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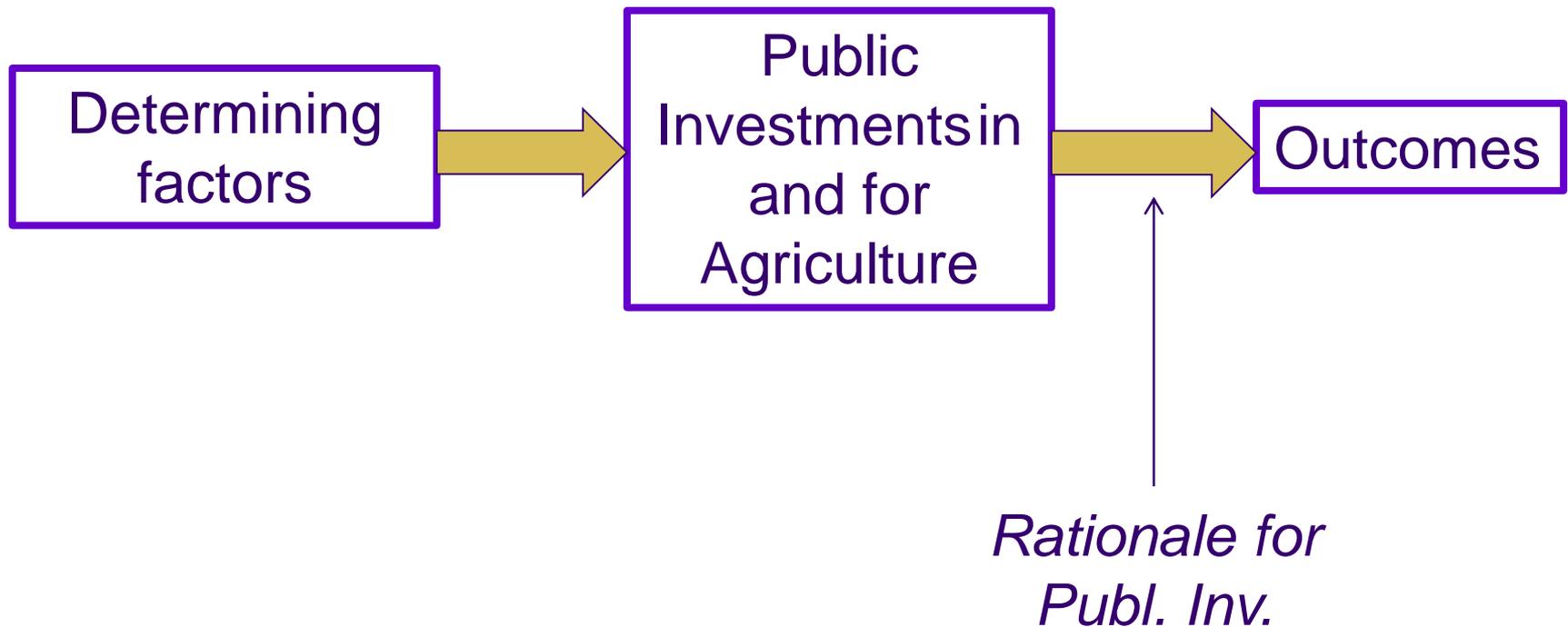
*Technical Workshop on
Policies for Promoting Investments in Agriculture
Food and Agriculture Organisation (FAO)
Rome; 12-13 December 2011*

Public Investment in and for Agriculture: What Has it Achieved, and What Determines it?

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Chain from Policy Process, to Public Investments, to Impact on the Ground



Impacts of Agricultural Public Investments:

Key messages

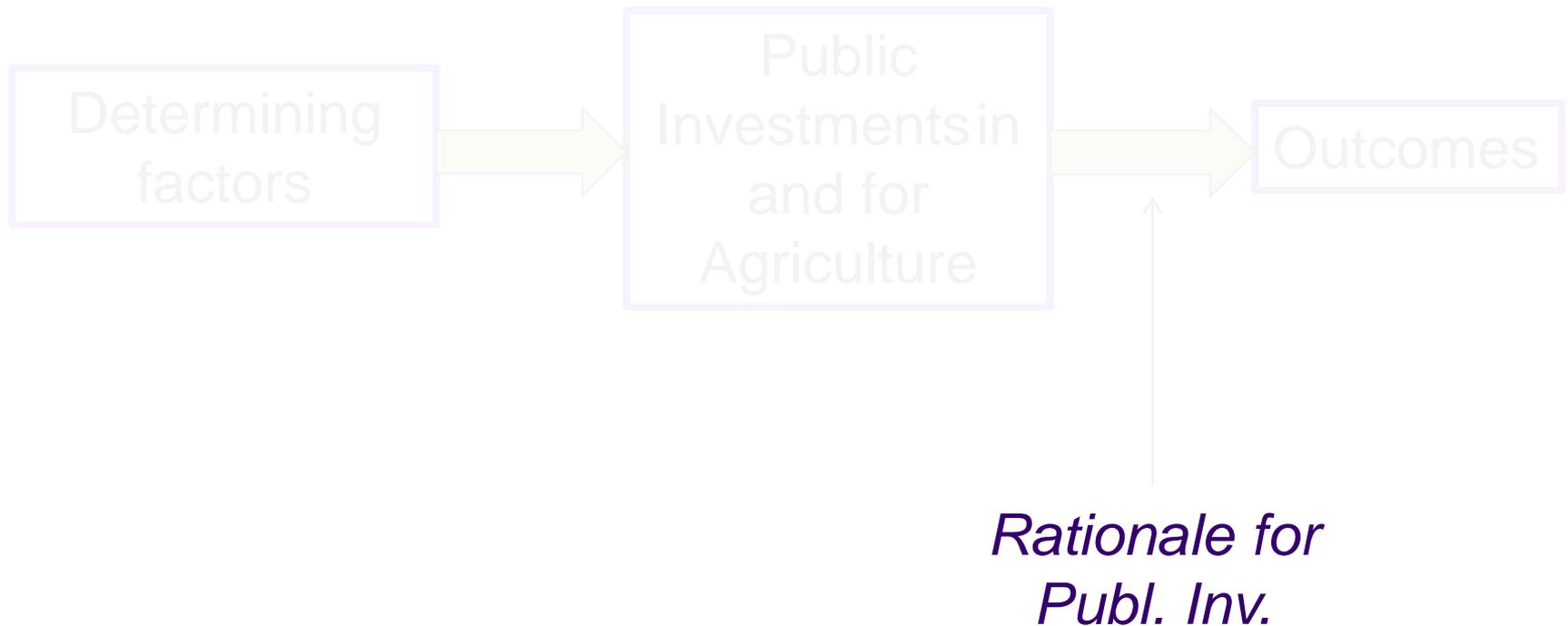
- **Substantial returns to public investment in ag. R&D across several countries—not only in absolute terms but also in comparison with other types of investments. But role of other non-ag. investments can have very large influence on agricultural growth and poverty reduction**
- **All types of ag. spending are not the same! Spending on ag R&D vs other ag vs aggregate ag.; ag subsidies vs. investments; etc.**
- **Strongly differentiated impact of investments across different areas: Returns to spending in marginal areas is often greatest for reducing poverty; can be as great or greater for fostering agricultural growth**
- **Relative returns do not remain static over time, thus policy priorities should change as well**

