

**HISTORY OF POTASH IN INDIA**

- ✦ Use of Potash in India started about 70 years back on plantation crops in South India.
- ✦ The consumption of MOP was only 12000 MTs in 1955 when Government of India brought all individual importers under one banner namely Indian Potash Supply Agency (IPSA) and made it sole entrusted agency for import, handling, marketing and promotion of potash.
- ✦ This Company was renamed Indian Potash Limited (IPL) with over 90% equity assigned to cooperative/public sector but with unchanged mandate.
- ✦ Only instances in the world of a company having been incorporated to promote a single nutrient.
- ✦ With focus on farmer and massive extension programmes of IPL.

**Consumption of MOP increased to 2.3 million tonnes in 1991-92**

- NPK RATIO IN 1955-56	10.0 : 1.3 : 1
- NPK RATIO IN 1991-92	5.9 : 2.4 : 1

- Potash decontrolled and decanalized in 1992-93.



## IPL INITIATIVES FOR PROMOTION OF 'K'

- ✦ IPL insisted on greater focus on 'K' since hitherto 'K' received less attention compared to N & P in research and extension.
- ✦ Emphasis on balanced application with Government consenting to NPK use ratio of 4 : 2 : 1 as a guideline.
- ✦ Government agreed to make some minimum storage of 'K' mandatory under FCO in 1971.
- ✦ IPL promoted Potash Research Institute of India (PRII) in 1977 to collaborate with ICAR, SAUs and State Governments for research, experiments and generate information on various aspects of 'K' nutrition.
- ✦ One of the largest extension programmes with more than 400 agriculture graduates working with farmers during 1971 – 1992.



## POTASSIUM FERTILITY STATUS

- ✦ Fertiliser use is a function of soil fertility status.
- ✦ For scientific use which is remunerative for the farmers, adequate and reliable soil testing services is a pre-requisite.
- ✦ Potassium Fertility Status of India in 1976 by Researchers Ghosh and Hasan showed 20% soil samples low in Potash, 42% medium and 38% high.
- ✦ Study in 2002 showed only 13% low, 37% medium and 50% high.

## REMOVAL OF 'K' BY CROPS AND RECOMMENDED REPLENISHMENT



CROP	YIELD MT/ha	REMOVAL OF "K"	RECOMMENDED DOSE OF "K" (Kg/ha)
RICE	5	156	60
MAIZE	6	120	60
WHEAT	6	175	60
POTATO	40	310	100
TOMATO	50	190	40
COTTON (lint)	1	90	40
SUGARCANE	100	340	120
BANANA	40	1000	320
SOYBEAN	3	173	40
ONION/GARLIC	35	160	100

## POTENTIAL OF "K" IN INDIA



✦ Cropped area in India – 141 million hectares.

✦ Based on Government recommendations for "K" application for different crops, requirements worked out as under:

YEAR	TOTAL "K"
2012-13	3.75 million tonnes
2014-15	4.00 million tonnes
2016-17	4.20 million tonnes

*(Based on Multiple Regression Equation)*

✦ The consumption kept pace till 2010-2011.

YEAR	TOTAL "K"
2008-09	3.31 million tonnes
2009-10	3.63 million tonnes
2010-11	3.51 million tonnes

✦ Setback in 2011-2012 and 2012-2013.



## ANALYSIS FOR GROWTH IN 2000-01 TO 2010-11

- ⚡ Spectacular growth of 124%
- ⚡ Heavy Government Subsidy – stable farmer's price
- ⚡ Remunerative crop prices
- ⚡ Potash Promotion Project (PPP) – correcting the imbalance – launched by IPL for five years up to 2006-07 with suppliers' support.



## PRICE SENSITIVITY ANALYSIS OF 'K' USE

All our references to price are to the farmer's price in India which is a derivative or a function of fertilizer subsidy, forex fluctuations, etc. which are all local factors. Any reference to prices in this paper should not be confused with international prices.

