

Fostering Democratic Innovation as a Means of Reducing the 10/90 Gap in Health

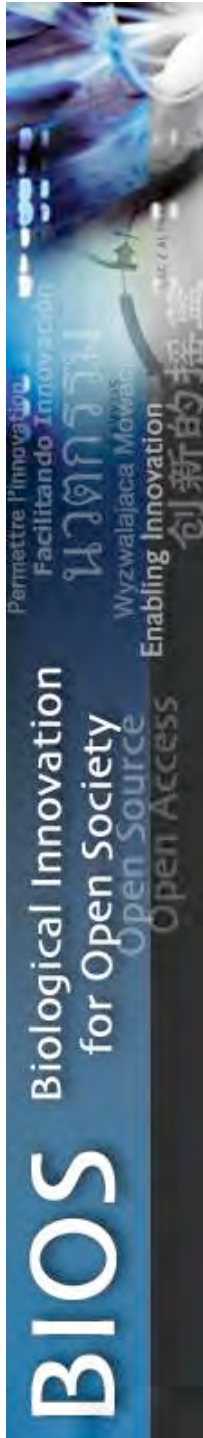
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CAMBIA BIOS Initiative

Enabling Innovation

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- To meet the Millenium Development Goals there is a need for agricultural innovation
- How can such innovation be fostered/enticed/drawn out?
- What kinds of innovations are needed to combat food shortages?
- Fostering democratic, distributive, inclusionary, locally appropriate innovation to reduce the 10/90 gap in health

Malnourishment, rather than disease, constitutes the single greatest cause of poor health (by any definition) and of untimely death worldwide

- At least 800 million people worldwide suffer from the chronic lack of adequate food
- At least 6 million children under the age of five die each year as a result of hunger; between 20% and 75% of child deaths in many LDCs can be attributed directly to malnutrition
- Malnutrition greatly slows recovery to injury and increases reportable infection rate and death rate associated with common diseases
- Many of the MDGs must be viewed in the context of populations concerned with the daily struggle to obtain food

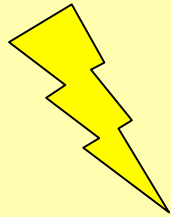
The Question: how to foster innovation that will reduce the "10/90 gap" in health?

