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From the Editor's Desk

The role of natural resources and their efficient management in economic development is of great importance. In recent times, we have witnessed public disagreement and debate on use of spectrum and coal. While such debates will continue to take up our time, we should not forget that the more pressing issues are concerning the use of land and water. In this issue of Analytique, we have focused on some of these issues, including the role of agriculture in India's development story.

Our next issue will see the completion of three years of the new Analytique. We have had our share of skeptics as well as well wishers. Of course, both demand for and supply of useful and topical contributions from our members as well as from academics and practitioners will ensure longevity of this Journal. We believe that Analytique will carry on with its mission to disseminate knowledge gleaned from experts and practitioners. We are happy to state that we are now registered and from this issue you will observe that we carry the ISSN number.

This is also the last issue for me as the head of the editorial team. I thank all our contributors and readers as well as sponsors without whose support and help this publication could not have survived. It has been a pleasure working on Analytique and I hope and pray for its long and fruitful life.

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The 2G Saga Compromises India's Institutional Credibility

*Sumit K. Majumdar**

The capacity of the state to redistribute wealth is a primary obstacle to growth. Providing credible institutional constraints on the state to redistribute wealth leads to efficient economic growth. Yet, India has embarked on a major wealth redistribution exercise, as her 2G spectrum drama has unfolded.

Given government role in providing clarity to property rights allocation, ease of asset rights alienability and security from trespass, India's government could have ensured growth by committing to institutional credibility. Instead, India's institutional bodies have perpetrated a hold-up on the information superhighway.

The drama may be reaching its conclusion. The re-auction of the confiscated licenses for 2G spectrum has commenced from November 12th. Numerous irregularities had taken place in 2008, when the 2G spectrum licenses for mobile communications were awarded to firms. After complex investigations, India's Supreme Court confiscated the license of all firms involved, even of those which had not been culpable in irregularities.

122 of these 2G licenses, awarded to Uninor (22 licenses), Loop Telecom (21 licenses), Sistema Shyam (21 licenses), Idea cellular (13 licenses), Videocon (21 licenses), Etisalat (15 licenses), S-Tel (6 licenses)and Tata Teleservices (3 licenses) were cancelled. These licenses are to be re-auctioned, the process starting now.

India's 2G spectrum drama will end in tragedy. The proceeds of the license re-auction will represent comprehensive trespass over the property rights of firms, with several parties to business transactions held to ransom and coerced into a negative outcome.

Instead of taking punitive actions against the primary culprits, by confiscating all licenses and the loss of all sums expended on their acquisition India has socialized punishment. By making sanctions diffuse, it provides incentives for others to engage in future similar acts. Individuals and firms will know that engaging in underhand means is a lottery. If one is caught, the sanctions will be borne by all.

The re-auction will not draw a line under events. Instead, it will depict a saga of institutional bungling. For the want of common sense and reason, India's future has been irretrievably compromised. India has lost institutional credibility.

Institutions are human constructs structuring human interactions. They reduce uncertainties involved

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in interactions. In a stroke, India has shown that she is an uncertain investment destination. Most of human history is a story not of growth, but of stagnation interspersed with modest growth spurts. That has been India's history. India needs to be a promising investment destination.

In the first half of the twentieth century, before independence, India's growth rate was 0.5 percent per annum. In the second half of the twentieth century, these rates averaged 4 percent. In the first decade of the twenty first century, there was a quantum leap to 8 percent per annum. That dream is over. The investments required to sustain a double-digit growth can dry up in the face of overwhelming uncertainties.

The 18th and 19th century industrial revolution was made possible because there was a set of institutions formulated and implemented, so that there were laws and rules facilitating innovation and motivating efficiency-seeking behavior.

Prior to the Glorious Revolution of 1689 in Britain, pruning monarchy absolute power and replacing it with the citizen and Parliament power, the rapacious activities of monarchs had destroyed all efficiency-oriented activities. Such a situation was detrimental to common good. This rapaciousness led Charles I to lose his head.

The revolution constrained an absolutist state's ability to redistribute wealth, generated by citizens, towards itself and its supporters. This wealth redistribution constraint set forth institutional conditions enabling the industrial revolution to progress and make Britain rich. These institutional conditions have survived, providing security for those making investments in Western Economies.

A feature of ideas dealing with institutions is the notion of credible commitments. Commitment is a pressing issue. Via commitments governments make to uphold property rights sanctity, they commit themselves to constraining their own power to arbitrarily change property rights.

Property rights protection and sanctions enforcement against trespass is central to credible commitments permitting complex contracting. They bind parties to agreements across space and time, as required for infrastructure investment deals involving massive expenditures. Credible commitments ensure sanctity that motivations for long-term relationships are protected. Governments make growth possible by binding themselves credibly to commitments.

The communications revolution could have been for India what the industrial revolution was in the 19th century. By leapfrogging into a technologically-rich future, India could have set herself on a permanent double-digit growth trajectory. Such leapfrogging would require high quality institutions, with credible commitments an integral part of this milieu. India has shown she does not possess this.

The Indian polity's decimation of institutional norms has ensured that

India will stagger along modestly, becoming a middling entity. Countries such as China will become world powers. Investors' mental constructs will be of India as a country where commitments are not credible. She will not be a chosen investment destination. Foreigners may shun India. Domestic entrepreneurs will invest abroad. India may remain underdeveloped because she is uncredible!

Performance Benchmarking of Sectoral Mutual Funds: A Case Study Using Free Disposal Hull

*Dr. Ram Pratap Sinha**

Abstract

Performance analysis of mutual funds operating in the Indian markets have so far used ratio analysis involving methodologies suggested by Sharpe and Treynor. The present paper makes use of the Free Disposal Hull method (a non-parametric endogenous benchmarking method) to evaluate the performance of 18 sectoral mutual fund schemes based on observations for the second half of 2010. The study uses the reward to lower partial moment framework for the measurement of technical efficiency of the in-sample mutual fund schemes using both the input and output oriented approach.

Introduction

In the context of a perfect capital market characterized by the absence of transaction cost and informational asymmetry, the common investors do not require the assistance of any portfolio manager. However, a real life capital market is substantially different from the utopian capital market and typically a small investor do not possess the requisite information to operate in the market on their own and in this context the mutual funds do play an important role in maximizing the wealth of such investors. The performance of mutual funds is therefore an interesting area of research as this facilitates the decision making process of a common investor.

Portfolio Benchmarking: Alternative Efficiency Criteria

In earlier days portfolios were compared in terms of returns generated by them. However, this approach suffers from a fundamental weakness in the sense that it does not take into consideration the underlying risk. The integration of risk in to the analysis led to the development of a number of efficiency criteria. We may mention a few of them at this juncture:

(a) The Mean-Variance Efficiency Criteria:

The mean-variance criterion was developed by Markowitz (1952) and Tobin (1958). Given two discrete return distributions f(x) and g(x), investors will prefer F(x) over F(G) if $\mu_F \geq \mu_G$ and $Var_F \leq Var_G$ (not both equalities holding simultaneously).

(b) First Order Stochastic Dominance:

The concept of first order stochastic dominance was due to Quirk and

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Saposnik (1962), Hadar and Russell (1969) and Hanoch and Levy (1970). According to this concept, f(x) dominates g(x) if $F(x) \leq G(x)$ where F(x) and G(x) are the cumulative return distributions of the two portfolios. The first order stochastic dominance excludes the possibility of intersection of the two cumulative distributions.

(c) Second Order Stochastic Dominance:

The concept of Second Order Stochastic Dominance was developed by Hammond (1968), Hadar and Russell (1969) and Hanoch and Levy (1970). In the case of Second Order Stochastic Dominance, the cumulative distributions may intersect but the total accumulated area between F and G remain non-negative.

The Capital Asset Pricing Model and Portfolio Benchmarking:

The capital asset pricing model was proposed by Sharpe (1964) and Lintner (1965). They showed that in the presence of a risk free asset, there is a linear relationship between the portfolio return and the return available on the market portfolio:

$$R_x = R_f + \beta_x (R_m - R_f)$$

Where R_a is the return available on a portfolio x, R_f is the return available on the risk free asset and R_m is the return available on the market portfolio. $\beta = Cov(x,m)/Var(m)$.

The capital asset pricing model led to the formulation of two important measures by Treynor (1965) and Jensen (1968). The Treynor measure considers the ratio of the excess return of the portfolio and the portfolio beta while Jensen's performance measure is obtained by measuring the difference between the observed and risk adjusted rate of return (computed from capital asset pricing model).

Integration of Downside Risk in Portfolio Theory

Roy (1952) conceptualized an investor who would be guided by the safety of principal first when dealing with risk and his contribution was instrumental in the development of downside measures of risk. He stated that the investor would prefer the investment with the smallest probability of going below the target return. By maximizing a reward to variability ratio, $(r_e - t)/s$, the investor will choose the portfolio with the lowest probability of going below the target level, t, given a expected mean return, r_e, and a standard deviations.

In the seventies, researchers started questioning the methods of portfolio performance evaluation using CAPM since they depends on normal distribution. Klemkosky (1973) and Ang and Chua (1979) showed that these measures could provide incorrect rankings and suggested the use of reward to semi-variability (R/SV) ratio as an alternative. However, path-breaking development in the field of downside risk measures occurred with the development of the Lower Partial Moment (LPM) risk measure by Bawa

(1975) and Fishburn (1977). Bawa (1975) was the first to define lower partial moment (LPM) as a general family of below-target risk measures provided a proof that the LPM measure is mathematically related to stochastic dominance for risk tolerance values of 0, 1, and 2.This model was later further generalised by Fishburn. The development in the area of lower partial moment led to the emergence of new measures of performance evaluation like the Sortino ratio.

Comparison of Performance through Endogenous Benchmarking: The Methodological Issues

In the present study, Free Disposal Model has been used for comparing the performance of in-sample mutual fund schemes using two outputs and one input.The FDH (Free Disposal Hull) model was first formulated by Deprins, Simar and Tulkens (1984) and developed and extended by Tulkens and his associates at the University of Louvain in Belgium. The basic motivation is to ensure that efficiency evaluations are effected from only actually observed performances. The production possibility set corresponding to the Free Disposal Hull Model encloses all of the production possibilities which can be generated from the actual observations. In the output oriented case the performance of an observed fund (corresponding to given level of input) is compared against the available best practice fund(s). Similar procedure is followed for input oriented cases also.

Previous Studies on Mutual Fund Performance – The Received Literature

In the international context, quite a number of research studies compared the performance of mutual funds using non-parametric frontier analysis. Perhaps the earliest attempt was by Murthi, Choi, and Desai (1997) who used DEA portfolio efficiency index (DPEI), with standard deviation and transaction loads as inputs, and excess return as output, to investigate performance of 2083 mutual funds in the third quarter of 1993.In the first phase of empirical analysis, they compared the DPEI measure with traditional measures of performance corresponding to 731 mutual funds belonging to seven categories: aggressive growth, asset allocation, equity-income, growth, growth-income, balanced and income. In the second phase, they used all 2083 mutual fund for computing DPEI for each fund. They also used a regression analysis to test for the source of variation in efficiency.

Basso and Funari (2001) used several risk measures (standard deviation, standard semi-deviation and beta) and subscription and redemption costs as inputs, and the mean return and the fraction of periods in which the mutual fund was non-dominated as outputs. In a later study (2003), Basso and Funari used an ethical score of mutual funds in place of the stochastic dominance indicator.

Gregoriou, Sedzro, Zhu (2005) used DEA to appraise the performance of 168 hedge funds for the period 1997-2001.They initially used the BCC model to classify the hedge funds into efficient and inefficient categories. Then they used cross efficiency and super-efficiency models to further analyse the efficiency of funds.

Using the Morningstar database of mutual funds, Daraio and Simar (2006) evaluated performance of six categories of mutual funds (asset allocation, aggressive growth, balanced, equity income, growth and growth income) in terms of conditional input oriented order-m efficiency, Free Disposal Hull (FDH) method and DEA, Jensen's α and Sharpe Index. Total return has been taken as the output in the study while Expense Ratio, Loads and Turnover Ratio have been taken as the inputs.The study also compared the simple traditional indicators(Jensen's α and Sharpe Index) with their non-parametric counterparts (order m efficiency, DEA and FDH) using the Pearson, Spearman and Kendall's tau-b measures of correlation. The results indicate that while indicators based on nonparametric and robust approaches (DEA, FDH, order-m) are highly positively correlated, they are weakly correlated with the traditional indicators (Sharpe ratio and Jensen's alpha).

Zhao, Wang and Lai (2011) proposed two quadratic-constrained DEA models for evaluation of mutual funds performance, from a perspective of evaluation based on endogenous benchmarks. They decomposed two vital factors for mutual funds performance, risk and return, in order to define mutual funds' endogenous benchmarks and give insights and suggestions for managements. Of the two quadratic-constrained DEA models, one is a partly controllable quadratic-constrained programming. The approach is illustrated by a sample of twenty-five actual mutual funds operating in the Chinese Market corresponding to the years 2005 and 2006. The results show that although the market environment in year 2006 was much better than that in 2005, average efficiency score declined in year 2006 due to relaxing of system risk control. The majority of mutual funds do not show persistence in efficiency ranking. The results indicate that mutual fund ranking in China depends mostly on system risk controls.

In the Indian context, most of the studies [with very few exceptions like Mishra and Rahman (2002)] used the CAPM structure for analyzing mutual fund performance. Rao and Ravindran (2002) applied relative performance index, Sharpe Measure, Jensen's measure and Fama's measure etc. to evaluate the performance of 269 open-ended schemes for the bearish period of September 1998 to April 2002.

Roy and Deb (2004) used a sample of 133 open-ended Indian mutual fund schemes, over the period January 199 to July 2003 for examining mutual fund

performance. The broad based S&P CNX 500 is used in the study as benchmark. The study uses the lagged information variables – interest rates, dividend yields, term structure yield spread and a dummy for April-effect. Panwar and Madhumati (2006) used Jensen's alpha, Sharpe information ratio, and excess standard deviation adjusted return, e SDAR to evaluate the performance of samples of public and private sector sponsored mutual fund schemes for the period May, 2002 to May, 2005.

In contrast to the aforementioned studies Mishra and Rahman (2002) measured mutual fund performance using lower partial moment. In this paper, measures of evaluating portfolio performance based on lower partial moment are developed. Risk from the lower partial moment is measured by taking into account only those states in which return is below a pre-specified "target rate" like risk-free rate.

