice-forgotten-by-women-to...), including minority women, (https://zcomm.org/znetarticle/ensure-that-farmers-receive-a-fair-living-...) have been leaders in this.

US farm justice advocates like these women have played a "unique" role in this, because the US has had such a dominant share of major global exports. The US too has been colonized by global mega-

agribusiness, and has chosen to lose money on farm exports for decades. Agribusiness lobbying led Congress to reduce (1953-1995) and eliminate (1996-2018) Price Floor programs. Previously, 1942-1952, corn prices averaged over $12/bushel, wheat over $16/bu, cotton over $2.50/lb, etc. In the 21st century, due to the policy changes, prices have been close to a third of that.

The US and Europe need fair prices, (with supply management fairly shared globally) to eliminate the need for any subsidies, as subsidies are unfair.

Changes need to be transitional, as it takes time for global rural economies to adjust to the greatly increased wealth of a fair standard. Global farmers need to be protected from land grabbing and other abuses in the process, especially women, as in the article. 60 years of cheap prices have created savage dilemmas that are very difficult to fix. It's like the refugee crisis from the Middle East. So much was done by Europe and the US to cause the problems over such a long period that it's tough to fix, as the problems explode in new ways.

Bottom line, Global rural women and their families deserve to be paid fairly. The problem of global corporate megamachines, of the colonization of global agriculture, must be addressed to achieve this.

34. Paul Rigterink, Potomac Technical Advisors, United States of America (fourth contribution)

The U.S gave political asylum status to thousands of Afghans in the 1980's. One Afghan Center was in California on the Union City / Fremont border not far from what became 'Little Kabul'. The people in the Afghan Center were very interested in helping their Afghan countrymen combat poverty and were excellent at determining what ideas might work. Their primary focus was lobbying organizations to help Afghanistan.

In the case of poultry, it was important to get as many Afghan people familiar with modern poultry production and modern small business practices as possible. The UN FAO Poultry Development Service in Rome Italy did an excellent job in this regard. If I remember correctly, UN FAO personnel conducted 1 hour courses every week on poultry production and small business development in many parts of Afghanistan. It took 6 months for an Afghan woman to complete their course.

The UN FAO personnel in Rome should answer the detailed questions that you posted since they were in charge of the technical direction of the FAO poultry program in Afghanistan. I believe that Afghan women will become major producers of poultry. I also believe that Afghan women will become excellent businesswomen. You may want to read the FAO report "Poultry Projects enhance lives of afghan women" and USAID report "Case Study of Poultry and Grape/Raisin Subsectors in Afghanistan" for more information on present status of poultry production in Afghanistan. It takes time for new ideas to be implemented. The Afghan government personnel may need more technical and business development help (and perhaps very limited policy help?).

I know in the 1980s that Bell Telephone Labs did a major internal study on why it took 15 years on average for new inventions to become commercial products. Many of the problems that the Bell System encountered in converting research to development and operation are exactly the problems that the FAO encountered. In particular, you need to train development and operation personnel in the new technology and finance the costs of starting development and operation facilities. Bell Labs management felt that researching a new idea costs 10% of the budget while developing the idea cost 90% of the budget. I fear that international development personnel may not have the necessary business experience to convert a new idea from research to development to operations. For example does the FAO have an expert who can increase exports to Afghanistan of the following supplies: basic home canning kits

(consisting of a water bath canner, (6) 1-pint mason jars, (6) lids, canning guide, jar lifter, lid wand, canning funnel, bubble freer™), additional mason jars and lids, pressure canner/cookers, portable food storage facilities, greenhouse equipment, garden hand tools, garden fencing, garden equipment suitable for preparing large gardens for schools, small trucks for transporting supplies, garden seeds, nursery stock, and horticulture information?

I feel that Mojamma Jafar Emal has done an excellent job although I do not know him. He deserves the full support of the UN FAO, World Bank, USAID and the NGOs.

Paul Rigterink

35. Myriam del Carmen Salazar Villarreal, Universidad Nacional de Colombia, Colombia

Original contribution in Spanish

Las relaciones de género realmente son muy marcadas en los sistemas agropecuarios y en las familias campesinas a nivel mundial. Todos somos conocedoras de que las mujeres hemos hecho un aporte muy grande a la agricultura pero desafortunadamente no se reconoce y por lo tanto no se valoriza. Las mujeres somos las que empezamos a guardar semillas, y de alguna manera inicia la agricultura cuando iniciamos el proceso de recolección y guarda semillas.

Actualmente vemos que la mujer se encuentra muy marginada, aporta ampliamente en la producción de las fincas, pero en el momento de repartir los beneficios obtenidos en las cosechas, no es tenida en cuenta. De la misma manera se observa esta situación con las mujeres y hombres jóvenes, y niños, trabajan y aportan en las fincas, pero su trabajo es invisible a la luz del padre, que es el encargado de coger el dinero, esto desmotiva mucho a los jóvenes y de ahí que los jóvenes no deseen seguir en el campo y no vean la agricultura como una actividad rentable, súmele a estas situaciones, la situación de violencia que se vive en los campos, en el caso de Colombia los diferentes grupos armados; y no es muy diferente en los demás países de América del Sur, Centro y el Caribe. En todos se observa estos tipo de violencia de genero.

De mi experiencia de trabajo en República Dominicana, Nicaragua, Honduras, Ecuador y Bolivia puedo mencionar que el mayor nivel de desnutrición y vulnerabilidad en la parte sanitaria lo presentan las mujeres y muy en especial la mujer campesina, y es el claro resultado de un machismo marcado y sistema patriarcal aún vigente, en donde aún se cree que el hombre debe recibir las mejores porciones y las mejores comidas en la familia.

En las ciudades es una situación muy dura ver como mujeres jóvenes campesinas vienen a trabajar de empleadas domésticas y se ven explotadas sin un pago justo y sin tener reconocimiento de ningún tipo de prestaciones social.

A nivel de las ciudades es clara la afrenta que sufrimos las mujeres profesionales a las cuales para contratarnos nos colocan un sinnúmero de trabajos y cuando somos contratadas nos pagan un salario más bajo que el salario que recibiría un hombre, estos es típico en nuestra América.

English translation

Actually, gender relations are clearly defined in farming systems and peasant families worldwide. We all know that women have played a key role in agriculture but, unfortunately, our contribution has not been recognized or valued. Agriculture kicks off somehow when we started collecting and storing seeds.

Currently, women are highly marginalised. Their contribution to farm production is substantial, but they are left out when it comes to benefit sharing. Similarly, young women and men (and children) work in farms and contribute to their output. However, their work is invisible to their father, who manages the money. This situation has a highly demotivating effect on youth, who no longer wish to stay in the field and do not regard agriculture as a profitable activity. In addition to the above, violence in rural areas –in the form of armed groups in Colombia and similar forms in other countries in South America, Central America and the Caribbean– worsens their prospects. This type of gender violence exists in all the region.

Based on my work experience in the Dominican Republic, Nicaragua, Honduras, Ecuador and Bolivia, I believe that women, and particularly rural women, suffer the highest levels of undernutrition and health vulnerability. This is clearly due to the marked machismo and the patriarchal system still in force, by which men must be allocated the best portions and the best food in the family.

Young women farmers come to the cities to work as maids and are exploited, unfairly paid and have no access to any social benefit.

In the cities, discrimination against professional women is evident. When we are hired, we are assigned innumerable tasks and we are paid a lower salary than men. This is typical in America.

36. Ann Steensland, Global Harverst Initiative, United States of America

*The following case study highlighting women's empowerment through agriculture and improved nutrition in India appears in Global Harvest Initiative's 2014 Global Agricultural Productivity Report, *Global Revolutions in Agriculture: The Challenge and Promise of 2050*, pages 39-40.

Woman Overcome Barriers to Introduce Improved Agricultural Practices

The **UN International Fund for Agricultural Development (IFAD)** is supporting the **Tejaswini Rural Women's Empowerment Program (TRWEP)** to facilitate social and economic empowerment in the six poorest districts in the State of Madhya Pradesh, where there is little resource or technology utilization and limited livelihood options or access to markets and credit. The state government, banks and beneficiaries are co-funding the project and the Department of Women and Children's Development is the implementing agency. Since the Tejaswini Program's start in 2007, **more than 12,000 Self Help Groups (SHG) have been formed, which provide the platform for social/gender equity discussions, savings groups and livelihoods, skills and leadership training.**

The program targets 166,000 of the poorest households by supporting 12,442 SHGs. The key achievements as of September 2013 were:

- 82 percent of the households now have cash income and need not rely solely on bartering, compared to 47 percent with cash income in control villages;
- 86 percent of participating households have improved food security and reduction in occasional food shortages; and
- In participating villages, 1,809 SHG members were elected to Panchayati Raj Institutions (village assemblies that develop economic and social plans) and 62 percent of the members of the assemblies were women, exceeding the 50 percent reserved for women by law.

The Tejaswini Program introduced the **System for Rice Intensification (SRI)**, using high-yielding certified seeds that are first tested for germination and then sown in a nursery with the right amount of water to ensure quality seedlings. Within eight days, the seedlings are transplanted to the fields with

uniform spacing. An NGO, PRADAN, demonstrated how the system worked and trained 124 village-level agents to provide field training and support to women farmers at each critical stage — nursery raising, transplantation and weeding. The Madhya Pradesh Department of Agriculture provided the certified seeds and inputs — including weeders, sprays, pesticides, manure and rope for lining up the rows.

At first, many women had difficulty convincing their families to allow them to try the new technologies. As one participant, **Mrs. Kulasti, explained, "Neither my husband nor my father-in-law believed that I could learn something that would be useful for the entire family."** Mrs. Kulasti's family acquiesced to allow her to use half a hectare of their land to demonstrate the technique, but if her production was lower than their side (with the traditional method), then she would have to leave the house or work extra hours as a laborer to earn the deficit.

Mrs. Kulasti produced twice as much rice as her family on the same amount of land using substantially less seed. Her experience was similar to many other women and the high levels of productivity convinced other families to adopt the technology as well.

The success of SRI changed attitudes in the village — people were open to new ideas. Villagers started growing maize as a second crop and are also growing tomatoes, eggplant, coriander, spinach, spices and chilies in their backyards or on upper land. The village started making collective decisions about agricultural production — something they had never been done before.

Now, **the Gadhar village has surplus food, extra income and almost no cases of child malnutrition**. **Men help with farming since they are willing to use the mechanical weeders**, while hand weeding was considered women's work. **Women have more confidence and leadership roles, and they do not have to work as laborers in order to earn additional wages.**

37. Kuruppacharil V. Peter Peter, World Noni Research Foundation, India (third contribution)

Feminisation of agriculture is a reality in the context of migration of male workers, reduced land holding and above all legal equity for land among male and female members of family for ancestral properties. Nutrition garden or back yard kitchen garden or backyard poultry both caged and open, housed goat rearing with jack fruit leaves providing roughage and feed are emerging as sustainable household activities carried out by female members of the family. In the Panchayat system of local governance, the councillor presides over the "ayalkootam" - neighbourhood assembly - where activities for self-reliance for food and nutrition are discussed and future plans worked out. Fifty % of the total councillors in local panchayat, block and district are reserved for women. There are women mayors in districts like Thrissur, Ernakulam etc. where political power is held by them. Much progress has been made in empowering women and in making them financially independent.

38. Mustafa Nangraj, Agriculture Extension, Agriculture Department Government of Sindh Pakistan, Pakistan

DIRE AND URGENT NEED OF AGRICULTURE & LIVESTOCK ENTREPRENEURSHIP EXTENSION SERVICES (FA&LEES) FOR RURAL FEMALES

Dr. Tehmina Mangan Ghulam Mustafa Nangraj ***

Rural females are least empowered segment of society. They work 16 -hour a day but their status is of unpaid family workers. They do not have professional and entrepreneurship capacity building and

income earning opportunities that empower them. Gender norms dictate the role of women and their opportunities for type of work. The role that females are given restricts their time and mobility for schooling, training and women empowerment economic activities. Females have limited access to productive resources. Rural females are socially, physically, economically, politically and educationally deprived. These females cannot be empowered until they are capable to initiate and run their own entrepreneurships in their own circumstances within their villages without any contradiction or clashes with local customs.

In this situation ray of hope for the rural female empowerment is folded in the sound and sustainable economic activities for females in rural areas. For that purpose "Agriculture and Livestock Rural Female Entrepreneurship" is the best option and have full potential to be utilized. As rural females are already involved in agriculture and livestock activities just need is to convert those activities in entrepreneurship. In order to achieve this objective professional capacity building of rural females regarding entrepreneurship economic activities are essential.

A research study conducted by Dr. Tehmina Mangan and me (Ghulam Mustafa Nangraj) assessed status and potential of rural females and tested best options for their empowerment. For the assessment of status and potential of females survey was conducted in 8 districts of the Sindh. Study revealed that females of 89% of rural households of study area are involved in Agriculture and livestock activities but no regular agriculture and livestock entrepreneurship extension services are available for females. In this survey 86% female respondents informed that they need agriculture & livestock entrepreneurship extension services for building their capacity in agriculture and dairy value addition and marketing- cultivation of clean vegetable, fruits and ornamental plant nurseries and marketing on commercial basis- poultry farming- kitchen gardening- grain storage- livestock management- handicraft etc. They emphasized that they need services of female extension workers for capacity building for developing their own entrepreneurship and markets linkages establishment which help them to start their own business and earn direct income.

On the bases of results of this survey a Female Entrepreneurship Center (FEC) was established in Village Hot Khan Laghari, District Mirpurkhas Sindh Pakistan under Australia Pakistan Agriculture Sector Linkages Program, Social Research Project executed by Sindh Agriculture University Tandojam and ACIAR-University of Canberra Australia with team of Australian Professors Dr. John Spriggs, Dr. Sandra Heaney Mustafa and Dr. Barbara Chambers and Dr. Robert Fitzgerald. In that center product based groups of females such as; mango value addition group, dairy value addition group, vegetable and fruit nursery raising group etc. were formed and they were given professional entrepreneurship based training. After getting training they started their entrepreneurships. For the sale of their products market linkages were also developed with the help of Social Research Project. Along with that a Female Agriculture & Livestock Entrepreneurship Services (FA&LEES) Model was also developed and tested. Two females of village who were actively participating in Female Entrepreneurship Center (FEC) and Social Research Project's activities were selected, trained and mobilized for providing extension services to other females. Female extension workers visited their own village households and neighboring villages and conduct entrepreneur extension service sessions of rural females. It was observed from results of Female Agriculture & Livestock Entrepreneurship Services (FA&LEES) Model that experience of female extension workers was very effective and successful to help village females to initiate their own entrepreneurships.

Significance of this model:

1. This model can help government to utilize huge untapped potential of human capital of rural female

2. The model ensures entrepreneurship based capacity building of rural females rather than traditional crop based extension trainings
3. It helps rural females to initiate their own businesses which provide them direct and personal income which will empower them
4. The model have income earning opportunities for rural females within their villages this will resolve the issue of their restricted mobility
5. Replication of this model can enhance contribution of rural females in increasing gross domestic productivity (GDP) and export of agriculture and dairy value added products of country

In order to replicate this model it is suggested that Government can initiate a policy to start "Female Agriculture & Livestock Entrepreneurship Extension Services (FA&LEES)" based on female entrepreneurship and empowerment approach through existing Agriculture Extension Services System.

*Associate Professor & Chairperson, Department of Agricultural Economics, Sindh Agriculture University Tandojam

**Assistant Publicity Officer, Agriculture Extension, Agriculture, Supply & Prices Government of Sindh

39. Nigel Poole, facilitator of the discussion, University of London and LANSA, United Kingdom

More on poultry:

I was delighted to have further correspondence with Mr Mohammad in Kabul about the project in northern Afghanistan.

I like the focus on capacity building and women, and believe that the model is exciting. I hope it can be extended more widely. The winter food problem for poultry in harsh conditions such as northern Afghanistan is an interesting one. I don't know much about hydroponic forage, but it seems to be a successful solution. The results for food scavenging systems are interesting - my thoughts err towards extensive rather than intensive systems at the household level.

I would be interested to know any differences between districts close to Mazar and those further away. Access to markets is usually so important. It is also good to see how appropriate the system is for women in Afghanistan, because it is a system that they can control within the household/home, and leads to empowerment. I would like to know if women can be involved in the marketing, and maybe the extent to which this is changing. These are probably long-term issues.

It will be good if you can post your recommendations.

40. Emile Houngbo, Agricultural University of Ketou (UAK), Benin

Original text in French

Les comportements de la femme influencent énormément la situation nutritionnelle des enfants, d'elle-même et tout le ménage. Car, c'est la femme qui gère les choix, les achats et la cuisson des aliments. La disponibilité, les connaissances et l'expérience dont elle est porteuse influencent beaucoup ses choix

alimentaires, déterminants de la nutrition. Ainsi, la question de nutrition est toujours liée aux réalités socioculturelles et économiques en présence. Car, les attentes sociales de la femme diffèrent selon les communautés, les pays et les régions. En dehors donc de l'offre de nourriture, les habitudes alimentaires liées à ces réalités sociales influencent fortement la nutrition. Car, les aliments peuvent exister et pourtant la malnutrition peut être remarquée. Il en est de même de la disponibilité et des capacités de la femme qui influencent la nutrition. Mais, on ne doit pas détacher ces questions de disponibilité et de capacité des rôles de la femme dans le système social global où elle se trouve. Les activités économiques (rémunérées ou non) auxquelles elles s'adonnent sont déterminées socialement. C'est dire que l'amélioration de la nutrition relève non seulement de la production alimentaire, mais aussi doit beaucoup être rattachée aux réalités socioculturelles et économiques en présence. C'est ainsi que la quantité d'aliments disponible per capita qui a permis de résorber la malnutrition dans un milieu A peut ne pas permettre de réaliser cette prouesse dans un autre milieu B. Même au sein d'un même continent, le problème doit être abordé différemment.

Une étude menée par la FAO en 1989 a révélé que du point de vue habitude alimentaire, l'Afrique subsaharienne peut être divisée en trois groupes, selon la structure ci-après:

Groupe I : République centrafricaine, Congo, Mozambique, Zaïre (actuelle République Démocratique du Congo).

Dans ces pays, le manioc domine, tant au niveau de la production qu'au niveau de la consommation ; sa part dans la consommation d'aliments de base est supérieure à 50 %, contre 30 % pour les céréales, dont près d'un tiers sont importés.

Groupe II : Angola, Bénin, Burundi, Cameroun, Comores, Guinée équatoriale, Gabon, Ghana, Côte d'Ivoire, Nigeria, Rwanda, Tanzanie, Togo, Ouganda.

Dans ce groupe de pays, le modèle de production et de consommation alimentaire est beaucoup plus varié. Les racines et les bananes plantains sont les principaux aliments de base, et le manioc est beaucoup moins consommé que dans le groupe précédent. Les pays de ce groupe sont typiques de la « ceinture de l'igname » d'Afrique de l'Ouest. Alors que dans certains pays, la banane plantain, la patate et le taro occupent une place importante dans l'alimentation, les céréales dont environ 30 % sont importées fournissent la moitié des calories consommées.

Groupe III : Botswana, Burkina Faso, Cap Vert, Tchad, Ethiopie, Gambie, Guinée, Guinée Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritanie, Maurice, Niger, Réunion, Sao Tomé, Sénégal, Seychelles, Sierra Leone, Somalie, Soudan, Swaziland, Zambie, Zimbabwe.

Ces pays produisent et consomment beaucoup plus les céréales, mais dans certaines régions, les racines sont souvent les aliments de base. Les parts de consommation de céréales couvertes par leurs importations de céréales sont généralement moins importantes : moins d'un cinquième du total en moyenne.

Il s'agit là par exemple d'une réalité que l'on devra prendre en compte en matière de nutrition en Afrique.

English translation

Women's behaviour strongly influences children's, their own, and the household's nutritional situation because women make the decisions and the purchases, and cook the food. Their availability, knowledge and experience strongly influence their food choices, which are determinants for nutrition. Therefore, the question of nutrition is always connected to the surrounding sociocultural and economic realities because women's social expectations differ among communities, countries and regions. Apart from the availability

of food, eating habits related to these social realities strongly influence nutrition because food can be available and still, malnutrition can be noticed. The same applies to the availability and capacities of the women who influence nutrition. But, we should not separate availability and capacity of women's role in their overall social system. The economic activities (paid or not) which they devote themselves to are socially determined. This means that the improvement of nutrition not only comes from food production but should also be strongly attached to the surrounding sociocultural and economic realities. This is why the amount of food available per capita which ended malnutrition in place A might not be able to do the same in place B. Even within the same continent, the problem has to be tackled differently.

A study conducted by the FAO in 1989 revealed that, from a food consumption standpoint, sub-Saharan Africa be divided into three groups:

Group I: Central African Republic, Congo, Mozambique, Zaire (current Democratic Republic of Congo).

In these countries, cassava dominates, both in production and consumption; its share in staple crop consumption is over 50%, against the 30% of cereals, where close to a third of these are important.

Group II: Angola, Benin, Burundi, Cameroun, Comoros, Equatorial Guinea, Gabon, Ghana, Ivory Coast, Nigeria, Rwanda, Tanzania, Togo, and Uganda.

In this group of countries, food production and consumption habits are much more varied. Roots and plantains are the staple foods, and cassava is much less consumed than in the previous group. The countries in this group are typical of the West African "yam belt". Although in some of these countries, plantains, potatoes and taro play and important role in nutrition, cereals, about 30% of which is imported, make up half of consumed calories.

Group III: Botswana, Burkina Faso, Cape Verde, Chad, Ethiopia, Gambia, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Niger, Reunion, Sao Tome, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Zambia, and Zimbabwe.

These countries produce and consume a lot of cereals but, in some regions, roots are often the staple food. The shares of cereal consumption covered by their cereal imports are generally smaller: on average, less than a fifth of the total.

This is a reality that should be taken into account in terms of nutrition in Africa.

41. Nigel Poole, facilitator of the discussion, University of London and LANSA, United Kingdom

Following Barnali's comments on women's involvement in fruit and vegetable production...

I was at a research conference in London on Monday and posed an argument that kitchen gardens for better nutrition don't need much new research - we know that increasing fruit and vegetable consumption is really important, probably among most populations and in most countries.

However, I think an important question is about women's involvement in such enterprises and perhaps the potential for empowerment. How kitchen garden development proceeds is more complicated than production models. I worry about the patterns of utilization of kitchen garden products, opportunities for marketing, and I would like to ask if there is any experience of kitchen gardens that do lead to better incomes, better household nutrition, successful commercial marketing - and female empowerment.

42. Nigel Poole, facilitator of the discussion, University of London and LANSA, United Kingdom

I have recently finished reporting on work in Burkina Faso on the contribution of tree products derived from baobab, shea and néré to rural livelihoods in Burkina Faso. We wanted to identify and understand the social and environmental factors influencing the utilization of tree products by rural households for home consumption and commercialization, and to explore the contribution of tree products to food security.

We focused on the roles and responsibilities of women for tree product utilization, which we found to differ between tree species, and with household composition. This we think was due to contrasting ecological contexts and evolving social mores. We found no evidence of conflict within households about tree product management and utilization - decision making processes were negotiated and consensual in both regions, even though gender rights and roles were clearly demarcated.

Nevertheless, we concluded that domestication and dissemination of tree planting and regeneration technologies, and tree product processing and marketing initiatives, definitely need a gendered and tree-specific approach in order to build on local norms and capacities - particularly of women.

An extensive report is available at:

http://www.fao.org/3/a-i4878e.pdf

And an article is forthcoming in the journal *Environmental Conservation*:

Poole, N., Audia, C., Kaboret, B. and Kent, R. (2016 forthcoming). Tree products, food security and livelihoods: a household study of Burkina Faso. *Environmental Conservation*.

I can send a copy to anyone interested if you contact me at np10@soas.ac.uk.

43. Md. Sirajul Islam, BRAC, Bangladesh (second contribution)

Recently BRAC Agriculture Programme has taken initiative to promote Nutri-garden model through organic homestead fruits and vegetables cultivation in two most climate vulnerable regions of Bangladesh. Programme participants are being trained on year round production of fruits and vegetables cultivation. Massive campaign has taken on awareness building in producing safe food and restricting the use of chemicals. We envisage that the year round vegetables and fruits cultivation in homesteads will enhance diet diversification and improve nutritional status in household's level. Only the female participants are being engaged on Nutri-gardening. 13500 Nutri-garden will be established where 324000 participants will be trained on year round production of fruits and vegetables aiming to improve nutritional status of the women and children by the year 2020 in our two project regions.

44. Barnali Chakraborty, facilitator of the discussion, Research and Evaluation Division of BRAC and LANSA, Bangladesh

So far I know HKI has been implementing homestead gardening program for a couple of decades in Bangladesh in improving income, consumption and, thereby, nutrition. There are different reports on this where the results of the interventions were discussed indicating that homestead gardening increase the income of the women. The point is even after having better income, are the women really able to spend the money for their own welfare according to their choice? There are also examples of agricultural credit programs implemented by BRAC, Bangladesh, where women receive credit for their agricultural

activities and may access financial resources. In a study we have found that women who receive agricultural credits less often use it according to their choice. Mostly they handover the money to their male partners who decide on how to spend the money. Even, they don't have any complain in this regard as they are adapted with such practice. Therefore, in a male dominated scenario it doesn't matter how much a woman earn or receives, unless she is able to use the resources. We may think of addressing those cultural aspects while planning for any sensitization program in empowering women.

45. Anjali Verma, Swayam Shikshan Prayog, India

Promoting Women Leadership for Income and Nutrition Security

Swayam Shikshan Prayog's strategy for sustainable agriculture targets women farmers in landless, marginal and small farmer households across drought-prone regions of Vidharba and Marathwada in Maharashtra. With the third year of drought in these regions, families are caught in a poverty trap due to climate change induced water scarcity and environmental degradation which disrupts agriculture and livelihoods. This in turn, has led to high levels of malnutrition and farmer distress.

SSP's experience shows that women are most interested in making agriculture viable. They are keen on using basic agriculture equipment, adopting water efficient, low input farming methods and are ready to make a shift in the cultivation pattern - such as use of mixed farming, intercropping and increasing cycles of cultivation.

The programme combines three important objectives— **nutritional awareness leading to better food security, and increased food self-sufficiency through sustainable agriculture** by empowering women as informed farmers and decision makers women's leadership in their communities.

Strategy

· **SSP's has created a unique strategy by focussing on the inter linkages between agriculture, food security and nutrition in its initiatives**. Primarily, aiming to bring together the key stakeholders – women farmers, local government and other institutions- during different aspects of the program.

· T**he program focuses on equipping community women to take charge of building sustainable livelihoods.** The project, aims at empowering women farmers with sustainable agriculture information, enhanced skills and solutions. This in turn supports women to be recognized as farmers and leaders of the communities. At a household level, women will be more aware of the importance of nutrition, health status and adopt better practices for improved health and wellbeing.

· The **progressive agriculture leaders play key role as community advocates and catalyze collaborations between women farmers and local government institutions to** transfer basic agriculture tools prototyped in their labs in the fields through women farmers, livelihoods increase, there have never been easy bridges to bring the two together.

This three-pronged approach together makes the model innovative and pragmatic.

Approach: Sustainable Agriculture

SSP enables women to become farming experts by linking them to updated information, and use of low input farming techniques and tools. Capacity building of women farmers, formation of groups and recognition of women as farmers, in turn ***empowers women as decision makers to drive the shift towards sustainable nutrition-sensitive agriculture***.

SSP's addresses the key drivers of nutrition sensitive and sustainable farming in following ways:

1. **AWARENESS**: *I**ncrease knowledge of sustainable agriculture - farming techniques and methods*** to women farmers through **Farmer Field Schools (FFSs)** in- low cost input farming methods - bio-composting, seed processing and use of water efficient techniques. At the same time, SSP teams and leaders increases their awareness around safe drinking water, sanitation and hygiene practices which reduce the risk of illnesses and nutrient absorption.

- **ACCESS**: ***Train women farmers to adopt nutrition sensitive farming and increase food security.*** *Shift to* ***one acre model*** of farming- cultivate nutrition dense crops in part of their household farms and move towards self-sufficiency. Women farmers are made more aware of locally available nutritious crops through the leaders and group meetings.
- **ACTION**: ***Increase recognition for women's contribution in agriculture together with increase in decision making with enhanced individual and household income.*** *Also, develop capacities of progressive women farmers by providing leadership training to continue sustainable agriculture intervention.*
- **LIASONING & ADVOCACY:** ***Women leaders actively participate in linking women farmers groups for technical support with Government Research Institutions*** such as Krishi Vigyan Kendras (KVK), Farmer Field Schools, Agriculture University etc. They support in community advocacy and linking the communities to access various government schemes and programs.

46. Charita Jashi, Causus Development Group, Georgia

Fortification Bread is important for Georgian Family!

Association Agreement (DCFTA) between Georgia and EU fully comes into force since 1 July 2016. Implementation of this document will help Georgia to create an environment that will increase competitiveness, promote a stable growth of the economy. Ensuring a sufficient level of safe security and nutrition is identified as the one of the key strategic directions of this AA/ /(DCFTA) document. There are many factors which make barriers to empower national strategy on food security. Initiatives and activities have been provided from Government and civil society sides to increase health care access for low income women and children, who are at risk of developing nutrition related health problems.

One of the challenges under AA//(DCFTA) are the increasing reforms in food security and providing essential nutrition program for all citizens of the country. It is important to support agrarian organizations, farmers (including women farmers) and women NGOS in this field. Due to insufficient incomes Georgian family has a high poverty level. The survey provided by UNICEF in 2015 outlined the problems of malnutrition amongst of children, IDP`s and older population. According the report of the Georgian National nutrition Survey in 2009 (NNS) about half of a million population in Georgia are suffering from malnutrition.

