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Budget

A Major Push to Agriculture

**CROP PROTECTION:
NEED FOR BIO-PESTICIDES**

**BAN ON EXPORT
OF ONIONS: AN ANALYSIS**



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EDITORIAL

As always the Union Budget was awaited with bated breath on what it had in store for various stakeholders and their expectations of fulfilling promises in the ensuing financial year.

The thrust to the agricultural sector is only to be expected because this is the segment that protects and has potential to strengthen the innate economic coping mechanism.

In our current issue we attempt to analyse agriculture from a budgetary viewpoint and understand how the budget proposes to boost the agrarian sector, how the government plans to redress farmers' grievances, and how it plans to usher in food security. These are some questions which may find answers here.

The Finance Minister has overall been kind to agriculture. The Plan Outlay for Department of Agriculture and Co-operation has been increased by 18 percent.

The Union Budget has also hiked agricultural credit by Rs 1,00,000 crore. It stood at Rs 5,75,000 crore last fiscal.

One critical move worth mentioning here is FM Pranab Mukherjee's decisive strategy of curbing high food inflationary trends. His budget hopes to achieve this by seeking to remove food production and distribution bottlenecks.

He also hopes to fully provide for subsidies related to administering the Food Security Act.

Since it is all about crop productivity, ultimately we have also pondered over onion exports. Because the commodity is a widely-consumed culinary item in India, our issue studies in detail the short-term and long-term consequences of the ban on its exports.

Going somewhat out of the box, there is also a piece on the Green India Mission, which readers will find readable and informative.

Apart from budget statistics, there is a brief but in-depth analysis of the economic parameters within which agriculture functions. However, how far this budget will accomplish its mission and how well will it boost overall agricultural productivity, on which revolves our entire economy, only time will tell.

A.K. Garg
Editor-in-Chief

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Budget

A Major Push to Agriculture

By Dr. Rana Kapoor



The Union Budget identifies agriculture as one of the sectors which has shown a growth of 2.5 percent in the current year. The Union Budget clearly establishes supply chain bottlenecks as one of the key issues in agriculture and one of the primary reasons for demand-supply gap and inefficiencies in post harvest distribution.

With an aim of “faster, sustainable and more inclusive growth” the Finance Minister has clearly identified “supply bottlenecks in agriculture and delivery systems” as one of the top five objectives that the government must address effectively in the ensuing fiscal year.

FM has clearly identified “supply bottlenecks in agriculture and delivery systems” as one of the top five objectives that government must address effectively in ensuing FY

Given that agriculture is recognised as central to our nation's growth strategy, it is critical to implement measures planned to boost agricultural development and reduce supply bottlenecks in the union budget, and look for enablers that would allow us to achieve this objective.

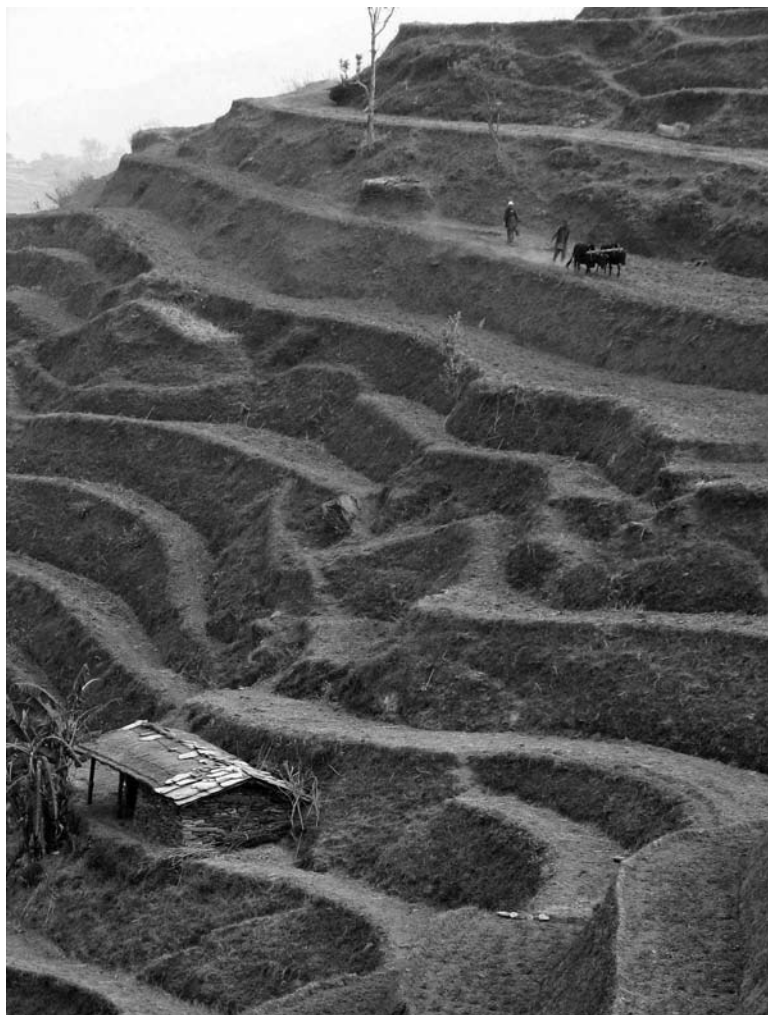
Agricultural Development – Key Focus Areas

Building on the four-pronged strategy of agricultural production, reduction in wastage of produce, credit support to farmers, and a thrust to the food processing sector envisaged in the previous budget, the finance minister has emphasised on the need to remove bottlenecks in production and distribution of food products that are driving inflation. Some of the key focus areas include:

Increasing farm productivity: The green revolution envisaged in the Eastern region of the nation has been given a further fillip by increasing the allocation to Rs 1,000 crore, an increase of 150 percent with a focus on rice based cropping systems catering to the Eastern region's requirements. This increase in allocation has been primarily due to the significant increase in yield and productivity as a result of this initiative.

The strategy for increasing production of agricultural commodities focuses on providing incentives to farmers through various development programmes. Outlay for programmes under Crop Husbandry is Rs 18,215.78 crore, of which Rs 9,217 crore is for State Plan Scheme, 'Rashtriya Krishi Vikas Yojna'.

A token provision of Rs 1 crore each has been proposed for new schemes, viz. National Mission on Agriculture Extension; National Mission on Seeds and Planting Material; National Mission on Agricultural Mechanisation; National Mission on Oilseeds and Oil Palm; National Mission for Sustainable Agriculture; Integrated



Villagers sow crops like wheat, barley, and mustard on the mountain slopes of the Himalayas in Nepal using traditional farming techniques, such as terracing and labor intensive agriculture.

Scheme for Farmers' Income Security; Central Agriculture Infrastructure and Establishment Scheme; and, National Centre for Crop Statistics in order to further energise the role of these pivotal organisations.

In addition, the National Mission for Protein Supplements and the Accelerated Fodder Development Programme have been strengthened, and to improve productivity in the dairy sector, a Rs 2,242-crore project is being launched with World Bank assistance. To broaden the scope of production of fish to coastal aquaculture, apart from fresh water aquaculture, the outlay in 2012-13 is being stepped up to Rs 500 crore.

Increased Access to Farm Credit: Reinforcing the need to increase the

access to credit, the finance minister has raised the target of credit flow to farmers from Rs 4.75 lakh crore to Rs



5.75 lakh crore which represents an increase of Rs 1 lakh crore over the target for the current year. In addition, existing interest subvention scheme of providing short term crop loans to farmers at 7 percent interest has been retained with additional subvention of 3 percent to those farmers who repay their crop loans on time. In addition, the same interest subvention on post harvest loans up to six months against negotiable warehouse receipts will also be available, which will encourage the farmers to keep their produce in warehouses thereby providing a much needed post harvest agri-infrastructural support towards reducing farm gate wastage and giving pricing power to farmers.

Post Harvest Storage Infrastructure:

Post harvest wastage is a key inefficiency that needs to be corrected and in the budget the corpus of Rural Infrastructure Development Fund (RIDF) has been increased from Rs 18,000 crore to Rs 20,000 crore with a special sub allocation of Rs 5,000 crore dedicated for warehouse development.

The Finance Minister has indicated that nearly 15 million tonnes capacity is being created under the Private Entrepreneur's Guarantee Scheme, of which 3 million tonnes of storage capacity will be added by the end of 2011-12, and 5 million would be added next year.

To boost investment in post harvest infrastructure, capital investment in the creation of modern storage capacity has been made eligible for viability gap funding scheme of the Finance Ministry at an enhanced rate of 150 percent as against the current rate of 100 percent.

Increasing processing infrastructure:

With a view to retain the momentum of private investment in building the food processing capacity of the nation, the Plan outlay for 2012-13 of the Ministry of Food Processing Industries is Rs 660 crore. The allocation under all three components, i.e. mega food parks, cold chain, value addition and preservation infrastructure and modernisation of abattoirs, have been maintained to upscale the execution of these schemes.

The Ministry has also proposed for a major shift in its role from implementing agency to policy formulation with greater involvement of State Governments through newly proposed centrally sponsored scheme of 'National Mission on Food Processing' for which Plan outlay of Rs 250 crores has been proposed for 2012-13. This Mission will enable the Government to have a better outreach and to provide more flexibility to suit local needs as well as ensuring greater Public-Private partnership in the food processing sector.

Fertiliser availability and use:

A mobile-based Fertiliser Management System (mFMS) has been designed to provide end-to-end information on the movement of fertilisers and subsidies, from the manufacturer to the retail level. This will be rolled out nation-wide during 2012. This step will benefit 12 crore farmer families, while reducing expenditure on subsidies by curtailing misuse of fertilisers

To reduce India's import dependence in urea, the Government plans to finalise pricing and investment policies for urea. It is estimated by the government that with the implementation of the investment policy, country will become self sufficient in manufacturing urea in the next five years. In case of the potassic-phosphatic (P&K) fertiliser, use of single super phosphate (SSP) will be encouraged through greater extension work.

With a view to increase indigenous fertiliser production, the rate of withholding tax on interest payments on external commercial borrowings for capital investment in fertiliser production has been reduced from 20 percent to 5 percent for three years.

In addition, capital investment in fertilisers

It is estimated by the government that with the implementation of the investment policy, country will become self sufficient in manufacturing urea in the next five years

have been made eligible for viability gap funding scheme of the Finance Ministry at a rate of 150 percent and imports of equipment for initial setting up or substantial expansion of fertiliser projects have been fully exempted from basic customs duty of 5 percent for a period of three years up to March 31, 2015.

Measures that Need Focus in the Long Term

While the budget has broadly focused on the short term imperatives of increasing agricultural production, increased access to farm credit and building post harvest storage and processing infrastructure, an aggressive perspective of trying to double agricultural growth needs to be envisioned. Some of the key enablers for this jump-growth include:

- Creation of agri-marketing infrastructure.
- Incentivised shift towards drip-irrigation.
- Incentives for farm machinery and technology.
- Creation of a national policy on cropping pattern, with well defined market-linkages.
- Creation of a national body collecting global commercial intelligence on crops.
- Stable market-linked export-import policy.

Conclusion

The Union Budget's focus on investment in farm production and post harvest management is commendable. However, as the demand for agriculture grows, future union budgets would need to focus on even larger scale investment into fundamental enablers of agricultural growth with a target of achieving at least 6-7.5 percent per annum growth.

** Authored by Dr. Rana Kapoor, Founder, MD & CEO, YES BANK, also published by The Hindu Business Line on 19th March 2012*



UNION BUDGET

2012-2013 : Highlights



Source: www.indiabudget.nic.in



Approach to the Budget

- For Indian economy, recovery was interrupted this year due to intensification of debt crises in Euro zone, political turmoil in Middle East, rise in crude oil price and earthquake in Japan.
- GDP is estimated to grow by 6.9 percent in 2011-12, after having grown at 8.4 percent in preceding two years.
- India however remains front runner in economic growth in any cross-country comparison.



- Monetary and fiscal policy response for better part of past 2 years aimed at taming domestic inflationary pressure.
- Growth moderated and fiscal balance deteriorated due to tight monetary policy and expanded outlays.
- Indicators suggest that economy is turning around as core sectors and manufacturing show signs of recovery.
- At this juncture, it is necessary to take hard decision to improve macroeconomic environment and strengthen domestic growth drivers.
- Twelfth Five-Year Plan to be launched with the aim of "faster, sustainable and more inclusive growth". Five objectives identified to be addressed effectively in the ensuing fiscal year.
- If India can build on its economic strength, it can be a source of stability for world economy and a safe destination for restless global capital.
- industrial growth.
- Headline inflation expected to moderate further in next few months and remain stable thereafter.
- Steps taken to bridge gaps in distribution, storage and marketing systems have helped in more effective management of inflation.
- Developments in India's external trade in the first half of the current year have been encouraging. Diversification in export and import market achieved.
- Current account deficit at 3.6 per cent of GDP for 2011-12 and reduced net capital inflow in the 2nd and 3rd quarters put pressure on exchange rate.
- India's GDP growth in 2012-13 expected to be 7.6 percent +/- 0.25 percent.
- Deterioration in fiscal balance in 2011-12 due to slippages in direct tax revenue and increased subsidies.

Overview of the Economy

- GDP growth estimated at 6.9 percent in real terms in 2011-12. Slowdown in comparison to preceding two years is primarily due to deceleration in

FRBM Act

- Introduction of amendments to the FRBM Act as part of Finance Bill, 2012.
- Concept of "Effective Revenue

Deficit” and “Medium Term Expenditure Framework” statements are two important features of amendment to FRBM Act in the direction of expenditure reforms.

- Effective Revenue Deficit is the difference between revenue deficit and grants for creation of capital assets. This will help in reducing consumptive component of revenue deficit and create space for increased capital spending.
- “Medium-term Expenditure Framework” statement will set forth a three-year rolling target for expenditure indicators.
- Recommendations of the Expert Committees to streamline and reduce the number of centrally sponsored schemes and to address plan and non-plan classification to be kept in view while implementing Twelfth Plan.
- Central Plan Scheme Monitoring System to be expanded for better tracking and utilisation of funds.

Subsidies

- Some subsidies, while being inevitable, may become undesirable if they compromise the macroeconomic fundamentals of economy.



- Subsidies related to administering the Food Security Act will be fully provided for.
- Endeavour to keep central subsidies under 2 percent of GDP in 2012-13. Over next 3 years, to be further brought down to 1.75 percent of GDP.
- Based on recommendation of task force headed by Shri Nandan Nilekani, a mobile-based Fertilizer Management System has been designed to provide end-to-end information on movement of fertilisers and subsidies. Nation-wide roll-out during 2012.
- All three public sector Oil Marketing Companies have launched LPG transparency portals to improve customer service and reduce leakage.



