

# California against cronyism

The scale of funds set to be spent by the state on stem-cell research necessitates strong governance.

The California Institute for Regenerative Medicine (CIRM) has been making up for lost time. It didn't award a single grant until more than a year after California taxpayers voted it into existence, because lawsuits were holding up its funding. Now the agency is about to award another round of grants, which will bring its total spending to just over \$520 million. The upcoming awards will fund a network of new and renovated buildings across the state — a striking achievement, all the more remarkable for coming in the same year that Governor Arnold Schwarzenegger asked the state's public universities to cut the rest of their budgets across the board.

So much for the CIRM's good news. Now for the growing pains. Several episodes over the past year have highlighted an inherent problem with the CIRM's structure: the board that distributes its funding is stacked with representatives from the universities that benefit most from those disbursements. The CIRM has enacted rules to try to limit the conflicts of interest posed by this arrangement. They don't go far enough. At one meeting in January, for instance, CIRM board members from institutions that had applied for a facilities grant voted to deny one of these grants to an institution that has no representatives on the CIRM board (see page 18).

Another potential conflict is sure to become a bigger issue if, as the CIRM has promised, its discoveries yield commercializable results. Some in the California state legislature, such as Senator Sheila Kuehl (Democrat), want to ensure that treatments resulting from the CIRM can be afforded by all taxpayers footing the bill. But the CIRM must also court biotechnology companies if its discoveries are to make it to the clinic, and these companies want maximum control over their pricing options.

The CIRM requires companies to which it gives money to offer

any resulting drugs "at a price as provided in the California Discount Prescription Drug Program" to people eligible for that programme. The CIRM also requires academic institutions to license their CIRM-funded inventions "only to persons that agree to have a plan in place at the time of commercialization to provide access to resultant therapies and diagnostics for uninsured California patients".

But these relatively vague requirements lack teeth, a fact that Senators Kuehl and George Runner (Republican) are attempting to address with legislation requiring CIRM grantees and licensees to "sell drugs at a price that does not exceed any benchmark price in the California Discount Prescription Drug Program", a measure aimed at ensuring affordability, and a sensible one at that. This proposal is a way to nudge the CIRM towards something it has already promised — guaranteed access for taxpayers to the results of the work they have funded. It also attempts to strengthen the voice of the public in setting the CIRM's path — a voice that, although institutionalized on the CIRM's board, has competed there with mixed success against academic and industrial interests.

This will be the CIRM's main procedural challenge. For the agency to succeed, patient advocates and other public representatives must fight the tendency of the academic institutions on the board to hoard dollars. As the patient advocates grow into their roles as full partners, and with help from well-intentioned lawmakers such as Kuehl, the CIRM must be coaxed into serving its most important constituency — the taxpayers of California. The roles themselves are not unusual in the world of governance, but here the stakes are exceptionally high. ■

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## A research menu

More spending on agricultural science is needed to help resolve the world's food crisis.

This was not a sudden crisis. It may be only this spring that food prices have started sparking riots on the streets of Haiti and Egypt, not to mention rice rationing at Wal-Mart's cash-and-carry stores, but food prices have been rising since 2000. The rises accelerated in 2006, when global cereal stocks dropped to levels not seen since the early 1980s. And although the factors driving them are many and various, a good few of them look likely to persist for years to come.

Nor is the crisis unremittingly heinous. Higher food prices, other things being equal, mean higher farm incomes, and there are a lot of poor farmers in the world who could do with such a boost. But although this may suggest benefits for some in the future, the net

effect so far has been negative. An interim report released by the World Bank in April says that seven years' poverty reduction has been undone by the past two years of high staple-food prices.

The causes of these shortages are not easily undone, and some of them are things no one should want to undo. In China and India there is ever more — and utterly reasonable — demand for a third meal in the day and more meat in the diet. In Australia prolonged drought has had a severe effect on wheat production. High energy prices mean costly fertilizers and insecticides, not to mention making farm machinery more expensive to run. In the United States, more and more corn (maize) goes to making ethanol, raising the price of both corn and other cereals that can substitute for it.

There are various ways in which the fruits of scientific research might have helped ease the suffering that comes from this confluence of factors. But here, too, the harvest is not what it might have been. Public spending on basic agricultural research fell during the 1980s and 1990s in rich countries (see page 8). The proportion of US aid ploughed into agriculture wilted from 25% to 1%, bilateral farming aid from Europe

dropped by two-thirds and World Bank lending in the sector slipped from 30% to 8%. The reasons for this included the perceived success of Green Revolution technologies in Asia, and, indeed, some backlash against intensified farming among green groups. The downside was most pronounced in sub-Saharan Africa, where the cutbacks were still severe even though there had been no Green Revolution comparable to that in Asia. A contributing factor to this decline from the 1990s on was Europe's attitude to genetically modified crops, which both chilled research in the area and reduced incentives for such technologies to be fielded in countries looking to European export markets.

