This article is an extract of a master thesis written at the Division of Engineering Logistics, Department of Industrial Management and Logistics at Lund Institute of Technology. The thesis was conducted at the United Nations Population Fund during the summer of 2005 and focuses on forecasting and related supply chain issues.

**Introduction**

The term Reproductive Health Commodity Security (RHCS) was first mentioned and became a priority area for United Nations Population Fund (UNFPA) at the International Conference on Population and Development (ICPD) in Cairo in 1994. The definition of RHCS is:

“All individuals can choose, obtain and use affordable, quality reproductive health commodities, whenever they need them.”

At the ICPD 179 countries agreed on meeting a goal defined as: universal access to reproductive health care by 2015. This initiative was based on the recognition that demand far exceeds supply, and inadequate systems of logistics and health care leave many people vulnerable to for example unwanted pregnancies and sexually transmitted infections (STI) including HIV/AIDS.¹

**Problem analysis**

As of June 2005 many countries solely handled short-time commodity requests without sufficient plans for long-term capacity building and sustainability. The reasons why this situation has arisen are many. One is lack of commitment and supportive environment at country level; another one is lack of coordination. Amongst all imaginable reasons there is one that would explain all the others – the lack of a clear and concrete guide on how to actually achieve RHCS.

It is in this context, where a modified and enhanced approach to RHCS could prove useful, that the thesis serves a purpose. With the aim of making RHCS more concrete and understandable the thesis will complement the document *Global programme to enhance RHCS* in order to:

- Help promote strategic international support for RHCS.
- Secure more regular and dependable funding flows necessary to undertake the multi-year plans required to enhance capacity and facilitate development of sustainable procedures and mechanisms to achieve durable RH commodity security at the national level.
- Facilitate increases in national domestic financing for RHCS in developing countries.²

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¹ [http://www.unfpa.org/icpd/icpd.htm](http://www.unfpa.org/icpd/icpd.htm) 2005-06-15

² *Global programme to enhance RHCS, UNFPA, 2005*
Purpose

The purpose of the thesis is to map and analyze the contraceptive supply chain of UNFPA at the global and national level. The global part of the supply chain is comprehensive whereas the local supply chain is based on a case study on one country involved in the progression of RHCS.

The mapping and analysis is, apart from giving insight to the entire contraceptive supply chain of UNFPA, used as a foundation on which suggestions to improvements are given. The suggestions are meant to serve as guidance, for UNFPA headquarters as well as country-level representatives, on how to proceed with logistics management in order to enhance RHCS.

Problem statement

With reference to the purpose and focus of the thesis the problem statement is as follows: How can the forecasting tool be modified and what actions need to be taken to create a stimulating environment for the purpose of enhancing RHCS?

Research approach

In the process of writing the thesis the author found it suitable to follow the path of the systems approach. Mostly, this decision was based on the fact that identifying a continuous supply chain demands a holistic perspective. The author coherently worked with models; a case study; systems; and mapping. Furthermore, when investigating the forecasting mechanism as a part of the supply chain also analytical approach was taken into consideration. The author used quantitative data as a basis for testing concepts, tools and their relations. Therefore it is concluded that the initial approach has been of systems characteristics in order to establish a supply chain framework within which the author applied the analytical approach.

Case study

Within UNFPA, Bangladesh is regarded as one of the most committed countries in terms of developing the work on RHCS. Together with the fact that the author early on got in contact with Jawher L. Das who works as procurement officer with UNFPA in Bangladesh made a strong case for choosing this country for the case study. Thirdly, both UNFPA and USAID have performed a number studies in Bangladesh, which facilitated the availability of multiple information sources.