- Endeavour to scale up and roll out Aadhaar enabled payments for various government schemes in at least 50 districts within next 6 months.

Tax Reforms

- DTC Bill to be enacted at the earliest after expeditious examination of the report of the Parliamentary Standing Committee.
- Drafting of model legislation for the Centre and State GST in concert with States is under progress.

- GST network to be set up as a National Information Utility and to become operational by August 2012.

Disinvestment Policy

- Government has further evolved its approach to divestment of Central Public Sector Enterprises by allowing them a level playing field vis-à-vis the private sector in respect of practices like buy backs and listing at stock exchanges.
- For 2012-13, Rs 30,000 crore to be raised through disinvestment. At least 51 percent ownership and management control to remain with Government.

Strengthening Investment Environment

Foreign Direct Investment

- Efforts to arrive at a broad-based consensus in consultation with state governments in respect of the decision to allow FDI in multi-brand retail of up to 51 percent.

Advance Pricing Agreement

- Provision regarding implementation of Advance Pricing Agreement to be introduced in Finance Bill, 2012.

Financial Sector

- Rajiv Gandhi Equity Saving Scheme to allow for income tax deduction of 50 percent to new retail investors, who invest up to Rs 50,000 directly

in equities and whose annual income is below Rs 10 lakh to be introduced. The scheme will have a lock-in period of 3 years.



Capital Market

- Various steps proposed to be taken for deepening reforms in the Capital markets, including simplifying process of IPOs, allowing QFIs to access Indian Bond Market etc.

Legislative Reforms

- Official amendment to “The Pension Fund Regulatory and Development Authority Bill, 2011”, “The Banking Laws (Amendment) Bill, 2011” and “The Insurance Law (Amendment) Bill, 2008” to be moved in this session.
- Various Bills proposed to be moved in the Budget session of the Parliament to take forward the process of financial sector legislative reforms.

Capitalisation of Banks and Financial Holding Company

- To protect the financial health of Public Sector Banks and Financial Institutions, Rs 15,888 crore proposed to be provided for capitalisation. Possibility of creating a financial holding company to raise resources to meet the capital requirements of PSU Banks under examination.
- A central “Know Your Customer” depository to be developed in 2012-13 to avoid multiplicity of registration and data upkeep.

Priority Sector Lending

- Revised guidelines on priority sector lending to be issued after stakeholder consultation.

Financial Inclusion

- Out of 73,000 identified habitations that were to be covered under

“Swabhimaan” campaign by March, 2012, about 70,000 habitations have been covered. Rest likely to be covered by March 31, 2012.

- As a next step, Ultra Small Branches are being set up at these habitations.
- In 2012-13, “Swabhimaan” campaign to be extended to more habitations.

Regional Rural Banks

- Out of 82 RRBs in India, 81 have successfully migrated to Core Banking Solutions and have also joined the National Electronic Fund Transfer system.
- Proposal to extend the scheme of capitalisation of weak RRBs by another 2 years to enable States to contribute their share.

Infrastructure and Industrial Development

- During Twelfth Plan period, investment in infrastructure to go up to Rs 50 lakh crore with half of this, expected from private sector.
- More sectors added as eligible sectors for Viability Gap Funding under the scheme, “Support to PPP in infrastructure”.
- Government has approved guidelines for establishing joint venture companies by defence PSUs in PPP mode.
- First Infrastructure Debt Fund with an initial size of Rs 8,000 crore launched

earlier this month.

- Tax-free bonds of Rs 60,000 crore to be allowed for financing infrastructure projects in 2012-13.
- A harmonised master list of infrastructure sector approved by the Government.
- IIFCL has put in place a structure for credit enhancement and take-out finance for easing access of credit to infrastructure projects.

National Manufacturing Policy

- National Manufacturing Policy announced with the objective of raising, within a decade, the share of manufacturing in GDP to 25 percent and creating 10 crore jobs.

Power and Coal

- Coal India Limited advised to sign fuel supply agreements with power plants, having long-term PPAs with DISCOMs and getting commissioned on or before March 31, 2015.
- External Commercial Borrowings (ECB) to be allowed to part finance Rupee debt of existing power projects.

Transport: Roads and Civil Aviation

- Target of covering a length of 8,800 kilometre under NHDP next year.
- Allocation of the Road Transport and Highways Ministry enhanced by 14 percent to Rs 25,360 crore.
- ECB proposed to be allowed for capital expenditure on the maintenance and operations of toll systems for roads and highways, if they are part of original project.
- Direct import of Aviation Turbine Fuel permitted for Indian Carriers as actual users.
- ECB to be permitted for working capital requirement of airline industry

for a period of one year, subject to a total ceiling of US \$ 1 billion.

- Proposal to allow foreign airlines to participate upto 49 percent in the equity of an air transport undertaking under active consideration of the government.

Delhi-Mumbai Industrial Corridor

- In September 2011, central assistance of Rs 18,500 crore spread over 5 years approved. US \$ 4.5 billion as Japanese participation in the project.

Housing Sector

- Various proposals to address housing shortage for low income groups in major cities and towns including allowing ECB for low cost housing projects and setting up of a credit guarantee trust fund etc.

Fertilisers

- Government has taken steps to finalise pricing and investment policies for urea to reduce India's import dependence in urea.

Textiles

- Government has announced a financial package of Rs 3,884 crore for waiver of loans of handloom weavers and their cooperative societies.
- Two more mega handloom clusters, one to cover Prakasam and Guntur districts in Andhra Pradesh and another for Godda and neighbouring districts in Jharkhand to be set up.
- Three Weaver's Service Centres one each in Mizoram, Nagaland and Jharkhand to be set up for providing technical support to poor handloom weavers.
- Rs 500 crore pilot scheme announced for promotion and application of Geotextiles in the North Eastern Region.



- A powerloom mega cluster to be set up in Ichalkaranji in Maharashtra with a budget allocation of Rs 70 crore.

Micro, Small and Medium Enterprises

- Rs 5,000 crore India Opportunities Venture Fund to be set up with SIDBI.
- To enable greater access to finance by Small and Medium Enterprises (SME), two SME exchanges launched in Mumbai recently.
- Policy requiring Ministries and CPSEs to make a minimum of 20 percent of their annual purchases from MSEs approved. Of this, 4 percent earmarked for procurement from MSEs owned by SC/ST entrepreneurs.

AGRICULTURE

- Plan Outlay for Department of Agriculture and Co-operation increased by 18 percent.
- Outlay for Rashtriya Krishi Vikas Yojana (RKVY) increased to Rs 9,217 crore in 2012-13.
- Initiative of Bringing Green Revolution to Eastern India (BGREI) has resulted in increased production and productivity of paddy. Allocation for the scheme increased to Rs 1,000 crore in 2012-13 from Rs 400 crore in 2011-12.
- Rs 300 crore to Vidarbha Intensified

Irrigation Development Programme under RKVY.

- Remaining activities to be merged into following missions in Twelfth Plan:

- National Food Security Mission
- National Mission on Sustainable Agriculture including Micro Irrigation
- National Mission on Oilseeds and Oil Palm
- National Mission on Agricultural Extension and Technology
- National Horticultural Mission
- National Mission for Protein Supplement

- Rs 2,242 crore project launched with World Bank assistance to improve productivity in the dairy sector.

- Rs 500 crore provided to broaden scope of production of fish to coastal aquaculture.

Agriculture Credit

- Target for agricultural credit raised by Rs 1,00,000 crore to Rs 5,75,000 crore in 2012-13
- Interest subvention scheme for providing short term crop loans to farmers at 7 percent interest per annum to be continued in 2012-13. Additional subvention of 3 percent available for prompt paying farmers.

- Short term RRB credit refinance fund being set up to enhance the capacity of RRBs to disburse short term crop loans to small and marginal farmers.

- Kisan Credit Card (KCC) Scheme to be modified to make KCC a smart card which could be used at ATMs.

Agricultural Research

- A sum of Rs 200 crore set aside for incentivising research with rewards Irrigation



Food Security

- National Food Security Bill, 2011 is before Parliamentary Standing Committee.
- A national information utility for computerisation of PDS is being created. To become operational by December, 2012.

Multi-sectoral Nutrition Augmentation Programme

- A multi-sectoral programme to address maternal and child malnutrition in selected 200 high-burden districts is being rolled out during 2012-13.
- Allocation of Rs 15,850 crore made for Integrated Child Development Service (ICDS) scheme, representing an increase of 58 percent over BE 2011-12.
- Rs 11,937 crore allocated for National Programme of Mid Day Meals in schools.
- An allocation of Rs 750 crore proposed for Rajiv Gandhi Scheme for Empowerment of Adolescent Girls, SABLA.

Rural Development and Panchayati Raj

- Budgetary allocation for rural drinking water and sanitation increased from Rs 11,000 crore to Rs 14,000 crore representing an increase of over 27 percent.
- Allocation for PMGSY increased by

20 percent to Rs.24,000 crore to improve connectivity.

- Major initiative proposed to strengthen Panchayats through Rajiv Gandhi Panchayat Sashaktikaran Abhiyan.
- Backward Regions Grant Fund scheme to continue in twelfth plan with enhanced allocation of Rs 12,040 crore in 2012-13, representing an increase of 22 percent over the BE 2011-12.

Rural Infrastructure Development Fund (RIDF)

- Allocation under RIDF enhanced to Rs 20,000 crore. Rs 5,000 crore earmarked exclusively for creating warehousing facilities.

Education

- For 2012-13, Rs 25,555 crore provided for RTE-SSA representing an increase of 21.7 percent over 2011-12.
- 6,000 schools proposed to be set up at block level as model schools in Twelfth Plan.
- Rs 3,124 crore provided for RTE-SSA representing an increase of 21.7 percent over 2011-12.
- 6,000 schools proposed to be set up at block level as model schools in Twelfth Plan.
- Rs 3,124 crore provided for Rashtriya Madhyamik Shiksha Abhiyan (RMSA) representing an increase of 29 percent over BE 2011-12.
- To ensure better flow of credit to students a Credit Guarantee Fund proposed to be set up.

Health

- No new case of polio reported in last one year.
- Existing vaccine units to be modernised and new integrated vaccine unit to be set up in Chennai.
- Scope of 'Accredited Social Health Activist' – 'ASHA' is being

- Structural changes in Accelerated Irrigation Benefit Programme (AIBP) being made to maximise flow of benefit from investments in irrigation projects.
- Allocation for AIBP in 2012-13 stepped up by 13 percent to Rs 14,242 crore.
- Irrigation and Water Resource Finance Company being operationalised to mobilize large resources to fund irrigation projects.
- A flood management project approved by Ganga Flood Control Commission at a cost of Rs 439 crore for Kandi sub-division of Murshidabad District.

National Mission on Food Processing

- A new centrally sponsored scheme titled "National Mission on Food Processing" to be started in 2012-13 in co-operation with State Governments.
- Steps taken to create additional food grain storage capacity in the country.

Inclusion

Scheduled Castes and Tribal Sub Plans

- Allocation for Scheduled Castes Sub Plan at Rs 37,113 crore in BE 2012-13 represents an increase of 18 per cent over BE 2011-12.
- Allocation for Tribal Sub Plan at Rs 21,710 crore in BE 2012-13 represents an increase of 17.6 percent





enlarged. This will also enhance their remuneration.

- Allocation for NRHM proposed to be increased from Rs 18,115 crore in 2011-12 to Rs 20,822 crore in 2012-13.
- National Urban Health Mission is being launched.
- Pradhan Mantri Swasthya Suraksha Yojana being expanded to cover upgradation of 7 more Government medical colleges.

Employment and Skill Development

- MGNREGS has had a positive impact on livelihood security.
- Need to bring about greater synergy between MGNREGA and agriculture and allied rural livelihoods.
- Allocation of Rs 3915 crore made for National Rural Livelihood Mission representing an increase of 34 percent.
- To ease access to bank credit, corpus for 'Women's SHG's Development Fund' enlarged.
- Proposal to establish Bharat Livelihoods Foundation of India through Aajeevika scheme.

- Allocation for Prime Minister's Employment Generation Programme increased by 23 percent to Rs 1,276 crore in 2012-13.

Skill Development

- Projects approved by National Skill Development Corporation expected to train 6.2 crore persons at the end of 10 years.
- Rs 1,000 crore allocated for National Skill Development Fund in 2012-13.
- To improve the flow of institutional credit for skill development, a separate Credit Guarantee Fund to be set up.
- "Himayat" scheme introduced in J&K to provide skill training to 1 lakh youth in next 5 years. The entire cost will be borne by the Centre.

Social Security and the Needs of Weaker Sections

- Allocation under NSAP raised by 37 percent to Rs 8,447 crore in 2012-13.
- In the ongoing Indira Gandhi National Widow Pension Scheme and Indira Gandhi National Disability Pension Scheme for BPL beneficiaries, pension amount to be raised from Rs 200 to Rs 300 per month. A lump sum grant

on the death of primary breadwinner of a BPL family, in the age group 18-64 years, doubled to Rs 20,000.

- To enhance access under SWAVALAMBAN scheme, LIC appointed as an Aggregator and all Public Sector Banks appointed as Points of Presence (PoP) and Aggregators.
- Special grant provided to various universities and academic institutions.

Security

- A provision of Rs 1,93,407 crore made for Defence services including Rs 79,579 crore for capital expenditure. Any further requirement to be met.
- Rs 1,185 crore proposed to be allocated for construction of nearly 4,000 residential quarters for Central Armed Police Forces.
- Rs 3,280 crore proposed to be allocated for construction of office building of Central Armed Police Forces.
- Scheme to create National Population Register likely to be completed within next 2 years.

Governance

UID-Aadhaar

- Enrolment of 20 crore persons completed under UID mission. Adequate funds to be allocated to complete enrolment of another 40 crore persons.

Black Money

- Proposal to lay a White Paper on Black Money in current session of Parliament.

Public Procurement Legislation

- Bill regarding Public Procurement Legislation to be introduced in the Budget Session of the Parliament.
- Legislative measures for strengthening anti-corruption framework are at various stages of enactment.