The Emphasis: resource flows

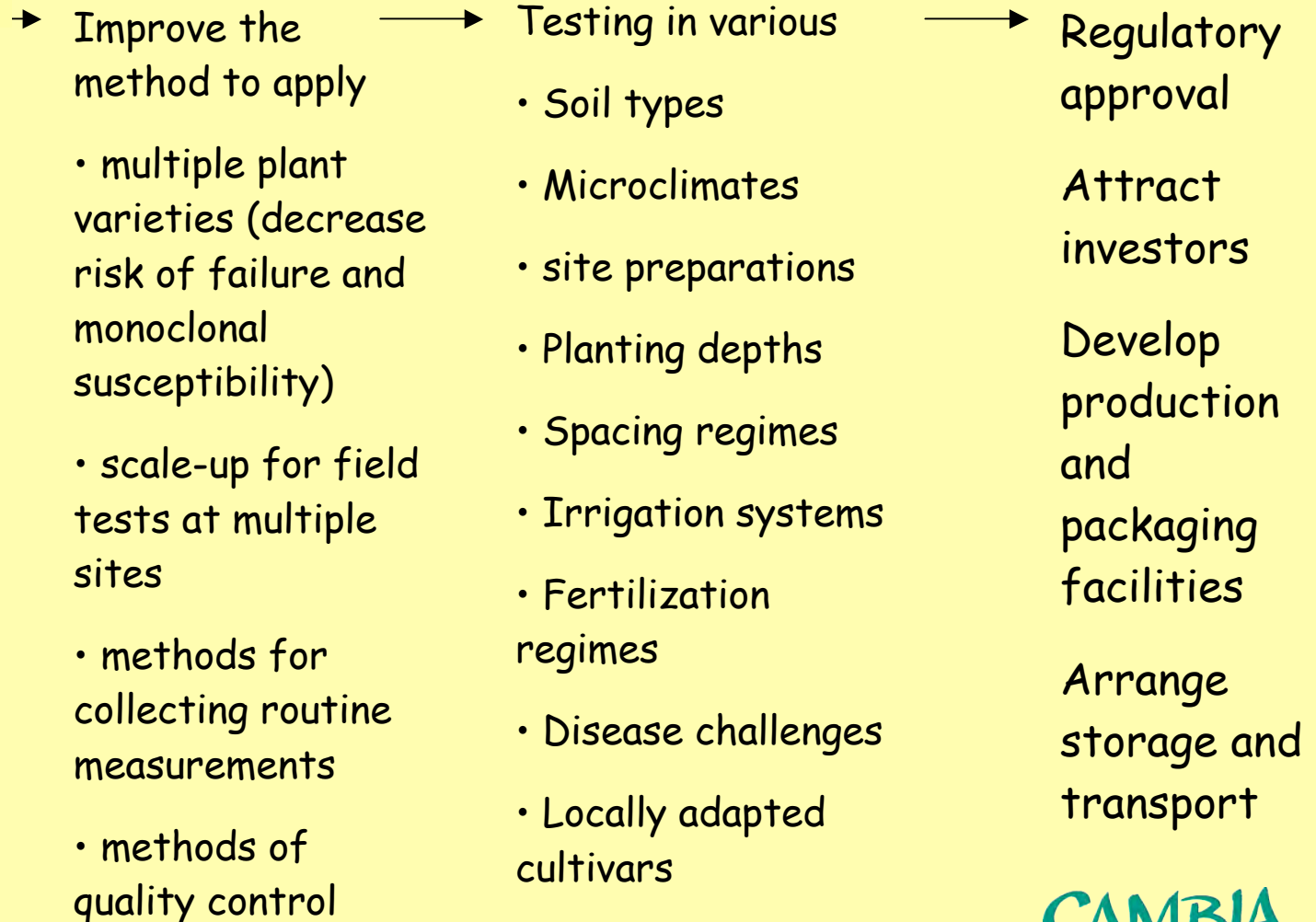
- Patents are one policy tool to increase private investment in R&D; there are other policy tools to entice or force technology holders to make technology available, and for all it is important to consider long-term interaction with technology provider behavior
- Private investment responds to large market signals because it seeks the largest return on investment
- ROI can be increased by increasing returns, decreasing entry cost, decreasing incremental cost flows, altering risk, altering timing...

Development of a typical agricultural innovation to a product

Patentable invention



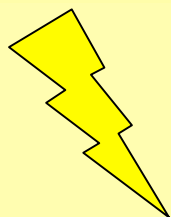
Expensive, critical, mostly not patentable innovation steps



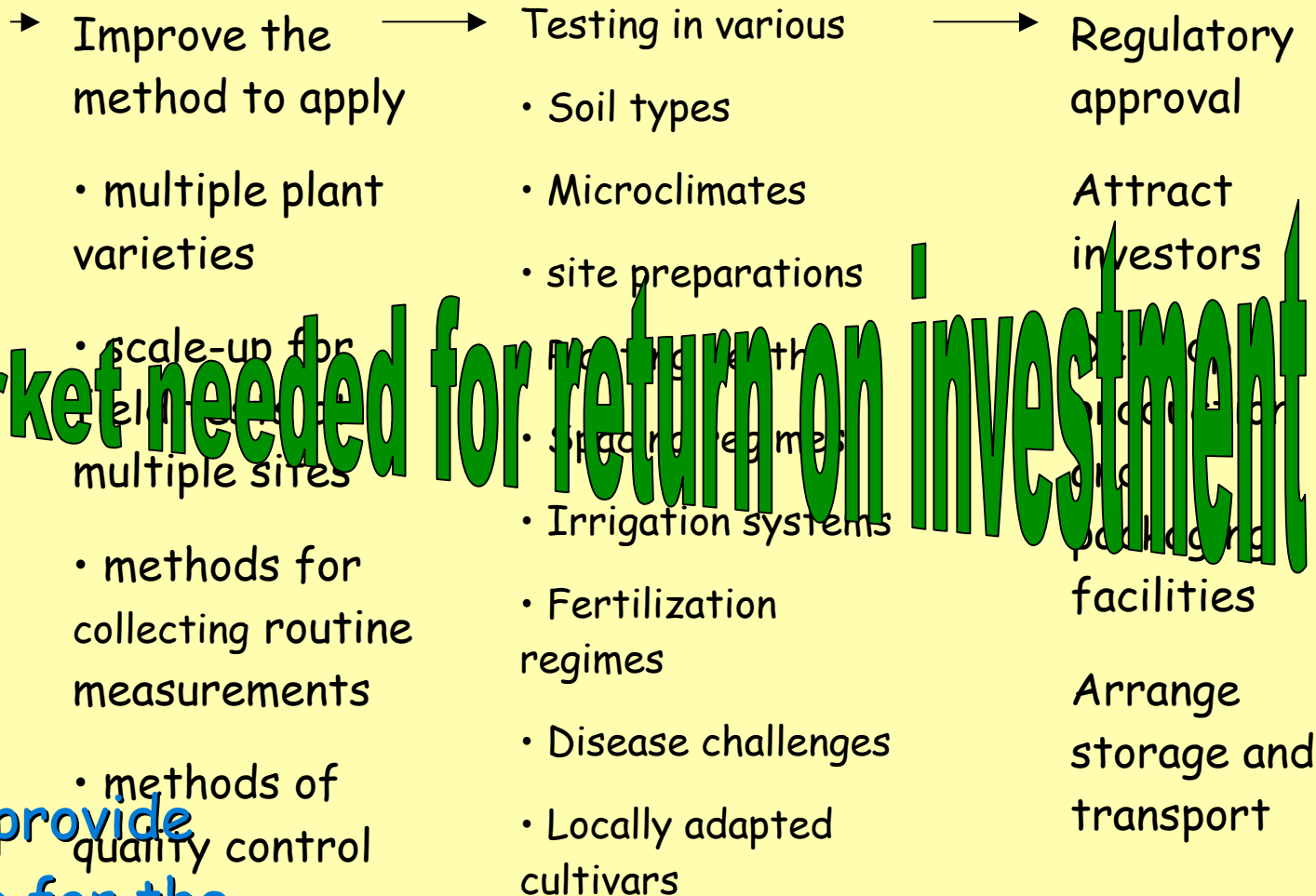
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Development of a typical agricultural innovation to a product

