User Guide to the
Agriculture and Rural Development Costing Model

PART ONE: NEEDS ASSESSMENT OVERVIEW

This user guide is a step-by-step introduction to the MDG Support Team's Agriculture and Rural Development needs assessment tool. It assumes that users have read the *Handbook* and have a basic familiarity with the fundamentals of an MDG Needs Assessment, but does not presume any prior technical knowledge of MDG Needs Assessment tools. The guide should be used concurrently with the Agriculture and Rural Development needs assessment tool, available at www.undp/poverty/mdgsupport.htm. In conjunction with the *Handbook*, it aims to help users embark on an MDG-based agriculture and rural development Needs Assessment.

Based on data input by the user, the Needs Assessment tool estimates the resources needed to support agricultural interventions as part of a strategy for meeting the MDGs at the national level. It yields aggregate financial costs, as well as quantitative estimates of necessary infrastructure, such as storage, and specialized human resources. These estimates, along with estimates from other thematic areas (health, gender, and urban development, etc.) will help provide the basis for a national investment strategy for meeting the Millennium Development Goals.

MDG Needs Assessments

MDG needs assessments are the analytical building blocks for developing MDG-based poverty reduction strategies. They aim at helping governments to answer the question, "What investments will it take to meet the MDGs by 2015?" This approach marks a fundamental shift from current practice to strategy design, which asks the question: "How can governments best allocate existing resources?" Traditional sectoral work is thus based on forming annual budget allocations in a resource-constrained setting. An MDG Needs Assessment aims instead to help countries identify what resources are needed each year over a 10-year period to meet the MDGs by 2015. The resulting estimates can then be core inputs to an MDG investment strategy, including sequencing and capacity building, which, along with a policy and implementation outline, comprise a 10-year framework for meeting the MDGs.

The *Handbook* specifies an approach to creating an MDG-based PRS, and describes in detail the steps required to conduct an MDG needs assessment. This introduction will briefly outline these steps, and the role that the agriculture model plays in the overall MDG needs assessment process.

First and foremost, the MDGs need to be interpreted at the country level. This entails defining quantitative *outcome* targets that are meaningful at the national level, and defining the areas of intervention that are needed to meet each of the MDGs. For agriculture, the MDG target of halving hunger is relatively clear**,** but countries may wish

to alter the target in various ways, as different countries will have different approaches. For example, countries may wish to increase their agricultural production to a subsistence level before 2015 to generate income and develop the economy or countries may add targets for livestock, etc. Once outcome targets have been set, there are four steps in conducting a needs assessment.

1 – Develop list of interventions

Users first need to define the critical interventions required to meet the MDGs. As outlined in the *Handbook*, interventions are defined broadly here as goods, services and infrastructure that need to be provided to generate outcomes. In agriculture, interventions are categorized into different levels, national-, district-, community- and farm level interventions. In each category, interventions include, for example research, pest and disease surveillance, community storages, and improved seeds and fertilizer, to mention one possible intervention for each level. The MDG Support Team recommends that thematic working groups be organized as part of the MDG-based planning process. These groups will help to guide the selection of a comprehensive set of interventions that comprise each investment cluster [see *Step 2* of the *Handbook*]. In many cases countries will have already elaborated such interventions in their national and sectoral planning documents. These documents should be a starting place for defining MDG interventions. The MDG Support Team has drawn up sample lists of interventions to reach the MDGs that can also be an input into thematic working group discussions. This list will then have to be modified and adapted to national needs. The agriculture-related interventions from these lists are the basis of the interventions outlined in this model.

2 – Specify targets for each set of interventions

Once national outcome targets have been set and interventions have been identified, countries need to determine who the interventions should reach, what proportion of this population will need to be covered by 2015, and how many units of each intervention are needed to reach them. This requires setting targets for each intervention and input quantity ratios that relate interventions to the people they reach. For example, community level interventions aim to reach all smallholder farmers. To know the number of, say storage facilities, which need to be built to meet this goal, countries need to also set a target farmer-to-storage ratio. These quantified coverage targets and ratios are the basis for determining "how much" of each intervention will be necessary over the 10-year period. Countries should also establish interim milestones to measure progress.