### 1992-93 EXPERIENCE

YEAR	MOP PRICE (Rs. per MT)
1980-81	1300
1990-91	1700
1992-93	4500

- ⚡ After decontrol and decanalisation in 1992-93, farmer's price in India increased from Rs.1700/- per MT to Rs.4500/- per MT.
- ⚡ Consumption of MOP dropped significantly from 2.3 million tonnes in 1991-92 to 0.80 million tonnes in 1992-93 and it took exactly 10 years to reach 1991-92 level.
- ⚡ Adverse trade terms for farmers

## PRICE SENSITIVITY ANALYSIS OF 'K' USE



### 2011-12 EXPERIENCE

- ✚ History repeats – farmer's price for MOP increased from Rs.4,455/- per MT in 2010-11 to Rs.16,800/- per MT in 2012-13.
- ✚ Once again adverse trade terms for the farmer.

YEAR	MOP PRICE (Rs. per MT)
2000-01	4255
2005-06	4455
2010-11	5055
2012-13	16800

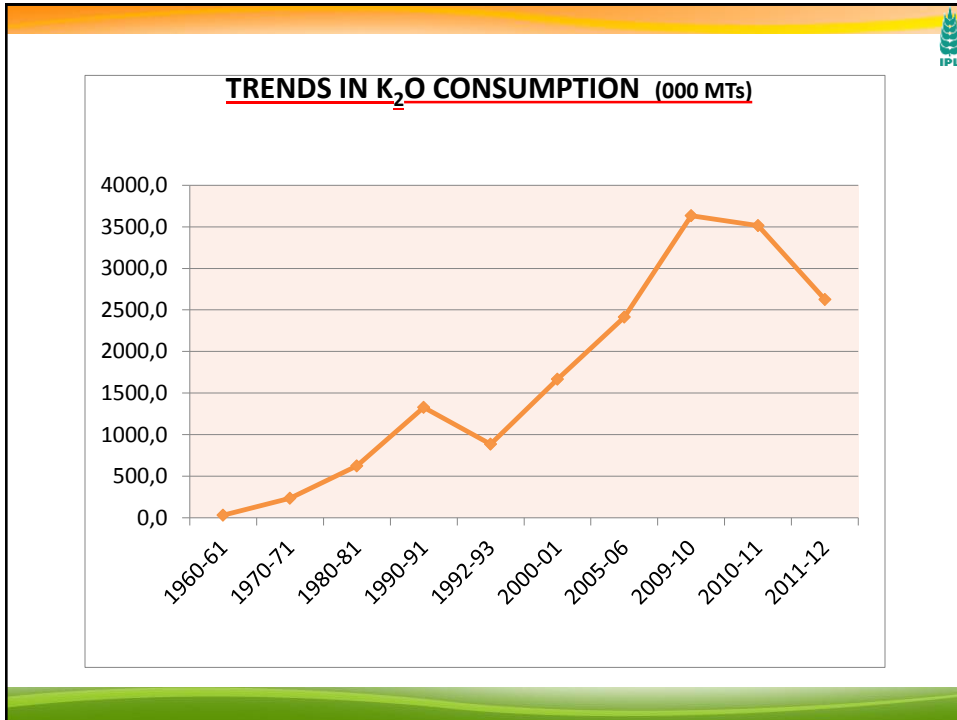
- ✚ Immediate effect on 'K' application
 


Kharif 2010	2.92 million tonnes
Kharif 2012	1.50 million tonnes
- ✚ Data for 2011 omitted as first half was marked by 'Potash Holiday'.