Patentable invention



Expensive, critical, mostly not patentable innovation steps

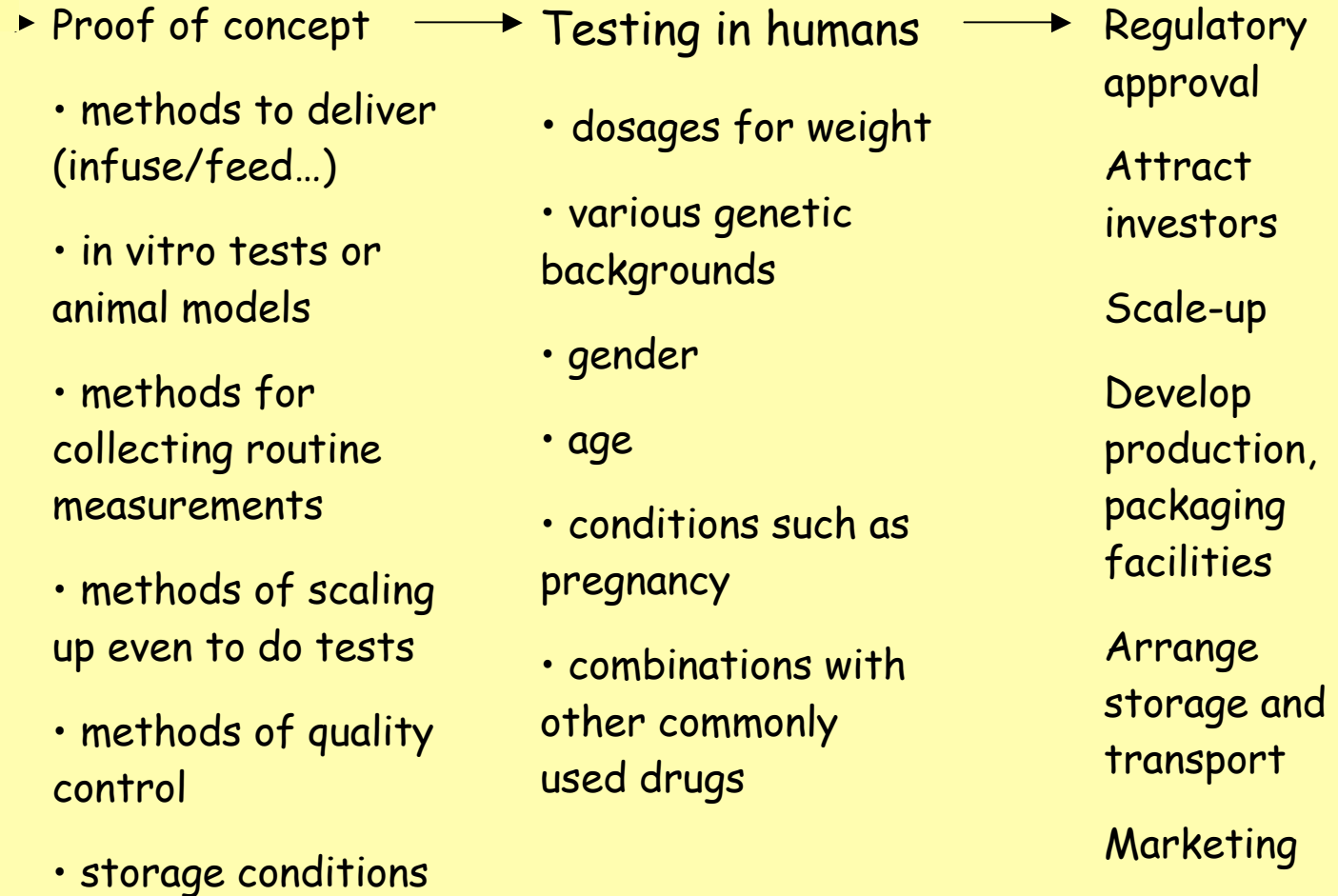
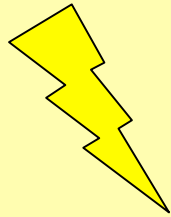