It is known that the bread is the main food for Georgian citizens. Global food crisis and the growth of wheat prices have negative influenced on Georgia, because Georgia belongs to wheat importer (90%) countries. Georgian populations usually consume many bread, but gaining little nutrition benefits to return. Most of the population (women, children) do not aware the significant of flour fortification. Fortification bread increase price and all the cost be passed on to consumers? This question is very popular in the period of the upcoming election campaign, this issue is related as political populism. The issue of bread fortification is not free from controversy.

In 2006 the strategy of flour fortification began in Georgia. This program was financed by the Global Alliance for Improved Nutrition (GAIN). The problems arose in the society regarding bread fortification

was issue of bread price increasing. The food experts highlighted that fortification gives big benefits to population and does not create risk to bread increasing price of bread. According the UNICEF investigation in 2013 the cost of flour fortification is estimated to be around 1-2 USD per ton.

That could mean around 1-2 tetri (currency Georgia) increase price per kilogram of flour. The law about fortification is under discussion in the Parliament. Georgia Parliament has not approved yet the law of flour fortification. Flour fortification is not mandatory yet in Georgia. But it should be noted that flour fortification has not facilitate price increasing, but it probably reduces infant death, less problem for pregnant and lower rates of birth defects in the country.

There is a lack of awareness of the population on food security and nutrition. This fact impedes implementation of strategy food safety standards that meet EU requirements. Nevertheless, experts agree that a key feature of fortification involves calculating the optimum amount of nutrient to be used. Local agriculture production takes a third and last place in Georgian food security. Nutrition is less considered within in food security policy. Food security must be ensured equally by all the stakeholders: producers, consumers, government and civil society.

Charita Jashi

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47. Kendar Nath Rai, India

CONTRIBUTION POSTED ON FAO FACEBOOK

Many complicated analyses have been done and can be done, and the results would be what we see today. It all boils down to three things:

1) There should be adequate amount of food available for the family: it is mostly not the case in the poor families

2) There should be diversity in diet using local crops and vegetables, and milk products, of course: there has been dangerous shifts to narrow diet base, and away from traditional nutritious food crops (which also applies to well-to-families), and

3) Unhygienic living conditions, including poor water and air quality. To make significant and acceptable level of progress all three have to be addressed simultaneously through various technological interventions, including education, all on campaign basis

48. Hira Iftikhar, University of Agriculture Faisalabad, Pakistan (third contribution)

Effects of malnutrition in pregnant women

Hassam Ishtiaq*, Hira Iftikhar, Akhtar Ali, Tahir Ahmad and Umar Ali Amjad

*National Institute of Food Science and Technology, University of Agriculture, Faisalabad.

Malnutrition is a major issue in developing and developed countries around the world due to under nutrition and overweight problems respectively. 39% of world population is facing the overweight problem and being obese during pregnancy can have a major impact on female and baby health. Being obese during pregnancy increases the risk of various complications for female including: Gestational diabetes, preeclampsia, overdue pregnancy, labour problems, pregnancy loss, etc. Complications may arise in newborns due to obese mother including: Macrosomia, chronic conditions and birth defects. Most of the world's population live in countries where overweight and obesity kills more people than underweight. Supportive environments and communities are fundamental in shaping people's choices, thus forcing people to make the healthier choice of foods and regular physical exercise to control overweight problems. In Pakistan, especially in Thar, large numbers of deaths are reported every year due to malnutrition. Thar communities, particularly women, lack awareness of their health concerns. An underweight woman has a high risk of having a low birth weight infant, especially if she is not taking adequate diet during child bearing age as pregnancy requirement of micro and macro nutrients is higher. Malnutrition prior to conception prevents the placenta from developing completely. A poorly developed placenta cannot deliver optimum nourishment to the foetus, and the born infant will be small and with possible physical and cognitive abnormalities. Malnutrition, coupled with low birth weight, is a major factor in more than half of all deaths of children under four years of age worldwide. An underweight woman improves her chances of having a healthy baby by gaining sufficient weight prior to conception or by gaining extra pounds during pregnancy. To gain weight and ensure nutrient adequacy, an underweight woman can follow the dietary recommendations for pregnant women.

49. Md. Sirajul Islam, BRAC, Bangladesh (third contribution)

Bangladesh has achieved considerable progress in agriculture and food security. The country has achieved self-sufficiency in its staple food, rice. There is also surplus production of table potato and many vegetables in the peak growing season. Bangladesh also stood fourth in the world in producing inland fish through pond aquaculture. In spite these achievements, the country is well behind in achieving the major nutritional indicator especially for the children. The food safety and hygiene is also contribute in human nutrition. In order to ensure contaminant free and food safety for the people, the Government has started implementing the 'Food Safety Act, 2013' from the 1st of February, 2015. Eventually, 'Bangladesh Food Safety Authority' was activated on the 2nd February, 2015. Along with the inception of the implementation of the 'Food Safety Act, 2013', the Government has also taken steps to raise people's awareness of food safety and about the fundamental concepts of the law. The awareness of the women in the household is the key since the overall food preparation is done by them in Bangladesh.

50. Georgina Njiraini, Center for Development Research, Germany

Women work for long hours in the farms and in their household chores thus taking up most of their time. Investment in technologies that would save on their time is likely to be valuable and enable re allocation and prioritisation of the freed time to important aspects of child care and nutrition. For example, research in some regions shows that investment in water infrastructure saves on the time spent by women fetching water from long distances. Additionally giving water rights to women is part of empowerment and goes a long way to foster healthcare and nutrition.

51. Mahtab S. Bamji, Dangoria Charitable Trust, India

Apart from technological intervention, education of women for behavioural change is extremely important. In that context, I would like to share the paper on 'Impact of Enriching the Diet of Women and Children through Health and Nutrition Education, Introduction of Homestead Gardens and Backyard Poultry in Rural India' published in Agriculture Research. Here we have targeted pregnant women and mothers with 6-24 months old children registered at Anganwadis in India.

Dr Ms Mahtab S. Bamji

INSA Emeritus Scientist, Dangoria Charitable Trust, Hyderabad & Director Grade Scientist, Retd.National Institute of Nutrition, Hyderabad, India.

Attached document "Impact of Enriching the Diet of Women and Children Through Health and Nutrition Education, Introduction of Homestead Gardens and Backyard Poultry in Rural India" in Annex 4

52. Bhavani R. Vaidyanathan, M S Swaminathan Research Foundation, India (second contribution)

Nutrition awareness and education for women is definitely important. It should not however be limited to women and adolescent girls. Men too need to be sensitized and made to realise the burden of work on farm and at home being shouldered by the women and its consequences. Better understanding and sharing or responsibilities at work and at home can help a great deal in addressing undernutrition in women. Easier said than done though!

53. Ghady Chedrawi, FAO, Italy

I am glad to share with you a transformative gender approach implemented by FAO in several sub-Saharan African countries. Dimitra, a gender sensitive participatory communication approach promotes individual and collective socio-economic empowerment of rural populations, women and youth in particular. These clubs are informal spaces for dialogue and action at community level. The members are women, men, mixed or not, who meet regularly to discuss their development priorities and challenges, exchange experiences with other clubs, make informed choices, and take collective action to solve their problems – mainly related to agriculture and nutrition, as the clubs decide on which issues to tackle, all kinds of topics are discussed as well.

Today, about 1.500 Dimitra Clubs exist in five countries of Sub-Saharan Africa (DR Congo, Senegal, Niger, Burundi, and Ghana) with more than 300.000 direct beneficiaries and at least 1 million indirect beneficiaries, two thirds of which being women.

The Niger experience is of particular interest. In the framework of the UN joint program "Accelerating Progress towards the Economic Empowerment of Rural Women" (RWEE), the Dimitra Clubs have been chosen by the four agencies of the Programme (UN Women, IFAD, WFP and FAO), as the entry point for all the activities. The approach was selected because the clubs ensure, at field level, efficient coordination among all agencies, participation of rural communities and feedback to the programme coordination, in general, transparency of all activities.

In the framework of the RWEE, specific training sessions on nutrition have been organized in five villages in the region of Dosso, where the programme is implemented. Participation was at the heart of these sessions in which the clubs identified themselves local nutritious ingredients and were trained to classify these ingredients into three main groups: energetic, constructive, and protective. The clubs were trained on the seasonal crop calendar, an activity that helped them brainstorm and find solutions when nutritious crops are not available around the year. They came up with some new conservation and processing methods, such as conserving cowpeas in vegetable oil and transforming it into Beroua. Participatory culinary demonstrations (millet couscous, cowpeas and squash with peanut sauce) also highlighted the importance of combining the three groups in one dish, in order to have a diversified nutrition and healthy lifestyle.

In order to assess the role and impact of the Dimitra Clubs approach on nutritional education, the Dimitra project conducted a survey after three months, focusing on participation levels, nutritional knowledge, knowledge transfer and community mobilization and actions. 125 members of the clubs (1 group of men, 1 group of young men, 1 group of young girls and 2 groups of women) were interviewed.

The survey results showed high participation in discussions among all club groups (women, men, and youth) and an improved knowledge base related to nutrition, malnutrition and its consequences. As a result, collective actions within the clubs have been mainly focused on sensitizing the communities to the benefits of a diversified diet and good hygiene. It was also evident that several households began to diversify their diet for all family members. Results also showed a high level of networking among people, indicating that the information had circulated among friends, relatives and even reached other villages. Once again, Dimitra Clubs proved to be an innovative and efficient gender sensitive transformative approach for changing behaviours, here for improving nutrition.

A video showing another successful experience regarding the key role of FAO- Dimitra clubs in the Province of Tshopo (DR Congo) for improving food security and nutrition and promoting gender equality for men, women and youth is available on the following link: https://youtu.be/jHG07gQ2H8Q

54. Abdul Mazid, Advisor, Agriculture | BRAC International, Bangladesh

We have been working on bio-fortified crops especially provitamin A rich orange flesh sweet potato (OFSP), iron rich beans (IRB) in Uganda and yellow cassava in Liberia successfully where the beneficiaries are mostly women, under five children (girls & boys), pregnant women, lactating mothers and youth (adolescent girls). We have established a tissue culture lab (TCL) in Nakaseke seed farm in Uganda for production of disease free vines of HYV of OFSP (Naspot10 O, Naspot12 O, Naspot13 O) successfully and supplied to 40 vine producers and reached >16000 HH beneficiaries of 4 western districts targeting women led agriculture farming for food & nutrition security of small holders in Uganda. We have developed & trained community promoters such as Community Agriculture Promoter (CAP), Community health promoter (CHP) and adolescent health promoter (AHP) where 100 % are youth girls. We have developed new extension model and ensured technical guidance & effective extension services to HH beneficiaries (mostly women) through CAP. These were integrated with health & WASH practices through CHP partnership with Govt. local health and Agriculture services and peer to peer learning through AHP in Uganda. This model can be replicated to Asia particularly in Bangladesh, Myanmar, Nepal, Afghanistan, Pakistan etc. and others African counties.

There are huge potential for large scale promotion of high zinc rice & wheat to reduce stunting problems, iron rich lentil (IRL) & IRB for reducing anaemia (iron deficiency), provitamin A rice maize OFSP, yellow cassava and red maize for reducing vitamin A deficiency (VAD) in Bangladesh and others in Asia especially in Myanmar, Nepal, Pakistan, Afghanistan etc. and also in Africa too. We need to work very

closely for production, consumption, value addition with multiple uses and marketing link of bio fortified nutrient rich crops to small holders particularly women, youth in agriculture.

Our keen interest to introduce and scale up of such crops with supply of quality seeds/vines, ensure effective extension services through local service producers (for example CAP, CHP, AHP etc.), integration with health services & WASH practices, ensuring consumption of nutrient rich crops by U2-5 Childs, pregnant women, lactating mothers, adolescent youth (both girl & boys) and women. So it require awareness build-up of Agriculture nutrition based bio-fortified crops, advocacy to Govt. policy for production, consumption, e-marketing and income of small holders especially women in agriculture in Asia and Africa. We need to develop quality training modules, skill training using pictorial flipchart and manuals with both local & English language, ensure quality seeds/vines to youth especially 'Empowering women in agriculture for better nutrition'

New funding opportunity, resource mobilization and partnership with Govt. –INGO- local NGO & private sectors with LSP could be the priority for 'Empowering women in agriculture for better nutrition'.

Md. Abdul Mazid, PhD

Advisor, Agriculture | BRAC International, Bangladesh

55. Barnali Chakraborty, facilitator of the discussion, Research and Evaluation Division of BRAC and LANSA, Bangladesh

I would like to explore if there is any experience of male sensitization program that was found to be effective in empowering women and improving nutrition?

56. Mahesh Maske, M S Swaminathan Research Foundation, India

Promoting Agricultural technology for Drudgery reduction in Farm Women

Women are the backbone of agricultural workforce and a vital part of Indian economy. Studies have shown that Indian women work up to 14 hours a day to carry out the most arduous activities on farm and at home. Rural women perform field operations like preparatory work for sowing, transplanting, weeding, inter-culture, harvesting and threshing and primary processing of agro produce. All these tasks are time consuming and drudgery ridden.

Cotton picking is one of the laborious tasks performed by farm women in Vidarbha region of Maharashtra. Cotton picking is a tedious job and it is done manually and women's deft hands are required for quick collection. On an average, a woman spends approximately 6-8 hours daily collecting 30-35 Kg of cotton in a 'Jholi', a traditional 'conventional bag' made out of their own garments and soft clothing which is tied in the form of a bag across their shoulders and back. The whole process is very time consuming and back breaking.

After observing the problems of farm workers while picking cotton in the fields, a cotton picking bag was designed for farm women by Krishi Vigyan Kendra (KVK), Central Institute for Cotton Research (CICR) Nagpur, keeping ergonomics' in mind. Ergonomics is a discipline that aims at improving efficiency at work and minimizes health hazards. The cotton picking bag was then tested in the field and found to be user friendly and better than existing method of cotton picking. The cotton picking bag is designed as per anthropometric measurements of female farm workers. Shaped pockets are provided in front and below waist level to hold things. The straps on the shoulders make it comfortable to carry

the weight of cotton. This innovation promotes workers' comfort and safety and helps improve efficiency.

These cotton picking bags were introduced on pilot basis in all villages under the Farming System for Nutrition (FSN) study of LANSA in Wardha district of Vidarbha in 2015-16 following field demonstration and discussions with the women farmers. Feedback from women farmers who tried them out was positive: reduction in pain in wrist, upper back and shoulders; the bags are more amenable for tying, picking, emptying, load carrying and more efficient compared to other back and front loaded traditional bags; they were able to harvest more cotton per day and cover more area/hour than under the traditional system. The bag is more efficient in cotton picking with higher output of cotton harvested and cotton harvest area covered among all cotton pickings.

There is now demand from more women for these bags. More innovations of this type that can help reduce the burden and drudgery of women farmers are urgently required.

57. Nigel Poole, facilitator of the discussion, University of London and LANSA, United Kingdom

I was excited to read Abdul Mazid's contribution on OFSP and other bio-fortified crops. These have real potential to improve nutrition, and can be implemented through working with women. I know of other work done in Africa on OFSP, and of the BRAC efforts to promote OFSP in Bangladesh.

Abdul Mazid seems to point to the difficulties of promotion of novel crops, creating nutritional awareness, and gaining consumer acceptance. Are there any short-cuts to accelerate this process and ensure success? What is required?

58. Nigel Poole, facilitator of the discussion, University of London and LANSA, United Kingdom

My friend Sirajul from BRAC Agriculture Programme has highlighted the nutri-garden model for year-round production of fruits and vegetables cultivation. It is an exciting opportunity.

I am working in Afghanistan, where seasonality is a major challenge: there are parts of Afghanistan where little or nothing grows for 3, 4, 5 or even 6 months of the year due to cold and snow.

Actually I am writing from Edinburgh in Scotland, which is 400 miles north of where I live in the south-east of England, and the differences of seasonality were something I was talking about this morning with research colleagues: the growing season up here is much shorter than in England, and the range of crops that can be cultivated is much smaller. Seasonality affects agriculture and limits what can be tried.

So my question in relation to this forum is: in what ways does seasonality affect women in agriculture in other parts of the world?

59. Haris Gazdar, Collective for Social Science Research and LANSA, Pakistan

In many parts of South Asia women's work in agriculture is an extension of unpaid or low paid drudgery associated with domestic work - in fact it is more exhausting and taxing on their health and the health of their children.

What Joan P Mencher notes about changes in the gendered division of labour once implements are introduced has some resonance in our observations in Pakistan. I believe that at the core of this gendered division of work lies the deeply structural social segmentation of labour - with women being paid lower wages than men. I believe that in many parts of South Asia gender wage discrimination in agriculture is probably more severe than it is in other sectors. The problem with labour markets is that they need to appear to be fair. So work that is particularly drudgerous (is that a word?) is often seen by social norm as women's work. Men's work, by contrast, tends to be less of a drudgery and somewhat better paid. I believe that Nitya's observations about the gendered division of work can also be interpreted in this way. The observation of men having almost exclusive access to digital technology (Joanna Kane-Potaka) might be a manifestation of the same tendency.

Here is a blog I wrote on this subject on cotton harvesting based on LANSA research:

http://researchcollective.blogspot.com/2015/08/womens-work-and-wages.html

The backdrop, of course, is that agricultural work in general is drudgerous and low paid - for women AND men. So, in a way what Akmal Nazir says has an element of truth - that we should focus on the welfare of the household. But nevertheless, there is a strong reason in many parts of South Asia to focus on women agricultural workers. As economies get diversified those who are left in agriculture - men and women - are the ones who command low wages and poor working conditions due to their weak socio-economic positions. Within this group women are at a particular disadvantage. So, by focussing attention on women agricultural workers might be a very efficient way of reaching some of the most disadvantaged segments of society.

60. Haris Gazdar, Collective for Social Science Research and LANSA, Pakistan

It is good to read about Dr Nangraj's work on women agricultural extension workers in the Sindh province of Pakistan. It is important agricultural policies and programmes acknowledge the contribution of women to agriculture.

This is also an opportunity for noting the link between women's work and nutrition. According to DHS data from Pakistan, children of mothers who work in agriculture tend to be far more likely to be stunted than those whose mothers do not work. This, I believe, is because agricultural work is undertaken out of sheer necessity and want, and is not because it is a positive economic opportunity. Women agricultural workers must make very cruel choices between earning an income and taking care of their own and their children's health.

61. Md. Sirajul Islam, BRAC, Bangladesh (fourth contribution)

In response to my friend Nigel from UK I need to mention that yes seasonality does affect not only the nutrition but also the overall agricultural productivity and thus the food security as a whole. In Bangladesh, the agricultural productivity of an unfavourable rain fed ecosystem (monsoon season) is much lower than the irrigated ecosystem (winter season). The available option of growing vegetables and fruits is much higher in winter than in monsoon season. To tackle this seasonality we may take few indigenous and as well as modern technological approaches. Like using low cost greenhouse techniques to grow vegetables and fruits in hot summer as well as in cold winter season. Likewise, in flooded conditions indigenous techniques of growing vegetables in floating gardens may be a unique example. I would like to copy below a case study on floating gardens published in recent BRAC Annual Report of 2015.

Floating farms that fight climate change

Flooding and water logging are common occurrences in Gopalganj district in central Bangladesh. Parts of the region stay submerged for months on end during the monsoon season, resulting in reduced crop production. People have adopted a new method of cultivation called floating agriculture to overcome this. Plants are grown in the water and derive nutrients from the water instead of soil. Floating agriculture is not only climate-adaptive, but can also lead to sustainable, large-scale crops. Monika Kirtoniya is one of many who started a floating farm on her 33 decimals of land upon after receiving training on floating vegetable cultivation. Aquatic plants like water hyacinth are grown on soil-less rafts on water, providing a platform to sow seedlings in. Plants get nutrition from either composted organics or from the water. Field crops often perish during water logging, but floating farms survive. Monika used to follow traditional rice cultivation methods. The land she cultivated on would stay waterlogged for up to six months every year, leading to an unstable income. Managing three meals a day for her family was often impossible during those months. When waters around her home began to rise again last year, she turned to floating farms. Both Monika and her husband work in her floating farm. She cultivates red amaranth, water spinach, Indian spinach and okra, producing 3,900 kg of crop per acre. She makes a net profit of USD 865 (BDT 67,500) per acre. Floating farms have meant not only securing three meals a day, but the freedom of having vegetables all year round.

62. Muqeem Shah Miakheel, Ministry of Public Health, Pakistan

This is very important topic because, in Afghanistan, most of organizations are working for the development of agriculture business in local communities and most of Afghan families are working with agriculture. Afghan women are working together with their family members and can bring changes to their economy.

For the development of Afghan women in agriculture, Afghan women need to join the economic mainstream, they need education, skills and self-confidence. Their families must support their going to school and work. Their community must give them places to work and the country must provide the legal framework, institutions and ministries that support women's economic inclusion.

63. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

There are several very interesting dimensions emerging from this discussion. Haris has picked up the issue of women's work, gender divisions of labour, and its links to both technology and wage markets. This is probably an area that needs more systematic research to understand its impacts on nutrition, as much research in south Asia points to the differential impacts of wages in terms of empowerment, linked partly to the motivation for work - whether it is out of necessity or choice - and the type of work. When new technologies are introduced, why do particular tasks/activities often shift to men, and consequently their value too rises? Can the better designed cotton bag described by Mahesh lead to significant improvements in women's health, but will it also lead to sharing of the cotton picking task by men?

Thanks Mahtab for raising the issue of nutrition awareness and education. This is crucial, however, rather than using a standardised approach, there is need to contextualise it in line with local food cultures and availability. The differential food preferences emerge also from some of the other contributions, especially from Africa. While several NGOs in India have been successful in working with groups of women to develop nutrition-sensitive agriculture as well as awareness strategies, could these potentially be up scaled? The issue of sensitisation for men, raised by Barnali and Bhavani, is important,

as despite women's work and incomes, sometimes it is the men who go to the markets and make the household purchases. Final decisions on what is consumed then often lies with the men.

It is very good to hear about the food safety act of Bangladesh. I think this is an important dimension, as despite all efforts, lack of adequate safety measures in both production and food processing/handling, can have adverse consequences for health and nutrition.

I would like to hear a little more about the seasonality dimension. Recent Lansa research in India seems to indicate that there are seasonal changes in food availability and consumption, leading to temporary energy stresses. Whether these have any longer term outcomes is however not clear.

64. Muhammad Haseeb, PLAN International, Pakistan

As per the given topic, In South region of Asia women play a dominant role in child care, nourishment of their children and better production, and also have role in livestock production and management activities. In dairy production, women account for about 93% of total employment, almost always unwaged, because she need dairy by-products for their children growth and better health. Rural women engage in cutting fodder, cleaning livestock, managing sheds and watering and milking animals. Despite their significant involvement, women's contributions to livestock production and management are undervalued. As women's livestock management work is unpaid it is not considered worthy of investment. Despite the government's 2007 Livestock Development policy, which focuses on the training and capacity building of women in livestock management. Within the household, women lack access to information that could help lead to balanced diets for their kids, because for rural women livestock is main source of complete diet (milk) for their children. So, improved dairy management techniques could help women address poverty, as well as improve their own health, their families, their children diet and position in communities.

According to ground realities regarding our south Asia Region, the empowerment of women at village level is not imaginary thoughts, it is achievable task. To empower the women through provision of productive assets to vulnerable and deserving women at village level and better production from productive assets will support to their families nutrition and children health to utilise products and generate income. The beneficiary vulnerable women would be self-sustained by milk production for self-consumption and sale to generate income. Income from the sale of male calves will be utilised to run livelihood expanses, better family nutrition, and improved children health.

Challenge: The main focused challenge is to involve men at village level and conduct capacity building training of men and women both through gender prospective view to achieve task of women empowerment in agriculture sector.

Dr.Muhammad Haseeb

PLAN international Pakistan.

Rural Women Economic Empowerment through enhanced participation in dairy sector Project,

Vehari Office, Pakistan.

Contact No. +92 334 6758606

65. Tiphaine Bueke, FAO, Democratic Republic of the Congo

Original contribution in French

La promotion des bonnes pratiques alimentaires constitue un pilier important dans les programmes de jardins scolaires mis en place par la FAO en République Démocratique du Congo.

Bien que l'objectif principal soit d'améliorer la nutrition des enfants, le second est celui de contribuer à l'autonomisation financière des comités de parents dans les écoles. Les jardins scolaires sont à la fois un outil pédagogique, une source d'aliments riches en vitamines et sels minéraux mais aussi de revenus financiers par la vente des produits des champs. Les légumes récoltés dans les jardins scolaires permettent d'améliorer la qualité nutritionnelle des repas servis dans les écoles, mais aussi dans les ménages car dans certains cas, il est remis aux familles et enseignants des légumes et plantules à repiquer à domicile. Et ainsi avoir des légumes à portée de main à la maison.

Dans la majeure partie des cas, au début de nos interventions, le travail n'étant pas rémunéré, il est compté beaucoup plus de femmes que d'hommes. Un grand travail de sensibilisation est mené auprès des autorités coutumières et politico-administratives pour arriver à une participation des hommes à cette étape. Mais, dès que les premières retombées financières se font voir, il est également observé une augmentation des hommes dans les groupes.

Les us et coutumes locales ont encore une grande influence dans le comportement des femmes et hommes dans les communautés bénéficiaires des projets. L'approche Champ Ecole Paysan, CEP, qui est la méthodologie participative utilisée dans la mise en place des activités permet d'aborder non seulement les aspects liés à l'agriculture, mais aussi à des aspects sociaux notamment le genre. Ajouter à cela, la production d'émissions à la radio qui est le média le plus répandu en milieu rural en RDC pour toucher le plus grand nombre de personnes. Les CEP ont permis à des femmes d'être capables de s'exprimer en public, de diriger des groupes, de devenir des entrepreneurs agricoles. L'implication des femmes dans la mise en place des jardins scolaires a contribué à l'amélioration des conditions de fonctionnement des écoles et des repas qui y sont servi. Il serait important d'y ajouter l'élevage des cobayes pour avoir des protéines animales dans la ration alimentaire. La synergie avec les programmes de l'UNICEF (Villages et Ecoles Assainis) et ceux du PAM permet d'améliorer le paquet d'activités dans les écoles en vue de l'amélioration de la nutrition

English translation

Promoting good nutritional practices constitutes an important pillar in the school gardens programmes put in place by the FAO in the Democratic Republic of the Congo.

Despite the main objective being to improve children's nutrition, the second objective is to contribute to the financial empowerment of the parent committees in the schools. School gardens are both a pedagogical tool and a source of vitamin and mineral-rich food and also of revenue through the sale of the produce. The produce from the school gardens improves the nutritional quality of the meals served at school and at home because, in some cases, vegetables and seedlings are given to the teachers and parents to transplant which makes vegetables accessible at home as well.

In most cases, at the start of our programs, the work was not paid and relied on many more women than men. A large amount of work involves the increase of awareness with the traditional and politico-administrative authorities to encourage men to participate at this stage. But, as soon as income starts being seen, more men are also observed joining the groups.

The local habits and customs still have a strong influence in men and women's behaviour in the communities benefitting from the projects. The Farmer Field Schools approach (FFS) which is the

participative methodology used in the establishment of the activities, not only allows for the approach of agricultural aspects but also social aspects, notably gender. Add to this the production of radio programmes, which are the most well established media in the rural DRC, can reach the most amount of people. The FFS allowed women the capacity to publicly express themselves, coordinate groups, and become agricultural entrepreneurs. The inclusion of women in the development of school gardens contributed to the improvement of the operating conditions in schools and of their meals. It would be important to include guinea pig raising as a source of animal protein. The partnerships with UNICEF programmes (Health Schools and Healthy Villages) and those with the WFP improve the activity packages available at schools which, in turn, improve nutrition.

66. Mylene Rodríguez Leyton, Universidad Metropolitana de Barranquilla, Colombia

Original contribution in Spanish

Hasta qué punto puede influir el reconocimiento normativo del papel de las mujeres y su contribución a la agricultura en fortalecer su empoderamiento y, a su vez, en los resultados nutricionales?

Considero que el reconocimiento normativo contribuye a la visibilidad y le da el carácter de obligatorio al asunto que quiere regular, lo pone en la agenda de los gobernantes, en los planes de los técnicos y en la mente de las comunidades. Por ello el reconocimiento del papel de la mujer y su contribución a la agricultura contribuye de manera importante al empoderamiento. A continuación me permito presentar el resumen de un proyecto en mi país denominado Bases para una estrategia de intervención con enfoque de género y familias: El caso de comunidades campesinas e indígenas en Nariño- Colombia.

Perilla L1Universidad Nacional de Colombia

Resumen

En esta investigación nos propusimos identificar los roles que mujeres y otros miembros de la familia cumplen en la nutrición, para definir estrategias sostenibles, que busquen el reconocimiento del valor que tiene el papel que ellas cumplen en los procesos productivo, de cuidado y de nutrición de las familias y las comunidades. Esta investigación se aborda desde una perspectiva de Mujeres y Familias.

En los sectores rurales de Colombia, es evidente una histórica invisibilización del aporte que han hecho las mujeres en la producción de bienes y servicios, del trabajo agrícola y de comercio. Estos trabajos, son considerados, culturalmente, como una prolongación de las tareas domésticas, que las mujeres "deben hacer", por lo que no son valorados como actividad laboral o económica, pues el rol de la mujer es restringido al espacio del hogar.

En esta investigación, esta reflexión forma parte de la corriente principal del problema de seguridad alimentaria y nutricional.

Esta investigación desarrolla un enfoque cualitativo, a partir de técnicas como Espacios de Encuentro, grupos focales, entrevistas a profundidad y elaboración de Historias de Vida, lo que permite identificar las dinámicas sociales y familiares de las mujeres.

