

GENDER RELATIONS,
RURAL TRANSFORMATION
AND TECHNOLOGICAL CHANGE (1)

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For many Third World countries 1985 will signify a further deterioration in both their production and distribution of food output. Nowhere, at present, is this reality more acute than in Sub-Saharan Africa where all, except five economies, are producing *less* food output (in total) than they were twenty years ago, and most are experiencing contracting rates of food output *per capita* - a fall of about 15 per cent on average, over the last two decades. Ecological, demographic and structural economic factors combine to exert enormous pressure on the capability of indigenous farming systems to save, let alone expand, current food output levels. Clearly then, there is an urgent need for strategies which focus specifically on the production, distribution and consumption of food. Food strategies invariably stress the importance of integrated approaches for overcoming the interlinked problems of food availability, production and distribution, and for "coordinating policies on technology, investment and international assistance" (World Food Council - 1982). Their effectiveness as policies for ameliorating the food crisis in the Third World hinges not only on sufficient political will but also on an explicit recognition of the critical role that women play as food producers, processors and managers for rural families and communities. Strategies must therefore be based on a detailed understanding of how rural production and distribution systems operate within their own eco-

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conomic, political and cultural context and a full recognition that the division of labour, control over resources, and decision making, all central to the functioning of farming systems, are in many fundamental ways structured along gender lines.

In Sub-Saharan Africa, recent initiatives for improving the efficiency of agricultural production have centred on integrated development programmes. Technological innovation is crucial to most of these programmes, and the prospect of technological changes for the specificity of technical and socio-economic processes has aroused considerable research interest in recent years, primarily in the form of farming systems research. Yet in the abundant quantitative and qualitative research published either women remain invisible or only facets of the relationship between rural women and technological changes are covered, and then often only in passing. Farming systems research points to the fact that technical aspects of rural development cannot be divorced from the institutional, ecological and socio-economic aspects. The emphasis is placed on a 'bottom up', on farm, interdisciplinary approach using models and linear programming techniques for studying the various constraints and possibilities facing small farmers in adopting new technologies etc. for increasing agricultural welfare. The common factor left out of these models is gender. Whilst environment and technique in the rural context each involve different bundles of problems, little attention has been given to tracing the interrelationship between technological interventions, the nature of the 'gendered farming system' (YOUNG - 1985) and the position of rural women both relatively and absolutely. While technical innovation is not necessarily gender selective, evidence of a differential impact on women and men (DEY - 1981 ; AHMED - 1983 ; AGARWAL - 1981 ; BUKH - 1976 ; SPENCER - 1979) and the importance of women's contribution to the functioning and reproduction of agricultural and non-agricultural rural enterprises point to the immediate policy relevance of research in this area. What is needed is a research methodology which can break away from the cultural norms and preconceptions often applied to studies of gender relations to capture :

1. Empirically and quantitatively the complex relations between women, men, the 'household' and farming system.
2. The extent to which these relations shape adaptations and responses to technological interventions and bear important implications for

agricultural performance, and importantly, the potential of food production and availability in both processed and unprocessed forms.

Considerable research has been done on women's roles in rural African production systems (ILO - 1984 ; GUYER - 1977, 1980, 1984 ; HAFKIN & BAY - 1976 *inter alia*), and for West Africa a wealth of literature is available. The studies document the main components of women's economic and social lives, what women are responsible for, what land rights they have, how they spend their time, as well as a whole range of complex ethnographic factors (eg marital strategies, kinship relations, female organisation etc, McCORMACK - 1982 ; GUYER - 1980). Detailed analysis of rural women's relationship to technology is less common except for Dey's work on The Gambia, Spencer and Stevens in Sierra Leone, Bukh in Ghana. What is particularly striking about much of the literature on rural women is the almost universally supported scenario of the deleterious consequences of 'modernisation' in agricultural production for rural women farmers. The contention of this paper is that to fully understand 'modernisation' processes which affect rural food producing systems and the relative and absolute position of women we need to take a hard and detailed look at what form technical innovation takes, where it intervenes in the production/reproduction process and in what ways it affects economic and social differentials between the genders, at intra and inter household levels.

Historical studies show that traditional organisation of West African farming involved a complex integrated system of agriculture itself emeshed within a wider division of labour (HART - 1983). Crudely, African small-holder agriculture depends largely on family labour with women providing anything up to 60-80 per cent of the labour used in cultivation and processing. The gender division of labour is fundamentally task and crop specific. Since colonisation, when monetary and commercial relations spread through African agriculture, the gender division of labour has been profoundly and fundamentally shaped around the imperative of cash and export crop production. Producers, assumed to be synonymous with male farmers have been encouraged by development projects comprised of technical packages, incentives and extension assistance, to specialise in market oriented cash crop production either of traditional subsistence crops e.g. sorghum, millet, cassava, rice, or newly introduced staples and various indigenous non-edibles, cotton, coffee, rubber, cocoa etc. Rural women denied such attention, have continued to

produce *and* process household food crops (often marketing the surplus too), to manage household budgeting and basic needs, and to supply unpaid family labour, now on essentially male managed cash cropped land.