\$ market needed for return on investment

Patents provide incentive for the initial invention

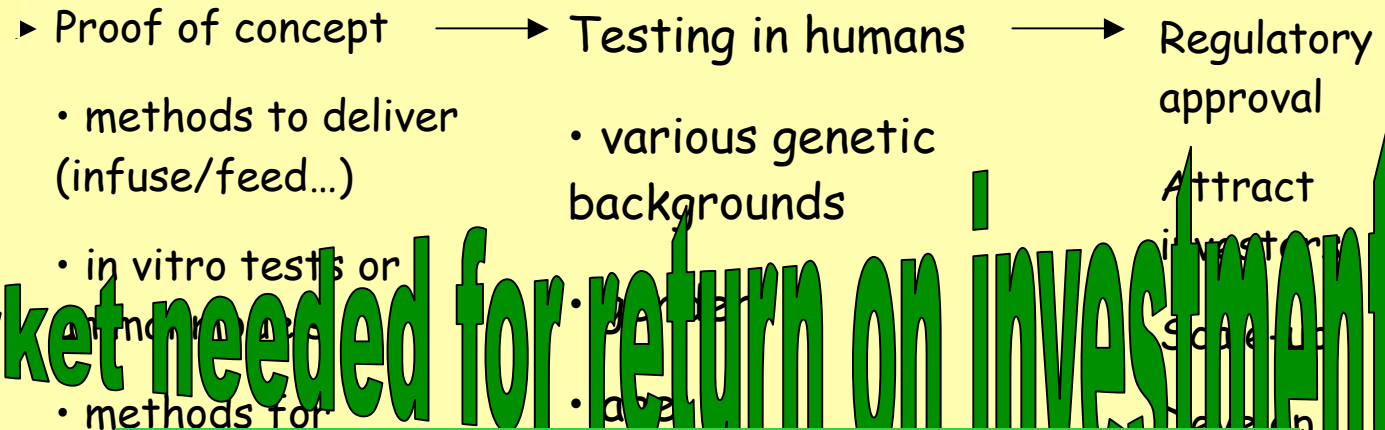
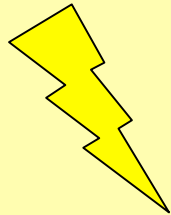
Development of a typical pharmaceutical innovation to a product

Candidate
ligand



Development of a typical pharmaceutical innovation to a product

Patentable invention



\$ market needed for return on investment

Provide incentives for downstream innovation

Decrease total costs

Decrease risk

Decrease time

Provide efficiencies

Entry points for capital investment

Are patent monopolies a necessary incentive?

