## An Agricultural Law Research Article

# Andhra Pradesh, India, As A Case Study in Perspectives on GMO's

by

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# BIOETHICS SYMPOSIUM

## ANDHRA PRADESH, INDIA, AS A CASE STUDY IN PERSPECTIVES ON GMO'S[1]

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### I. INTRODUCTION

Agriculture has been the object of global revolutions since it first dawned on humankind. Roughly ten thousand years ago, agriculture revolutionized civilization for all time when it appeared—in explicably—across the earth nearly simultaneously in places as far flung as the Far East, the Middle East, and South America. More recently, the Green Revolution spread "modern" agriculture throughout the world: an agriculture of chemical inputs, machinery, technology, research and development networks, and investment and involvement by governmental institutions and agencies. The Green Revolution was the product of many forces, not the least of which was a concern that agriculture as it had existed was unable to feed a burgeoning world population, particularly in developing nations.[3] Increased yields were the goal, along with the political stability that accompanies food security.[4] The Green Revolution has now performed much transformative work, but the world faces yet another global agricultural revolution: biotechnology is changing the essence of food production across the world. To say that this latest revolution is controversial would be

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[1] This article was originally presented at the March 31, 2004 symposium on National and Global Implications of Genetically Modified Organisms: Law, Ethics, and Science. The symposium was presented by the Center for Biotechnology, Law, and Ethics, of Cumberland School of Law, Samford University; the Center for Ethics and Values in the Sciences, of the University of Alabama at Birmingham; and the Cumberland Law Review.

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[3] For a discussion of some of the forces shaping the Green Revolution with particular focus on India, see generally SHALIA SESHIA & IAN SCOONES, TRACING POLICY CONNECTIONS: THE POLITICS OF KNOWLEDGE IN THE GREEN REVOLUTION AND BIOTECHNOLOGY ERAS IN INDIA (Inst. of Development Studies, Working Paper No. 188, 2003), http://www.ids.ac.uk/ids.ac.uk/ids/bookshop/wp/wp188.pdf.

[4] *See id.* at 2-5.

trite. This revolution is both a war and a battlefield.[5]

The controversy over biotechnology rages the world over, and the struggles over biotechnology issues are set within broader ideological conflicts. Some see the biotechnology revolution as a battle waged by the "capitalist imperialism" of large multinational corporations and developed nations against local autonomy and traditional values; for others, biotechnology is the golden opportunity for developing nations to become industry leaders while developed nations fail to seize the moment of opportunity. Although in the developed nations ideological controversy rages, nowhere is the controversy more poignant than in developing nations, where livelihoods and lives depend on the outcome of the debate.[6] Particularly in India, the biotechnology revolution is taking hold,[7] bringing controversy with it.[8] Because of its size and population and its significant role in the politics, stability, and economy of the world, India "has become a key site for biotechnology companies and anti-GM activists alike in the global contest over the future of biotechnology in agriculture."[9]

There are two key settings for the biotechnology debate in developing nations.[10] The first debate setting centers on biotechnology as an opportunity for food security and nutrition for the people of developing nations. Although India is presently self-sufficient in most foods, its already remarkably high population is rapidly growing.[11] In addition, India has 350 million people below the poverty line.[12] The

[5] The biotech revolution is a war in that it involves struggles for dominance in determining how GMOs will be used (if at all). It is a battlefield in that it is a forum for struggles between ideologies warring globally on many fronts.

[6] Developing countries have much at stake: on the one hand, the need for increased food production and nutrition enhancement for the sake of the people and of political stability; on the other, preservation of traditional agricultural methods and crop varieties that are useful inasmuch as they are adapted to local climate and conditions. Less developed nations face the same concerns, and may be particularly vulnerable to the crossfire in the biotech revolution.