Drivers of Agricultural Public Investments:

Key messages

- Important to understand what drives decision-making on public investments in and for agriculture
- Be aware of how budget process (formal as well as de facto) influences which investments are made
- Actors and their interests matter in decisionmaking: politicians, bureaucrats, donors, citizens organised as interest groups, etc.
- Some features of public investments—unrelated to their merit—may work for or against them in getting policy attention
- Economic and political institutions can influence the composition of public expenditures
- Need to start taking these factors seriously in policy dialogue and policy/project design

Rationale for Public Investments in and for Agriculture



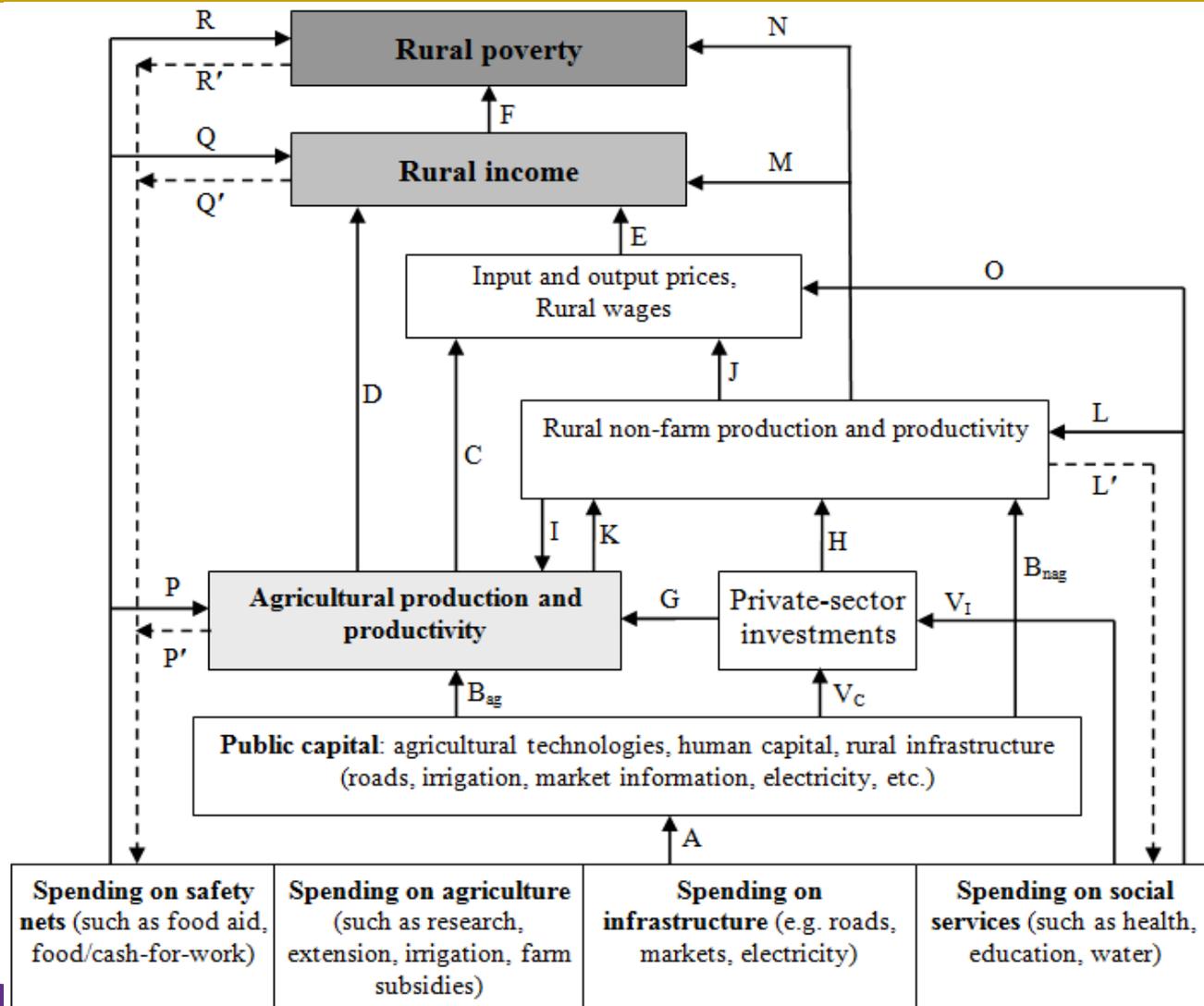
Rationale for Public Investments in and for Agriculture

- **Efficiency rationale arising from market failures**
 - Many investments have pronounced public goods character (e.g. nonrivalrous ag technologies)
 - Externalities in the provision of key ag. services (e.g. knowledge transfer / extension)
 - Pervasive information asymmetry problems (e.g. in ag. insurance)
 - Imperfect competition in markets (e.g. among ag. traders)
 - Co-ordination failures
- **Equity and poverty reduction rationale**
 - especially given poor are disproportionately present among agricultural population

Core Framework for Assessing Impact of Public Investments



Core Framework for Assessing Impact of Public Investments



Returns to Investments in Agricultural Technology Creation and Dissemination

	No of IRRs reported	Per cent distribution						Approx. median IRR
		0-20	21-40	41-60	61-80	81-100	100+	
<i>Extension</i>								
Farm observations	16	0.56	0	0.06	0.06	0.25	0.06	18
Aggregate observations	29	0.24	0.14	0.07	0	0.27	0.27	80
Combined research and extension	36	0.14	0.42	0.28	0.03	0.08	0.16	37
<i>By region</i>								
OECD	19	0.11	0.31	0.16	0	0.11	0.16	50
Asia	21	0.24	0.19	0.19	0.14	0.09	0.14	47
LatinAmerica	23	0.13	0.26	0.34	0.08	0.08	0.09	46
Africa	10	0.4	0.3	0.2	0.1	0	0	27
All extension	81	0.26	0.23	0.16	0.03	0.19	0.13	41

- *Reproduced from Evenson (2001)*

Meta-analyses show very high internal rates of return for public agricultural extension investments ...