Hemos estudiado los roles reproductivos, productivos y omunitarios de los miembros de la familia y su relación con: el significado del ser mujeres y hombres; lo que significa ser familia; la participación de las mujeres en las organizaciones sociales y comunitarias; su capacidad organizativa y creadora de redes y nuevas redes sociales para el bienestar de sus familias y comunidades.

En unos primeros análisis, encontramos que muchas mujeres siguen teniendo un lugar de subordinación y de silencio, muchas veces generado por la violencia intrafamiliar, reconociendo que existen aspectos de orden cultural y simbólico en estas regiones, en donde la religión cumple un papel determinante que,

en última, afecta la calidad nutricional en la familia. Esto no significa que las mujeres no participen de propuestas y acciones colectivas, sino que, a pesar de las resistencias asumen también responsabilidades colectivas y se aventuran a la participación comunitaria.

English translation

How far can policy recognition of women's roles and contributions to agriculture lead to strengthening women's agency, empowerment and in turn nutritional outcomes?

I believe policy recognition contributes to the visibility of this matter and establishes its binding nature, putting it on the agenda of government leaders and technicians, and raising public awareness. Therefore, the recognition of the role of women and their contribution to agriculture strengthens their empowerment. Please find below a summary of the project "Foundations of a gender and family sensitive intervention strategy: Peasant and indigenous communities in Nariño, Colombia".

Leonor Perilla, National University of Colombia

Summary

This research aimed to identify the role of women and other family members in nutrition, in order to define sustainable strategies acknowledging their contribution to productive processes and to family and community care and nutrition. This research follows a gender and family sensitive approach.

In rural areas of Colombia, the contribution of women to the production of goods and services, agricultural labour and trade has been traditionally neglected. Culturally regarded as an extension of their home duties, women "must do" all this work. Therefore, it is not considered an occupational or economic activity, as the role of women is homebound.

In this research, this thought is part of the food and nutrition security problem.

This research develops a qualitative approach, based on techniques such as forums, focus groups, in-depth interviews and records, which enable the identification of the social and family dynamics of women.

The research has studied the reproductive, productive and community roles of family members and their relationship with the meaning of being women and men; the meaning of being a family; the participation of women in social and community organizations; their organizational skills; and their ability to create new social networks for the well-being of their families and communities.

An initial assessment showed that many women still play a subordinate and silent role, usually driven by domestic violence and linked to cultural and symbolic factors. Religion also plays a decisive role in these regions, affecting the household nutritional status. This does not mean that women do not participate in communal proposals and initiatives: despite the difficulties, they take collective responsibility and dare to participate in communal activities.

67. Md. Sirajul Islam, BRAC, Bangladesh (fifth contribution)

I want to bring one particular issue. In the name of women empowerment in agriculture and making gender as cross-cut in every development programme or project are not we actually over burden them through increasing engagement in agricultural activities. In Bangladesh, especially the rural women are solely responsible for household activities, childcare and even many of the post-harvest agricultural activities. We very seldom recognized these and try to increase their participation in agriculture to achieve project or programme goal. Increasing participation does not necessarily mean empowerment.

Research or even policies should indicate how we can bring women in the decision making process. Awareness and education might have the answer for sensitizing both men and women on this issue.

68. Bibhu Santosh Behera, Ouat Bhubaneswar, Odisha, India

Respected All FAO/UNEP friends and all members of globe

Hi I am Bibhu Santosh a Young Scientist of Gender mediated Agriculture and Climate Smart Extension.I am pleased to share my Research to Society for upliftment and Devt. of Rural artisans.

I think this may helpful for every one.

Yours Loving

Bibhu

Attached document "A Gender Comparative Study on Communication System among the Farmers and Farm Women in Keonjhar District of Odisha" in Annex 5

69. Guo Cheng, Sichuan University, China

The Double Burden of Poor Nutrition in China:

Roles of Fathers and Grandparents for Children's Diet Quality

Over the past two decades, China has met its first Millennium Development Goal (MDG) of halving the proportion of people who suffer from hunger. Particularly impressive progress has been made to improve the nutritional status of Chinese children. From 1990 to 2010, the prevalence of stunting and underweight caused by malnutrition in children below 5 years old were decreased by about 70%. Meanwhile, the improvement in nutritional status resulted in a general acceleration of growth and development of children. China has employed a number of strategies to help achieve this progress, mainly including scaling up political commitment, increasing resources and taking urgent actions on nutrition.

Since 1990, the Chinese government has promulgated the Outline Program for the Development of Children in 1990-2000, 2001-2010 and 2011-2020, respectively, to implement the principle of giving priority to children. Under the guidance of this policy, various programs and activities for improving children's nutritional status and health have been implemented, especially in rural areas. For example, with the launch of Nutrition Improvement for Children in Impoverished Areas Program, the National Health and Family Planning Commission started promoting a nutritional parcel (a soybean-based micronutrient-fortified food supplement with a demonstrated effect on the reduction of anaemia and other micronutrient deficiencies) among children aged 6-24 months. To date, with the allocated government funds, around 4 million children in 341 poverty counties have enjoyed the benefits of this nutritional parcel. Another fruitful activity is the China Nutrition Improvement Plan (2011), which covered children in 699 impoverished counties, provided free daily school meals for 26 million children. Except for nutrition interventions, the National Health and Family Planning Commission has issued a new version of the "Chinese dietary guidelines (2016)" recently, which includes specialized guides to infants, children and adolescents, respectively, to meet their needs of physiological characteristics and nutrition.

In spite of the remarkable achievements in improving children's nutrition, new threats to children's health continuously arise in China. For example, with the rapid development of economy, nutritional

shifts in recent decades are driving the obesity epidemic in Chinese children. China, now, has been one of the developing countries struggle with the so-called 'double burden' of the undernutrition and over nutrition. A recent work carried out by our group suggests that the diet quality of Chinese children, in general, was not very cheerful. Under consumption of soybeans, fish and shrimp, eggs, vegetables and fruits, and overconsumption of fried foods and meats were becoming growing threats to Chinese children. Notably, this study has proposed an impact of paternal, rather than maternal, education level on the children's diet quality, suggesting the important role of fathers which had been ignored before, in children's nutrition. It is conceivable that fathers can exert great influences on children's eating since fathers play a major role in the traditional Chinese family. Another novel finding of this research was the relevance of family size for children's diet quality, which indicated the grandparents' impacts in the three-generation family.

Taken together, the persistent undernutrition and the increasing over nutrition among Chinese children demand sustained targeted efforts to promote optimal nutrition. Future priorities should be given to the special roles of fathers and grandparents in improving children's nutrition.

70. Amin Uddin, Helen Keller International, Bangladesh

Helping homestead gardeners mitigate the impact of soil salinity

Homestead food production (HFP) is an effective way to help poor families increase access to nutritious food and new sources of income. HFP enables women to access fresh vegetables for themselves and their children directly, instead of relying on a male family member to purchase them, and proceeds from household gardens are usually controlled by women and thus more likely to be used for education, healthcare and other activities which directly benefit women and children. Helen Keller International (HKI) has implemented HFP programs throughout Bangladesh since the early 1990s. As part of the global Project Laser Beam initiative, the Mondelez Foundation supported HKI to increase women's asset base and food security through HFP, improve nutrition, address gender barriers and intra-household communication and strengthen farming groups.

However, a changing climate requires that new practices be integrated into strategies to promote HFP, particularly in the vulnerable areas of southern Bangladesh which face frequent floods and cyclones where southwestern Bangladesh bordering the Bay of Bengal, is particularly vulnerable to floods and storms. The soil salinity is worst during dry periods. The spring of 2012 was particularly dry, with no rainfall during the month of May according to the local farmers and the Department of Agricultural Extension. With support from the Mondelez Foundation, HKI surveyed the impact of soil salinity on household gardeners in Shymnagar, Satkhira district during this period and rolled out strategies to help families continue vegetable production.

About half of households were already implementing practices to cope with soil salinity. Among these, 38% were using organic compost and 34% were planting crops in pits which were first leached with water. However, households with the knowledge and means to adopt these practices tended to be among the better off; poor households who are more reliant on their gardens for food and income had fewer coping mechanisms and were thus most affected by the salinity.

Challenges: However, introducing this practice requires a relatively high level of expertise by program staff in order to demonstrate the correct method of soil management and planting for various types of crops. Composting & mulching is a practice that poor household have found more difficult to adopt. It is therefore worth developing tools and techniques to promote composting in areas where vegetable cultivation is a priority strategy to increase nutrition and income for poor households.

Results: PLB provided training to households, both men and women, to increase garden production and produce more varieties in small water-prone areas, introduced poultry-rearing practices to increase production, formed marketing committees with links to market actors, built business skills to market agricultural products, and educated mothers through nutrition education. Data were collected from project participants as a panel survey at baseline (n=207) and end line (n=197). Participants were pregnant women with more than 2 decimals of land.

A significant reduction in inadequate diets was observed among target women at baseline, 76% (n=158) of women had an inadequate diet (all participants were pregnant at the time of the baseline). By the end of the project, this number had dropped to only 23% (n=45) among the same survey sample. There was also a significant increase among women who consumed >5 food groups per day.

Amin Uddin, Director- Food Security & Livelihood, Helen Keller International, Bangladesh.

71. Priya Rampal, M S Swaminathan Research Foundation, India

Analogous to the water-diamond paradox, women spend more time doing unpaid household work including child-care and cooking. Social and cultural norms prevent them from asking the males in the household to help out in the domestic work, especially in the rural areas. The household dynamics might not even allow them to cook according to their own preference. Typically, in India, they are also the last to eat in the household.

Given this context, it becomes vital to increase their awareness and education levels. The importance of the first thousand days in a child's life and diet diversity needs to be stressed. Empowering the women is the only way forward to tackling the inter-generational aspect of malnutrition.

72. Eng Shah Wali "Allokozai", Rural Rehabilitation Association of Afghanistan (NPO/RRAA), Afghanistan

Thanks a lot for sharing your input about the women empowerment in agriculture for better nutrition and I would like to mention that when we talk about agriculture and nutrition, it is very important to know and consider not only agriculture but know livestock too. Women are traditionally and locally involved in the agriculture and livestock sector in the CDCs level. They produce products regularly in the local area and they know how to feed, how to treat and how to extend their livestock and agriculture. Also livestock is good source for nutrition, each woman knows how to keep, feed, treat and bring extension in their livestock like cows, chicken, goats, fish and bees. Also, daily wage-based poor and agriculture farmers' wives are involved in the cultivation of agriculture seeds, vegetable seeds, and establishment of new orchards. They learn new technology like establishment of greenhouses, fish ponds, and bee keeping.

In our country, Afghan women traditional involved in the agriculture and livestock know the traditional importance of agriculture and livestock issues. Strengthening and empowerment of women is required, and there is a need to conduct different kinds of training for capacity building of them. Only then it will provide sources to earn income, find marketing for their product and in linkages - getting their product to local and supermarkets resulting in regular transfer of their produce to the Baazzar market. It is good way to provide facilities for females to involve themselves in the process of business.

When they have the required trainings and have better capacity, then women will be able to have better knowledge of cultivation, irrigation, water management system, treatment, keeping, feeding, trade and extension of agriculture and livestock. This will help solve their economic problems in the future, and will empower them to be involved in the economic process of the country.

Eng Shah Wali "Allokozai"

East Zone manager

Norwegian Project Office,

Rural Rehabilitation Association for Afghanistan (NPO/RRAA)

73. Rohit Parasasr, M S Swaminathan Research Foundation, India

I am happy to see the discussion on interaction of gender with other important aspect of agriculture and nutrition.

We are aware that the sectors (people) with greater improvement in technology (innovation) are better off and others have deterioration in terms of trade. Unfortunately the deteriorating terms of trade for agriculture could have made women worse off within agriculture (in terms of decision making power, purchasing power, comparative higher burden of work)

Given the above situation and large number of population dependent on agriculture makes child born in these household to be more vulnerable. As indicated earlier by Sirajul, mere participation of women in agricultural interventions might not change the above mentioned dynamics. To have a positive impact on nutrition, interventions should bring men as an important stakeholder to be sensitised.

I am citing an unfortunate instance of recent drought of Marathwada (in Maharashtra, India) where a girl child died because of the burden of carrying 70-80 lts. of water a day from a distance of a Km. Startling fact was that the male adult in the region did not considered carrying water as their task even in the stress situation. Perhaps because of the perception that carrying water is a non-income generating activity and 'unproductive' human resource- children and women, are supposed to do it.

Can we think of ways or cite any existing policies/initiative or interventions that are sensitive to these intricacies of gender for better nutritional outcome?

74. Shirin Afroz, Helen Keller International, Bangladesh

Shirin Afroz

Director-Nutrition, Helen Keller International, Bangladesh.

HKI's experience over more than 35 years of implementing nutrition and food security programs in Bangladesh has been that traditional gender norms can limit women's ability to leave the household and access to production system. These social norms constrain improved nutrition, and women's access to secure food sources. The norms reduce interactions between women and men outside the family circle and often restrain women from being active part of the production system within the community. These experience led HKI to challenge these norms by integrating interventions specially aimed at empowering women.

Nurturing Connections is the signature curriculum by HKI for gender and nutrition in Bangladesh. The aim of the curriculum is to create a safe space and structure activities for communities, where they can directly discuss and challenge existing intra-household inequalities that underlie food insecurity and malnutrition. While the curriculum is oriented around nutrition and food security problems, it also builds skills in communication, assertiveness, and problem-solving. Drawing from HKI's fieldwork and actual problems faced by local women, it provides family stakeholders (mothers, fathers, and family elders) with the opportunity to discuss nutrition and gender related problems among their peer groups, and then share their perspectives in a mediated, community-group setting.

Nurturing Connections draws on approaches developed through HKI's integrated gender and nutrition interventions, which have been used over decades of programming in Bangladesh to empower women in improving the nutrition of themselves, their children and family members. The curriculum also has been successful in helping communities talk about the gender-power relations and about highly sensitive topics that are underline caused of gender discriminations. The approaches have also been shown to reduce domestic violence. The approach of the curriculum in not to targeting only women but include their husbands and family elders. At HKI we recognized the importance and fundamental necessity to include all family members to address gender-based discriminations within the household, and bring about change.

HKI first tested *Nurturing Connections* in Nilphamari, North-West Bangladesh, in Oxfam-Novib supported Building Equity in Agriculture and Markets project. From project baseline to end line, responses among women indicated increasing from 0 to 65%, reporting they were very confident their husband's families would support them with a personal problem; from 33 to 97% reporting having a say in child health care; from 8 to 30% receiving husbands' support in cooking and from 40 to 56% receiving support with child care.

Internationally, the *Nurturing Connections* approach has received wide interest and HKI is working to adapt it for use in local context in West Africa and in Cambodia, including a language adaptation.

Our experience has proven that homestead food production and nutrition education program, when combined with a tailored behavior change and gender intervention, can bring better impact for nutrition and wellbeing outcomes.

"During the Nurturing Connections session, I have had an opportunity to learn more about the work of my wife. Previously I was getting indirect information about the project from my wife, because there was no direct engagement of men, that made me think that the project was doing something against our cultural norms/unacceptable with regard to women. But after attending Nurturing Connections I learned about her work and that there is nothing wrong with it"

Bekas Kabiraj, Granganampur Union, Lohagara Upazila, Norail District, Bangladesh.

75. Gustavo Aguilar Casas, Mexico

Original Spanish text

El problema de la desnutrición a nivel mundial se ha generado por la falta de educación en la sociedad, ya que el alta índice de natalidad en sociedades poco favorecidas no es controlado por falta de interés de los gobiernos y esto ha llevado un aumento en la pobreza de esos sectores.

Las mujeres tienen un papel muy importante, porque han sido las administradoras de los bienes de la familia, por eso es muy importante llevar una educación al núcleo familiar y esto implica capacitar a la ama de casa para el mejor aprovechamiento de sus recursos.

La educación en agrícola debe tener por objetivo el mejor aprovechamiento de los recursos, tomando en cuenta los mejores cultivos de esa tierra, temporal y el aprovechamiento de los residuos de estos para enriquecer nuevamente la tierra.

En conclusión, debemos exigir a los gobiernos, universidades y población en general en apoyar programas para mejorar la educación agrícola, de aprovechamientos de recursos y nutrición en estas poblaciones poco favorecidas.

English translation

The problem of malnutrition worldwide has been generated by the lack of education, as the high birth rate in less favored societies is not controlled because of a lack of interest of governments, and this has led to an increase of poverty in these sectors.

Women play a very important role, because they do manage the family assets. Hence, it is very important to bring education to the family nucleus and this involves training housewives in the best use of resources.

Agricultural education should aim at the best use of resources, considering the best crops in the area, and the temporary use of waste of these to enrich the soil again.

In conclusion, we should urge governments, universities and the general public to support programs to improve agricultural education, resource exploitation and nutrition for these less favored populations.

76. Ikhtiar Khandaker, Plan International, Bangladesh

Economic opportunity for landless women either through homestead gardening or poultry or goat rearing linking with existing opportunities either from government or non-government organizations has created capacity to take the family level decisions especially about their children's nutrition and also children's education. Women used to use useless lands owned by the government like alongside cannel or roads with a free allocation negotiated with government departments as lease. It is also giving them opportunity to control over their income from those sources that has great impact on their respect by their family level counterpart. Women's income has increased their mobility in the community even to market. This is the result of a project named Women Economic Empowerment through Nutritive Initiatives (WEENI) which was implemented by Plan International Bangladesh a couple of years back.

77. Hira Iftikhar, University of Agriculture Faisalabad, Pakistan (fourth contribution)

In an era of virtual advancement eating healthy food has become a highly stressed upon issue because of increasing cases of malnutrition. Despite the fact, that deficiencies of macronutrients have been studied for decades, it has come to the point of focus that the deficiencies of micronutrients is also of great concern not only in underdeveloped countries but also in highly developed societies. In Pakistan only, the mortality rate of children under five is 89 per 1,000 live births just because of micronutrient deficiencies. Today every consumer prefers healthy yet convenient food products which contribute to an overall nutritious diet. Food manufacturers have responded by creating innovative products such as dietary, modified or functional foods. In addition to being nutritious, functional foods also provide the consumer with a health benefit and are expected to become a major growth sector. It is important to

introduce value added products in market on cheaper prices so that people from all family backgrounds can avail these products and overcome micronutrient deficiencies and hidden hunger

78. Mehwish Iaghari, Pakistan Fisherfolk Forum, Pakistan

Food and climate justice has been a major issue of coastal communities in Pakistan. The community is vulnerable to both food insecurity and climate change impacts. Sindh despite being the richest in natural resources is a highly food insecure province in Pakistan. No legal tool or law is available ensuring food security to the people in Sindh

Despite having 14 million acres under crop cultivation in Sindh, over 71 per cent of households in the province are food insecure — the highest level of food insecurity among the provinces and region. Of these food insecure households, 34pc are food insecure with moderate hunger and 17pc are food insecure with severe hunger, according to a report drafted by the provincial planning and development department.

Not only agriculture but fishing communities are suffering an epidemic of disability in Karachi, Thatha, Sanghar and Jamshoro. Researchers say malnutrition is the cause. Hence, the government must be blamed for visiting this calamity on them. There has been no policy for fishing in the country. This is what has made life and livelihoods impossible for the fisherfolk.

According to the Health & Nutrition Development Society (HNDS), the fisherfolk have the highest number of disabled persons per union council. The HNDS carried out a survey of 11,014 households and found 5148 suffered disability. Children are the main victims. The research studied 3460 households in Landhi, 3304 households in Rehri and 4250 households in Ibrahim Hyderi. Results shocked everyone. Some 2250 were identified as disabled in Rehri, 1286 in Ibrahim Hyderi and 1612 in the Landhi union council.

Persons with disabilities (PWD) comprise 15% of the total population in Pakistan, says the World Health Organization (WHO). Families normally hide disability due to the social stigma attached. Parents also fear their child might be abused outside. Children are kept at home to ensure safety. Families want to avoid community reactions. So data collection is difficult. Perhaps that is why the Pakistani authorities give a lower figure.

79. Md. Ataur Rahman, Global Affairs Canada, Bangladesh

Hi All,

There were many national level consultations/workshops/seminars held in Bangladesh last two years on Nutrition. e.g. Multisectoral engagement like coordination with other ministries with health, food security & nutrition, ending hunger etc. Now it's time for a grounded nutrition program which is more important rather than consultation. Everybody knows the pros and cons of the nutrition programming. In Bangladesh women were engaged with nutrition since many years. They are involving with court yard gardening, home based poultry livestock etc. Yet they do not have enough knowledge on nutrition value or cooking practice.

I would suggest to desk review others documents and immediately design and implement nutrition programmes on the ground to avoid duplication, so that nutritional status will be better for our children, adolescents, mothers and others.

80. Frozan Darwish, International Centre for Agricultural Research in the Dry Areas (ICARDA), Afghanistan

Dear FSN Forum team,

I am a gender specialist of ICARDA and would like to post a story about the establishing the women based Village Based Seed Enterprise for the first time in Afghanistan.

The story is as following:

Establishing and Engaging Women in VBSE as a first Innovation in Afghanistan

ICARDA as a leading organization regarding formation of VBSE has a good previous experience in Afghanistan.

There are around 130 seed production companies which are formed by international organizations including ICARDA and FAO in different provinces of Afghanistan but all these companies were male dominated companies and the presence of women in such companies was not at all existent. In Afghanistan's patriarchal social and cultural setup that is highly restrictive, seed production is considered to be primarily the task of men farmers. Women farmers have fewer opportunities to be involved, further deterred by their limited land rights.

Women comprise up to 65 percent of the agricultural workforce in rural areas, but their participation is primarily family-based and without remuneration, as it is not accorded a monetary value. Although women are rarely compensated for their labour, in terms of time allocated they make the majority of labour contributions to a range of marketed products (World Bank 2005).

Empowerment of women economically and socially is an essential factor in Afghanistan, not only for the well-being of individuals, families and rural communities, but also for overall economic productivity and giving them large presence in the agricultural workforce worldwide.

Engaging the women in commercial-agricultural activities will be a sustainable approach to improve the women status, establishing the woman-led VBSE as it is a new innovation in Afghanistan and this approach will bring a good income for them and will help us to achieve this purpose.

However, through community-based activities concerted efforts are being made by ICARDA and Afghanistan's Ministry of Agriculture, Irrigation and Livestock (MAIL) to encourage the active participation of Afghan women. Village Based Seed Enterprise (VBSE) model has been successfully tested in Afghanistan by ICARDA to resolve most of the problems related to the introduction and seed multiplication of newly developed improved varieties. This approach has demonstrated the potential of being replicated and scaled-up.

On the other hand, women had to be encouraged to accept social and security challenges and get involved in seed production and their skills had to be upgraded to compensate for their lack of previous experience in seed production.

Promotion of women enterprise in developing countries is essential to reduce poverty. Women are good communicators and more conscious to make more profits. They are very intelligent in marketing and it will be encouraging while they use the technology and machinery.

Approaches of Women's Engagement in Seed Production

Close consultation with ICARDA's national and international experts and numerous meetings in various social categories such as CDCs, DDA, DAIL, directorate of women's affairs, female farmers and male members of their families have been taken to engage women in VBSEs.

With great efforts by accepting insecurity, environmental and social challenges it was very challenging but possible.

The followings ways have been done to achieve this purpose:

ü The women farmers and female headed households have been recognized and mobilized in each targeted districts by close consultation of CDC, DAIL, DoWa and other partners or relevant projects.

ü Agreement of male members of the families is very important for sustainable presence of women in the VBSEs. Because of that, we visited male members of the families to convince them to allow their family members to take part in VBSE.

ü Involving of family couples, husband- wife, brother -sister and mother-son and father- daughter should be considered, because it obtained more women permission of families to work and increase their mobility.

ü According to project commitment, small farmers should be recognized and involved the family couples from small farmers in VBSEs. Because they need to work and have their own business to bring a real change in their life and their economic situation, it will be acceptable for them to work together with their female members of their families and other small farmers families. Usually the big farmers and well known persons don't need to involve their female members of their families in VBSE and they don't like to show their wives or daughters to others.

ü Women should believe on their power and capability. They should be encouraged to take a meaningful part in VBSE by us. Because of that, we had some close and informal meetings with them and their families.

Finally

Along with four VBSE establishments in Kabul and Logar, one woman-led and one mixed-women and men VBSE were formed in Parwan province – "Hurra Jalali Agriculture Service and Seed Production Company" and "Jabaulsaraj Sabz Agriculture Service and Seed Production Company".

They were registered with the Afghanistan Investment Support Agency (AISA) and have received the investment license. They were registered with the National Seed Board (NSB) and Afghanistan National Seed Organization (ANSOR) as well. Women farmers from these companies were given foundation seeds and chemical Fertilizer by ICARDA-CLAP Project and they produced certified seeds from it which will be distributed for other communities and villages.

All female members of mentioned companies have their own allocated lands for seed production and shared their capital for running the business as well as the male members. There were some organizations which interested to see these women and hear about their stories. By establishing the two mentioned VBSEs, the other women encouraged getting membership of these companies.

After these enterprises, some male dominated companies encouraged to accept the membership of women as well. Parwan-e- Bastan is one of these companies that didn't have any female members previously, but nowadays, seven female farmers have got the membership of this company.

Women are very excited about this seed distribution. They feel confident about starting a seed business very soon. It has further encouraged women's for participating in seed companies. 'Parwan-e- Bastan was one of them.

In spite of many challenges, these companies will be sustainable in a closed and conflicted society, as of Afghanistan.

It is hoped that these companies will be supported by government, national and international organizations for sustainable existence.

Few women own land and where they do, fewer still exercise control over it (AREU, 2008). Access to land in Afghanistan is largely obtained through inheritance. According to Shari'a law, women can inherit land as daughters or as wives upon the death of a husband. The Civil Code of 1978 governs inheritance law in Afghanistan and is based on Islamic jurisprudence. Widows are to receive one eighth of the property or one quarter, if they have children. Where there is more than one wife, this proportion is shared among them. Provision for widows is priority. Daughters should receive half of their brother's share. Although the law dictates that women have rights to inherit as daughters and as wives, the reality is different, particularly for daughters. In short, the inheritance of land is affected by numerous factors that largely stem from the position of women in the households. Women's access to land is thus tied to a system that prioritises land ownership by men as the breadwinners of the family, increases women's economic dependence as wives and later as sisters (in the event of widowhood, divorce, or desertion), and necessitates women's compliance with these rules to assure livelihood security

The majority of female farmers, who are motivated to produce seeds, do not have sufficient land to qualify for seed production due to the current land tenure system, which restrict them from owning land. However, this challenge is slowly overcome by farmers consolidating their land for seed production and hiring land from institutions such as churches.

Women working in closed quite challenging societies of Afghanistan, Women don't have much willing to involve in seed production. Because they are more interested in incomes that can be achieved in short time, heavy duties in seed production companies and lack of access to land are the reasons that women are not much interested in this field.

The heavy tasks on the field for seed production, presence of male farmers in VBSE and due to some social, cultural problems, and excuses in rural are some courses to have men and women in same companies.

With regards,

Frozan

81. Rengalakshmi Raj, M S Swaminathan Research Foundation, India

Dear FSN Forum,

I would like to share a specific example with reference to dietary diversity, women's engagement in agricultural and ecosystem services. This is the most crucial issue in rural areas due to changes in the land use systems and practices.

Most commonly, the changes in cropping systems as well as species growing in the common land affects their dietary diversity. In one of our field sites we observed that intake of wild greens was drastically reduced due to the changes in crops from millet species to cassava in agricultural fields and invasive growth of Lantana species in common areas which reduced the growth of such wild greens. Consequently the knowledge associated with the species, nutritional benefits and use among families

declined over the last 5- 7 years among men and women. Earlier both men and women farmers were aware of the edible species and men supported in their collection while returning from the field (intake is at least five days in a week). Now the communities entirely depend upon other vegetables which are commonly available in markets. Intake rates of greens reduced to a large extent. This issue came up when we evaluated the outcomes/impacts of nutritional gardens. These insights and understanding helped the team to realign and revisit the interventions; document and share the gendered knowledge on wild green species; explore the possibility of its cultivation in the home gardens and field bunds; manage invasive species involving local PRIs; and create awareness among younger generations on local species and their importance. Identifying such nuanced field level issues and evolving strategies to address them would help to strengthen the linkages in rural areas.

Regards

Rengalakshmi

82. Bibhu Prasad Mohanty, Climate Smart Technologies Associates, India

I have a suggestion.

When we discuss about nutritive materials for women, children, sick persons and old age people we have to take a few points into consideration. Persons those who required nutritive material in food must have the capacity of absorbing those in their system. For example those women who cook with traditional biomass stove regularly they suffer from several ailments and physical weaknesses. Around 600000 women die every year in India from influence of smoke from biomass stove. In this condition it is well understood how would be the condition of other women with traditional stoves. In this condition absorption of nutritive stuff requires induction of improved efficient stoves along with supply or making real availability of nutritive stuff for them. Unless the women become free from health drudgery, we cannot expect women empowerment is possible.

Thanks with warm regards

83. Nitya Rao, facilitator of the discussion, School of International Development and LANSA, India

Thanks for sharing HKI's strategy of addressing malnutrition in Bangladesh. Nurturing Connections seems to be working well as it appears to address gender norms in a sensitive rather than confrontational way; at the same time aware of not overburdening women. This often seems to be the trade-off in attempts to empower women that we end up adding to their burdens.

Livestock and fisheries are clearly important sectors for women's engagement and income, but often marginalised in agricultural policies that focus primarily on cultivated crops. From a nutritional dimension, these are important sources of protein. It is quite shocking to hear about the poor nutrition amongst fishing communities in Pakistan, as one would assume that fish is a part of their diet. Thank you for raising these issues, as when talking of agriculture, and women's and men's roles within it, we need to keep in mind that this term includes livestock, fisheries and even forestry/agro-forestry.