Studies suggest that processes of transformation, whether induced by colonial or indigenous interest, interlock with existing cultural patterns in the gender division of labour intensifying the lack of complementarity rather than subverting them. In this technological change plays a significant role, reshaping production relations within the household and the wider farming system. The literature shows these changes, whether in the form of biochemical or mechanical technologies, benefiting male producers in terms of increased productivity or income returns by virtue of their specific tasks and control over resources and family labour, whilst their wives are either displaced from activities in which they previously had some share and control, or restricted to low productivity, low return tasks in which innovations to reduce energy expenditure or increase productivity are almost entirely absent. Women's own food production and processing continues to be carried out with tools and methods based on indigenous agricultural knowledge. Using both time and income criteria the net effect of changing technologies does not appear to correlate with any anticipated reduction in workloads for women, nor is there much evidence of compensating productivity or income gains (AGARWAL - 1981 ; WHITEHEAD - 1979 ; PALMER - 1979). Rather women are overburdened with physical and economic responsibility with deleterious consequences not only for the women themselves, but also for the whole rural farming household. Kisseka puts it succinctly : "Uniformly such modernisation processes have disbenefited women, increased their labour demand and created productivity differentials between the sexes" (1984).

This generalised picture is a disturbing one and has very serious short and long term implications for women (and their dependents) as major contributors to both the productive and reproductive potential of rural farming households, and in consequence food output and availability, locally and nationally.

Yet, while the waste of resources and opportunities is apparent, attempts to characterise the relationship between women and technology remain only partial and often ambiguous. Undeniably, Boserup, Dey, Rogers, Bukh and others have made West African women visible as agriculturalists and have provided essential information on the extent of

neglecting many rural development projects of women farmers. However little analysis has been devoted to asking why women and men accept this bleak situation. Is it the structure of activities and opportunities within the household and for the farming system that directs the anticipated benefits of improved technological packages into the hands of certain, usually male farmers, leaving women to cope with the consequences? Or are other processes at work? The fact that these questions remain only partially answered arise from a number of research limitations that have tended to restrict past analyses. These include :

1. Restricted definitions of technology treating it as a product impacting upon basic input-output production relations, usually field relations and neglecting temporal and spatial considerations with respect to labour allocation, access, distribution and household management (FRESCO & JUGGENS - 1984).
2. Concentration on the incidence and implications of technology within the cultivation sphere only, usually the cultivation of a single cash crop. By classifying innovations in terms of its innate material character and its objective effects i.e.:labour saving, land augmenting, productivity enhancing, by classifying activities in terms of whether gainful economic activity, broadly domestic activity or leisure activity, and slipping these into a two-dimensional framework with a simple vector of possible trade-offs (labour time and income) the net effect of a particular innovation is calculated. However the worry is that the highly complex character of the rural cultivation process, the very fuzzy flexible lines of demarcation between the spheres of women's activity, the fact that technology is not necessarily immutable and rarely affects the technical division of labour in any systematic fashion, actually makes conclusions of this sort partial and often ambiguous.

Cultivation is but one, albeit crucial, stage in the production cycle of any crop and other activities which feed into and succeed cultivation are potential candidates for new technologies e.g., processing (involving numerous tasks), storage, transport. The study of any crop must trace the effects of technological changes across this *whole cycle of activities* from pre-cultivation to consumption and marketing in order to a) understand the nature of the technological balance within the production cycle, b) gauge the differential impact