Returns to Investments in Agricultural Technology Creation and Dissemination

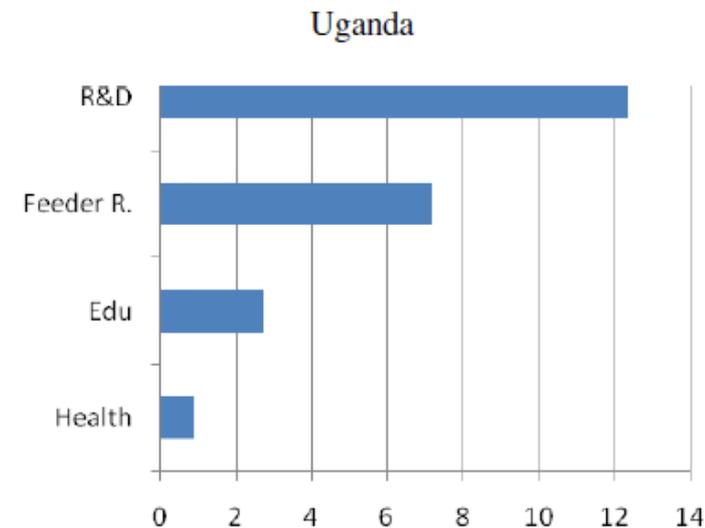
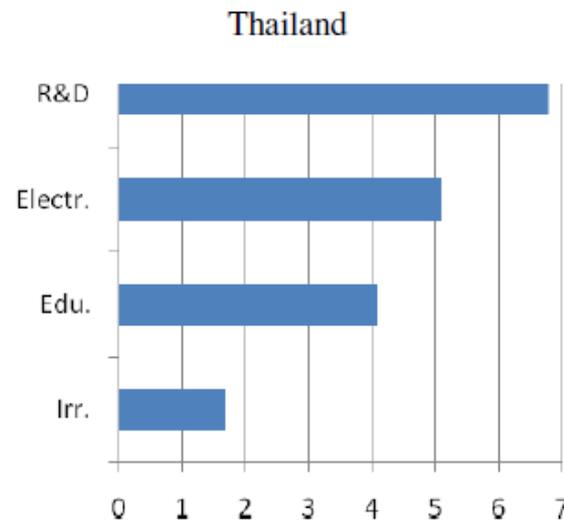
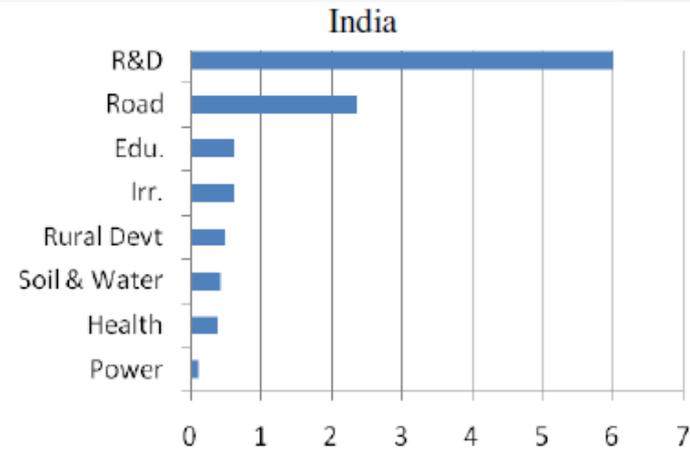
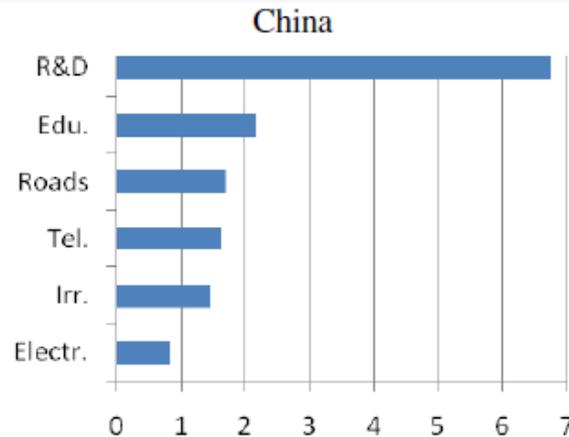
	No of IRRs reported	Per cent distribution						Approx. median IRR
		0-20	21-40	41-60	61-80	81-100	100+	
<i>Applied research</i>								
Project evaluation	121	0.25	0.31	0.14	0.18	0.06	0.07	40
Statistical	254	0.14	0.20	0.23	0.12	0.10	0.20	50
Aggregate programmes	126	0.16	0.27	0.29	0.10	0.09	0.09	45
<i>Commodity programmes</i>								
Wheat	30	0.3	0.13	0.17	0.1	0.13	0.17	51
Rice	48	0.08	0.23	0.19	0.27	0.08	0.14	60
Maize	25	0.12	0.28	0.12	0.16	0.08	0.24	56
Other cereals	27	0.26	0.15	0.3	0.11	0.07	0.11	47
Fruits and vegetables	34	0.18	0.18	0.09	0.15	0.09	0.32	67
All crops	207	0.19	0.19	0.14	0.16	0.1	0.21	58
Forest products	13	0.23	0.31	0.68	0.16	0	0.23	37
Livestock	32	0.21	0.31	0.25	0.09	0.03	0.09	36
<i>By region</i>								
OECD	146	0.15	0.35	0.21	0.1	0.07	0.11	40
Asia	120	0.08	0.18	0.21	0.15	0.11	0.26	67
Latin America	80	0.15	0.29	0.29	0.15	0.07	0.06	47
Africa	44	0.27	0.27	0.18	0.11	0.11	0.05	37
All applied research	375	0.18	0.23	0.2	0.14	0.08	0.16	49
Pre-invention science	12	0	0.17	0.33	0.17	0.17	0.17	60
Private sector R&D	11	0.18	0.09	0.45	0.09	0.18	0	50
Ex ante research	87	0.32	0.34	0.21	0.06	0.01	0.06	42

... and for public agricultural research.