84. Nigel Poole, facilitator of the discussion, University of London and LANSA, United Kingdom

It is good to have the role of women in livestock production in Afghanistan highlighted - a very welcome contribution. The pastoral economy poses particular challenges, but offers particular opportunities for women

85. Nigel Poole, facilitator of the discussion, University of London and LANSA, United Kingdom

Thanks to Muqeem Shah Miakheel for your contribution – perhaps we can work together to bring about the changes you propose for Afghanistan.

86. Regina Laub, FAO, Italy

Milk and dairy products are crucial for the daily food security and income generation of Afghan families, and women play an important role in the related activities. Since 2005, FAO is implementing the Integrated Dairy Schemes (IDS) Project, with financial support of the Afghan, German and Italian Governments and IFAD. The aim of the project is to improve food security in Afghanistan by supporting the national dairy sector. Since its inception, four milk processing plants have been set up in Herat, Kunduz, Mazar-i Sharif and Kabul: they are operating independently and successfully. Over 5 700 smallholder farm families, including 1 540 women, benefit on a daily basis from the regular "milk money".

In 2014, FAO undertook a detailed assessment to investigate the in depth impact on rural Afghan women and their families of the project. The assessment identified lessons learned and actionable recommendations to inform the design and implementation of gender-sensitive and inclusive dairy programmes. This publication draws on the evidence gathered during the implementation of the Project on the multiple benefits on gender equality and women's empowerment. The Integrated Dairy Schemes (IDS) can be seen as a first stepping stone for a large number of rural women to start establishing a better place for themselves in the Afghan society.

Please find the link to the publication Empowering women in Afghanistan. Reducing gender gaps through Integrated Dairy Schemes www.fao.org/3/a-i4585e.pdf

Best regards

Regina Laub

Senior Gender Officer,

FAO Social Protection Division (ESP)

87. Tehmina Mangan, Sindh Agriculture University Tandojam, Pakistan

Females and children of rural Pakistan are mostly malnourished due to many reasons some areas under:

1. Poverty
2. Low literacy rate

3. Lack of availability of nutritious food
4. Lack of knowledge about nutrition
5. Poor cropping patterns related to balanced nutrition
6. Male dominant social setup

Historically in Sindh it is observed that most people used to rear animals to get milk and butter for home use only and they feel that it is not good to sell milk or butter for earning money because they feel that these are very sacred things therefore these should not be sold for the sake of money and they prefer to use it at home and give to other people as gifts or free of cost. Along with that they used to cultivate different types of vegetables and pulses with other crops and used those vegetables and pulses to fulfil their family nutritious food requirements. As milk, butter and other poultry products and fresh vegetables, pulses etc. were highly nutritious therefore people in past were enjoying a healthy life.

But nowadays situation is totally different. Mostly they are selling total milk of their animals and not preparing butter. Due to increased population, fragmentation of natural resources and enhanced poverty people are helpless to sell these nutritious foods and as a result they face issues of malnutrition.

On the other hand, rural community has changed cropping patterns. They emphasize on commercial crops and cultivate mainly four major crops such as wheat, rice, cotton and sugarcane but they are not cultivating vegetables and pulses for their home use. This situation leads to poor nutrition issues for all family members especially females and children who suffer more.

These situations need long term policy initiatives. We (Dr. Tehmina and Mr. Mustafa) have developed a model "**Female Agriculture and Livestock Entrepreneurship Services"** for the empowerment of females of rural areas. Results of this research model were very successful and sustainable and suggest that Rural Female Empowerment can ensure successful solutions of all problems (including malnutrition) of rural females their children and families. Based on those results it is suggested that FAO and other donors can select some areas for piloting and **Female Entrepreneurship Centres** (FECs) can be established and can be linked with other organizations for successful and sustainable results.

88. Mustafa Nangraj, Agriculture Department Government of Sindh Pakistan

Dear FSN forum participants

It is my suggestion that we can introduce a good kitchen gardening subject in schools and trained the students for practically cultivation of fresh fruits and vegetables at their homes. Through this trend children and females can get some nutritious food. We can also utilize health workers, for the awareness and capacity building rural females about use and production of nutritious food but first we should trained health workers up to required level.

Thanks,

Mustafa Nangraj

89. Shahzad Hussain, Bunyad Literacy Community Council, Pakistan

Women are the backbone of subsistence farming and play a pivotal role in providing food security, in Pakistan, more than 75 % rural women are engaged in agricultural & livestock, unfortunately, their

contribution is not acknowledged, they are not paid against their work and are considered only helping hands for their family which leads not to be considered their economic activity.

"The tragedy is that there are no accurate figures about rural women's contribution to the economic growth and gross domestic product (GDP) which is quite significant" said Sindh Institute for Democracy and Development's Zulfiqar Halepoto. A major portion of household budget is spent on men instead of women, despite their greater contribution. Boys are given preference over girls when it comes to education and health. If rural women's work is recognized and recorded, it would help develop agriculture faster, and it would be the biggest single factor in reducing poverty.

· Women's work especially in agriculture & livestock sector should be recorded to ensure their access to resources, to open bank accounts and to borrow money and buy agriculture inputs like fertilizers and seeds.

· Governments should give subsidy to female farmers for their active role in agriculture sector.

· Women's role in agriculture should be made a part in national policy.

· Landless women should be allotted land, be encouraged to carry out their economic activity themselves, not dependent to men.

· Their access to micro-finance facility should be ensured.

· Women should be encouraged to make women farmers unions.

· For the education and lifelong learning, Sustainable Development Goals 4 & 5 should be implemented in letter and spirit.

· Kitchen Gardening for food security, must be promoted at household level. Government departments, International and Non-Governmental organizations should design programmes for training especially women in Kitchen Gardening, agriculture and livestock. Use of information communication technology (ICT) should be promoted, CDs can explain a large number of illiterates, how to work in livestock & vegetable farming, to improve & then forward with entrepreneurship skills.

Though women's contribution in agriculture is tremendous, but it has been underestimated, the value of their output has never been acknowledged in national statistics. Need to be included women's contribution in national statistics and they should be further encouraged and trained to manage their economic activity by themselves.

90. Atiqullah Khan, PECMS-DAIL, Afghanistan

The subject is very interesting, and I think we have a training (Empowering women in Agriculture) at the end of July 2016. As you are aware, we have long time internal war in Afghanistan that has resulted in poor economy and education. The situation affects the social, cultural life and environment of Afghanistan. In fact, vulnerability in the Afghan community has influenced the women's life. For a long time now, women work behind the men in agriculture – particularly during harvesting, hatchery, Saffron processing, home gardening, milk processing, etc.

My concern is we have limited number of women with Agriculture education. In agriculture higher education for example, we have had just one female student in agriculture faculty of Kandahar University for the last 20 years. Reasons are usually because men do the hard work in the fields and women can't do it, but that notion is not true. We have to try to encourage women to get an education in agriculture. This will make them self-sufficient and we will have some changes on women empowerment.

Atiqullah Khan

Agri Promote Officer

PECMS-DAIL, Kandahar Afghanistan

91. Nitya Rao, Barnali Chakraborthy, Haris Gazdar and Nigel Poole, LANSA Facilitators

Dear Colleagues,

As our consultation period draws to a close, we take this opportunity to thank you for your fantastic contributions to this important debate. We are delighted with the tremendous response and very grateful to you all for taking the time to share your thoughts and experiences.

There is clearly a lot of knowledge already in this field, and it is heartening to hear about the numerous interventions and successes in the region and around the world. Despite these examples of success across contexts, however, we seem to be confronted by a general non-recognition in the policy domain of women's work in agriculture and contributions to household nutrition.

In spite of their hard work, it appears that women have little say in decision-making and benefits too are not shared equally. Inadequate attention has been paid to reducing the drudgery of women's work, and where technological innovations have been possible, the work itself has often been reclassified and revalued as 'male'. Gendered wage discrimination persists, and there are few attempts at redistributing or reducing the burdens of domestic and reproductive work. Issues of male responsibility and awareness have been raised as central to addressing the burden of malnutrition alongside achieving women's empowerment, and gender equality more broadly.

We are grateful for your willingness to share your ideas, examples and research with us in such a collegiate manner. We will aim to draw together the general themes and specific ideas generated by this online consultation in a single document over the next few weeks, so please do keep an eye on the Forum page.

Moving forward, the Leveraging Agriculture for Nutrition in South Asia (LANSA) programme plans to not only consolidate its ongoing research in this field, but also draw on your experiences in order to engender the policy debates around agriculture and nutrition in South Asia.

We hope that our collective research and advocacy efforts will contribute first of all to recognition of women's roles and contributions to agriculture and nutrition in South Asia. This will help strengthen women's claims for equal entitlements, and policy interventions to reduce, redistribute and support these contributions to attain the larger goals of household food and nutrition security as well as gender equality.

Finally, we thank you again for your support and contributions to this discussion. It has been an extremely rewarding and refreshing process.

With very best wishes,

LANSA facilitators: Nitya Rao, Barnali Chakraborthy, Haris Gazdar and Nigel Poole.

92. Paola Romero, FIAN Colombia, Colombia

Gracias por esta oportunidad de participar, desde FIAN Colombia nuestra contribución gira en el marco del derecho a la alimentación y nutrición adecuad y los derechos humanos de las mujeres y su interdependencia.

El Derecho Humano a la Alimentación y Nutrición Adecuada (en adelante DHANA), desde una perspectiva de derechos humanos de las mujeres, confronta el tema de la desigualdad de género en todas las escalas y dimensiones que la realización social, económica y cultural de ese derecho implica. En ese sentido, el DHANA de las Mujeres es mucho más que "no padecer hambre" o tener "seguridad alimentaria". Significa disfrutar de una gobernanza sobre su propia vida, cuerpo y territorio, en la que la alimentación no esté sometida a ninguna amenaza o restricción (interna o externa), y se desarrolle respetando las decisiones autónomas de las comunidades o mujeres en torno a cómo controlar su proceso alimentario; es decir, qué producen, cómo lo intercambian, de qué manera transforman los alimentos, cómo los consumen, cómo se recrean los ciclos alimentarios, y cómo todo esto se desenvuelve en armonía con las culturas, la naturaleza y el derecho de las futuras generaciones a gozar, también, de las condiciones necesarias para garantizar su alimentación.

El DHANA de las mujeres implica el Reconocimiento de su rol como sujetas políticas, su autonomía y dignidad, así como de los aportes que brindan en todo el proceso alimentario (producción, intercambio y comercialización, transformación, consumo y utilización biológica) tanto en las esferas públicas y privadas. De igual manera requiere la Redistribución paritaria de los beneficios que de ello se desprende en materia de salud, educación, tierra, trabajo y alimentos. También se relaciona la defensa de ese derecho con la Representación política en los escenarios de toma de decisión sobre sus cuerpos y comunidades y, finalmente, con la protección de los procesos de Resistencia que nacen fruto de sus luchas en y/o por sus territorios (cuerpo – tierra) frente a procesos de despojo, violencias y discriminación. Avanzar en la garantía del DHANA de las mujeres y niñas en Colombia es avanzar en la construcción de horizontes de paz y caminos de verdad, justicia y reparación. Algo muy importante para la realidad de un país sumidos en décadas de conflicto interno.

Frente a al componente de disponibilidad del DHANA, las mujeres colombianas no cuentan con garantías para la producción agrícola y el desarrollo de alimentos adecuados con semillas propias; tampoco con titulación de tierras individual o colectivamente, ni se protege desde el Estado la transmisión de conocimiento y la pervivencia de la cultura propia. En cuanto al componente de acceso a la alimentación, las mujeres no cuentan con capacidad económica suficiente para la compra de alimentos cultural y nutricionalmente adecuados. Además, el acceso a agua potable de calidad es muy pobre ya que las fuentes hídricas están fuertemente contaminadas por residuos industriales o derivados de las fumigaciones y la minería. A pesar de esta realidad, apenas el Estado ha generado limitadas acciones asistencialistas, con impactos dudosos, dirigidas a mujeres gestantes y lactantes, y niños y niñas en edad escolarizada.

Cabe resaltar que esta situación se presenta también en las mujeres profundiza las dificultades que ellas tienen para ver realizados el conjunto de sus derechos humanos. En caso de pueblos o comunidades étnicas como esta, la no protección, respeto y realización del DHANA se constituye en un obstáculo que condiciona o determina la no realización de otros derechos humanos, profundiza su situación de pobreza y exclusión social, y facilita las dinámicas de expropiación, por parte de otros actores, de los pocos recursos con los que aún cuentan.

Finalmente, frente a la violencia contra las mujeres la no garantía del DHANA podría ubicarse como una categoría de femicidio, cuando se refiere a formas encubiertas de violencia extrema contra las mujeres, en este caso la muerte por hambre como práctica discriminatoria relacionada con el género. "Variantes del término feminicidio también incluyen otras conductas delictivas que no necesariamente conducen a

la muerte de la mujer, sino a un daño grave en su integridad física, psíquica o sexual, y que algunos han denominado recientemente como violencia feminicida[1]. Lo cual refuerza la conceptualización realizada por la Ley 1761 de 2015 crea el tipo penal de feminicio en Colombia, la cual en su artículo No. 2 literal b. Describre: Ejercer sobre el cuerpo y la vida de la mujer actos de instrumentalización de género o sexual o acciones de opresión y dominio sobre sus decisiones vitales y su sexualidad. Y el Artículo 3º. Literal f. Cuando se cometa el delito con posterioridad a una agresión sexual, a la realización de rituales, actos de mutilación genital o cualquier otro tipo de agresión o sufrimiento físico o psicológico.

Es importante adoptar medidas como

1. Incluir de manera transversal la categoría y variable género, en todas las políticas, reformas y leyes que pueden mantener y reforzar las desigualdades existentes entre mujeres y varones.

2. Que adopte e implemente las medidas necesarias para la incorporación del enfoque de derechos humanos de las mujeres en los programas de desarrollo rural, potenciando la superación estructural de los estereotipos de género.

3. Que adopte e implemente medidas para garantizar la protección y el acceso a la tierra de las mujeres afrocolombianas, indígenas y campesinas, independientemente de la titularidad de la tierra colectiva.

4. Que los programas que diseñe e implemente para garantizar el derecho a la alimentación y nutrición adecuada, basados en ayudas alimentarias o acciones asistencialistas, no tengan un enfoque exclusivamente familista.

5. Que en el desarrollo e implementación de políticas y programas en materia alimentaria y rural no se adopten medidas que reproduzcan la dependencia a las mujeres. Por el contrario, deben tener como uno de sus fines desarrollar capacidades para que las mujeres puedan ver garantizado su DHANA de manera autónoma, así como asegurar salarios dignos y equitativos (en relación con los hombres) para aquellas mujeres que acceden a la alimentación a través del trabajo no rural.

6. Que adopte medidas específicas para proteger el DHANA de las mujeres ante los intereses de empresas y negocios, especialmente aquellas que dañan el ambiente o afectan negativamente la relación de las mujeres con su territorio, recursos y comunidades. Deben así mismo adoptarse medidas que eliminen las prácticas discriminatorias en la selección de personal al interior de las empresas, y que erradiquen cualquier forma de violencia contra los derechos humanos de las mujeres.

7. Que adopte mecanismos de exigibilidad con perspectiva de género que permitan a las mujeres rurales denunciar política, administrativa y jurídicamente cualquier tipo de violación a su DHANA.

8. Que se implementen medidas dirigidas a promover institucionalmente o en el campo privado (publicidad comercial en medios masivos, por ejemplo), visiones sexistas de la mujer en relación con el tema alimentario. Este tipo de medidas es fundamental para frenar los problemas alimentarios derivados de la imposición de patrones culturales y tendencias consumistas con alto impacto en la salud de las mujeres (los desórdenes alimentarios, por ejemplo).

[1] Citado en: Instituto Nacional de Medicina Legal y Ciencias Forenses. "Homicidio 2009, Aproximaciones a los conceptos de femicidio, feminicidio y Homicidio en Mujeres". Centro de referencia Nacional sobre Violencia, Dirección de referencia de información pericial. 2009. P:22.

93. Dhanya Praveen, Environment Protection Training and Research Institute, Hyderabad, India

It is to share a project which has strong women empowerment component at the grass root level

Bringing back the traditional crop cultivation is carried out as a part of enhancing the coping capacity of the women farmers of the highly vulnerable tribal women farmers of Attappadi region of Kerala, South India, with the help of National Rural Livelihood Mission (NRLM). This initiatives rae done through the Neighbourhood Groups (NHG) of the Kudumbashree, a poverty eradication mission of the state of Kerala. Under this initiatives, native seed varieties of vegetables, millets and pulses sourced from the Tamil Nadu Agriculture University (TNAU) and the Desi Seeds Collective are distributed only to the women farmers. These activities are carried out under the Mahila Kisan Shashakthikarna Pariyojana (MKSP) of NRLM. It is proposed that the productivity under this cultivation will be used merely for the self-consumption of families which will take care of their nutritional demands and to prepare seeds for the next season.

94. Santosh Kumar Mishra, Population Education Resource Centre (PERC), Department of Continuing and Adult Education and Extension Work, S. N. D. T. Women's University, Mumbai, India

1. How far can policy recognition of women's roles and contributions to agriculture lead to strengthening women's agency, empowerment and in turn nutritional outcomes?

During end of previous decade, there has been growing recognition of the fact that developmental initiatives, particularly in the developed world, has led to considerable changes in women's position in the society. This recognition was pushed by certain crucial underlying social and technological changes, as well as a liberalized political environment. Women were part of a rapid increase in the extent and quality of education. In the United States, the civil rights movement, affirmative action, and consciousness–raising resulted in a political renaissance for both black people and women. Access to higher education and training, as one direct result, improved the bargaining position of black and white women in the job market. This emancipation led to, and was supported by, important changes in societies' attitudes. This was followed by reforms in policy and legislation aimed at strengthening women's contribution to betterment of nutritional outcomes.

The major changes, as outlined above, provided women particularly in the wealthiest societies, with almost similar social, political and economic rights to those of men in these countries. Although further progress is still to be made, by the 1980's women were increasingly seen as nearly equal partners in the workforce at all levels of developed society. This liberation movement, evolving at different rates in various countries, was an important factor in the global concern for issues affecting women, with a leading role coming to be played by the United Nations. With advances in industrialized societies under way, the position of women in developing countries, and the equally compelling case for concern for their position, came increasingly to the fore. The changes in developed societies in favour of women's status were seen almost universally as signs of progress in society, beneficial not only to women, but to communities as a whole.

Programs intended to improve nutritional conditions for women and their families can be more successfully designed and implemented if there is a greater understanding and awareness of the specific roles that women play. This is because of the fact that women's status and their health (and nutrition) are intricately entwined. Thus, in order to ensure any meaningful improvement, one must first deal with those ways in which health and nutrition of a woman are affected adversely by the existing social, cultural and economic systems. A sound nutrition program needs to go beyond the provision of health and nutrition services. Also, there is need to recognize that nutritional problems often have their origins in social and economic systems, and that these problems can be solved only by bringing about changes in these systems, particularly at household level. Further, women's access to productive resources affects food availability at the household level. Increased access to productive resources itself can be an outcome of many complex interrelated factors such as:

- Increased income and more importantly increased control over it (both women's income and total household income);
- Enhanced educational opportunities, social knowledge and decision-making power;
- Increased time available and devoted to productive tasks; as well as
- Enhanced efficiency of production.

Source: United Nations (October, 1990). Women and Nutrition – Nutrition Policy discussion paper No. 6. Switzerland: ACC/SCN, c/o World Health Organization. http://www.unscn.org/layout/modules/resources/files/Policy_paper_No_6.pdf, accessed on July 22, 2016.

2. Are there experiences/strategies that can help address the issue of women's time?

a) Examples demonstrating the impact of the reduction or redistribution of unpaid care work on nutritional outcomes in agricultural households.

Unpaid care work is a critical - yet largely unseen - dimension of human well- being that provides essential domestic services within households, for other households and to community members. 'Unpaid' means that the person doing the activity does not receive a wage and that the work, because it falls outside the production boundary in the, is not counted in GDP (gross domestic product) calculations. 'Care' means that the activity serves people and their well-being, and includes both personal care and care - related activities, such as cooking, cleaning and washing clothes. The term 'work' implies that the activity entails expenditures of time and energy. "Unpaid care work" is also referred to as 'domestic' work in order to distinguish it from market - based work.

Source: Falth, Anna; and Balackden, Mark (October, 2009). Policy Brief: Gender Equality and Poverty Reduction. United Nations Development Program (UNDP). http://www.undp.org/content/dam/undp/library/gender/Gender%20and%20Poverty%20Reduction/Unpaid%20care%20work%20English.pdf, accessed on July 22, 2016.

From a human rights perspective, social protection programs should recognize the role of women as caregivers and the burden that this role can create. For example, when women are made responsible for complying with conditions attached to participation in a conditional cash transfer (CCT) program (for example, taking children to medical check-ups or ensuring they go to school) or when they are required to travel (sometimes long distances) to collect the benefits or to participate in various stages of the program, their domestic unpaid workload increases. If this is not expressly addressed in the program design, the increased burden on women may further undermine their own welfare disincentivizing them

from participating in the program. Sometimes, programs that have not been designed with women's care responsibilities in mind can even have a detrimental impact on girls' schooling. For example, when as program moves on, the time the mother spends away from home, girls are then required to assume their mother's responsibilities such as cooking or collecting water.

Source: Social Protection Human Rights (2015). Care responsibilities and unpaid care work. Social Protection Human Rights. http://socialprotection-humanrights.org/key-issues/gender/care-responsibilities-and-unpaid-care-work/, accessed on July 22, 2016.

In the context of unpaid care work, there are policies to enhance female labour force participation and gender equity in various parts of the globe. Following example from Brazil demonstrates the impact of the reduction or redistribution of unpaid care work on overall gender equity and agricultural households:

Over the past two decades, Brazil's female labour force participation rate (FLFPR) increased by more than 15 percentage points to almost 60 percent, with the increase mainly driven by married women and women with children. Brazilian women are now more educated than men, with tertiary education participation exceeding male participation. However, the gender gap in labour force participation remains at a high 21 percentage points, women are 9 percent more likely than men to live in poverty, and women face significant earnings gaps. Brazil is ranked eighth out of 86 countries in the 2012 Social Institution and Gender Index (SIGI), which comprises five dimensions of social institutions to promote gender equality.

Brazil has implemented following targeted reforms to remove restrictions in access to resources and entitlements for women:

- The National Documentation Program for Rural Women Workers helps rural female workers obtain the necessary documentation to get access to land, credit and government services, which resulted in an increase in the share of women who own land titles from 13 to 56 percent between 2003 and 2007.
- The Bolsa Familia direct cash transfer program was launched in 2003 as a merger of the federal government's existing conditional and unconditional cash transfer programs and covered around one fourth of Brazil's population by 2007. Building on studies that show that increasing women's share in household income raises the share of resources spent on family well-being, this program distributes most of its payments directly to women. The program has increased women's financial independence (SIGI, 2012) and has also had a positive effect on women's labour force participation.
- In 2004, the authorities adopted the National Plan for Women's Policies to address specific needs of mothers, including health care during pregnancy, as well as child care and education.
- Brazil's maternity benefits policies include 120 days of paid leave at 100 percent of their salary, which is paid by the employer but reimbursed by Brazil's Social Security Institute. An additional 60 days allowance that can be provided by employers is tax-deductible.
- In the year 2003, the authorities introduced the Pronaf-Mulher credit line targeting women in rural areas. As a result, women's credit share in rural development financing programs increased by some 15 percent between 2001 and 2006 to almost 26 percent.

Source: Elborgh-Woytek, Katrin, et al. (September, 2013). Women, Work, and the Economy: Macroeconomic Gains From Gender Equity. International Monetary Fund (IMF). https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&ved=0ahUKEwialZG1yIbOAhVBuY8KHbltCGYQFgg-MAQ&url=https%3A%2F%2Fwww.imf.org%2Fexternal%2Fpubs%2Fft%2Fsdn%2F2013%2Fsdn1310.pdf&usg=AFQjCNFFhDDFRFihbb4v3OX8tWyVw6ST_Q&cad=rja, accessed on July 22, 2016.

b) Do men, community/state institutions take responsibility for the care of young children, especially during peak cultivation seasons when women's labour is much needed?

This question has no standard answer. In some settings, community takes responsibility to some extent. It all depends upon type of family, nuclear or joint, and the level of responsibility assigned to each family member. Another contributing factor is value system. For example, in to understand Southeast Asian parenting and child-rearing practices, one must first understand the cultural values and beliefs that influence parents, especially regarding family life and interpersonal relationships.

c) How rigid or flexible are social norms when it comes to issues of survival?

This question has no standard answer. In some settings, social norms are rigid and vice-versa. There are let of variations in the context of type of society, rural-urban differences, type of value system, geographical region, etc. But as the time goes on, on finds variations in flexibility of social norms.

3. Are you aware of changes in gender divisions of work, roles/responsibilities in contexts of change (eg: shifts in cropping patterns, technical innovations, the loss of ecosystem services, social and political conflict)? How is the contribution of men to household nutrition changing?

Differences between men and women with respect to dietary intakes and eating behaviours have been reported and could be explained by gender differences in motivational variables associated with the regulation of food intake.

4. What is the link between dietary diversity, women's engagement with agriculture, and access to ecosystem services?

Broad-based agricultural growth has been shown to be effective in reducing poverty. However, increases in agricultural productivity do not translate directly into improved health and nutrition outcomes. A broad body of literature demonstrates that the linkages between agriculture, health, and nutrition are dynamic and multifaceted. Production-oriented projects that ignore the nutritional quality of food produced, potential trade-offs between crops for food and other uses, the health impacts of pesticide exposure, and a range of other health and nutrition outcomes stand to have little - potentially even negative - impact on the well -being of the rural poor. With the increasing recognition that agricultural growth and development do not necessarily translate into improved nutrition outcomes, policymakers are increasingly grappling with how to design and implement agricultural policies and programs that can also achieve nutritional objectives. Agriculture has direct links to nutrition in the sense that it provides a source of food and nutrients and a broad-based source of income, as well as directly influencing food prices.

Further, with the increasing recognition that agricultural growth and development do not necessarily translate into improved nutrition outcomes, policymakers are increasingly grappling with how to design and implement agricultural policies and programs that can also achieve nutritional objectives. Agriculture has direct links to nutrition in that it provides a source of food and nutrients and a broad-based source of income, as well as directly influencing food prices. Gender roles mediate these linkages, particularly in relation to increased food availability and increased income. Thus, one possible pathway through which agricultural development could improve health and nutrition outcomes is by considering gender roles and gender equity in agriculture.

Source: Malapit, Hazel Jean L., et al. (December, 2013). Women's Empowerment in Agriculture, Production Diversity, and Nutrition: Evidence from Nepal (IFPRI Discussion Paper 01313). Washington, DC: International Food Policy Research Institute (IFPRI). http://r4d.dfid.gov.uk/pdf/outputs/LANSA/ifpri-dp-01313.pdf, accessed on July 22, 2016.

5. For Afghanistan, we want to capture experiences about women's roles in agriculture and agribusiness value chains in order to shape policies and interventions to recognise and support women's contribution to livelihood security.

Following experience can be quoted as guiding principle on women's roles in agriculture for Afghanistan:

Rural Women's Project: In Tanzania, agriculture is the largest and most important sector of the economy. Majority of the country's population which lives in rural areas relies heavily on agriculture. The sector accounts for about half of the national income, three quarters of merchandise exports and is source of food and provides employment opportunities to about 80 percent of Tanzanians. Agriculture also has linkages with the non-farm sect ors through forward linkages to agro-processing; consumption and export; provides raw materials to industries; and a market for manufactured goods. Consequently, agriculture has a pivotal role in economic growth, and is directly linked with sustainable development and poverty reduction. Gender differences are a significant attribute in agriculture, from access, control and ownership of land to marketing of raw and processed produce. In Tanzania, despite constitutional proclamations of gender equality and many laws that promote equal opportunities for both men and women, it remains the case that on both smallholder farms and large plantations, men and women carry out different types of work, have different levels of access to resources, and are unequally rewarded for their contributions to the agricultural system, with women typically having less access and lower incomes. Among the CARE's mandate in various countries in Africa is to promote gender equity, women's empowerment, productive and sustainable agriculture, market engagement, and environmental change. The newly defined overarching goal of CARE Tanzania states that "CARE Tanzania and allies will contribute to the empowerment of the most marginalized and vulnerable rural women and girls to exercise their rights. This will enable them to achieve access to, and control over quality services and resources, leading to sustainable livelihoods".

In order to support the goal, CARE Tanzania, is launching a major initiative targeting 'Women and Agriculture (WAA)' in Southern Tanzania, that will promote pro-poor and gender sensitive approach to economic development and management of natural resources. The initiative aims to achieve more productive and equitable participation of rural women in the agriculture sector, focusing on smallholders.

The proposed WAA program will address CARE's long-term goal of promoting impact groups including the most marginalized and vulnerable women and girls dependent on natural resources in areas with severe environmental restrictions. As a result, the impact groups will have built their resilience, diversified their livelihood strategies, addressed equitable access to, and control over resources, and

benefiting from natural resources. The program's geographic area of focus is Mtwara and Lindi Regions. The two regions are characterized by:

- Relatively poor infrastructural links,
- Varied and vast undeveloped terrain,
- Erratic weather conditions,
- High level of poverty,
- Food insecurity,
- Cultural dynamics,
- High illiteracy, and
- Maternal mortality rates.

Source: Care Tanzania: Women and Agricultural Project. http://gender.care2share.wikispaces.net/file/view/WAA+Gender+Analysis.pdf, accessed on July 22, 2016.