- on women and men's labour investment, and c) measure the differential access of the genders to available technologies and their benefits.
3. The rural production system including the maintenance of the household does not depend on producing a single crop alone but on managing a host of other enterprises eg, cultivation, processing and sale of a variety of food crops, care of small animals, fishing, artisan work, water and fuel collection, cooking, childcare etc. Although the multifaceted nature of women's undertakings is widely recognised, its significance with respect to technical change has been underestimated. To understand the extent of intensification and/or displacement, the effect of technological intervention has to be analysed across the range of women's field and off-field activities, productive and reproductive tasks (WHITEHEAD - 1981). That is, the *aggregate net effect*. These are of two basic types : a labour use and an income effect. To take the former, the introduction of high yielding variety cash crops is likely to increase labour demand not only in cultivation, where the involvement of women varies from crop to crop and across cultures and locations, but also in processing, storage, transport etc. activities which are predominately women's responsibility everywhere. The increased demands on women's labour time may clash with other major demands e.g., harvesting and processing her own food crop, fuel and water collection, animal care, beer brewing, cooking etc. The resulting redistribution of labour time is likely to have a greater effect on women than men (McKEE - 1984), not only because of the non-substitutability of their tasks within the sphere of cultivation (i.e. the gender division of labour), but also because either technology is not on stream for the tasks women are responsible for, or women lack the purchasing power/bargaining power to obtain, maintain or attract through investment available technology. Intensification therefore, to have rigorous analytical meaning, must be based on an understanding of how the effects of innovation/change are possibly multiplied by virtue of the complex interaction of women's responsibilities, and how in consequence, they reflect back on the welfare of the whole rural household. Crucial to the notion of intensification are factors such as the time spread of work, seasonality, duration of each activity, energy expenditure, labour flexibility in the midst of many competing economic and maintenance responsibilities and so on. To look at intensification in a simple vector

of trade-offs between cultivation and a generalised bag of domestic tasks is insufficient, if not misleading.

4. Insufficient attention to identifying exactly how women respond through their own productive and reproductive strategies. Little appears in the literature as to how women adapt to these pressures given their constrained time and limited resource base, i.e., changing the types of food crops grown on their household plots ; the way in which processing, storage etc. is conducted ; frequency of cooking, fuel and water collection, childcare. These have implications for the quality and quantity of food available, the quality of childcare and so the servicing of basic needs etc.
5. Absence of sustained focus on the inter and intra-household dimension : anthropological and ethnographic literature stresses the importance of access, distribution and control of valued social resources. Increasingly weighty evidence points to the significance of intra-household divisions of work responsibility, resources, differential incentives and access to markets (GUYER - 1981 ; DWYER - 1982 ; WHITEHEAD - 1979 ; HARRIS - 1981 ; McKEE - 1984 ; BUTLER-FLORA - 1984). Studies point to the relative autonomy of male and female incomes and expenditures affecting women's possibilities to become users and beneficiaries of new technologies. While economists have been criticised for treating farming households as harmonious, undifferentiated units with single production and consumption functions, research on technological change has not yet encountered these issues head on.

Analysis must therefore look very closely at the rural production system at the household and inter household level. For policy formulation a number of conceptual and methodological issues are important, these include the following premises.

Technology itself is not necessarily gender selective nor immutable, it rarely affects the division of labour in any systematic fashion, and it is never neutral.

Technological change should be seen as a product of social and political relations in society. At the abstract level it reflects power relations inherent within the social system ; on the ground it becomes embodied in power relations such as those manifested by the unequal bargaining positions of different social groups, or of women and men.

Who actually benefits and who bears the cost of technical change can only be fully understood within this social context.

Given the above, any study of technology use must encompass not only the social relations of production but also the nature and significance of interconnections with the relations of reproduction - biological and social.

Technical change in agriculture, and in particular technologies aimed at improving food production at the household level, is becoming more user oriented. Women have the right to be represented as potential users of technology ; to make that representation effective for women themselves and as major contributors to household welfare, knowledge is needed of their conditions, priorities and strategies.

Technology should therefore be viewed in its widest sense to include :

'Objects, techniques, skills and processes which facilitate human activity in terms of, first, reducing human energy expenditure, second, reducing labour time, third, improving spatial mobility, fourth, alleviating material uncertainty' (BRUCESON - 1984).

Full conceptualisation of the interconnections between technological intervention, the nature of the gendered farming system, the position of rural women and levels of food production and availability requires a research methodology operating along the following guidelines :

1. What do women, men and children do and how are their activities linked into a household and farming system ? How is labour organised : is it along sex-sequential or sex-segregated lines ?
2. What technologies historically and in the present are available and what is the incidence of adoption in the broad cycle of activities ? Which crops, tasks, processes are directly and/or indirectly affected ? What are the seasonal and the synergistic effects of the technological package offered, on women and men, by age and class ?
3. What is it about relations within the environment, local economy or between men and women that privileges certain (male) farmers in terms of access to higher productivity, cash returns, etc. through technical assistance, while women (and less privileged men) must intensify their labour in certain areas and to displace it from others ? What are the most telling consequences of intensification and displacement - over-exploitation or under-productivity of labour ; loss of

cash income or assets ; deteriorating health and nutrition conditions, wastage of resources etc ?