Budget Estimates 2012-13

- Gross Tax Receipts estimated at Rs 10,77,612 crore.
- Net Tax to Centre estimated at Rs 7,71,071 crore.
- Non-tax Revenue Receipts estimated at Rs 1,64,614 crore.
- Non-debt Capital Receipts estimated at Rs 41,650 crore.
- Temporary arrangement to use disinvestment proceeds for capital expenditure in social sector schemes extended for one more year.
- Total expenditure for 2012-13 budgeted at Rs 14,90,925 crore.
- Plan expenditure for 2012-13 at Rs 5,21,025 crore is 18 percent higher than BE 2011-12. This is higher than 15 percent projected in Approach to Twelfth Plan.
- 99 percent of the total plan outlay met in the Eleventh Plan.
- Non-plan expenditure estimated at Rs 9,69,900 crore.
- Rs 3,65,216 crore estimated to be transferred to States including direct transfers to states and district level implementing agencies.
- Entire amount of subsidy is given in cash and not as bonds in lieu of subsidies.
- Fiscal deficit at 5.9 percent of GDP in RE 2011-12.
- Fiscal deficit at 5.1 percent of GDP in BE 2012-13.
- Net market borrowing required to finance the deficit to be Rs 4.79 lakh crore in 2012-13.
- Central Government debt at 45.5 percent of GDP in 2012-13 as compared to Thirteenth Finance Commission target of 50.5 percent.
- Effective Revenue Deficit to be 1.8 percent of GDP in 2012-13.

Part B — Tax Proposals

Direct Taxes

- Tax proposals for 2012-13 mark progress in the direction of movement towards DTC and GST.
- DTC rates proposed to be introduced for personal income tax.
- Exemption limit for the general category of individual taxpayers proposed to be enhanced from Rs 1,80,000 to Rs 2,00,000 giving tax relief of Rs 2,000.
- Upper limit of 20 percent tax slab proposed to be raised from Rs 8 lakh to Rs 10 lakh.
- Proposal to allow individual tax payers, a deduction of upto Rs 10,000 for interest from savings bank accounts.
- Proposal to allow deduction of up to Rs 5,000 for preventive health check-up.
- Senior citizens not having income from business proposed to be exempted from payment of advance tax.
- To provide low cost funds to stressed infrastructure sectors, rate of withholding tax on interest payment

on ECBs proposed to be reduced from 20 percent to 5 percent for 3 years for certain sectors. Restriction on Venture Capital Funds to invest only in 9 specified sectors proposed to be removed.

- Proposal to continue to allow repatriation of dividends from foreign subsidiaries of Indian companies at a lower tax rate of 15 percent up to 31.3.2013.
- Investment link deduction of capital expenditure for certain businesses proposed to be provided at the enhanced rate of 150 percent.
- New sectors to be added for the purposes of investment linked deduction.
- Proposal to extend weighted deduction of 200 percent for R&D expenditure in an in house facility for a further period of 5 years beyond March 31, 2012.
- Proposal to provide weighted deduction of 150 percent on expenditure incurred for agri-extension services.
- Proposal to extend the sunset date for setting up power sector undertakings by one year for claiming 100 percent deduction of profits for 10 years.
 - Turnover limit for compulsory tax audit of account and presumptive taxation of SMEs to be raised from Rs 60 lakh to Rs 1 crore.
 - Exemption from Capital Gains tax on sale of residential property, if sale consideration is used for subscription in equity of a manufacturing SME for purchase of new plant and machinery.
 - Proposal to provide weighted deduction at 150 percent of expenditure incurred on skill development in manufacturing sector. Reduction in securities transaction tax by 20 percent on cash delivery transactions.



- Proposal to extend the levy of Alternate Minimum Tax to all persons, other than companies, claiming profit linked deductions.
- Proposal to introduce General Anti-Avoidance Rule to counter aggressive tax avoidance scheme.
- Measures proposed to deter the generation and use of unaccounted money.
- A net revenue loss of Rs 4,500 crore estimated as a result of Direct Tax proposals.

Indirect Taxes

Service Tax

- Service tax confronts challenges of its share being below its potential, complexity in tax law, and need to bring it closer to Central Excise Law for eventual transition to GST.
- Overwhelming response to the new concept of taxing services based on negative list.
- Proposal to tax all services except those in the negative list comprising of 17 heads.
- Exemption from service tax is proposed for some sectors.
- Service tax law to be shorter by nearly 40 percent.
- Number of alignment made to harmonise Central Excise and Service Tax. A common simplified registration form and a common return comprising of one page are steps in this direction.
- Revision Application Authority and Settlement Commission being introduced in Service Tax for dispute resolution.
- Utilization of input tax credit permitted in number of services to reduce cascading of taxes.
- Place of Supply Rules for determining the location of service to be put in public domain for stakeholders' comments.

- Study team to examine the possibility of common tax code for Central Excise and Service Tax.
- New scheme announced for simplification of refunds.
- Rules pertaining to point of taxation are being rationalized to maintain a healthy fiscal situation proposal to raise service tax rate from 10 percent to 12 percent, with corresponding changes in rates for individual services.
- Proposals from service tax expected to yield additional revenue of Rs 8,660 crore.

Other proposals for Indirect Taxes

- Given the imperative for fiscal correction, standard rate of excise duty to be raised from 10 percent to 12 percent, merit rate from 5 percent to 6 percent and the lower merit rate from 1 percent to 2 percent with few exemptions.
- Excise duty on large cars also proposed to be enhanced.
- No change proposed in the peak rate of customs duty of 10 percent on non-agricultural goods.
- To stimulate investment relief proposals for specific sectors - especially those under stress.

Agriculture and Related Sectors

- Basic customs duty reduced for certain agricultural equipment and their parts;
- Full exemption from basic customs duty for import of equipment for expansion or setting up of fertiliser projects up to March 31, 2015.

Infrastructure

- Proposal for full exemption from basic customs duty and a concessional CVD of 1 percent to steam coal till 31st March, 2014.

- Full exemption from basic duty provided to certain fuels for power generation.

Mining

- Full exemption from basic customs duty to coal mining project imports.
- Basic custom duty proposed to be reduced for machinery and instruments needed for surveying and prospecting for minerals.

Railways

- Basic customs duty proposed to be enhanced for certain categories of completely

built units of large cars/MUVs/SUVs.

Rationalization measures

- Excise duty rationalised for packaged cement, whether manufactured by minicement plants or others.
- Levy of excise duty of 1 percent on branded precious metal jewellery to be extended to include unbranded jewellery. Operations simplified and measures taken to minimise impact on small artisans and goldsmiths.
- Branded Silver jewellery exempted from excise duty.
- Chassis for building of commercial vehicle bodies to be charged excise duty at an ad valorem rate instead of mixed rate.
- Import of foreign-going vessels to be exempted from CVD of 5 percent retrospectively.
- Duty-free allowances increased for eligible passengers and for children of upto 10 years.
- Proposals relating to Customs and Central excise to result in net revenue gain of Rs 27,280 crore.
- Indirect taxes estimated to result in net revenue gain of Rs 45,940 crore.
- Net gain of Rs 41,440 crore in the Budget due to various taxation proposals.

AGRICULTURE: A Budgetary Perspective

By Ritam Banati



Revolution to Eastern India (BGREI) has resulted in increased production and productivity of paddy. Allocation for the scheme increased to Rs 1,000 crore in 2012-13 from Rs 400 crore in 2011-12.

- Rs 300 crore to Vidarbha Intensified Irrigation Development Programme under RKVY.
- Rs 2,242 crore project launched with World Bank assistance to improve productivity in the dairy sector.
- Rs 500 crore provided to broaden scope of production of fish to coastal aquaculture.

Finance Minister Pranab Mukherjee has justified what can be called as “budgetary non-sops” while quoting from Hamlet, “I must be cruel only to be kind”. The bottom-line must be paying the people to benefit the society in the long run.

Economics is not a hardcore science. It is based on predictions and assumptions. Since we live in a transitional economy, notwithstanding its prominent agrarian characteristics, we cannot derive any certain conclusions out of the budget.

This year’s budget too realizes that not giving agriculture its due is perilous to the entire economic set-up. So the government has raised the plan outlay for the Department of Agriculture and Cooperation by 18 percent.

In line with this, funds for the Rashtriya Krishi Vikas Yojana (RKVY) have also been increased to Rs 9,217 crore. And to augment wholesome growth further, the following has been decided:

- Initiative of Bringing Green



Achieving 7.6% GDP may not be a stupendous task as it seems to be. The answer lies in devising the right strategy which begins from analyzing agriculture in the context of its contribution to GDP growth rate

Subsidies related to administering the Food Security Act will be fully provided for. While there is an endeavour to keep central subsidies under 2 percent of GDP in 2012-13, over the next 3 years, it is slated to be further brought down to 1.75 percent of GDP. Mobile-based Fertilizer Management System designed to provide end-to-end information on movement of fertilisers & subsidies is a technological upgrade.

Achieving 7.6 percent GDP may not be as much of a stupendous task as it seems to be. The answer lies in devising the right strategy which begins from analyzing the most crucial sector of our economy in the context of its contribution to the GDP growth rate.

Government’s smart move that aims at reducing India’s import dependence in urea by finalising pricing and investment policies may be a step in the required direction. Urea imports totalled 66.10 lakh tonnes last fiscal and this is quite substantial considering that the remaining total of fertiliser imports touched 131.78 lakh tonnes in the entire 2010-11, according to government data.

The point to remember here is that we may have been underestimating the relevance of studying urea imports. The fund allocation is huge. If a good amount is spent to reverse the cycle – that is, make India a urea exporter rather than importer, then the impact on total fertiliser trade will be more positive. And if we develop on these lines, then it may be as easy to carve a niche in the fertilizer market of the world too, as has become for horticulture. Taking note of the below statistical truths, it looks achievable:



Agriculture Credit

- Target for agricultural credit raised by Rs 1,00,000 crore to Rs 5,75,000 crore in 2012-13;
- Interest subvention scheme for providing short term crop loans to farmers at 7 percent interest per annum to be continued in 2012-13. Additional subvention of 3 percent available for prompt paying farmers;
- Short-term RRB credit refinance fund being set up to enhance the capacity of RRBs to small and marginal farmers;
- Kisan Credit Card (KCC) Scheme to be modified to make KCC a smart card which could be used at ATMs;
- A sum of Rs 200 crore set aside for incentivising research with rewards;
- Structural changes in Accelerated Irrigation Benefit Programme (AIBP) being made to maximise flow of benefit from investments in irrigation projects;
- Allocation for AIBP in 2012-13 stepped up by 13 percent to Rs 14,242 crore;
- Irrigation and Water Resource Finance Company being operationalised to

mobilize large resources to fund irrigation projects;

- A flood management project approved by Ganga Flood Control Commission at a cost of Rs 439 crore for Kandi sub-division of Murshidabad District;
- A new centrally sponsored scheme titled “National Mission on Food Processing” to be started in 2012-13 in co-operation with State Governments; and,
- Steps taken to create additional food grain storage capacity in the country.

The last point is the most significant. The ultimate objective of a country like India being to ensure that there is no starvation, protecting rotting food grains by creating additional food grain storage capacity is of paramount significance. All else is in vain if this basic requirement is not met.

Government realizes that food security is the real need of the hour. And laying a greater emphasis on this aspect is a more foolproof mechanism to address both the problems – of food security and food inflation, simultaneously

India, which is the world's second biggest wheat and rice producer, has been able to successfully address the starvation problem, but still has a long way to go in solving the malnutrition problem. Not only this, in the absence of a good monsoon season coupled with a burgeoning population, there is sometimes a pinching need to import foodgrains.

The Food Ministry had proposed extending the current deadline for wheat exports to March 31, 2013, while the trade ministry rightly argued against any limits. Local flour mills have been pleading with the government to put an export policy in place for at least three years to ensure that overseas buyers are assured continuous supplies as part of long-term contracts.

The food security bill which was passed last year with the goal of providing subsidized foodgrains is a welcome step to avoid a recurrence of the of late vertical food inflationary trends. The government realizes that food security is the real need of the hour. And laying a greater emphasis on this aspect is a more foolproof mechanism to address both the problems – of food security and food inflation, simultaneously.

The following budgetary points are worth mentioning:

- National Food Security Bill, 2011 is before Parliamentary Standing Committee;
- A national information utility for computerisation of PDS is being created and is slated to become operational by December, 2012;
- A multi-sectoral programme to address maternal and child malnutrition in selected 200 high-burden districts is being rolled out during 2012-13;
- Allocation of Rs 15,850 crore made for Integrated Child Development Service;



- Rs 11,937 crore allocated for National Programme of Mid Day Meals in schools;
- An allocation of Rs 750 crore proposed for Rajiv Gandhi Scheme for Empowerment of Adolescent Girls, SABLA;
- Allocation of Rs 3915 crore made for National Rural Livelihood Mission representing an increase of 34 percent;
- Basic customs duty reduced for certain agricultural equipment and their parts;
- Full exemption from basic customs duty for import of equipment for expansion or setting up of fertiliser projects up to March 31, 2015;
- Proposal to provide weighted deduction of 150 percent on expenditure incurred for agri-extension services.

Exemption from Duty for importing fertilizer-related equipment will boost extension agriculture even more. This should lead to a better infusion of innovative technologies. Couple this with Finance Minister's proposal to bolster its net market borrowing to Rs 4.79 lakh crore to finance fiscal deficit and this seems to augur well. Only if and when the central government's debt at 45.5 percent of GDP is taken care of properly, can the road to effective Revenue Deficit

Because total expenditure is budgeted at Rs. 14,90,925 cr, plan expenditure at Rs. 5,21,025 cr which is 18 % higher than before, non-plan expenditure at Rs. 9,69,900 cr, fiscal deficit targeted at 5.1 % of GDP, as against 5.9% in revised estimates for 2011-12 may no longer be a feat to achieve

of 1.8 percent of GDP in 2012-13 become smooth.

Corruption is a serious bottleneck that prevents the percolation of financial benefits down to where necessary. So alongside fund allocation, it is also essential to deal with this menace to ascertain that the following decisions actually result in a noticeable lessening of burden on the economy:

- Rs. 30,000 crore to be raised through disinvestment;
- Target for agricultural credit raised to Rs. 5,75,000 crore;

- Interest subvention for short-term crop loans to farmers at 7 percent interest continues; additional 3 percent for prompt paying farmers;
- Rs 200 crore for awards to incentivise agricultural research;
- Multi-sectoral programme to address maternal and child malnutrition in 200 high burden districts; and,
- Relief in indirect taxes to sectors under stress including agriculture.