An example: software development using "open source code", such as Linux:

- No patents
- Source code available in a "protected commons"
- To use the source code, agree to the conditions of the license
- License requires users agree not to prevent any other licensee from using the source code
- Widespread compliance

Side benefits obtained by “open source” (protected commons) software platforms

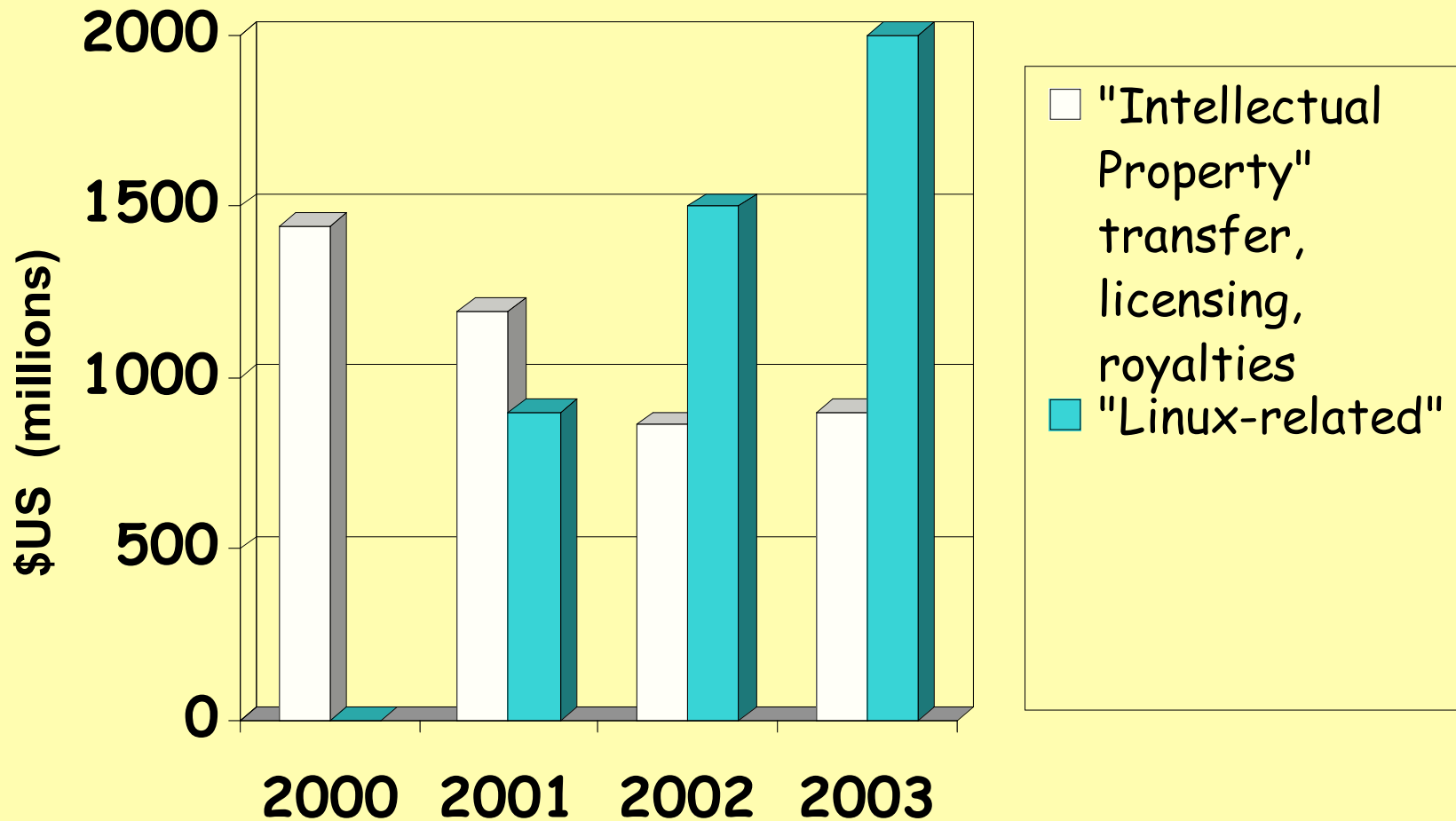
- Use of the distributive capacity of the Internet: increasingly wide availability of broadband
- Apache: Many contributions to improvements in spare time and without pay (incentive: being able to display work to others with low fear of appropriation)
- Development of robustness to language, cultural and resource diversity
- Shaming is a powerful disincentive for hackers or non-compliant or destructive users
- Community feeling, connectedness, guanxi
- A degree of security and entry points for (small) investments