3 - Estimate resource needs

The next step is to estimate the financial, human and other resources needed to achieve the identified targets. The agriculture and rural development model is designed to assist

countries in making these estimates. This Excel-based needs assessment tool integrates the information entered by the user to generate these estimates. It uses outcome targets, coverage targets and ratios, and unit costs to develop aggregate as well as intervention-based estimates of resource needs. Similarly, simple ratios between beneficiaries, HR parameters, and infrastructure yield the non-monetary results. A simple scale up path allows users to maps out the yearly investments needed to meet 2015 targets. The model aims to be transparent and adaptable to national needs. This user guide focuses largely on explaining how to use and adapt this model.

4 - Check Results

With any needs assessment, the results should be carefully reviewed to make sure that they are accurate and adequate to reach the MDGs. While every country will obtain different results based on local circumstances, the MDG Support Team has carried out preliminary needs assessments in several countries that can serve as a basis for comparison. These results provide some guidance on the order of magnitude of the costs for reaching the MDGs in a subset of low income countries. See the *Handbook* for sample results across areas and countries.

This sectoral needs assessment is part of a broad MDG strategy that covers all investment areas. Once needs assessments are completed for all investment clusters, they need to be aggregated and integrated as a first step in creating a ten-year MDG framework. As part of this consolidation process, countries should produce one summary budget outlining the projected expenditures for meeting the MDGs. In practice, this means that each model should contain a summary output page that can be easily summed and manipulated across clusters.

This user guide is designed to explain the use of the needs assessment tool as clearly and simply as possible. As you work through it, please feel free to contact the MDG Support Team with any comments, questions, or suggestions for improvement. We look forward to hearing from you and wish you good luck in the needs assessment process.

PART TWO: NEEDS ASESSMENT TOOL BASICS

Objective

The objective of the Rural Development needs assessment tool is to estimate the resources required for a country to halve the proportion of people who suffer from hunger. The model identifies the interventions needed to increase agricultural productivity by three-times, and is effectively supplemented by rural income generation programs.

Scope

Between 1990 and 2015, target 2 of the Millennium Development Goals calls for halving the proportion of people who suffer from hunger. The Millennium Project Task Force on Hunger has identified specific interventions required to reach this outcome target, such as improving agricultural productivity, nutrition and other rural income *development.* All of these recommendations are presented in the Rural Development Needs Assessment tool, and are embedded in the overall architecture of the model with three different intervention levels.

As it is, the agriculture model covers a 9-year period from 2006-2015 and is structured to make interventions on three levels of the agricultural sector, with the cross cutting exception of **small scale water management**:
1. **Farm level** with the aim of increasing direct agricultural productivity at the local level.
2. **Community level** with the aim of providing appropriate services at scale in a cost-effective manner.
3. **National level** with the aim of providing functional research and extension support.

Limitations of the model

This model provides a framework for modeling the direct costs of achieving halving the proportion of people hungry. Additional costs for managing the systems required to implement the recommended interventions at scale are not detailed in the model. Currently, capacity costs are calculated as a percent of total expenses, a proxy for the actual management expenses. This is only a rough guide and a more comprehensive analysis on the requisite management systems required, including requirements for human resources, infrastructure and training, management systems, and monitoring and evaluation can be developed by the user. For more information on how to add interventions, please see Part Four of this user guide: Adapting the model.

Synergies between interventions have also not been accounted for in this model because predicting the relationships between interventions can often be a complicated and unreliable practice. Users are encouraged to first estimate the gross interventions needs for meeting the MDG hunger target. Once interventions have been in place, synergies will be better understood at the local level, and the user can reflect synergy estimates by revising intervention scale-up paths and targets.

Data Requirements

The rural development model will require users to supply a number of data inputs and parameters. These inputs fall into five basic categories: demographic data, coverage and outcome targets, input quantity ratios, and unit costs.