Thanks to agriculture, ours is a resilient economy which has been able to achieve a certain degree of self-sustenance. Due to this, it has been possible to weather the impact of global recession. A certain degree of independence even in the face of considerable imports spells well for economic health. Any movement towards higher exports must not come at the cost of grossly disregarding domestic requirements. Because agriculture has a sizable GDP contribution and is the nation's most critical economic component, it becomes even more essential to start from this constituent.

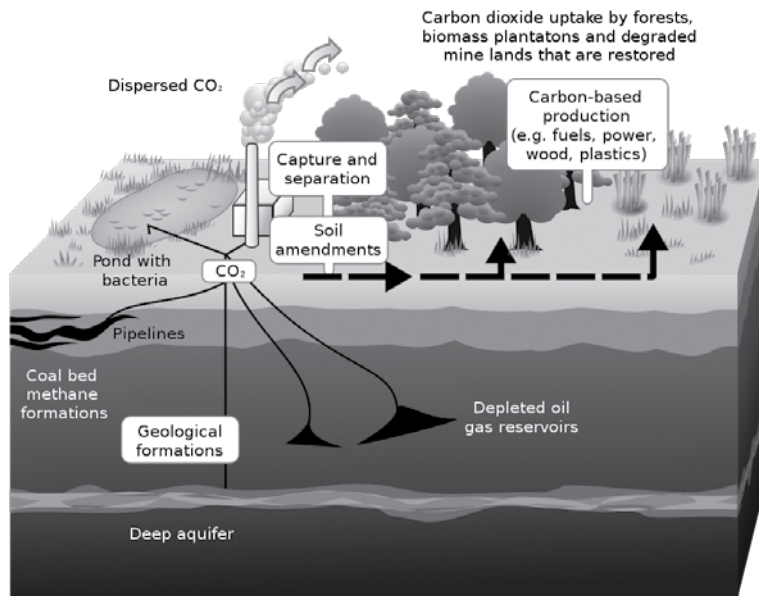
Moving on, because the total expenditure is budgeted at Rs. 14,90,925 crore, plan expenditure at Rs. 5,21,025 crore which is 18 percent higher than before, non-plan expenditure at Rs. 9,69,900 crore, the fiscal deficit targeted at 5.1 percent of GDP, as against 5.9 percent in revised estimates for 2011-12 may no longer be a feat to achieve.

However, since economics does not always function well just within financial limitations, any certain conclusions about agriculture against budget backdrop is nearly impossible today. Since dynamics are so uncertain, only time answers questions pertaining to economy in the mould of long-term repercussions on the socio-political and political-social sectors.

Hence, one can only analyse parameters within which predictions could be made as accurately as possible and advance decisions taken as precisely as they can be. Any definite answers would emerge only with time since studying of economics, particularly agriculture, is as complex as dissecting a Rhizome.

Carbon Sequestration: In the Context of Urban Forestry

By TT Krishnan



Schematic representation of both terrestrial and geological sequestration of CO2 emissions from a coal-fired plant

- The artificial methods can be described as Geological Sequestration (using oceans, subsurface saline aquifers, depleted oil fields, coalbeds etc.) and Mineral Sequestration (which involves the chemical process of storing CO2 in carbonate forms by reacting it with metal oxides)

Schematic representation of both terrestrial and geological sequestration of CO2 emissions from a coal-fired plant

Carbon dioxide capture occurs naturally through biological, physical and chemical processes. Techniques have been devised to exploit these natural processes

What is Carbon Sequestration?

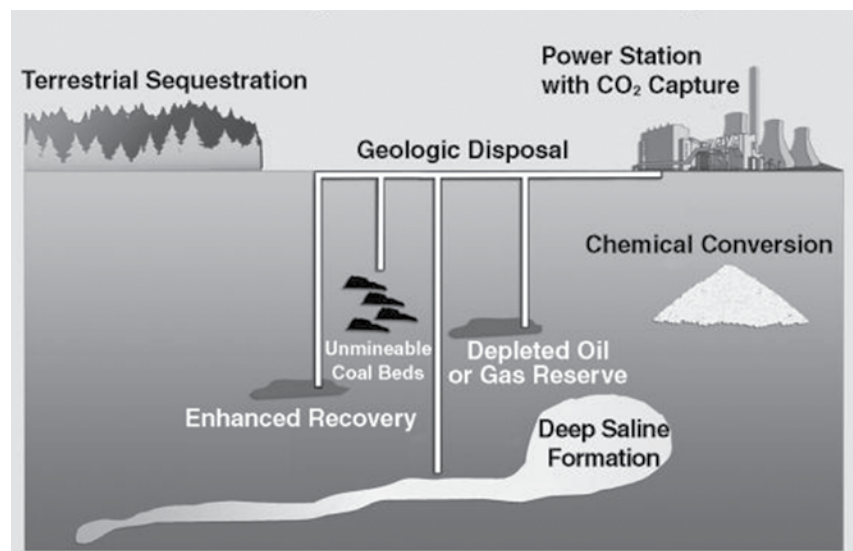
The meaning of the word “sequester” is: To remove, set apart, isolate, segregate from other things. Carbon Sequestration is the removal of carbon from the atmosphere and depositing it in a repository to reduce global warming. It is the process by which CO2 is absorbed from the atmosphere and stored.

CO2 Capture & Methods of CO2 Sequestration

Carbon dioxide capture occurs naturally through biological, physical and chemical processes. Techniques have been devised to exploit these natural processes. There are two broad CO2 storage methods – natural and artificial

- The natural process occurs through Carbon Sinks (forest, soils, oceans)

Carbon Sequestration options



Global CO₂ Emission Levels

The estimated global emission levels for the year 2010 are given in the following table. China leads the table accounting for more than 25% of the global emissions, followed by USA with 16.39%. India is in the third place with 6.17% of the total emissions.

List of top ten countries by 2010 emissions

Rank	Country	Annual CO2 emissions (in thousands of metric tons)	% of global total
	World	33,508,901	100%
1	China	8,240,958	25.59%
2	United States	5,492,170	16.39%
3	India	2,069,738	6.17%
4	Russia	1,688,688	5.04%
5	Japan	1,138,432	3.40%
6	Germany	762,543	2.28%
7	Iran	574,667	1.71%
8	South Korea	563,126	1.68%
9	Canada	518,475	1.55%
10	Saudi Arabia	493,726	1.47%

Source: www.huffingtonpost.ca

Unbridled emissions are supposed to contribute to climate change and global warming. Hence efforts are on to cap emission levels with the cooperation of all countries. However, no consensus has been arrived at so far.



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How forest management can be used to reduce rate of CO₂ emissions

- Conservation management: Aids in protecting forests, controlling deforestation, changing harvesting regimes, and controlling fire and pest outbreaks
- Carbon storage management: Increasing forest area coverage and carbon density of forests
- Substitution management: In the long term forests can be considered to substitute fossil fuel based energy products, cement based & other building materials by resorting to forest biomass carbon products

National Mission for a Green India – 2010-2020 (GIM)

Overall Goal of the GIM: The Mission aims at responding to climate change by a combination of adaptation and mitigation measures, which would help enhancing carbon sinks in sustainably managed forests and other ecosystems, adaptation of vulnerable species/ ecosystems, and adaptation of forest-dependant communities.

Objectives of GIM:

- Increased forest/tree cover on 5 m ha of forest/non-forest lands and improved quality of forest cover on another 5 m ha (a total of 10 m ha).
- Improved ecosystem services including biodiversity, hydrological services and carbon sequestration as a result of treatment of 10 m ha.
- Increased forest-based livelihood income of about 3 million households living in and around the forests.



Categories of Urban Forests to be supported by GIM: According to the Mission document, carbon stored in Urban Forests is estimated at 23.9 m. t in 7.8 m. ha urban area which works out to 3.01 tons of carbon/ha as against 17.11 tons of carbon/ha in forests. Hence there is ample scope for greater carbon storage by urban forests. To support urban greening, the Mission document specifies the following categories for its proposed interventions:

1. **Recorded or notified forest patches** to be secured by fencing; restoration of representative ecosystems and plantation of bio-diverse species mix to supplement natural

regeneration. Special care will be taken to retain the natural local mix of grasses, herbs and shrubs along with tree species.

2. **Open spaces/green spaces like parks/wood lots** set up on municipal land will be supported to enhance their biodiversity status.
3. **Diffused planting such as on avenues and in households:** Support for plantation of multiple species.
4. **Institutional lands:** Will be supported for taking up planting of native species having multiple values for users. These interventions are expected to result in sequestration of 0.06 m t of carbon which would amount to 0.22 m t of CO₂e

Kyoto Protocol

Here it would be pertinent to mention that afforestation and reforestation are included under the Clean Development Mechanism of the Kyoto Protocol. In the post-Kyoto negotiations, REDD+ (Reducing Emissions from Deforestation and Degradation, and the plus activities include forest conservation, sustainable forest management and carbon stock enhancement) mechanism has been

- Enhanced annual CO₂ sequestration by 50 to 60 million tonnes in the year 2020
- Total Outlay : Rs. 46000 crore

Sub-missions of GIM: The Green India Mission has eight submissions of which urban forestry is the sixth mission. The eight missions are:

Sub Mission 1: Enhancing climatic resilience in moderately dense forests: 2 m ha

Sub Mission 2: Eco - Restoration of open forests: 4m ha

Sub Mission 3: Restoration of scrub/grasslands: 2 m ha

Sub Mission 4: Restoration of new mangroves 0.10m ha

Sub Mission 5: Restoration of Wetlands: 0.10m ha

Sub Mission 6: Enhancing tree cover in Urban and Peri-Urban areas (including institutional lands: 0.20m ha

Sub Mission 7: Agro-forestry and social forestry (increasing biomass and creating carbon sink): 1.5 m ha

Sub Mission 8: Securing Corridors to help species adapt to climate impacts: 0.10 m ha

Sub Mission 6: Enhancing tree cover in Urban & Peri-Urban areas: 0.20m ha; Rs. 2000 Crore: The justification given

The GIM document states “Increasing trend in urbanisation, however, has also meant deterioration of air quality, increase in air temperature, increased noise level, along with water and land pollution”

for this sub-mission is that 310m Indians are presently living in cities. By 2030, 40% of population will be urban dweller. By 2045, urban population is expected to reach 800m. The GIM document states “Increasing trend in urbanisation, however, has also meant deterioration of air quality, increase in air temperature, increased noise level, along with water and land pollution”.

Urban forests offer an exciting opportunity to help: a) mitigate climate change; b) ameliorate air pollution; c) improve the overall water regime; d) nurture urban biodiversity; and, e) provide shade and reduce ambient temperatures and the heat-island effect

included as one of the key strategies to mitigate climate change.

What others are doing

Right Mix of Trees for Optimum Carbon Sequestration

- Students and faculty members at the State University of New York's College of Environmental Science and Forestry have determined the precise combination of trees that would be most effective in reducing the level of greenhouse gases in the air around Syracuse, New York. If the combination of trees were planted it could reduce carbon dioxide -- a greenhouse gas -- by 2% by the year 2046
- The research team found 31 hardy trees including dogwood, red hickory and hawthorn that sequester carbon efficiently for the New York region.
- To create the ideal combination of trees for Syracuse, the group chose trees with the best carbon-sequestering ability and lowest emissions of volatile organic compounds. Large and long-lived trees are crucial, particularly for the shade they provide. The group also recognized that it was necessary to include a lot of different types of trees, and avoided trees that are very susceptible to disease, such as the American elm.

Carbon Sequestration In Urban & Recreational Forest: A Case Study At Banobitan In Kolkata

- Study conducted by School of Water Resources Engineering, Jadavpur University and the RC of NAEB, Kolkata in December 2007 at Banobitan one of the largest man-made urban forest at Salt Lake in Kolkata on 5 year old Jackfruit tree of 15 ft ht.
- Observed that CO2 level in ambient air are 419.62 ppm at

Banobitan Gate and 377.65 ppm near the Jackfruit tree. Difference of these two observations is 41.97ppm. This means 41.97ppm CO2 is sequestered by the plants between two locations.

What needs to be done

- Minimum standard suggested by WHO is 9 m2 green open space per city dweller.
- The basis of arriving at 0.2m ha & budget of Rs.2000 crore is not clear.
- Determine present CO2 emission levels of all cities and making annual projections for the next 20-30 years based on expected level of urbanisation
- Studying the present sequestration

In the post-Kyoto negotiations, REDDplus mechanism has been included as one of the key strategies to mitigate climate change

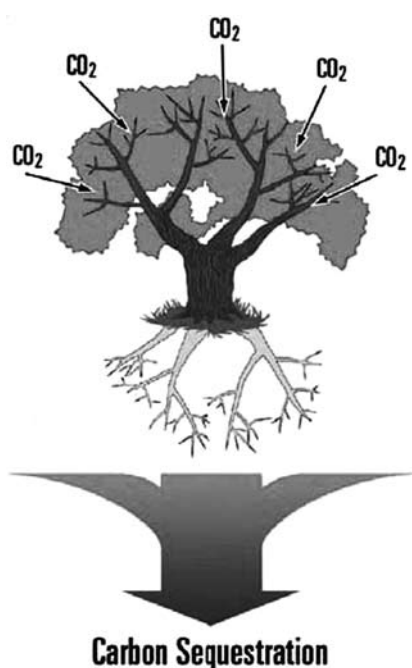
potential of urban forests and estimating sequestration gaps.

- Suggest best tree combination considering species diversity and spatial heterogeneity for each city that would ensure optimum sequestration after systematically studying sequestration capabilities of each specie at various age levels

Extensive Research Needed – City-wise research required: The Occasional Paper entitled "Urban Forests and Open Green Spaces- Lessons for Jaipur, Rajasthan India recommends the following:

- to quantify the spatial extent, species diversity across different urban land use
- growth and mortality
- urban tree biomass, diameter distribution of urban trees across various species
- present carbon storage and rate of carbon sequestration by urban trees/ forest,
- pollution mitigation potential, and hydrological functions of urban forests





The Orissa Government is launching a project to capture carbon dioxide using algae, the first such venture in India

Other Innovative Methods being tried

Using algae to trap carbon dioxide: The Orissa Government is launching a project to capture carbon dioxide using algae, the first such venture in India. The Rs 9.5 m project will be started on a pilot basis at Nalco's thermal power plant at Angul in Orissa. Algae will be grown in

The golden glow of street lights could soon be replaced by the green fluorescence of tree leaves

shallow ponds and CO₂ produced from the power plant will be tapped and introduced in the pond. Being soluble in water, CO₂ will get absorbed in it. CO₂ and water are the basic requirements for algae growth and this in turn will release oxygen as a by-product. The project is said to be 100 times more efficient in carbon sequestration compared to plantation.