The Framework of Present Study:

Inputs and outputs:

In the present study we consider two outputs (return and probability of getting excess return over the mean return) and one input (second order lower partial moment). Therefore the input-output relation is: Output (Return, Probability of Excess Return) =f(Second LPM)

The correlation coefficient between the input and the two outputs are provided in Table 1:

Table 1: Correlation Coefficient Between Inputs and Outputs

Particulars	Second Order Lower Partial Moment	Mean Return	Probability of Excess Return Over Mean
Second Order Lower Partial Moment	1	0.523069	0.096022
Mean Return	0.523069	1	-0.45124
Probability of Excess Return Over Mean	0.096022	-0.45124	1

Source: Calculated.

Period of study

The present study is based on observations relating to 18 sectoral mutual fund schemes for the period July 2010 to December 2010.The data have been collected from the AMFI website. Estimation has been made under the assumption that the funds operate under variable returns to scale.

Descriptive Statistics of Technical Efficiency Scores

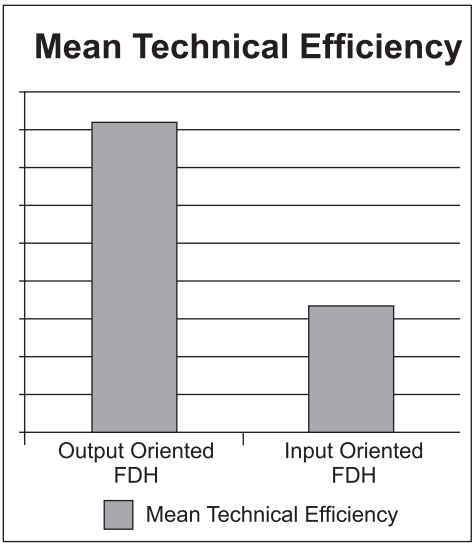
Table 2 presents the descriptive statistics of technical efficiency scores using the Output Oriented Approach, Input Oriented Approach.

Table 2 : Descriptive Statistics of Technical Efficiency Scores

Particulars	Output Oriented FDH	Input Oriented FDH
No. of Mutual Fund Schemes	18	18
No of Efficient Mutual Funds	10	09
Mean Technical Efficiency	0.9851	0.8866
Standard Deviation	0.0232	0.1577
Maximum	1	1
Minimum	0.9143	0.4802

Source: Calculated.

Figure 1 : Mean Technical Efficiency of In-sample Schemes



Summary of the Findings

In the present study eighteen sectoral mutual fund schemes have been evaluated for the second half of 2010 using two non-parametric Free Disposal Hull models: Output Oriented FDH and Input Oriented FDH. Both the models used same input and output indicators: second order lower partial moment (input) and mean return and probability of excess return over mean (outputs).

The fund wise results are available in the Appendix in Table A1. The outcomes reveal that as per the output oriented model, 10 schemes exhibit technical efficiency. On the other

Table 3 provides the fund-wise efficiency scores.

Table 3: Fund-Wise Technical Efficiency Scores

Scheme	Output Oriented FDH	Input Oriented FDH
Birla Sun Life Commodity Equities Fund - Gbl Agri - Retail - Growth	1	1
Birla Sun Life Commodity Equities Fund - Gbl Multi Comm - Retail - Growth	1	1
Canara Robeco FORCE Fund - Institutional - Growth	0.998481	0.991254
Canara Robeco FORCE Fund - Retail - Growth	1	1
Franklin Infotech Fund - Growth	0.9545	0.9832
Franklin Pharma Fund - Growth	1	1
ICICI Prudential Banking and Financial Services Fund - Retail - Growth	0.9545	0.749356
ICICI Prudential Technology Fund - Growth	1	1
Reliance Banking Fund - Growth	1	1
Reliance Pharma Fund-Growth Plan-Growth	1	0.889901
Religare Banking Fund - Regular - Growth	0.9848	0.711998
Sahara Banking and Financial Services Fund - Growth	0.9697	0.740741
Tata Life Sciences & Technology Fund - Growth	0.9844	0.779814
Sundaram Financial Services Opportunities Fund - Retails - Growth	1	1
UTI - MNC Fund (UGS 10000)-Growth Option	1	1
UTI Banking Sector Fund - Growth	0.9706	0.632293
UTI Pharma and Healthcare Fund - Growth	1	1
UTI Services Industries Fund-Growth Option	0.9143	0.48016

Source: Calculated.

hand, as per the input oriented model 9 schemes are efficient.

Appendix

The Concept of Distance Function and Free Disposal Model

In the context of multi-criteria portfolio evaluation, Shephard's (1953, 1970) distance function approach provides a sound conceptual basis for the derivation of evaluation criteria. The idea is invoked from a multi-input multi-output production system where distance function provide a functional characterisation of the structure of production technology. The input set of the production technology is characterised by the input distance function while the output set is characterised by the output distance function.

In order to elaborate the concept of distance function, we consider a technology T using a nonnegative vector of inputs

$$X=(x_1,x_2,.....,x_n)\in R^n_+$$

to produce a nonnegative vector of outputs

$$Y=(y_1,y_2,.....,y_m)\in R^m_+.$$

In functional terms, they can be related as: $Y=P(X)$ and $X=L(Y)$

Given this, an input distance function can be defined as $D_{input}= Max[\lambda:X/\lambda \in L(Y)]$. Intuitively speaking, an input distance function gives the maximum amount by which the producer's input vector can be radially contracted and yet remain feasible for the output vector it produces.The reciprocal of the input distance function can be considered as the radial measure of input oriented technical efficiency.

In an analogous fashion, the output distance function is defined as: $D_{output}= Min[\mu:Y/\mu \in P(X)]$. Intuitively speaking, an output distance function gives the minimum amount by which the producer's output vector can be deflated and yet remain feasible for a given input vector.

The derivation of efficiency score on the basis of Free Disposal Hull model is based on the concept of distance function. For providing the technical details we specify the production possibility schedule as:

$\mathbf{PPS}_{FDH}=\{(x,y)|x \geq X_j, y \leq y_i, x, y\geq 0, j = 1,...,n\}$ where $x_j(\geq 0), y_j (\geq 0)$ are actually observed input and output performances for $j=1,2,\ldots,n$.

The output oriented optimization program corresponding to the Free Disposal Hull Model is:

$$\text{Max } \theta$$

Subject to: $x_i \geq \lambda X$, $\lambda y_j \leq Y$ $\lambda \geq 0$,$\sum\lambda=1$, $\lambda(0,1)$

The condition $\lambda(0,1)$ implies that the components of λ are constrained to be bivalent. They must all have values of zero or unity so that together with the condition $\sum \lambda = 1$ only actually observed performances can be considered.

The input oriented optimization program corresponding to the Free Disposal Hull Model is:

Min ϕ

Subject to:

$\phi x_i \geq \theta x$, $\theta y_j \leq Y$ $\lambda \geq 0, \lambda \geq 0$, $\sum \lambda = 1$, $\lambda(0,1)$

Note: I am grateful to Ms. Diptosree Sengupta, Correspondent, Business Economics for providing me the data.

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Some Issues in Banking in the Present Context

*Dr. Brinda Jagirdar**

Abstract

There is enough empirical evidence to show that sustained economic growth is underpinned by a strong banking and financial system. In this context, to enable the economy to achieve 8-10% GDP growth, the recent decline in domestic savings rate, particularly in financial assets, needs to be reversed. At a time when rates in the economy are softening, it will be a challenge to mobilise financial savings.

I. Cut in Deposit Rates

There is a view that to revive growth, banks must cut their interest rates. However, to protect their margins and profit, banks can affect a cut in lending rates only if they are also able to cut their deposit rates. In today's integrated and globalised world of financial markets, savers are closely tracking returns and flock to those institutions offering competitive rates to savers. Therefore, the suggestion from some quarters that banks must cut deposit and lending rates appears to be too simplistic. How can banks cut rates when competing instruments in the market are offering higher rates? Let us not forget the 2004-05 experience when deposits grew by 13%, credit growth was a robust 30% and interest rates came under intense pressure.

The main reason interest rates have remained stable this time even as deposits rose by 13.5% in 2011-12, was because credit growth was sharply subdued at 17%. Recent data show that ASCB deposits grew by 14.1% year on year upto 24th August 2012 against 18.0% a year ago and RBI's full year's target of 16%. If anything, the current persisting trend of lukewarm growth in bank deposits is a matter of concern more so because bank deposits are getting pushed out and funds are flowing into the shadow banking system of Liquid Mutual Funds, Tax Free Bonds by PSUs, etc.

In the present milieu, when banks have to compete for retail deposits with other players, it is difficult to see how banks are supposed to offer rates that are out of sync with the market. Perhaps, companies offering tax-free bonds should not be allowed to unfairly crowd out the retail market and there is no necessity of giving tax advantage to these large infrastructure companies as these entities have the financial strength and standing to raise funds directly from the market. Instead, banks, provident funds and pension funds could be allowed this benefit of garnering tax free long term funds for

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investing in infrastructure, which would help promote a vibrant corporate debt market and incentivise infrastructure development.

As we move into the busy season and credit demand picks up, slower deposit growth will not only add to tight liquidity, the resource crunch will also make it difficult for banks to support economic growth going forward. Inability to mop up adequate resources through deposits is not good for banks and definitely not good for the economy as banks will not be in a position to meet the credit needs of productive sectors of the economy. China on the other hand, has been able to support its economic growth due to robust growth in bank resources.

In our view, for GDP growth to go back to the 8-9% levels seen in the past, bank finance backed by robust deposit growth is necessary. Therefore, the tax advantages flowing to non-banks, which affects deposit mobilisation by banks, may be re-examined in the present context.

II. Need for a Level Playing Field

Another issue is the need for a level playing field. Just as banks mobilise deposits from the public, other competing institutions like insurance companies, NBFCs and Mutual Funds are also engaged in collecting funds at the retail level. So it is only fair to ask that these institutions also be subject to CRR. Interestingly, this was one of the issues considered by the Khan Committee which then decided that DFIs like IDBI and ICICI should be allowed to become banks and be subject to the same regulations. After all, institutions that perform functions similar to those of banks should also be subject to the same regulations.

Today insurance companies and large NBFCs operate regularly in the stock market and are commercial entities so they should also share the burden of the costs imposed by pre-emptions like CRR. Perhaps at least a 3% CRR can be introduced for such companies as against a 4.75% CRR for banks.

Besides the issue of level playing field, another aspect is the cost of CRR as the large sums kept idle on account of CRR earn no interest and hurt the financial health of banks. Imposing CRR as a measure for mopping up liquidity should not be confused with payment of interest on these balances as a liquidity infusing measure. Banks are only asking for a fair return to be given on impounded funds to compensate them for the foregone lending opportunity. Besides, keeping funds idle affects overall production.

III. Need for Bringing Down CRR

When capital adequacy was first proposed for NBFCs by the James Raj Study Group 1985 and the AC Shah Committee suggested prudential norms for NBFCs way back in 1992, these ideas also went against the thinking at that time. The Narasimham Committee and the Tarapore Committee had also suggested sharp reduction in pre-emptions like CRR. More recently, the

RaghuramRajan Committee in 2008 had also suggested reduction in pre-emptions like CRR and SLR.

Today, we need to ensure productive use of all resources including financial resources. And in this context, there is a view emerging in the country that pre-emptions like CRR serve limited purpose and banks should be allowed to deploy these productively to support economic growth. While speaking at the recent FIBAC 2012 Conference of Bankers, the Chairman of the Prime Minister's Economic Advisory Council, Dr C. Rangarajan suggested that the CRR be used "only in extraordinary circumstances" and that it was time to phase this out.

The cash reserve ratio (CRR) is a tool for managing liquidity but at times this is also seen as a monetary policy instrument. Currently the CRR is 4.75%, for every Rs 100 of deposits, banks have to keep Rs 4.5 with the Reserve Bank of India (RBI) and no interest is payable to banks on this money. Unlike the past, there are now more instruments available with RBI to manage liquidity. For example, through open market operations it can increase or decrease money supply by buying and selling bonds at any point of time. RBI can also influence interest rates by raising or reducing the repo rate. Against this backdrop, there is a growing debate in the country today about the relevance of CRR as this pre-empts resources that banks could have otherwise lent out. The State Bank of India, Chairman, Shri Pratip Chaudhuri, has argued that if these funds were available with banks, they could have lent these out, interest rates could be reduced, and banks' bottom lines improved. More importantly, with banks being in a position to increase their lending to support for productive activity, the economy would have been 25% larger and besides increased production in the economy, there would have been a commensurate increase in employment and tax collections.

This view has received support among sections and therefore, we argue that the CRR may be brought down and used only selectively under extraordinary circumstances, like for instance, if there is a sharp increase in capital flows which poses challenges to domestic liquidity management, requiring RBI's intervention to control the liquidity.

Conclusion

India's banking sector has remained resilient in the face of the global economic crisis and has received praise from abroad as it has managed to weather the economic and financial storms raging globally. A sound regulatory framework as well as strong systems and processes in banks have helped India's banks. Going forward, we need to ensure that our banks are well capitalised and able to support India's growth in the years to come.

The Indian Agriculture – An Overview

*Agriculture and Food Processing Committee**

Abstract

Agriculture provides the principal means of livelihood for over 58.4% of India's population.

Indian Agriculture accounts for 17% of India's GDP and 55% of employment (direct and indirect)

Rate of growth in agriculture has been significantly lower than that in industry and services.

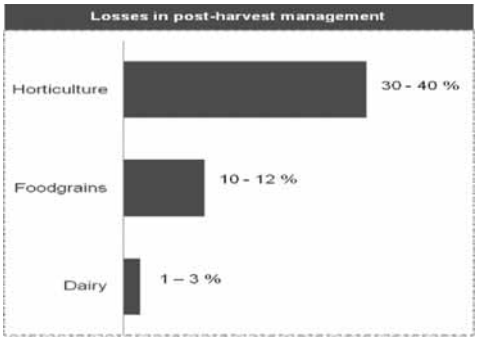
Agriculture has a propensity to create higher employment as compared to industry, per rupee of investment. An investment of Rs. 1 Mn creates 45 jobs in agriculture compared to 18 jobs in industry.

This sector has a ripple effect on various other sectors of the economy, as rural India constitutes almost 50% of consumption in various product categories.