## K<sub>2</sub>O PRICE (Rs./KG.) BASED ON MOP



YEAR	K <sub>2</sub> O Price
1981-82	2.17
1990-91	2.83
1992-93	7.50
2001-02	7.09
2005-06	7.43
2009-10	7.43
2010-11	8.43
2011-12	20.0
2012-13	28.0





**WHAT HAPPENS IF NO SUBSIDY ON MOP - ?**

	With Subsidy Earlier	With Subsidy Now	Without Subsidy
Retail price (Rs/t)	4600	17000	32000
Price of K <sub>2</sub> O (Rs./kg)	7.7	28.3	53.3
Kg Paddy needed to pay for 1 kg K <sub>2</sub> O	0.9* (*Rs 8.5/kg paddy)	2.3** (**Rs 12/kg paddy)	4.4** (**Rs 12/kg paddy)
Crop response rate needed for Value Cost Ratio of 2.5 (kg additional Paddy yield/kg applied K <sub>2</sub> O)	2.2	5.8	11.1

**Hence, Subsidies are Necessary for the Balanced Fertilization and Soil Health**

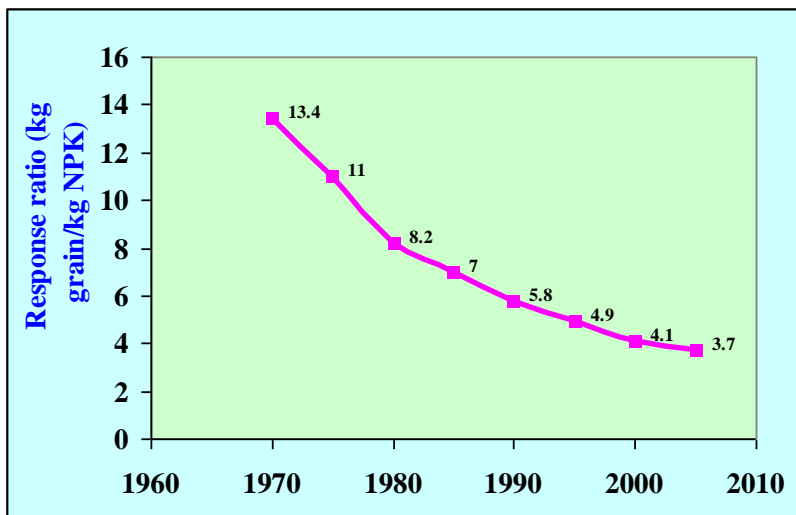


### ECONOMICS OF "K" USE

Year	Kg of Grains Required to Purchase 1 kg of K <sub>2</sub> O	
	Paddy	Wheat
1981-82	1.89	1.67
1992-93	2.78	2.27
2001-02	1.4	1.2
2005-06	1.3	1.06
2010-11	0.84	0.72
2011-12	1.85	1.56
2012-13	2.24	2.18



### DECLINING FERTILISER RESPONSE - IRRIGATED AREAS



### DECLINING CROP RESPONSE TO FERTILISERS

Period	Response ratio (Kg grains per kg NPK)
5 <sup>th</sup> Plan (1974-79)	15.0
8 <sup>th</sup> Plan (1992-97)	7.5
9 <sup>th</sup> Plan (1997-02)	7.0
10 <sup>th</sup> Plan (2002-07)	6.5
11 <sup>th</sup> Plan (2007-12)	6.0

#### Reasons:

- Inadequate and imbalanced fertiliser use
- Increasing multi-nutrient deficiency
- Lack of farmers awareness about balanced plant nutrition
- Lack of varietal breakthrough
- Poor crop management (Excess fertiliser dose is no substitute for poor management)