Using genetic modification to enhance photosynthesis and increase biomass yield: Making the sugar-transfer enzymes of a plant work more effectively would be one way to speed up the process of using sugars. As a result, plants would move sugars faster and produce more cellulose. Consequently, more carbon would be stored.

Glowing Trees to Replace Glowing Lamps: The golden glow of street lights could soon be replaced by the green fluorescence of tree leaves. Scientists from the Academia Sinica and the National Cheng Kung University in Taipei and Tainan have implanted glowing, sea urchin shaped gold nanoparticles, known as bio light emitting diodes, or bio LEDs, inside the leaves of a plant. The new nanoparticles could replace the electricity powered street light with biologically powered light that removes CO₂ from the atmosphere 24 hours

a days. The gold, sea urchin shaped nanoparticles are the key to turning a material that normal absorbs light into one that emits it. Chlorophyll, the photosynthetic pigment that gives leaves their characteristic green color, has ability to absorb certain wavelengths of light. However, under certain circumstances, such as being exposed to violet light, chlorophyll can also produce a light of its own. When exposed to light with a wavelengths of about 400 nanometers the normally green colored chlorophyll glows red. Violet light is hard to come by at night. The scientists needed a source of violet light, and found it in the gold nanoparticles. That violet light strikes the nearby chlorophyll molecules, excites them, and the chlorophyll then produces the red light.

The effect has been tried on an aquatic plant known as *Bacopa caroliniana*. Expanding to terrestrial plants, the kind that line streets, should be possible, said Krishanu Ray, a scientist at the University of Maryland, with some additional work.

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Ban on Export of Onions: An Analysis

By A.K. Garg, Rachana Wankhade



Introduction

Onion (*Allium cepa*) is one of the important commercial vegetable crops grown in India. It is widely grown in different parts of the country mainly by small and marginal farmers. It is used as salad or cooked in various ways in curries, fried, boiled or baked. It is also used in processed forms e.g. flakes, powder paste, pickles etc. It has very good medicinal value. Nutritive value of onion varies from variety to variety. Small sized onions are more nutritive than big ones. Its major value is in its flavour. Onions are a widely consumed commodity in India due to a low percentage of fats and sugars. The perpetual demand for onions within the country and for export has made it essential to supply them round the year either from fresh harvest

or from stocks. Annual production of onion is estimated to be about 74.50 lakh tonnes. This quantity is enough to meet the present domestic requirement as well as export. It is also necessary to have proper planning for production, post-harvest handling, storage as well as marketing so as to maintain the stability in prices and supplies. It is, however, necessary to make efforts for increasing production and minimizing post- harvest

losses for meeting increasing demand both in domestic as well as export markets.

Nutritive values of Onion

Onions are highly nutritious. The nutritional value of onions per 100 g is presented below:

#	Nutrition	Value
Nutritional value per 100 g		
1	Energy	166 kJ (40 kcal)
2	Carbohydrates	9.34 g
3	Sugars	4.24 g

4	Dietary fiber	1.7 g
5	Fat	0.1 g
6	Saturated	0.042 g
7	Monounsaturated	0.013 g
8	Polyunsaturated	0.017 g
9	Protein	1.1 g
10	Water	89.11 g
11	Thiamine (Vit. B ₁)	0.046 mg (4%)
12	Riboflavin (Vit. B ₂)	0.027 mg (2%)
13	Niacin (Vit. B ₃)	0.116 mg (1%)
14	Vitamin B ₆	0.12 mg (9%)
15	Folate (Vit. B ₉)	19 µg (5%)
16	Vitamin B ₁₂	0 µg (0%)
17	Vitamin C	7.4 mg (9%)
18	Vitamin E	0.02 mg (0%)
19	Vitamin K	0.4 µg (0%)
20	Calcium	23 mg (2%)
21	Iron	0.21 mg (2%)
22	Magnesium	0.129 mg (0%)
23	Phosphorus	29 mg (4%)
24	Potassium	146 mg (3%)
25	Sodium	4 mg (0%)
26	Zinc	0.17 mg (2%)

Source: USDA Nutrient database

Objectives of Study

The broad objectives of the present study are given, as under:

1. To Study the packages of Practices of onion
2. To Study the State wise Area, production and Productivity of Onion
3. To study the Trend in Onion Production
4. To Forecast the Prices of Onion for October, November & December 2011
5. To study the Consequences of Export ban on Onion

Methodology:

Data Collection

The present study predominantly is based upon desk review, analysis and interpretation of relevant secondary data obtained from various websites.

Data related to exports collected from website pertains to the year 2011. For trend analysis, time series data related to area, production and productivity collected from websites pertains to year 1978-79 to 2008-09 (31 years data). For forecasting the onion prices, monthly time series data of Arrival and Prices collected from website pertains to year 2005-06 to 2010-2011 for Mumbai Market.

Statistical & Analytical tools

Trend analysis in Production and Productivity of Onion: -

Time series data of 31 years pertaining to 1978-79 to 2008-09, have been collected, compiled and analyzed by using the following statistical tools:

- a. Mean (\bar{X})
- b. Standard Deviation (SD)
- c. Coefficient of variation(CV)

The degree of variation in area production and productivity of Onions has been measured by using coefficient of variation

$$\text{Coefficient of variation (C.V.)} = \frac{\sigma}{\bar{X}} \times 100$$

Where,

$$\sigma = \text{Standard deviation} = \frac{\sum (x - \bar{x})^2}{n}$$

\bar{x} = Arithmetic mean

To study State wise Area, Production and Productivity of Onion following tool has been used

- a. Column chart

To forecast the prices from October to December 2011 in Mumbai market

- a. Monthly time series data of Prices of Onion were collected for 2008-2011.
- b. Alyuda Forecaster software has been used for forecasting the prices of onion for the month of October, November and December 2011

Results & Discussion

Package of Practices of Cultivation

Climate: The onion is cool season crop, tolerant to frost in the young stage but less sensitive to heat. It is well adapted to a temperature range of 13-25°C. A temperature range of 15-21°C before bulbing is required for its good vegetative growth, whereas a temperature of 20-25°C is considered ideal for bulb



development. At least 10 hours light with favourable temperature is essential for growth, development and bulbing. Onion thrives well in places, which receive an average rainfall of 750-1000 mm during monsoon.

Soil: Onions can be grown on all types of soil such as sandy loam, silt loam and heavy clay soils. A pH range between 5.8-6.5 is considered as optimum. Good drainage is essential as water-logging results in total failure of the crop.

Land Preparation: The field is ploughed to fine tilth by giving four to five ploughing with a sufficient interval between two ploughing. The field is then divided into beds and channels.

Method of Planting: Seedlings obtained from seed sown nursery are usually transplanted in flat beds of size 1.5 x 4 m. In kharif crop 6-7 week old seedlings are transplanted whereas 8-9 weeks old seedlings are used for rabi crop. In some parts of the country, beds are first irrigated and then the seedlings are transplanted.

Broadcasting in Beds/Direct Sowing

Seeds of big onion are sown directly in lines (30 cm apart) in parts of Chitradurga, Bellary and Dharwar districts of Karnataka, which are thinned later to give proper spacing for development of bulbs. Seeds of small onion (Bangalore Rose, Agrifound Rose and Arka Bindu) are broadcast in small flat beds, which are thinned later. For broadcasting directly in the field or sowing in the row, 20-25 kg seeds per hectare are used. In the plains, seeds are sown in lines 30 cm apart during September-October. After sowing, hand hoeing is done to allow the seeds to reach to a depth of 2.5-3 cm.

Irrigation Requirement

The onion crop is irrigated immediately after transplanting. Frequent and light irrigations at weekly interval result in good bulb development and increased yield. In kharif season, depending upon the rains, 8-10 irrigations are sufficient. Late kharif crop requires 12-15 irrigations while for rabi season crop 15-20 irrigations are given.

Onion Varieties Grown in Maharashtra

#	Variety	Season	Colour
1	N-53	Kharif	Red
2	Baswant-780	Kharif	Red
3	N2-4-1	Rabi	Brick-Red
4	N-257-9-1	Rabi	White
5	Phule Safed	All year	White
6	Phule Suvarna	Late Kharif /Rabi	Yellow Red
7	AFDR	Late Kharif /Rabi	Dark Red
8	AFLR	Rabi	Light Red

The Sowing and Transplanting Time in Different Areas are as Follows

Season	Month of Sowing	Month of Transplanting
Maharashtra & Gujarat		
Kharif	May-June	July-August
Late Kharif or early Rabi	August-September	September-October
Rabi	November-December	December-January
Tamil Nadu, Karnataka and A. P		
Early Kharif	February-April	April-June
Kharif	May-June	July-August
Rabi	September-October	November-December
Rajasthan, Haryana Punjab, U. P & Bihar		
Kharif	May-June	July-August
Rabi	October November	December-January
West Bengal & Orissa		
Kharif	June-July	August-September
Late Kharif	August-September	October-November

and Productivity reported under onion in Maharashtra state i.e. 111650 ha, 2409180 tons and 21.58 tons/ha respectively.

Note: Data related to Area Production

Annual production of onions is estimated to be about 74.50 lakh tonnes. This quantity is enough to meet the present domestic and export requirements

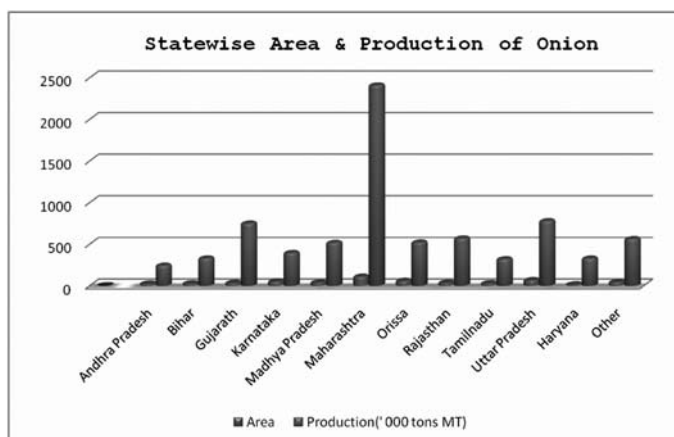
Harvesting: Onion is harvested depending upon the purpose for which the crop is planted. Onion crop is ready for harvesting in five months for dry onion. However, for marketing as green onion, the crop becomes ready in three months after transplanting. Not all the onions in a crop mature at the same time. Onions for sale as dried bulbs or for storage should be harvested progressively after tops have started falling over. Early harvest results in sprouting of the bulbs and late harvest results in formation of secondary roots during storage. In kharif season, late harvesting results in doubles and bolting.

Yield: Irrigated onion crop in rabi season gives yield of 25-30 t/ha while under rainfed conditions it yields only about 0.7-1.0 t/ha. Onion raised as an intercrop in sugarcane and turmeric, in alleys of young fruit garden and banana garden, gives a yield of 5-9 t/ha. The small sized, pungent, local cluster type onion yields half as compared to the large sized varieties.

State-wise Area, Production and Productivity (year 2009-2010)

The major onion producing states in India are Maharashtra, Gujarat, Orissa, Karnataka, Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Bihar, Punjab and Rajasthan. It is observed that amongst total highest area, Production

#	State	Area (' 000 ha)	Production (' 000 tons MT)	Productivity (tons/ha)
1.	Andhra Pradesh	26.00	244.00	9.38
2.	Bihar	28.75	329.88	11.47
3.	Gujarat	35.50	750.00	21.13
4.	Karnataka	53.00	395.00	7.45
5.	Madhya Pradesh	39.55	517.35	13.08
6.	Maharashtra	111.65	2409.18	21.58
7.	Orissa	60.45	522.47	8.64
8.	Rajasthan	37.75	570.00	15.10
9.	Tamilnadu	30.50	320.50	10.51
10.	Uttar Pradesh	69.50	778.75	11.21
11.	Haryana	16.00	329.00	20.56
12.	Other	45.50	563.00	12.37
	Total	554.15	7729.13	



Trend in Area Production and Productivity of Onion

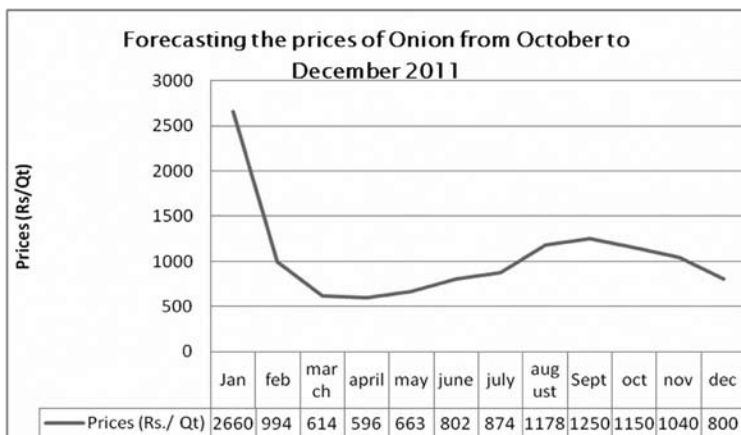
Particulars	Area	Production	Productivity
Mean --- X	0.40	4.49	10910.38
STDEV (SD)	0.16	2.53	1358.79
CV (%)	39.63	56.24	12.45

and Productivity of onion in India (from 1978-79 to 2008-09) enclosed as Annexure I.

It could be seen from the above table that 39.63 percent variation was observed in area, production increased by 56.24 percent but productivity increased only by 12.45 percent.

Thus, it is necessary to focus on onion productivity and use suitable measures and agronomical and recommended package of practices to increase productivity of the crop.

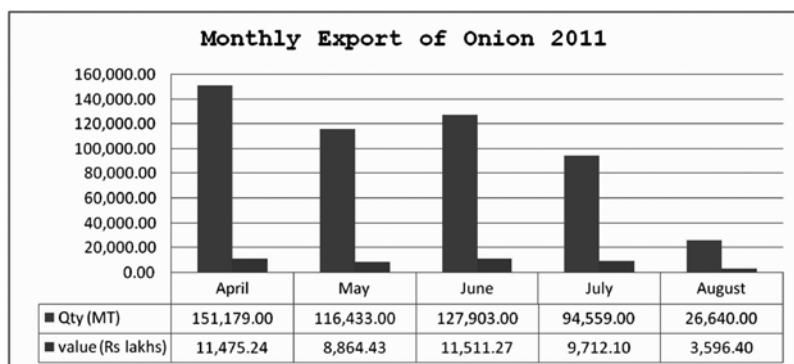
Forecasting the prices of Onion from October to December 2011 (Mumbai market)



Prices of Onion were forecast by using time series monthly price data of Mumbai market. Alyuda Forecaster software was used for forecasting the prices of onion for the month of October, November and December 2011. It is seen from the

analysis that the tentative price of onion was Rs.1150, Rs. 1040 and Rs. 800 for the month of October, November and December respectively in Mumbai Market. It was observed that actual prices were almost similar or matched with the

Month-wise Export of Onion Year 2011



Onions contain low percent of fats and sugars; because of these health benefits They are widely consumed

forecasted values of Mumbai Market.

