URBAN WOMEN IN DEVELOPMENT MODEL

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International Research and Training Institute for the Advancement of Women
INSTRAW

This manual is based on its shorter version originally formulated by Professor Scott Moreland of the Center for Development Policy of the Research Triangle Institute, Research Triangle Park, North Carolina

FOREWORD

One of the main features of the last three United Nations Development Decades has been the central role of women in all aspects of development. As United Nations agencies have sought to assist governments in development planning, UN technical advisers have been learning increasingly that socio-economic planning that does not account for the contribution of women to development through their reproductive and productive roles cannot lead to sustainable development. Unless women become equal partners with men --both as contributors and beneficiaries-- development programmes cannot yield the desired results. Gender is a crucial variable in the development formula.

Since 1975, when the first women's decade was inaugurated, the entire UN system has tirelessly supported the efforts of member countries in making women active participants in the development process. The number of conventions, strategic plans and actions implemented since then are a testimony to the unwavering support the United Nations has lent to women's advancement.

The technical cooperation programme of the United Nations has a substantial and far-reaching mandate to promote women in development (WID) issues. The United nations Department for Economic and Social Information and Policy Analysis (DESIPA), and its predecessor organizations, have always assigned the highest priority to women's roles and issues connected to women in development. Promotion of WID has been sustained, despite limited resources and in the face of a dramatically increasing demand for technical cooperation.

One operational area which is of the highest priority to the United Nations --human resource development through training-- has always claimed priority in technical cooperation despite scarcity of means. DESIPA's specific measures to promote women in development have entailed efforts to design training tools and raise awareness on issues of concern.

Women have always contributed to survival, sustenance and development. However, the scope and measured value of that contribution has remained modest, and women have been viewed as passive contributors --unseen, unacknowledged and invisible. In effect, women's potential for genuine economic contribution has remained untapped, and women often have been deprived of the benefits of change and progress.

Like many other international, governmental and non-governmental agencies, DESIPA is keenly aware of the urgent need to raise awareness of women's role in development. The Task Force on Women in Development which was established under the chairmanship of Ms. Dunja Pastizzi-Ferencic, Former Director of the United Nations International Research and Training Institute for the Advancement of Women (INSTRAW), has adopted an approach to raise the awareness of women's issues in development, as well as to ensure that WID issues and concepts are translated into action and incorporated into concrete programmes. With regard to these models, one strategy is to establish analytical training tools that provide a framework for logical and consistent thinking about WID issues. The second is to raise awareness among planners, policy makers, politicians, administrators and government decision-makers about such issues by

demonstrating, with the aid of statistics, how policies designed to support women in fulfilling their intrinsic socio-economic development potential, can achieve an equitable, balanced and sustainable development process. Through quantitative inputs and analyses in these statistically based frameworks emerge qualitatively significant and policy-relevant models.

Currently these models are teaching tools and conceptual frameworks to serve as a basis for recognizing the multisectoral dimensions in the planning process must employ to ensure equitable participation of men and women in development. These models cannot, as yet, be used for decision at the national level. However, if the required data at the national level can be collected, the validity of the models can be fully established. The models could then serve as the basis for development policy, investment planning and programmatic interventions --essential building blocks of socio-economic development.

Two members of the Task Force on Women in Development, Ms. Krishna Roy of the Population Division, DESIPA and Ms. Jeanne-Marie Col of the Public Administration and Development Management Division, DDSMS, prepared these models in collaboration with other colleagues. The models have been demonstrated international seminars, workshops and other training activities for middle and senior level government officials. Considerable interest and enthusiasm have been generated among audiences, resulting in a great demand for additional copies and more opportunities to use them. The models have now been amended and improved, and should be extensively disseminated. The United Nations International Research and Training Institute for the Advancement of Women has generously contributed to their publication.

It gives me great pleasure to present these models to interested development practitioners in the hope the models will be of help in enhancing women's contribution to sustainable development.

Jean-Claude Milleron
Under-Secretary-General for Economic and Social Information
and Policy Analysis
United Nations
New York

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I. INTRODUCTION

Issues related to "women in development" (WID), or more specifically, the contribution of women to national socio-economic development in the Third World, have received increasing attention in the last two decades. This is especially true since the 1975 International Women's Conference in Mexico. Many studies have attempted to document the quantitative contribution of women. Many writers have attempted to provide a theoretical rationale as well as empirical evidence for the proposition that improving the role of women in various ways can be beneficial or even necessary for development to take place. The arguments are many and it is not the purpose of this study to summarize the findings to date. Interested readers, however, may find a sample of these studies in the bibliographic reference in Appendix 4 of this report.

In the developing countries, where action is taking place, hundreds of well-intentioned women-oriented development projects are now being financed by donor agencies in an effort to capitalize on the potential contribution of women. In general, development planning is paying more attention to the role of women, and it can be expected that, as more studies are undertaken to analyze the role of women in development, increasing emphasis will be put on re-assessing development projects in order to fully involve women in the process.

In spite of all this interest in WID, there still is no clearly defined analytical model which permits a systematic assessment of women's contribution to social and economic development. The model discussed here is a very modest attempt to capture some of the economic elements of the potential contribution of women to the development of an economy. The model examines women's role in urban informal and urban formal sector households. Since the proportion of the Third World's female population in urban areas is increasing, and a majority of them subsist on informal sector employment while a small percentage depends on the formal sector, this model will be relevant to the rising number of women in urban areas.

The contribution of urban women in the informal sector has been all too often left out of formal analysis. Their activities do not lend themselves to measurement through marginal productivity, which is significantly less than ruling market wage, while the contribution that women make in the formal sector is taken note of in national accounts. However, much of the time they are exploited, underpaid, overworked and the "first to get out," although they are the "last to get in" in times of economic recession and downward trend of trade cycles. As an "awareness raising" model, it is important to highlight the often-understated contribution of these women. The model is conceived at the micro level (i.e., the household) and therefore it faces the same problems as any micro model — aggregation of results from the micro to the macro i.e., regional and national level use, is justified only under certain conditions.

The purpose of the model is to provide an analytical device which can show the effect of various policies in the arena of women in development on social and economic progress. It is a model that demonstrates an analytical framework with which WID issues in urban contexts can be imaginatively and logically discussed. It is, in essence, an example of such analysis. The model is useful for training participants in workshops on WID issues specific to urban areas. Its primary objective is to help workshop participants become familiar with a method of analyzing WID-related problems, and to internalize a framework for conceptualizing the issues involved and relationships among them in the context of development planning. Users of this model in its present stage of development can learn from it a method of logical thinking and analysis rather than derive specific, detailed real urban-life solutions. It also may be useful to sensitize policy-makers to urban WID issues. Thus, it is an awareness-raising model.

Strictly speaking, the model in its present form is not an empirically-based model of the actual role and contribution of women in a particular country. On the contrary, it is a generalized model based on stylized "facts" relevant to urban households. While the model is not empirically based, meaning the parameters are not the results of econometric regressions, it can be empirically verified (see Appendix 1 for a simple example for empirically estimating parameters for the basic equations of the model), and most of the relationships built into it are based on actual observations in the field. Moreover, efforts have been made in the actual computer version of the model to specify parameters typical of developing country situations.[1] However, until empirical research is undertaken to verify the model, users are reminded that the model is a teaching tool and its results can only be viewed as tentative.

As a teaching tool, attempts have been made to simplify the model to the point where it is easy to learn and easy to use. This also implies that the model is by no means complete. But an effort has been made to keep its complexity to a minimum and to construct a meaningful model that approximates reality as closely as possible.

The computer version is a quantitative model which yields a numerical solution for the model's endogenous (i.e., dependent) variables. But the main interest in the model's use is in the qualitative information these quantities signify. It is the insight these numbers provide into women's contribution, not the quantification of the indicators themselves, that is most important. For example, the model should not be used to answer questions like "by how much does women's income go up or down when their access to education increases?", but, "does it go up and does it go up consistently?" or "does it go up by more than a similar policy oriented toward men?".

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[1] Many of the parameters originally determined for a rural companion model to this model have been retained here for lack of necessary basic urban data. In view of the illustrative nature of this model, using a minimum number of similar parameters for urban and rural situations may not cause a major distortion in the methodology and the conclusions.

The model is very general, highly illustrative and easy to learn. It involves the use of a personal computer. The basic computer operations necessary for running it are introduced in Appendix 2 of this document. Readers who wish to refresh their knowledge of DOS and LOTUS 1-2-3 can use that section as a reference for some common terms and commands. A 5-1/4-inch DOS-formatted disk containing the model is included at the end of Appendix 2. The rest of this document is organized into three chapters. The theoretical model itself is first presented in Chapter II. Chapter III is a test run which includes a description of the simulation model and the results of exercises illustrating implications of policy changes. The manual ends with concluding remarks.

II. THE MODEL

A. Background and main assumptions

As already mentioned, there are a number of elements that one would ideally like to have included in a general urban WID model. For the purposes of teaching a method with minimal complications, the scope here has been limited to a few key aspects. After all, the function of a model is to simplify reality so that interrelationships among the factors involved become easier to understand. In theory, one can add more elements to a model to more closely approximate real life, but there is always the risk of the model becoming so complicated and intimidating that it could turn out to be a veritable black box. With this "trade-off" in mind, the model constructed is a compromise. More specifically, it is built on a few assumptions, which are stylized facts observed in many developing countries. No claims are made, however, that these assumptions accurately describe the situation of women in any particular country.

For the sake of simplicity, the main distinguishing factor between formal and informal sectors is assumed to be wage/income, which in the informal sector holds little relationship with marginal productivity, whereas in the formal sector, wage tends to be equal to marginal productivity.

To keep the model simple and well-focused on the role of women, assumptions regarding the contribution of men have been simplified, but not denied or overlooked. What is intended in making these assumptions is to highlight the role of women, other conditions being equal. The aim is to prove how government policies aimed at strengthening women's role can improve the welfare of families. From an analytical point of view, the assumption regarding men's contribution is justified because (1) calculations are greatly simplified, and (2) the model's validity is not compromised, since men's contribution in the areas included in this model is not negated or impeded by policies directed at women.

It is observed that women's time in urban areas is distributed in the following manner:

(i) Time spent on domestic work for which they receive no remuneration;
(ii) Time spent on work in the formal sector at their own jobs for which they are paid the prevailing market wage, which equals marginal productivity of labour;
(iii) Time spent on work in the informal sector, either in production or service; and
(iv) Time spent in helping out the spouse at his main job.