[7] *See Evergreen Revolution Is the Answer*, THE TIMES OF INDIA, Jan. 6, 2004, *at* http://timesofindia.indiatimes.com/articleshow/406744.cms. India, though currently self-suffi cient in most foods, foresees increasing food demands due to a rapidly expanding population and predicts that in fifteen years it will need to import substantial amounts of major foods, including rice. Faced with this forecast, India has announced a six-year plan, the Plant Genome Research Road Map, for using biotechnology to increase yields and the nutritional value of food. Richard Black, *India Unveils a Six-Year Plan*, BBC NEWS, Jan. 5, 2004, *at* http://news.bbc.co.uk/1/hi/sci/tech/3369263.stm.

[8] For an overview of the India's multifaceted debate over biotechnology and the key personalities in the debate, see Shiv Visvanathan & Chandrika Parmar, *A Biotechnology Story: Notes from India*, 37 ECON. AND POL. WKLY. 2714 (2002).

[9] PETER NEWELL, BIOTECH FIRMS, BIOTECH POLITICS: NEGOTIATING GMOS IN INDIA 1 (Inst. of Development Studies, Working Paper No. 201, 2003), *available at* http://www.ids.ac.uk/ids/bookshop/wp/wp201.pdf.

[10] SESHIA & SCOONES, *supra* note 2, at 11, 14.

[11] Black, *supra* note 7; *see supra* note 7.

[12] P. Chengal Reddy, *When Western Activism is Misguided*, Oct. 31, 2000, *at* http://agbioworld.org/biotech_info/topics/agbiotech/activism.html; *Malnutrition Takes*

food needs of approximately 320 million people in India today are unmet, and in several states (including Andhra Pradesh) starvation deaths have been reported.[13] Genetically modified organisms could offer India's poor help in obtaining affordable, sufficient nutrition, if developed and introduced in a pro-poor manner.[14] Of course, the issue of whether they *should* be part of the solution to the problem of feeding India's poor is very much a point of contention.

The second debate setting centers on biotechnology as an opportunity for economic growth—a chance for developing nations to boost economic growth and acquire a respectable place in an ever-more-neoliberal global economy. India is taking an increasingly more important place in the world economy, and India's own economy is opening to multinational companies and entrepreneurs.[15] As a member of the World Trade Organization, India is subject to all the treaties of that organization which are obligatory for its members—treaties that foster economic neoliberalism and a globalized economy and that require members to open up their markets to world trade.[16] Furthermore, in 1991 India accepted a six billion dollar loan from the International Monetery Fund ("IMF"), "which, among other things, obliged it to liberalise [sic] its industrial licensing policy and relax the terms on which multinationals could enter the Indian economy."[17]

In the context of India's changing place in the world market, biotechnology is considered an opportunity for competitiveness in world markets, both for its own sake and for the sake of revolutionizing agriculture, a key industry in India.[18] In the world's new economy, the idea is to move to "large, consolidated and mechanised [sic] farms competing with their equivalents in other parts of the world for high value export markets."[19] Biotechnology's mission in the new agriculture is to cut the costs of labor, fertilizer, and pesticide inputs, to reduce losses caused by draught, pests, poor soil, and disease, to reduce post-harvest losses, and to improve food quality, including nutrition value.[20] In this context, poor, marginal, small-scale farmers (the majority of farmers in India) "are not really part of the picture, being

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*Heavy Toll on Economy*, THE HINDU BUSINESS LINE INTERNET EDITION, Feb. 8, 2002, http://ww.blonnet.com/2002/02/09/stories/2002020900740200.htm.

Reddy is the President of the Federation of Farmers Associations, Andhra Pradesh, India.

[13] Ranjit Devraj, *Development-India: Food Rejected Over Starlink Fear*, INTER PRESS SERVICE, Mar. 10, 2003, www.westlaw.com.

[14] *See, e.g.*, *Tailoring Modern Biotechnologies for Resource-Poor Farmers*, ISB NEWS REPORT, Oct. 2003, *at* http://www.isb.vt.edu/news/2003/news03.oct.html#oct0305.