It is revealed from the graph that total onion exports upto August were 516,714.00 MT with total value being Rs. 45,159.44 lakh. Highest export was reported in the month of April; it was 151,179 MT with a value of Rs. 11,475.24 lakh and lowest export reported in the month of August i.e. only 26,640.00 MT valued at Rs. 3,596.40 lakh.

Onion Export period in Other Countries

In India, onion export is channelized through Nafed, which decides the minimum export price every month in consultation with 12 other state trading agencies and issues no-objection certificates to empanelled exporters.

The government had imposed a ban on onion exports on September 9, 2011 to check its spiralling prices which touched Rs 25 a kg in retail in the national capital.

Consequences of Export Ban

- Maharashtra is the leading onion producer in the country while Nashik district alone accounts for more than 50% of onion production in the state. Farmers have been holding onions in storage from the past 4-5 months with the hope of selling them at higher prices.
- This year, onion export has fallen 30 percent.
- The wholesale prices had fallen from Rs 11/kg to Rs 5.50/kg in Nashik after the announcement of the decision to ban exports.
- Exporters are worried about losing their customers. "There is a possibility

Period of Onion Export in Other Countries

Country	Period of Export	Destination
Iran	May-Jan	Doha, Bahrain, Kuwait
Egypt	March-Oct	Gulf
China	July-Jan	Malaysia, Singapore
Pakistan	Round the year	Malaysia, Singapore, Gulf
Yemen	Feb- Sept	Gulf
Saudi local crop	June- Nov	Gulf
Allain local (U.A.E.)	June-Sept	Oman
India	Round the year	Gulf, Malaysia, Singapore, Sri Lanka, Bangladesh, Pakistan, Nepal

Source: www.nhrdf.com

of India damaging its reputation as a reliable supplier of onions to the world market.

- Farmers stated the decision may discourage them from planting onions in future.
- Farmers in Nashik district and Bangalore had refused to bring their produce to markets protesting the drop in their profit level due to ban on onion exports.

Political Economy Marketing

Onion and garlic are bulbous crops originally from Afghanistan which became popular in India only after the 10th century. The world produces 60 million metric tonnes of onions. India's share ranges from six to ten million tonnes depending on weather and yield.

Without caring for rising domestic demand, the government is promoting onion exports. From a negligible quantity of just 50 thousand tonnes, 60 years ago, India exported more than one million tonnes of onions in 2008. This is equal to 20 per cent of domestic demand. The onion demand-supply crisis and spiralling prices demonstrate the importance of understanding the complex political economy of marketing of tropical cash crops after quantitative restrictions on exports (QR) were removed and WTO regime came into play.

Demand Growing in Goa

Onion and garlic are bulbous crops originally from Afghanistan which became popular in India only after the 10th century

Goa does not figure on the onion production and marketing map of India, since the area, production and yields are very low. Two to three onion crops are now taken in various parts of the country. In Maharashtra fresh onion starts coming in market in September-October (Satara). It continues from October to April-May in Nasik, Ahmednagar and some parts of Pune districts. Karnataka also takes two onion crops. Both these markets influence onion prices in Goa.

The demand for onions in Goa is growing. From just a few hundred tons per year at the time of liberation it has now reached more than ten thousand tonnes. It is maximum during the tourist season (October to May) which also overlaps with the wedding season. Most of Goan recipes, Moghlai and Chinese cuisine popular with tourists need onions. Government of Goa has no scheme to promote the local varieties of organically grown onions and shallots. These have proven medicinal uses. During the local 'purumetachem fest' (feast for monsoon provision) Goans used to purchase large quantities of local onions sufficient to last for at least six months. This traditional stocking habit used to stabilise the onion prices. But after globalisation and entry of hybrid onion varieties, the traditional

varieties were neglected. Now these fetch premium prices during the feast. It is possible to stabilise the market prices if the state government offers attractive incentives for cultivation and promotion of local onions and shallots. Hybrid varieties can be selectively promoted to supply niche consumers. If Goa manages to produce just ten thousand metric tonnes of onions per year then it would insulate the local consumers from the crisis which they are now facing. People would be able to stock disease resistant onions as in the past

From the small onion farmer in Dindigul or Gulbarga to onion planters in Lasalgaon in Maharashtra there are many active players in onion market economy. The government has not been able to reign in the middlemen and market agents. In Hubli and Gulbarga they brought tears in the eyes of the onion farmers by quoting auction prices as low as Rs. 5 to 8 per kilogram. The farmers could see in local markets retail prices hovering above Rs. 50 per kilogram. Neither the onion farmers get the expected price nor are the consumers satisfied.

Faulty Government Policies

Under the most adverse conditions, the cost of onion production in the country per kilogram ranges from Rs. 2 to Rs. 8. The onion crop losses this year in major states are estimated to be 40 to 50 per cent. The yields are also low. In Lasalgaon, the biggest market for onions in India, the yields decreased to just 5 per cent of the average yields. These losses were known to NAFED. Still a large number of onion export licences were given in October. With the beginning of wedding season and festivals, onion demand continued to rise. India needs a minimum of five million metric tonnes of the crop per year. The surplus production is normally exported. However, this year despite deficit in production, exports were promoted. This is highly intriguing to say the least. Vast quantities of onions were hoarded and agents who paid a poor price to the farmers made a killing in just a week. Estimates range from Rs. 350 to Rs. 1000 crore in major markets.

The government intervened and banned exports only after the prices for best large onions reached Rs. 110 per kilogram. The minimum offset price for exports were raised to equivalent of Rs. 55 per

kilogram to discourage exports.

Due to floods, Pakistan has also suffered a loss in onion crop but at the border Pakistani onions are sold for Rs. 18 per kilogram. Considering the adverse circumstances and losses suffered, onion consumers would not have protested much if the prices were kept at a reasonable level of Rs. 25-30 in retail markets. Farmers would have been happier to get a minimum support price of Rs. 15-20 per kilogram. But purchasing onions for Rs. 50 to 80 per kilogram was a luxury for consumers. So the inflated prices clearly indicate that the onion commodity market was deliberately manipulated to get a windfall income. After rice and sugar- the latest agro-commodity scam is the onion scam.

No doubt, the Prime Minister himself, being an economist, suspected something unconvincing in the sudden spiralling of the onion prices in the country within just one week and ordered an investigative report. Multiple agencies are involved in creating this situation despite having excellent field level machinery to gather crop production and losses statistics. Onion exports from the country have been increasing phenomenally. The nodal agency for onions is National Horticultural and Research Foundation – NHRF - a NAFED subsidiary located at Nasik. It gives full statistics of onion production in the country, area-wise, state-wise and year-wise. After China, amongst the onion-producing countries in the world, India ranks second in area and production. India's productivity of 10.16 MT/ha can be compared to Korea Republic (67.25 MT/ha), USA (53.91 MT/ha), Spain (52.06 MT/ha) and Japan (47.55 MT/ha).

Scope for Increasing Export

India is presently exporting onions mainly to Gulf countries, Far East countries, Bangladesh and Sri Lanka where there is not much scope to increase the quantity as some countries have also started their own production. The scope, however, exists for diversifying the market to European countries and Japan.



These countries do not prefer strong and pungent onions. In these countries, yellow onions having mild pungency, bigger bulb size with thick fleshy layers are preferred. The possibility of growing yellow onions in Maharashtra,



India is presently exporting onions mainly to Gulf countries, Far East countries, Bangladesh, and Sri Lanka, where there is not much scope to increase the quantity as some countries have also started their own production

Orissa, Madhya Pradesh and other parts was explored by NHRDF by taking trials on farmers' fields where bulbs could be successfully produced during late-*kharif* season. The evaluation of various exotic varieties has been done in the past and is being taken up by NHRDF now also where good bulb development with required size and quality could be produced during late-*kharif* season and thus export from February to May by sending bulbs in electrically-ventilated containers could be explored. For this, however, contract production is preferred as there may not be much local demand for these onions if not purchased by exporters.

Similarly, there is a scope for exporting dehydrated onions, as many processing units under export-oriented unit schemes

have been installed in India. These are not presently running to their installed capacity mainly for want of raw material. Thus, there is a scope for development of varieties suitable for dehydration.

Strategy for Increasing Export

- Production and distribution of quality seed of improved varieties in adequate quantities.
- Development of disease and insect pests resistant, heat / moisture stress tolerant varieties.
- Development of biological control



measures against pests and disease.

- Development of yellow-coloured hybrid for export to European and Japanese markets by popularizing the technology for production during late-kharif season.
- Development of bigger bulblet varieties in multiplier onion.
- Training of farmers, traders and exporters involved in onion production, handling and marketing.
- Creation of adequate curing and storage facilities at field level and at ports.
- Popularizing various onion products in export markets developing varieties suitable for various processed products.

Suggestions for Improvement of Export

- Popularization of improved varieties, quality seed production and distribution, expansion of area in non- traditional pockets and contract production for export.
- Planning for contract production for export market expansion of area and production of *kharif* onion for early harvesting.

Pakistan has also suffered a loss in onion production, but at the border, onions are sold for Rs. 18 per kilogram. After rice and sugar, the latest agro-commodity scam is the onion scam



- Creating awareness of proper post harvest practices and quality training of farmers and others involved in onion production, post-harvest management and marketing.
- Introduction of attractive, eco-friendly packages, consumer packages etc.
- Electrically-ventilated containers for export of yellow onions to Europe. Adequate transport with reasonable rates, synchronize the rail/road transport with schedule of vessel and providing insulated wagons.
- Developing more ventilated storage godowns for onions. Providing handling sheds and make available modified containers with proper ventilation
- Developing market intelligence for different seasons, quality of produce and corresponding season crop in other competing countries.

* A K Garg, Managing Director Agricultural Finance Corporation, Rachana Wankhade, Economist, Agricultural Finance Corporation

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Crop Protection: Need for Bio-pesticides

By Dr. Deepali Gangwar, PhD
and Dr. K.K. Gangwar*



In India, about 70 percent of the population depends on agriculture. Farmers indiscriminately use conventional pesticides to minimise crop losses to maximise returns. Although insecticides do substantially reduce disease-transmitting pests that destroy crops, they also have a negative impact on health. This is because of the toxins that are a part of the sprays used to destroy insects. Not only this, the long-term usage of chemicals has developed resistance in bugs against them. As a part of government-led initiatives to safety, the use of many harmful pesticides has been banned or restricted. Still there has been a sequential rise in their production and utilisation during the last three decades. As a part of the endeavour to promote natural pesticides, through this article we have attempted to endorse the application of bio-pesticides.

Conventional pesticides, by contrast, are generally synthetic that directly kill or numb the pest. Bio-Pesticides control target pests by non-toxic mechanism

Chemical Pesticides

To obtain higher crop production, a farmer resorts to the use of pesticides. However, the continuous use of chemical pesticides beyond permissible limits may have negative effect on human health as well as the environment because of their toxic potential. Indiscriminate use of pesticides over the years has

resulted in many problems caused by their interaction with the biological system. Their continued use has added to environmental pollution to such an extent that human health has been adversely affected. Chemical pesticides get transferred through the food chain and are accumulated in the body of living organisms, which leads to dangerous side-effects. With thrust on quality along with quantity, a novel approach would be to develop eco-friendly bio-pesticides from micro-organism or plants, which are non-toxic.

Bio-Pesticides

These are naturally occurring substances that control target pests by non-toxic mechanism i.e. as lure, attractants, repellent, by causing suffocation, desiccation or induced resistance induction. These include substances, such as insect sex pheromones that interfere with mating, as well as various scented plant extracts that attract insect pests to traps; plant or insect hormones regulators; attractants and repellents and some enzymes. Conventional pesticides, by contrast, are generally synthetic that directly kill or numb the pest. Approximately 200 biochemical pesticide active ingredients are registered by EPA (www.epa.gov).

Advantages

Since bio-pesticides are of biological origin and eco-friendly too, they do not pollute the environment and are not detrimental either directly or indirectly. In terms of production and commercialization also, bio-pesticides have an edge over chemical pesticides due to lower research expenditure, faster rate of product development as well as flexible registration process.

Types: Microbial Pesticides; Plant Pesticides; Plant Incorporated Protectants (PIPs); and, Biochemical Pesticides.

Microbial Pesticides

Microbial pesticides are comprised of naturally occurring microscopic living organisms like viruses, bacteria, fungi, protozoa, or nematodes. They are applied as sprays, dusts, liquid concentrates, wet powders or granules.

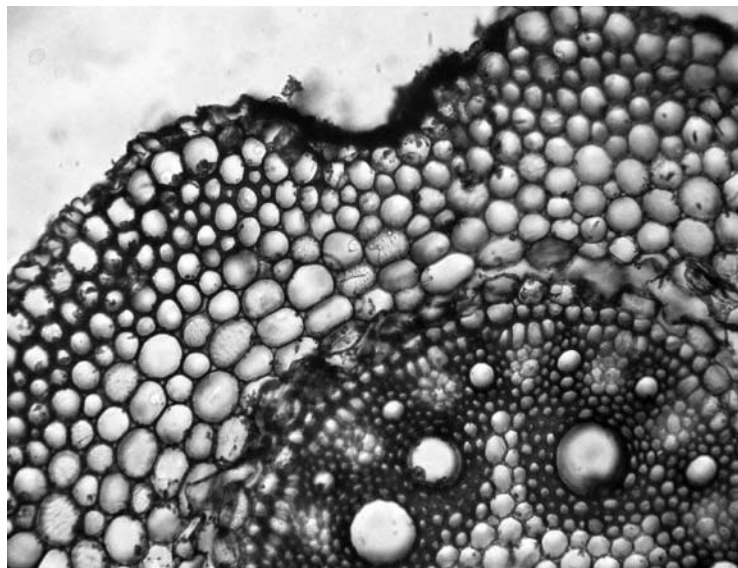
Bacteria as biopesticides

***Bacillus thuringiensis*:** It is a widely distributed soil bacteria. It can be isolated from soils, litters and dead insects (pathogenic to larvae of lepidoptera). Being a spore-forming bacterium, it damages larvae of several species of insects but is non-toxic to other organisms. Several *B. thuringiensis* insecticidal crystal proteins (ICPs) have been developed and commercialized. Sprayable biopesticides and transgenic plant incorporated protectants are available for agricultural applications. *Bacillus thuringiensis* crystal proteins of the Cry 34 and Cry 35 classes, function as binary toxins showing activity on the western corn rootworm, *Diabrotica virgifera virgifera* Le Conte.. Bt can be applied to plant foliage or incorporated directly into crops' genetic material. Transgenic Bt cotton as currently commercialized in India, incorporates a Cry 1 AC gene derived from the soil bacterium *Bacillus thuringiensis*. The gene expresses a crystal protein delta endo toxin called Cry 1 AC in all parts of the transgenic plants. The protein is toxic to many lepidopteran caterpillars that feed on the transgenic plants.