Reproduced from Evenson (2001)

Returns to Investments across Sectors – Country Comparison of Impact on Agricultural Performance

- Ag. R&D investments consistently greatest returns
- Returns to other ag. investment (irrigation) positive but often surpassed by non-ag investment returns

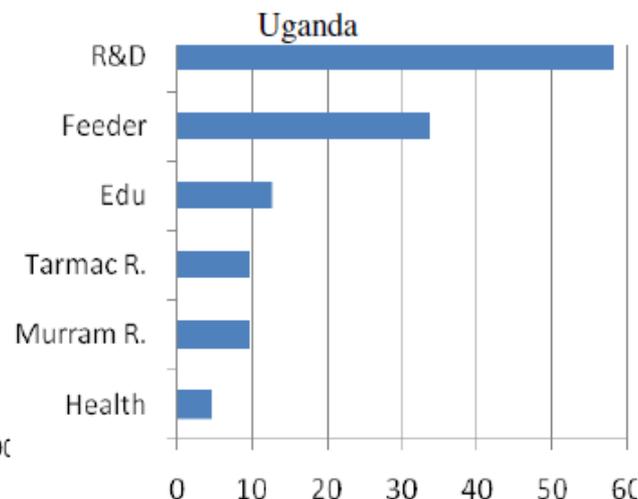
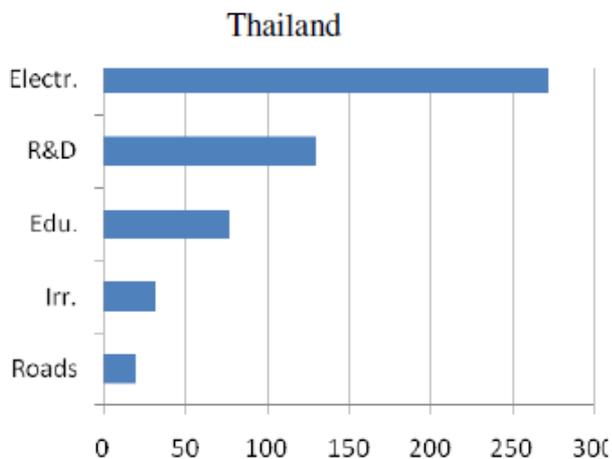
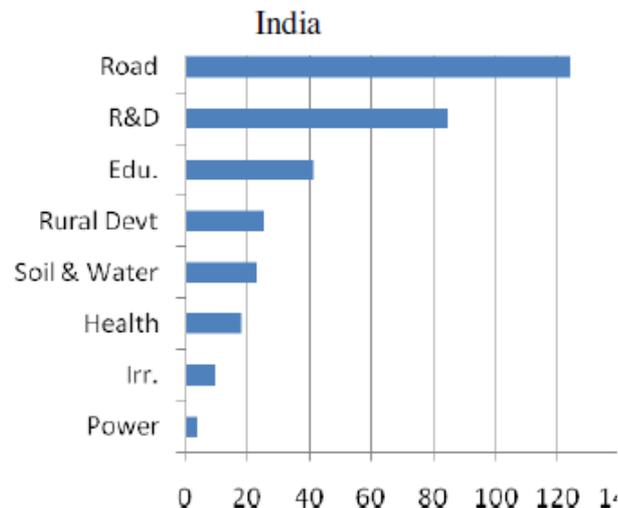
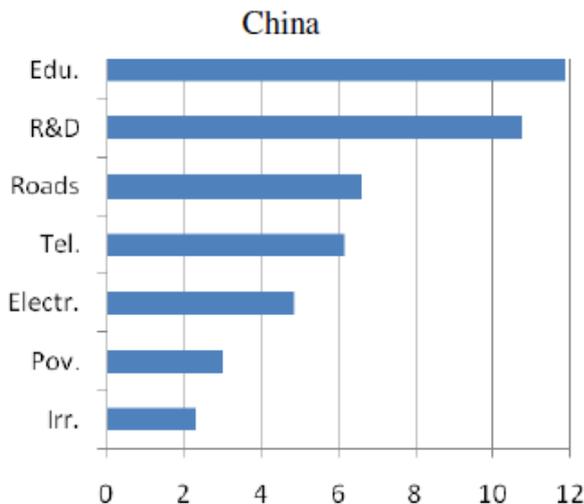


Note: Graphical illustration of estimation results in Fan, Zhang and Zhang (2004), Fan, Hazell and Thorat (2000), Fan, Yu and Jitsuchon (2008) and Fan and Zhang (2008). The magnitudes are returns to one monetary unit of different types of public spending in terms of (the same) monetary units of the value of agricultural production or productivity. The agricultural performance variable is measured slightly differently in each country: agricultural GDP in China, agricultural total factor productivity in India, and agricultural labour productivity in Thailand and Uganda.

Returns to Investments across Sectors – Country Comparison of Impact on Poverty Reduction

- No apparent trade-off between ag growth and poverty reduction, in terms of contribution of ag. R&D

- But for poverty, other types of investment can be more important than R&D (but latter remains close second)



Note: Graphical illustration of estimation results in Fan, Zhang and Zhang (2004), Fan, Hazell and Thorat (2000), Fan, Yu and Jitsuchon (2008) and Fan and Zhang (2008). The magnitudes are the reductions in the population size of the poor per monetary unit spent in each area of spending. The respective monetary units are: one million baht in Thailand (i.e. number of poor population reduced per one million bahts spent in different sectors); one million rupees in India; 10,000 yuan in China; and one million Ugandan shillings in Uganda.