- *Demographic data* are needed to establish basic population parameters. Required inputs include per capita GDP, agricultural GDP, GDP per capita growth rates, and urban and rural populations, disaggregated by age. This data are typically found in national population censuses and statistical databases.

- *Outcome targets* define the outcome objectives of the model. In other words, they represent the state of the world the model is trying to achieve. In the case of rural development, these outcome objectives include halving the proportion, between 1990 and 2015 of the proportion of people who suffer from hunger.

- *Coverage targets* define the proportion of the population that will be reached by a given intervention. Some interventions in the rural development needs assessment are intended to reach only a proportion of the population. For example, only the proportion smallholder farmers are to receive the intervention package. And among the smallholder farmers 10% will be covered in the first year and 100% are aimed to be covered in the last year. With a linear scale up function a set proportion will be added every year until the desired coverage has been achieved.

- *Input quantity ratios* define the ratios of inputs needed to deliver interventions, e.g. households per water storage facility. These ratios are necessary to calculate how many units of each intervention will be needed for a given coverage target. Many input quantity ratios have both a current and a target value; e.g. 200 households per water storage facility in 2005 and 150 households per water storage facility in 2015. Target input quantity ratios are important because they permit users to control aspects of service quality. It is important to note that input quantity ratios should not be a reflection of coverage rates for the same year as this would underestimate the number of units required to be built that year (e.g. in 2005, 400 households use a water storage unit, but the input quantity ratio should reflect the target of 200 households per storage unit for 2005).

- *Unit costs* describe the cost of a single intervention. Some examples include the cost of a single storage facility, or the cost of rural abattoir. These costs should be based on average unit costs for interventions, and should embed all costs elements include production, procurement, and distribution. These data can be derived from a number of sources, including past procurement contracts or current market rates.

Because the model deals in constant dollars, some costs are treated as static, i.e. the cost of a storage facility is the same in 2005 as it is in 2015. Because the user may want to escalate costs over time for specific interventions, the model has been built to accommodate these possibilities.

Key points:

1. This model calculates the full cost of achieving the hunger target of Millennium Development Goal 1.

2. The rural development needs assessment includes agricultural productivity, nutrition, awareness, capacity costs, and other rural income generation. Each of these elements in critical to achieving the MDGs.

3. Required inputs include demographic data, outcome and coverage targets, input quantity ratios, and unit costs. These can be derived from research, the experience of well-performing countries, national statistics, and records from the Ministry of Agriculture.

Overview

I. *The purpose of the model*

The agriculture model is designed to facilitate country-level costing and planning for achieving the MDG and targets on hunger and poverty. Based on expert opinion and country level consultations of what it would take to reach the goal, the model outlines a set of interventions and targets aimed at halving hunger by 2015. The model allows a country to tailor the set of interventions to its needs and conditions.

The agriculture model covers a 9-year period from 2006-2015 and is structured to cost interventions in three levels of the agricultural sector. Please note that all components, the years as well as the interventions and the farming systems, are subject to change. More detail on how to change items in this model can be found in section 1.1.3 of this user guide.

1. Farm Level:

This model is based on a **farming systems** approach, and aims at improving agricultural productivity at the farm level. It is adapted from FAO's description of the Farming Systems of Africa, and defines a condition governed by ecology and management practices. Therefore, this model is especially relevant to Africa where farming systems govern what type of crop is grown, which animals are kept, and how they are fitted into a production system. These production activities (different crops, livestock, etc) that are undertaken within each farming system are defined as different **enterprises** that farmers engage in to derive economic products or render services on the farm. Some farming systems include more **enterprise types** than others depending on the ecology (rainfall, temperatures, and soils), management factors, and market access.

While farming systems are very much governed by the agroecological conditions of the region, some farming systems can be found in more than one agroecological zone. A good example is urban and peri-urban agriculture, which can be found within every zone. If need be, the model provides the flexibility to change the systems' definition from farming system to agroecological or agroclimatic zones. This may be more suitable for the agricultural planning strategies of many countries.