Despite India already being a large agri-producer, huge improvements are desirable and possible new Green Revolution is require.

Introduction

India has a very large area under cultivation as compared with other countries and produces over 230 million tones of foodgrains, 120 million tones of vegetables and over 60 million tones of fruits, but yields are well below world averages. There are substantial



Source: CMIE, www.indiastat.com

wastages across the value chain which results in a significant quantity as well as value loss.

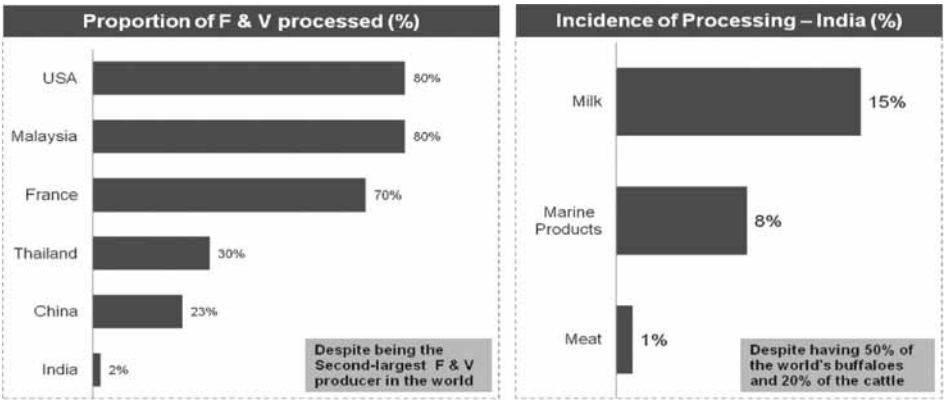
A 5% improvement in yield would lead to 12 million tones of additional food grain output, and over 9 million tones of additional fruits and vegetables, critical to feed our growing population. This will result in additional output valued at Rs.300 billion (Rs.30,000 crores).

Significant additional savings are possible by ensuring reduction in wastage through various means including better pre and post harvest management practices, temperature controlled storage, dedicated supply chain and agri-processing.

Agri-Processing

The Indian Food Processing Industry is large, with a value added processed food market of Rs.1800 billion (Rs.180,000 Cr.). But a very small proportion of produce in India is

* This Report has been prepared by Agriculture and Food Processing Committee, Bombay Chamber of Commerce & Industry. The Committee can be reached at ks@bombaychamber.com



Source: Ministry of Food Processing, GoI

processed across sub-sectors like milk, marine products, meat and horticulture.

In fruit and vegetables, India is far behind most other developing and developed nations. The same holds true for meat and marine products in particular. The sector is constrained by lack of backward integration, and a dedicated supply chain, thus leading to lack of scale, poor capacity utilisation and low investment.

Value Addition through Food Processing could help profitably absorb current output. Food Processing converts perishables into consumables as it increases the shelf life.

Agri-Exports

India's agri exports account for a dismal 1.9% of global trade in the sector. This is despite the fact that India is the second largest producer to fruit and vegetables, the largest dairy producer, and has the largest number of buffaloes in the world. An increase from 1.5% to 5% share of global trade can increase the forex contribution from this sector to the tune of USD 30 bn.

For, the integration of Indian agriculture to international markets, value addition to agri produce and growth of organised food trade is imperative.

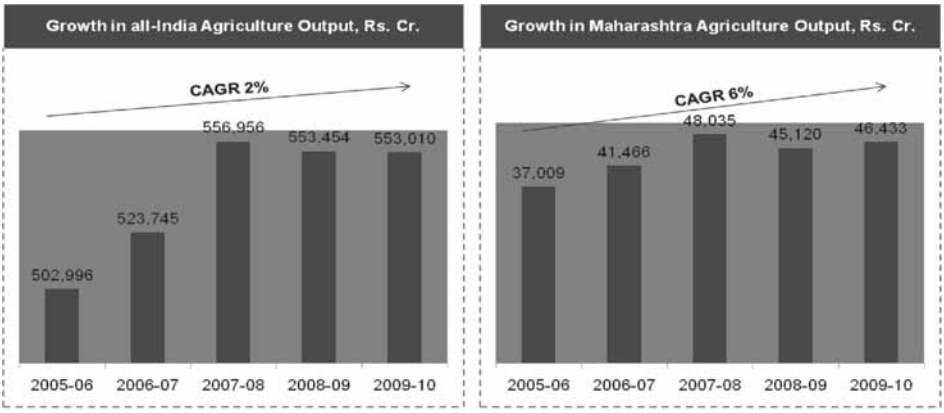
Source: FAO Stats, IFPRI

Development of Modern Food Retail will help integrate the back-end and the front-end of Agri business.

The Maharashtra Story

India and Maharashtra – Agriculture Output Growth

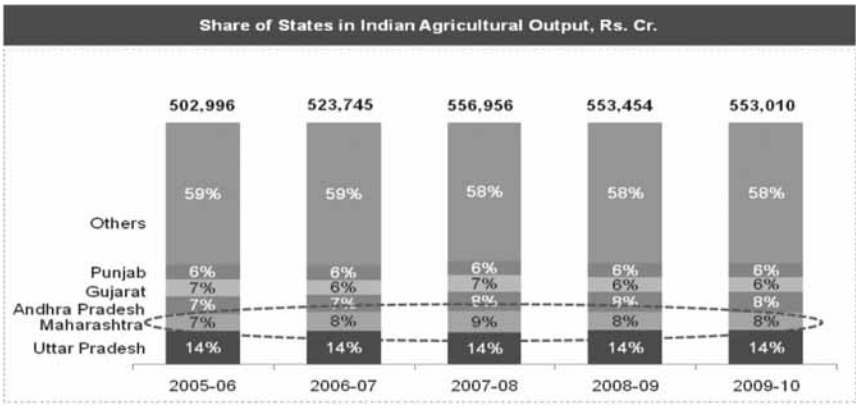
Agriculture output in Maharashtra grew at the rate of 6% between FY06 – FY10 compared to an all India growth of 2%.



Constant prices assumed

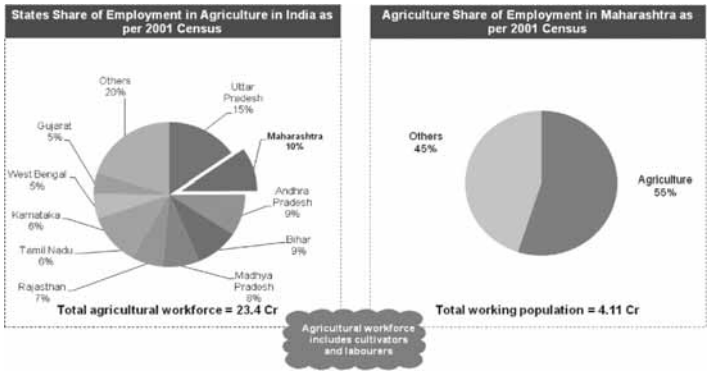
Source: Directorate of Economics and Statistics, Maharashtra Economy Survey

Maharashtra also contributed 8% to India's agriculture output in FY10, making it one of the leading agricultural states in the country.



Constant prices assumed

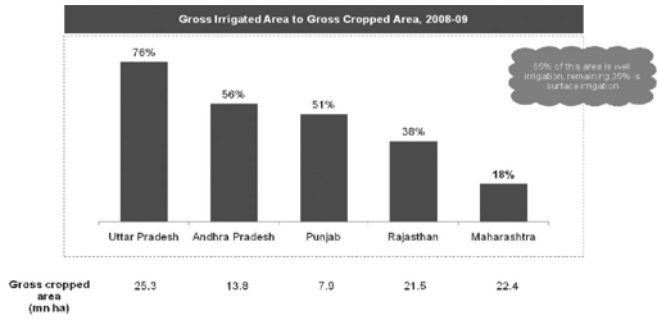
55% of the workforce in Maharashtra is engaged in Agriculture which is about 10% of the country's total agricultural workforce.



Inadequacies affecting agriculture

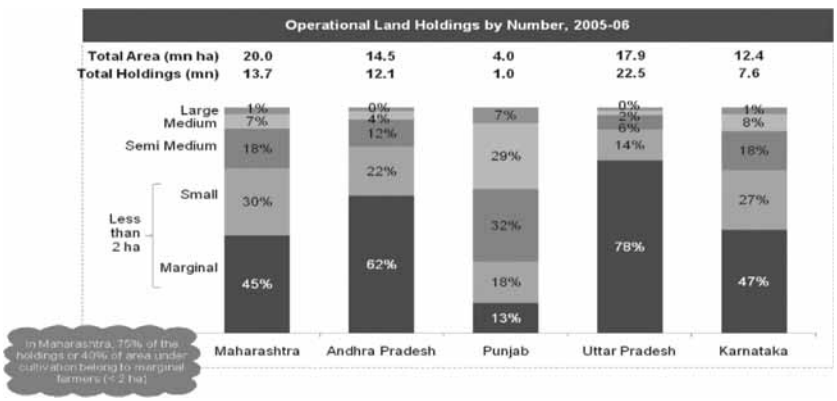
Poor irrigation infrastructure, marginal land holdings and lower fertilizer consumption in Maharashtra are some of the key reasons for low yield.

Firstly, irrigation infrastructure issues make agriculture in Maharashtra dependent on the vagaries of the monsoon and limits the scope for crop diversification.



Source: Economy Survey, Maharashtra / UP / AP / Punjab / Rajasthan

Secondly, the predominantly marginal land holdings result in inefficient utilization of resources and difficulty in adoption of farming best practices.



Source: Economy Survey of Maharashtra

Other Issues Impacting Agriculture

Policy level:

- APMC Act
- Taxes and Duties
- Land Tenure Policies
- Credit Availability
- Integrated Food Laws
- Support to Farm Mechanization

Infrastructure:

- Transport
- Water/ Irrigation Technologies
- Power
- Cold Chain infrastructure
- Research and Development
- Back-end to Front-end integration

Shift is Required from 'Public Policy to the Principles of Market and Competition'

- Consolidation and Aggregation can help create demand; add value to produce; hedge risks, establish public-private-people partnership and encourage organised retailing using alternate farm management practices.
- Modern Retail Supply Chain Infrastructure and Logistics can help strengthen procurement and distribution chain; reduces post-harvest losses, improve shelf life of produce and in integration of Indian Agriculture with International Markets

FDI in Agriculture

The industry is divided on this issue. Some are in favour and others are against the FDI policy.

Those in favour have an opinion that encouraging FDI policy can remove the present limitations in Indian system such as:

First, there has been a lack of investment in the logistics of the retail chain, leading to an inefficient market mechanism. Though India is the second largest producer of fruits and vegetables, it has a very limited integrated cold-chain infrastructure, with only 5386 stand-alone cold storages, having a total capacity of 23.6 million MT, 80% of this is used only for potatoes. The chain is highly fragmented and hence, perishable horticultural commodities find it difficult to link to distant markets, including overseas markets, round the

year. Storage infrastructure is necessary for carrying over the agricultural produce from production periods to the rest of the year and to prevent distress sales. Lack of adequate storage facilities cause heavy losses in terms of quality and quantity of produce and therefore low returns to farmers. Though FDI is permitted in cold-chain to the extent of 100%, through the automatic route, in the absence of FDI in retailing; FDI flow to the sector has not been significant.

Second, Intermediaries often flout mandi norms and their pricing lacks transparency. According to some reports, Indian farmers realize only one third of the total price paid by the final consumer, as against two third by farmers in nations with a higher share of organized retail.

Third, there is a big question mark on the efficacy of the public procurement and PDS setup and the bill on food subsidies is rising. In spite of such heavy subsidies, overall food based inflation has been a matter of great concern. The absence of a 'farm-to-fork' retail supply system has led to the ultimate customers paying a premium for shortages and a charge for wastages.

Fourth, the Micro, Small & Medium sector has also suffered due to lack of branding and lack of avenues to reach out to the vast world markets.

Furthermore, it is believed that substantial benefits will accrue from development of organized food retail.

At the Farm level:

- The farmer gets better support for seeds and inputs.
- The farmer receives timely information on weather patterns, harvesting parameters, demand trends, quality specifications, variety, market prices etc.
- Computerisation and Information Technology will percolate down the supply chain giving more leverage to the farmer.
- Provision of modern, appropriate farm inputs, pre and post harvest facilities and aggregation of produce at climate controlled collection centers.
- Enhanced quality standards leading to better price realization.
- Insulation from unreasonable price fluctuations and prompt payments without unnecessary deductions.
- Better quality/ price trade-off through improved production systems and inputs.

At the Retail, Consumer Interface level:

- Provision of appropriate store formats with equipment for proper display.
- Enhanced sales and profitability because of reduction in wastage.
- Quality produce at 'value for money' prices.
- Consumers getting more variety, better availability, hygienic produce with enhanced shelf life.

Thus the rationale behind allowing FDI in Indian retail sector comes from the fact, that it will act as a powerful catalyst to spur competition in retail industry. Permitting foreign investment in food-based retailing is likely to ensure adequate flow of capital into the country and its productive use. India will significantly flourish in terms of quality standards and consumer expectations, since the inflow of FDI in retail sector is bound to pull up the quality standards and cost-competitiveness of Indian producers in all the segments.

Those against the FDI Policy are of the opinion that while it will benefit corporate sector, consumers and investors, it will not be in favour of the Indian farmers.

- Current Independent Stores will be compelled to close: This will lead to massive job loss
- Big players can knock-out competition: Big players can afford to lower prices in initial stages, become monopoly and then raise price later.
- Import of agri produce from competitive countries will distort the Indian market and Indian farmers will be compelled to sell their produce at throw away prices.
- India does not need foreign retailers as they cannot cater to huge domestic demand in terms of taste and variety.

'Remember East India Company it entered India as trader and then took over politically'

Governance and Management of Water Resource to Ensure Water and Food Security

*Vidyanand Ranade**

Introduction

Besides meeting the basic need of existence of life on the earth, water is a very potent agent in achieving socio-economic development of the society. History of development of water resources dates back to more than five millennia, and man-made interventions in the natural aquatic ecosystems have been continually evolving since then, to harness water resources for ensuring water and food security to the human beings. It was an interplay between water demand, which was continually increasing and changing in tune with the pace and pattern of development of the society and the supply of water, which was met with by constructing appropriate type of infrastructure to match the demand. Even if population of the world increased by three times during the twentieth century, world water demand increased by seven times, to ensure food security to the teeming millions by increasing land productivity through irrigated agriculture, and to fulfill the ever growing water demand for industries and for urban population. Such situation imposed strain on the available water resources in many water-scarce river basins of the world, calling for governance in the development of water resources. For International rivers, agreements were signed between the co-basin countries, for sharing of water resources available in the basin. Issues of sharing of water resources of inter state rivers in our country were settled either by mutual agreements between the co-basin states, or as per provisions of awards of the Interstate River Water Disputes Tribunals.