Returns to Investments across Sectors in African Countries

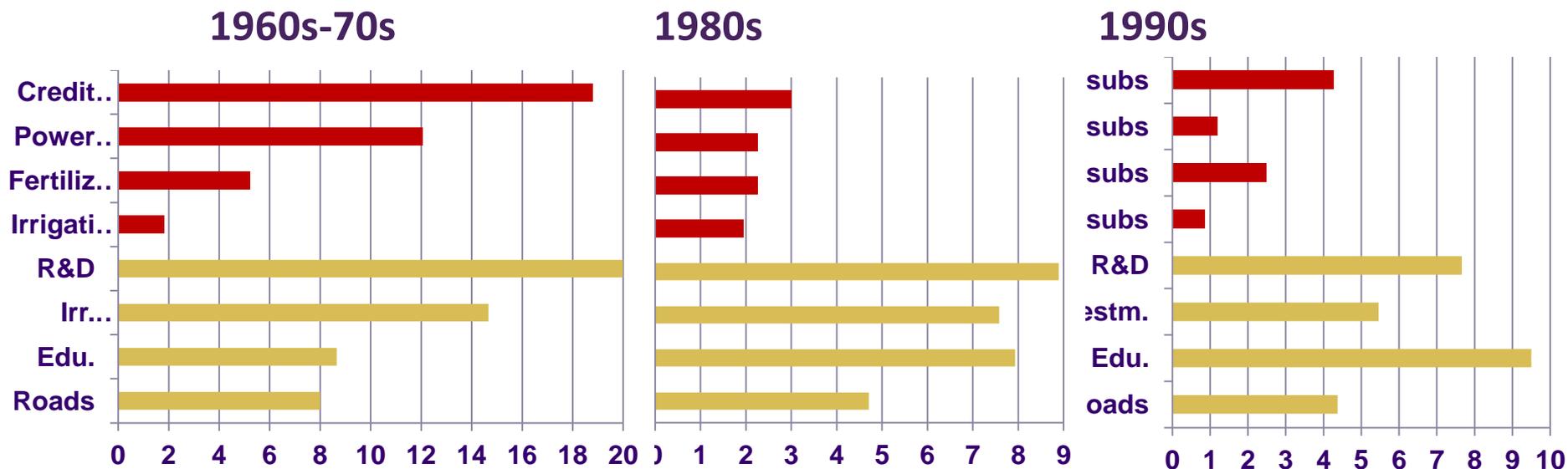
Ranking of dollar-for-dollar returns in different types of public investments (1=highest)

Sector	Ghana	Uganda	Ethiopia	Tanzania
Agriculture	1	1	3	1
Education	4	2	2	3
Health	3	4	4	--
Roads	2	3	1	2

Chapters in: Mogues, Benin [eds.] (forthcoming) – book: * Benin, Mogues, Cudjoe & Randriamamonjy;
* Fan & Zhang; * Mogues; * Fan, Nyange & Rao.

- Diversity across countries in relative returns across sectors
- In some cases, *aggregate* public spending in agriculture appears to have low or insignificant impact on incomes and welfare (e.g. Mogues 2011; Easterly & Rebelo 1993; Milbourne et al. 2003; Mosley et al. 2004)

Returns to Subsidies vs. Investments, across Time – India

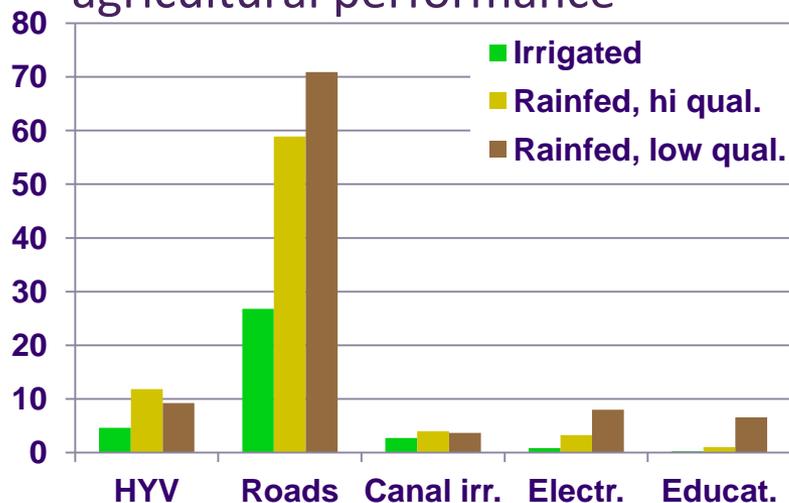


- In early stages of green revolution, returns to spending on subsidies were similar to that of investment in public goods
- In subsequent decades, while overall returns to investments declined somewhat, remained very high
- Over time, the marginal contribution to subsidies started to fall behind returns to public goods spending

Returns to Investments across High- and Low-Potential Areas – India

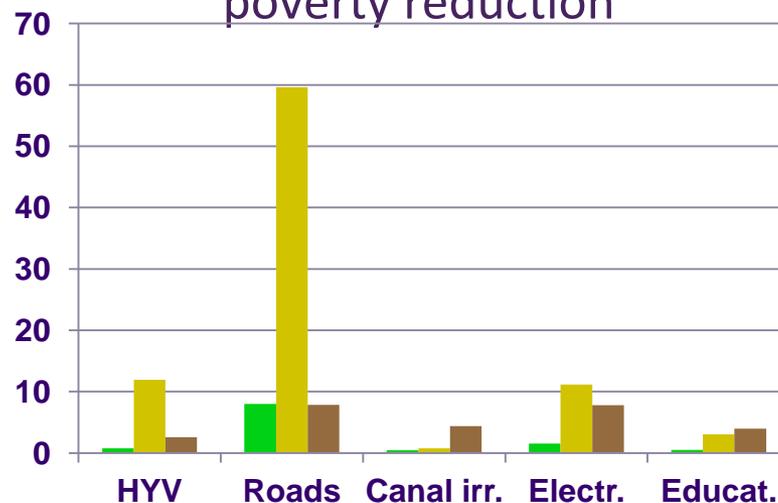
Marginal impact on:

agricultural performance



Returns to agricultural production (rupee per rupee expenditure)