Agricultural productivity is one of the most critical components of the rural development intervention package and targets smallholder farms. Smallholders own less than one hectare of land and often do not produce levels required for subsistence. There are proven technical interventions, which can multiply agricultural yield the complete recommended intervention package is implemented together. On average, smallholder agricultural production would indeed need to increase for a developing country to meet the Hunger target of the MDGs. In most countries, smallholders are

the majority of the farming community. Investments in soil health, small-scale water management, improved seeds, agricultural extension, improving access to markets, and agricultural research would allow these smallholders to meet this goal.

Investments in soil health are critical to increasing yields. Integrated soil management requires the use of mineral fertilizers along with organic sources of nutrients such as farm yard manure, agroforestry and cover crops to improve soil organic matter. Both fertilizer and water use efficiency is increased when soil organic matter is improved. Depleted levels of nitrogen in soil can severely curb the yield produced. Simply injecting nitrogen into the soil through organic or chemical fertilizers, fertilizer trees, and farmyard manure can go a long way to increasing production. Additionally, crop residue return and conservation tillage can help to restore a healthy functioning soil.

Improved seeds are also required to improve agricultural productivity. This includes seeds of crops and fodder plants, seedlings raised in crop and tree nurseries, and cuttings used for vegetative propagation. When combined with improved soil and water management interventions, these inputs will allow smallholders to reach or even exceed subsistence levels. Other investments may be more appropriate for country-specific needs and should be included as substitutes or supplements when suitable.

2. **Community Level:**

One of the biggest problems that farmers are facing in Africa, aside from the challenges of production, are post-harvest losses that can often exceed 30%. With community level interventions, storages can be built and shared by the farmers, which enables them to protect the harvest from diseases and facilitates the selling of the product at a reasonable market price as opposed to the supply driven post-harvest drop. Other examples are community mobilization, microfinance, agroprocessing, adaptive research and equipment; all of these interventions contribute to a form of sustainable rural development.

3. **National Level Interventions:**
While interventions on the ground are quintessential to improve agricultural production, national level interventions are necessary to build capacity in each country. Such interventions include national extension services and research. Extension services for example ensure that the products provided for on the farm level, such as fertilizer and seeds are applied correctly, either by on-farm assistance or through demonstration plots. National research also contributes to the development of the agricultural sector, ensuring that the progress achieved by the other interventions is sustainable and mainstreamed throughout the political system on the highest levels.

4. **Small Scale Water Management:**
Small Scale Water Management is another essential component of the intervention package for maximizing productivity from land resources. It is a cross cutting

intervention which is relevant for farm-level interventions as well as on the community level. One key assumption in this model is that farms are exclusively rain-fed. There are a variety of water technologies that smallholder can use including water control structures, land/water management works, water storage, wells, pumps, pipeworks, and small irrigation. Countries can select appropriate interventions within this technology mix according to community-specific needs.

II. *Other Rural Income Generation*

Other rural income generation describes the interventions that allow smallholder farms to generate income through other means than agriculture productivity. This intervention package is intended to augment the direct agricultural interventions and provide smallholder farmers with an opportunity to access alternative sources of income as a safety-net. The interventions in this package include storage facilities, investments in livestock, value-added food processing, micro-credit, food for work programs, credit, farmers associations, and market space building.

III. *Inputs and Outcomes of the Model*

The three sections of the model mentioned above can be thought of as different areas of public investment that play a vital role in reaching the hunger and poverty MDG. In each of these sections, the model allows the user to specify the following:
>   1. Coverage targets for each target population. At the farm level, the coverage is more refined to target the proportion of smallholder farmers within a given farming system.
>   2. A mix of interventions for the target population (by percentage of total target population reached by each intervention).
>   3. Unit costs of providing interventions

Using these inputs, the model allows the user to calculate the following:
>   1. Total cost of inputs to increase agricultural production. It assumes there is no or negligible use of input for improving production by smallholder resource-poor farmers
>   2. Human resources (professional extension workers, master farmers, staff for providing other services such as credit, agro processing etc.) needed to achieve the targets
>   3. Physical infrastructure needed to achieve the targets
>   4. Per capita and total costs of providing interventions, both yearly and in total
>   5. Number of yearly incremental and total households reached by interventions.