Surface Water Resource

After independence to the country, to tide over acute food shortage faced in the fifties, activity of construction of Major dams was taken up on a large scale, to store seasonal flow of rivers and use the water for irrigation and power generation. Due to irrigated agriculture coupled with revolution in the agriculture sector, the country had become self sufficient in food grains since then. However, in due course of time, priority gradually shifted from construction of major dams aimed at making optimum development of water resources in the basin to small size dams, with a

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view to bringing social equity through equitable dispersal of irrigation benefits. When awareness about reservation for water requirements for aquatic and terrestrial ecosystems was realised during later half of the last century, restrictions were imposed on the water use for human consumption. At the global level, sustainable development was defined as 'meeting needs of the present generation without sacrificing needs of the future generation'. Governance thus aimed at ensuring optimum, equitable and sustainable development of surface water resource. In almost all the developing countries, role of Govt. was that of a 'Provider' as well as 'Manager' of the infrastructure for surface water resource development infrastructure.

Groundwater Resource

Unlike Indo-Gangetic plains in the North India, availability of groundwater (GW) in the Peninsular India is primarily confined to shallow aquifers consisting of in-situ decomposed rock, underlain by a network of cracks, rock joints, flow joints and fissures in the parent rock, to permeate, hold and store groundwater. GW availability is more or less confined, disconnected and limited in quantity, depending on intrinsic substrata conditions and on the actual natural recharge each year according to magnitude and pattern of rainfall. GW from shallow aquifers could be accessed by means of dug wells, by installing centrifugal pumps on them. GW from deep aquifers could be accessed by drilling deep bores and installing submersible pumps in them. However, since water stored in deep aquifers was the effect of recharge accumulated over hundreds of years, its exploitation could be said as mining of water. In the pre independence period, GW development was on a low key, limited to lifting of water from dug wells by means of draft animal power.

During last quarter of the twentieth century, however, pace of GW development increased on account an altogether different reason. Average family land holding size in our country has been continuously decreasing as a result of partition of land during its transfer from one generation to the other, as per provisions of the 'Succession Act'. Average family land holding size is now less than one third to one fourth of what it was at the time of independence. With the result, rain-fed agriculturists especially from the drought prone area of the state found it more and more difficult to ensure livelihood security from the reduced family land holding size. This situation, coupled with the two successive severe drought years (1971 to 1973), induced small land holders to explore various measures to provide irrigation facilities to increase land productivity and income. Govt. promoted development of GW resource by extending loan facilities for digging / drilling of wells and installing pumps. Exploiting GW as a means to achieve livelihood security to the cultivators practicing rain-fed agriculture in the state, resulted in overexploitation of GW in some mini watersheds. To tide over the resulting water shortage, at the individual farmer level, installation of pressurized

micro irrigation systems on wells was resorted to on a large scale in the state. To promote this activity, subsidy was also given by the Govt. for installing pressurized micro irrigation systems on private wells. In the development of 'Groundwater Resource', role of Govt. was that of a 'Facilitator', leaving the task of 'Providing and Managing of GW' entirely to the private sector, to individual cultivators.

Since nineties of the last century, Watershed Development (WSD) works, consisted of conservation of soil and water at the farm level in the mini watersheds, were taken up by the State Govt. to accomplish artificial augmentation of GW. Govt. thus acted as a 'Provider' in taking up WSD works, to augment GW recharge through human interventions. Objective of such measures was to improve GW availability at the on-farm level to meet with social obligations such as water security to the people and livestock, and livelihood security by providing protective irrigation to many rain-fed cultivators.

Gradual shift from Major dams to Watershed Development works.

Substantial part of the water resources available in a river basin can be exploited by construction of Major dams (irrigated area more than 10,000 ha each). Cost of storing per unit of water by major dams is least and it increases to about 4 to 5 times, as the size of the storage reduces from major to minor dam. Even then medium dams (irrigated area between 10000 to 2000 ha) and minor dams (irrigated area between 2000 to 250 ha) were taken up on the grounds of social justice and equity, since they provided irrigation facilities to the rain-fed areas in the upper reaches of the basin, which were bypassed by command area of major dams. Promotion to the exploitation of GW was necessary because it dispersed the irrigation benefits to most needy farmers and water-use efficiency was of very high order when compared with surface irrigation schemes. Even though cost per unit of water stored (in the form of additional GW recharge) by Watershed Development (WSD) works was much more than that of a minor dam, such works were given priority because they assured water to the dry land cultivators. This shift in the priority of taking up works starting from Major dams to medium and Minor dams and then to groundwater development and lastly to watershed development works, was a gradual process which stemmed from providing irrigation needs of the dry land farming cultivators and demands made by their elected representatives.

Study of ultimate irrigation potential that could be developed in a representative river basin in the peninsular India, viz. Upper Bhima Basin (UBB) covering 14,700 sqkm (catchment area of Ujjani dam) in the Krishna river basin would highlight contribution of each of these measures in providing water security for all the competing water demands. Out of the total ultimate irrigation potential of 7.06 lakh ha in UBB, Major dams contribute 3.52 lakhs (50%), Medium and Minor dams 1.08 lakhs (15%), GW

1.60 lakhs (23%) and augmentation by WSD 0.86 lakhs (12%). In addition to the use of water for irrigated agriculture as above, all the water required for Pune and Pimpri-Chinchwad cities, towns and industries around them is supplied from major and medium dams. Since it is a representative basin, situation in other small and large river basins in the state would not be much different from it.

In spite of this stark reality, arguments are often made that 'small is beautiful and big is ugly' by despising Large dams and advocating only for construction of small dams and WSD works. Sentimental appeals made by the activists always get precedence over ground reality, rational thinking and dispassionate deductions, in the minds of not only the common man but also in the minds of the intelligentsias. Irony of it is that, such statements are made and supported by the people even while taking all the benefits (water, food and power) provided by large dams. Major, Medium, Minor dams, GW development and WSD works cannot replace each other. Each has its plus points and constraints. Hence what is required is a mosaic of all of them to optimize use of water resources and its dispersal in a more equitable manner.

Looking forward

In the river basins where water resource development is nearing its optimum development, performance review of existing WRD infrastructure and its modernization where ever necessary should be done and all in-progress and contemplated works should be completed expeditiously. Concurrently, efforts would have to be directed towards achieving better water management of the existing infrastructure, by improvement in water-use efficiency by structural measures such as concrete lining of open water conveyance net work, water distribution through closed pipes, introducing pressurized Micro Irrigation Systems (Drip & Sprinkler) on surface irrigation schemes etc. Non structural measures would be to involve beneficiaries in the water management at local level through Water User's Associations, so as to generate 'more cash, crop and jobs per drop of water'. Government of Maharashtra has already passed Participatory Irrigation Management Act in the year 2005, to facilitate transfer of water management to the stakeholders. For equitable use of available groundwater, involvement of stakeholders is also essential in the operation and maintenance of watershed development works. Need of the hour is cooperation on the part of stakeholders to come forward and manage the water more efficiently and equitably.

In the use of water by cities and industries, polluted effluent generated after use of water by the humans, has added new dimension to the problem, due to impairment in availability and quality of water for human use. Appreciable increase in the use of water has generated polluted effluent and its direct release into rivers without giving much treatment, has degraded quality of water flowing in

most of the rivers and that of the man-made reservoirs into which the rivers drained. Where such polluted water was lifted from rivers and used for irrigated agriculture, the groundwater got polluted and the agricultural produce was also got contaminated. It is going to be a big challenge before the planners, to evolve a mechanism to raise finance for constructing effluent treatment plants and to implement and operate them sustainably to ensure that polluted effluent is not released directly into rivers. Only then availability of water would improve qualitatively and quantitatively.

Conclusion

Govt. had acted as a 'Provider and Manager' in harnessing surface water resource, and has acted as a 'Facilitator' in promoting use of subsurface water, while ensuring water and food security to the people. Water use for agriculture and for industries has generated employment in the rural and urban sector. Availability of adequate water of good quality for drinking and domestic use has improved quality of life. Even if governance of water resource development has been and would continue to remain within the domain of Govt., management of water should hereafter be the responsibility of the stakeholders or end users in all the sectors, for more efficient use of the limited, scarce and finite water resource.

Water Resource Management – Policies, Economics and Conflicts in Water Usage for Agriculture

*A. K. Bajaj**

Introduction

India is endowed with sufficient quantities of water as compared to many other countries having dry and arid climates. The total precipitation in the country is of the order of 4000 Billion Cubic Metres (BCM). However even this large availability is not sufficient to meet the requirements of the various sectors of the country and drinking and household needs of all citizens. The reasons are many. While India had a per capita availability of 5100 cu m per annum in 1951, this declined to 1700 cu m per capita per annum mainly due to increase in population. Then there is the '***effectively utilisable***' quantum figure since a large quantity of the total precipitation is lost due to transpiration and evaporation and rainfall is in excess in areas where it is not possible to harness and use. Thus, out of the total 4000 BCM precipitation it is assessed that the total utilisable quantity is only 1190 BCM. However, this quantity is by no means too meagre and, if properly managed can be utilised to meet the requirements of various sectors like agriculture, household, environment, industry and others. This is where the role of the Government comes in being tasked the role of managing the country's water resources by framing proper policies, managing the economics by ensuring adequate funding and overseeing equitable distribution to various sectors for meeting their competing demands.

Managing India's Water Resources – the Paradigm of Conflicting Interests and Factors

India is, however, a multi faceted nation with diverse climatic regions, areas of economic backwardness and areas of advanced development, pockets of sparse population and areas of high density urban agglomeration, all having their diverse water needs. All these contribute to complicating the management of the resource for its effective utilisation. The climate of the country is such that almost 75% to 80% of the rainfall of the country happen during the three monsoon months and that too in a few concentrated spells of 10 to 15 days. Added to that is the diversity of climatic regions within the country from the wettest north eastern regions where average annual precipitation is of the order of 11000 mm to the arid

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regions of the western deserts where it is only 100 mm. Thus we have the paradox of droughts in some parts of the country and floods in other parts concurrently as well as droughts and floods in the same region at different times of the climatic cycle. Added to this is the constitutional provisions laid out by our forefathers in their wisdom where the State Governments have been given all constitutional powers to manage the waters flowing within their territory for their own requirements pretty much as they want to except for some limited restrictions on interstate deficit region rivers. This gives rise to massive conflicts and interminable wrangling between various states over the use of water within their territories. All this makes formulating policies for managing water and equitable distribution not only between the states but also between various sectors a formidable task.

Policy Formulation in Water Resources Sector – Present Status

Complexities / Limitations:

The constitution of India lists Water as a state subject with some specific powers to the Central Government, but mainly for resolving inter-state disputes or sharing the waters in the interstate rivers. The planning, development and execution of schemes for management and utilisation of the water is left to the states to do as they wish. This arrangement worked fine in the early years after the formulation of the constitution when water was available to meet the needs of the people. However with the ever increasing population, the boom in the industrial sector and the need for water in the agricultural sector to meet the growing need for food production to feed the increasing population, there has been a huge surge in demand from the various sectors and the State Governments are hard pressed to meet the requirements of their people. The matter is further complicated by other factors like aggressive opposition by environmental lobbies to all types of water resources infra-structure projects, problems in rehabilitation of project affected persons, vested interests in pushing their own agendas for development, politicisation of the whole issue of water resources development in the interest of vote bank politics, increasingly parochial view being taken by State Governments and their reluctance to share this natural resource in the most optimal way for benefit of all citizens of the country etc. Thus formulating policies and guidelines for the sector which would be acceptable to all sections is a herculean task. The Government of India first formulated a 'National Water Policy' (NWP) in the eighties (implemented in 1987). This was revised in 2002 and is now again under revision. The very fact that a National policy is being revised so frequently attests to the dynamic nature of the sector which is continually throwing up new challenges for its management.

Initiatives by the Governments:

The Central Government with all the restrictions and limited powers

available has tried its hand at policy formulations with the ultimate objective of

- Optimising the use of the available resources.
- Ensuring equitable distribution.
- Fixing priorities in allocation of water.
- Nudging the State Governments towards accepting the formulations.
- Promoting integrated utilisation of the resources while maintaining the environment and other natural resources.

The National Water Policy has prioritised sectors for water allocation. Water being a basic necessity for all forms of life and more so for humans and animals, drinking water has been given top priority. After that fresh water requirements for growing basic food grains to feed the ever increasing population and to ensure food security for the country comes next on the list. Thus the agriculture sector has been given priority over others like industrial sector, environment, navigation etc. However, the State Governments like to fix their own priorities depending on their own local circumstances. While most states have drinking water and domestic supply as the first priority some states have priority for industry over agriculture etc.

However, the conflict of interest with the State Governments arises since the Central Government is looking at the big picture and is naturally keen to have the most optimal development of the available resources with least financial burden. This calls for integrated development of the water resources on the river basin concept, creation of infrastructure projects that would develop the entire basin and use the available water most judiciously for the various sectors. In other words the creation of River Basin Organisations to manage the water of the basin as a whole rather than leave decisions to individual states to build their own projects for catering to their own local requirements. However, the attitudes have hardened so much over the years at smaller and smaller local sections, whether states, districts, towns and even villages that there is no chance of collaboration at the basin level. Under the circumstances, the Central Government is restricted to formulating policies that more often are a statement of ideal intent rather than something that will be practically implemented on the ground by all stakeholders. The ideal solution to our water woes keeps changing with the shifting scenario and situations and thus the National Water Policy is revised every few years, the present one being the third such exercise under way. The Central Government then tries to coax the State Governments to accept this National Policy and adopt it as their State Water Policy but very few states buy the argument.