The first three of these four components need no further elaboration. In the fourth component, however, the following symbols are used for representing compensation received for time spent helping the spouse: if he works in the formal sector the compensation the wife receives is represented by w1f; if he works in the informal service sector, the compensation the wife receives is represented by w2f and

if he works in the informal productive sector, the wife's compensation is represented by a fraction of Om, which is his total production in the informal productive sector. At the same time, the following three cases cover the use of time, in their different roles, by a majority of urban women who work in the formal and/or informal sector:

Urban women's use of time

Case I:

(i) Domestic work
(ii) Work in the formal sector
(iii) Work in the informal sector, both service and productive
(iv) Helping the spouse in his formal sector job

Case II:

(i) Domestic work
(ii) Work in the formal sector
(iii) Work in the informal sector, both service and productive
(iv) Helping the spouse in his informal service sector job

Case III:

(i) Domestic work
(ii) Work in the formal sector
(iii) Work in the informal sector, both service and productive
(iv) Helping the spouse in his informal productive sector job

The basic assumptions of this model are discussed below:

Assumption 1: There is a sexual division of labour.

This assumption implies that for a given productive activity (e.g., weaving baskets or rolling rustic cigarettes), men's and women's tasks vary, but complement each other. For example, men may buy tobacco and paper, while women role cigarettes. In general, men may buy raw material, and women may convert it into finished products for sale by men. This typically is true of households where both men and women are engaged in informal sector activities. In the informal service sector, such as delivery of newspapers or any other consumer goods, or owning/managing a store, men may collect/procure goods to be delivered/sold, and women may carry out the actual delivery/sale. In the formal sector, especially for contracted work, men actually may be legal contractees and organize the activities involved, and women may undertake some of the tasks to be carried out.

Assumption 2: There is a sexual division of economic activities.

This assumption is based on the observation that men and women are engaged in different types of economic activities both in the informal and formal sectors. This is true of all the categories of urban households listed above and especially the category in which both men and women are engaged in the informal productive sector. In such households, women more than men engage in handicrafts which are both used at home and marketed, or are vendors of vegetables/fruits or other such produce and inexpensive items of daily needs. Such sexual division of labour applies to market wage-earning jobs as well.

Assumption 3: There is a sexual disparity in terms of access to productive resources.

In addition to differences in productive activities and tasks, thereare also disparities regarding access to factors of production other than labour. Such inputs as credit, education, technical training and technical services are complementary to labour, and access to them is not equal for both genders. There is documented evidence which shows women are at a disadvantage on this count. Obstacles to female access may vary from country to country, even from factor to factor. In some cases, it may be traditional inequalities between the sexes, or cultural stigma that discourage women from having direct contact with non-relative males who provide services. In other cases women may be able to overcome these social disadvantages, but they still may find themselves tied entirely to child-care and other household chores.

Assumption 4: Women and men have unequal economic power, and this inequality can adversely affect productivity.

Economic power has been defined in this study as the ability to retain the returns of one's labour or to have control over the use of such returns. Often, women are powerless to keep the fruits of their labour and are thus exploited. Blumberg's (1988) study makes a strong case for this assumption. In many African countries, men and women of the same household maintain separate purses. This phenomenon can be interpreted as an indication that women try to control their income. Studies have shown that the ability to retain one's income or returns from labour has a significant effect on the productivity of one's labour. These studies conclude that many well-meaning WID projects could have been more successful in helping women if they had taken account of the relative control women have over their earnings. Where women have more control over their income, their responsiveness to the introduction of new technologies and production techniques is greater, and can lead to greater increases in productivity.

Assumption 5: Women devote a significant amount of their time to non-income earning activities.

The biological role of women as child-bearers and the societal norms of women's roles in the family result in women having to devote a significant amount of their time to such home-based, non-income

earning activities as child care and housework. Compared to women, men spend considerably less time on such home activities. These non-income earning activities have social value, yet are overlooked in the measurement of gross national product (GNP) or other macro indicators of development that are conventionally used. The actual amount of time a woman spends in such activities is directly influenced by the size of her family. Therefore, family size also affects the amount of time a woman spends in such economic activities as production or market-wage earning employment. The model also takes into account the amount of time men spend on household activities, which is assumed to be a small proportion of the time women spend on these activities.

Assumption 6: Men who work either in formal or informal sectors may be engaged in more than one job.

However, for the sake of simplicity, and the fact that we are concerned here with women's economic activity and the income they earn over which they have control, it is assumed that women help their spouses in their main jobs, which may be in any one of the three sectors, while there is no participation by men in their spouses' economic activity, except in the informal productive sector. This is especially applicable for the 28% of the economically active female population whose main sector of activity is informal sector production. Introducing men's participation in their spouses' formal/informal service sector activity, in this model, if found relevant, through empirical studies, is an easy step which can be incorporated without major changes in the model.

Assumption 7: Fertility is related to women's education, labour force participation and access to family planning services.

Almost all studies of the determinants of fertility show that female education and labour force participation are important factors in determining fertility. Since family planning services provide knowledge and means for controlling fertility, there is a direct correlation between access to such services and fertility. Family planning practice involves both men and women. However, it is observed that the intensity of practice is higher on the part of women than men. In this model it is assumed that the proportion is 1:5 for men to women.

B. The structure of the model

In this section, the structure of the model is defined and relationships among the variables are explored. Relationships are expressed as mathematical equations. An attempt is made to explain the significance of each parameter and the rationale behind each one of the expressions.

The present model differs from most other computer models which have been developed for analyzing issues in developing countries (such as the United Nations Population and Development Simulation Game) in two important aspects.

First, it is not a macro model with variables defined at the national or regional level. It is a household or micro level model. Many WID issues, especially in the urban informal sector, can be better identified and defined at the micro level, and it is at this level that policy interventions are urgently needed and are also likely to become more effective. This does not exclude macro analysis, but aggregation from the micro to the macro level entails another step not considered in this model.

Second, this is a static model — a time dimension is not present in it. This does not imply that comparison over time is not possible. One can compare the final outcome under different policy options and derive conclusions, such as, "if policy A is changed, the resulting effects will be...." But the model does not reveal the amount of time it actually takes to implement policies or for their effects to fully materialize. Nor is the mechanism through which policies are implemented discussed. Put simply, this model takes the user from one solution to another as policy variables are manipulated. In this sense the model does explain the eventual effect of a policy. This type of "what happens if..." comparison is often referred to as a "comparative static" study, as against a study of the concerned dynamic process itself.

The structure of the model reflects the main elements of women's role while employed in urban informal and formal sectors of the Third World, as well as the main assumptions listed in the preceding section. The model consists of four inter-related components:

(i) Time allocation among various activities;
(ii) Informal sector production;
(iii) Cash income derived from formal and informal service sector activities; and
(iv) Family size.

The overall evaluation is summarized in a synthetic measure denominated "household welfare". A higher value of this welfare index represents a better outcome.

The main exogenous/policy variables in the model are:

- Level of education of women/men (Ef, Em);
- Share of control of women's/men's income controlled by women/men, where the term "income" refers to total income she/he earns (gf, gm);
- Share of men's income going to the home(s);
- Access to capital for use by women/men in their total production in the informal sector, whether on their own job or on the job of the opposite sex (Kf and Km);
- Access to technical training, credit and services for women/men (Af, Am);
- Rate of wage for women/men when they work in the formal sector, either on their own job or helping the spouse who also works in the formal sector (w1f and w1m);

- Rate of wage for women/men when they work in the informal service sector, either on their own job or helping the spouse who also works in the informal service sector (w2f, w2m);
- Proportion of urban work force employed in the three sectors included in this model (Q1 — formal sector, Q2 — informal service sector, and Q3 — informal productive sector);
- Weight assigned to each component of household welfare (z1, z2, z3);
- % of total time women spend on their job (vf) and the percent of time women spend helping the spouse in his specific sector of activity (1-vf); for Case I, of the total time M1f that a woman devotes to her formal sector job, vf.M1f goes to her own job, which is also in the formal sector and (1 - vf)M1f goes to her spouse's job, which also is in the formal sector; for Case II, of the total time M2f that a woman devotes to her informal service sector job, vf.M2f goes to her own job in the informal service sector, and (1 - vf)M2f goes to her spouse's job, also in the informal service sector; and for Case III, of the total time Lf that a woman devotes to her informal productive sector job, vf.Lf goes to her own job in the informal productive sector and (1 - vf) Lf goes to her spouse's job, also in the informal productive sector;
- Price per unit of output produced in the informal productive sector by women/men (Pf, Pm);
- Share of informal sector women's/men's product marketed for cash (df, dm);
- Total amount of time available (T) (this is the same for both the sexes); and
- Access to family planning services by women/men (FPPf,FPPm).

It should be noted that percentage/share variables are represented in small letters and others in capital letters. Throughout the model, the subscript "f" refers to female variable and "m" to male variable. The subscript "1" corresponds to all variables of the formal sector and "2" to variables of the informal service sector.

For ease of use and understanding, many of the above variables are employed in the model as index variables, which are above or below 1 relative to a reference level. The reference level can be relative to men's standard, as in the present example (see Chapter III), and at the same time it can be for a specific scenario to permit comparison with others. Index numbers represent relative values rather than absolute levels. By indexing these variables, computations are simplified, since the numbers become much smaller. This also facilitates comparison of the effect of changes in policies between different scenarios or countries — a situation where "women's education is increased by 50%" is more general than one where "government funding for women's education is increased from $10 million to $15 million." By indexing variables, it is possible to allow for country-specific reference levels to be used without

changing the structure of the model. For example, in some countries the reference level of education for women (index value 1) may be two years' primary schooling, while in some others it may imply finishing five years of primary school. The model, however, can be used in analyzing the effect of raising female education in either group of countries.

The main endogenous/dependent variables are:

- Informal sector output produced by women/men (O^Af, O^Am);
- Proportions used for combining $O^if(O^im)$, $O^{ii}f(O^{ii}m)$ and $O^{iii}f(O^{iii}m)$ to derive $O^Af(O^Am)$ are Q1, Q2 and Q3 (defined on page 9);
- Cash income women/men retain out of the total cash income they earn from all sources (Y^Af, Y^Am);
- Time spent on informal productive sector employment by women/men (Lf, Lm);
- Time spent on formal sector employment by women/men (M1f, M1m);
- Time spent on informal service sector work by women/men (M2f, M2m);
- Total time spent on domestic work by women/men averaged by the size of the household (Hf, Hm);
- Family size (S); and
- Household welfare index (U).

By manipulating the model's exogenous variables, users can explore their effect on the model's main endogenous variables. Many of the exogenous variables are the model's equivalents of policy interventions.