IV. *Source and structure of the Model:*

The agriculture model is modified and adapted from the hunger one that was designed by the UN Millennium Project in 2005. The interventions and unit costs used here are based largely on the recommendations of the Millennium Project Hunger Task Force.

The current structure of the model has the following Excel worksheets:

(Please note that almost all sheets have grouped tables to provide a better overview of the worksheet. The user can either ungroup one table by clicking on the "+" icon next to the rows, or click on the "2" in the upper left hand corner next to the "A" column if all tables should be ungrouped all at once. Pressing the "1" next to the "2" collapses the tables into groups again.)

Structure: provides schematic diagram showing the overall structure of the model. The key interventions of the three components levels of the model (farm, community and national) are provided as well as small scale water management, which is applied at Farm as well as on Community Level.

Please enter the **country name** in the cell **B2**, as well as the start year and the end year in cells **B3** and **B4**. The year 2006 provides a base-year, where, as of now, no inputs are being calculated.

1.1 Farming Systems and Crops:

The overriding question that should be answered in this page is *"What are the relevant farming Systems and their dominant enterprise types (crops/livestock mix)?"*

- The model provides a list of definitions for the 11 relevant *African* farming systems. They can be adapted by changing the name in the yellow cell that indicates the name of the farming system (B5, B8, B11, etc). It is advisable to edit the descriptive text right next to it.
- The relevant Enterprise Types that are listed below should also be closely revised and edited as necessary. They can easily be changed, replaced or omitted (by overwriting them with "other") by changing the cells B51-B94. Enterprise types should not, be replaced if available in the list because the cost estimates on the following sheet are based on this sequence.
- This Enterprise Type/Farming Systems matrix forms the basis of the model, where the user needs to indicate which enterprise types are relevant for each Farming System; "1"= indicates that enterprise type is included in Farming System and "0"= indicates that enterprise type is not relevant for the Farming System at hand.

1.1 Farm Intervention Package:

The question to be answered here is: *"What Intervention Package is needed to reach the full production potential?"* In order to answer the question, the user needs to think about the direct inputs that need to be applied for crop as well as for livestock production. The suggested interventions can be found in B6-12 and D6-18 and can be changed here as necessary.

Scrolling down, starting from row 22 downwards, the user has to be more specific and indicate the quantity (kg/ha) and the price per kg, such that an estimate can be calculated answering how much one smallholder farmer needs to spend on each enterprise type.

It is important to note, that the fertilizer cost is dependant on a yield response function, indicated on sheet 1.5, and should only be changed by experts.

When scrolling to the right (BC-BO and DC-DN), the user will discover options for *different scenarios*. These scenarios can be adjusted to the average input mix and potential price differences in different Farming Systems. For example, if the averages across different Farming Systems vary considerably, the user can indicate that here for each enterprise type. Once this is completed, the user will have the option of adjusting the appropriate input mix to the corresponding Farming System on the next worksheet: 1.3 Pop & Scale up path (G12, L12, etc).

1.2 Population and Scaling-Up approach
Here, the question to be answered is: *"What is the scaling up approach?"*
In order to create a basis for this response, the user has to provide basic demographic information, such as total population and rural population, population growth rate and average household size.

The next step focuses on the *Farming Systems*. Here, the user has the choice of selecting the 6 most prevalent Farming Systems that were agreed upon in sheet 1.1. It is recommended to limit the number of farming systems by grouping. The selection of the farming systems is done in each box separately, selecting a farming system from the dropdown menu in F12, K12, P12, etc.

Different scenarios can be selected in cells G12, L12, Q12, etc. As described above in *1.1 Farm Intervention Package*, this feature enables the user to adjust the input quantity and cost to its corresponding Farming System. If, for example, the user knows that crops require less input in a dry Farming System, he/she can select "low". By default, the model is set on "low" to facilitate the navigation of the tool.