The states, the few who have formulated their own State Water Policy, however like to keep their own local interests and lobbies happy while taking steps towards managing their water resources at the State Level. Political compulsions also play a major

role in deciding State Policy. Thus we have States giving priority to industry over environment and even agriculture, or States where even environment has been given priority over other factors but only as a cover for other hidden agendas. Thus we have a state which has built in "decommissioning of existing unsafe dams" into their State Policy which is just a ploy to settle scores. While on the subject it would not be out of context to point out that water resources infrastructure is built and completed at huge costs, not only in terms of money but men, material, time and sacrifices of sections of society that it would be criminal to even think of "decommissioning" a project that is providing so many benefits all round, not only to the immediate neighbouring areas, but to far flung areas around. No project becomes unsafe if it is properly maintained and taken care of. We have examples of centuries old still functioning water resources systems.

Thus we see that there is not much of effective policy formulation at the country level as a whole while the state level policies are more of statement of local objectives and parochial intent, pandering to local political lobbies and vote banks. What has been achieved at the Central level is some modicum of agreements between various states on sharing the waters of the deficit rivers. The Central Government has been able to set up a number of Water tribunals which have been able to assess the available quantities and allocate them to the various stake holders in the basin.

Water Usage In Agriculture:

India's development thrust for many years was in the agriculture sector and the first few five-year plans allocated a major share of the financial resources for agricultural development. It is therefore not surprising that agriculture was given priority in allocation of water resources. With the antiquated practices of irrigation followed by the farming community it garnered a disproportionately high share of the resource. Even today almost 80% of the fresh water of the country is utilised by the agriculture sector. Although India has now started stressing on the industrial sector and specially the service sector but still, even today almost 70% of the population is engaged in the agricultural and related areas. However, with the increasing demand for water from other competing sectors, there is now a realisation that share of water for the agricultural sector needs to be reduced without compromising on the food productivity and output of the sector. In fact there is a need for increasing output of food grains to meet the ever increasing population. While production has increased from about 50 million tonnes in the early fifties to near about 250 tonnes today but it is estimated that the country will need at least 450 tonnes of food grains by 2050 to meet the needs of the population at that time.

While on the one hand there is a demand for water from all sectors there is the dichotomy of reduced per capita availability of water for the country as

a whole. While there was availability of about 5100 cu m of water per capita per year in 1950 this has reduced to almost the defined stress line figure of 1750 cu m per capita per year. This is mainly due to the huge increase in population from 350 million in 1951 to 1.15 billion today while water availability in the form of total annual precipitation has remained more or less constant. In fact India is burdened with a disproportionately large share of world population compared to the available fresh water. India has only 4% of the world's fresh water supply on which it supports almost 18% of the world population plus almost 15% of the world's cattle and live stock. The per capita water availability is very low even compared to most of our neighbours. Bangladesh has a per capita water availability of 8800 cu m and Nepal 9100 cu m per year. Countries like Myanmar and Bhutan, due to their low population have huge quantities of water to meet the needs of their citizens. (Myanmar has about 22000 cu m per capita and Bhutan a humungous 45500 cu m per year for each of its citizens). The Tibetan Plateau is called the "Water Tower of Asia" as it is the source of the eight largest rivers in Asia. These rivers have perennial flow throughout the year and operate as essential lifeline for nearly two billion people. Therefore, it is not as if India is in a water deficit region but the major challenge is in managing India's meagre per capita availability for meeting the demands of the various competing sectors.

Agriculture has traditionally been the pampered sector of the water management establishment in India for decades. Now, with the need to provide for the ever increasing demands of the other sectors, there is a need to draw back from the agriculture sector without hurting food productivity. It has been estimated that this sector which uses almost 80% of the country's fresh water of about 633 BCM harnessed presently can still continue to use a major share of the available water in absolute terms with some increase but its share in the total pie will have to go down in percentage terms in order for India to meet the water demand from other sectors when we achieve the target of ultimate utilisable water resources of 1123 BCM. It is estimated that the ultimate share of the sector will go down to about 70%.

The Way Forward:

The solution to effective management of the country's water resources to meet the needs of all sectors with equitable allocation to them, thus seems obvious and straight forward.

• Manage the agricultural sector so that water intensive crops are grown only in surplus water basins. However this is easier said than done, as the following example of wrong government policy and initiatives implementation will bear out:

Rice would be good crop to consider as an example of the story gone wrong with excessive water availability to the agricultural sector. We are well aware that the conventional method of growing rice in standing water in paddy fields. This system worked fine as long as rice was grown in the

lower Gangetic basin in East India or in the Brahamputra basin where water was available in plenty. However the problem started when the farmer in Punjab started to grow rice. With large quantities of irrigated water available and the free electricity for pumping out more from the ground, the fertile land of Punjab has gone into major problems of alkalinity / salinity and drastic falls in ground water table levels.

• Improve the utilisation efficiency of the water supplied to the sector so that food productivity of irrigated areas is enhanced for the same land and water applied.

It has been known for some time that the efficiency of the irrigation applied to areas where huge infrastructure projects have been built to bring irrigated water. However a scientific study was conducted some time back by Central Water Commission of the Government of India. A total of 28 completed projects were studied and it was found that water use efficiency varied from as low as 14% to a high up to 62% with average overall project efficiencies of about 38%. This is abysmally low and the reasons identified varied from

- ✓ No provision of lining in canal reaches passing through permeable soil strata.
- ✓ Not giving due attention towards maintenance of irrigation system
- ✓ Distortion of canal sections due to siltation and collapse of slopes.
- ✓ Poor management practices.

• As the eventual aim is food security and the ultimate target of 450 m tonnes of food grain production to feed the population at which it is expected to stabilise by 2050, improvement in productivity of the rainfed areas is also vital.

Another problem with the Indian agriculture sector is the guy working on the ground - the farmer. The average farmer is small time with a small land holding, quite illiterate, wedded to his generations old systems and methods and not willing to change and adapt modern methods. Asides from that he is living a hand to mouth existence and does not have the means or resources to switch over to mechanised and micro-irrigation equipment to improve efficiency and production per unit area of land. In most cases he has no incentive to adopt water saving methods since he is not paying for the water used or, at best, paying a lump sum rate depending the size of the land holding rather than on volumetric basis.

The Central Government on the other hand is well aware of what needs to be done and the road ahead, especially after getting all those studies done. As part of its high level National Action Plan on Climate Change, one of the objectives is "*Improving irrigation efficiency by 20%*" under its National Water Mission. The Government also introduced a plan scheme titled "Farmers Participatory Action Research Programme" (FPARP) during the XIth Five Year Plan. The scheme consisted of 5000 actual demonstrative programs on farmers fields over 3 seasons by various institutes and centres in agricultural and related sectors,

WALMI's and educational institutions all over the country. One farmer's filed for selected for the demonstration while all farmers around were drafted into the process. The technologies adopted in the various demonstrative project included:

- Micro irrigation (drip and sprinkler irrigation)
- Water conservation (Jalkund, storage tanks, percolation tanks, check dams, recharging wells etc.)
- Crop diversification and multiple use of water.
- System of Rice Intensification (SRI).
- Soil and soil moisture conservation.
- Reclamation of soils through Bio-drainage.

The results of the demonstrations were quite impressive and a crop-wise and technology wise data compilation was done mid way for about 2450 results received. The same is presented in the Tables below:

Depending upon technology, crop-wise water saving and increase in yield, as reported by institutes varies

Table 1

Crop	Water saving (in%)	Increase in Yield (in%)
Wheat	5-91	7-289
Paddy	22-69	8-100
Gram	22-33	10-66
Vegetables	10- 64	10-230
Groundnut	6-26	16-18
Soyabean	25-33	17-34
Maize	8-49	10-78
Banana	40-50	9
Coconut	50-65	15-150
Cotton	11-35	3-25
Chickpea	40-60	47
Barley	20	50
Sugarcane	38-50	34-82

The data in the Table below shows the impact depending on the technology used and the crop on which implemented:

Technology	Crops	Water saving (in%)	Increase in Yield (in%)
SRI	Rice	14-54	12-35
Integrated Nutrient Management (INM)	Wheat, Rice, Chickpea, Bajra	5-44	5-92
	Vegetables	20-23	12-20
Drip Irrigation	Cotton, Banana, groundnut, chilly	26-75	14-100
Sprinkler Irrigation	Barley, Onion, Sugarcane, Soyabean, Maize Mustard, Wheat,	18-80	12-166
Soil Moisture Conservation			
Mulching	Horticulture, Vegetables	40	15-150
Dead Furrow	Cotton, Gram, Soyabean,	11	2-11
Opening Furrow	Cotton, Gram, Soyabean	25-28	6-14
Tied Ridging	Cotton, Gram, Soya Bean, Pigeon Pea	32-35	9-16
Pit method Cultivation	Sugarcane	46	82
Paired method of cultivation	Sugarcane	38	34

The results from the FPARP programme were quite encouraging. There was very good response from the farmers and a willingness to adopt

the methods demonstrated as they led to better yields although the savings in water were not of so much interest to farmers with adequate access to irrigation water, but were definitely a important factor for farmers in water stressed regions. Buoyed by the results that show a distinct possibility of water saving and increased yield by adoption of these methods the Government is planning to expand the programme is the 12th Five Year Plan to cover wider and wider areas.

Role of Micro Irrigation

The need to adapt micro irrigation systems like sprinkler and drip cannot be over emphasised. It is the norm all over the developed world where successful automated irrigation systems are being implemented. It has been estimated that out of the net sown area of about 140 MHa there is a potential of adoption of micro irrigation systems in almost half this area or about 69.5 MHa. However the area under micro irrigation presently is abysmally low at about 3.6 MHa only. A lot can be done for reducing water utilisation in the agricultural sector if more areas are brought under micro irrigation. However, as pointed out above there are limitations in the capacity of the average farmer to invest in these equipments and today there is no incentive for him to do so except if he is in a water stressed area. However Government effort is not lacking in encouraging adoption of water efficient systems. Besides training the farmers in modern methods by actual demonstrative projects, it also provides financial incentives in the form of a 50% subsidy for purchase of equipment to switch over. Ultimately, use of MI systems and recycling of water will be what will save the day.

Conclusion

It is a fundamental rule of life that man likes to continue in a state of inertia and resist change unless forced to do so. The ever increasing realisation of the finite nature of this resource and the growing shortages leading to virtual wars between the various states over sharing their resources with neighbouring states as also the burgeoning demands from various competing sectors for the limited resources is causing a rethink. There is a growing realisation that there is a need to take proactive steps to resolve the issues today in order to circumvent the impending crisis that is definitely looming ahead if we continue business as usual. It has been estimated that if we adopt water efficient systems in all sectors we may be able to make do with an ultimate water utilisation of about 1180 BCM by the year 2050 when our population is expected to stop growing further. This is near about to the total available utilisable annual water of 1123 BCM. The balance can be wet by adopting other methods like inter basin transfers of river waters. However if we go with business as usual we may end up with a figure of about 1447 BCM which will in no way be possible to develop and provide. This realisation has already dawned on the policy makers and water managers having being confronted with hard

facts and figures. It will also dawn upon the common man eventually and that is when there will be clamour for a collective effort to tackle the crisis. Already there is a growing realisation everywhere that water management is too important an issue to be left to the whims of individual states and even political representatives of all state governments admit, albeit privately, that water needs to be brought on the concurrent list in the constitution from the state list if not on the union list. Central Government on its part are not sparing any effort to issue policy statements, guidelines and model legislative bills and thereafter providing all sorts of fiscal and other incentives to the State Governments to follow them.

Notes for Contributors

- **ANALYTIQUE** welcomes original articles or essays on any subject of interest related to commerce and industry such as macro economy, industrial performance, international trade, banking and finance, etc.
- Contributions must be no more than 4,000 words, including notes and references. And must be accompanied by an abstract of a maximum of 150 words in MS word. Tables, Graphs should be in MS Excel format.
- Contributions should be sent by e-mail at analytique@bombaychamber.com
- Contribution should not have been simultaneously submitted for publication to another Journal.
- Authors are requested to provide full details for correspondence: postal address, day-time phone numbers and e-mail address for our records. Only author's affiliation and e-mail address will be published along with the articles unless otherwise directed.

Water Literacy Foundation: Creating Water Warriors For A Water Efficient India In 2020

*Ayyappa M. Masagi and Miss Angela Voegtle**

Introduction

Water may be the most precious resource humans have. It is not just needed for daily drink demand; there is also a huge correlation between water management and economy, industry as well as energy supply. Health and food production depends on this one resource. And although we know that life cannot exist without, the usage of water is still dissipative, the exposure still ignorant.

'*By 2025, 1 800 million people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could be under stress conditions*' (FAO) and unfortunately India will be one of the countries with then nearly 1 500 million people living in it (WPP).

Given the fact, that the world use about 70% of our freshwater demand for irrigation, 22% for industry and merely 8% of domestic use (WWAP, 2012) we have to develop new ways to make agriculture sustainable and save as much water as possible.

The agricultural sector is the backbone of India's existence. Around 48% of 1210.2 million Indians (CENSUS) are engaged in agriculture and cultivate over 60% of Indians total land area (FAO). But farming is becoming less reliable, mainly due to unpredictable rain and other depleting water sources (Figure 1). Migrant workers, formerly helping harvest crops are flowing into cities for work. To address these problems, farmers often use wrong solutions, such as digging more bore-wells, which has no other impact than creating new pressure on remaining water supply of the Ground Water Table.

If the important pressure industrialization has put on groundwater table is added, nobody has to wonder that there is a situation of water scarcity in India.

Problem is almost no one is answering the dilemma with good solutions. Illiteracy about water issues is probably what is causing the main damages on our water resources. If India continues using the same pattern, no bright future can be considered. Population is growing steadily, while percentage of farmers is decreasing. Water crisis will be combined with food crisis and important poverty, due to rural exodus.

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Water Literacy Foundation (WLF) worked out some efficient solutions that could prevent such scenario to happen. As a base for spreading this new concept and urging people to adopt better water conservation practices, WLF operates in a technical as well as an awareness-raising capacity with three primary targets: rural farmers, industrial factories, and urban-dwelling people. First of all raising water literacy among the Indian population is one of the most important works. Rain water harvesting and good water management can be taught by awareness programs, books and as a subject, which should be included in the education system.

To address water scarcity, WLF wants to transform ordinary people into 'Water Warriors'. Every warrior fights for a balance between water usage and water replenishment and tries to inculcate a culture of water efficiency. First an enlightened community, included and involved in every step of the implementation of water controlling solutions can ensure a real and sustainable impact.