### RETURN ON INVESTMENT ON K FERTILISER IN PADDY

Yield Response K (Kg/ha) ->		200	500	1000
Cost of MOP (Rs/tonne)	Year	At 100 Kg K <sub>2</sub> O/ha Application Rate		
4455	2009-10	2.69	6.73	13.47
11300	2010-11	1.06	2.65	5.31
13600	2012-13	-0.88	2.21	4.41
17000	2012-13	-0.71	1.76	3.53
		At 80 Kg K <sub>2</sub> O/ha Application Rate		
4455	2009-10	3.37	8.42	16.84
11300	2010-11	1.33	3.32	6.64
13600	2012-13	1.10	2.76	5.51
17000	2012-13	-0.89	2.23	4.45
		At 60 Kg K <sub>2</sub> O /ha Application Rate		
4455	2009-10	4.49	11.22	22.45
11300	2010-11	1.77	4.42	8.85
13600	2012-13	1.47	3.68	7.35
17000	2012-13	1.18	2.94	5.88

Source: IPNI

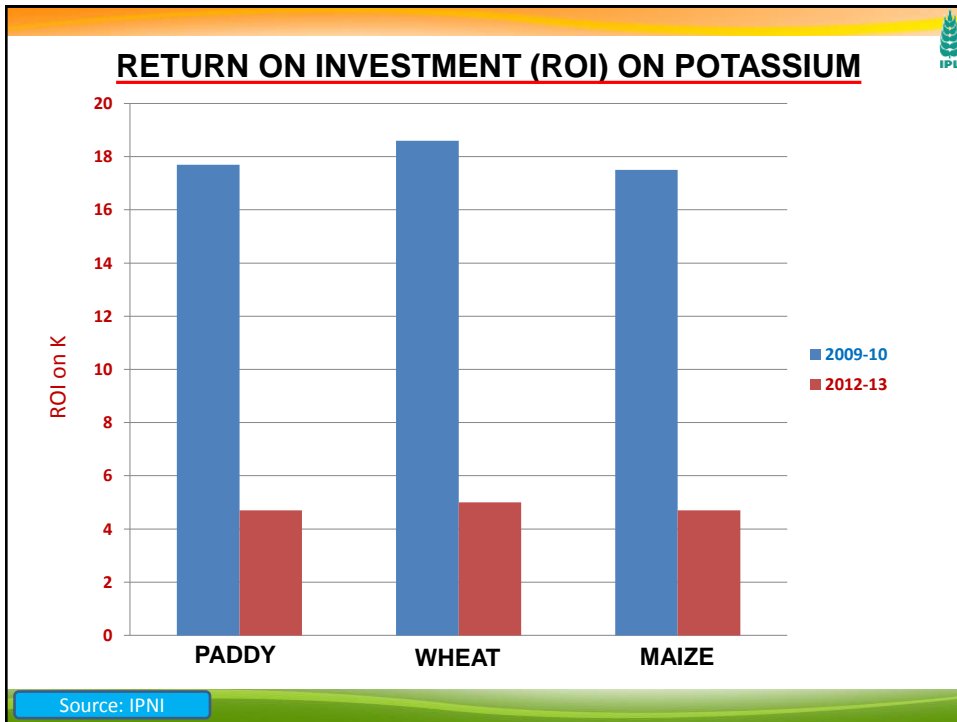


<b>RETURN ON INVESTMENT ON K FERTILISER IN WHEAT</b>				
Yield Response K (Kg/ha) ->		200	500	1000
Cost of MOP (Rs/tonne)	Year	At 100 Kg K <sub>2</sub> O/ha Application Rate		
4455	2009-10	3.15	7.88	15.76
11300	2010-11	1.24	3.11	6.21
13600	2012-13	1.03	2.58	5.16
17000	2012-13	-0.83	2.06	4.13
		At 80 Kg K <sub>2</sub> O/ha Application Rate		
4455	2009-10	3.94	9.85	19.70
11300	2010-11	1.55	3.88	7.77
13600	2012-13	1.29	3.22	6.45
17000	2012-13	1.04	2.58	5.16
		At 60 Kg K <sub>2</sub> O /ha Application Rate		
4455	2009-10	5.25	13.13	26.26
11300	2010-11	2.07	5.18	10.35
13600	2012-13	1.72	4.30	8.60
17000	2012-13	1.38	3.44	6.88