IBM example (Y. Benkler)

- Largest patent holder in the world
 - > 22,000 patents 1992-2002
 - More patents than 10 other largest IT companies combined
 - including Hewlett-Packard/Compaq, Intel, Sun, Microsoft, Dell, Apple, EMC, Oracle, and EDS
- [<http://www.ibm.com/news/us/2003/01/131.html>] Report on USPTO study



Selected IBM revenues



Sources: IP income: IBM annual reports

"Linux-related": 2003 Forbes Magazine, http://www.forbes.com/forbes/2004/0607/086_print.html

2002 CNET News <http://news.com.com/2100-1001-981633.html>

2001 CNET

http://news.com.com/IBM%3A+Linux+investment+nearly+recouped/2100-1001_3-825723.html?tag=nl

What causes food shortages? (1)

- Drought and floods account for the majority of crop failures
- = Fluctuations in water supply compared to holding capacity and water need

Is the answer sending irrigation systems to LDCs?

Is irrigation the answer?

- China: half of the irrigated lands rely on groundwater extraction; water tables fell >50 meters in the past 30 years (water pumped out for irrigation > replenishment by rainwater percolating through the soil)
- Accumulation of salts has caused degradation of about 27 million hectares of irrigated land globally
- Remediation of contaminated water in Asia based on technologies borrowed from the U.S. and Europe: troublesome uncertainties when applied at sites whose characteristics are different
- Up to 60 percent of the water diverted or pumped for irrigation in Asia is not successfully directed to plant production (due to poor seasonal timing, containment systems that are mismatched to the topography and soil, leakages etc.)
- Importance of local knowledge

How to combat food shortages? (2)

- 42% of crop losses are caused by plant pathogens, insect pests, and weeds
- Globally, \$26 billion annually for insecticides and fungicides
- Pesticidal inputs can be largely ineffectual if applied with the wrong timing
- Responses other than pesticides, *e.g.* alternate host eradication programs, identification of diseased individuals can also be very expensive
- Once incidence is observed, patterns are increasingly predictable with weather factors and the migration of vectors
- Damage, and expense of response, can be mitigated by early detection
- Importance of local knowledge

How to combat food shortages? (3)

- In most countries, malnutrition is concentrated in regions of degraded environment
- Clearing for food production → worsened runoff further degrades water and land: 14 MM ha of soil annually in Africa and Asia
- Overfertilization of marginal land → contamination of surface and ground water and estuarine environments
- Compliance failures in erosion control programs and cropping systems: lack of ownership of regulations and norms, or a lack of fit with the local culture.

New crops to combat food shortages?

Learning from past mistakes:

- Adaptation to local soils
- Suited to local water availability
- Resilience to local pests
- Fit within local traditions for planting, cropping, and harvest practices
- Account for local constraints on storage, distribution logistics
- Consider local acceptance of product characteristics

The old proverb:

Give a man a fish, and he eats for a day. Teach a man to fish and he eats for a lifetime.

- What if fish resources in a particular locality are insufficient to sustain the population, and overfishing results in renewed famine?
- What if a temporarily well-funded fish program diverts water resources away from the main cash crop of the region, displacing farmers and resulting in longer-term staple shortages?
- What if the fish of the area are not safe for consumption because of sanitation or chemical deposition problems that are not being addressed?

The new approach:

Make the tools available to enable locally knowledgeable people to figure out optimal management of the local fishing resource.

New crop innovations to combat food shortages

- Improvement by plant and animal breeding
- Biotechnology
- Substitute crops
- Improved planting practices/operational gains
- Viable combinations

BioForge

The BioForge concept mirrors Sourceforge.net, a mechanism that has fostered the creation of over 85,000 protected commons projects.

To optimize possibilities for biological innovation:

- for wide access and choice
- to support **effective** innovation: **product development**
- **inclusionary** of weak market signals
- with leverage of local investment
- capture of small contributions, TK, how-not-to
- using the **distributive** power of the Internet
- for delivery to **locally committed** public

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- BioForge**
- Forums
- Links
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BioForge FAQ

BioForge

BioForge is the internet based-platform for the use of new "public-good binding licenses" and the commissioning of "democratising" technologies to forge a dynamic protected commons in enabling technology for biological innovations of all kinds.

For more information, see the [FAQ](#).