WLF has developed new technologies for controlling the flow of fallen rainwater and maximizing its use, combined with re-popularizing traditional Indian methods and knowledge for doing the same. These alternatives are more cost effective than digging new bore-wells and have been proved to be really efficient. WLFs technology is simple to understand and easy to replicate. In addition, it uses locally-available materials that are generally eco-friendly. Not only it has an impact on the livelihood of all the people but it also has a positive impact on the environment by rejuvenating the ground water table.

We visualize India of 2020 to be a water-efficient nation: A nation, in which all people are able to enjoy their basic human right to water. This ideal will be achieved through a massive movement for Water Literacy – knowledge about water issues and conservation methodology.

1. Mismanagement of a Precious Ressource

70% of worldwide usage of freshwater is used for irrigation (WWAP, 2012). A large quantity, especially since there are only 2.5% freshwater of the total water volume on earth. After the amount which is stored in the groundwater and water in form of permanent snow and ice cap is subtracted, 0.3% easily available water in lakes and rivers remain (UNEP). Freshwater sources can be differed according to their locality. The Surface Water Table consists of every visible water resources, like ice cap, lakes, rivers and streams. The regular percolation of water of this table forms the Sub Soil Water Table. Open bore wells as well as shallow bore wells get water by this source. Between this table and the Ground Water Table the Deeper Soil Water Table can be found. Finally the Ground Water Table, as a result of water percolation from the above water tables stores 30% of freshwater resources collected

over millions of years and stored in, underground streams and caves (UNEP). The different approaches to water can be seen in Figure 1.

When there's no access to surface water, like lakes or rivers, people tend to dig bore wells. Economically they are as deep as needed, but as short as possible, so they get their water supply by the water stored in the sub soil or deeper soil. If these possibilities are fully exhausted the groundwater table will be touched. The water circle will be interrupted as soon as the groundwater table decreases, and the direct connection between this table and the deeper soil table is cut off, which means, there will be a steadily decreasing amount of water in the soil and even rainwater, who restock the soil normally will be spurned by the soil, which has become to dry. 60% of European cities for example, with more than 100,000 people living in it, use groundwater in a faster rate than it can be replenished (WBCSD). India was the world's number one groundwater abstracting country in 2010. The country abstracted 251 km^3/year, in comprehension, China, ranked second, abstracted 112 km^3/year (WWAP, 2012).

It is suggested that, '*the abstraction of groundwater accounts approximately 26% of total water withdrawal and equals around 8% of mean global groundwater recharge*' (WWAP, 2012).

The historical solution for water shortage, digging deep and even deeper bore wells is consequently an amplifier of the problem of groundwater shortage. These technique problems are associated with lack of knowledge, so called illiteracy, pure waste and irresponsible behaviour. In India for example there is no water budgeting neither in farming nor in building apartment areas. Plans how high the amount of water will be, and how water

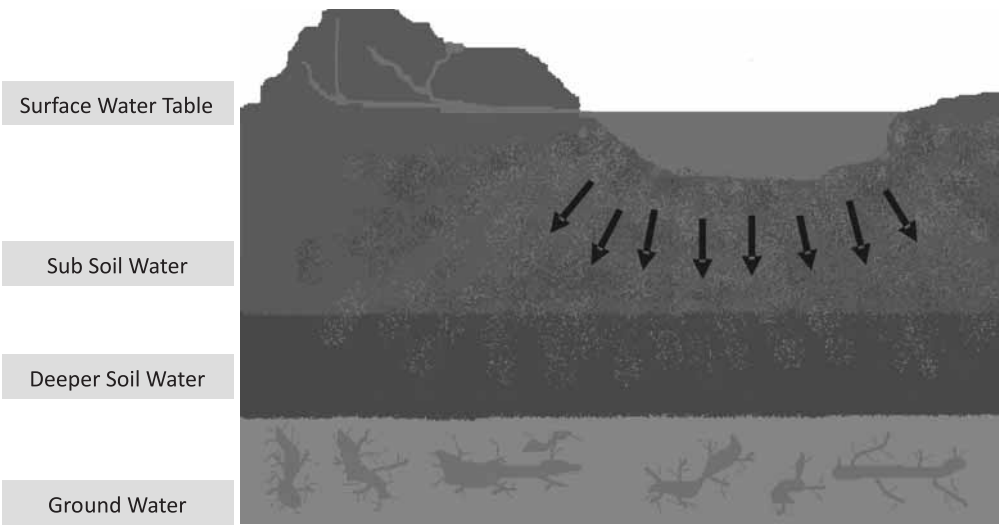

Figure 1: Watertables

supply will be guaranteed over the next periods aren't created. To mitigate these difficulties we have to work on all three main water consumers: Agricultural Sector, Industrial Sector and Urban Sector.

1.1 An Dangerous Illiteracy in Rural Areas

'*The daily drinking water requirement per person is 2-4 litres, but it takes 2 000 to 5 000 litres of water to produce one person's daily food*' (FAO) and until 2050 there will be additional 2.7 billion people, which wanted to be fed (FAO). But at the same time, agriculture sector is responsible for 70% of all water withdrawn, from a global perspective, and in India even 87% (WWAP, 2012). So it seems as a huge conflict between food supply and sustainable water usage.

The 48% of Indians, engaged in agriculture (FAO) have to fence, that farming is becoming less and less reliable, mainly due to unpredictable rain and other water sources like decreasing groundwater table and absence sub soil water. Furthermore production, transportation and storage costs are increasing while land fertility is decreasing. Combined with a more and more intrusive and destructive wildlife, like rats plague and increased numbers of wild animals pushed into farmlands by deforestation, farmers have no assured incomes for their efforts. Lack of supporting governmental policies can be as destructive as wrong and too heavy chemical usage. Migrant workers, formerly helping harvest crops are flowing into cities for work. Rural exodus is a real threat for India's future and the additional needed food, mentioned above. But water scarcity is the most important problem of all. In a world of abundant water for irrigation, drinking and domestic purpose, all the other problems won't exist. So, fading out all the other problems we want to solve the water related problems and issues. In this field there are two main problems, which correlate:

– Illiteracy about water usage
– Lack of water

Illiteracy About Water Usage

Illiteracy can be seen as the disability to read and or to write. In society it is a huge disadvantage, and persons who are adversely affected by this problem are often ashamed and try to hide their problem. WLF sees this illiteracy also in water consumption. Most people have not learned how to use water efficiently, and do not understand the need for sustainable water consumption. The best way to fight this kind of water illiteracy is to learn it as a child, while get it taught in school, or learn it from the model parents can be. But there is a huge mass, which can't be reached through schools, and some would just copy the mistakes their parents did. This results in a dangerous circle, amplified by the search of fast success and good harvest, without the foreside of the next years. One result of this circle is salinization of cultivated land. 'Poor drainage and irrigation practices have led to waterlogging and salinization of approximately 10 percent of the world's irrigated lands.'(WWAP, 2012).

But additional to old problems there are new difficulties farmers have to face. How to adapt to climate change, soil change and unpredictable rainfalls? What to do, when the old solutions, do not work anymore and former knowledge can't be used?

WLF assumes that about 90% of rural Indian farmers are not aware of alternatives to bore-wells, such as rainwater harvesting, groundwater recharging techniques, grey water harvesting, or non-irrigational agriculture.

Water supply and rainwater as a part of it, is a complex system. Human intervention in this ecological system should guarantee a high need and the effort to give as much water back as possible.

Lack Of Water

Next to dried up surface water sources and absence of groundwater, a problem especially India has to face is the rainwater supply through Monsoon. It is more and more often failing farmers' expectations, because it turns out, that it will be unpredictable.

To address the absence of water, the habit to dig borewells is common, but this can be seen as a fundamental turning point in the regional water supply. Fountains nearby with less depth, used by neighbours will dry out. Further, digging bore-wells is costly and can indebt farmers in need. Unluckily, bore-wells in areas with low soil- or groundwater are nothing but inefficient, and farmers are unable to repay their debts. It is a vicious circle that led to suicide (SAINATH). These new bore-wells are creating a new pressure on existing groundwater supplies, and some states in India like Tamil Nadu, Andhra Pradesh, Maharashtra, and Karnataka are facing an important water scarcity, as the ground water table is alarmingly depleting

Additional to all these problem climate change will have a huge impact on water resources. The frequency of floods and droughts will rise, rainfall patterns will change and water compound as well as quality can be modified. Water can be seen as the 'primary medium through which climate change impacts the earth's ecosystem and people' (WWAP, 2012).

One, recognizable change, due to climate change is the intensity of rain. Heavy rains or periods with high intensity increase. Due to this, recharging of natural springs is no longer possible; the water runs of too quick. Furthermore, huge drops destroy small plants and crops and resulting uncontrollable streams can flood fields and destroy a whole harvest. And even in open areas, rain water cannot be captured accurately. WLF assumes that 97-98% of the rainwater which falls into an open area won't percolate into the ground because of dry soil and just ran off, instead of feed natural springs, which would provide water for open wells and bore wells.

The number of deaths in India attributed to water, sanitation and hygiene, 2011 is said to be 5% to 15% (WHO/UN-Water). The Number

of sick and water injured is even higher. Fluorosis for example is a widespread disease, caused by continual consumption of water contaminated with Fluoride. While a small concentration helps against dental caries, high fluoride concentrations damages teeth in long term and in extreme cases cause skeletal fluorosis. The WHO guideline value for fluoride in drinking water is 1.5 mg/l, but especially developing countries can't guarantee water supply with values less this mark (WHO). In India it affects millions of people and is an enormous threat for Indian society, especially in rural areas (WWAP, 2012). The concentration of fluoride in groundwater depends on the 'geological, chemical and physical characteristics of the aquifer, the porosity and acidity of the soil and rocks, the temperature, the action of other chemical elements, and the depth of the aquifer.' But human intervention in the groundwater table and wastewater intrusion can force the problem.

1.2 Industries And Factories, Highly Pollutant Consumers And Other Mismanagements

"In developing countries, 70 percent of industrial wastes are dumped untreated into waters where they pollute the usable water supply."(WWAP, 2012).

The amount of water needed for industrial purpose increased over the last 10 years and is to increase further. At the moment 22% of the used freshwater is for this purpose (WWAP, 2012). But many sectors of industry do not just need a lot of water, they also pollute it while usage. It is important, that this water is filtered before it is released into the open space, because one litre of wastewater can pollute further 5-8 litres of clean water (IIR). Mixture of contaminated water with drinking water leads to damages, environmental but also human and strengthen the water issue significant.

Clarification plants seem to be expensive and water treatment not necessary, because huge factories still have access to usable water, due to their economic independence and abilities. Indian Law says that the landowner also owns the groundwater beneath his soil. While it can be a security guarantee for private households, it is an easy opportunity for industries to exploit the groundwater. First they have a significant advanced against private households, due to the big area they have settled on. Second, they have the money and technology to bank water in deep areas. This impacts the surrounded area, especially wells, with less depth. So the law concerned for industries as well as for domestic is an unfortunate advantage for companies.

There is also a high mismatch between real water consumption and discharge. For example, the operation of thermal power plants produces 27,000.9 million cubic metres wastewater discharge, while using 32,157.4 Mio m3. The pulp and paper industry wastes 695.7 Mio m3 and uses 905.8 Mio m3 (IRR). If they would recycle their own wastewater,

they would nearly create two thirds of needed water, reduce their water supply of freshwater significant and become nearly water independent. But they do not see the profit they can gain by saving water, recycle it or replenish it to the groundwater. Due to the poor pricing of freshwater, they do not see a reason to change their inefficient practices. Industries have to pay three water related charges: "a water cess […], tariff to municipalities or other suppliers of water and cost of extraction of water from rivers or groundwater." As long as these prices are low, only few companies, forced by mother nation in fact of absence water, started to implement recycling systems. But even if companies are not interested in environmentalism, they should be at least interested in the possibility so save money. On the long run, implementing recycling or harvesting system is economical.

There are two ways to become a water efficient company. On the one side, they can recycle and reuse the polluted water for further industrial manufacturing process, or, they recharge the groundwater with their surplus water. But at least they should install a rainwater harvesting system.

1.3 Private Customers

A growing capitalistic interested in this good and growing water shortage will led to rising costs of bottled water, which is being sold as an economic good. But nobody should depend on uncontrollable water distributer. Depending on the climate, a household can get nearly water independent through rainwater harvesting. Even there are only advantages for private water warriors; the consciousness is not yet established. It seems that the majority has to be forced by government. In Bangalore, as in a few other Indian cities the implementation of rainwater harvesting systems for new built homes is mandatory, since 2009. But in addition to this force, every household should understand why rainwater harvesting systems are important, and how to spend water in an intelligent and responsible way.

Most of urban people developed an unsustainable behaviour due to an increasing abstraction level of resource recovery. While rural people have to get their water by exhausting activities, walk to wells and carry full buckets over kilometres, urban people just have to turn a tap. The loss of water does not hurt directly. Kitchen water for example is still used for feeding animals in rural areas, while it is just thrown away in urban areas.

Bad behaviour continues in most of daily activities. Toilets are used as wastebaskets, small waste, food or cigarettes are thrown away in this expensive way. Costs: 4 litres of water per small flush, 10 litres per normal or big flush. Pipes, cap, or toilet leaks are ignored, wasting gallons of water every day. While millions of people have no access to proper water, and risk their health by using contained and dirty water, freshwater is used to irrigate gardens, lawns and golf courses.

The amount of water used per day to irrigate the world's golf course

is 2.5 billion gallons of water, the same number, it would take per day to support 4.7 billion people at the UN recommended minimum (WATERINFO).

WLF is not against these purposes of usage as a whole, but criticizes that drinking water is used for this concern, while there are other solutions like grey water usage. A household with 5 members spends up to 500 litres for showering and bathing per day. This water, with a low percentage of dirt and also small portion of soap and shower gel can reused for toilet flushing and gardening. With his phosphate ingredients due to the soap it can be seen as an extra fertilizer for gardens and golf courses. However, at least it should be used to return it into the soil water table.

1.4 What Is Going To Happen If We Do Not Change The Pattern

To conclude the problem in an easy way, we can say, that we are searching where there is no water, but we are neglecting where there is water like rainwater and greywater. And as long as the importance of water isn't clear for everyone, there will be waste.