Additionally, more specific questions should be answered to clarify what scale up function should be used and who exactly the target population is for the selected intervention package. The key questions are the following: "Who is you target population? Smallholder farmers or all farmers?"—to be answered in F16 for the current year and in G16 for the target year. The same methodology applies for: "What is the average farm size?", "What is your current and future coverage rate for the entire intervention package?", and "What proportion of the rural population is living in this farming system?" The box looks as following:

Microsoft Excel - Agric_Model_July 3 Haiti

What is the scaling up approach?

	FARMING SYSTEM	1			FARMING SYSTEI	
Unit of analysis	smallholder farm households	Scale		Unit of analysis	smallh farm housel	
Farming system	Maize mixed system	Low (1)		Farming system	Cereal Crop s	
FARM SYSTEM SPECIFIC INPUT DATA	2007	2015	Interval	FARM SYSTEM SPECIFIC INPUT DATA		
Who is you target population? Smallholder farmers or all farmers?	What % of the rural population are smallholder	80%	80%	0.00	What % of the rural population are smallholder	
What is the average farm size?	Average farm size (ha)	0.3	0.3	0.00	Average farm size (ha)	
What is your current and future coverage rate for the entire intervention package?	Coverage rate for intervention package	40%	80%	0.05	Coverage rate for intervention package	
What proportion of the rural population is living in this farming system?	% of rural population	40%			% of rural population	

Sheet tabs: 1.3 Pop & Scaling up approach / 1.4 Farm interventions (CALC) / 2.1 Community interv's (INPUT) / 2.2 Communi

1.3 Farm Interventions (Calc)

This worksheet directly answers the question: *"What is the total Cost per Farming System?"* It simply summarizes the calculations made on sheet 1.2 in the first table and is followed by calculations for each of the 6 Farming Systems. The data points that this sheet requires is provided by agricultural experts. They will need to indicate the hectares covered by each enterprise type (in percentages) for each farming system. They will also need to estimate approximately how many additional animals need to introduced to each farm and how many farms there are in each Farming System (in percent).

Besides that, this page provides you with information about the amount of hectares and farms covered by each enterprise, and with the total cost per enterprise for each of the 6 pre-selected farming systems (scroll down to reach farming systems 2-6).

1.4 Potential Yields

Here, the user need not enter any information, unless he or she is an expert who can adjust the otherwise pre-estimated yields and yield response functions to answer the question: *"What are the current yields and what is the potential?"* Published data, where available, can also be used. Otherwise, this sheet provides the user with calculations made and that is based on previous data required.

The calculated tables include information about the *total hectares covered by enterprise across all farming systems*; the *incremental hectares of crops planted per year* (a linear

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scale up function is assumed) and by way of the *yield response function* and the expert-based *yields estimates per hectare*, the *incremental yields* are calculated in order to estimate the *total yields across all farming systems*. This sheet completes the costings for the farm level interventions.

2.1 Community Interventions (Input)

When taking the analysis to the next level, it is important to ask the question of: *"What are the appropriate Community Interventions?"*

In the yellow box, suggested interventions can be either deleted or changed by simply overwriting the blue font (see Box2):

Box 2:

Community Interventions

1	Community Storage
2	Community Mobilization
3	Microfinance
4	Agroprocessing
5	Adaptive Research

Once the appropriate interventions have been established, more specific information is needed, such as the coverage rates, the ratio of total households to the unit, staff required per unit, number of existing units, percentage that requires rehabilitation, and the unit costs per storage and salary. Please find an example below (Box3):

Box 3:

Community Storage

		2006	2015	Interval
Coverage Rate		5%	50%	5%
Input Mix		**2006**	**2015**	**Interval**
Unit measured as	mass storage			
ratio of Total rural households to mass storage		60	50	-1
staff per mass storage		1	1	0
existing mass storage		0		
% requiring rehabilitation		0%		