***Pseudomonas Species*:** It has been observed that some rhizospheric bacteria have biocontrol capabilities. They produce some nematocidal metabolites i.e. 2^o metabolite 2,4-diacetyl phloroglucinol (DAPG) by *Pseudomonas fluorescense* has been found to play a major role in the biocontrol to plant parasitic nematodes including potato cyst nematode (Cronin et.al., 1997) and the root knot nematodes meloidogyne species. Another species *Pseudomonas aureofaciens* strain Tx-1 (006473), naturally occurring bacterium, have been used for biological control of several fungal plant diseases attacking the root zone of crop species. *Pseudomonas aureofaciens* is found to produce a

phenazine antibiotic which is known to have antifungal properties that is useful in limiting the spread of fungal phytopathogens.

***Streptomyces Species*:** Recent studies on marine microorganisms have focused mainly on the discovery of human drugs, but rare information about marine microalgae possessing insecticidal activities has been reported.



Microbial pesticides are comprised of naturally occurring microscopic living organisms. They are applied as sprays, dusts, liquid concentrates, wet powders or granules

The isolated *Streptomyces* species, 173 has great insecticidal potency. This work indicates that marine microorganisms could be an important source of insecticidal antibiotics and the improved antibrine shrimp bioassay is suitable for primary screening. According to Xiong et. al., total 331 isolates were examined through bioassay of brine shrimp and 40 isolates (12.08 %) showed potential insecticidal activities. Of the 40 isolates one isolates designated *Streptomyces species*, 173 were found to have strong insecticidal activity against both brine shrimp and *Helicoverpa armigera* similar to that of avermectin B1.

Fungi as Bio-Pesticides

Fungi also act as important natural control agents that limit insect population. Most of the species that cause insect diseases spread by means of asexual spores commonly called as conidia. Fungal conidia can germinate on the insect cuticle and produce specialized structures that allow the fungus to penetrate the cuticle and enter the insect's body. *Chromolaena odorata* commonly known eupatium, is an alien, obnoxious and aggressive weed. It suppresses young plantations, agricultural crops and smothers vegetation, as it possesses allelopathic potentialities and growth inhibitors (Ambica and Jayachandra, 1980). *Beauveria bassiana*, a common soil fungus, has a broad host range that includes many beetles and fire ants. It infects both larvae and adults of many species. Similarly, *Lagenidium giganteum*,

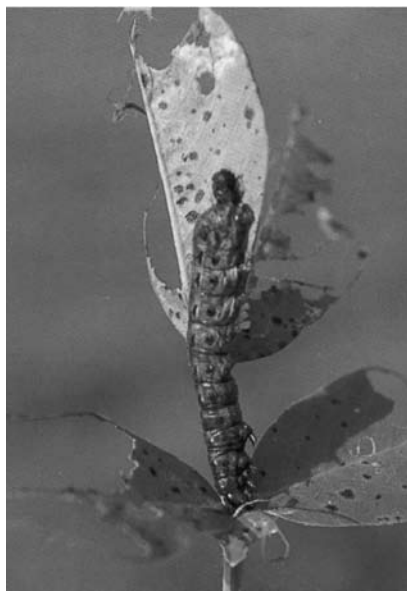
an aquatic fungus, is highly infectious to larvae of several mosquito genera.

Trichoderma: In India, all pulses and oil seed crops are affected by many diseases, of which the root rot disease caused by the fungi *Macrophomina phaseolina* results in 20-30 percent loss of produce worth millions of rupees. The bio-control agent *Trichoderma viridae*, a fungus, effectively checks spread of root rot disease of pulses and oilseeds. Seed treatment with the product of this bio-agent is more effective than conventional fungicides. Further, the bio-agent is able to survive and multiply at the root zone of the crops. The product is used at the rate of 4.0 gm / kg of seeds of crops like groundnut, chickpea, sunflower, sesame, black gram, green gram and cotton.

Parasitoids: The egg parasitoids, *Trichogramma* species can be mass produced even under rural situations for effective management of sugarcane internode borer. It attacks the egg stage of the pests. It can also be released in cotton against bollworms. Its efficiency has been shown in more than 3000 ha in many districts of Tamil Nadu against sugarcane borer. The loss due to pests in sugarcane varies from 12-18%. Bollworm in cotton accounts for a total loss of 15% of lint production. For mass production in laboratory host insect viz., eggs of rice moth *Corcyra cephaloneca*, are introduced, which in turn are cultured on broken grains of pearl millets or sorghum in plastic trays. The eggs of this stored product insect are collected in large quantities and exposed to parasitoid by pasting on paper cards. The parasitized cards are taken to sugarcane fields and tied on leaves at 2.5 cc/ha/release. There is a great scope and demand for parasitoids against sugarcane and cotton pests. Sugarcane is grown in 33 lakh ha. and cotton in 73 lakh ha. in India.

Viruses

Viruses from two groups i.e. nuclear polyhedrosis viruses (NPV's), in which numerous virus particles are packaged together in a crystalline envelope within insect cell nuclei, or cytoplasmic polyhedrosis viruses (CPVs), in which one or two virus particles are surrounded by a capsid shell, are used as bio-control agent. These groups of viruses infect



Viruses can be multiplied under lab conditions on host insects and then released into crops to control pests. The viruses are species-specific and don't affect other species

caterpillars and the larval stages of sawflies. Viruses can be multiplied under laboratory conditions on the host insects and then released into crops to control pests. The viruses are species-specific and do not affect other species. These are the following:

Nuclear Polyhedrosis Viruses (NPVs): In case of *Heliothis armigera*, the Tamil Nadu G.D. Naidu Agricultural University has succeeded in developing a technique for mass production of a virus called Nuclear Polyhedrosis Virus (NPV). The NPVs of *H.armigera* as well as *Spodeptera litura* are naturally occurring and the strains isolated indigenously have been found to be quite effective in the field control of pests. To produce viruses in Tamil Nadu, on a mass scale, the host insect has to be reared in the laboratory. *Heliothis armigera* can be reared on a

semi-synthetic diet. The larvae from the insect culture are separated and allowed in the same synthetic diet. The virus is inoculated and the viroseed larvae can be seen in 3-5 days.

Cytoplasmic Polyhedrosis Viruses (CPVs): CPVs are present in more than 200 insects, out of which only a few have been used for control of insect pests. For the first time in France, a CPV of pine processionary caterpillar (*Thaumetopoea pityocamps*) was applied as pesticides used for control of pine forest pests. In 1974, Japan produced a commercial preparation of CPVs under the name 'Matsukemin' for the control of a pine caterpillar (*Dendrolimus spectabilis*). This insect was controlled fully upon application of 10" polyhedral inclusion bodies per hectare.

Plant Pesticides

Plant products have been used as pesticides or insecticides since ancient times in every part of the country. Their use was common in rural and tribal areas and can be still observed. Plant synthesizes many chemicals in addition to their food material exclusively for self-defense against pest and diseases. Plant insecticides have low mammalian toxicity. Chinese were the first to discover the value of Derris (*Derris elliptica* and *Derris malaccensis*) as an effective insecticide. Plant pesticides have some characteristics:

- Easy availability.
- Preparation should be simple.
- It should not be time-consuming.
- Highly selective or target species with little toxicity towards non-target organisms and environment.

Plant insecticides can also be categorized as follows:

- Primary Toxicants, e.g. nicotine, rotenone, etc.
- Essential Oils, e.g. oil of citronella, lemon grass and cassia.
- Fixed Oils e.g. cotton seed oil and fish oil.
- Miscellaneous



Indian Neem: Indians commonly use it due to insecticidal and medicinal properties. All parts of neem tree possess insecticidal activity but seed kernel is most active. Entomologists have found that neem constituents can affect more than 200 insects' species as well as some mites, nematodes, fungi and bacteria. Neem bark, leaf, fruit and oil as well as extracts within various solvents especially ethanol, have been found to exhibit insecticidal activity. Azadirachtin, a tetranortriterpenoid from *Azadirachta indica*, A. Juss (Meliaceae), is well known as an insect growth inhibitor (Renbold *et.al.*, 1982). Source of Azadirachtin is leaves and berries of *Azadirachta indica* (Indian neem) and *Melia azedarach* (Chines berry tree). It inhibits the feeding and growth of insects belonging to several taxa. Although its effect involves intervention in endocrinal activities (Barnaby and Klocke, 1990), Azadirachtin has a three-pronged action on insects. It is a growth inhibitor, preventing the growth of insects from one stage of their life cycle to another. Eggs do not hatch into larvae and larvae do not become adults. As it is an antifeedant, insects that come in contact, stop feeding and die of starvation. Thirdly, azadirachtin repels insects from sitting on plants. In a study Neoliya *et al.* (2005) found that medium to low doses of Azadirachtin ($P < 0.01$) significantly influenced the

Pyrethrins are used as insect powder. They are toxic to insects, It is relatively harmless to mammals, but poisonous if injected into bloodstream

total head protein profile in the larvae of *Helicoverpa armiger* (Hubner/ Lepidoptera: Noctuidae). Azadirachtin was found effective in reducing the protein concentration at 0.1 μg by tropical application in the second stadium. However, treated larvae did not show the same protein concentration up to 72 hours compared to control. Azadirachtin is one of the most antifeedants against the African desert locust *Schistocerca gregaria*. (The limiting concentration to cause 100 percent impregnated on to filter paper/ nanogram/ cm^2). It is very active against African armyworm, some species of chewing insects that occurs in United States (e.g. Japanese beetle) and several scale insects. Azadirachtin is a potent phagorepellant and shows toxic effects at 0.1 to 1000 ppm when incorporated into diets of different insect species. Brown rice hopper avoided feeding on plants sprayed with neem oil. Neem oil is mostly used for soap manufacturing industry.

Pyrethrum: It is found in the floral part of *Chrysanthemum* genus belonging to the family 'compositae' or 'sun flower family'. Only few species of this large family like *Chrysanthemum (Pyrethrum) roseum*. Web and Mohr., *C. cinerariifolium* Trev., *C. marshalli* Ach. And *C. tambutne* have been found to be a valuable source of this insecticide. It is known for the past 100 years for its insecticidal properties. Aphids and red spiders have been controlled by application of sprays containing 0.4 percent pyrethrins. Though pyrethrum was formerly used as finely grounded flowers, today it has been used as dust or sprays. Pyrethrum content of flower head increases up to the time of full opening of flowers. Pyrethrum flowers are being dried at same temperature (as in sun earlier) viz. 54.40C. Then the dried flowers are compressed and exported. These flowers are ground to a fine powder and extracted with the solvents (Misra and Mani, 1994). Pyrethrins are active as Pyrethrins I and II but they are an unstable compound as they decompose when exposed to air or sunrays (Singh *et.al.* 1993). Pyrethrins are toxic stomach poisons but non-toxic to humans. Their action is similar to that of DDT. Pyrethrins are used as insect powder (obtained from flower head), oil extracts and water soluble extracts. Pyrethrins are toxic to insects, which come in contact causing rapid paralysis owing to their effect on nervous system. It is relatively harmless to mammals, although it is poisonous if injected into the bloodstream and dust may cause allergic reaction in some people.

Rotenone: A crystalline substance was isolated from *Derris chinensis* by Nayai in 1902. As this plant was known locally as Rohten, the crystalline substance was called Rotenone. Mueholic extract of roots of fish-poison climber (*Millettia pachycarpa*) controls aphids. This plant contains two insecticidal compounds, Rotenone and Saponin. Rotenone is a complex isofleovoroid placed in the group. Rotenoids are obtained from roots of plant of genera *Darnis*, *Lonchocarpus* and *Tephrosia*. Rotenone acts as stomach poison used in pest control. Extract of *Derris* roots mixed with pyrethrum is also used as insecticidal sprays. Rotenone is not harmful to man; important sources are *Derris elliptica*, *D. malaccensis*, *Lonchocarpus nicon* and *L. utilis*, obtained chiefly in roots but may occur in

other parts of plants like leaves, stem or seeds. Derris and ryania preparations are harmless to men and domestic animals but derris is extremely poisonous to fish and must not be allowed to contaminate ponds or streams.

Nicotine: Nicotine, an alkaloid obtained from tobacco (*Nicotiana tabacum*), is graded as a contact insecticide. It occurs in at least two solanaceous genera, *Nicotiana* and *Duboisia*. However, it is found in species completely unrelated to *Nicotiana* as well *Asclepias syriaca*, *Atropa belladonna*, *Equisetum arvense* and *Lycopodium clavatum* (Schmeltz, 1971). Anabasin is obtained from the tobacco (*Nicotiana glauca*) plant. The crude extract of its leaves can be used to control aphids. It has been used successfully in the control of aphids, capsids, apple suckers, psyllids, midges, grape worms, mealy bugs etc. Nicotine was first used as a decoction in 1960, against the bugs in France. In 1773, tobacco smoke was directed on to plants for control of aphids etc. In 1828, its chemical nature was discovered as nicotine sulphate. It is a compound obtained commercially by the action of nicotine with sulphuric acid and used as a contact spray. Nicotine is highly volatile. Its conversion into sulphate lowers its volatility. Nicotine sulphate sprays effectively control many insects and pests. Though nicotine is usually used as a contact insecticide and when applied in the form of dust or spray, it probably acts as fumigants. Nicotine fumes, obtained by evaporation of liquid nicotine base over a heater or by burning nicotine are important in house fumigation. As a

toxicant to insects, nicotine penetrates directly through the integument and spiracles. Nicotine acts directly on ganglia of insects CNS producing excitation at lower concentration and paralysis at high concentration. There are several other solanaceous plants (potato family) that contain promising insecticidal properties.