Eventually, Indian agriculture will not be able to provide food to the entire population in the future. Prices will be increasing, and people will not be able to buy food. If there is no reaction, India is heading toward a major food crisis, coupled with water crisis and increasing poverty. Water scarcity will confront the whole country. Not just villages will have problems to gain access to portable water; even good developed cities won't be able to provide water for their entire citizen. Water will be an economical good, only the rich are able to buy. Poor people have to take too grand with polluted and morficial water. The number of Indian deaths attributed to water, sanitation and hygiene, in 2011, 5% to 15% (WHO/UN-Water) will increase again.

The efforts India has already done to provide water access and good sanitation for a steady growing community will become useless. 522 million Indians gained access to drinking water in the last 20 years. (WHO/UN-Water) But in the future it will decrease again.

2. Water Literacy To Fight Water Scarcity

What is water quality, which sort of water can be used for which purpose? Where do I spend the most water, where can I save it? What is the difference between the groundwater table and the subsoil water table? Questions like this have too little attention in our daily live; even they can be easily answered. WLF wants to be the initial part to questioning this demand and search for an answer to the most important question: What can I do?

2.1 Awaking People To Water Issues: Create An Army Of Water Warriors

Most of the people are considering water scarcity as a fate they have to accept and deal with.

People won't be motivated to act in a water-conscious way if they are

unaware of the impact they have on the water supply. Therefore, WLF has launched water literacy campaigns in various villages of Karnataka, Rajasthan, Andhra Pradesh and further states, totally 11 in India. WLF staff regularly speaks to rotary clubs, farmers' clubs, universities, government officials, schools, self-help groups, professional organizations, apartment and villa associations and further, raising awareness about water conservation and the actions that people can take towards improving the situation. Topics covered range from basic water conservation to in-depth discussions about water-budgeting, catchments analysis, and water recharging methods. Model rainwater harvesting systems have been implemented in area schools, with corresponding seminars and lessons to explain their value and use. WLF wants to install water related issues in every school kids' education. The Foundation also organizes large-scale special events to draw public and media attention to the water problem and participate on international programs like World Water Day to get in touch with other fighters.

Publishing books is also a way to spread the message in a wide range. The Foundation already published four books in Kannada to share their innovations with the public and will promote an English version until the end of 2012. Exposure visits to successful sites of rainwater harvesting are the final ingredient in this recipe for converting ordinary citizens into Water Warriors.

2.2 Water Independence For Rural Areas: Rain Water

To sustain the livelihoods of farmers as well as to feed the nation, agricultural water conservation technologies are of primary concern. The overarching goal of these varied techniques is to increase the total surface area of soil moisture and replenish groundwater supplies, thereby maximizing crop yields.

All the systems depend on rain water, because, rain, as a natural phenomenon will happen. And even the predictability as well as the pattern of rain has changed, the average rainfall is nearly the same.

After rains, the surface runoff water passes through several streams before joining the main rivers. During and after heavy showers and/or continuous rains, most of the rain water runoff, leaving behind very less rainwater percolation into the sub soil water table and instead overflows and floods the adjoining fields by sweeping standing crops and transplanting a substantial amount of spoiled soil that erodes fertile soil. Due to poor maintenance several surface mud bunds are silted up and rendered inoperative.

To overcome these difficulties WLF developed a simple and productive method called stream water harvesting. This system helps against floods during rainy season and also droughts and water scarcity, in the rest of the year.

It is a simple but result oriented innovative way of harvesting rainwater flowing in the stream by constructing series of underground lakes, underground

check dams, percolation pits and recharge shafts to recharge the sub-soil, deeper soil and underground water. Unlike surface check dams, stream water harvesting is done underground to harvest the hidden stream which flows below the stream. Hidden stream flow is obstructed by a underground plastic dam or underground bund which effects the recharging of natural springs resulting in water in nearby open wells and bore wells.

A trench 150 feet across the stream, 100 feet upstream an 8 feet deep, is dug into the hard soil. The derived material is used to build a bun across the stream, with a high, little less than the hidden stream high. The bund and part of the trench bed is lined with plastic and finally the entire trench is filled up with sand that was shifted earlier (Figure 2).

Due to water pressure and gravity the water, flowing against the bund is forced to percolate into the hard soil surrounding the trench. By this, the groundwater level increases significantly, all soil water tables carry more water and surrounding bore wells can be recharge.

If ten such systems are created along a stream in 500 meters, water will be available all the twelve months of a year downstream. Nearly 10 villages drinking and agricultural water needs can be addressed. In this system no land is encroached for creating a reservoir, it is a onetime installation with no loss of water due to evaporation and no further costs.

For the best result it is helpful to combine it with a non-irrigation agricultural system. Non-irrigational Agricultural means agriculture without using bore wells, wells and canal water. WLF's systems are rain water catchment area treatment systems. Which means rain water is systematically stored in the top soil, sub-surface soil and sub-soil so that

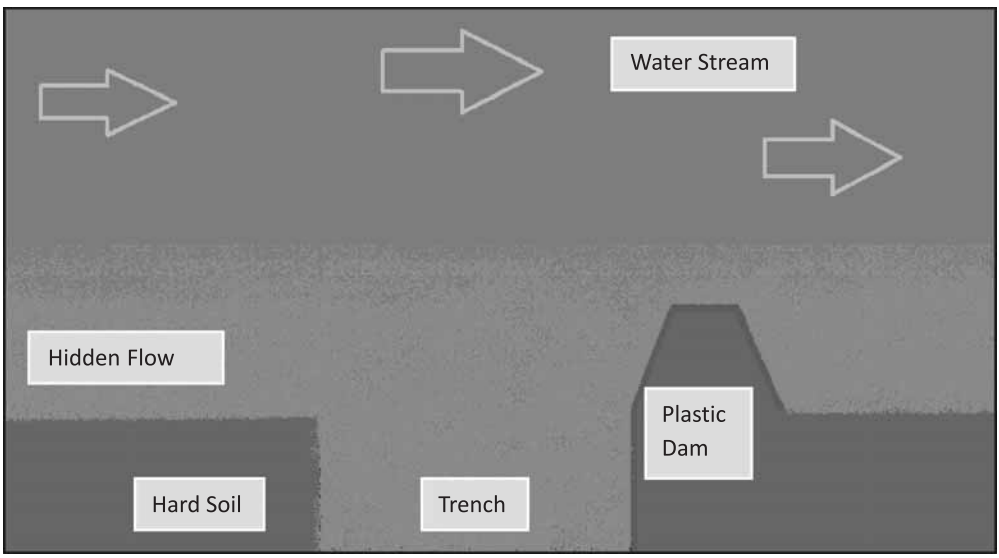

Figure 2: Stream Water Harvesting

vegetation can retrieve the stored water during dry periods of the year. These systems also prevent soil erosion and thus assure crops be it flood or drought. These systems contribute in their own way in making streams perennial.

2.3 Water Independence For Industries: Rain Water

Our solution contains 4 R: Rain – Reuse, Recharge and Recycle.

To achieve the best result from this concept, lake construction and replenishment is ideal for customers with huge rain water catchment areas, like most of middle and huge companies have. After years of research on lakes, we recommend government to adopt a law, that it's mandatory that there should be a one acre sized lake for every 100 acres built- up land. This would reduce the exploitation of groundwater significant, due to the fact that all rainwater caught on all rooftops as well as in the open areas would be stored in these lakes.

Implementation of rainwater harvesting depends on the area and the alignment of the company. Nevertheless the basic system combines lake construction as well as bore well recharging. Systems differ from Sump Type, Open Sump Type and Lake Type Bore Well Recharging Units. In all types rainwater is systematically channelized through pipes or drainage lines and collected in collection tanks and lakes, which sizes depends upon the rainwater catchment. Next to multiple layers of Netlon mesh, sand, gravels and boulders are used to filter the water in a natural way under the influence of pressure and gravity. After the rainwater is run through the different stone layers it can be directly injected into the underground water table through perforation. By means of that, the subsoil water table increases through every further rainfall, defunct own bore wells can be recharged and active ones can be sustained for a better run. Besides it has a social impact for the community, by refilling surrounding bore wells as well. The need of bore wells which reach out to the groundwater table decreases automatically. Furthermore, lakes are a good and sustainable way to storage local water and to prevent floods on account of the good drainage systems. In comprehension with tanks, they do not to be cleaned up, nor replaced, so it turns out to be cost effective, also a good water quality can be provided, as the water is filtered through soil or natural materials as jelly.

2.4 Water Independence For Urban Areas: Rain Water

Roof rain water harvesting is a simple way of channelizing, collecting and filtering rain water as an alternative to river, open well and bore well water. This means to reduce pressurized load on existing water supply at least for 4-5 months during rainy season using only rain water. Most of Indians houses, have one giant advantage, they are flat, means they are perfect for rainwater harvesting. The amount of water a roof can harvest depends on its size and on the average rainfall per annum. For example, a house with a roof size of 96 m^2 in Bangalore with an average rainfall

of 1000 per annum can harvest 96,000 litres in one year. The water is collected on the rooftop and transported by pipes to the OnLine-Filter, installed on one house wall. Due to gravity and water pressure the water will be filtered through a one meter Nethlon mesh as can be seen in Figure 3.

The First Rain Drain Valve is needed to release the first rain shower in the season. This rain is highly polluted and shouldn't be used. Second, it should be opened after rain, to release all the leftover of the water. After 10 minutes it can be closed again. The water will be pushed through the filter system, while dirt and filth will be stored in the Silt up Cavity, which also can easily be removed and cleaned. The Filtered Water Outlet will be fed through pipes in the next bore well or tank, depending on the customers wish. The system is as small and inconspicuous as possible, to not disturb the ambient of the house.

The filter is a onetime installation and need no further materials. The Nethlon mesh can be used over years, it just should be cleaned all two months by spreading it in the sun and brush it with a customary brush.

The water can be used for domestic use, as well as for drinking; there are no restrictions to it, but persons, who are very careful can install a Reverse Osmosis Filter System for drinking purpose.

In a slow process local governments recognize the possibility and the need for rain water filter systems like this. In Bangalore, implementation of rainwater harvesting systems is mandatory for new built houses, since 2009.

For almost complete water recycling, every house should also use grey water

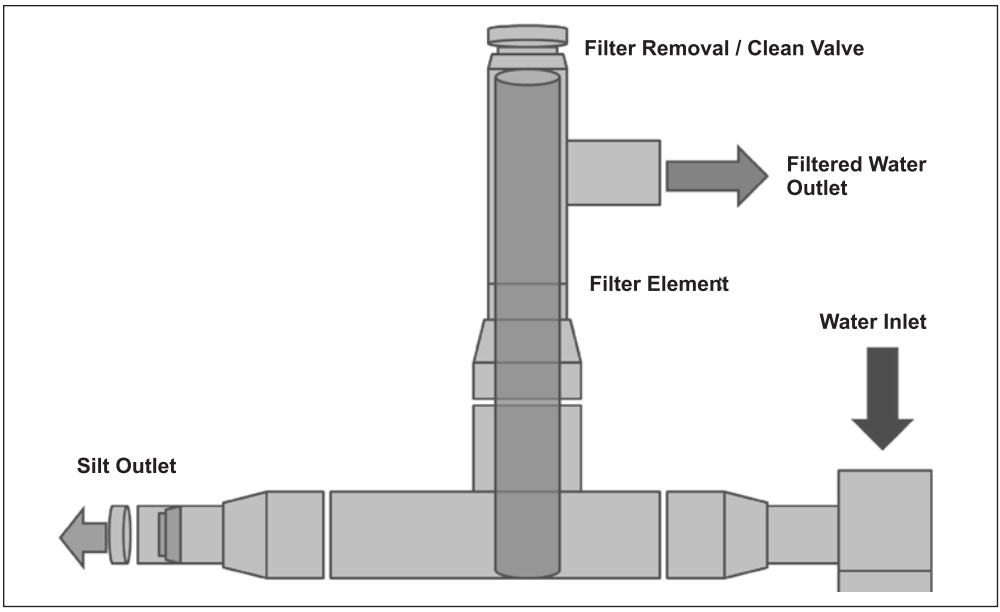

Figure 3

harvesting. Grey water is nothing but the water that comes out of our bathroom and kitchen except the sewage. This practice is even more effective than rain water harvesting.

The water will be canalized differently from the water used for the toilet. It will be collected in a soak bit, 15 feet away from the well for drinking water. It will be replenished to the groundwater, and filtered by the soil. Nearly 80% of used water by a household can be recycled and reused. By this way we also can save our water bodies from contamination as most of the grey water is currently let into freshwater sources.

3. Conclusion

'*By 2025, 1 800 million people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could be under stress conditions.*' (FAO). And India especially is a compound hotspot in five of ten water related problem categories due to the United Nations World Water Development Report:

India has to fence increasing water scarcity threat, is a flood-prone as well as a drought prone country, has to fear a climate change risk and is still not able to provide good access to sanitation for the majority.

These are problems every Indian should be aware of, and we should start to work on every each of the problems. WLF wants to give one solution, which will not solve all the problems India have to fence in the future, but it will facilitate a lot problems mentioned above. We can eliminate drinking water crisis. And we have to. And there is a solution, we all know. Rain and Literacy. If we create an army of Water Warriors, the first force who will only bring.

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Select Economic Indicators

Agriculture & Industrial Production

	April – September			
Industry	**Percentage change over previous year**			
	2011-12		**2012-13**	
	Q1	**Q2**	**Q1**	**Q2**
Agriculture, Forestry & Fishing	3.7	3.1	2.9	1.2
Industry				
Mining and Quarrying	-0.2	-5.4	0.1	1.9
Manufacturing	7.3	2.9	0.2	0.8
Electricity, Gas & Water Supply	8.0	9.8	6.3	3.4
Serivces				
Construction	3.5	6.3	10.9	6.7
Trade, Hotels, Transport and Communication	13.8	9.5	4.0	5.5
Financing Institutions, Real Estates & Business Services	9.4	9.9	10.8	9.4
Communtiy, Social & Personal Services	3.2	6.1	7.9	7.5
GDP at factor cost	8.0	6.7	5.5	5.3

Source: Ministry of Statistics and Programme Implementation, Government of India. Estimates of Gross Domestic Product (at current price).