C. Relationships among the "Building Blocks" of the model

The model is based on seven major hypotheses regarding interrelationships. These interrelationships are:

1. Use of time

Other things being equal, the amount of time devoted to an activity will, inter alia, determine the output and/or income. Hence it would be useful to consider the allocation of a typical woman's/man's time among

(i) Informal sector employment (including productive activity in return for output and service for wage);
(ii) Formal sector employment; and
(iii) Non-income earning domestic work.

First, the model assumes a fixed amount of time (T) as being available to a person. This amount may be biologically determined as the natural time minus the hours needed to rest and to feed to sustain one's physical condition. T, therefore, may vary from person to person. However, this variance is not accounted for in this model.

The following equation describes the relationship between the share of total time devoted to wage employment and the wage rate:

m1 is a constant being the share of time devoted to formal sector economic activity.

In most countries, for employment in the formal sector, people have to work a fixed number of hours per week, which is not left to the discretion of the employee:

w1 and w2 = wage rate in the formal and informal sector, respectively;

m2 = Min [(0.2 + 0.1 w2) , 0.8], where

m2 = share of time devoted to employment in informal service sector, either on her own or for the spouse.

The mathematical function Min [... , ...] compares the values of all its arguments and assigns the smallest value to the variable on the left side. For instance, if the wage rate is equal to 1 then the value of the first argument will be 0.2 + 0.1 x 1 = 0.3, which is smaller than 0.8. Applying the formula we get m2 = 0.3, meaning the woman will devote 30% of her total time to informal service sector employment.

The first element inside the bracket is a constant term (0.2), which is not related to wage rate. It represents the amount of time one will allocate to market wage employment independent of wage rate because one needs cash income to purchase necessary personal and household items not produced by any member of the family. The term 0.1 w2 captures the positive relationship between the portion of one's time spent in market employment in the service sector and wage rate. As a whole, the main implication of this equation is that a person devotes 80% of his/her time or a percentage determined by the expression (0.2 + 0.1 w2), whichever is smaller, to market wage employment in the informal sector.

In other words, a person decides what proportion of his/her time is to be used for informal sector market

wage employment when a wage rate is given, with the constraint that it will not exceed 80%. This 80% limit is set because in the present model we assume that a part of the time is devoted to helping the spouse and on informal sector productive activities. Nonetheless, 80% is an arbitrary limit used to illustrate the point and, therefore, should not be taken as fixed. In reality, this limit is determined by social as well as cultural factors, such as the degree of self-sufficiency, cultural and other biases that prevent women from engaging in many types of economic activities, especially outside the home.

With respect to formal sector jobs, the option to choose the amount of time on such jobs does not exist since most such assignments are, in a majority of cases, for a predetermined number of hours per day/ week or any other comparable period. It is assumed that the remaining time is then used for informal sector jobs and/or informal productive sector work.

Next, the amount of time spent in home activities is taken as a function of the size of the family. Home activities include child care, food preparation, washing and cleaning, and may include looking after such animals as chickens and goats. Based on empirical observations of traditions and customs, it is assumed that men spend less time in home activities than women do. Therefore, the expressions used to determine the percentage of time spent in home activities are:

$$hf = 0.1 + 0.025\ S,$$

$$hm = 0.01 + 0.01\ S.$$

In these equations, h is the proportion of one's time spent in domestic activities, and S is the size of the family. This formulation needs very little explanation.

Finally, the amount of time remaining will be used for informal sector productive activities. Therefore, the expression used for calculating this residual is: $l = 1 - m1 - m2 - h$.

Now, to summarize the use of time among three different components:

1) Amount of time allocated to formal sector employment

   $M1 = m1.T$

2) Amount of time allocated to informal service sector activities

   $M2 = m2.T = \text{Min}\ [(0.2 + 0.1\ w2f), 0.8].T$

3) Amount of time devoted to household chores

   $Hf = hf.T = (0.1 + 0.025\ S).T$

   $Hm = hm.T = (0.01 + 0.01\ S).T$

4) Amount of time spent in informal productive sector activity

   $L = l.T = (1 - m1 - m2 - h).T$

In conclusion, the total amount of time available to a person is divided among different activities. The amount of time one uses for wage employment is, in the formal sector predetermined, and in the informal sector directly related to the demand for labour (which is not reflected in this model) and wage rate, with higher wages inducing more time to be allocated to such employment, up to 80% of one's total time. The amount of time a person devotes to household work is determined by the family size, since larger families require more time to care for. The rest of the time available will be allocated to informal sector production, where both sexes have their own products and help the opposite sex with some of the tasks of their production.

2. Informal sector production

In the tradition of economics, output is seen as a function of the factors of production — labour, capital and technical services. In addition, access to technical training and modern technology and the share of income one retains from one's production (i.e. economic power or the incentive factor) directly influence productivity. Economic power directly influences the incentive to work. This factor is as important to informal productive sector as to formal and informal service sector employment. The assumption is that if one is able to control only a small amount of the fruits of one's labour then the incentive to shirk or seek other options will be high. As a result, productivity and output will be lower. Therefore, greater economic power will lead to higher productivity via the economic incentive mechanism.

Thus, modern technical know-how, access to technical services and the share of one's income under the control of oneself enter the production function in the same way as the other traditional factors of production. A multiplicative functional form is employed to reflect the economic rationale that, while it is possible to substitute among factors, all are necessary. Also, the product of these factors of production, together with their respective power parameters, in a multiplicative mode, is used as the common measure for output per unit of time employed in the informal productive sector. Following are the equations describing women's production functions under the three cases that cover women's participation in economic activity in the urban sector:

Case I: $O^{i}f = Lf.Ef^{0.4}\ Kf^{0.3}\ Af^{0.1}\ gf^{0.1}$

Case II: Same as above, except for those women who spend a different proportion of their total time on these three sectors as compared to those in Case I above.

Case III: $O^{iii}f = [Lf.vf]Ef^{0.4}\ Kf^{0.3}\ Af^{0.1}\ gf^{0.1}$, where

$O^{\wedge}f$ = total informal productive sector output produced by women (the superscripts refer to the three cases already specified above); $O^{\wedge}f$ was derived by combining $O^{i}f$, $O^{ii}f$ and $O^{iii}f$, using Q1,

Q2 and Q3 (explained earlier) as the proportions;

$O^{A}m$ = total informal sector production by men; in the case of men, according to our assumptions, $O^{i}m$ and $O^{ii}m$ are zero, therefore, $O^{A}m$ is the same as $O^{iii}m$; the other variables in the above equations have been defined on pages 8, 9 and 10.

It may be noticed that both women's and men's education enter the production function just as capital, technical services, credit and share of control of income. As explained above, a combination of these exogenous (policy) variables is used as a common measure of output per unit of time, appliable to all the three sectors among which women distribute their economic activity time. The rationale for using a combination of these factors as the output standardizing measure is that they act as quality and/or quantity indices and so positively affect production. For example, men's and women's education enters this measure because the level of education acts as a quality index and so positively affects production in conjuction with the level or quantity of labour.

Kf is the capital input, and Af and gf are the other two nontraditional inputs — technical training, credit and technical services and the incentive factor. These have the same affect on output as education. The constants in the equations represent the productivity, or productive power, of each factor. They appear in the equation as the power parameters in the exponential expressions. In this functional form, an increase or decrease in any particular production factor will have an effect on the output per unit of time modified by its power parameter. Multiplied by the amount of time invested (Lf, Lm) gives the total output. A larger power parameter means an increase in the input of the relevant factor will increase the total output. The difference in the magnitude of these constants thus represents the difference in the productivities of different factors, or the contribution of each factor to output. The contribution of labour to total output is modified by education/training, capital, technical services and the incentive factor (gf, gm).

$O^{A}m$ defines output produced by men. The present model takes into account only that part of such output which women have helped produce and are therefore entitled to a portion. Based on Assumption 6, men work at one main job in which the woman helps. This job may be in any one of the three sectors. According to our definition, of the three cases, in the first two, the only job in which the woman helps is either the formal sector or the informal service sector. This implies that in these two cases the output of men, $O^{A}m$, that goes to women, is zero. The only case relevant to this model is:

Case III: $O^{iii}m = [Lm + Lf(1-vf)]Em^{0.4}Km^{0.3}Am^{0.1}gm^{0.1}$

The rationale behind this equation is the same as the one for women's case.

3. Income

Net cash income has four main components. The first component is the income derived from economic activity in the formal sector. Its size is determined by the wage rate and the amount of time devoted to such activity, which in most cases is fixed.

The second component is the wage income from informal service sector activities.

The third consists of income derived from the sale of informal sector production. This is determined by the level of production, the share of the production marketed, and the prices.

The fourth is the income gained as compensation for helping the spouse. If this assistance is provided to spouses working in the formal sector, then the woman earns w1f. If the assistance is to men working in the informal sector, then the woman gets w2f returns.

Consequent to Assumption 2, that men and women engage in different types of economic activities (both formal and informal), male and female income is calculated separately. What is meant by male/ female income is the amount of income over which men/women have actual control, in the sense men/ women spend this income in the way they see fit. In informal sector productive activities, just as in the formal and informal service sector activities, there is a division of tasks. Therefore, there may be tasks performed by one sex for the other, which may be compensated.

Following the reasoning above, women's income may be expressed through the following equations:

Case I: $Y^{i}f = O^{i}f.Pf.df.gf. + M1f.vf.w1f.gf + M1f(1 - vf).w1f.gf + M2f.w2f.gf$;

Case II: $Y^{ii}f = O^{ii}f.Pf.df.gf + M1f.w1f.gf + M2f.vf.w2f.gf + M2f(1 - vf).w2f.gf$; and

Case III: $Y^{iii}f = O^{iii}f.Pf.df.gf + O^{iii}m.Pm.dm(1 - gm) + M1f.w1f.gf + M2f.w2f.gf$; where

$Y^{i}f$, $Y^{ii}f$ and $Y^{iii}f$ = Total cash incomes that women retain out of the total cash incomes they earn from the formal, informal service and informal productive sectors;

$O^{i}f$, $O^{ii}f$ and $O^{iii}f$ = informal sector output produced by women employed in the corresponding sectors.

All the remaining variables in the above equations have been defined on pages 8-10.

Since most of women's production is consumed by the family, only a portion will be marketed for cash. ($O^{A}f.Pf.df$) gives the total income derived from selling this fraction of women's production in the market. Out of this income women control gf percent. Therefore, the first term in the formula in Case III helps calculate the cash income derived from selling some of women's production actually controlled

by women. At the same time, some income derived from the sale of men's production may become available to women. This may be compensation for the work women have done to help men with their informal sector production. The term ($O^{\wedge}m.Pm.dm.(1-gm)$) in the $Y^{iii}f$ equation captures this element.