ANNEXES

Annex 1 - Mohammad Jafar Emal, IFAD/RMLSP/MAIL, Afghanistan

Ministry of Agriculture, Irrigation and Livestock (MAIL)

Rural Microfinance and Livestock Support Program (RMLSP)

International Fund for Agriculture Development (IFAD)

(IFAD/RMLSP/MAIL)

Backyard Poultry Development in Balkh and Jauzjan

Study on Creation of Other Income Sources from Backyard Poultry Productions

Prepared by:
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April, 2016

Introduction/Background:

The government of Afghanistan through the Ministry of Agriculture, Irrigation and Livestock (MAIL) is promoting small holder poultry production as part of the global strategy and a tool for poverty alleviation in Afghanistan. In consideration with this global principle, the Backyard Poultry Development project funded by IFAD via RMLSP through MAIL, was initiated in 2010 in North of Afghanistan with the aim to reduce vulnerability and improve on a sustainable basis the livelihoods, incomes, food security and nutritional status of more than 5000 poor and vulnerable rural households.

Although the backyard poultry income alone is not sufficient to enable an average Afghan rural family to rise above the poverty line, it can constitute the first step out of poverty. The possibilities and opportunities for the beneficiaries to take the next step was built, encouraged, initiated and practiced into the enabling environment, throughout the period of the project. The reports received from targeted villages, indicated that above 15 percent of the beneficiaries initiated other income sources from poultry products income, such as tailoring, embroidery and livestock sheep, goats, female calves and even cotton processing machine from the poultry income. These initiatives open a window for the next step into enabling environment, poverty alleviation and further economic development in rural areas of Afghanistan.

The additional technical knowledge that women gain through the technical training can also be for some a good basis to further develop a more semi-commercial poultry production system.

In rural Afghanistan small-scale poultry production has a number of comparative advantages, namely:

- It needs less capital investment and land ownership is not a requirement.
- Short reproductive cycles ensure quick financial returns.
- Village women can manage and benefit directly from household poultry.
- While feed supplementation is a major variable cost, part of the daily nutritional requirements can be obtained from scavenging, kitchen waste and spent/spoilt grains.
- Crossbred pullets, the Golden Crossbreed, which is well adapted to the rural environment in Afghanistan are locally available and popular.

The results indicate that the project has reached the poor rural women, the main target of the project, and those women beneficiaries have benefited positively in terms of income, food security, social and economic empowerment. The project experiences show that the additional income generated through the sale of eggs, pullets and old stock has immediate positive impacts for the rural women beneficiaries that are practicing the improved backyard poultry management. With the help of Women Poultry Associations they are able to sell their products and generate extra income that is used for domestic needs and creation of other income sources.

This field study was conducted to explore the opportunity for the social and economic empowerment of rural women in Afghanistan.

Methodology:

The project trained and equipped the Village Group Leaders (VGLs) as well qualified poultry trainers, facilitators, instructors and day-to-day advisors to their relevant Village Groups These VGLs are then organized in Poultry Associations of their relevant districts. They are performing well their family poultry development business, collecting and reporting the relevant data's on poultry productions, marketing, Seasonal Female Family Poultry School (FFPS) and other activities. In order to conduct a study on "Other Income Sources Created through Poultry Incomes", the VGLs of 32 randomly selected villages among 104 targeted villages were advised to collect the required data with the assistance of poultry monitors and submit it to the poultry project manager and monitors. The required data from 245 targeted beneficiaries belong to 32 villages was collected and submitted to the National Poultry Advisor , which was for compiling it into a field study. Very simple questionnaire was developed and provided to the VGLs of selected villages for data collection.

The data collected on creation of other income sources from poultry productions and reported by the VGLs in 32 villages randomly selected out of 104 targeted villages of 5 targeted districts is presented in the following table 1:

Table 1 - Creation of other income sources from poultry products in randomly selected targeted villages

S. No.	District	No. of Villages	No. of Benef.	No. of layer	No. eggs Sold	Income from poultry production (Afs.)				Other Livestock purchased from poultry income				
						Sold eggs	Sold old stock	Sold pullets	Sold Broiler	Female Calf	Goat	Sheep	Broiler	Turkey
1	Aqcha	5	53	776	12124	84868	80750	23920	0	5	33	10	0	0
2	Balkh	5	23	286	5600	39200	66000	18960	0	6	10	9	0	0
3	Dawlatabad	5	21	538	5799	40593	28400	13940	0	4	21	3	0	0
4	Nahri Shahi	5	30	1212	7222	50554	191800	26680	164670	10	49	21	5489	5
5	Shoolgar	12	118	1818	30930	216510	21000	13200	4260	23	69	36	142	4
	Total	**32**	**245**	**4630**	**61675**	**431725**	**387950**	**96700**	**168930**	**48**	**182**	**79**	**5631**	**9**

Discussions and Conclusions:

The data on creation of other income sources from poultry production collected , analyzed and shown in above table 1, indicates that among 1600 beneficiaries belonging to 32 villages of 5 targeted districts, 245 of them benefited from creation of other income sources from poultry products, which is about 15% of the all 5022 beneficiaries of the poultry project. The income of poultry productions used for creation of other income sources is summarized and discussed as below:

Income from Poultry productions:

Backyard poultry is worldwide accepted as a tool for the first step out of poverty. The main sources of family poultry income are surplus eggs, old stock and chicks/pullets. The income from old stock, eggs and pullets as shown in above table 1 is Afs.278950, Afs.431725 and Afs.66700 respectively, which is mainly used for creation of other income sources as livestock (cow, calf, goat, sheep, broilers) and tailoring/embroidery/cotton processing machines). The total income from sold eggs, old stock and chicks/pullet is shown in the following table 2:

Table 2 - Income from poultry products used for creation of other income sources

	Sold eggs	Sold old stock	Sold pullets	Sold Broiler
Income (Afs.)	**431725**	**387950**	**96700**	**168930**
Percentage	**40%**	**35%**	**10%**	**15%**

As shown in above table and figure 2, the maximum income is saved from sold eggs, while the income from sold old stock is second, broilers is 3rd and that of pullets is in the 4th position. The broiler business is mostly practiced in Nahri Shahi, which is located close to Mazar-i-Sharif city. It is also initiated in Shoolgar district and will be developed in other districts as well.

The total income from poultry production is above one million (Afs. 1085305), which is mainly used for purchasing other animals as income generating source besides the family poultry farming.

Use of Poultry Income:

In consideration with the fact that "the backyard poultry can constitute the first step out of poverty" the RMLSP poultry project encouraged, initiated and practiced possibilities and opportunities for the beneficiaries to take the next step to build into the enabling environment. These efforts were mostly concentrated in the last 3 years of the project (2013, 2014 and 2015) to ensure the sustainability of backyard poultry approach. The percentage and amount of poultry income (Afs.), used for creation of other sources of income is shown in the table 3:

Table 3 - The percentage of other income sources created form poultry income

	Female Calf	Goat	Sheep	Turkey	Machines*
Number	48	182	79	9	25
Percentage	10%	55%	28%	2%	5%

As shown in Table 3, the purchasing and rearing of dairy goats is the maximum (52%), while the sheep is 2nd , female calf is 3rd , machines is 5th and Turkey is in 6th position. This may due to local conditions, price of animal and need/interest of the beneficiaries. Purchasing of these animals' means that, 48 dairy cows, 182 goats, 79 sheep, 9 Turkey and 25 machines are added form poultry income in the villages under consideration. The female calves are reared to become dairy cows, while the turkeys are mostly used for natural hatching and sold back or used for meat. The goats are kept mainly for kidding and milk production. The sheep are mostly purchased for fattening and sold back with good benefits. The machines are used for tailoring, embroidery, cotton processing and other purposes.

The values of other income sources purchased from poultry income can be estimated roughly considering the common prices of animals and items in the areas under the study.

S.No.	Type of animal purchased	No. of animal purchased	Average price per animals	Total price	Up-coming values
1.	Calf	48	Afs. 5000	Afs. 240000	Afs.14400000 (cow/heifer)
2.	Goats	182	Afs. 3000	Afs.546000	Afs.910000 (+ kids/goat)
3.	Sheep	79	Afs. 3000	Afs.237000	Afs. 474000(after fattening)
4.	Turkey	9	Afs. 800	Afs. 7200	Afs.7200
	Total	-	-	**Afs.1030200**	**Afs. 15,791,200**

The total income used for purchasing above animals is Afs.1085305 (USD 15960), while the amount spent for animals is Afs.1030200 (USD 15150). The future value expected from these animals can be estimated as Afs.15791200, which equals to USD 232223. This figure is enough to the 15% of beneficiaries to take next step to build into the enabling environment and improved livelihood.

The rearing of broilers is mostly practiced in Nahri Shahi district which is located close to Mazar-i-Sharif city, where there is good market for broiler, while the pullets(layer) is practiced in some villages of all targeted districts and is being expanded to other districts. The pullets are produced by the beneficiaries through the improved natural hatching and or purchased day old chicks form big suppliers, rear them up to one or two months and then sold to the group members and other interested villagers. About more than 50% VGLs are actively involved in this business. The pullets produced and reared through natural hatching are mostly retained for the replacement of old stock and the surplus is sold to the interested village women and group members. The ratio of broiler and pullets rearing is shown in the bellow table:

Table 4 - The ratio of broiler and pullets rearing

	Broiler	Pullets(layer)	Total
Percentage	77%	23%	100%
Number	5631	1683	7314

The business of pullets/broiler rearing is mainly developed by the VGLs. The day old chicks are purchased from the big suppliers and reared up to one or two months and then sold to the villagers or market. The pullets are sold only to the group members and other interested village women.

Purchasing of tailoring, embroidery and other machines from poultry income is more common among rural women. Purchasing of total number of 25 machines from poultry income was found in this study. Even, the cotton processing machine purchased from poultry income was also reported, the story of which is presented as bellow:

From 15 layers Up-to Cotton Processing Machine:

A woman beneficiary in Arabha village of Nahri shahi district, who received 15 layers in 2010, opened a street shop by Afs.7000 saving from eggs in 2013, she could managed to invest Afs. 80000 from the street shop and replace it into Cotton Processing Machine in 2015, which is providing more than Afs.150000/year as net income to her family. There are many such cases, the samples of which are collected and analyzed in this field study.

The Tailoring and Embroidery also create good income for rural women through sewing the cloths and beautiful handicrafts as per the demand of the villagers and customers.

Conclusions:

1. In general, most of the Women Village Group Leaders (VGLs) initiated good poultry business from the poultry income and now they are considered as the leading women in family poultry development for their relevant groups.
2. The creation of other income sources from family poultry income is the next step for Afghan rural women/families to rise above the poverty line,
3. The development of integrated livestock raising and keeping through backyard poultry income further enhance the income and food security in rural areas,
4. The active participation of rural women in livestock development is further encouraged,
5. The study shows generally the positive impacts of family poultry on livelihood, income and food security of rural farming families,
6. The possibilities and opportunities for the poor rural women/families to take the next step should be built, encouraged, initiated and practiced into the enabling environment by all the involved institutions working in backyard poultry development in Afghanistan.

Annex 2 - Paul Rigterink, Potomac Technical Advisors, United States of America

Doubling the Income of Africa's Poorest Farmers

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ABSTRACT

Our goal is to present a method for doubling the income of Africa's poorest farmers. The FAB marketing technique is used to show the potential of modern free range poultry production procedures to cause an explosive growth in poultry production much as modern medicine has caused an explosive growth in human population. It is suggested that the techniques used by system engineers in large corporations can be used to ensure that the introduction of modern poultry practices will work in the field. We note that major refugee camps offer an ideal training site to introduce these ideas. It is expected that the major obstacles to implementing this technology are the need to distribute inexpensive poultry medicine in very small quantities which can be purchased by the poorest farmers and a willingness of charitable organizations to train farmers on how to make money.

INTRODUCTION

Charities and major Government organizations have been extremely successful in supplying emergency relief, improved medical services, water, and food to victims of natural and man-made disasters. However, their goal to establish and expand microenterprises to the point that there is a definite trend to ending the cycle of poverty and violence has not been as successful. This paper borrows from the techniques used by large business in the areas of system engineering and marketing to show what could be done to help a small farmer with four hens, a rooster and approximately $10 (U.S) of investment funds. It relies on African entrepreneurs (such as an elementary school teachers wishing to supplement his/her income) to make the right investment decisions and the use of prototypes to develop and analyze potential system concepts. In particular, it is absolutely necessary that prototype poultry farms be developed which test the feasibility and cost implications for the critical and high-risk technical and operational concepts described.

To illustrate these ideas, we have reworded concepts introduced Dr. John Bishop (See References 1-5), in a way that might be used by an entrepreneur interested in increasing poultry production in Afghanistan. In particular, the **American Poultry Challenge** announcement below uses the "FAB" marketing approach to selling a product. Briefly, it describes:

(F)acilty – the product that can be provided

(A)dvantage – the advantage that this product has compared with other products

(B)enefit – the benefit it provides to the farmer implementing these ideas

In addition, it supplies "ghosts" which describes what will happen if one does not follow this approach.

THE AMERICAN POULTRY CHALLENGE

Many people throughout the world are earning additional income by raising poultry the modern way. This paper offers a little test to see if you are ready to join these modern producers throughout the world earning extra money raising poultry. In particular, it describes how to maintain and improve the productivity of backyard chicken flocks of 12 to 48 birds. Once you have met this challenge, you will be ready to move-on to learn the technology of "transitional" poultry systems of 200-300 birds and finally full commercial production of 10,000 birds.

Backyard producers value chickens for their adaptability, contributions to the family's income and general welfare, and for insect control and fertilizers in the garden. In most family flocks, chickens scavenge plant or food residues and insects around the home. With minimal care, family flocks can hatch and raise chicks, produce high-value meat, and supply eggs. Eggs can be a particularly important source of food for children with protein malnutrition who are between six months and three years of age. Live chickens sold for meat bring a good price and are a primary source of household income for poor farmers.

It is extremely difficult for families to maintain flock numbers and replace birds which are lost or sold if they cannot produce chicks on the farm. Buying replacement chicks from a hatchery is expensive and can be disastrous for household chicken production. Hatchery birds may require artificial incubation, disease control measures, or special feeds not available on the small farms. The loss of hens' broodiness (readiness to set on eggs for hatching) is particularly serious. When hatchery roosters cross with traditional hens, flocks can lose their ability to hatch and raise chickens in just one generation. For the American Poultry Challenge it is best to avoid dealing in hatchery birds which have lost most of their ability to successfully hatch eggs. In addition, to gain the maximum profit, the use of poultry feeds is discouraged.

Key elements of our American Poultry Challenge will be:

1. Use small-scale poultry production systems with low purchased inputs and minimized risk.
2. Choose appropriate breeding stock which can incubate and brood replacement chicks by natural production
3. Apply fundamental pest and disease control practices outlined below

Inexpensive disease control markedly increases the survival and productivity of a family flock. The following four preventive practices, given every three months, will eliminate most health problems in poultry flocks:

1. Vaccination for Newcastle disease
2. Deworming for roundworms and tapeworms
3. Dusting under wings for irritating external parasites such as lice
4. Treatment for chronic respiratory disease to increase production.

To accept the American Poultry Challenge you will need a permanent poultry flock stabilized at 12 adult hens and one rooster. You must let one broody hen set per month with 10-12 eggs and produce at least 4 replacement chicks per month after losses in incubation and brooding. A hen will take about 4 months to raise her chicks, so that at any given time about 4 of the 12 permanent hens will be caring for chicks, leaving the other 8 hens for egg laying.

To feed the chickens and obtain maximum profit on a small farm you can use:

1. Excess and/or unusual food crops
2. Crop residues
3. Household refuge
4. Scavenger feed (e.g., weeds, seeds, insects, worms, etc)

You will probably get only 2 eggs per day without supplemental poultry feed. By feeding the twelve hens one pound of corn per day the 8 laying hens will give an average of 4 eggs per day. This American Poultry Challenge system assumes you will supplement surplus on-farm resources with one pound of grain per day so that you will produce about 120 eggs and 4 replacement chicks per month.

Once you have a productive and profitable system with traditional chickens, you may want to try "Triple Production Reds" which have been specially bred to maximize the production of meat, eggs, and chicks. You are now ready for the next challenge, which is how to learn how produce 200-300 chickens per month for commercial sale. For this challenge you will need to learn about hatchery breeds, balanced feeds, artificial lighting and brooding, and other components of a commercial farm. The book Raising Poultry the Modern Way describes all you need to know for this Step 2 of the American Poultry Challenge. Later, when you have earned enough money to start Step 3 of the American Poultry Challenge, references given in Raising Poultry the Modern Way describe how to build a high-input, large scale poultry system found in the United States. You will now be a "World Class Poultry producer. Good Luck in Step 1!

For more information on responding to the American Poultry Challenge Supply Centers contact

American Poultry Supply Centers

(Local Address)

MINIMIZING RISK TO SMALL FARMERS

A major problem with small scale poultry development is the high risk. With limited resources, small farmers with take the low risk approach unless their total investment is small (e.g. Government sponsored lottery tickets). Corporations are well aware that higher rewards are associated with higher risks. A large corporation often will fully define and validate the product concept on a small scale to mitigate risk before making a substantial investment. A full product definition would (1) rigorously define user requirements and operations needs and (2) assess the technical and economic feasibility of the product. Table 1 illustrates what system engineers at a major corporation might consider before starting a poultry business. Note that this product concept includes identification of potential risks and potential high cost-areas. Table 2 illustrates the production flow that a large corporation would use for producing the birds for sale.

On the other hand, organizations such as USAID, World Bank, U.S. Peace Corps, World Vision, Care, etc. rarely conduct studies which measure the profitability of small investments made by poor African farmers. We suggest that these organizations follow the advice of former Secretary of Agriculture, Orville Freeman (Reference 9), who noted about "cash crops":

"The ability of small farmers to take the plunge into cash crops has an immediate effect on a village. Even if only marginally successful, the farmer needs help at harvest time so that casual labor is taken on. When farmers have a profitable year, their first expenditure is home improvement. Materials and labor come from the village. As farmers climb out of subsistence production, they take other members of their village with them. Perhaps one of the most important effects on a small farmer having just a little money to spare is the apparently universal instinct to spend money on educating his children.

The raising of cash crops introduces the farmer to modern methods of cultivation that constitute a triple-win proposition. It increases the income of the farmer and his family; it has an immediate effect on the local community, as well as the nation; and it contributes to the global food supply."

To mitigate the risks of small farmers, we suggest that African entrepreneurs (such as an elementary school teacher wishing to supplement his/her income) be given four hens, a rooster, and approximately $10.00 (U.S.) of investment funds. Business experts then should monitor their decisions and supply expert advice to determine if the product concept is economically feasible and whether the rewards are worth the risk. Extensive interaction will be required initially to identify all product requirements and elicit ideas on alternative system concepts. Different ideas should be tried to determine the best approach. Several iterations may be required before the best approach can be determined. Efforts should be made to determine what technical and operational resources are needed and what resources are readily available. Critical technological limitations, cost-drivers, life-cycle costs, and risks will need thorough analysis. Questions that might be answered with this approach include:

1. What are the best methods for preventing the loss of chickens from predators and thieves?
2. Is the application of fundamental disease control to prevent losses from common infections and parasites worth the investment?
3. Can the veterinary medicines required be repackaged in the small quantities required by poor farmers? In particular, how can their flock be vaccinated for Newcastle disease?
4. What methods were used to insure maximum egg production (e.g. supplemental feed and keeping the chickens shaded)?
5. Should small farmers sell primarily eggs, live chickens, freshly processed poultry meat, or cooked chicken meat to maximize profits?
6. Are development workers willing to demonstrate sanitary poultry processing or is it too messy?

Based on initial field results, development workers should be able to assess the end-to-end scope and feasibility of proceeding with the development of larger projects. All issues need to be closed and the concepts must be complete and field proven before proceeding to a large project.

INTRODUCTION OF MASS PRODUCTION

A major training area is needed to make an impact on a large group of farmers. An example of a location where a large group of farmers can be trained conveniently is a large refugee camp (one million persons). Here one can demonstrate to a large group of people how to make money by developing a modern poultry farm based on the results of the earlier prototype studies. This large project would have to ensure that all refuges leaving the camp have the necessary supplies to start a very small poultry farm (i.e. 4 hens, a rooster, veterinary supplies, proper training, etc.) before leaving camp. A follow-up support team would be needed to ensure that:

1. All issues are resolved
2. Key risks have not been overlooked
3. The concept is valid on a large scale

The follow-up support team must be able to supply all critical information and have access to funds which will allow them to quickly purchase missing items necessary for project success. It is expected that the major obstacles to implementing this technology are the need to distribute inexpensive poultry medicine in very small quantities which can be purchased by the poorest farmers and a willingness of charitable organizations to train farmers on how to make money. In particular, the only criteria for success should be that the income of Africa's poorest farmers has doubled.

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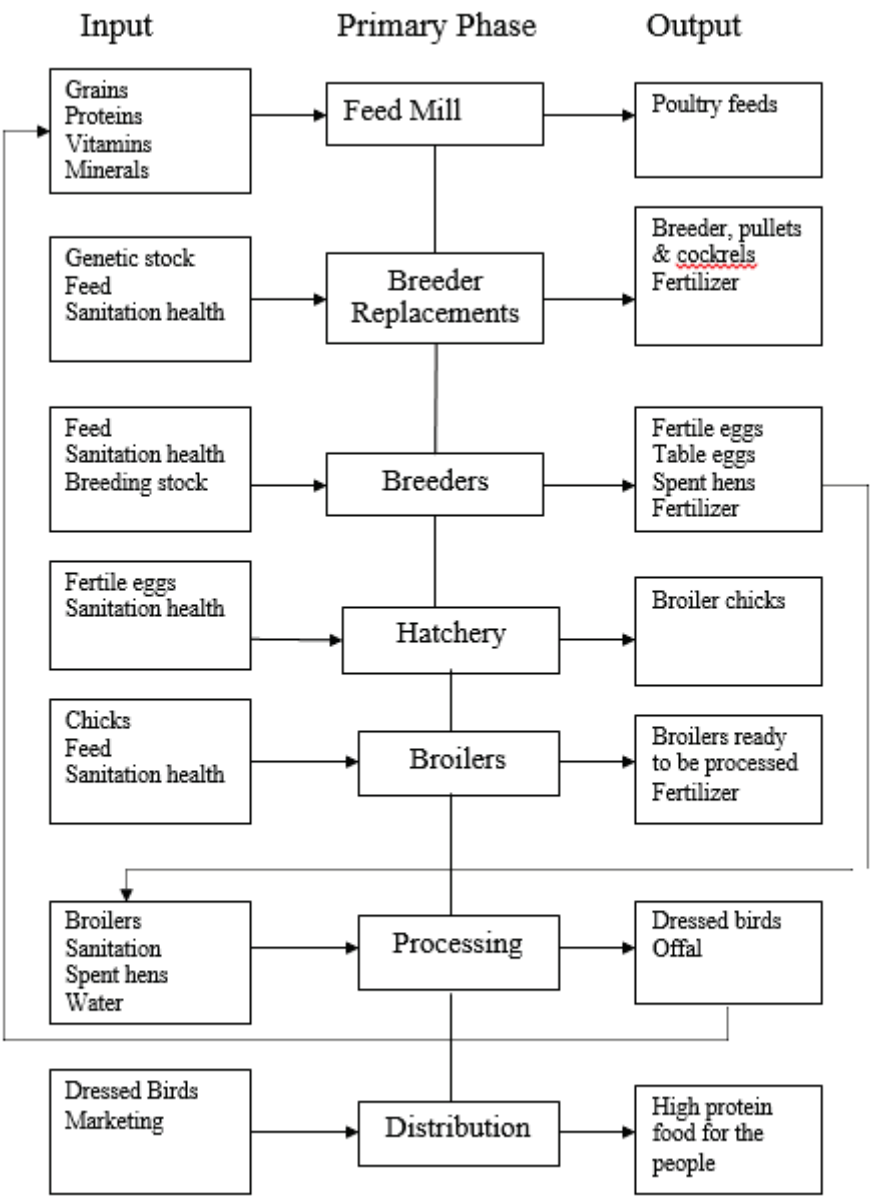
Table 1 - American Poultry Challenge System Concept Definition

Business Concept Element	Step	Work required
Requirements Analysis	Preliminary Analysis	• Assessment of Product's Capability • Assessment of Market
	Strategy Formulation	• Definition of Objectives • Definition of Priorities • Determination of Alternative Approaches • Selection of Preferred Approach
Design	Formulation of Development Plan	• Identification of Customers • Identification of Area to Sell Product • Identification of Constraints • Definition of Product • Analysis of Costs • Definition of Required Actions • Sequence of Required Actions • Schedule
	Establishment of Support Required	• Definition of Required Resources • Acquisition of Required Resources • Organization of Human and Material Resources • Acquisition of Training
	Ensuring Acceptable Levels of Quality and Supply	• Selection of Technology • Site Selection • Variety Selection • Feed Selection • Pest and Disease Control Practices • Water Use • Determining When to Sell
Operations	Maintaining Quality	• Quality Control Procedures • Maintaining Standards • Packaging Procedures
	Capturing a Market	• Obtaining and Using Market Data (Pricing Analysis) • Making Use of Market Intelligence • Selection of Target Markets • Identification of Middleman • Negotiating the Best Deal
	Optimal transport	• Selection of Means of Transport • Packing for Transport • Keeping Quality Control During Transport
Maintenance	Maximization of Income, Profits, and Production of Product	• Analysis of Costs • Analysis of Returns • Analysis of Business Operations

Table 2 - Poultry Production Diagrammatic Flow



Annex 3 - Zhanhuang Shang, School of Life Sciences, Lanzhou University

ROLE OF TIBETAN WOMEN IN CARBON BALANCE IN THE ALPINE GRASSLANDS OF THE TIBETAN PLATEAU. A REVIEW[1]

Zhanhuan Shang, Andrew White, A. Allan Degen, Ruijun Long

Abstract

Males and females often contribute differently to the ecosystem as a result of their different roles and labour responsibilities. This is especially true in remote areas like the Tibetan alpine grasslands, where women handle most household chores and agricultural labour. Within this framework, women are involved physically in carbon balance to a much greater extent than are men. The collection and use of livestock dung for fuel (dung-fuel) and the production of livestock commodities are two female activities that are extremely important in the carbon cycle in grassland ecosystems. More than ninety per cent of fuel in the alpine grassland areas in China comes from livestock dung, which is collected and burnt by women. In addition, animal carbon leaves the grassland ecosystems through the selling of milk products by women. The burning of dung reduces the use of fossil fuels and wood in alpine areas, but causes severe indoor air pollution in homes and greatly increases health risks, mainly among women. Women should receive more education on and made aware of these dangers. Because of their heavy work load and busy time schedule, however, Tibetan women have little time for other activities. Consequently, their education is at an extremely poor level and their health issues are often neglected. Steps should be taken to improve the status of women in the community, involve them more in decision-making, promote their education and health standards, and encourage more gender equality in agricultural labour tasks. These changes for women have been implemented in other pastoral societies and have proven to be successful.

KEYWORDS: Carbon management, nomadic women, female labour, climate change, alpine grassland.

Introduction

From the pre-industrial period to 2010, the atmospheric concentration of CO2 has increased by thirty-nine per cent, from 280 ppm to 390 ppm. This enrichment in atmospheric CO2 concentration, along with other greenhouse gases, including methane (CH4) and nitrous oxide (N2O), 'may accentuate radiative forcing and alter the Earth's mean temperature and precipitation' (Lal undated). To minimise the risks of global warming, it was recommended at the Copenhagen Accord in 2009 that atmospheric CO2 concentrations should be contained below 441 ppm by 2100 (Ramanathan and Xu 2010) and that this should be accomplished 'by reducing CO2, CH4 and N2O emissions and by offsetting emissions through sequestration of carbon in soils and other terrestrial and inland aquatic ecosystems' (Lal undated).

Of the five global C pools, the soil C pool, with an estimated 2,500 Petagrams (Pg) C (Batjes, 1996), ranks the third largest (the oceanic C pool contains an estimated 38,000 Pg and the geological C pool an estimated 4,130 Pg: see Lal undated). As rangelands produce a large proportion of total land carbon and sequester large quantities of carbon above and below ground, the immense rangelands on the Tibetan plateau 'could have widespread effects on regional climate and global carbon cycles'; in fact, 'alpine meadow and alpine steppe range, found primarily on the Tibetan plateau, comprise forty percent of all

1 This literature review is an insight into the current mainstream perspective on livestock keeping and climate change in the grasslands of Tibet. Editor's Note.

carbon stored on China's rangelands, indicating that these ecosystems have a significant and long-lived effect on global carbon cycles' (Miller, 2003). This can be explained, at least in part, by the colder air temperatures on the plateau, which slow organic decomposition rates and increase the mean retention time of the carbon.

The 390 ppm of atmospheric CO2 has a total mass of 3,030 Pg or 825 Pg of carbon. Anthropogenic emissions, through activities such as animal husbandry and burning of biomass, total 9.9 Pg C per year, of which 4.2 Pg is absorbed by the atmosphere. Consequently, human and livestock activities are important components of CO2 emission in the carbon cycle (IPCC 2007, WMO 2010).

In grassland-livestock production and management systems in the Tibetan alpine, the roles of women and men differ substantially, as is the case in many mountain areas (Khadka et al. 2014, Verma et al. 2014) and other pastoral communities (Radel and Coppock 2013) and, consequently, their contribution to carbon balance can differ greatly (Cecelski 2000, IFAD 2004, OECD 2008). Due to traditions and religious beliefs in Tibet, women undertake most of the heavy labour associated with agriculture and livestock production (Dong et al. 2003) while men handle most of the decision-making. As a result, the physical actions of women are integrally involved in carbon balance through their roles in livestock husbandry and fuel management, much more so than men. In essence, their daily activities are the key to the carbon cycle in alpine grassland ecosystems. The importance of women as a labour force has grown over the years on the Tibetan plateau. From 1990 to 2009, the female population increased from 0.9 to 1.2 million in rural and pastoral areas, with about 0.45 to 0.58 million women engaged in agriculture and animal husbandry, mostly in alpine meadow ecosystems. Although a similar increase in the number of men was reported during this period, a much smaller proportion joined the animal husbandry labour force.