Unit costs	**Cost Type**	**2006**	**2015**	**Interval**
mass storage	Capital	$5,000	$5,000	$ -
	Recurrent (as % of capital)	10%	10%	0%
	Rehabilitation (as % of capital)	5%	5%	0%
staff per mass storage	Training	$50	$50	$ -
	Salary	$200	$200	$ -
Administrative costs (as % of total recurrent)	Recurrent	5%	5%	0%

2.2 Community interventions (Calc):

On this worksheet, the question that is automatically answered for the user, without any additional input needed from experts, is: *"What are the costs for the Community Interventions?"*

First it recalls the population data that the user provided in sheet 1.3, and then it calculates each community intervention that was defined on the previous worksheet 2.1. Ultimately, the model adds up the total costs for each intervention, categorized in capital, recurrent and total.

3. Small Scale Water Management

The structure of this sheet is very similar to 2.1, answering the question: *"What interventions are needed to improve **Small Scale Water management**?"* The same principle applies of needing to verify or change the yellow intervention box as necessary and then entering the intervention specific data on coverage rates, ratios of rural households per structure, number of existing structures, and unit costs (capital and recurrent). In contrast to the community interventions, here the calculations can be found directly underneath the input boxes.

4. National Level Interventions

Based on the same principle as sheets 2 and 3, this worksheet aims at answering the question: *"What interventions are needed on a National Level and how much do they cost?"*

First, sheet 4 provides the user with a summary table of hectares and farms reached within each farming system. It then uses these numbers, in addition to ratios that the user still needs to provide in the yellow cells, to calculate national extension service costs.
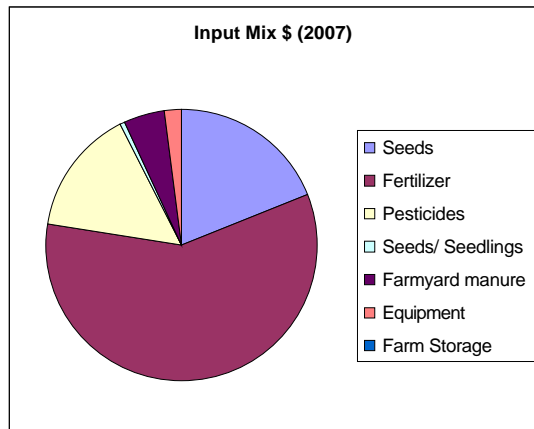
The national research investments are calculated differently, by simply multiplying the percentage of Agricultural GDP with the percentage of agricultural GDP devoted to research. Finally, on the bottom of this page, the user can find a summary table of the national extension and research investments needed.

5. Resource Needs

The resource needs table is a mere summary of all the previous calculations made throughout the model, providing the user with a clear overview of the absolute resource needs; first by intervention level and then as a summary at the bottom of the page.

6. Graphs

This worksheet allows the user to view graphs of cost distributions and relationships between investments needed, different levels of intervention, and between enterprise types and their input needs. The only important detail to remember when viewing these tables is that the other sheets need to be "ungrouped" completely; otherwise the information will not be visible.

Input Mix $ (2007)

Legend:
- Seeds
- Fertilizer
- Pesticides
- Seeds/ Seedlings
- Farmyard manure
- Equipment
- Farm Storage

1.5   Frequently Asked Questions (FAQs)

1. *Why focus on smallholders and exclude large scale, commercial farmers since it is the combined production of both small and large scale producers that will achieve the desired growth in agriculture, especially in sub Sahara Africa countries?*

Smallholder farmers, with land holdings below 0.5 hectares, are the majority among the farming community in many countries of Africa. These farmers have little or access to agricultural inputs, especially improved seeds and fertilizers. And where they do, they cannot afford to buy them because of the high costs of the inputs. The intention of the model is, therefore, to determine what interventions could improve the agricultural production of these farmers and help them and their families achieve the MDG targets on hunger and poverty. The model is, however, robust and can be used to include and cost the needs of the large scale producers. For marketing, processing and value addition, the focus is on all farmers.