One might assume that such cutbacks in research reflected poor results. Not so; the pay-offs to agricultural research are massive. The World Bank's *World Development Report 2008: Agriculture for Development* (<http://tinyurl.com/2ngyqd>) — the first of the annual reports to focus on agriculture for a quarter of a century, the bank noted with self-reproach — cites 700 published estimates of rates of return on investment in agricultural research, development and extension services in developing countries. It reports an average annual return of 43%.

Agriculture has poverty-busting powers beyond straightforward revenue increases. One reason for this is that poor people in poor countries who earn a little extra cash will spend it on basic local goods and services — agricultural growth spurs economic growth from the bottom up. A study of 42 developing countries covering the period from 1981 to 2003 found that growth in gross domestic product (GDP) that originated in agriculture increased spending by the poor two-and-a-half times more than does GDP growth in other sectors.

The past weeks have brought signs that global institutions and donors are beginning to bow, belatedly, to this logic. On 2 April the World Bank announced its intention to double agricultural lending to sub-Saharan Africa over the next year, and bank administrators say that a portion of the new money will go towards basic research.

Britain, the International Monetary Fund and the Bill & Melinda Gates Foundation are also opening their coffers. In the case of the Gates's money, much will be channelled through the Alliance for a Green Revolution in Africa led by Kofi Annan.

There are many useful directions for such development; higher yields, drought resistance and reduced requirements for inputs such as fertilizers and pesticides are all promising. But the more pressing problem for poor farmers is not the development of new technologies but access to those already there. Plenty of good agricultural science — such as locally adapted seed varieties and soil surveys — sits unused because it has not been delivered in a form adequately tailored to the end users and their limited means.

**“Agriculture has poverty-busting powers beyond revenue increases.”**

Resources need to go towards coordinating and strengthening local agricultural extension services as an integral part of revamping and reintegrating the research infrastructure. Agricultural research systems in sub-Saharan Africa are fragmented into almost 400 distinct agencies, eight times the number in the United States and four times the number in India.

Access is not just a matter of seeds and bloodlines and new agronomic know-how. Weather services that rich-world farmers rely on are extraordinarily hard to get hold of in poor countries. The first attempt to evaluate the impact of climate change on agriculture in Africa, for example, had to rely on climate-sensitivity studies carried out in the United States for lack of any data from the continent in question. Better weather and climate data would allow lenders, be they development banks or local sources of microfinance, to create insurance products for farmers of a sort that is almost completely unavailable to the world's poor. These pragmatic solutions should get a large slice of a rapidly expanded pie. ■

## A place for everything

More researchers must record the latitude and longitude of their data.

Who, what, where and when? Among the basic elements of scientific record-keeping, too often the ‘where?’ gets neglected. Now advances in satellite-positioning technology, online databases and geographical information systems offer opportunities to make good that neglect, and to add a much-needed spatial dimension to many types of biological research. Location data are essential for those modelling species' responses to climate change, or the spread of viruses, for example. Failure to include spatial information from the get-go may close off potentially highly productive routes to analysis — including those not yet foreseen. But those data are frequently inadequate or absent.

Many museums and herbaria are trying to make good this problem as best they can, geo-referencing their collections and putting them online. This frequently requires nightmarish work translating place names from various historical eras, languages and conventions into

latitudes and longitudes. Although this is a necessary evil in matters retrospective, going forward there is a much simpler and easier answer in the form of coordinates and a time-stamp taken from the Global Positioning System (GPS) at the point of capture, or any other specified point of relevance.

This technology means that there is now much less excuse for allowing spatial data to fall by the wayside simply because they are not relevant to the data collectors' project in hand. Not only are the data easily collected, they are easily stored too. GenBank, for example, introduced fields for latitude and longitude in the metadata attached to its nucleotide sequence records in 2005. But few yet contain such information.

Gene sequence and structure databases have flourished in part because journals require authors to submit published data to them. It is worth considering a similar requirement that all samples in a published study be registered, along with GPS coordinates, in online databases such as the Global Biodiversity Information Facility. At the same time, it would behove spatial scientists to articulate to the broader research community the potential of recording and making accessible spatial data in the appropriate formats — and the painlessness of the process. ■