poverty reduction



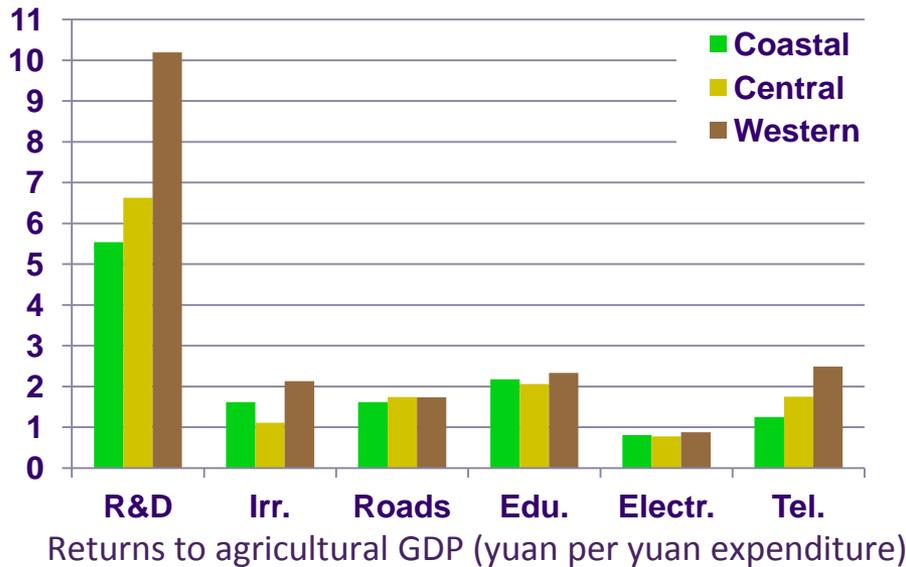
of poor reduced per 1 million rupees expenditure

- In India, marginal impact of spending in irrigated/ high-potential areas on agricultural production is lower than in neglected areas (possibly due to diminishing returns)
- The same holds with regard to impact on poverty; however, here greatest effect achieved by investments in the more productive among rainfed areas

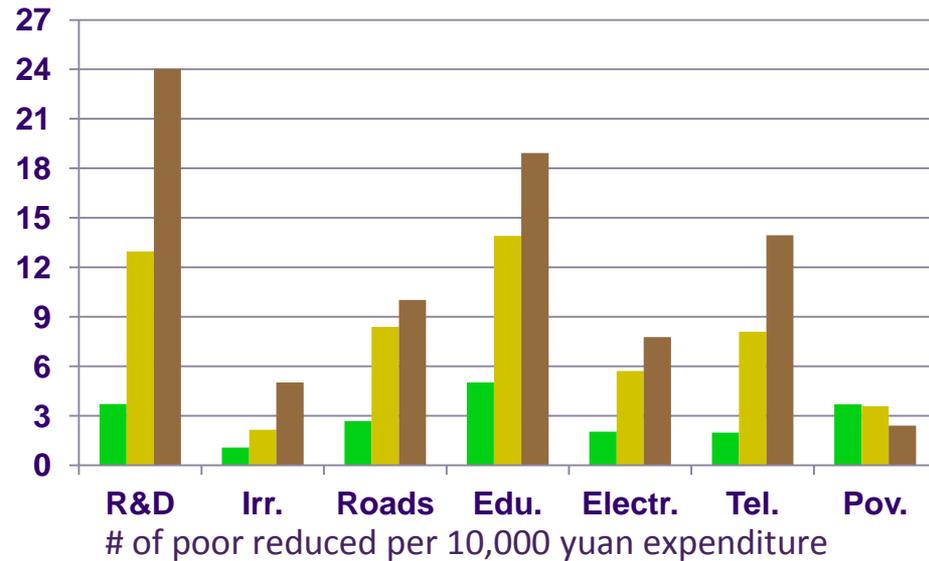
Returns to Investments across High- and Low-Potential Areas – China

Marginal impact on:

agricultural performance



poverty reduction

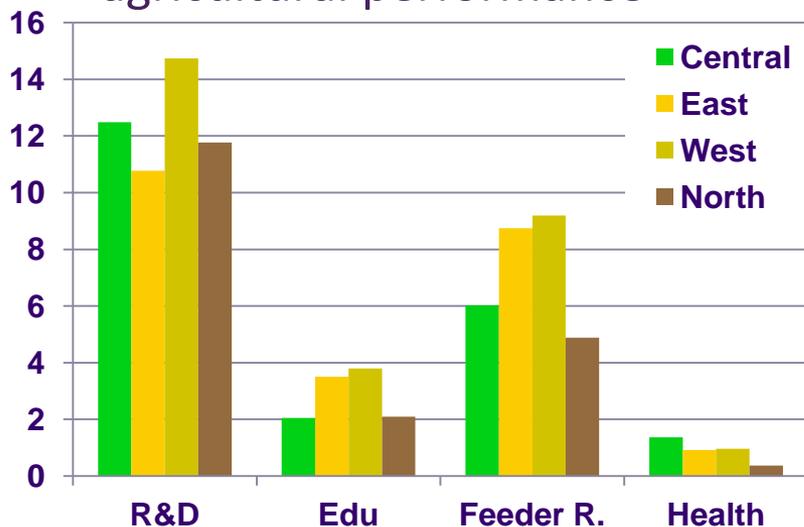


- In China, similar conclusions as in India
- Key difference is: greatest payoffs to investment in lowest-potential areas, both in terms of ag. incomes as well as poverty

Returns to Investments across High- and Low-Potential Areas – Uganda

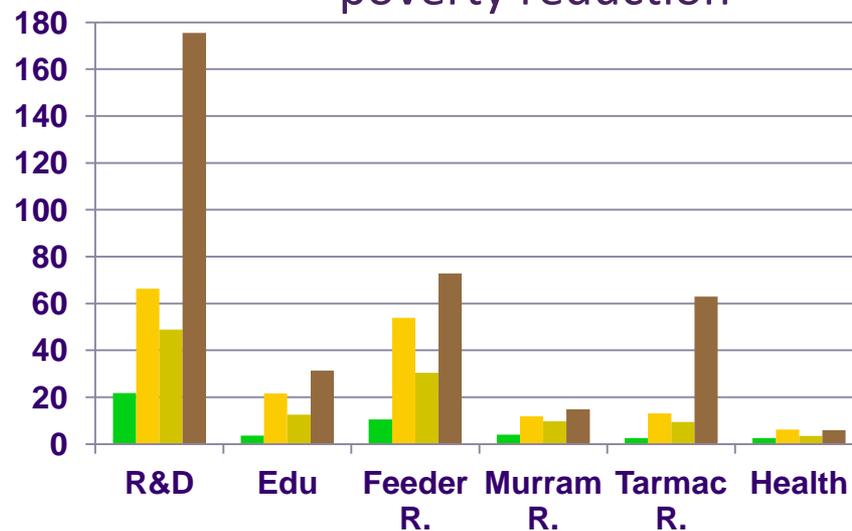
Marginal impact on:

agricultural performance



US\$. to US\$. Benefit cost ratio for agricultural production

poverty reduction



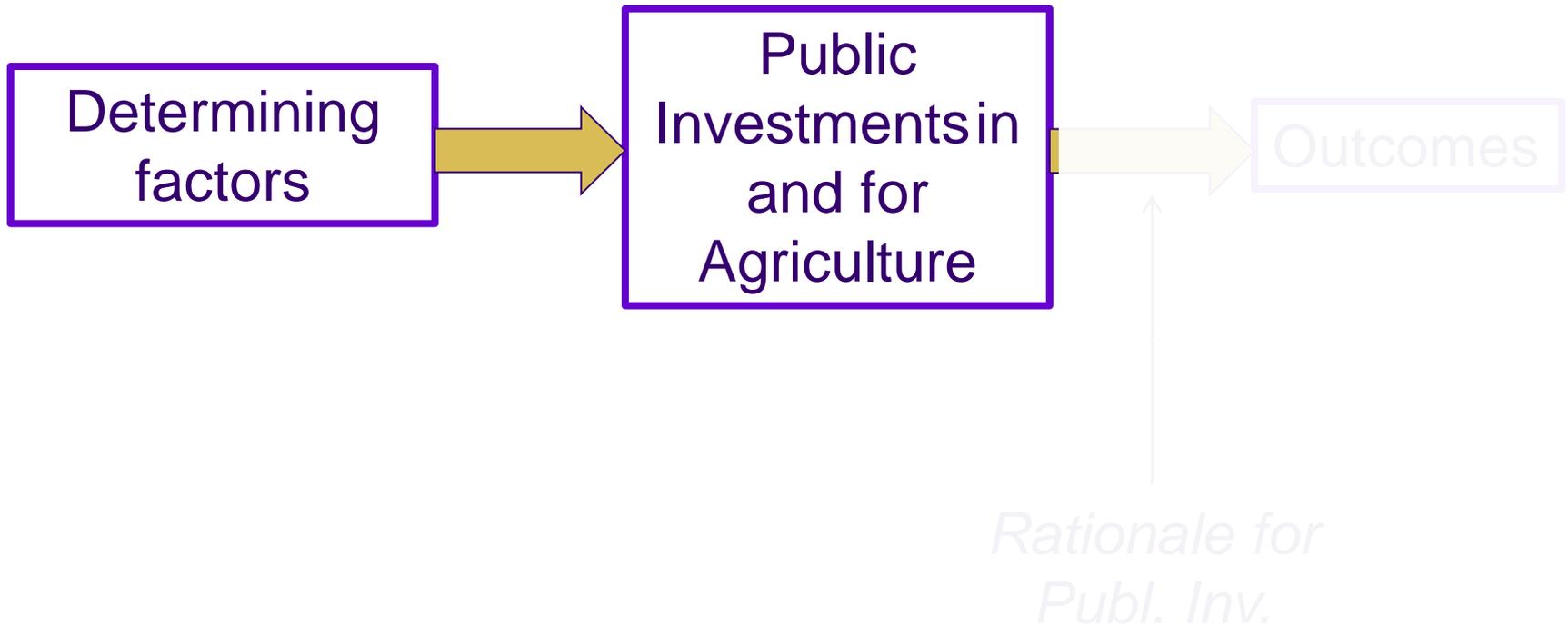
of poor reduced per 1 US\$. expenditure

- In Uganda, the superior gains to investing in neglected areas is very pronounced for the poverty goal
- But only limited spatial differentiation of agriculture-related returns to investments

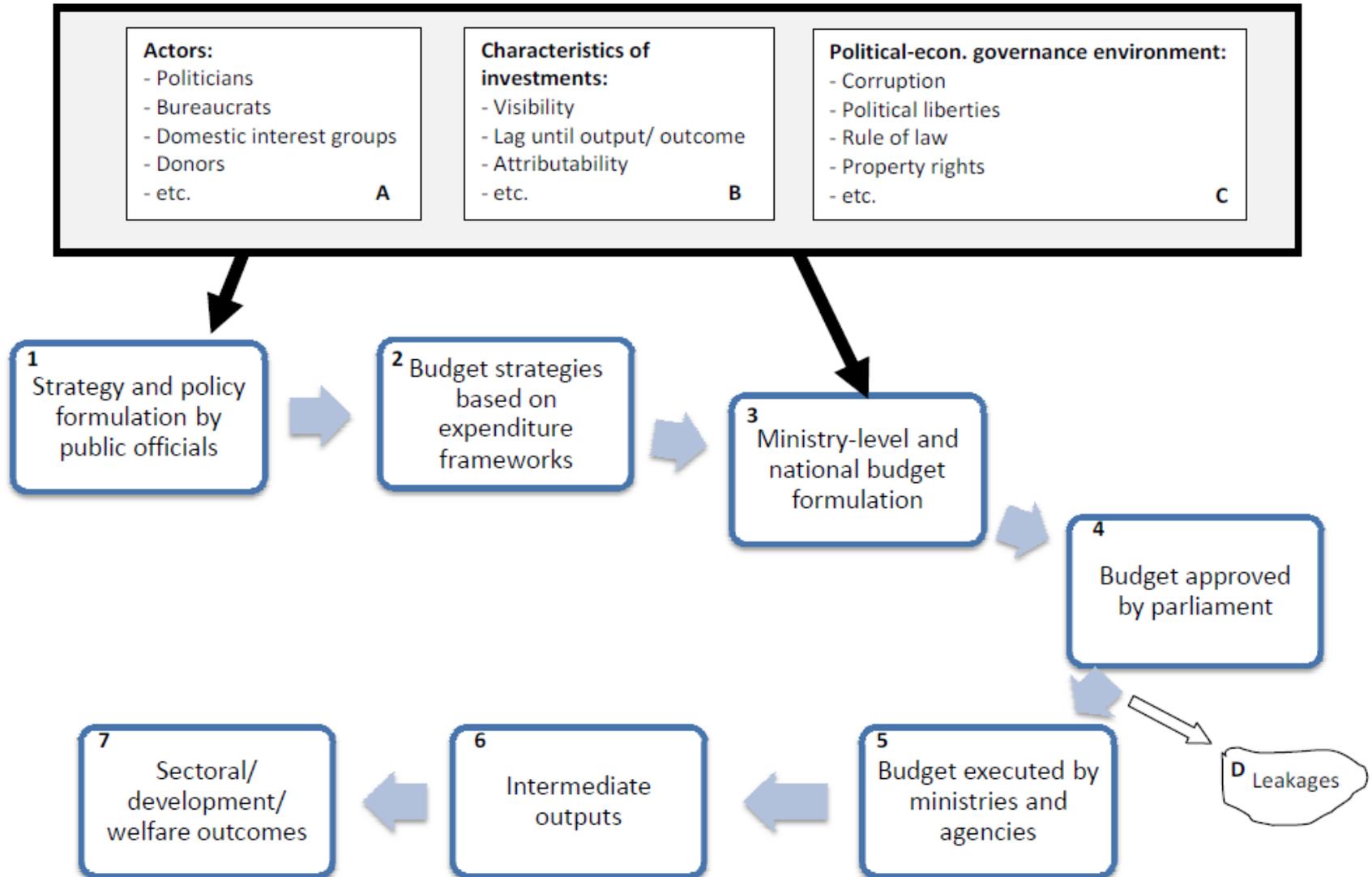
Does Agr. Public Investment Crowd-In or Crowd-Out Agr. Private Investment?