In this review paper we 1) describe the role of the female in carbon cycling in the alpine grasslands ecosystem; and 2) provide information for the need to improve the education, health and social status of women, and to encourage more gender equality in the alpine region.

Female and male labour in rural areas of the Tibetan Plateau

Women undertake almost all of the housework and most of the labour needed for agricultural and pastoral production in the alpine grassland ecosystem (Li and Yang 2005). They are responsible for activities such as milking livestock, making cheese and ghee, drying cottage cheese, frying barley, producing mill fired power, collecting and drying manure, stacking and storing dung-fuel and drying leather. Their typical day consists of at least ten hours of continuous work, especially during the summer when they start milking animals at 04:00. Milking is usually followed by cleaning livestock sheds, drying animal dung, preparing breakfast, processing milk products and then preparing lunch. In the afternoon, women generally collect animal dung, and then milk the animals until about 17:00, at which time they prepare dinner (Lu undated).

Men have a higher status in the family, and are more involved in making family decisions. In addition, they slaughter animals and may do some hunting, but this latter activity is rare today. Many men become monks in the Gelug sect of Tibetan Buddhism, and consequently cannot marry, have children or participate in productive labour. This religious practice has serious social impacts on the Tibetan population, resulting in labour shortages and women having to play a major role in their family and society. In the traditional family, women have a lower degree of social participation and have a poorer level of education than men (Bowes undated).

There are two main ways in which women influence carbon balance in alpine grassland ecosystems. The first is through their role in animal production. By consumption of livestock products and sales to areas outside the grassland ecosystem, livestock products become part of the carbon output in the carbon

cycle. The second is by the collection of livestock dung to be used as fuel. This is an important source of energy in the cold alpine areas, which not only reduces fossil-fuel imports into the grassland ecosystem and the use of firewood, but also accelerates the decomposition of livestock carbon into the atmosphere or ash into the soil.

Carbon management by women through animal products in alpine areas

In the alpine area of the Qinghai-Tibetan Plateau, most dairy products are produced from livestock grazing grasslands (Figure 1; La 1995, Dong et al. 2003). With the increasing number of livestock and with the introduction of intensive production systems, milk production has increased gradually (TARBS 2010). Hand-milking by women is still commonly practised, however, and is more practical than machine-milking in this low-cost labour region, mainly due to the poor infrastructure on the summer pastures where milking normally occurs (Figure 2). Three milking regimes exist in different localities: once-daily in the mountain areas of the northern Plateau, twice-daily on the grasslands of the central Plateau and thrice-daily along the valleys of the eastern Plateau (Dong et al. 2003). Fresh milk is processed immediately into a variety of indigenous products capable of being stored for long periods. Most milk products are consumed locally, although some are sold outside the ecosystem. All these tasks are the responsibility of women in alpine areas.

Although the amount of carbon from animal products increased compared to the 1990s, total carbon leaving the alpine region actually declined due to the reduced sale of milk and its products (TARBS 2010). The population increase lead to an increase in the consumption of milk products, while the amount of yak milk, as a commodity, did not increase proportionately. In addition, more milk products are being sent to temples, resulting in a further reduction in the sale of carbon from milk products outside the alpine region.

In alpine grassland ecosystems with no animals, carbon is fixed from the atmosphere through photosynthesis and accumulates in the grassland vegetation and soils. While part of the carbon eventually returns to the atmosphere via geochemical cycles, the cold hypoxic environment reduces its ability to decompose. This results in a rapid, short-term accumulation of carbon, making the alpine grassland ecosystem a positive feedback mechanism for carbon sequestration. Continued plant photosynthesis causes further accumulation of carbon in grassland ecosystems.

Livestock consumption of plant carbon alters the carbon flow and carbon accumulates at a higher trophic level. Animal carbon can re-enter the carbon cycle via two pathways. The first is through the decomposition of the body directly into the carbon cycle. The second is through its products such as meat, milk and leather. Women play a role in the latter through the production of dairy products, an output from plant photosynthetic carbon through the 'plantlivestock-atmospheric' system. The output of carbon products can eliminate carbon redundancy by the accumulation of excessive animal carbon products in the alpine grassland carbon cycle, an important part of a negative feedback mechanism. Moderate animal carbon output is necessary to sustain the normal carbon cycle of grassland ecosystems.

From the 1970s to the present, yields of animal products increased throughout the alpine region. The increase in milk products, and hence carbon, was a result of increased livestock consuming more grass and, therefore, more carbon, which reduced the grassland's regenerative capacity and, inevitably, resulted in grassland degradation. In essence, heavy grazing reduced the net ecosystem exchange (NEE), that is, the net effect of C fixation by plants, heterotrophic and autotrophic respiration and soil C sequestration, resulting in reduced plant biomass (Zhu et al. 2015). Consequently, nutrition levels for livestock have declined, resulting in reduced quantities of high-quality milk being produced per animal. For example, on the Tibetan steppe region of Tianzhu (Gansu Province), a woman milks an average of four yaks daily and each yak produces only 1.5–2 kg of milk per day, which is considerably less than

what was produced twenty years ago (Long et al. 2008, Shang et al. 2014). Zhu et al. (2015) concluded that 'reducing stocking rates on heavily grazed grasslands of Northern China to moderate grazing levels would enhance NEE, and benefit biomass and animal production'.

Most women in the alpine grassland areas harvest traditional Tibetan medicinal plants (Fang et al. 2012) and this also influences the carbon cycle. The original level of harvesting Tibetan herbs had little effect on the grassland carbon cycle, but the increased collection today can undermine the normal carbon fixation capacity of grassland vegetation. The participation of women in harvesting plants is a significant factor affecting the normal carbon cycle of the alpine grassland ecosystem.

Carbon management by women through using dung as fuel in alpine areas

Globally, the supply of energy in agricultural and livestock systems relies mainly on fossil fuels and firewood. In alpine grassland ecosystems, however, livestock dung is the main fuel used to supply household energy and heat, and hence plays an important role in the livelihoods of the households in these systems (Xiao et al. 2015).This is especially true for the alpine region of the Tibetan plateau, where yak dung accounts for 91.4 per cent of the entire fuel use (Sharma 2010). The labour involved with livestock dung use as fuel is mainly that of women (Figure 4). In addition, women sell dung at the market, which can replace coal and the need to import fossil fuels into the alpine grassland ecosystem.

Dung-fuel reduces the number of native shrubs that are harvested and lowers the importation of fossil fuels. Yu (2010) reported that in the alpine region of China at elevations from 2,500 to 4,700 metres, households burnt from 590 to 9,200 kilograms of dung-fuel per person per year. This is roughly equivalent to reducing the burning of coal by approximately 331 to 5188 kilograms (Table 1). If coal, however, were used and imported from outside the alpine region, the carbon sink in the alpine region would increase as dung would be used to a lesser extent.

Table 1. *The amount of yak dung burnt per person and the equivalent quantities of local shrubs (area), coal and emission of CO2 at different altitudes in alpine meadow ecosystems in China (adapted from Yu, 2010).*

Item (per person)	Altitude			
	2500 m	3000 m	3700 m	4700 m
Burning yak dung (kg)	590	2182	9233	3595
Area of local shrub (m^2)	332	1229	5200	2025
Coal quantity (kg)	331	1226	5188	2020
CO_2 (kg)	847	3133	13257	5162

Most Tibetan families have little choice but to use only yak dung for cooking and heating, as their limited income does not allow them to purchase fossil fuels. Families live in either tents or stone homes and, for economic reasons, mainly use simple stoves without chimneys (Xiao et al. 2015). Because of the low air temperatures, they heat for an average of sixteen hours per day (Chen et al. 2011) and, as a result, indoor emissions of black carbon and fine particulate matter rank among the highest in the world. Indoor air pollution has become extreme (Holthaus 2015, Watts 2015), increasing the risk of diseases such as cancer, cardiovascular diseases and respiratory disorders (Pope and Dockery 2006, Holthaus 2015). Women are most vulnerable to these health hazards as they do the cooking and spend the most time near the burning dung.

It has been calculated that approximately 0.4 to 1.7 Gg/year of black carbon is emitted by burning yak dung in Tibet (Xiao et al. 2015); black carbon is one of the main causes of both global warming and the melting of snow and ice in the Himalayans (Menon et al. 2002, 2010). Furthermore, it was reported that the mean indoor concentration of fine particulate matter (PM2.5; aerodynamic diameter of 2.5 μm or less) in households using a simple stove was 956 $\mu g/m_3$, that is, considerably higher than the mean twenty-four-hour average of 25 $\mu g/m_3$ recommended by the WHO Air Quality Guidelines (Xiao et al. 2015). It was also considerably higher than the air in kitchens in other countries that use biomass as fuel. These countries, such as India and Mexico, are at lower altitudes and have higher air temperatures, and heat less than the homes on the Tibetan plateau (Xiao et al. 2015).

By collecting yak dung, women reduce its residence time on the grasslands. The decomposition rate of yak dung is very slow in cold and highland areas. It takes at least two years because insects are few and freezing retards decomposition. Collecting dung from grasslands can promote normal vegetation growth as the accumulation of yak dung blocks vegetation regeneration and may affect nutrients returning to the soil. A small amount of dung remains on the grasslands which enables normal cycling of nutrients and elements for grass growth. Good growth and regeneration of grassland vegetation is an important guarantee of a balanced carbon cycle in grassland ecosystems.

Gender responsibilities and inequalities

In the pastoral regions of the Tibetan Plateau, labour for livestock production is very arduous. Most Tibetan women, especially young ones, are fully involved in agricultural labour and housework, and, consequently, participate physically in carbon management to a greater extent than men. In spite of their important role in the economy of the household, however, women have a lower status in the family and society than men do, as is the case in many pastoral societies (Radel and Coppock 2013, Ulambayar and Fernández-Giménez 2013), including those in the mountains (Khadka et al. 2014, Molden et al. 2014). In addition, women have little or no education and their health care is basically neglected (Fan 2010, Yang 2010, Li et al. 2012, Bowles undated).

Improving the educational standards of women would make them more aware of the hazards of indoor pollution and the dangers to their health, and would also better their understanding of the importance of carbon cycling. They could then modify husbandry practices to improve carbon management and biomass production. In addition, involving women more in decision-making would enhance their status within both their working and living conditions, and would acknowledge and enhance their contribution to livestock production (Fan 2010, Li et al. 2012).

Women in other pastoral societies have demonstrated leadership qualities and decision-making abilities when given the opportunity (Radel and Coppock 2013). Ulambayar and Fernández-Giménez state:

> In many cultural settings, gender has been one of the factors that have facilitated collective action. Women's participation increases the diversity of views and helps to address specific needs of different community members, which, in turn, strengthens collective decision-making and governance processes within the community organisations. (2013)

They reported that in Mongolian pastoral societies, which are based on livestock production systems, women display better trust-building among community members, while showing equal leadership and rangeland management abilities to those of their male counterparts. They recommended that women should be given increased leadership roles in their communities. Coppock et al., reporting on women's empowerment programs in Ethiopia and Kenya among pastoral societies, concluded:

> Men have typically dominated the discourse with development agencies, and women's voices have been muffled. Seeing what empowered pastoral women can do, however, alters this approach. If change agents make sure there are strong pastoral women at the table when projects are conceived and planned, this adds a vital new dimension that more broadly includes the welfare of entire households as well as prospects for diversified livelihoods. Women's empowerment should be a major focus of pastoral development because of the positive synergisms that women can create for their communities. (2013)

For changes in gender roles to occur in the Tibetan Plateau, the government should play a key role in addressing the social problems of women (Halbrendt et al. 2014). Due to the remoteness of the alpine areas, however, it is difficult for government and agencies to effectively influence the lives of women, while local governments have not been willing to be involved. Due to the high cost and sparse numbers of suitable and willing people, the government should recruit social organisations to undertake this capacity-building of women, while providing support to ensure effective implementation. In the alpine region, capacity-building should focus on the long-term interests, involving both women's work and education (Yang 2010, Molden et al. 2014).

Fully recognising and promoting the important role of women in ecosystem-management is an important pathway to strengthen the status of women in society. The government should better acknowledge this important role of women and should provide them with more support for mainstream activities in alpine ecosystems. Female roles should be given greater emphasis in government policy making and should be provided with more support for social development. Through technology and the media, the status of women should be promoted and men should be made fully aware of the important role of women in the ecosystem. Strengthening the education of women in alpine regions would enhance the self-image of women. In addition, proper education for women would make them more aware of the dangers of indoor pollution and would also improve and promote the sustainable management of ecosystems. Strengthening of education should reduce the marginalisation of women in the politics of the alpine region, but this requires a long-term commitment (Wang 2011).

Improvements in the medical infrastructure to reduce the high rate of female disease and mortality in alpine regions are fundamental in promoting and improving female health (Nan 1996). In alpine regions, in addition to improving medical facilities for women's health care, medical teams are needed with training and skills in women's health. In poor remote areas, mobile medical services should be developed which provide regular medical treatment. The mobile medical teams should pay special attention to women's health issues to improve the ability of women for self-awareness and self-treatment.

Improvements in the social status of women would result in greater participation in social and political decision-making, including ecosystem-management. Historical records show that Tibetan women occupied a dominant position in the management and governance of the alpine region in the past and were capable of making decisions (Wang 2011, Lokyitsang 2014). As well as participation at the village, township and county levels, participation by women in higher administrative organisations could direct policy. Women should be given more opportunities for involvement in social development, as well as policy making for ecological management. The important female role in carbon management should be given greater prominence in social administrative decision-making.

Addressing and protecting women's current and future needs and interests would improve the status of women in grassland ecosystems and livestock management. This should include mainstreaming current gender differences in livestock production and animal-dung management. Women should receive more credit for their roles in livestock production and animal-dung management. Such recognition could promote women's economic and social empowerment, particularly for vulnerable women or those living in highland areas. This empowerment could contribute significantly to meeting

commitments agreed in government conventions, as well as addressing development goals of women as social protection for women's labour and contributions (Agoramoorthy and Hsu 2012). Promoting carbon management based on gender could reduce vulnerability and increase opportunities of women, including providing for their families. This is particularly relevant in sub-alpine areas of the Tibetan plateau, such as Sunan County and Tianzhu County. Women in the alpine area have established the management of alpine carbon cycles and grasslands through their actions. Governments should better acknowledge the key role of women in maintaining grasslands through their sustainable landscape management and livestock husbandry systems.

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Impact of Enriching the Diet of Women and Children Through Health and Nutrition Education, Introduction of Homestead Gardens and Backyard Poultry in Rural India

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Abstract: The study addresses the issue of micronutrient deficiency in diets through health and nutrition education and introduction of homestead gardens and backyard poultry with high egg-yielding birds in a rural community. The target was the pregnant women and mothers with preschool children aged 6–24 months registered with the 11 Integrated Child Development Services (ICDS) centres called 'Anganwadi'in eight villages ofMedak district,inthe South Indian state of Andhra Pradesh (now Telangana). Knowledge, attitude and practice (KAP) surveys of health and nutrition on a sub-sample of 142 mothers with 6- to 24-month-old children done initially and at the end of three years showed marked improvement in mothers' knowledge and child-feeding practices. At the end of three years, 335 target families had raised vegetable gardens diverting 57.8 acres of land. The KAP survey responses showed that the percentage of families raising homestead gardens increased from 30 % initially to over 70 % finally. Weekly mean frequency of green leafy vegetables (GLV) cooked, increased from 1.9 to 2.4. The percentage of households cooking GLV more than three times per week increased from 21 in the initial survey to 45 in the final survey.Weekly frequency and quantity of eggs consumed, among households who set up BYP, more than doubled. ICDS records showed gradual decline in percentage of 6 to 24-month-old children suffering from moderate-to-severe malnutrition, over the three-year experimental period.

Keywords: Dietary micronutrient deficiency in India Homestead gardens Backyard poultry Health and nutrition education Integrated Child Development Services - Anganwadi Knowledge, attitude and practice survey Preschool children nutrition status

Abbreviations: AICRP: All India Coordinated Research Project; ASHA: Accredited Social Health Activist; BYP: Backyard poultry; GLV: Green leafy vegetables; ICDS: Integrated Child Development Services; KAP: Knowledge, attitude and practice; LBW: Low birth weight

Introduction

Surveys in India show that Indian diets, particularly those of pregnant and lactating women and preschool children, are qualitatively very deficient in micronutrients (vitamins and minerals) particularly iron, vitamin A, vitamin B2 and folic acid due to low intake of vegetables, fruits, legumes (pulses) and livestock-based foods [5]. In recent years, the problem of deficiency of vitamin D and B12 has also emerged. These vitamins are not found in plant foods, pointing to the importance of animal foods. The Integrated Child Development Services (ICDS) scheme in India addresses the dual issue of maternal and child nutrition and child development through supplementary feeding programmes and non-formal education for preschool children. Pregnant women and mothers of preschool children in rural and urban areas are invited to register at the ICDS centres called Anganwadi, at no cost. Supplementary food containing a mixture of cereals, pulse ('dal') and sometimes vegetables is given to

children over the age of 2 years during the day to eat it at the Anganwadi. Some states like the erstwhile Andhra Pradesh also give eggs once or twice a week. Take-home food is given for children under the age of 3 years and pregnant and lactating women. This is often shared by the family.

A programme of home gardens and backyard poultry coupled with nutrition education was implemented in Bangladesh, Cambodia, Nepal and the Philippines, by the Helen Keller International to increase access to micronutrient-rich foods in poor households particularly among women and children [3, 7, 8]. There was a quantum increase in the weekly consumption (frequency as well as quantity) of dark green leafy vegetables (GLV) and eggs consumed by mothers and preschool children [3]. KAP surveys showed improvement in mothers' knowledge of nutrition. Significant reduction in the prevalence of anaemia was seen in Bangladesh and Philippines [8]. Homestead farming has been reported to contribute significantly to food security and income in a developing economy like Nigeria. [6]. A 'Farming system model to leverage agriculture for nutritional outcomes' has been recently suggested by MS Swaminathan Research Foundation [2].

In the past several years, we have examined the feasibility of 'crop diversification from agriculture to nutritionally and environmentally promotive horticulture' by motivating small and marginal farmers from villages of Medak district in South Indian state of Andhra Pradesh (now Telangana), to divert small parts of their land from traditional water-guzzling crops like paddy and sugar cane to homestead (near home, or in farmers' fields) cultivation of micronutrient-rich vegetables and fruits using environmentally sustainable farming practices. Such diversification we explained would not only improve access to nutritious vegetables and fruits for home consumption, but also conserve groundwater—the major source of water for irrigation. Apart from transfer of farm-based technologies, the community was educated on issues of health and nutrition. Need for home consumption, particularly by women and children for nutrition and health, was stressed [1].

With some persuasion, many households did divert small patches of land (0.125–0.25 acres) to raising vegetables and fruit gardens. Though a family approach was used, male members of the family dominated and came for the training programmes. Household food consumption survey showed marked increase in the weekly consumption (frequency and quantity) of green leafy vegetables (GLV) in the end-line survey, done after 3 years compared to initial (baseline) survey. Consumption of other vegetables showed little change. However, in the nonparticipating households, there was marked decline in the consumption of vegetables over the 3-year project period, probably due to escalating market price of vegetables. Thus, it appears that homestead production at least protects the families from the inflation-induced increase in market price of vegetables [1].

In the same villages, backyard poultry (BYP), using high egg-yielding breeds, was introduced, by selling few birds to each household. One cock was given free by way of incentive. Egg is a very wholesome food rich in good quality protein and all vitamins and minerals, including vitamins A, B2, B12 and D. Families who raised poultry showed almost 40 % increase in the frequency as well as weekly consumption of eggs, suggesting BYP to be a promising intervention for household food security [4].

Nutritionally speaking, pregnant and lactating women and preschool children, particularly 6–24 months old, are among the most vulnerable groups. Since women have the primary responsibility of home keeping and child rearing, the present study was specifically targeted to pregnant women and mothers of 6- to 24-month-old children who had registered in ICDS centres. Homestead gardens of vegetables and fruits and backyard poultry (BYP) with high egg-yielding breeds were promoted. Health and nutrition education was important part of the study. For nutrition security, access to safe drinking water and disease-free environment besides balanced diet are necessary.

Methodology

Project Area

Eleven well-performing Anganwadi (ICDS Centres) operating in eight villages with population ranging from 1000 to 3000 (total population 12,000) were selected from two mandals (geographical area covering population of approximately 25,000) of Medak district of the South Indian State of Andhra Pradesh (now Telangana). All the households were below the poverty line and majority belonged to backward class communities (69 %) or schedule cast (15 %) or schedule tribes (17 %). All the villages had a primary school. Farming using bore well water was the major occupation. Paddy, sugar cane and maize were the major crops grown. Small quantities of red gram were grown by intercropping with maize. Some families raised vegetables in monsoon and winter.

Initial and End-Line Knowledge, Attitude and Practice (KAP) Surveys

All pregnant women and mothers with preschool children in the age group 6–24 months registered at the 11 Anganwadi were included in the study. A baseline KAP survey was conducted on a sub-sample of every alternate mother with preschool children aged 6–24 months (total of 142) to find out, information regarding educational level, occupation, type of house, presence of bathrooms and toilets, land holdings, cropping practices, etc. KAP information with regard to health and nutrition knowledge, infant-feeding practices, hygienic practices, knowledge of common communicable diseases, etc. was also elicited. A household food frequency diet survey was done to assess the impact on consumption of vegetables including GLV. Due to paucity of material and human resource, the KAP study had to be confined to a subsample of mothers of 6- to 24-month-old children. The age group—6–24 months—is regarded to be most vulnerable from nutrition point of view. An end-line KAP survey was repeated on 142 mothers with 6- to 24-month-old children to assess the improvement in knowledge and practices. Both the surveys were cross sectional.

The data were analysed for statistical significance using two-sample proportion Z test.

Introduction of Homestead Gardens

Seeds of vegetables like a variety of green leafy vegetables (GLV) (Amaranth—Amaranthus gangeticus; Ambat chuka—Rumex vesicarius; corrriander—Coriandrum sativum; fenugreek—Trigonella foemum graecum; 'gogu'— Hibiscus, cannabinus; spinach—spinacia aleracea);broad beans—Vicia faba; cluster beans—cyamopsis tetragonolova; French beans-phaseolus vulgaris; tomatoes— lycopersicon esculentum; ladies finger (okhra)—abelmoschus esculentus; and saplings of curry leaves—Murraya koenigii; drum stick—Moringa oleifera; Malabar spinach—Basella alba; and fruits like guava—Psidiunm cattleyanum; mango—Magnifera indica; papaya—Carica papaya; and lime—Citrus aurantifolia were distributed to families with a pregnant woman or 6- to 24-month-old children who were willing to raise homestead gardens. Fruit plants were selectively given only to families who had assured source of water and performed well, since grafted plants are expensive. GLV are a treasure trove of most micronutrients–vitamins and minerals. They are easy to grow and can be grown almost throughout the year. Other vegetables like beans, tomatoes and okra are also rich source of vitamin C and minerals. Beans are also rich in proteins. Papaya and mangoes are rich in b carotene (pro-vitamin A) and vitamin C and guava in vitamin C. Farmers grew vegetables like brinjal (egg plant) and gourds out of choice. Few households had one or two trees of plants like papaya, mangoes, guava, drumstick (Moringa) and curry leaves prior to intervention. Twenty-four women were taught to raise nurseries of plants like papaya, drumstick and Malabar spinach (Basella alba), by giving seeds and sachets. Each woman raised 50–100

saplings, and these were purchased from her at Rs 5/sapling. These served as planting material for distribution and women who raised them earned some money through supply of saplings.

Introduction of Backyard Poultry with High Egg-Yielding Breeds of Birds

High egg-yielding breeds of poultry like Rajasree developed by AICRP on Poultry, Hyderabad, and Rainbow rooster from Inbro Research and Breeding Farm, Hyderabad, were obtained. These breeds lay over 160 eggs per year compared to 30–40 eggs laid by country birds. Initially, 1-day-old chicks of Rajasree breed were purchased by an experienced local farmer, raised them to the age of 2.5 months and sold to the interested families in the project villages. Subsequently, older birds of Rainbow rooster purchased from Inbro Research and Breeding Farm were sold to the families. Each family purchased four female birds. One male bird was given free as incentive. Records of egg consumption by the family were maintained. Note books were given to 15 educated farmers to maintain records of the eggs produced daily. It was not possible to get this information reliably from all the farmers.

Health and Nutrition Education: Methodology

Centralised training at the Dangoria Charitable Trust, centre in village Narsapur, Medak district, and decentralised, hands-on training in the villages or in the 'anganwadi' centres using focus group discussions, slide and video shows and demonstrations were conducted. For centralised training, the women were given transportation charge and some food. Separate training programmes were held for the Anganwadi workers (ICDS teachers) and ASHA (Accredited Social Health Activists) workers from the same villages, to help them work in tandem, and with the community.

Besides transfer of farm technologies, cooking demonstrations showing preparation of recipes incorporating vegetables, particularly GLV, were held. Mothers came to these programmes with their infants and participated in infant and child feeding. Open-air slide and sound and video shows were conducted in the evenings in the villages. These were open for all. Health and nutrition education/communication to the community in general and mothers and pregnant women in particular were important part of the project. Based on identification of knowledge gaps in the initial KAP survey, educational pamphlets, in the local language Telugu, were prepared and distributed. Fortunately, there has been remarkable improvement in literacy among women from earlier observed less than 20–69 % in the present project. This helped communication. Even illiterate women took the pamphlets home where there was someone who could read and explain.

Assessment of Impact on Child Nutrition

Impact on the incidence of low birth weight (LBW) was assessed from the records of birth weight in the 'Mother and child protection card' given to each mother registered at the ICDS centre. Since the study was primarily targeted to mothers with preschool children besides pregnant women registered at the ICDS centres, impact on growth of 6- to 24-month-old children was assessed from the growth charts (weight for age) maintained by the Anganwadi teacher for each child. This was felt to be an independent and investigator bias-free approach. Auto-regressive integrated moving average (ARIMA) model was used to test the significance of change over time. Assessment of micronutrient status could not be done due to limitation of human and financial resource.

Results

Land Holding

Among the 142 households of mothers with 6- to 24-month-old children surveyed (KAP survey), 18.31 and 11.97 per cent households were landless in the initial and final surveys, respectively. The rest had own or leased land. The mean and range of land among the land-holding families was 1.73 acres (range 0.125–15 acres) initial survey and 1.79 acres (range 0.25–20 acres) final survey. Land-holding families also worked as wage labourers. Only 6 % families were artisans and 2.8 % employed in service (initial survey data). There are no major handicrafts in these villages. About 29 % women were housewives at the time of survey, but all women went to work once the child was grown.

Acceptance of Farm Technologies

Homestead Gardens

Overall at the village level, at the end of 3 years, 335 families with either a pregnant woman or 6- to 24-monthold children had raised vegetable gardens diverting 57.85 acres of land from traditional crops, while initially only 30 % mothers in the KAP survey reported having homestead gardens; after 3 years of intervention, more than 70 % respondents (142 women with 6- to 24-month-old children) had started raising vegetables and fruit gardens.

Backyard Poultry

Almost 25 % families had country poultry with nondescript birds. Initially, only few families had poultry with high egg-yielding birds. At the end of 3 years of project, 150 households with preschool children had established poultry units with high egg-yielding birds with proper night shelters made of wood, or brick and cement. Records of egg production maintained by the fifteen educated farmers who were given a note book to record daily production of eggs showed that on an average these birds laid 14–15 eggs per month. Maximum egg-laying period is 52 weeks. Some birds were lost due to predation (despite night shelters) or disease or slaughtered. Reliable records of these losses or total number of eggs produced could not be maintained. Some farmers sold the fertilised eggs (since a cock was also given) at Rs. 5 each for hatching and also hatched some eggs themselves. However, since the free-roaming female birds were not protected from the local male birds, purity of the breed cannot be maintained and a mechanism has to be developed to ensure continuous supply of fresh stock of female birds or protection from nondescript male birds.

Results of KAP Survey

Mothers' Knowledge, Attitude and Practice (KAP) Regarding Health and Nutrition

The initial KAP survey of mothers with 6- to 24-month-old children revealed some existing positive trends like at least three antenatal check-ups for almost all pregnant women, good immunisation coverage for infants, regular consumption of iron–folic acid tablets by pregnant women, early (day 1) initiation of breast feeding, and recording of birth weight. However, knowledge gaps and wrong-feeding practices such as food taboos during pregnancy, late introduction of complementary feeding, poor understanding of a balanced diet and child-feeding practices, and poor intake of protective foods existed. With education of the mothers during the project period, the end-line KAP survey showed considerable improvement in several indicators. Thus, while in the initial survey, only 38 % mothers reported initiating breast feeding within 1 h after birth as per WHO guidelines; in the final survey, the number

increased to 87 %. There was a significant improvement in the percentage of mothers who did exclusive breast feeding for 6 months and reduction in introducing pre-lacteal foods (Table 1). There was a significant improvement in knowledge and practices like a pregnant woman should eat more food, initiation of complementary feeding by age 7 months, frequency of complementary feeding (Table 1), and components of a balanced diet.

However, some beliefs like avoidance of papaya during pregnancy are hard to change.

All mothers reported cooking vegetables, GLV and dal (soup made from a pulse), at least once a week and majority twice or thrice. There was a significant increase in the mean frequency of cooking GLV as well as percentage of mothers who cooked GLV three times or more (Table 1). Surprisingly, there was decline in the frequency of cooking other vegetables. Despite stressing the importance of consuming home-grown vegetables at home, particularly by women and children, over 25–50 % families sold home-grown vegetables. In resource-poor families, income takes priority over reasoning of nutrition and health.

In general, most families consume little milk daily in tea, which children also drink. Meat is cooked once a week on Sundays.