The link between health/nutrition conditions and technological change is a very important one, but has been largely neglected in the literature, for West Africa at least. Undeniably this is a complex area, since although criticisms have been advanced against certain economic indicators of changes in status and welfare, e.g. A.K. Sen & J. Kynch (1983). To suggest that health indicators are more suitable is to face the problem of how to decipher whether incremental changes in health condition actually do improve the well-being of the individual given that individual circumstances are highly disparate, and how to establish that changes in the technological balance of a farming system do have significant effect on health conditions. A possibility is to observe seasonal patterns of malnutrition, morbidity and mortality and establish to what degree alterations in energy expenditure, the duration of certain activities, the intensity of labour peaks and so on, actually compound or relieve stress as shown by these indicators. Given the very crucial role that women play in biological reproduction and food provisioning and the basic maintenance of the farming system itself, any deterioration in their health status has consequences for the entire household e.g. : observations made in The Gambia (see CHAMBERS et al - 1981) relating to an inverse relationship between percentage increases in time spent in activities per day and breast milk output, birth weights, food intake, nutritional standards point to the possible deleterious consequences of increased workloads for young women, there are also the economic costs of sickness and weakness lowering capabilities at work etc.

4. How do women perceive the technological packages available ? How do they respond ? Are women eager to innovate but frustrated by obstacles restricting access to inputs, credit, extension services etc ? Are there ways in which women adapt their own production and reproductive activities to capture some of the benefits of planned technologies ? Are they predominately in the sphere of cultivation ? Or are they unwilling to innovate because of cost factors, loss of potential autonomy, income or other reasons ? Would alternative technological packages directed to processing or domestic activities be

most labour reducing/productivity and income increasing for women ?
How could such access be facilitated ?

5. To evaluate the direct and indirect effects of, and the take-up of, particular innovations as part of strategies to increase food output levels etc., research must look at the differentials between the genders with respect to access to local and regional markets, differential pricing patterns and incentive structures. Although this type of analysis has been executed along socio-economic lines of differentiation, rarely is it approached in the context of gender relations. All too often research, and definitely, policy, misses the point that men and women may be in structurally different situations - especially in polygynous arrangements. Different kinds of decisions are made at different levels, hence the need to distinguish precisely what are the units of consumption, expenditure and production (GUYER-1982). It matters with respect to potential access to, and benefit from, technologies because women and men may have different preferences as influenced by different access to a labour pool, different labour flexibility, separate markets and different incentives. It may be that an innovation seemingly introduced to assist women directly in food production is unsuccessfully adopted or fails to achieve desired results, because of how incentive structures are patterned, within the household and markets, displaying the preferences of women to organise and allocate their labour time and resources in a particular fashion. This is often to enterprises in which they control the product and its distribution as opposed to enterprises in which they are contributors but unequal beneficiaries (McKEE - 1984 ; BUTLER-FLORA - 1984).

All of these points raise not only conceptual but also methodological research issues which are still, in many ways, problematic. However that such issues have an important bearing on the design and implementation of food self-sufficiency and food security strategies should be clear, since programmes for promoting productivity, income and output levels in food production have at their core packages of technology, and the degree to which these are successful is obviously influenced by their implications for rural women agriculturalists, not simply as cultivars but as processors, preparers and distributors of food to households and local markets, for provisioning basic needs and maintaining the nutritional and basic welfare of rural families. Such research

can provide information of great value to those conceiving food strategies and plans for self-sufficiency so that mistakes of the past can be laid to rest and that for the future, along with support and research from other areas, turn around the chilling picture of a massive crisis in food availability.

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ABSTRACT

This paper takes as its starting point evidence of the negative and contradictory effects of technological packages on women's autonomy and status. Just how serious these negative effects are, in quantitative terms, and why women and men should accept this bleak situation, is not completely clear in the existing literature. This paper argues for an extended research approach looking at technological change as a product of social and political relations. Technology is a central component of current food self-sufficiency strategies, and women are primary contributors to food production points to the policy relevance of this type of research.

RÉSUMÉ

Cet exposé prend pour point de départ des éléments prouvant les effets négatifs et contradictoires des technologies sur l'autonomie et le statut des femmes. La documentation existante ne précise pas clairement, ni quantitativement, l'ampleur de ces effets négatifs, et encore moins la raison pour laquelle les femmes et les hommes devraient se contenter de cette difficile situation. Le présent exposé propose une recherche de portée plus vaste, qui examinait les changements technologiques comme le produit des rapports socio-politiques. La technologie constitue un élément-clé des stratégies actuelles d'auto-suffisance alimentaire, et les femmes contribuent au premier chef à la production alimentaire : ceci montre assez la pertinence politique de ce type de recherche.