Source: IPNI

<b>RETURN ON INVESTMENT ON K FERTILISER IN MAIZE</b>				
Yield Response K (Kg/ha) ->		200	500	1000
Cost of MOP (Rs/tonne)	Year	At 100 Kg K <sub>2</sub> O/ha Application Rate		
4455	2009-10	2.37	5.39	11.85
11300	2010-11	-0.93	2.34	4.67
13600	2012-13	-0.78	1.94	3.88
17000	2012-13	-0.62	1.55	3.11
		At 80 Kg K <sub>2</sub> O/ha Application Rate		
4455	2009-10	2.96	7.41	14.81
11300	2010-11	1.17	2.92	5.84
13600	2012-13	-0.97	2.42	4.85
17000	2012-13	-0.78	1.94	3.88
		At 60 Kg K <sub>2</sub> O /ha Application Rate		
4455	2009-10	3.95	9.88	19.75
11300	2010-11	1.56	3.89	7.79
13600	2012-13	1.29	3.23	6.47
17000	2012-13	1.04	2.59	5.18

Source: IPNI



### NEED FOR INCREASED 'K' CONSUMPTION IN THE COUNTRY – LEGITIMATE QUESTIONS ?

Without any subsidy and at our average yields today, use of 'K' is largely unremunerative in all cereal crops.

**CONSUMPTION OF "K" IN INDIA AND PAKISTAN**

*(Kg. per ha)*

Year	N		P <sub>2</sub> O <sub>5</sub>		K <sub>2</sub> O		Total	
	India	Pakistan	India	Pakistan	India	Pakistan	India	Pakistan
2006-07	71.5	112.4	28.8	41.5	12.1	1.8	112.4	155.8
2007-08	73.8	122.6	28.2	26.4	13.5	1.1	115.6	150.1
2008-09	77.3	127.2	33.3	27.3	16.9	1.0	127.6	155.5
2009-10	79.8	146.8	37.2	36.3	18.6	1.0	135.7	184.1
2010-11	84.8	132.4	41.2	32.4	18.0	1.3	144.1	166.1



### AVERAGE YIELD OF MAJOR CROPS IN INDIA & PAKISTAN

(Kg. per ha)

Year	Wheat		Rice		Maize		Sugarcane	
	India	Pakistan	India	Pakistan	India	Pakistan	India	Pakistan
2006-07	2708	2716	2131	2107	1912	3037	69022	53199
2007-08	2802	2451	2202	2212	2335	3427	68877	51507
2008-09	2907	2657	2178	2346	2414	3415	64553	48635
2009-10	2839	2553	2125	2387	2024	3488	70029	52357
2010-11	2989	2833	2239	2039	2540	3806	70091	55981



### STIMULATION OF DEMAND FOR 'K' - CHALLENGES IN INDIA

- ✚ Notwithstanding the present grim scenario, need for balanced fertilization cannot be underestimated.
- ✚ Need for stable farmer's price.
- ✚ Focus on 'K' loving crops in the short run and all crops in the long run.
- ✚ Gaps between lab. results and farmers' fields to be addressed:
  - Liebig's Law of limiting factor.
  - Application of 'K' improves 'N' use efficiency.
  - Role of 'K' in combating water stress.
  - Role of 'K' in preventing incidence of insects, pests and diseases.
  - Declining crop responses to be addressed with balanced NPK use and micro nutrients.



## CONCLUSIONS

- ✦ Consumption of Potash must increase for balanced use of fertilisers and enhancing crop productivity.
- ✦ Potash use at existing MRP is still remunerative for farmers.
- ✦ This message has to be backed by extension & more extension.
- ✦ With farmers' income remaining stable, recovery in K demand should start from 2013-14.
- ✦ The drop in K consumption in 1992-93 & 1993-94 got recovered in almost 10 years.
- ✦ Hopefully the total recovery takes much lesser time now.