More than 70 % mothers said they gave vegetables including GLV and 'dal' to their child when cooked with some increase in the percentage of this practice in the endline survey.

Table 1 Knowledge, attitude and practice of food consumption practices, food taboos during pregnancy and infant-feeding practices in mothers with 6- to 24-month-old children

Parameter	Initial % respondents	Final % respondents
Number of respondents	142	142
More food should be consumed during pregnancy	18	64***
Papaya avoided during pregnancy	88	76**
Banana avoided during pregnancy	75	35**
Discard excess water from rice after cooking	89	30**
Pre-lacteals given	29	1.41***
Complementary food started at 7 months of age	16	68***
Frequency of complementary feeding >3 times	43	64***
Mean frequency of cooking vegetables per week	3.1 ± 0.64	2.48 ± 0.50***
Frequency of cooking vegetables two times per week	10	52***
Frequency of cooking vegetables three times or more	88	48***
Mean frequency of cooking GLV per week	1.9 ± 0.73	2.39 ± 0.594***
Frequency of cooking GLV two times per week	49	49
Frequency of cooking GLV three times or more	21	45***

** $P < 0.001$; *** $P < 0.0001$, by two-sample proportion Z test

Consumption of Eggs by Families Who Set Up BYP

Table 2 shows that both the frequency and the weekly consumption of eggs showed marked increase in families who set up BYP. This suggests that this is a promising intervention for improving household food security.

Knowledge of Balanced Diet

When asked about the components of a balanced diet, almost all the mothers mentioned rice and vegetables including GLV in both the surveys. Also over 80 % mothers mentioned animal foods like eggs and meat initially and the number went up to over 95 % in the final survey. Initially, less than 50 % mothers mentioned foods such as 'roti' (dry salty pancakes made with wheat or millets), 'dal', fruits and milk. The percentage went up to over 90 % in the final survey. It was interesting to note that more mothers mentioned meat and eggs than 'dal' or 'roti' or milk in the initial survey.

Sanitation and Hygienic Practices

As mentioned earlier, safe drinking water and clean environment are very essential for nutrition security. In the KAP survey, 90 % mothers reported getting water from bore wells in the village or farms. Few families also got bottled water from reverse osmosis (RO) plants which are coming up in villages. Thus, in the villages surveyed, access to safe drinking water was there. However, problem area in sanitation is lack of bathrooms and toilets.

While 39 and 31 % households reported having bathrooms and toilets, respectively, in the initial survey, the number went up to little over 40 % in the final survey, suggesting that these are not perceived as priorities.

While all mothers said they washed hands before feeding the child, only 44 % washed hands with soap. That percentage went up to 94 % in the final survey. Not using soap to wash hands is a common observation which needs to be emphasised during education.

Table 2 Impact of backyard poultry with high egg-yielding breeds on weekly frequency and quantity of eggs consumption

Year	No. of units/initial and final survey		Consumption (g) per capita per week		Frequency per week	
			Mean	SD±	Mean	SD±
First year 2011–2012	38	Initial May 2012	2.22	1.202	2.32	0.739
		Final May 2013	3.27***	0.963	3.21***	0.905
Second year 2012–2013	60	Initial March 2013	1.79	0.668	1.78	0.666
		Final April 2014	4.88***	1.509	4.72***	0.940
Third year 2013–2014	52	Initial October, 2013	1.82	0.598	2.44	0.608
		Final May, 2014	4.16***	0.985	4.35***	0.617

*** $P < 0.001$, Asymp. Sig. (two-tailed) based on negative ranks, using Wilcoxon signed-rank test

Knowledge of Cause and Management of Infectious Diseases

Except malaria where many women could name mosquitoes as causative agent, the understanding of the cause of common diseases like diarrhoea, typhoid, jaundice and tuberculosis was very poor. This was surprising since many women had studied beyond primary school. The knowledge of causes of diseases showed significant improvement in the end-line survey. It was interesting to find that even while the women did not know the cause of diarrhoea, 93 % mentioned ORS for treatment of diarrhoea.

Salt sugar solution, 'sabudana' (sago) and 'gulab jamun' (an Indian sweet) were also mentioned for treatment. In the final survey, 'dal 'water was also mentioned.

Impact on Child Nutrition

Mean birth weight at the end of the first, second and third year as obtained from the records was 2.78 ± 0.374, 2.73 ± 0.438 and 2.81 ± 0.483, suggesting no change. Though only 9–12 % infants were born with low birth weight (\2.5 kg), 21–33 % had birth weight of exactly 2.5 kg suggesting at-risk status.

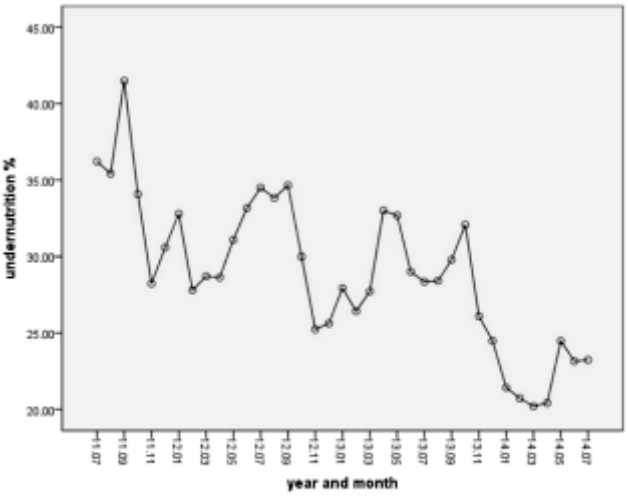

Fig. 1 Decline in moderate-to-severe nutrition deficiency as determined by the weight for age among the 6- to 24-month-old children, based on ICDS data, during the period of this study, July 2011–July 2014

The growth chart (Fig. 1) shows data (weight for age) for all the 6- to 24-month-old children registered at the 'Anganwadi' centre from July 2011 (when the project was started) to July 2014 as obtained from the ICDS records. There was a significant reduction in the degree of moderate-to-severe malnutrition, over the 3-year period (P\01-Lung Bopx test, ARIMA Model). The incidence of moderate-to-severe malnutrition varied from 41.5 % in September of 2011 to 20.2 % in March 2013. Figure 1 also shows seasonal effects on child nutrition. There was a trend of higher degree of moderate-to-severe malnutrition during the summer and monsoon months than during winter. This is a common observation due to greater morbidity during monsoon and relative scarcity of food, particularly vegetables during summer and early monsoon. Availability of foods, particularly vegetables, is best during winter.

Discussion

For nutrition security, there has to be awareness and access at affordable cost to age and physiological status-appropriate balanced diet, safe drinking water, disease-free environment and healthcare outreach. This would ensure the 4th A—absorption. Therefore, in this project, impact of multiple interventions combining education in health and nutrition with introduction of farm technologies like homestead gardens and BYP with high egg-yielding breeds was studied. The scope of education in this project was wider and included issues related to sanitation and health besides foods and nutrition. Improvement in mothers' knowledge and hopefully practice was remarkable stressing the importance of combining social engineering through education/communication to promote behavioural change with scientific and technological interventions. An informed mother is equipped to make wise choices, despite financial constraints. Despite stressing the importance of consuming home-grown vegetables at home, particularly by women and children, 50 % of the families sold 25–50 % of the vegetables grown in homestead gardens for economic reasons. This suggests that for nutrition security, ensuring livelihood and income are important.

Significant increase in the frequency of consumption of GLV, in the end-line survey compared to the initial survey, is a positive trend (Table 1). To some extent, consumption of other vegetables was replaced by GLV, perhaps because it was more attractive to sell the other vegetables in the market where the prices of vegetables were high.

Apart from homestead gardens and BYP, effort was also made to introduce millets like finger millet (ragi) and ironfortified pearl millet (bajra) and motivate the families to grow more pulses. Orange-flesh sweet potato rich in b carotene was tested in few places. More effort to promote biofortified crops is needed. Organic methods of farming such as vermicomposting and use of botanical pesticides (decoction of chilli–garlic or neem seeds—Azadirachta indica) were also taught. More effort is also needed to promote judicious use of organic methods of farming which would protect environment and save money. Vermicompost units were set up by only 25 families.

Backyard poultry needs little investment in terms of money, space or feed (since these birds forage). Remarkable increase in egg consumption following setting up of small backyard poultry with high egg-yielding breeds suggests this to be a promising intervention. Few eggs that are produced are consumed at home, rather than sold, though some families did sell the eggs for hatching. Promising as this approach is to increase access to eggs—a highly nutritious food; its sustainability will depend on easy access to the good breeds of birds to replenish the old stock. Establishment of local poultry farms for breeding and supply of female birds would help. Alternately, all nondescript male birds should be removed from the village.

Since the target was women registered at the ICDS centres, impact on growth of 6- to 24-month-old children (the most vulnerable group) was studied from the growth charts maintained in ICDS centres. This would be an independent assessment, free of investigator bias. Improvement seen over the 3-year period is encouraging. It may be attributed to the education of the mothers since not all the families with 6- to 24-month-old children had set up gardens or poultry. The selected Anganwadi were well managed with motivated AW workers, who followed the schedule of weighing the children and took active interest in the project.

Champions of 'Food-based rather than Pharmacy-based' approach (to quote the eminent nutrition scientist Dr. C. Gopalan) for food and nutrition security look forward to learn from studies of this nature, though limited in scope. This has been the recent focus of FAO as well. The authors look forward to learn from a large study taken up in two states of India, by the MS Swaminathan Research Foundation, Chennai, to test a 'Farming System Model to Leverage Agriculture for Nutrition Security' mentioned earlier [2]. Even while food-based approach is important and empowering, for some nutrition deficiency disorders like iron-de- ficiency anaemia, pharmaceutical supplementation of vulnerable groups is necessary. Food fortification offers an important and effective method for combating micronutrient deficiencies. The success of iodised salt to combat iodine deficiency disease in India is a case in point. Double-fortified salt (iron fortified, iodised salt) has been developed in the country. Its efficacy has been shown. This salt needs to be promoted in a bigger way. Nutritionists differ on the continuation of massive dose vitamin A supplementation programme for preschool children. There is ample b-carotene in nature, and all effort should be made to promote food-based approach to combat vitamin A deficiency. However, this is a long-term strategy. In the mean time, vitamin A supplementation programme should continue since the current dietary intake of vitamin A and its precursors is very low [5]. Recently, Thompson and Amroso [9] have compiled experiences with respect to food-based approaches for combating and controlling micronutrient deficiencies. It brings out the benefits as well as limitations of such efforts.

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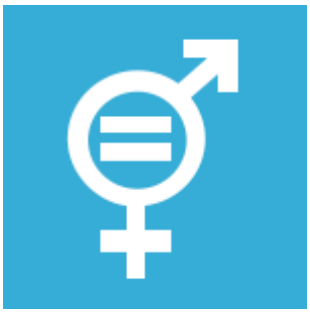
Annex 5 – Bibhu Santosh Behera, Ouat Bhubaneswar, Odishar, India

A research note on "A Gender Comparative Study on Communication System among the Farmers and Farm Women in Keonjhar District of Odisha"



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Major Stake Holder of MGCY-UNEP-10YFP-SCP(Asia and Alternate Focal Point)

Chairman,State Anticorruption Cell,AIASA-Odisha Cabinet

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Presently working as Principal,Green College,Livingfarms,Muniguda,Rayagada

Submitted To

FAO-UN,FAO GFFSN for further Research and social Devt.

INDEX

1. Introduction
2. Review of Literature
3. Theoretical Framework
4. Research Methodology
5. Presentation of data regarding gender
6. Result and Discussions
7. Case Study
8. Conclusion
9. Appendix
10. Bibliography
11. Some Models

ANNEXURE-A, B,C

Date Of Submission:-14th July 2016

Preface

Before Conducting this Research an idea came to the mind and this was being refined and accessed through the Chairman and Advisory Committee members. The Problem was selected purposively with some valid reasons. As Gender is the thrust area of Research, a new burning Concept so selected as Quantitative Research by blending with Communication System which is an emerging concept for Qualitative mode of research.Here Comparative study was being conducted for achieving the real meaning of Sustainable Development Goal as per the paraphonia of UNEP.Finally the suitable suggestions and policy document will be Submitted for Future Research and Development of Farmers and Farm Women in the Sample area of Research

Advisory Committee For research

Chairman:-Dr.Bibhuti Prasad Mohapatra

Members:-Dr.Bibudha Parasar,Prof and Head Dept.of Extension Education

Dr.R.K.Mishra,Associate Professor,Dept.of Agriculture Economics

Dr.A.K.Parida,Professor and Head,Dept.of Agriculture Statistics

Research Topic

"A Gender Comparative Study on Communication System among the Farmers and Farm Women In Keonjhar District Of Odisha"

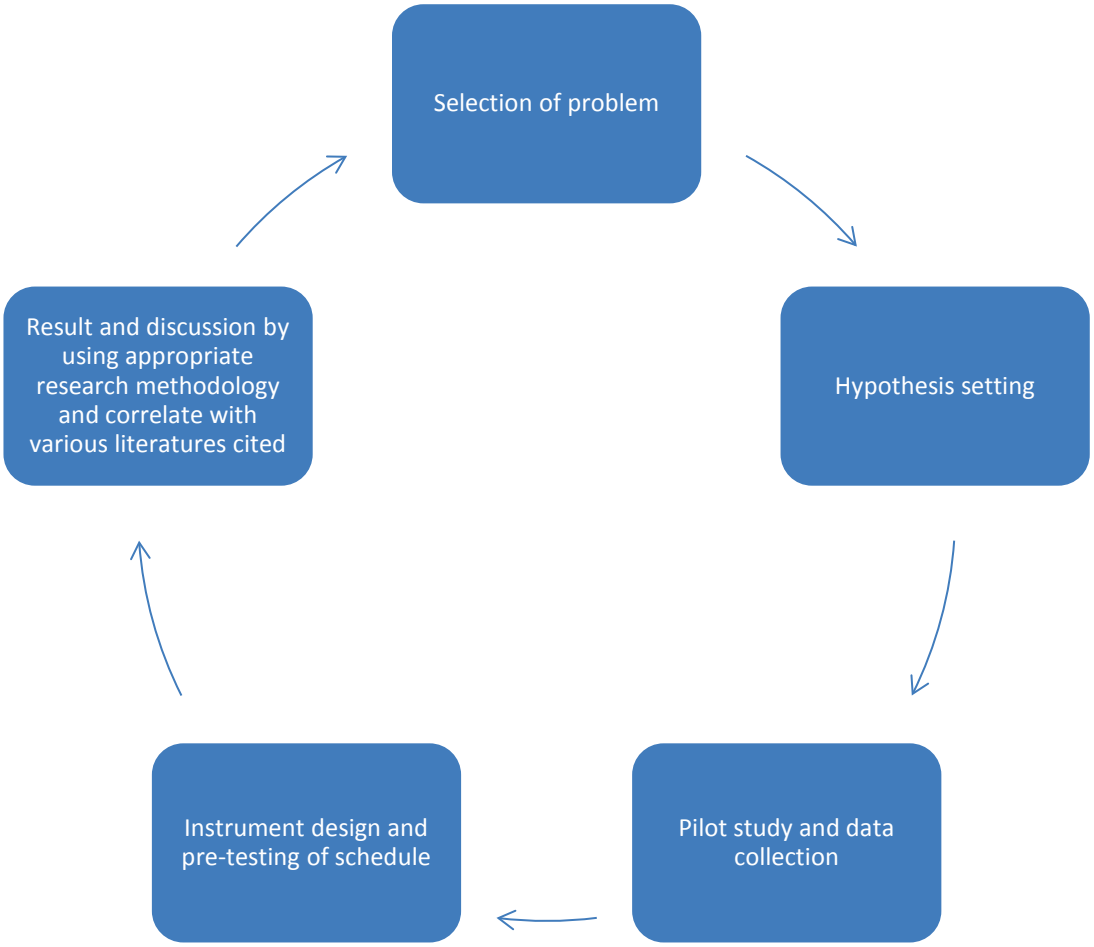
Chapter-1 Introduction

Gender Play a Vital role in the Society .In the era of Research, now-a-days every country and also whole world follow the thumb rule of Gender Studies. As Gender may be classified 3 types such as 1.Male 2.Female and 3.Transgender, so we can make gender comparative studies in every aspects like Gender in various field of studies. Here I have taken the above research problem entitled as "A Gender Comparative Study on Communication System among the farmers and farm women in Keonjhar Dist. Of Odisha" as I have a special interest to take a lucrative research based on Gender which is the current demand in every sector. The current communication system is mandatory for Gender and farmers to empower them and uplift in a developmental action hence be justified. According to UNEP, Gender studies should be introduced in Education Systems along with climate and environmental programs. To maintain Gender stability through gender equity and gender main streaming Gender study is important. In the era of pluralistic extension our extension communication system must be developed for Gender as Gender is the main client of any type of study and research. Here my research work will be conducted in Keonjhar Dist. Of Odisha , which is a big platform to conduct quantitative and qualitative research by taking various clients like Gender, Farmer and Tribal's along with the communication and extension system existing in this Dist. to bridge the gap among all clients.

Objectives of the Study

1. Analysis of socio-economic situation of the farmers and farm women of the sample area.

2. Identification and gender wise comparison of the sources of information among the respondents and their nature of influence.
3. Analysis of communication of the farmers and farm women with the extension methods and materials.
4. To identify the extent of contact of the farmers and farm women with community organizations and institutions.
5. To correlate the socio economic parameters of the respondents with the extent of contact with



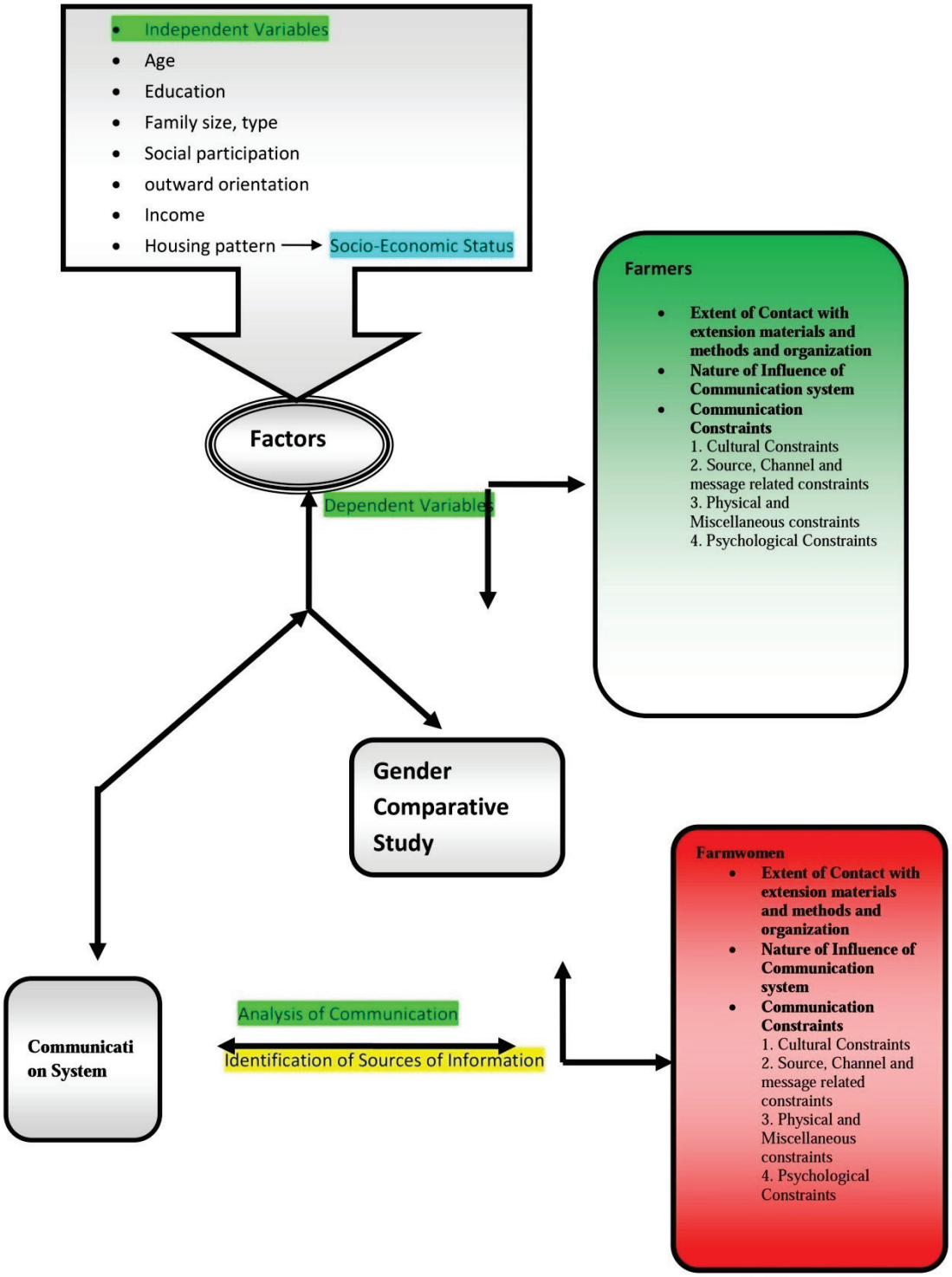
institutions and extension methods.

6. To list out the communication constraints with the farmers and farm women of the sample area.

RESEARCH MATRIX

CONCEPTUAL FRAMEWORK

Figure 1: Conceptual Framework of Gender Comparative Study on Communication System



Chapter-2 Theoretical Framework

Information System:

An information system is a collection of message that transforms data into knowledge and methods desired by and useful for individual and group users in organizations and other entities.

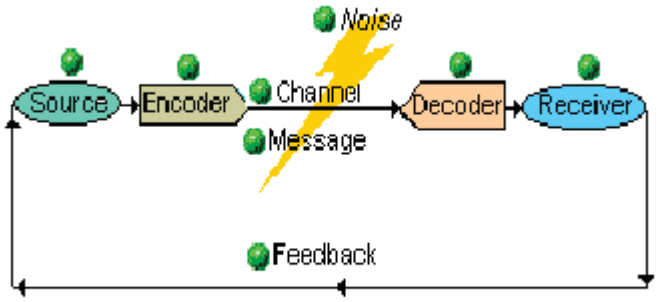
Communication:

Leagens says, "it is a process by which two or more people exchange ideas, facts, feelings or impressions in ways that each gains a common understanding of the message. In essence it is the act of getting a sender and a receiver tuned together for a particular message or series of message

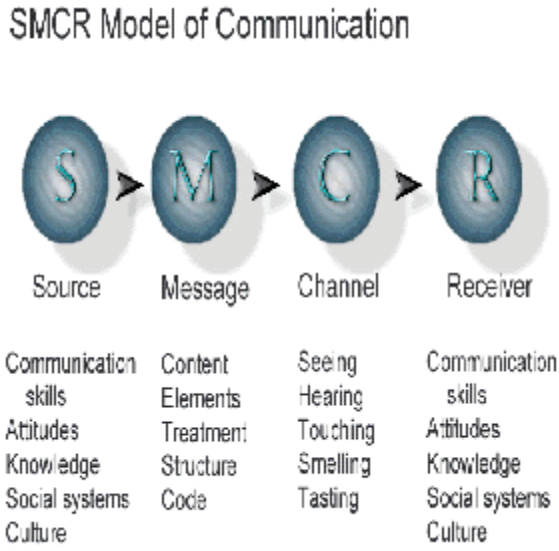
Importance of communication:

Paul Leganes has very rightly said that, for development of any nation, three things are necessary, (i) investigation, (ii) interpretation and (iii) administration. Our country India is self-sufficient in investigations i.e. improved technology. Also administration is not posing any problem. But only due to lack of proper interpretation we failed to achieve significant success as compared to developed countries. Interpretation is nothing but communication.

Models of Communication



The Shannon-Weaver Model



- **Farmer:** A hard working individual whom may be male or female. Provides food for everyone. They work 24hours a day normally from a very young age. A dangerous and selfless occupation to which all should be thankful.
- **Farmwomen:** In rural India, the percentage of women who depend on agriculture for their livelihood is as high as 84%. Women make up about 33% of cultivators and about 47% percent of agricultural labourers
- **CommunicationSystem**
  A system or facility for transferring data between persons and equipment. The system usually consists of a collection of individual communication networks transmission systems, relay stations, tributary stations and terminal equipment capable of interconnection and interoperation so as to form an integrated whole. These individual components must serve a common purpose, be technically compatible, employ common procedures, respond to some form of control and generally operate in unison.

["Communications Standard Dictionary", 2nd Edition, Martin H. Weik]. (1995-02-06)

- **Comparative Study**. The **comparative** method is often used in the early stages of the development of a branch of science. It can help the researcher to ascend from the initial level of exploratory case **studies** to a more advanced level of general theoretical models, invariances, such as causality or evolution.
- **Communication Constraints**:-Communication constraints are nothing but the barriers and draw back in Communication Channel.Ex:-SemanticBarrier,MirageDistoration,Fog Distoration,Technical Jargons,In adequate Message.

Chapter-3 Review of Literature

Reviews on Gender

Advisory Services (NAADS) and NARO (NARO, 2000) in their plans have recognized the need for addressing gender concerns in all their activities. The paramount driving force is the desire to increase relevance, efficiency and effectiveness in addressing the needs and objectives of all stakeholders (Opio, 2003).

Yaqoob e*t al*. (2009) in their study on the "Gender Equity in Agriculture" found that the maximum participation of rural women in different sub-sectors of agriculture but further analysis reflected clear cut discrimination in land ownership, tenure, access to inputs, trainings, and credit facility. The finding of research study highlighted the immediate attention of Government, policy makers and law and order authorities to have a glance over such discrimination and reframe their rules and regulation, and mode of implementation.

Reviews on Communication system

Demiryurek (2000) also used agricultural information system theory to analyse the current information systems used by organic and non-organic hazelnut producers and found that the information systems for the two groups of farmers were largely separate. The conversion to organic production clearly demanded changes in the information system to allow producers to acquire the appropriate new knowledge and skills. The organic producers had used more information sources more frequently and more actively than non-organic producers.

Naidoo & Rolls (2000) also investigated agricultural information use by small-scale cattle farmers in Mauritius and found that the farmers managed information as a production resource. The personal characteristics and cattle husbandry practices of the farmers were major influences on their management of information. The practices were mainly learnt from family elders. Extension advice was only partly remembered, or rejected as the information from this source was sometimes not useful.

SOCIO-ECONOMIC CHARACTERISTIC OF FARMERS AND FARM WOMEN

Chavan et al (2010) state that the personal and socio-economic characteristics of the televiewing farmers namely, size of land holding, extension contacts, mass media exposure are significantly correlated with the perceived effectiveness of agricultural programmes.

Okwu and Umoru (2009) have taken a sample size of 70 women farmers for the study but only data for 65 respondents have been analyzed.

The result reveals that 35.4% of the respondents have had no formal education, 40% primary/adult education, 18.5% secondary education and 6.2% tertiary education. About 29% of the respondents are within the high income bracket while 46.2 and 24.6% are in the average and low income brackets respectively. The farm size distribution of the respondents shows that 36.9 and 40% of the respondents have large and medium size farms, respectively, while 23.1% have small farm size.

Azadeh N. Noorivandi (2009) have studied that majority of respondents are male (90%). Approximately 27.4% of respondents are between 31 to 40 years of age. Farmers have been asked to report their highest level of education, approximately 37% of farmers have had elementary education and 7.99% high school and post high school education.

Waman et al (2008) have attempted to assess the scientific orientation of respondent farmers to study the socio-economic status and also to study the agro-technological status of the respondent farmers. The finding of the study reveals that more than three-fourth proportion of respondents are mediocre in their scientific orientation and a majority of them have medium socio-economic status. The information about agro technological status of the respondent farmers indicates that the adoptions of some selected technologies are observed to be less.

Yeshwanth Kumar Naik (2008) has reported that nearly half (48.00%) of groundnut FFS participants belong to young age category, followed by 'old' (30.00%) and 'middle age' (22.00%), respectively. Education wise one fourth number of groundnut FFS participants (26%) have 'middle school', 24% 'high school' education and primary school, whereas,

12.00 per cent respondents are illiterate. Farming experience wise half (52.00%) of the groundnut FFS participants have 'medium' farming

2.2:- Identification and gender wise comparison of the sources of information among the respondents and their nature of influence

Sangha and Gupta (1995) reported that Television was considered as the most credible sources of information for agriculture by the rural T.V. viewers followed by Agricultural university, Radio, Block extension staff & relatives friends neighbours.

Popat and Salvaliya (1999) reported that more than half (53 percent) of the small and marginal farmers were the most regular in attending the meetings of V.L.Ws. They also revealed that majority (61 percent) of the small and marginal farmers .sometimes got satisfactory answers from the V.L.Ws. as 42 percent of them felt it necessary to discuss with somebody else for better understanding of the messages. Gupta (1999) revealed that majority of the small and marginal farmers sought information regarding modern, agricultural extension officers.

2.3:- Analysis of Communication of the farmers and farm women with the Extension methods and materials

Joshi and Vekaria (1996) reported that 55 percent of farmers passed on information to fellow farmers about improved agricultural technology.

Sonlanki and Kadam (1998) concluded that farmers consult different information sources before deciding whether to adopt or not any innovation. Farmers attach varying degree of credibility to different information. Because of close intimate and face to face contacts with the agriculture assistant

farmers, V.E.W and Agricultural Extension Officers, the farmers under study might have believed in them to the maximum extent. Demonstration had received less credibility from the farmers under study in getting the information about agricultural developmental activities.

Communication Constraints

A major problem in extension projects dealing with the poorest farmers in developing nations is the communication constraint (Ascroft, 1971; Roling et al., 1976).