- Public investment can increase the profitability of private investment, e.g. by reducing transactions costs or expanding PPF)
- It can also crowd out private investment, e.g. by increasing cost of borrowing, or competing directly with private investment
- Both can operate at same time – net effect?
- Very limited direct empirical study w.r.t. agriculture (mostly on S. Asia)
- **No or neg. impact:** Chand 2001; Mishra & Chand 1995; Misra & Hazell 1996; Mitra 1997; Easterly & Rebelo 1993.
- **Positive impact:** Baba et al. 2010; Dhawan & Yadav 1995; Dhawan 1996; Saeed et al. 2006; Ahmad & Qayyum 2008.

Public Investment Decisionmaking Process and its Determinants



Public Investment Decisionmaking Process and its Determinants



Processes of Budgetary Decisionmaking

- **Formal procedures underlying the budget process**
- **‘Garbage-can budgeting model’**: Allocations are random (Cohen et al. 1972)
- **Budgetary model of incrementalism: Inertia and path-dependency in investment decision-making** (Davis 1971; Cowart et al. 1975; Ostrom 1977)
- **Budget implementation (vs. approved budgets)**
 - E.g. in Nigeria, on average 21 % of agricultural budget never spent (Mogues et al. forthc.)
 - Sudden revenue short- (or wind)falls; use of funds for other purposes; leakages/corruption; etc.
 - Striking results from public expenditure tracking surveys (e.g. Uganda) (Reinikka & Svensson 2004)

Role of Various **Actors** in Public Investment Decision-making

- **Policy-maker as benevolent and unencumbered social planner** (Tridimas 2001; Reddick 2002)
- **Politicians vs bureaucrats** (Niskanen 1971)
- **Strength of ‘interest groups’ to lobby for provision of public investments benefiting them is larger when**
 - ‘Interest groups’ more spatially concentrated → dispersed agricultural households vs. concentrated urban residents (Olson 1985)
 - Better access to transport and communications infrastructure → urban vs rural
 - Size of group small → agricultural population much larger in many developing countries, reverse in rich countries (Olson 1965)
 - Average income and education of group member is higher → low among smallholder agricultural households (Binswanger & Deininger 1997; Krueger 1996)

Role of Various **Actors** in Public Investment Decision-making (cont'd.)

- **External actors: Donors**

- **Setting public investment requirements (directly or indirectly)**
- **Broad policy requirements, e.g. adjustment policies), implications for agr. inv. (Fan, Yu & Saurkar 2008)**
- **Detrimental accountability effects of aid-dependence (Bräutigam & Knack 2004)**
- **Fungibility of aid (Pack & Pack 1993; Feyzioglu, Swaroop & Zhu 1998)**

Characteristics of Public Investments

- **Attributability of investments to conscious decisions made by politicians (e.g. visibility, “markability”)** (Keefer & Khemani 2005)
- **Temporal features of public investments**
 - Long lag perturbs attributability
 - Lag of investments vs. political cycle
 - Time allows for “things to go wrong”
 - Even among subsidies, inefficient subsidies (e.g. price support) may be chosen over less inefficient subsidies (e.g. income support), when political power effect of former combines with the lag problem (Acemoglu & Robinson 2001)

Economic and Political Institutions

- **Governance context with high prevalence of corruption leads to *greater* shares of public investments in overall public spending** (de la Croix & Delavallade 2009; Keefer & Knack 2007)
 - In agriculture e.g. irrigation (Wade 1982; Walter & Wolff 2002)
- **More political freedom / improved democratic governance has nonlinear impact on agricultural expenditures** (Beghin & Kherallah 1994)
 - Improvement from very low base increases opportunities for farmers to advocate on behalf of stronger agriculture orientation
 - Further improvement to high levels of political governance has no further impact, as the power of agricultural interests to demand (excessive) agricultural protection is curbed

Impacts of Public Investments: Policy Considerations

- **Compelling and substantial evidence on the high social returns to public investments in agricultural research and technology**
- **Policymakers should choose judiciously between different agricultural subsectors and functions (revisit blanket recommendations to invest more in “agriculture” instead of high-payoff activities within the sector?)**
- **Gains in some investments may materialise only in a longer time-horizon; need to take that into consideration when evaluating payoff**
- **Gains are heterogeneous across space: undertake spatially differentiated policies/investments**
- **Very little evidence about private investment impact of public investment (and the limited evidence is mixed). Expand such examination.**

Determinants of Public Investments: Policy Considerations

- Consider dispensing with notion of ‘unencumbered benevolent social planner’
- Development interventions strengthening cooperatives / farmers’ unions *may* have additional benefits beyond lowering market transactions costs etc.
- Need sharper understanding of how attributability/visibility/ lag in agr. public inv. affects their likelihood of being undertaken
 - Then consider strategies how these impediments can be overcome
- Is there some value in incrementalism models? Identify what tends to break inertia and path dependency in order to be able to use windows of policy opportunities
- Pay attention to ways in which corruption environments can give public investments a “bad name”



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