Performance of Core-Industries

Sector- wise Growth Rate (%) in production (Weight in IIP: 37.90%)

	Weight	**April - October 2011-12**	**April - October 2012-13**
Overall Index	37.9	4.3	3.7
Coal	4.37	-5.4	8.7
Crude Oil	5.21	4.2	-0.7
Natural Gas	1.70	-8.3	-12.8
Refinery Products	5.93	3.5	7.3
Fertilizers	1.25	0.2	-4.5
Steel	6.68	8.7	3.0
Cement	2.40	3.3	7.7
Electricity	10.31	8.7	4.8

Compiled by BCCI; Source of data Office of the Economic Advisor

External Sector

Exports and Imports(in US $ million)

Item	**2011-12 (Apr-Nov)**	**2012-13 (Apr-Nov)**	**November**	
			2011-12	2012-13
Exports	201185.40	189222.20	23269.71	22299.63
Imports	323823.75	318722.38	39102.48	41586.90
Oil Imports	99324.20	110091.10	12436.60	14522.10
Non-Oil Imports	224499.50	208631.30	26665.90	27064.80
Trade Balance	-122638.35	-129500.18	-15832.77	-19287.27

Source: Ministry of Commerce and Industry

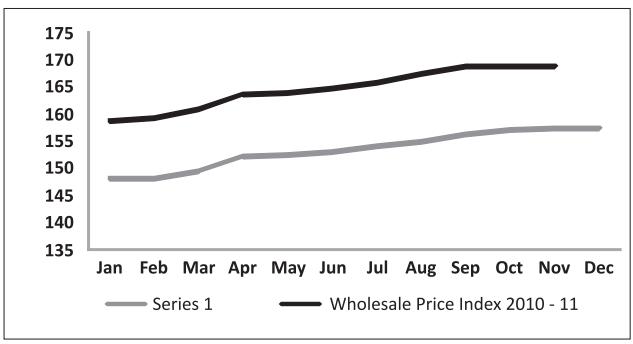
Foreign Currency Assets			
For the Quarter October- December 2012			
Currency	Rate	Currency	Rate
USD	54.1525	GBP	87.0225
EURO	70.3125	JPY	66.6875
CHF	58.1975	AUD	56.2600
HKD	6.9950	SGD	44.2925
CAD	54.6625		

Source: Foreign Exchange Dealers' Association of India

Prices

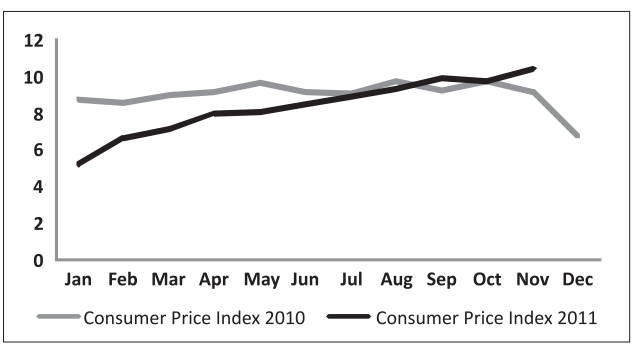
Current price situation based on monthly Wholesale Price Index in November, 2012 (Base: 2004-05=100)

Items/Groups	Weight(%)	Cumulative change (%) Since March		Inflation (%) (Year-on-Year)		Inflation(%) Average of last 12 months	
		2011-12	2012-13	2011-12	2012-13	2011-12	2012-13
All Commodities	100	5.28	4.84	9.46	7.24	0.25	0.06
Primary Articles	20.11	7.23	6.26	8.90	9.42	-0.84	0.27
Food Articles	14.33	9.78	8.17	8.32	8.50	-1.40	0.33
Fuel and Power	14.91	8.88	6.19	15.48	10.02	0.94	-0.58
Manufactured Products	64.97	3.54	3.79	8.17	5.41	0.57	0.07



All Commodities Wholesale Price Index Base 2004-0 = 100

Point to Point Rate of Growth



Point to Point Rate of Inflation (%) Base 2001 = 100

World Prices of Select Commodities

Commodity	Unit	Annual Averages			Monthly Averages		
		Jan-Dec 2010	Jan-Dec 2011	Jan-Nov 2012	Sep 2012	Oct 2012	Nov 2012
Energy							
Coal, Australia	$/mt	98.97	121.45	96.42	88.96	81.85	83.06
Crude Oil, Average	$/bbl	79.04	104.01	105.36	106.28	103.41	101.17
Crude Oil, Brent	$/bbl	79.64	110.94	112.17	113.38	111.97	109.71
Crude Oil, Dubai	$/bbl	78.06	106.03	109.20	110.96	108.73	107.13
Crude Oil, West Texas Int.	$/bbl	79.43	95.05	94.70	94.51	89.52	86.68
Natural Gas, Europe	$/mmbtu	8.29	10.52	11.44	11.08	11.58	11.83
Agriculture Beverages							
Coffee, Robusta	c/kg	173.6	240.8	227.90	231.40	230.30	215.30
Tea, Auctions(3), Average	c/kg	288.5	292.1	287.90	310.40	300.90	299.50
Food							
Coconut oil	$/mt	1124	1,730	1141.00	967.00	898.00	850.00
Groundnut oil	$/mt	1404	1988	-	2408.00	2375.00	2303.00
Copra	$/mt	750	1,157	760.00	645.00	591.00	577.00
Palm oil	$/mt	901	1125	1020.00	967.00	839.00	814.00
Palmkernel oil	$/mt	1184	1,648	1142.00	984.00	862.00	817.00
Soybean meal	$/mt	378	398	519.00	646.00	601.00	579.00
Soybean oil	$/mt	1005	1,299	1232.00	1283.00	1175.00	1133.00
Soybeans	$/mt	450	541	590.00	670.00	617.00	589.00
Grains							
Barley	$/mt	158.4	207.2	240.00	256.20	252.90	252.10
Maize	$/mt	185.9	291.7	297.50	320.80	321.20	321.60
Rice, Thailand, 25%	$/mt	441.5	506.0	–	543.80	533.00	530.00
Wheat, Canada	$/mt	312.4	439.6	–	–	–	–
Sugar,world	c/kg	46.93	57.32	47.94	44.07	44.78	42.64
Raw Materials							
Logs,Malaysia	$/cum	278.2	390.5	361.00	353.30	350.20	353.00
Plywood	c/sheets	569.1	607.5	610.10	608.10	610.20	611.50
Cotton	c/kg	228.3	332.9	197.90	185.50	180.80	178.20
Rubber RSS3	c/kg	365.4	482.3	340.20	303.80	320.40	297.40
Metals and Minerals							
Aluminium	$/mt	2,173	2,401	2018.00	2064.00	1974.00	1949.00
Copper	$/mt	7,535	8,828	7962.00	8088.00	8062.00	7711.00
Gold	$/toz	1225	1,569	1668.00	1745.00	1747.00	1722.00
Iron ore	c/dmt	145.9	167.8	128.50	99.50	114.00	120.40

Source: World Bank - The Pink Sheet

Government Accounts

Trends in Central Government Finances: April-October 2012-13

Item	Budget Estimates 2012-13	April-October		2011-12	2012-13	Per cent change over preceding year	
		2011-12	2012-13	BE	BE	2011-12	2012-13
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Revenue Receipts	**935,685**	**359,712**	**404,297**	**45.5**	**43.2**	**-19.6**	**12.4**
Gross tax revenue	1,077,612	425,147	486,825	45.6	45.2	12.5	14.5
Tax (net to Centre)	771,071	291,501	333,883	43.9	43.3	7.3	14.5
Non Tax	164,614	68,211	70,414	42.8	-61.2	-61.2	3.2
2. Capital Receipts	**555,241**	**320,662**	**375,170**	**68.5**	**67.6**	**88.8**	**17.0**
Recovery of Loans	11,650	10,922	5,864	72.7	50.3	109.5	-46.3
Other Receipts	30,000	2,731	1,386	6.8	4.6	20.8	-49.2
Borrowing and other liabilities	513,500	307,009	367,920	74.4	71.6	89.1	19.8
3. Total Receits (1+)	**1,490,925**	**680,374**	**779,467**	**54.1**	**52.3**	**10.2**	**14.6**
4. Non- Plan Expenditure	**969,900**	**479,181**	**554,518**	**58.7**	**57.2**	**12.8**	**15.7**
(a) Revenue Account:	865,596	431,709	505,009	58.9	58.3	13.9	17.0
Interest payments	319,759	144,521	155,851	53.9	48.7	25.3	7.8
Major subsidies	179,554	82,985	148,022	61.8	82.4	8.0	78.4
Pensions	63,183	33,922	34,586	62.2	54.7	13.6	2.0
(b) Capital Account	104,304	47,472	49,509	57.5	47.5	3.5	4.3
5. Plan Expenditure (i) + (ii)	**521,025**	**201,193**	**224,949**	**45.6**	**43.2**	**4.5**	**11.8**
(i) Revenue Account	420,513	171,015	184,540	47.0	43.9	4.7	7.9
(ii) Capital Account	100,512	30,178	40,409	38.7	40.2	3.6	33.9
6. Total Expenditure (4) + (5) = (a) + (b)	**1,490,925**	**680,374**	**779,467**	**54.1**	**52.3**	**10.2**	**14.6**
(a) Revenue Expenditure	1,286,109	602,724	689,549	54.9	53.6	11.1	14.4
(b) Of which Grants for creation of Capital Assets	164,672	56,904	58,954	38.7	35.8	167.1	3.6
(c) Capital Expenditure	204,816	77,650	89,918	48.4	43.9	3.6	15.8
7. Revenue Deficit	**350,424**	**243,012**	**285,852**	**79.1**	**81.4**	**156.3**	**17.4**
8. Effective Revenue Deficit (7-6(b))	**185,752**	**186,108**	**226,298**	**116.0**	**121.8**	**153.1**	**21.6**
9. Fiscal Deficit	**513,590**	**307,009**	**367,920**	**74.4**	**71.6**	**89.1**	**19.8**
10. Primary Deficit	**193,831**	**162,488**	**212,069**	**112.2**	**109.4**	**245.9**	**30.5**

Source: Review of Union Government Accounts, October 2012

Money & Banking

Money Stock - Components and Sources

(₹ Billion)

Item	Outstanding as on		Variation over (per cent)			
	2012		Financial Year so Far		Year on Year	
	Mar. 31	Dec. 14	2011-12	2012-13	2011	2012
M3	73,592.0	79,867.4	5673.9	6275.4	10202.0	9152.4
Components (i+ii+iii+iv)						
(i) Currency with the Public	10,265.0	11,037.8	773.5	772.8	1,107.0	1,146.0
(ii) Demand Deposits with Banks	7,049.1	6,959.8	-842.0	-89.3	-125.2	573.2
(iii) Time Deposits with Banks	56,249.7	61,845.2	5,767.2	5,595.6	9,242.0	7,420.3
(iv) "Other" Deposits with Reserve Bank	28.2	24.5	-24.9	-3.7	-21.8	12.9
Sources (i+ii+iii+iv-v)						
(i) Net Bank Credit to Government (a+b)	23695.5	26562.2	2268.3	2866.8	4088.1	4455.0
(a) Reserve Bank	5357.4	5972.4	414.8	615.0	1672.4	1592.1
(b) Other Banks	18338.1	20589.8	1853.5	2251.7	2415.7	2862.9
(ii) Bank Credit to Commercail Sector (a+b)	49594.3	53256.0	3574.7	3661.7	6712.7	7314.6
(a) Reserve Bank	39.6	43.5	-1.7	3.9	3.7	23.6
(b) Other Banks	49554.7	53212.5	3576.3	3657.8	6708.9	7291.0
(iii) Net Foreign Exchange Assets of Banking Sector*	15437.8	16324.1	2108.9	886.3	2329.8	281.8
(iv) Government's Currency Liabilities to the Public	142.7	150.5	11.5	7.7	16.2	11.7
(v) Banking Sector's Net Non- Monetary Liabilities						
of which:	15278.3	16425.4	2289.5	1147.1	2944.8	2910.6
Net Non-Monetary Liabilities of RBI	6038.4	7179.0	2442.4	1140.6	2587.6	1053.1

**: Includes Investments in foreign currency denominated bonds issued by IIFC(UK) since March 20, 2009.*
Note: Government Balances as on March 31, 2012 are before closure of accounts.

Select Scheduled Commercial Banks – Business in India

Item	2012-13 Outstanding as on (Rs. Crore)	Percentage Variation			
		Financial Year So Far		Year on Year	
	December, 14	2010-11	2011-12	2010	2011
Bank Credit	49,626.5	3262.3	3508.0	6237.5	6943.3
Non-Food Credits	48,539.7	3076.1	3234.2	6033.6	6685.5
Aggregate Deposits	64,339.3	4683.1	5248.5	8700.5	7576.5

Cash Reserve Ratio/ Interest Rate

Item/Week Ended	2011	2012
	Dec. 16	Dec. 14
Cash Reserve Ratio (per cent) (1)	6.00	4.25
Bank Rate	6.00	9.00
Base Rate	10.00/10.75	9.75/10.50
Term Deposit Rate	8.50/9.25	8.50/9.00
Saving Deposit Rate	4.00	4.00
Call Money Rate	8.66	7.97

(1) Cash Reserve Ratio relates to the Scheduled Commercial Banks (exclusing Regional Rural Banks)
(2) Deposit Rate related to major Banks for deposits of more than one year maturity.

Bombay Chamber of Commerce and Industry Trust for Economic and Management Studies

The Bombay Chamber of Commerce and Industry Trust for Economic and Management Studies was constituted in 1996 by the Bombay Chamber of Commerce and Industry to undertake independent research activities on various economic and management issues and for providing analytical views on macro-economic scenario, industrial performance and other issues of topical interest.

The Trust started publishing the quarterly magazine 'AnalytiQue' for the quarter October-December in the year of 1999 to serve as an effective vehicle of communication between the government, industry, economists, thinkers, management consultants and scholars. In its short journey the magazine had some trying spells and after the issue of January-March, 2006 there has been no issue. However, after four years, the Trust published the next issue as Journal in March, 2010. While retaining its basic purpose and character, AnalytiQue now continues to serve members, who are drawn mainly from the world of business and commerce and deals with contemporary economic issues while documenting some of the important developments of the Indian economy.

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"E - Information Service"

The **"E - Information Service"** is provided through an online newsletter called **'E - weekly'** to disseminate useful information on business and commerce in India and International countries. This service is provided to both the members of Bombay Chamber as well as non-members. The information contains notifications, circulars and reports issued by respective Departments on:

- Banking & Taxation
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