Plant-Incorporated-Protectants (PIPs)

PIPs are plants that have had genes inserted causing the plants to produce a pesticide inside its own tissues i.e. genetic modification of plant causes plant to produce pesticides in its own tissues. For example, scientists can take gene for the Bt pesticidal protein, and introduce the gene into the plant's own genetic material. Then the plant, instead of the Bt bacterium, manufactures the substance that destroys pest. The protein and its genetic material, but not the plant itself, are regulated by EPA (www.epa.gov).

An experiment was conducted in 1997 using three bio-pesticidal plants. Each of the extracts was inoculated in swiss

PIPs are plants that have had genes inserted causing the plants to produce a pesticide inside its own tissues



albino mice and its effect on the humoral and cell mediated immuno response was studied. It was observed that the pesticidal plant extracts proved to be immuno eco-friendly pesticides and an alternate/antagonistic agent to non-eco-friendly chemical pesticides. Insecticides of plant origin would always be superior to others because they are safe and least hazardous to humans.

Conclusion

Due to an increasing need of crop protection, it is necessary to promote alternative and eco-friendly methods. Bio-pesticides, as a substitute of chemical pesticides, offer effective alternatives for the control of many pests. Their greatest strength is their safety, as they are essentially non-toxic and non-pathogenic to animals and humans. These can be used without undue risks to human injury or environmental damage, hence will soon become crucial tools of insect management.

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AGRI NEWS

FM Pranab Mukherjee's Budget



New Delhi: With climate change posing one of the biggest challenges, Finance Minister Pranab Mukherjee's budget has declared that Rs 200 crore be allocated for research to develop plant and seed varieties that yield more and can resist climate change.

"Food security and agricultural development in the coming decades would depend upon scientific and technological breakthroughs in raising productivity. We have to develop plant and seed varieties that yield more and can resist climate change," Mukherjee said in his budget speech in the Lok Sabha.

"I propose to set aside a sum of Rs 200

Food security and agricultural development in the coming decades would depend upon scientific and technological breakthroughs in raising productivity. We have to develop plant and seed varieties that yield more and can resist climate change

crore for incentivising research with rewards, both for institutions and the research team responsible for such scientific breakthroughs," he said.

The budget allocation for the Ministry of Environment and Forests saw a minuscule jump of over five percent from Rs 2,491 crore last year to Rs 2,629 crore this year.

The Finance Minister announced major relief for the industries in renewable energy sector.

"In order to fully realise our potential in the realm of solar energy, solar thermal projects need encouragement. I propose to fully exempt plant and equipment etc. for the initial setting up of such projects from special countervailing duties (anti-subsidy duty)," he said.

Concessions have already been provided for encouraging the consumption of energy-saving devices.

"I propose to fully exempt a coating chemical used for compact fluorescent lamps, from basic customs duty. Excise duty on LED lamps is also being reduced to 6 percent," he added.

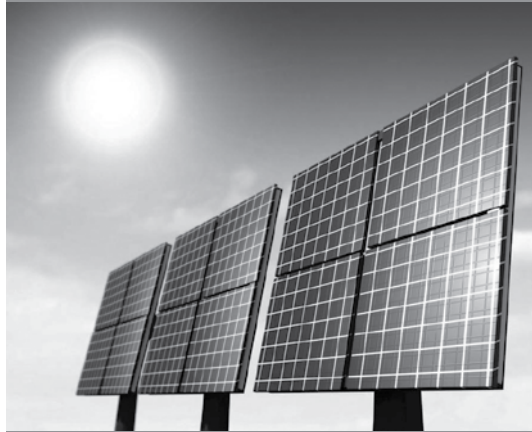
While the total outlay saw a drop in funding for prevention and control of pollution from Rs 389 crore in 2011-10 to Rs 312 crore this year, conservation programme also saw a drop from Rs 29 crore last year to around Rs 18 crore this year.

The national afforestation and eco-development programme saw an increase from Rs 253 crore in 2011-12 to Rs 342 crore this year, it was reported.

A provision of Rs 193 crore has been made for schemes in the environment and forest sector in the north eastern states.



AGRI NEWS



The agency will support a feasibility study for development of a rural micro-grid solar power project that will bring electricity to remote villages in India

US Inks Deals with India for Clean Energy

New Delhi: The United States Trade Development Agency has signed two deals with Indian firms to help develop clean energy projects. These will generate demand for US equipment worth over \$250 million in India.

Under the first deal, the agency will support a feasibility study for development of a rural micro-grid solar power project that will bring electricity to remote villages in India. The second deal is related to the implementation of smart grid technology in Kolkata.

"India has ambitious energy infrastructure development goals. We are pleased to join this trade mission to support those goals, and to help open the market for US clean energy technologies," Henry Steingass, regional director for US Trade Development Agency, said after signing the deal. Steingass was part of a business delegation accompanying US Commerce Secretary John Bryson. Bryson, on his India visit led a delegation of 16 US infrastructure firms.

According to a statement released by it, the US agency said it will help private solar power developer Azure Power in the feasibility study to access the development of a rural micro-grid solar power project that will bring electricity to remote villages in India. Azure aims to set up over 100 micro-grid solar systems. Each system would cover an area of 2-3 acres of rural land with little or no connectivity to existing electrical grids.

The other deal signed with CESC Limited is related to a feasibility study for implementation of smart grid technologies across their electricity distribution networks in Kolkata. The project will improve efficiency and energy reliability for its 2.5 million customers.

DARE Secy Hopeful of Better Foodgrain Productivity

Varanasi: The Secretary in the Department of Agricultural Research and Education (DARE) S Ayyappan and the Director General of Indian Council of Agricultural Research (ICAR) have expressed hope of better productivity of food grains in the country.

Ayyappan was in the city to receive the D Litt degree at the convocation of Banaras Hindu University (BHU). Talking to media persons at the Indian Institute of Vegetable Research (IIVR), he said despite the shrinking of cultivated area, the foodgrain productivity was enhanced due to extensive research and development in agricultural sector.

Agriculture in India is the key sector for generating employment opportunities for majority of the population. Stating that presently the agriculture sector provided employment to about 52% of country's workforce," the agriculture contribution in the gross domestic product (GDP) was 14.8%".



AGRI NEWS

New Agri-Model in the Making in Madurai

Madurai: The farmers of Madurai are gearing up to form a company and proceeds towards the full materialisation of the agri-venture concept.

Ideated by entrepreneurship expert R. Jayaraman, who is the Member-Secretary of Centre for Entrepreneurship Development, the new 'Madurai model' of agriculture should take off in a month's time at Vasinagar near Usilampatti.

"It is an innovative idea to do agriculture as a business venture. Since family property is shared by siblings, the agriculture land too is getting divided thereby each person getting less acreage. So, we suggested that farmers can

instead form a company and do agriculture as an industry," he mooted at a seminar.

Entrepreneurship experts are eager for the novel idea to take shape and describe this model as one that makes agriculture become 'agri-venture.'

Registered under the Companies Act, share certificates will be given to participating farmers. According to Dr. Jayaraman, one cent of land may be considered as one share in the company.

"There is going to be support from National Bank for Agriculture and Rural Development (NABARD) for this venture. We hope others too can follow this model but what is required for doing this is sizeable agricultural land and market-oriented approach for agricultural business," he said.



UP's Sugarcane Industry Gets a Boost

Hyderabad: The implementation of the Sugarcane Information Service (SIS) in Uttar Pradesh has become a turning point for the sugarcane industry in the state.

The IT solutions project provides a platform to all stakeholders of the

sugarcane industry, including farmers, mills and cooperatives, to help them interact and transact online.

As part of the project, the government mandates all the 125 sugar mills in the state to have websites giving all information from the issuance of supply tickets to sugarcane price payment on a daily basis.

Using the SIS system, the sugar mills were able to generate Rs 700 crore of revenue per annum and helped the farmers to achieve an income of Rs 846.54 crore. The project has boosted UP's sugarcane industry, which is the backbone of state economy, the second-largest sugarcane producer in the country.

Ashden Report to Boost Rural Electrification

Kolkata: The Ashden Indian Collective - a team comprising Ashden awardees from India - has prepared a report recommending ways to develop off-grid renewable energy in the country.

The report will soon be submitted to the Britain's Department of International Development (DFID) to get funds for framing policies on developing renewable energy in the country. The group's chairman is Ashden award winner and former West Bengal Green Energy Development Corporation's managing director, SP Gon Chaudhuri.

The recommendations primarily focus on two aspects - developing rural electrification and decentralizing distribution of generation.

The group conducted three round-table meetings last year on off-grid systems tariff to frame the draft policy. In rural areas, the power supply tariff is Rs 90 per unit in some places. In reality, many of these places do not receive any power.

Kerosene is still used in large scale in rural areas. "Solar, bio mass and wind are the available local renewable energy sources in rural areas. Cost of power can come down to Rs 10 per unit if these sources are tapped," said S P Gon Chaudhuri, the group's chairman and former MD of the West Bengal Green Energy Development Corporation.



Andhra Plans 3 Agri-Business Investment Regions

Hyderabad: Andhra Pradesh plans to roll out three integrated Agri Business Investment Regions (ABIRs) and take other initiatives to catapult the state as a prime destination for investment in the farm sector.

Agriculture and Agriculture Technology Mission Minister Kanna Lakshminarayana said the ABIRs would be developed like the Delhi Mumbai Industrial Corridor (DMIC) and the state planned to rope in Israel, the Netherlands and the US as partners to bring in investment and technology.

"The ABIRs are still in formulation stage and we will conduct a workshop next month to discuss the proposal with all the stakeholders," the Minister said after making a presentation on "Opportunities and Scope of Agri Business in Andhra Pradesh".

The state plans to roll out three ABIRs — Anantapur to Adilabad, Nellore to Icchapuram and Guntur to Warangal.

The infrastructure for ABIRs will include dedicated water supply, gas pipelines to establish mini power plants, establishing backward linkages by way of rural transformation centres — including cold storage, warehousing and rural mart and forward linkages with marketing complexes, aggregation centres and retail chains.

The state government also proposed to create a separate entity which would develop the ABIRs on public-private partnership basis and rope in international companies as joint venture partners, he said.

"This will create five lakh direct or indirect jobs and encourage 'agripreneurs' in rural areas as well as the graduates coming from business management institutions," the Minister said.

"This will be a multi-modal infrastructure development to empower the rural communities to create high value agri-business opportunities," he said. The proposed corporation will benchmark the ABIRs with those of developed countries and add value addition to the Indian food processing industry.

"A few innovative ideas, which are being contemplated, will certainly make Andhra Pradesh one of the developed states for agriculture on par with Israel and The Netherlands," the minister added.

The state government was also discussing with the Federation of Indian Chambers of Commerce and Industry (FICCI) and the central government to implement a scheme wherein all the applicable subsidies would be routed through a single window.

This scheme also involves issuing soil health cards to farmers. The initiative will be taken up in the three regions simultaneously, covering around 10,000 farmers in each cluster.

Farmers to Get Smart Kisan Credit Cards

New Delhi: Finance Minister Pranab Mukherjee has announced that Kisan Credit Card will be modified to make it a smart card to use it in ATMs.

Farmers, both big and small, will now get plastic smart cards from banks soon that could be swiped at automated teller machines, points of sale and hand-held machines to withdraw cash and pay for goods and services, the Minister said while presenting the Budget in Parliament.

Despite being called 'credit cards', Kisan credit cards have actually been the traditional passbooks issued by public sector banks with loan details, using which credit and debit entries were periodically updated.

The smart cards would be loaded with a pre-sanctioned credit limit for each farmer against which withdrawals can be made through ATMs or payments made through swipe machines available at merchant outlets.

Bankers said the proposed move would be a win-win situation for both banks and farmers. While it would be easy for farmers to withdraw cash and pay for goods and services, smart cards would reduce congestion in bank branches, they said.

He said the interest subvention scheme for providing cheaper loan to farmers at 7 per cent interest will continue in the next year. The Agriculture credit proposed to be increased to a whopping Rs 5,75,000 crore, an increase of Rs 1,00,000 crore. NABARD will get Rs 10,000 crore for short term crop loans to small and marginal farmers.

To bring green revolution to Eastern India, allocation for Rashriya Krishi Vikas Yojana will be increased to Rs 1,000 crore from Rs 400 crore.



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Projects included in this category are:

- Consultancy for World Bank Assisted Process Monitoring of Andhra Pradesh Rural Poverty Reduction Project – Phase-II (Zone-II) – Society for the Elimination of Rural Poverty, Government of Andhra Pradesh – 2007-08
- Implementation of DFID funded Western Orissa Rural Livelihood Project (WORLP) – Watershed Development Mission, Govt. Of Orissa – 2005-2010
- Comprehensive Watershed Development Project in Karnataka - Watershed Development Department (WDD)- Government of Karnataka – 2006-07
- Madhya Pradesh Tribal Development Project - The International Fund for Agriculture Development (IFAD), Rome – 1997

Grass Roots level Livelihood Implementation

AFC has undertaken large scale Agricultural Extension Programme in 820 Blocks covering all 71 districts of Uttar Pradesh.

The mission of the implementation project is to increase the farm productivity, profitability and sustainability of farming systems, efficient use of natural resources and agricultural inputs etc., by customised farmers' trainings at village cluster level and to provide online information on weather parameters, demand and use of agricultural inputs and market intelligence.

Organic Farming

This project involves the adoption and certification of Organic Farming in 22000 hectares.

Watershed Development

AFC is implementing Livelihood Development Programme based on Watershed Development with funding by DFID, and NABARD.

Panchayati Raj Institutions

AFC has set up an independent division for providing support services in terms of grass roots level planning, training of various stakeholders in UP, Bihar and Jharkhand. AFC has prepared Perspective District Plans in 25 districts of Uttar Pradesh under Backward Region Grant Fund (BRGF). AFC has also conducted TNA and prepared Training Manual for PRIs in Jharkhand.

The PRI division will also provide the following services:

- Organise training programmes for the senior & middle level executives of the NGOs.
- Capacity building of the ERs and various stakeholders.
- Conduct research studies, develop learning material for each level on local self governance, organise seminars and workshops, promote exchange of academic expertise on various aspects related to local planning & DPCs, disseminate specialised information and provide expert advice to all concerned.
- Take up advocacy role to strengthen democratic process, particularly grassroots level democracy through decentralised institutions.
- Lay special emphasis on involving the poor, marginalised and weaker sections of the society in the democratic governance.



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