It may be noticed that (1-gm) represents the fraction of income from selling men's production that is actually controlled by women. The presence of this term does not contradict Assumption 4, which states that there is a sexual inequality regarding economic power. This inequality lies in the magnitudes of gf and gm. A small gf (female control) and a large gm (male control) imply inequality.

The equation for male cash income is as follows :

$$Y^{i}m = T.w1m.gm$$

$$Y^{ii}m = T.w2m.gm$$

$$Y^{iii}m = O^{\wedge}m.Pm.dm.gm$$

It should be noted that a part of a combination of $Y^{i}m$, $Y^{ii}m$ and $Y^{iii}m$, which is represented by $Y^{\wedge}m$, is used in the final equation as men's contribution to family expenditure. This part of men's income is also assumed to be under women's control.

However, to simplify calculation of the synthetic variable, household welfare, one single variable for women's retained income and another variable for men's retained income have been derived by combining the three equations, using Q1, Q2 and Q3, as explained on page 10, pertaining to each gender. A weighted average of the three women's equations has been represented by $Y^{\wedge}f$, and the comparable men's equations is $Y^{\wedge}m$. The weights selected are based on the proportion of total urban female/male population estimated to work in the sectors relevant to this model.

4. Family size

A major element in the analysis of women's contribution to development concerns fertility. Fertility is important, not only because it is women who bear children, but also because it typically is women who provide most of the care for them, and such care is very time-consuming. Thus, factors that influence the number of children will, *inter alia*, affect other uses of women's time, which in turn determines the economic contribution of women to development. However, it goes without saying that caring for children itself is a significant contribution by women to the society at large.

In this model, fertility behavior is captured through a family size variable, since the model is static. Empirical studies have demonstrated that the size of the family is directly influenced by the level of female education, by access to family planning services and by women's participation in formal sector employment, among many cultural and economic factors. More specifically, the present model singles

out three factors — education, access to family planning services and formal sector employment. All the three have been observed to work toward reducing the number of children born, which thus determines the family size. To reflect the fact that these factors exert different degrees of negative influence on family size, constants of different magnitudes have been used in the same manner as in the production function. One way to rationalize this formulation is to think of these three factors as producing a reduction in family size, with each factor having a different degree of effectiveness or power.

The mathematical presentation of this reasoning is:

$$S = 3.5.\ Ef^{-0.1}.m1f^{-0.16}.(FPPf+FPPm)^{-0.06}, \text{ where}$$

The variables in the above equation have been defined on pages 8-10.

The number "3.5" is a constant parameter, whose meaning in this model is the size of family at a reference point. The main reason for choosing "3.5" instead of any other is to signify size of a nuclear family increasingly typical of urban environments. Users can change this constant according to their own preferences or the more representative actual information from their countries.

5. Household welfare

A synthetic index denominated "household welfare" measures and ranks the impact of policies on the model's main outputs — solutions to the endogenous variables. This index is designed to serve as a summary of the model's outcome under one set of policy interventions with a given set of parameters, so that different policy alternatives can be compared. Unlike some micro-level models, the household welfare function here is not an objective function of a welfare-maximizing model. When the model is solved, it does not automatically search for the highest value of this function subject to the other relationships. If one did not consider the financial and social costs and other constraints involved in each policy option, the index, in principle, could be increased indefinitely.

The welfare index is a function of three main components of household welfare — cash income used for the household, production retained for household consumption, and the amount of time spent in home activities. Although these are not the only factors that affect the well-being of a household, others are not being taken into account for the sake of manageability, and because of the illustrative nature of this model. It, nevertheless, captures the essence of household welfare. Income and home consumption summarize the production side of the model, and any policy change that affects women's and men's production and retained incomes will be reflected through these two components. The amount of time spent in home activities which captures the level of physical well-being of the household is a function of family size, and is influenced by family planning and women's education and participation in formal

sector employment. The household welfare index is, in fact, the outcome of a utility function (a device economists use to measure the satisfaction derived from consuming goods and services), which has weights attached to each of its components. Users can change these weights to reflect their priorities. If a component is considered to be unimportant, a zero weight can be assigned to it. Similarly a component with high priority can be given a greater weight. By assigning different weights, one can compare the values of the index to see how the ranking of policies will change even if all other factors (policy as well as parameters of the model) are held unchanged.

The household welfare function is expressed as:

$$U=[Y^{\wedge}f + s.Y^{\wedge}m]^{z1}[O^{\wedge}m(1-dm)+ O^{\wedge}f.(1-df]^{z2}(Hf+Hm)^{z3}$$

The variables of the above equation have been defined on pages 8-10.

It is easy to recognize that the first term ($Y^{\wedge}f + s.Y^{\wedge}m$) is the income component of household welfare. It has been repeatedly observed in developing countries that most, if not all, of women's income, over which they have control, is spent on the household. Women use their income for such things as covering expenses for family nutrition and clothing. Because urban women traditionally engage in informal sector service production and/or service that require a very small investment, they contribute the bulk of their income, whatever its size, for the immediate needs of the household. This is the empirical reason for including a major part of women's retained income in the income component of the welfare index.

Men, it is hypothesized, give a small percentage of their income for family use. This may result from cultural factors or from the fact that men need to invest more of their income in their productive activities and to procure or improve other household assets. The percentage they do contribute to household welfare in terms of cash income is denoted as "s". So "$s.Y^{\wedge}m$" represents the amount of men's income contribution to the household. This amount may be greater than $Y^{\wedge}f$ in some cases. However, the hypothesis for the present model is that women contribute a considerably larger portion of their income to household welfare.

The second term [$O^{\wedge}m(1-dm) + O^{\wedge}f(1-df)$] is the home consumption component of the welfare function. Since dm (df) is the share of men's (women's) production marketed, 1-dm (1-df) is, then, the portion of the men's (women's) output retained for household consumption. This percentage multiplied by the total output ($O^{\wedge}m$ and $O^{\wedge}f$ for male and female outputs respectively) gives the amount of output retained. As part of the output produced by both sexes is consumed by the household, there are two parts to this component.

The last term (Hf+Hm) is the home activity component of the household welfare. As assumed in an earlier section of this document, men spend a small proportion of their time caring for children or performing other household chores; women's time spent on such activities is much more substantial.

However, both men's and women's time spent on the household enter the household welfare index. The amount of time used here is in per capita terms (time spent by women or men on each member of the household), since it captures the immediate impact of family planning on the welfare of the household. The rationale for this component in the index is quite obvious. Women and men devote their time to care for the children, and to feed and clothe the family. These activities do not have a market value (except for the opportunity cost, which is not accounted for in this model), but they directly affect the well-being of a household.

In short, this household welfare index is being used to measure the overall impact of a policy on the well-being of the family. In calculating this index, the total cash income spent on household welfare, the amount of output produced that the family consumes, and the time allocated to family-oriented activities are included.

D. Data and parameters of the model

The above model is general enough to become applicable to the situation of women across the Third World. Of course, African women differ from Asian and Latin American women, but the differences can be accounted for in the model in terms of parameter values which define the functional relationships in the model. Hence, the model eventually could be established for three or four regions (North Africa and West Asia, Sub-Saharan Africa, Latin America, and Asia).

Ideally the parameters and functions in such a model should be established at the regional level through econometric estimation. However, it is doubtful that appropriate data exist. National statistical and demographic yearbooks normally do not provide the kind of micro data that is required for such estimation. Specially designed household surveys have to be conducted to collect the necessary data. (See Appendix 3 for the important variables that should be included in surveys.) Alternatively, one may use a combination of individual country studies, which can be distilled into stylized facts for a set of stereotype countries.

In the present study, data from a variety of sources have been used to establish a base solution for the model. While many of the parameters are "reasonable" for many developing countries, there is enough variation across countries and even within countries to suggest that a data bank of parameters needs to be established and a data base of solutions derived from the data bank. It is beyond the scope of the present study, however, to establish a data base for a set of real countries.

As pointed out in the introductory chapter, this model is constructed as a tool for teaching the user a method to conceptualize and possibly analyze issues connected with women in development, rather than to provide practical solutions. If one can master the method presented in this model and apply it for solving the problems in his/her own country by modifying or expanding it, the primary objective of this model will have been achieved.

III. THE COMPUTER SIMULATION MODEL AND POLICY EXERCISES

The model described in the previous chapter is relatively simple and does not require very sophisticated software to solve. To simulate the model on a personal computer, the commercial software package, LOTUS 1-2-3, which is widely available, has been used. In this section, an introduction to the LOTUS-based model is given and a few policy exercises are carried out. The computer model is very simple and easy to use.

A. Organization of the worksheet

The United Nations Urban Women in Development Model is distributed as one single diskette. The model itself is contained in a single LOTUS spreadsheet bearing the file name URBWID.wk1. On the same diskette, there is another directory, HG (Harvard Graphics), which contains a slideshow (the file name is UBWDSLSH.SHW) summarizing the purposes, assumptions used, and exogenous as well as endogenous variables of the model. As in the case of any software, a backup copy should be made before using the model. To run the URBWID model, a personal computer with a DOS operating system is required. The machine should be able to support the LOTUS 1-2-3 program. To view the slide show, a computer with graphics capability is necessary. The minimal requirement is a graphic desplay terminal and a computer with a graphic card installed. Any IBM-XT or above or its compatibles will be sufficient. The slide show can be brought up on the screen by using DOS commands.

The worksheet is divided into three panels. The diagram on the following page illustrates the range and contents of each panel.

	ROWS	COLUMNS		
		A B C	E F G	H I
Headers	1 . . . 7			
Endog. Variables	9 . 26 . . 37			
Exog. Variables and Parameters	39 . . 50	For the current solution		For reference solution

In the first panel (columns A to C), the current solution is presented. A reference (or baseline) solution is saved in columns H and I. The percentage changes between the current and reference solutions are provided in columns E to F.

In the upper left part (rows 9 - 33) of the current solution panel, the values of the model's endogenous variables for the current solution are found. In the bottom left panel, the values of the model's exogenous variables and its parameter values (rows 39 - 78) are found.

Similarly for the reference solution, the values of the endogenous variables are found in the same rows (9 - 33). As in the current solution panel, the values of the exogenous variables as well as of the parameters, which were used to establish the reference run, are presented in rows (39 - 78). Unlike the cells in the current solution panel which contain the 1-2-3 formulas for calculating endogenous variables, the reference run panel contains only values, because these are the results of the application of the same formulas.