Method of analysis

Initially, a discussion on the six rights [right product, right quantity, right place, right time, right quality, right cost] was adopted to provide a basis for identifying areas of potential development. Together with a thorough discussion and evaluation of the forecasting tool the analysis was rounded up by assessing and categorizing the UNFPA contraceptive supply chain. The reasoning behind this choice of analysis approach was that the author believes the conclusions of the thesis will be most useful to UNFPA when presented with long-term and strategic guidelines. However, regarding the forecasting tool it has been the aim to perform the analysis at a slightly more detailed level. Thus, the author has both analyzed the strategic impact of the forecasting function as well as evaluated how the tool could be improved to better match future global and local forecasting development and functional integration.

Supply chain management

As an introduction, the reader is presented with one definition, amongst many, of the term supply chain management (SCM):

Monczka and colleagues (1998)

SCM is a concept whose primary objective is to integrate and manage the sourcing, flow and control of material using a total systems perspective across multiple functions and multiple tiers of suppliers.

In relation to SCM it is uttermost important to clarify what a supply chain is. John T. Mentzer suggests his own characterization of a supply chain as: a set of three or more companies directly linked by one or more of the upstream and
downstream flows of products, services, finances, and information from a source to a customer.  

Contraceptive supply chains consist of numerous organizations, people, and procedures that, together, must accurately forecast demand and then efficiently negotiate, purchase and deliver the right amount of contraceptives from one level to the next until they reach family planning clients. Procurement and forecasting, together, form an important part of Program managers and policy makers at central level, which is one of the most important stakeholders in the contraceptive supply chain.  

Forecasting  
The purpose of the UNFPA forecasting tool Country Commodity Manager (CCM) is to assist country offices in their efforts to assess their reproductive health commodity requirements, stock positions, and possible shortfalls. As explained by Joseph Abraham, the creator of CCM, this is an easy-to-use program which can quickly generate models and reports which will:  

- Forecast RH commodity requirements based on logistics and inventory data  
- Validate this forecast utilizing demographic data  
- Warn of future reproductive health commodity shortfalls  

CCM also provides a mechanism to readily transmit each country’s data to UNFPA headquarters from their country offices for use in generating global level reports of the purposes of planning, advocacy and resource mobilization. Today, CCM is installed in 75 countries, mainly situated in Africa and it is a goal for UNFPA to continue the implementation of the software in additional countries within the next few years.  

Comparison of forecasting techniques  
In order to evaluate the UNFPA forecasting mechanism the author was assigned to compare population data estimations with the forecasting tool CCM. Examples of the analysis were given in two tables showing multiple consumption data for oral contraceptives and male condoms. In these tables several columns containing projected annual consumption based on different forecasting approaches were presented. In addition, both tables indicated each country’s request from UNFPA for the year of 2005.  

The comparison showed a great variation of forecasts and indicated a lack of consistency. Briefly, the major finding of the comparison was that calculations are very unreliable, and also that the figures collected from the CCM tool are lacking historical data. The fact that historical data is randomly deleted from the system causes the forecast result to be more of a snapshot of the present contraceptive consumption, instead of a scientifically measured figure.  

Supply chain integration  
One of the stronger focuses of the thesis was to focus on the forecasting function from a holistic perspective: By saying that, the author strived not to separate forecasting from other functions, but instead bring up a perspective of internal and external integration. Therefore, a framework is needed for how supply chain integration is categorized and assessed.  

In order to achieve supply chain integration it is necessary to identify and assess four different stages. These are discussed below, concerning planning and operating implications of each stage:  

- Stage 1: represents the baseline case; the supply chain is a function of fragmented operations within the individual company and is characterized by: staged inventories, independent and incompatible control systems and procedures, and functional segregation.  
- Stage 2: begins to focus internal integration characterized by an emphasis on cost reduction rather than performance improvement, buffer

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3 Mentzer, J. T. 2001  
4 Strengthening the Supply Chain, FPLM, 2000  
5 Christopher, M. 2004
inventory, initial evaluations of internal trade-offs, and reactive customer service.

- Stage 3: reaches toward internal corporate integration and is characterized by full visibility of purchasing through distribution, medium-term planning, tactical rather than strategic focus, emphasis on efficiency, extended use of electronics support or linkages, and continued reactive approach to customers.