The fault, according to this author, may reside within the extension process rather than the receivers, particularly with the capacities of agents/agencies to communicate adequately and systematically with project recipients, especially the small-scale farmers. The problem this author addresses is not diffusion in general, but rather the special case presented by the poorest farmers. In fact, many attempts at diffusion of innovations have enjoyed moderate success. Forexample, innovations such as the miracle rice, hybrid maize and wheat have diffused quite widely in many developing nations. Countries such as India and China which were once food importers have now become exporters. So, the problem discussed in this paper deals explicitly with the poorest sub-group of farmers, who apparently, constitute a fairly large proportion in developing nations

Limited Concept of Knowledge

In the correlational analyses of diffusion studies, the farmer variables were associated with a rather limited concept of knowledge of new practices with no measurement of the shallow depth of such knowledge or their conditional association with adoption. Shingiand Mody caution that, 'the long-range competence of farmers to evaluate and adopt (or reject) future innovations is not directly facilitated by mere awareness of a great number of innovations... In our opinion, the innovation- decision process is considered to be initiated not when the individual is merely exposed to information on the innovation but when he gains some understanding of how it functions" (Shingi and Mody, 1976:95).

Chapter-4 RESEARCH METHODOLOGY

Selection of problems

Selection, delineation and conceptualization of the research problem are the most important consideration in behavioral research. Good investigation gives priority on the formation of clear, realistic and unambiguous problem. Therefore delineation of problem is more important and essential than finding out solutions.

Therefore the present situation calls for an analysis of facts for the affinity of the farmers and farm women towards communication system as it is one of the leading Districts in Agriculture activities and also 8th position in population.. Hence the research study entitled "A Gender Comparative Study on Communication System among the Farmers and Farm Women in Keonjhar District of Odisha" has been selected for the purpose of investigation.

Research Design

The present research project was formulated on the basis of ex-post facto. Accordingly, specific objects were set to provide the basis of inquiry. In the light of objectives, the scope of study was oriented and

due techniques of investigation were followed; tools used and pattern of statistical analysis decided. Then the study was outlined from observation levels up to interpretation of observation, giving correct operational definitions of concept used. The study was then carried out in the light of objectives set and within the frame work of selected outlines.

Plan of work:

The researcher has made all attempts to make a detail survey of all related aspects of the study before actual investigation. A good number of interaction sessions were organized through seminars, focused group discussion workshops, meetings at the institutional level as well visit to the proposal areas of investigation in the depth discussion with the farmers and field level functionaries. In spite of time constraints as being a part course curriculum, all adequate attention was made to make the study as realistic as possible

Sampling Technique

The following sampling procedure was followed for the sampling in this Research Study.

1. *Selection of the District*

The purposive sampling procedure has been followed for selection of Sample District. The State of Odisha is comprised of 30 Districts. Out of which Keonjhar District. Was selected for study purposively as the Researcher belongs to the Sample District. And it will help in collection of Data Properly. As per 2011 Census Kendujhar is the 4th district in terms of size and 8th in terms of population. In terms of population per Sq. Km Kendujhar is 18th densely populated district in the state. Kendujhar has 12th rank in terms of sex ratio in the state.

2. *Selection of the Blocks*

DISTRICT	NAME OF THE BLOCK	NAME OF THE GRAMPANCHAYAT	NAME OF THE VILLAGE	TOTAL MALE FARMER POPULATION(P1)	SAMPLE MALE FARMERS(S1)	TOTAL FEMALE FARMER POPULATION(P2)	SAMPLE FEMALE FARMERS(S2)
KEONJHAR	PATANA	TURUMUNGA	TURUMUNGA	264	44	121	28
		RAJANAGAR	RAJANAGAR	166	27	134	31
	CHAMPUA	JAJAPOSI	JAJAPOSI	163	26	145	34

		BHANDA	NANDAPUR	141	23	112	27
			TOTAL	**743**	**120**	**512**	**120**

The Keonjhar District is Comprised of 13 Blocks, out of which 2 Blocks namely Patana and Champua were selected at Random for the Study.

3. *Selection of Grampanchayats*

The Block Patana is Composed of 20 Panchayats, out of which Turumunga and Rajanagar G.P. are selected at Random.Simillarly; the Champua Block is composed of 23 Gramapanchayats out of which Jajaposi and Bhanda G.P. were selected at Random.

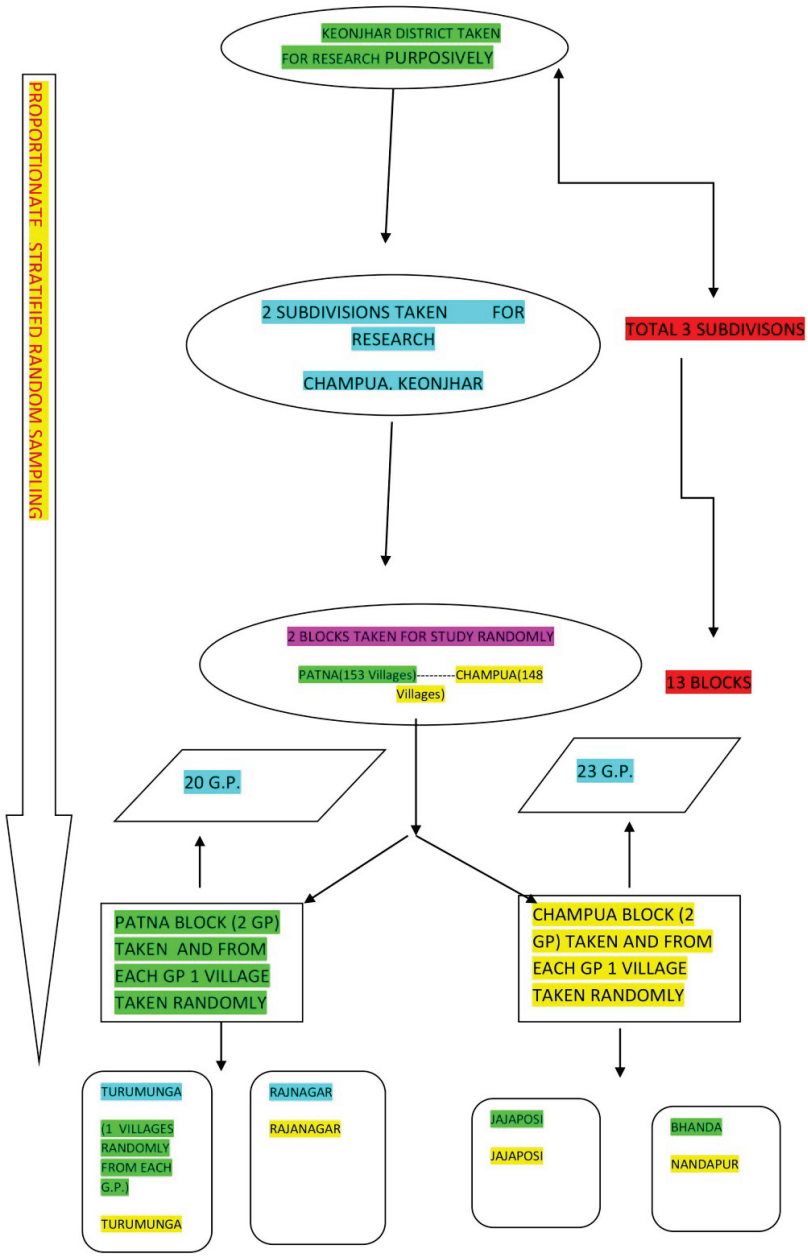
4. *Selection of Villages*

From Turumunga Grampanchayat Turumunga and From Rajanagar Gram Panchayat Rajanagar were selected at random. Simillarly, from Jajaposi Grampanchayat Jajaposi and from Bhanda Grampanchayat Nandapur villages were selected at random. All total of 4 villages were selected at Random.

5. *Selection of Sample respondents*

From each selected villages the total no. List of farmers and farm women was prepared; out of which the farmers and farm women sample was drawn through Proportionate Random Sampling.

Table 4.1 Sampling Design



LOCALE AND SETTING

The purposive sampling procedure has been followed for selection of Sample District. The State of Odisha is comprised of 30 Districts. Out of which Keonjhar District. Was selected for study purposively as the Researcher belongs to the Sample District. And it will help in collection of Data Properly. As per 2011 Census Kendujhar is the 4th district in terms of size and 8th in terms of population. In terms of population per Sq. Km Kendujhar is 18th densely populated district in the state. Kendujhar has 12th rank in terms of sex ratio in the state.

Situation of District

The KeonjharDistrict emerged as one of the District on 1st January, 1948. The District is bounded by Mayurbhanj District and Bhadrak District to the east, Jajpur District to the south, Dhenkanal District and Sundargarh District to the west and West Singhbhum district of Jharkhand State to the north. Covering a geographical area of 8240 sq kms, the Keonjhar District lies between 21^0 1' N to 22^0 10' N latitude and 85^0 11' E to 86^0 22' E longitudude.

Basic Information of Keonjhar District

Agro climatic Zone: North Central plateau & North Central coastal Plain.

Land Utilization Pattern(Figure in Ha)

Geographical area:-831000

Cultivable area:-297873(36% of Geographic area)

a) High land:-158653(53.3% of cultivable area)

b) Medium land:-99832(33.5% of cultivable area)

c) Low land:-40336(13.2% cultivable area)

Irrigation Potential

a) Kharif:-81653

b) Rabi:-31327

Cropped area

a) Single cropped area:-2959409

b) Double cropped area:-6504

c) Triple Cropped area:-278

ORISSA MAP FIG-1

FIG-2 KEONJHAR DIST .MAP

Administrative Setup

The Collector and district Magistrate is the administrative head of the district. For smooth running of administration, he is assisted by the Additional District Magistrates, Deputy Collecters, Sub-Collecters, Block Development Officers, Tahasildars and other officers. Within the district there are also district level officers of other departments. Collector as the head of administration of the district, he exercises general supervision.

The district consists of three subdivisions namely Kendujhar, Anandapur and Champua and each subdivision is under the administrative control of a sub collector. For smooth running of revenue administration the district is divided into 13 tahasils viz. Telkoi, Barbil, Champua,Patna,Kendujhar, Ghatgaon, Anandapur, Hatadihi, Jhumpura, Banspal, Saharapada, Harichandanpur and Ghasipura. Each tahasil is in charge of a Tahasildar. Similarly in order to look after the developmental activities the district is divided into 13 CD blocks and each Block is kept under the administrative control of a Block Development Officer. The list of CD Blocks with number of Gram Panchayats and villages are given below.

Sl No	Name of CD Block	No. of Gram Panchayats	No. of villages
1	Joda	15	120
2	Champua	23	150
3	Jhumpura	22	153
4	Banspal	21	164
5	Telkoi	22	149
6	Harichandanpur	25	219
7	KendujharSadar (Kendujhar)	24	225
8	Ghatgaon	26	142
9	Patna	20	153
10	Saharapada	20	139
11	Anandapur	16	127
12	Ghasipura	22	164
13	Hatadihi	31	223
	Total	287	2128*

*Includes 5 villages declared as Census Town

For maintenance of law and order there are 24 Police Stations viz. Telkoi, Kanjipani, Nayakote, Kendujhar Sadar, Kendujhar Town PS , Barbil, Joda, Champua, Bolani, Rugudi, Bamebari, Jhumpura, Baria, Turumunga, Patana, Ghatagaon, Pandapara, Harichandanpur, Daitari ,Ghasipura, Anandapur, Soso, Nandipada and Sainkul.

There are four Municipalities viz. Barbil, Joda , Kendujhar and Anandapur. Besides, there are five non-statutory towns i.e. Census towns viz. Balagoda (Bolani), Jajanga, Champua, Jhumpura and Daitari within the district.

Important Statistics						
			State		District	
Number of Villages		Total	51,311		2,123	
		Inhabited	47,675		2,064	
		Uninhabited	3,636		59	
Number of Towns		Statutory	107		4	
		Census	116		5	
		Total	223		9	
Number of Households		Normal	96,05,629		4,03,869	
		Institutional	21,857		1,113	
		Houseless	10,334		290	
Population	Total	Persons	4,19,74,218		18,01,733	
		Males	2,12,12,136		9,06,487	
		Females	2,07,62,082		8,95,246	
	Rural	Persons	3,49,70,562		15,48,674	
		Males	1,75,86,203		7,74,667	
		Females	1,73,84,359		7,74,007	
	Urban	Persons	70,03,656		2,53,059	
		Males	36,25,933		1,31,820	
		Females	33,77,723		1,21,239	
Percentage Urban Population			16.69		14.05	
Decadal Population Growth 2001-2011			Number	Percentage	Number	Percentage
		Persons	51,69,558	14.05	2,39,743	15.35
		Males	25,51,566	13.67	1,16,451	14.74
		Females	26,17,992	14.43	1,23,292	15.97
Area (in sq Km.)			155707		8303.00	
Density of Population (Persons per sq Km.)			270		217	
Sex Ratio		Total	979		988	
(Number of females per 1000 males)		Rural	989		999	
		Urban	932		920	

		State		District	
		Number	Percentage	Number	Percentage
Literates	Persons	2,67,42,595	72.87	10,52,518	68.24
	Males	1,50,89,681	81.59	6,05,119	78.12
	Females	1,16,52,914	64.01	4,47,399	58.28
Scheduled Castes	Persons	71,88,463	17.13	2,09,357	11.62
	Males	36,17,808	17.06	1,04,684	11.55
	Females	35,70,655	17.2	1,04,673	11.69
Scheduled Tribes	Persons	95,90,756	22.85	8,18,878	45.45
	Males	47,27,732	22.29	4,05,927	44.78
	Females	48,63,024	23.42	4,12,951	46.13
Workers and Non-Workers					
Total Workers (Main and Marginal)	Persons	1,75,41,589	41.79	7,66,514	42.54
	Males	1,19,02,655	56.11	4,98,077	54.95
	Females	56,38,934	27.16	2,68,437	29.98
(i) Main Workers	Persons	1,07,07,543	25.51	4,42,497	24.56
	Males	87,94,413	41.46	3,62,695	40.01
	Females	19,13,130	9.21	79,802	8.91
(ii) Marginal Workers	Persons	68,34,046	16.28	3,24,017	17.98
	Males	31,08,242	14.65	1,35,382	14.93
	Females	37,25,804	17.95	1,88,635	21.07
Non-Workers	Persons	2,44,32,629	58.21	10,35,219	57.46
	Males	93,09,481	43.89	4,08,410	45.05
	Females	1,51,23,148	72.84	6,26,809	70.02
Category of Workers (Main & Marginal)					
(i) Cultivators	Persons	41,03,989	23.4	1,98,044	25.84
	Males	33,75,350	28.36	1,65,481	33.22
	Females	7,28,639	12.92	32,563	12.13
(ii)Agricultural Labourers	Persons	67,39,993	38.42	3,10,075	40.45
	Males	34,81,836	29.25	1,32,616	26.63
	Females	32,58,157	57.78	1,77,459	66.11
(iii)Workers in household	Persons	7,83,080	4.46	21,314	2.78

industry	Males	4,39,215	3.69	12,288	2.47
	Females	3,43,865	6.1	9,026	3.36
(iv) Other Workers	Persons	59,14,527	33.72	2,37,081	30.93
	Males	46,06,254	38.7	1,87,692	37.68
	Females	13,08,273	23.2	49,389	18.40

Sl. No.	Social Group	Total	Percent
1	SC	181488	11.6
2	ST	695141	44.5
3	Hindu	1525874	97.7
4	Muslim	20390	1.3
5	Christian	6144	0.4
6	Buddhist	37	0.002
7	Other	9545	0.6
	All social groups	1561990	

(Social Composition of The Population of The District. As per 2011 census)

Some Basic Facts About Keonjhar District. As per 2011 census

Sl. No.	Feature	Unit	Value
1	Geographical Area	Sq. Km.	8303
2	Population as per 2011 provisional	Lakh	18.02
3	Sub-divisions	Number	3
4	Block	Number	13
5	Cluster/circles	Number	8
6	Revenue Village	Number	2122
7	Urban habitations	Number	65 wards
8	Gram Panchayats	Number	286
9	Panchayat Samitis	Number	13
10	Municipal Councils	Number	4
11	National Highways	Km.	287
	State Highways	Km.	79
	Major District Roads	Km.	78
	Other District Roads	Km.	367
	Rural Roads	Km.	1225
	Forest Roads	Km.	252
	Panchayat Samiti Roads	Km.	926
	Gram Panchayat Roads	Km.	2436
12	Length of rail network	Km.	155
13	Watershed	Number	1289
14	Irrigated Agriculture	Hectares	65779
15	Rain-fed Agriculture	Hectares	23204
16	Wasteland	Hectares	26522
17	Forest	Sq. Km.	310672
18	Major and medium dams	Number	4

Tools and techniques used for data collection.

In order to ensure maximum objectivity of the study, a number of standard tools developed by different expert in the field of science were considered. However selected tools were modified to required extent as per applicability.

Pilot study

The study was conducted in keonjhar district of odisha.The twp blocks namely patana,champua were selected at random for the study.Two grampanchayat two from each block were selected & two villages from each grampanchayat were selected for study.The datas are collected by door to door visit method and applying PRA tools.Then liasioning with various line departments like Agriculture dept. Horticulture dept.,I.T.D.A office,J.D.A office,Panchayatraj inst. & peoples organisation like PRADAN,WOSCA,KIRDTI,CYSD Etc. available in keonjhar districts.

Consultation made with Scientists of CIWA, Bhubaneswar, DDM NABARD Keonjhar,Sr.Scientist,KVK,AAO,AHO& Social Activist Padmashree Tulashi Munda of Adivasi kalyan vikas samiti Keonjhar. And Keonjhar Krushak kalian mancha

Pre-Testing of Interview Schedule

Based on the objective of study an interview schedule was prepared. Initially the schedule was pretested with twenty farmers and farm women to test the reliability. Here the questions are remain close ended because the research is specific in nature. In order to collect the broad data from their open mind the format is very common and general. Later the interview schedule was modified based on the experience gained at field level and to be modified with proper scaling techniques as per the requirement.

Collection of information

Collection of information is another important consideration in securing qualitative results personal contact was made by investigation in interviewing the respondents selected for the investigation. Good report was established along with desirable climate setting with the respondents which helped a lot to ask questions and discuss various dimension comfortable relating to study. At the outset, purpose of the study was clearly apprised to the respondents. The information received was duly recovered for analysis. The investigator usually makes use of the free time of respondents to personally interview and records all information.

Interviewing and Data Collection

The interviewer first of all introduced himself and gave a clear picture of the subject and purpose of the study. The interviewer made the respondents felt that her answer were important. Systematically the questions were asked as specified in the schedule and in informal manner from January 2016 to April 2016. The data thus collected were tabulated and subjected for empirical measurement and analysis.

Scaling Method

For conducting this Research Likert's Type scale was being used for administering the Interview Schedule and analysis work. 3 point to 5 point scale is being used based on type of Question . Accordingly Scoring is given from 0 to 5 as per response being collected from the respondents.

Measurement Procedure

Sl No	Variable	Empirical Measurement
1	Age(X1)	Schedule developed for the study
2	Education (X2)	Trivedi(1963)
3	Land holding Size(X3)	Schedule developed for the study
4	Family Type(X4)	Venkatramaish and Suthurao (1983) with modification.
5	Family Size (X5)	Schedule developed for the study
6	Occupation (X6)	Schedule developed for the study
7	Social Participation (X7)	Schedule developed for the study
8	Annual Income (X8)	Trivedi(1963)
9	Outward orientation(X9)	Schedule developed for the study
10	Housing Pattern (X10)	Schedule developed for the study
11	Ownership right(X11)	Schedule developed for the study
12	Credit status(X12)	Schedule developed for the study
13	Savings status(X13)	Schedule developed for the study

Dependent Variables

Sl No	Variables	Empirical Measurement
1	Extent of Contact with(Institutions(y1)	Structured schedule
2	Extent of Contact with Extension of methods(y2)	Structured schedule
3	Extent of Contact with community organizations(y3) .	Structured schedule
4	Analysis of Communication with Extension Methods and Materials(y4)	Structured schedule
5	Nature of Influence(y5)	Structured schedule

Processing and analysis of data

The data collected from all 120 farmers and 120 farm women respondents were manually processed. Each respondents was serialized, block wise and information received from them were tabulated on a master sheet. Weightage was given to different items with regards to their relative position of the scale and scoring was done accordingly. Then data were tabulated, processed and analyzed by using SPSS (Statistical package for social science)

Statistical methods used

i. The following statistical methods were used for the analysis of data basing on its mature and type of information obtained.

(a) Frequency - Number of respondents under a particular category.

(b) Percentage - Percentage was used in description analysis for making paragraph comparison. For calculating percentage, the frequency of a particular cell was multiplied by 100 and divided by the total number of respondents in the particular category to which cell they belonged.

$$\text{Percentage} = \frac{\text{No of respondents}}{\text{Total No of respondents}} x100$$

ii. Gap Analysis

It is worked out by finding out difference between maximum obtainable score and actual score obtained and expressed in terms of percentage by following formula.

$$\text{Gap percentages} = \frac{(E-A)}{A} \times 100$$

Where E = Maximum score obtained & A= Actual score obtained

iii. Rank Order

On the basis of mean score rank order was made. The item securing highest mean score was given first rank and then next highest was given second rank and so on.) Ranking is an expression of people's priority about their thoughts and feelings. Ranking was done by assigning the first rank to highest percentage and the second rank to the next highest percentage and so on.

iv. Persons co-efficient of correlation

It is employed to find out the association of independent variables with the dependent. The formal use of calculating co- efficient of correlation is as follows.

$$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{N(\Sigma X^2)-(\Sigma X)^2 \times N(\Sigma Y^2)-(\Sigma Y)^2}}$$

N = Number of pairs correlated.

X & Y = Variables being correlated

Critical Ratio (CR)=Difference Between P1 and P2/$\sqrt{PQ}[\frac{1}{N1}+\frac{1}{N2}$

Where P=N1P1+N2P2/N1+N2

Calculation of information scores

Information scores for each component of the farmers' agricultural information system were calculated by multiplying the weights of information contact with degree of information usefulness. Total Information Score is formulated as: $TIS_{ij} = FC_{ij} \times IU_{ij}$ where FC is the number of contact with information sources for the i-th farms and IU is the usefulness of information for the i-th farms

Chapter-5 Result and Discussion at a glance with respect to Objective-1

(Socio-Economic Status of Farm women and Farmer in the Sample area)

Table 5.1.1: Age distribution of the respondents

Age is an important social factor that influences individual working ability. Research findings linking age to productivity abound, Age as a social factor has been subject of social study by the social researchers on many situations relating to social research. Age is significant in terms of experience, maturity of judgment, decision making and power of understanding..

Age is one vital personal variable which has contribution on various parameters in life. Usually it is hypothesized that comparatively young individuals are having better adoption, communication and information sharing attitude than older generation.

The Table 5.1.1 depicts a gender comparative data on age distribution of respondents.

The respondents of the study were categorized into 3 groups as reflected in the table below.

Table 5.1.1

Sl.No.	Age Category	Male Farmer N1=120		Female Farmer N2=120		Pooled Data	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1.	Young(Up to30 years)	61	51	52	44	113	47.08
2.	Middle(Above30-50 years)	44	37	58	48.33	102	42.5
3.	Old(Beyond 50 years)	15	12	10	8.33	25	10.41

The data revealed that 51 percent of farmers were young up to 30 years of age, 37 percent belong to middle age category and 12 percent were old above 50 years of age.

With respect to the farm women were concerned 48.33 percent were middle aged within the age of 30 to 50 years.44 percent were young and rest 8.33 percent were old.

Therefore it may be concluded that the research study was mainly reflecting the views of young farmers and middle aged farm women however in this gender comparative research study the size of sample belonging to old age category was minimum.

So , my findings from the above study is in accordance with the result of the study by Kiranvani (2007) reveals that more number of groundnut growers are 'young' followed by 'middle age' and 'old age' respondents. It underlines that young farmers show more interest in participating in FFS. Further, the FFS organizers might have felt that the training given to young farmers is better utilized, as they have sufficient scope for practicing.

Table.5.1. 3 Family types of the respondents

Various research findings suggested that the joint families are fast disintegrating to nuclear ones due to various socio-economic and cultural issues.

Each family type has its own advantage and disadvantages. Generally two types of families are found in our society those are nuclear family and joint family. A family is considered as nuclear or single when it consisted of husband, wife and unmarried children. . A joint family consisted of other blood relations also. Results of investigation were presented in the table 5.1.3

Table 5.1.3

Sl.No.	Family Types	Male FarmerN1=98		Female FarmerN2=94		Pooled Data	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1.	Nuclear	67	55.83	69	57.5	136	56.66
2.	Joint	53	44.16	51	42.5	104	43.34

The data compiled in the Table.5.1.3 indicated that out of 120 farmers 55.83 percent had nuclear type of families, whereas 44.16 percent belonged to joint family type. Due to social, economic and cultural pressure in the l society majority of the joint families are segregating to nuclear families. It symbolized their change proneness in the society and care to their family culture. But on the other hand, due to large family their per capita income and socio-economic development index is very poor. It is also noteworthy that the farmers were still binding to their cohesiveness in joint family system.

The above table revealed that out of 120 farm women, 57.5 percent of the respondents belonged to nuclear family followed by 42.5 percent of the respondent's belonged to joint family system. This might be due to the reason that now a day's everybody wants more freedom and development. The findings suggest that there is more freedom for women who belonged to nuclear family and they are free to take their own decision as well as involve themselves in other activities rather than housewife. These findings are on par with the findings by Singh (1997), Prasad (1998) and Das (2004).

Table.5.1.5 Social Participation of the respondents

Social participation in this study refers to the involvement in social activities and membership of respondent in various formal and informal organizations, either as member or as an office bearer. It was measured in terms of membership or official status in any formal or informal organizations, along with the frequency of participation and type of organization in which she is a member using the scale developed by Trivedi (1963) with slight modifications. Social participation was expected to have positive relationship with the dependent variable

Table 5.1.5

Sl.No.	Social Participation	Male Farmer N1=120		Female Farmer N2=120		Pooled Data		C.R.
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	C.R VALUE
1.	Yes	53	44.16	47	39.16	100	41.66	0.864
2.	No	67	55.83	73	60.83	140	58.33	1.028

This table shows the level of social participation of farmers and farm women in various fields in society. Among the farmers 44.16 percent respondents were having social participation and 55.83 were not attending the Social activities as they want to remain in active and neutral. It was due to illiteracy, superstition, lack of awareness and interest due to communication gap. Similarly from farm women 39.16 percent respondents having social activities and 60.83 percent farm women had not that privilege. It is due to their overburdening of their productive roles in the family by getting less freedom and lower privilege to access all social activities due to family norms, shyness and taboos along with non-preference in decision making due to male headed family and society. Here as the CR Value is 2.5 so non-significant in nature.

Here my findings are matching with the research and findings with Natarajan and Santha Govind (2008) have stated that majority of the farmers have taken self-decision in most of the tapioca cultivation practices. Further, the decision making pattern among farmers is found to be high when compared to women.

Conclusion

India being a male dominated society, women are assumed to be economically and socially depend on them and also in decision making. But this notion seems to be diluted as women in India are becoming more and more aware towards their personal needs after their productive roles and demanding greater equality. As farm women's involvement in Agriculture sector is more than man, So feminization of Agriculture occurs. But if we consider gender balancing in day to day life, information and communication system is the only panacea for this matter. As per constitution ,Right to Information is accessible for all(RTI Act 2010) so communication system should be upgraded for the betterment and welfare of Farmers and Farm women in the agrarian society in order to achieve vision 2020 along with sustainable development goal.So we should follow the slogan "Suchana aur sanchar pranali se kisan ki museebat ka samadhan"(Rashtriya Kisan Sangathan, Delhi)

PRADAN BRINGS SMILE IN THE FACE OF MADHABANANDA SAHU OF SADANGI VILLAGE, AS A CASE STUDY

Madhabananda Sahu is a Small farmer having less cultivated land finally showed the way of living to poor's by Adopting SRI (System of Rice Intensification) Technique being facilitated under PRADAN, a leading NGO of that Area.

Madhabananda is a 51 years old man having positive attitude and strong determination like youths. During his youth time he had been practiced paddy in traditional method but after the invade of OTELP PLUS project and PRADAN Organization he had get a hope of producing more yield in paddy cultivation. So he had exposed to himself by taking Technical support from PRADAN and finally become an example among all farmers. His modus of operendi was as follows.

Details about Field Management of Madhabanand

Variety Taken For Cultivation:-Subarna (Masoori)

Area: - 2 Acre

Supports from PRADAN:-Detail information, Technical help by providing Package of Practice Training, TOT training, Exposure visit to NRRI, Cuttack and DRR Hyderabad and Process Demonstration

Vermicompost Unit: Provided by ATMA

Time line: He had started Traditional rice cultivation in 1999 and SRI in 2010.

Comparative Study of Traditional rice cultivation Vs SRI method

	Traditional Rice	SRI Method	Remarks by Cost-Benefit Analysis
Parameters			
Production			
Yield	10-12 quintal	Above 14 quintal	2 kg more in SRI
Productivity	Moderate	High	Good
Taste	Very Good	Good	Manageable
Input Cost(Expenses)	Rs7000/-	Rs5700/-	RS1300/- Saving
Out Put Cost(Profit)	Rs10,500/-	Rs18,200/-	RS7700/- More Earning
Consumption of Basic inputs	High	Low	Good
Water requirement	High	Moderate	Good
Orgnic culture required	Low	High	Good

Sources of Information

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- Department of Horticulture, Govt. of Odisha
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- DDM, NABARD Office, Keonjhar
- PRADAN, WOSCA, CYSD, KIRDTI, ORISSA, PRAKALPA NGO, Keonjhar.
- Panchayat Raj Institutes of Respective area, Block office & Collectorate, Keonjhar
- Department of Anthropology & Tribal Studies, North Orissa University, Baripada
- District Statistical Office, Keonjhar
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