The model contains simultaneous relations between variables. To solve the model, the spreadsheet iterates several times before arriving at a solution. This is done through the "recalculation" command with iterations set, for this model, to 10. Users are advised not to change the status of the recalculation mode.

If users wish to establish a new reference run, the exogenous variables and parameters should be assigned appropriate values in the current run panel. The model will calculate the solution. After all the desired changes have been made, the current run panel should be copied over to columns H and I, including the values of the new baseline solution, exogenous variables and parameters.

B. Using the spreadsheet model to simulate policy options

Using the URBWID spreadsheet is straightforward. All of the cells where formulas are found are "protected" and cannot be altered unless the user unprotects them. The unprotected cells are those cells which are then under user control. These are the model's exogenous variables and parameters. A change in any of these will result in a new solution. The model is constructed in such a way as to obtain a new solution every time an exogenous variable is changed. Therefore it is very easy to use. To experiment with different options, the user needs only to change the value of the exogenous variable that corresponds to a particular policy, and the solution is automatically calculated. Any new solution can be compared to the reference solution by either comparing the endogenous variable values in the two solutions or by consulting the percentage change columns.

As it is presently set up, the spreadsheet allows for only two solutions at a time. However, more than two solutions can be stored by copying the values (endogenous, exogenous, parameters and percentage changes) of a solution over to empty columns.

It is time to experiment with a few policy options. The users are reminded that, as explained earlier, any lessons learned from these policy exercises should be understood as examples or scenarios. Empirical verification and further refinements are necessary to make these lessons relevant to any particular real life situation.

First, a baseline reference solution has to be established. In this reference run, parameters are given values that approximately correspond to what may be the situation in many developing countries. They are the parameters that have been used in describing the model. As discussed earlier in the Data and Parameters section, while these parameters may approximate reality, they are not statistically obtained. Therefore, the particular parameter values are arbitrary to a certain extent. But the arbitrariness does not interfere with the illustrative power of the model.

In Table 1A on the next page, Reference Run values of the model's exogenous and policy variables are presented. For ease of use and interpretation, many of these values are index numbers without units. For example, the education variable is such an index factor. Here for men the variable has a value of 1, whereas for women the value is set for the reference solution at 0.6. Similar differences can be noticed for other variables.

TABLE 1A

Reference Run
Values of Exogenous Variables

Exogenous Variables	Men	Women
Education (E)	1.0	0.6
Capital (K)	1.0	0.5
Technical Services (A)	1.0	0.7
Wage Rate in Formal Sector (w1)	1.0	0.8
Wage Rate in Informal Sector (w2)	0.85	0.6
Retention Factor (g)	1.0	0.7
Prices (P)	1.0	1.0
Proportion of Prod. Marketed (d)	0.8	0.2
Family Planning (FPP)	0.2	1.0
Prop. of Men's Income for Home (s)	0.4	

Table 1B on the next page shows the solution to the model for the Reference Run. Different patterns of time use can be noted between men and women. These are within the range of values as reported in various empirical studies. The base solution family size is set at 4.55, representing a relatively high level of fertility, but an (as yet) incomplete family.

TABLE 1B

Reference Solution
Women in Development Time and Production Model

Allocation of Time	Men	Women
Pct.Time Home Activities (h)	6.00	21.00
Pct.Time Form. Sect.Emp. (m1)	—	25.00
Pct.Time Inf. Sect.Emp. (m2)	—	26.00
Pct.TimeInf.Sect.Production (l)	—	28.00
Prop.Time for Own Act. (v)	00.95	00.85
Time Use (Day equivalents)		
Total Available (T)	300.00	300.00
Formal Sect. Employment (M1)	—	75.00
Inf.Sect. Employment (M2)	—	78.00
Inf.Sect. Production (L)	—	82.89
Time for Home (H)	—	64.11
Tot.Inf.Sect.Prod.	76.91	40.51
For Market	61.53	8.10
For Home	15.38	32.41
Cash Income	258.03	80.43
FAMILY SIZE	4.55	
HOUSEHOLD WELFARE	104.00	

Effects of increased education for women

Table 2 shows the results of an exercise in which the education coefficient of women (0.6 in the Reference Solution) is raised to 50% over the level of men (1.0 in the Reference Solution). Given the initial differences between male and female education levels in the Reference Solution, this represents a significant increase in women's education coefficient, amounting to 250%.

TABLE 2

Impact on Household Welfare of Increasing Women's Education to the Same Level as Men

Allocation of Time	Men	Women	% Changes	
Pct.Time Home Activities (h)	6.00	20.00	0.00	-4.66
Pct.Time Formal Sect.Act.(m1)	—	25.00	—	0.00
Pct.Time Inform.Sect.Act.(m2)	—	26.00	0.00	0.00
Pct.Time Inf.Prod.Sect. (l)	—	29.00	—	3.60
Prop.Time for Own Act. (v)	00.95	00.85	0.00	0.00
Time Use (Day equivalents)				
Total Available (T)	300.00	300.00	0.00	0.00
Time for Form.Sect.Emp.(M1)	283.36	75.00	0.00	0.00
Time for Inf.Sect.Emp.(M2)	—	78.00	0.00	0.00
Time for Inf.Prod.Sect.(L)	—	85.88	0.00	3.60
Time for Home Act. (H)	16.64	61.12	-0.03	-4.66
Tot.Inf.Sect.Prod.(O^Am, O^Af)	77.02	60.55	0.15	49.47
For Market	61.84	12.06	—	49.47
For Home	15.49	48.49	—	49.47
Cash Income	258.13	83.24	0.04	3.49
FAMILY SIZE	4.15		-8.76	
HOUSEHOLD WELFARE	113.51		9.09	

Columns 1 and 2 give the values of the solution, while columns 3 and 4 give the percentage changes from the Reference Run for each variable. The interpretation of this and the following tables should be focused primarily on the qualitative, rather than the quantitative, information they contain. Hence, what is of interest is the changes in their signs and not so much their magnitude.

As can be seen, there are significant changes in the solution. Female home activities decrease. Time spent on informal productive sector activities increases for women. Less time required to be spent by women is due to the reduction in the size of family. More time spent on the informal productive sector

is reflected in higher informal sector production (49.47% more compared to the reference solution) in the case of women. It may be noticed that the rate of increase in women's production is higher than that of men. Cash income increases slightly more for women than for men. Family size decreases as a result of the increase in women's education. The combined effect on household welfare is positive.

An interesting result is the effect of a decrease in the family size, which gives more time to women to spend on their economic activity. A decline in family size releases time to spend on their economic activities, also with a corresponding increase in income. Because some of women's income is appropriated by men, any increase in women's income has a corresponding affect on men's income. To the extent that some of women's time is spent on male economic activity, any increase in female labour input translates itself into an increase in male income and production. This is another indirect affect on men.

Effects of wage equality

In the next exercise, given in Table 3 on the next page, the results of increasing women's wage level to that of men, in both formal and informal sector activities, are seen.

TABLE 3

Impact on Household Welfare of Increasing Women's Wage Level to That of Men

Allocation of Time	Men	Women	% Changes	
Pct.Time Home Activities (h)	5.55	21.00	0.00	0.00
Pct.Time on Form Sect.Emp.(m1)	—	25.00	0.00	0.00
Pct.Time on Inf.Sect.Emp.(m2)	—	29.00	0.00	9.62
Pct.Time on Inf.Prod.Sect.(l)	—	25.00	0.00	-9.05
Prop.Time on Own Act.(v)	00.95	00.85	0.00	0.00
Time Use (Day equivalents)				
Total Available (T)	300.00	300.00	0.00	0.00
Form.Sect.Employment (M1)	—	75.00	0.00	0.00
Inform.Sect.Activities (M2)	—	85.50	0.00	9.62
Inform.Prod.Sect.Activities(L)	—	75.39	0.00	-9.05
Time for Home Activities(H)	—	64.11	0.00	0.00
Tot.Inf.Sect.Prod.($O^A m$, $O^A f$)	76.61	36.85	-0.38	-9.05
For Market	61.29	7.37	-0.38	-9.05
For Home	15.32	29.48	-0.38	-9.05
Cash Income	257.80	108.53	-0.09	34.94
FAMILY SIZE	4.55		0.00	
HOUSE HOLD WELFARE	110.00		5.29	

Here, the policy has the effect of changing the allocation of women's time away from the informal productive sector to the informal service sector for wage employment. The increase in formal sector wage is not significant enough to raise women's time in formal sector employment. Also, there is no effect on the amount of time for home activities of women, as is true in the case of men. More wage employment, even in the informal sector, and higher wage rate means more cash income. Increase in formal sector wage also adds to women's cash income by 35%.

The increased cash income and higher rate of female participation in informal sector employment, which in many cases is compatible with child rearing, have no effect on family size. The welfare index increases slightly, since women's cash income increased by more than 35%. Thus, although raising women's wages raises household welfare, the effect is not strong enough to reduce family size. However, the household welfare improves.

It is interesting to note the effects of, (the very unliekly prospect of), moderately raising women's wages to more than ruling men's wages, even as a pure mental exercise, by 20% in the formal sector and 12% in the informal sector. This leads to a 53% increase in women's cash income and 8% increase in household welfare. These increases would have been even more dramatic in the absence of our assumption that the number of hours of work in the formal sector is fixed and cannot be changed. The significant increase in women's cash income has a strong positive impact on family nuturition, health and well-being since it has been empirically proved that women spend a very large proportion, if not all, of their income on their families. This holds a clear message for those policy makers who are mandated to improve family well-being.

Increasing women's control of own income

In this exercise (summarized in Table 4 below), a woman's control of her earnings is raised to 1[illegible].

TABLE 4

Impact on Household Welfare of Increasing Women's Control of Their Income

Allocation of Time	Men	Women	% Changes	
Pct.Time Home Activities (h)	6.00	21.00	0.00	0.00
Pct.Time Form.Sect.Emp. (m1)	—	25.00	0.00	0.00
Pct.Time Inf.Sect.Emp. (m2)	—	26.00	0.00	0.00
Pct.Time Inf.Prod.Sect.(l)	—	28.00	0.00	0.00
Prop.Time on Own Act.(v)	00.95	00.85	0.00	0.00
Time Use (Day equivalents)				
Total Available (T)	300.00	300.00	0.00	0.00
Form.Sect.Employment (M1)	—	5.00	0.00	0.00
Inf.Sect.Employment (M2)	—	78.00	0.00	0.00
Inf.Prod.Sect.Work (L)	—	82.89	0.00	0.00
Home Activities (H)	—	64.11	0.00	0.00
Tot.Inf.Sect.Prod.(O^Am, O^Af)	76.91	48.42	0.00	19.52
For Market	61.53	9.68	0.00	19.52
For Home	15.38	38.74	0.00	19.52
Cash Income	258.03	116.48	0.00	44.82
FAMILY SIZE	4.55		0.00	
HOUSEHOLD WELFARE	118.13		13.53	

The preceding table shows that this has an immediate productivity impact whereby both total informal productive sector output and income increase, but there is no effect on the allocation of time or on the size of the family. Household welfare increases by approximately 14% due to an increase in women's income by more than 44% which is a reflection of the positive effect of women's income under their own control. The absence of any impact on family size of higher cash incomes, is because of our assumption of already modest average family size, reflecting transition to replacement fertility levels.