- Stage 4: achieves supply chain integration by extending scope of integration outside the company to embrace suppliers and customers.

**Analysis**

Based on the theoretical framework and empirical studies one of the aims of the analysis was to assess how UNFPA has positioned itself with regard to logistic management.

As was identified so far, the supply chain of UNFPA is going from being a function of fragmented operations towards focusing on internal integration with emphasis of driving down costs. The procurement division has initiated great opportunities by implementing the software e-procurement in relevant countries worldwide. Though, regarding forecasting this function is still separated from procurement, which means that the full potential of forecasting consumption of contraceptives is not fully taken into consideration. Moreover, when looking at the case study, it is indicated that many countries are operating many different forecasting systems, which, in turn, can cause a much too wide focus.

Regarding inventories and transportation, UNFPA has developed an advanced system which can deal both with ordinary as well as emergency supply issues. By not carrying its own intermediate inventory many fixed costs are avoided, although it implies some inflexibility with long lead times or high transportation costs. However, this is an area where much money could be saved, merely by improving the forecasting mechanism of UNFPA so that emergency deliveries reach a minimum amount.

Looking at stage three in the assessment framework UNFPA is not yet characterized by full visibility of both local and global purchasing and distribution. Issues that require utmost attention are missing historical consumption data and collaboration between UNFPA and other contraceptive distributors. However, these areas are developing, for example the RHInterchange is growing stronger as the thesis is written.

Although there are many opportunities for UNFPA it must be pointed out that the financial donor environment, as of today, makes the situation rather challenging. In the thesis it has been commented that:

- Better coordination between financing and procurement planning will improve commodity availability both in-countries and at global level.

- There is a need for a paradigm shift in countries to conduct forecasts based on the principle of medium to long-term forecasts rather than only short-term estimates.

These ideas and suggestions are superior, however, with the present system of annually granted finances and country budgets being annulled in the end of every year, these characteristics are very demanding to achieve.

As a final comment to the assessment the author strives to make a just analysis of which stage UNFPA has positioned itself. And, the conclusion, based on the discussion in this subchapter is that UNFPA currently is positioned in stage two, moving towards stage three as transparency and communication increase. Other areas requiring attention are changes in the forecasting mechanism as well as coordination of strategic funding, procuring and forecasting.

**Conclusions**

Some of the most important recommendations given in the thesis are, as concluded from the analysis:

Increase collaboration between UNFPA and other contraceptive distributors. Share information, ideas and progress on how to
improve forecasting and distribution. A first step could be to establish a database with all historical distribution and consumption data of UNFPA gathered in one place. Also, it is of greatest importance to build further on the initiative of the RHInterchange and thereby extend the database to include all the major contraceptive distributors;

Advocate a stimulating financing environment, which allows for strategically longer planning periods. This action would encourage UNFPA and country governments to start building capacity such as investing in divisions for procurement, forecasting and quality testing;

Enhance coordination between financing, procurement planning and forecasting. Integration of these three functions could prove to be prosperous for UNFPA, for example by achieving benefits through economy of scale.

Transparency of data and information is of utmost importance and clear guidelines must be implemented so that historical data is saved for future consumption calculations. This would imply the possibility of using moving averages as a part of the Country Commodity Manager, which in turn could lead to a situation where UNFPA takes a leading position of forecasting contraceptive commodity consumption.

References

Literature

- Taylor, G. R. *Integrating Qualitative and Quantitative Methods in Research*, University Press of America, Lanham 2000
- Van Weele, A. J. *Purchasing and Supply Chain Management – Analysis, Planning and Practice*, 3rd edition, 2002

Articles & Reports

- *Building a better Supply Chain*, Helen L Richardson, Logistics Today; Apr 2005; 46, 4; ABI/INFORM Global
- *Population Reports “Strengthening the Supply Chain”*, Family Planning Logistics Management (FPLM), The Johns Hopkins Bloomberg School of Public Health, Number 1, 2002