2. *How can the user add new interventions?*
There are different types of interventions that can easily be added to the model. Typically, interventions that users want to add are additional enterprise types, different types of livestock, direct inputs, community interventions, and/or small scale water management.   All of the interventions suggested can be altered on the respective worksheets, in the cells highlighted in yellow.

3. *Why are community interventions like roads missing from the model?*

Road networks are costed under model for Infrastructure sector. Check with this sector working group to ensure the roads needed for agricultural growth are included and well costed. This should include the costs of new roads, rehabilitation of existing roads and maintenance of both old and new roads.

4. *How is gender mainstreamed in the model?*

There is a separate model for mainstreaming gender in all sectors. We, however, include in this model interventions that integrate gender perspectives into the sector. This is because gender is a significant determinant of the distribution of rights, resources, and responsibilities within both the household and the community. The most vulnerable and marginalized rural groups often lack access to resources because they lack secure property rights. Therefore, some of the interventions suggested and costed include: increased number of women staff in the extension services, community mobilization interventions that may address issues such as land reforms, and increased investment in research including social research that help ways to mainstream gender issues.

Key Assumptions:

- Focus only on smallholder farmers with maximum one hectare arable land. These are the resource-poor who cannot afford farm inputs and will need public funding and support. Large and medium scale farmers, who can afford to access inputs for increased and sustained production, are not included in this model. However, we recognize that sound economic growth would depend on growth of the entire farming community, small, medium as well as large scale farmers. Therefore, investments should be made on other policies that benefit all farmers. Examples of such policies include improvements in the coverage and maintenance of all weather roads, adequate and reliable supply of electricity, markets and market information, secure land and property rights, information and communication technology.
- The systems can be easily adapted to Asian or South American Farming systems, which are explained in the section: **Adapting the model**. The core assumption here is that the inputs for each enterprise type (such as maize, rice or beans) remains constant across all farming systems, what changes is the occurrence of enterprise types in different systems.
- While farming systems are very much governed by the agro ecological conditions of the region, some can be found in many agro ecological zones. A good example is urban and peri-urban agriculture. The model provides the flexibility needed by the user to change the systems definition from farming system to agro ecological or agro climatic zones; terminologies that are used in the agricultural planning strategies of many countries. Please note that the input mix cannot vary between each farming system.
- Purely rain-fed system with little or no irrigation system in place
- Price and amount of fertilizer/seeds/pesticides used remains constant over time while yield response is increasing until maximum is reached
- No external labor is employed for farm level activities
- There is no significant use of interventions for improving yields - fertilizer, seeds, and pesticides - are being used prior to the calculations that are being made
- Potential Income from production is not calculated (because prices vary too much depending on seasons, storage space, market space, regional natural disasters, etc)
- Agroforestry: the benefits of agroforestry and cover crops for soil fertility improvement will be reflected in improved crop yields.
- While investments in **nutrition** are critical to increase the health of the population, as marked by the Hunger-related MDG indicators, specific data requirements made this section be included in the Health model rather than in the Agriculture model. Nutrition investments are specifically necessary to reduce the proportion of population below the minimum level of dietary energy and the proportion of underweight children.

  The specific investments in nutrition identified by the Task Force on Hunger are complementary feeding, school meals, nutrition for adolescent girls and feeding supplementation for vulnerable groups, diet diversification programs, fortification programs, and emergency feeding assistance. These investments will supplement a regular diet, which is in many cases insufficient.

Definitions:

- *Farming System*:
  - *Farming Systems* define a condition governed by ecology and management practices and indicate what type of crop is grown, which animals are kept, and how they fit into a production system. Some farming systems include more *enterprise types* than others depending on the ecology (rainfall, temperatures, and soils), management factors, and market access.
- *Enterprise:*
  - An *Enterprise Type* is an activity within a farm that has a cost factor, produces a yield or a product, and has a financial benefit—in short-, or long-term. For example, growing maize requires inputs (fertilizer, seeds, etc) and it produces a yield that can be consumed or sold. Livestock has the same characteristics.