Effects of increased family planning

In this exercise (presented in Table 5 on the following page), family planning access was increased to simulate the adoption of more effective contraceptive methods. The experiment consists of doubling the family planning index variable in women's case and increasing it by 250% in men's case. This had the expected effect of decreasing family size and, *inter alia*, decreasing home activities for women and men and increasing informal productive sector time for both, including a slight increase in men's time for formal service sector activities. The effect of these changes on household welfare is substantial.

TABLE 5

Impact on Household Welfare of Increased Family Planning

Allocation of Time	Men	Women	% Changes	
Pct.Time Home Activities (h)	6.00	21.00	0.00	-2.29
Pct.Time Form.Sect.Act. (m1)	—	25.00	0.00	0.00
Pct.Time Inf.Sect.Act. (m2)	—	26.00	0.00	0.00
Pct.Time Inf.Prod.Act. (l)	—	28.00	0.00	1.77
Prop.Time on Own Act.(v)	00.95	00.85	0.00	0.00
Time Use (Day equivalents)				
Total Available (T)	300.00	300.00	0.00	0.00
Form.Sect.Employment (M1)	—	75.00	—	0.00
Inf.Sect.Employment (M2)	—	78.00	—	0.00
Inf.Prod.Sect.Empl. (L)	—	84.36	—	1.77
Home activities (H)	—	62.64	-3.53	-2.29
Tot.Inf.Prod.Sect.	77.12	41.23	0.27	21.64
For Market	61.70	8.25	0.27	21.64
For Home	15.42	32.98	0.27	21.64
Cash Income	258.61	80.53	0.22	45.04
FAMILY SIZE	4.35		-4.31	
HOUSEHOLD WELFARE	118.10		13.51	

Obviously, there are many more policy possibilities. Users are encouraged to run their own policy options. Through these exercises with different policy options, the user can see the effect of these changes on the time use, income, production, family size and household welfare index.

IV. CONCLUDING REMARKS

The model described in the previous chapters is a relatively simple, yet illustrative, one. The primary goal of this model is to introduce a method for conceptualizing WID issues and for analyzing qualitative, and to a lesser extent, quantitative aspects of women's role in development. It also is intended as an awareness raising model, an illustration, which, it is hoped, will help policy makers and the public understand the importance of WID issues. In this sense, it is a general model. But the model in its present form is not one which is based on generalized statistical evidences to define its parameters.

As a teaching tool, the model has been constructed to be simple, easy to learn and easy to use. The attempt to make it practically relevant has made the examples, it is hoped, interesting. But a compromise between immediate applicability and structural simplicity had to be struck. Hence, application of the model to any specific country will require extensive empirical verification and modification of the parameter values. Modifications also may be called for in the assumptions with respect to functions and their arguments in order to account for cultural, social and economic circumstances in any particular country. It is hoped that this model has demonstrated an analytical method with which one can customize the model to fit one's own needs and priorities.

One of the lessons that can be drawn from the exercises illustrated above is that for more effective implementation of WID policies (to ensure women's efficient participation in development, both as contributors and beneficiaries), it is necessary to work simultaneously on a number of policy variables to take advantage of the synergy such a combination generates, due to close interrelationships and interdependence among these factors. This can be easily verified from the model by changing a number of exogenous variables at the same time rather than sequentially. This is an important lesson worth bringing to the attention of policy makers.

APPENDIX 1

AN EXAMPLE OF PARAMETER ESTIMATION

Before applying any theoretical model, one needs to estimate all the parameters of the model. This requires the expertise of an econometrician. Various methods have been developed to empirically estimate a model, but only the simplest method will be outlined in this appendix as an illustration of how it can be done. Since teaching statistics and econometrics is not the purpose of this documentation, the technical issues, both in statistical manipulation and econometrics theory, will not be discussed here. Only a simple example using women's production equation will be introduced to show the procedure of parameter estimation.

The theoretical proposition underlying the production equations (women's as a special case at hand) is that a set of factors of production are necessary in producing any type of output. These factors may be substituted for one another, but all are required. Furthermore, each factor has a productivity, or productive power, to contribute to the production of output. In our particular model, five factors are included — labour, capital, technical knowledge, technical services and share of women's income controlled by women. Mathematically, this relationship can be expressed as:

$$Of = [Lf.Ef.vf + Lm.Em(1-vm)]^a \, Kf^b \, Af^c \, gf^d, \text{ where}$$

lower case letters a, b, c and d are the parameters representing
the productivity of respective production factors.

To empirically estimate these parameters, data should be collected on women's total informal productive sector output, time spent by men and women in this sector, men's and women's educational levels, the percentage of men's and women's informal productive sector time used for their own output, the amount of capital and technical services to which women have access, the share of women's income controlled by women, and the amount of technical knowledge women can use. After these data have been collected over a reasonably large sample, one can proceed to the estimation step. Notice that we have a non-linear equation here. To use the simplest and most common regression method, the equation has to be transformed into a linear form. This can be accomplished by taking the natural logarithm:

$$\ln(Of) = a.\ln[Lf.Ef.vf + Lm.Em.(1-vm)] + b.\ln(Kf) + c.\ln(Af) + d.\ln(gf)$$

This transformed equation can be estimated by the Ordinary Least Squares (OLS, for short) method. The resulting estimated values of the parameters a, b, c and d can then be plugged back into the women's production function, and the equation can be called an empirically based relationship.

All other equations in the URBWID model can be estimated accordingly. To estimate the whole model, however, more sophisticated econometrics methods will yield better results since the model involves simultaneous equations.

Readers are reminded once more that this model is intended to teach a method of analyzing WID issues, not as a device to generate policies. Therefore, the task of empirically establishing the model has been left out of this documentation. Consequently, only a simple illustration of estimation procedures, instead of a thorough introduction to econometrics, is given in this appendix. Interested readers may consult with econometricians or may read any econometrics textbook to more fully understand the technicalities involved in empirical applications.

APPENDIX 2

BASICS OF OPERATING A PERSONAL COMPUTER (PC)

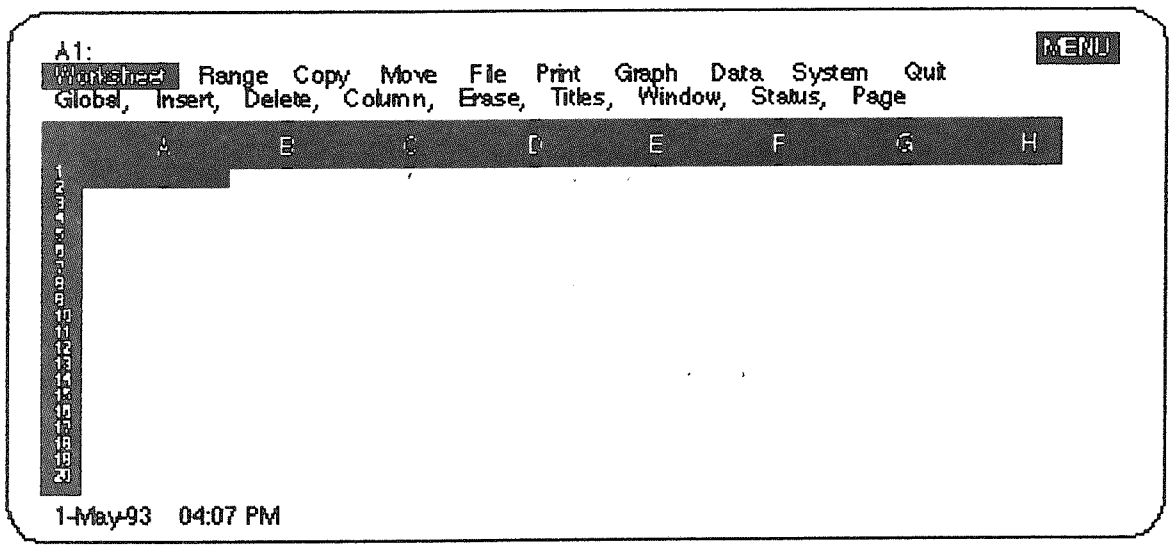
A. Hardware requirements and employment of software

As explained in the text of this document, a personal computer with a DOS operating system is required to run this model. The machine should be able to support the LOTUS 1-2-3 and Harvard Graphics programs. The model itself is contained in a single LOTUS spreadsheet bearing the file name URBWID.wk1. To view the Harvard Graphics slide show a computer with graphics capability is necessary. The minimal requirement is a graphic display terminal and a computer with a graphic card installed. Any IBM-XT or above or its "compatibles" will be sufficient. The slide show can be brought up on the screen by using Harvard Graphics commands.