BioForge Project

Cooperative Open Access Technology Development

Developing new interactive R&D paradigms, mechanisms and initiatives to collectively create new technologies and empower diverse solutions by harnessing the communications power of the internet.

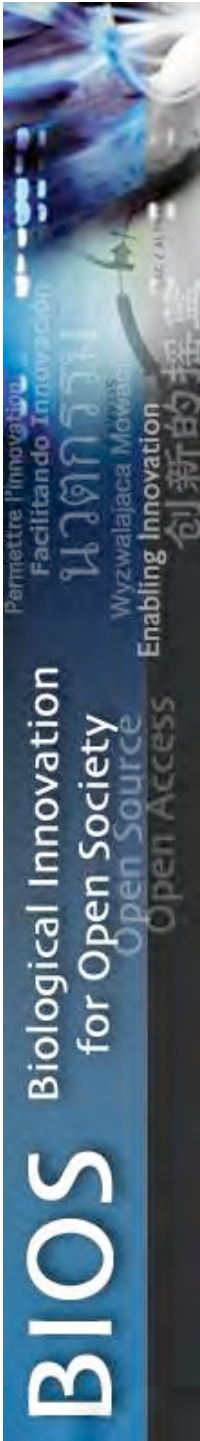
The cultivation of OATs and the creation of the BioForge

The first Open Access Technology activities of the BIOS initiative will focus on the key portfolios of technology that are presenting real bottlenecks to innovation by and for the developing world, and indeed for the structural reform of enterprise in the OECD countries, especially in agriculture, but ultimately in public health and environment. Subsequent to this, and dependent on acquiring suitable funding, 'flashin' programs can be developed targeting critical future technology.

Sponsors



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Example: java.net

- Get Involved**
- [java-net Project](#)
- [Request a Project](#)
- [Project Help Wanted Ads](#)
- [Publicize your Project](#)
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- [About java.net](#)
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Project Help Wanted Ads

The help wanted section of java.net is both for developers looking for an interesting project to work on and for those involved in a java.net project who are looking for someone to fill a particular need. Listings are restricted to volunteer openings for non-commercial projects. Commercial projects and paid positions can not be listed on this site.

Project listings remain live for 30 days, or until closed by the project owner, whichever comes first. (Project owners may always re-post expired openings.) To suggest new job skill categories, submit a request to feedback@dev.java.net

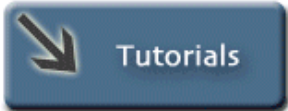
Project Owners: Log in to submit a help wanted ad. If you are logged in and do not see controls on this page please email your project name and login id to the Site Producer, Sarah Breen, at sbreen@oreilly.com
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Most Recent Posts

Title	Project	Initial Post Date
Developer With Docking Interest Needed The FlexDock project is looking for developers interesting in transforming FlexDock into the premier Java Swing docking solution. Skills Needed: GUI, J2SE, Swing Contact: Scott Delap at scott@clientjava.com	F l e x D o c k	Oct 25, 2004

IP Tools



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Intellectual property informatics and analysis

The intellectual property informatics and analysis component of the BIOS initiative provides information about the intellectual property landscape. These tools are an important and necessary component of the BIOS initiative, as they allow the user to determine the IP boundaries of what is free and what is not free.

The resource was initially developed by CAMBIA, as the *CAMBIA IP Resource*. It currently consists of a fully-text searchable [patents database](#), containing 1,500,000 life science patents, [technology patent landscape analyses](#) and intellectual property [tutorials](#).

BIOS will create new resources and develop existing toolkits to assist in the navigation of complex legal thickets and the evolution of intellectual property and technology.

BioForge cooperative development activities

- Develop licensing practices based on CAMBIA's existing industry links and open-source/GPL inspired licensing to enable a realistic protected commons for biological innovations and materials.
- Adapt Internet-based technology management tools to collect, evaluate and curate suitable for use by a range of professionals including researchers, SME managers and entrepreneurs at the local level, worldwide.
- Incubate innovative strategies based on inventor motivations and community norms, and foster compliance through reinforcement
- Implement collaboration software to enable formation of decentralized nodes of R&D functioning in important languages

You may be able to help!

Agriculture has a millennia-long experience of doing experiments and sharing the results in informal protected commons.

We can be hopeful that this paradigm can support distributive innovation globally for local application to other social and medical determinants of health.