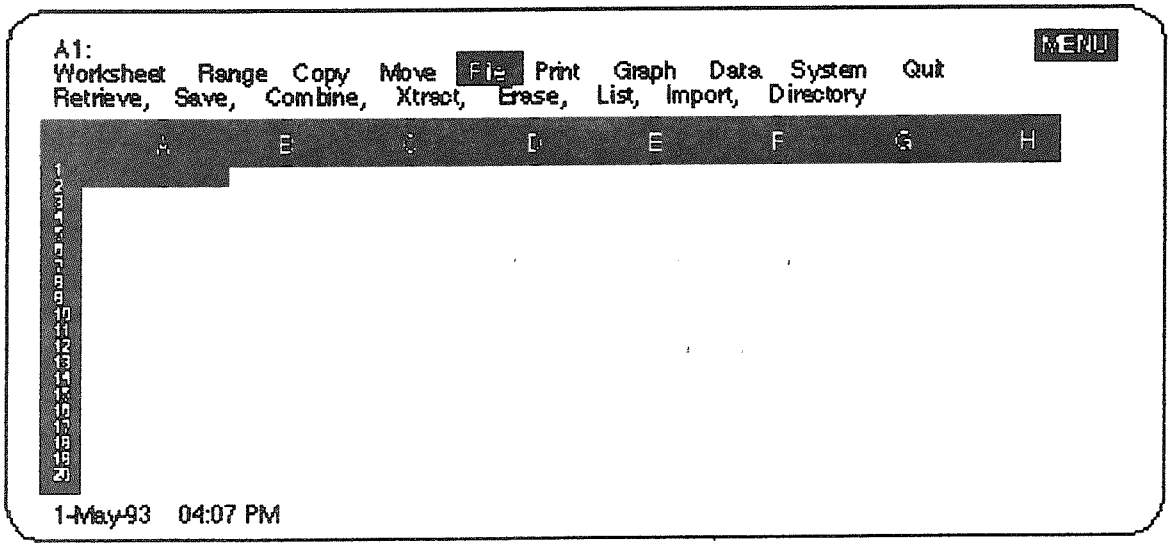
Since the purpose of this document is describing a method of analyzing WID issues rather than teaching computer techniques, the coverage of this appendix will be limited to materials necessary to use the software including its appropriate use and manipulation. An introduction to the basic concepts and skills needed by this model will also be covered.

To bring up the "slide show", the Harvard Graphics software has to be activated and the "slide show" program disk inserted in drive A or B and the drive door closed. The slide show is stored in a file called UBWDSLSH. When the Harvard Graphics software is activated in the drive in operation "\hg" will appear. Hit the "Enter" key. First Harvard Graphics logo will appear. This will soon be automatically replaced by the Main Menu screen. From this menu select the "Slide Show" option and hit "Enter". A second menu — Slide Show Menu — appears from which select "Display Screenshow" option and hit "Enter". At the top of the screen against the "Directory" line make sure that the drive in which the UBWDSLSH programme diskette is inserted is specified. The second line on top will display the name of the file. Pressing the "Enter" key will bring the first screen of the slide show. For the next and the successive screens just press any key. There are in all 6 screens in the slide show. To interrupt, the "ESC" key may be pressed twice to get back to the Main Menu. After all the 6 screens are displayed the programme returns you to the first screen. At this time hitting "Escape" key twice will bring you to the Main Menu. Selecting the "Exit" option from this menu will take you back to the Harvard Graphics directory and typing CD\ will put you back in DOS.

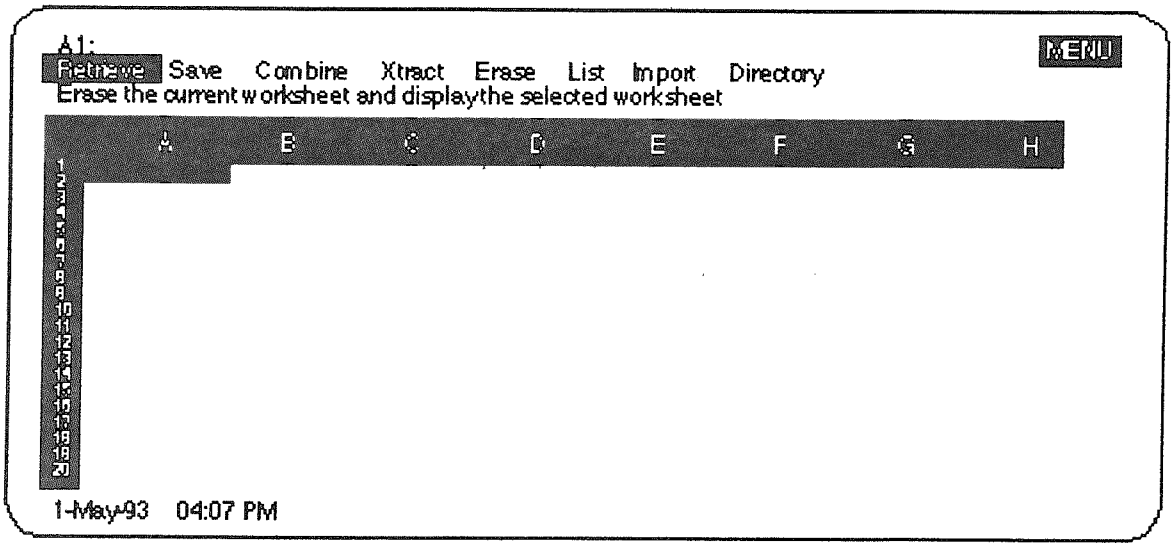
To use the worksheet, in which the model itself is stored, LOTUS 1-2-3 needs to be installed and activated first. After the product logo screen, a worksheet appears on the screen. At this stage, the menu mode has to be entered by pressing "/" at which time the screen should look like this:



The arrow key should be used to select/highlight the item "File" as shown in the following illustration.



Following this selection, the screen should be:



Selecting "Retrieve" and hitting "<------/ " will bring up the directory of files in the current drive. The user is then prompted to specify from which drive and which file to retrieve. The next step is to type the drive letter followed by :\URBWID.WK1, and then pressing "<------/ ". This brings up the work sheet that contains the model.

A personal computer (in fact, any computer) needs an operating system to tell it what to do. The one we are going to use is MS-DOS. There are a few terms, symbols and commands one needs to know before one runs a computer program such as the URBWID model, we are going to look at. Because the URBWID model is constructed in LOTUS 1-2-3, we will also introduce a few of its fundamentals.

MS - DOS

MS-DOS is a PC operating system. It has its own language one needs to know in order to use it.

A. Terms and symbols

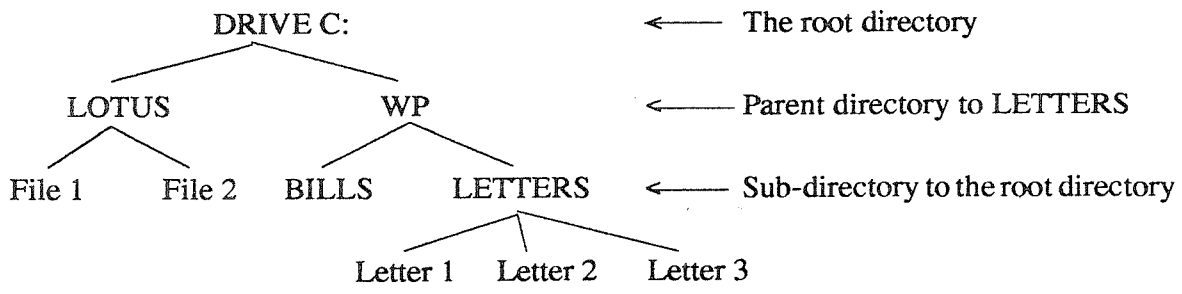
FILE. A file is a collection of related information, much like the items in a file folder. It can contain numerical data or texts. A file on a diskette needs a name, just like a file folder needs a label for identification purpose.

A file name consists of two parts — (1) a name (1-8 characters) and (2) an extension (1-3 characters). A period (.) separates the two parts. The extension is mainly for describing the contents of a file.

A file name can be entered either in upper or lower case letters. DOS automatically converts them to uppercase letters. For example, URBWID.WK1 is a file name, URBWID.WK2 is another. These two names also constitute an example in which the file names themselves indicate that the two files are related while the extensions set them apart.

DIRECTORY. A directory is the table of contents of a disk. Sometimes one may want to divide the many files on one disk into groups of related files, (for example, all LOTUS files and all other types of documents such as menus, circulars, letters, bills, receipts etc.) and give a unique name to each group. Each group will have its table of contents, hence there can be more than one directories on one disk. These directories are often called sub-directories. This is often the case with the hard disk.

Sometimes a subdirectory is further divided into another level of subdirectories. Such multi-level divisions give rise to the terms "root directory" and "parent directory". The root directory is the highest level directory on a computer. The directory one level above the current working directory is the parent directory of a working directory. The following diagram depicts one example of a "directory tree":



To access a file in a directory tree, one needs to follow the "path". For example, to use File 1, the path to follow will be C:\LOTUS then specify the file name "File 1". To edit Letter 3, "C:\WP\LETTERS Letter 3" will be the command to use.

DRIVE. To use the information stored on a diskette, one needs to insert the disk in a floppy disk drive. Floppy drives are the slots at the front of a machine; they are usually referred to as drive A and drive B. The hard disk, which is often inside a machine, is normally referred to as drive C. A drive is activated by simply typing a letter followed by a colon, such as C: or A: etc.

PROMPT and DEFAULT DRIVE. A prompt is a symbol MS-DOS uses to let you know that it is ready to receive a command. It contains the default drive letter followed by the greater-than sign (>). The default drive is the drive where MS-DOS looks first for the file when executing a command. One has to specify the drive name before the file name when a command is given, if a diskette is placed in a drive other than the default drive. Of course, one can always change the default drive to be the drive where the diskette is usually placed. To do so, one would only type the drive letter followed by a colon and then press "<------/ ".

SYMBOLS. The symbol "<------/ " is used throughout the document to represent "press the enter key". Another symbol "^" indicates a space (or "press the space bar once") between two characters. Unless this "^" symbol appears, no space should be left in a command.

B. The DIR command

This is the command you use to see the table of contents (i.e., the directory) of a disk. The directory contains the names of the files, their sizes and the date they were updated last. Typing "dir <------/ " brings up the directory of the disk in the default drive, drive C. If one wishes to view the directory of the diskette placed in drive A, one either changes the default drive to A by typing "A: <------/ " then gives the DIR command or includes the drive name in the command by typing "A:dir <------/ ".

C. Copying files

(1) From floppy to hard drive

Step 1: make the hard disk or C drive, the default drive by typing "C: <------/ ".

Step 2: place the source diskette in drive A and close the drive door. Note that now drive A is the source drive.

Step 3: at the DOS prompt, follow the directory tree to make the subdirectory to which you wish to copy the file(s), the current directory. If this subdirectory already exists, for example with a name "SD", type the following at the prompt: "CD\SD <------/ ". But if this subdirectory is new, you have to create it first,

then make it the current directory. Say we call this subdirectory NSD, you need to do the following:

MD\NSD <------/

CD\NSD <------/

Step 4: if there are no subdirectories on the source disk, type: "COPY ^ A: *.* <------/ " and all files will be copied from drive A to drive C under the subdirectory you have chosen. But if there are more than one subdirectory on the source disk, it is necessary to specify which subdirectory files you want to copy. Suppose we would like to copy all files in the subdirectory named "dn", we have to type: "COPY ^ X:\dn^*.*<------/ ".

(2) From floppy to floppy

If you wish to copy the contents of one diskette entirely to another diskette use the DISKCOPY command. It works in the following manner:

Step 1: Put MS-DOS disk in drive A and close the drive door (if you have MS-DOS on hard drive you do not need this part) then turn on the computer.

Step 2: At the MS-DOS prompt, type "DISKCOPY ^ a: b: <------/ ".

Then you will be prompted to insert the "source" diskette in drive A and the "target" diskette in drive B and close the drive doors. Follow these instructions (Remove DOS disk from drive A first, of course).

Step 3: Press any key (space bar, for instance) to start the copying process. Then self-explanatory instructions will be given by the computer, follow them exactly.

If only some of the files on a diskette need to be copied, the steps will be the same except the file names on the source diskette (including their extensions) will have to be included in the copy command.

D. Installing or copying the program URBWID on a PC

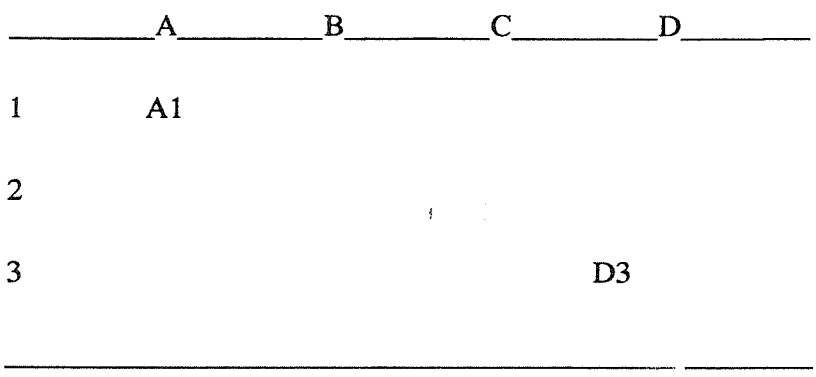
It is very easy to install a program, since only a few steps need to be followed. In our example, the program to be installed is URBWID. Since this program is contained in a spreadsheet written in LOTUS1-2-3, the LOTUS software will have to be installed first. Then a simple retrieve command in 123 will start the URBWID program. The procedure will be slightly different for computers with or without a hard drive. To copy the programs, you will need to create directories — LOTUSWID for the URBWID.WK1 file, and HG for the slideshow UBWDSLSH.SHW. Copying should be done through DOS commands.

LOTUS 1-2-3 (or just 123)

This is an MS-DOS based program — it operates in the DOS environment.

A. Structure of a worksheet and a few terms.

A worksheet is the LOTUS name for a spreadsheet. A LOTUS worksheet looks like the following illustration:



The worksheet is divided into columns (indicated by letters A. B. C. etc) and rows (indicated by numbers 1, 2, 3, etc). Each cell is identified by its column/row "address". For example, A1 is the address of the cell at the intersection of column A and row 1. A number, a label (string of characters) or a formula can be entered in a cell. Grouping one or more cells in a rectangle forms a range. To define a range, press "/", choose "Range" from the menu then use the arrow keys to specify the cells to be included and hit Enter to finish. The range will be highlighted.

B. Some useful functions of LOTUS 1-2-3

HELP. This function provides on-screen help to the users at virtually any time in 1-2-3. To get help, press F1. The "help" mode comes on. Then use the arrow keys to select topics of further help. To exit from this mode, press "Esc" key and it returns to where you left the worksheet.

MENU. Press "/" to enter this mode and then use the arrow key to move within the main menu. The menu appears at the top of the screen. The second line is a short description of the command on which the cursor (the highlighted block) is positioned. To choose a particular item, move the cursor over and press Enter. At each level of command, choice selection is done in the same way.

ENTER DATA. Move the cell pointer (or the cursor) to the cell where you wish to enter the data and simply type the data. To make the entry, press Enter after finishing typing.

EDIT DATA. Once data are entered, they can be edited if desired. Move the cell pointer to the cell then press the "Edit" key, F2, and the Edit mode will appear at the upper right corner of the screen. Use the arrow keys to move inside the entry and make changes. Press Enter to complete.

APPENDIX 3

ITEMS ON WHICH DATA SHOULD BE COLLECTED FOR CONSTRUCTING URBWID MODEL

It is to be noted that these items are illustrative and not exhaustive. Each researcher should design the study and topics to be investigated on the basis of the scope and focus of the study and the characteristics of the context in which the study is to be conducted. A specific reference period should be predetermined, such as the previous week or month.

I Household size and structure (those who slept in the household previous night)

1. Head of household
2. Relationship of each person to head of household
3. Personal data of each member:
   - (i) Name
   - (ii) Sex
   - (iii) Age
   - (iv) Civil status
   - (v) Educational level attained
   - (vi) Main occupation
   - (vii) Subsidiary occupation

(From the above information, the actual person to be interviewed should be selected. The person should be a female who is either head of a household or is responsible for the household. She should be requested to give her own and her spouse's (if applicable) information, as well as information on the other relevant members of the household.)

4. Fertility status of the interviewee
   - (i) Number of children born alive
   - (ii) Number still living
   - (iii) Of the living, number living in the interviewee's household
   - (iv) Of those living with the interviewee how many work, and give income to the interviewee
   - (v) Income provided by such members during the reference period

II Women's and men's time use

(i) Time spent in different types of household activities — preferably a list of activities and time spent on each
(ii) Time used for ones own sustenance
(iii) Time spent in formal sector job
(iv) Time spent on informal sector work
(v) Time spent on informal productive sector work
(vi) Time spent helping the spouse in his economic activity

III Household income

(i) Hourly wage/income obtained from formal sector job during reference period
(ii) Hourly income and total income from informal sector service job during reference period
(iii) Total informal sector production during the reference period — each product to be listed separately together with quantities produced and price per unit, how much was sold; how much was used for household consumption, and income gained during the reference period from each product
(iv) Of the income earned how much was given to the spouse
(v) Income over which the interviewee had control

IV Use of income

1. List of items of expenditure and the amount spent on each item including savings and how they were dealt with

V Capital available for production

(i) List of each type of capital used
(ii) Quantity of each type of capital used
(iii) Where and how obtained
(iv) Cost of each type of capital

VI Technical services

(i) What type of technical services used during the reference period; each item to be listed separately and following information should be provided
(ii) Where were they obtained from
(iii) How much was their cost

VII Technical training

(i) Type of technical training relevant to informal sector production the interviewee has received

(ii) Was this training received during the schooling years

VIII Family planning

(i) Type of services available

(ii) Where available

(iii) Contraceptive use: (a) yes (b) no

(iv) If yes, type of contraceptive used

(v) Cost per unit

(vi) Length of use

APPENDIX 4

BIBLIOGRAPHY

Anderson, Mary B. and Marty Chen. April 1988 "Integrating Women in Development or Restricting Development?" Paper prepared for Association of Women in Development Conference, Washington D.C.

Anker, Richard, December 1983 "Female Labour Force Participation in Developing Countries: A Critique of Current Definitions and Data Collection Methods", International Labour Review Vol. 122, No.6.

Anker, R. and Hein, C. (eds) 1985, "Sex Inequalities in Urban Employment in the Third World", London, Macmillan.

Beneria, L. 1981 "Conceptualizing the Labour Force: The Underestimation of Women's Economic Activities" in Nelson, N.(ed) "African Women in the Development Process", London, N.J. Frank Cass.

Berger, Brigitte, 1985 "Women in Third World Cities: Paths to a Better Future", In Paths to the Future: Women and Third World Development, edited by Jerry Jenkins, et.al, Washington D.C.

Berger, Marguerite and Myra Buvinic (ed), 1988 "The Informal Sector, Microenterprise and Women's Work in Latin America", International Center for Research on Women.

Blumberg, Rae Lesser, 1984, "A General Theory of Gender Stratification", In Sociological Theory 1984 edited by Randall Collins, San Francisco.

_____, 1989 "Work, Wealth and a Woman in Development "Natural Experiment in Guatemala: The ALCOSA Agribusiness Project in 1980 and 1985". In Women in Development VolII Case Studies. Washington D.C.

_____, 1989 "Towards a Feminist Theory of Development: From the African Food Crisis to the Israeli Kibutz", In Feminism and Sociological Theory, edited by Ruth A.Wallace, Beverly Hills, CA.

_____, 1989 "Entrepreneurship, Credit and Gender in the Informal Sector of the Dominican Republic: the ADEMI Story" In Women in Development: Vol.II Case Studies, Washington D.C.

Blumberg, Rae Lesser and Jaime Reibel, 1988 Guatemala's Urban Microenterprise Multiplier System (SIMME): Program Appraisal.

Carloni, Alice Stewart, 1984 "The Impact of Maternal Employment and Income on Nutritional Status in Rural Areas of Developing Countries: What is Known, What is Not Known and Where the Gaps Are" Rome United Nations ACC Subcommittee on Nutrition.

Casteneda, T. 1986, "Fertility, Child Schooling and Mother's Labour Market Participation in Chile and the Determinants of Mother's Labour Force Participation in Colombia", Washington D.C.: The World Bank Discussion Paper.

Cohen, Monique, 1986 "The Urban Street Food Trade: Policy Implications for Development", DPU Gender and Planning Working Paper, No.12, London: Development Planning Unit.

Dwyer, Daisy and Judith Bruce (ed)1988 'A Home Divided: Women and Income in the Third World" Palo Alto, Ca: Stanford University Press.

Foo Gilian, 1987 "Work and Marriage: Some Demographic Implications of Factory Work for Single Women in Peninsular Malaysia" Ph.D.Dissertation, University of Michigan, Ann Arbor.

Gutek, B.A., et.al., 1981, "The Interdependence of Work and Family Roles" in Journal of Occupational Behaviour, Vol. 2.

Guyer, Jane, 1980 "Household Budgets and Women's Incomes" Working Paper No. 28, Boston: African Studies Center, Boston University.

ILO/INSTRAW, 1985, "Women in Economic Activity: A Global Statistical Survey (1950-2000), Geneva.

Lycette, Margaret, 1984, "Improving Women's Access to Credit in the Third World: Policy and Project Recommendations" ICRW Occasional Papers, No.1, Washington D.C., International Center for Research on Women.

McKee, Katherine, 1988 "Micro Level Strategies for Supporting Livelihoods, Employment and Income Generation of Poor Women in the Third World - The Challenge of Significance", Paper Presented at the World Conference on "Support to Microenterprises", Washington D.C.

Oppong, C. 1980 "A Synopsis of Seven Roles and Status of Women: An Outline of a Conceptual and Methodological Approach", Geneva, ILO, World Employment Programme Research Working Paper.