[15] *See* SESHIA & SCOONES, *supra* note 3, at 6.

[16] *Id.*

[17] *Id.*

[18] *Id.* at 14.

[19] *Id.*

[20] *See id.* at 14-15.

seen more in terms of state obligations for welfare and support, and as part of a more general encouragement of deagrarianisation [sic] and diversification away from agriculture."[21]

These two settings for debate are dramatically illustrated in the Southern Indian state of Andhra Pradesh. Although approximately seventy percent of Andhra Pradesh citizens are engaged in agriculture,[22] malnutrition causes significant losses to the economy.[23] One of India's poorest states, Andhra Pradesh longs to become an economic force to reckon with, especially in both technological industries[24] and agriculture.[25]

The purpose of this discussion is to demonstrate the two settings for debate through the ongoing discussion of GMOs in Andhra Pradesh. I focus particularly on the second setting's aspect of biotechnology as a means to modernizing agriculture and demonstrate that opposing positions in this setting have more to do with concepts of power and with individual positions in the existing power distribution than with GMOs themselves.

An important note: the following illustrative perspectives are qualitative, not quantitative. I do not intend to represent that any of the viewpoints discussed is more or less accepted in Andhra Pradesh than another; my goal is to identify and analyze the substance of actual viewpoints.

## II. LIFE AND AGRICULTURE IN ANDHRA PRADESH

Andhra Pradesh is diverse in every way imaginable. In the capital of Hyderabad, people go to work at places such as the Centre for DNA Fingerprinting and Diagnostics, Hyderabad University, or a major pharmaceutical manufacturer producing generic drugs, while in the rural countryside some farmers plant traditional crops, plowing the land with oxen.

Even among farmers there is great diversity. They range from large farmers to small, marginal, and landless farmers,[26] and they come from different cultural groups—castes, tribal groups, and *dalits*. Farmland in India's fifth largest state also varies from dry lands (sixty

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[21] *Id.* at 15.

[22] MICHEL P. PIMBERT & TOM WAKEFORD, PRAJATEERPU: A CITIZEN'S JURY/SCENARIO WORKSHOP ON FOOD AND FARMING FUTURES IN ANDHRA PRADESH, INDIA 8 (2002), *available at* http://www.ids.ac.uk/biotech.

[23] *Malnutrition Takes Heavy Toll on Economy*, *supra* note 12.

[24] *See* Keith Bradsher, *A High-Tech Fix for One Corner of India*, NEW YORK TIMES, Dec. 27, 2002, at C1.

[25] *See generally* VISION 2020, 167-230, *available at* http://www.aponline.gov.in/quick%20links/vision2020/vision2020.html (last visited May 13, 2004).

[26] PIMBERT & WAKEFORD, *supra* note 22.

percent[27]) to irrigated fields. Andhra Pradesh is prone to both droughts (particularly in the dry uplands) and floods.

Of the seventy percent of Andhra Pradesh citizens working in agriculture, eighty percent are small and marginal farmers and landless laborers.[28] Together these groups own only thirty-five percent of the total agricultural land in Andhra Pradesh, but, oddly enough, about seventy percent of the state's livestock.[29] Among these groups, women play a significant role in agricultural work, food preparation and storage, and livestock management.[30]

Perspectives on GMOs are also diverse, and the state is a forum for the diverse perspectives of the entire world. In June, 2003, Hyderabad hosted a meeting of non-governmental organizations from around the world. The group concluded that GMOs in agriculture posed a "threat . . . to community knowledge systems, farmers' right to save and use seeds, biodiversity, livelihoods, food sovereignty and consumers' right for safe and healthy food."[31] In February of 2004, a global biotechnology business meeting, BioAsia 2004, met in Hyderabad. It was hosted by the Andhra Pradesh government.

*Tales of Agriculture in Andhra Pradesh*

Many farmers in Andhra Pradesh are on a treadmill. Small and landless farmers, often unable to obtain bank loans, take on high-interest loans from moneylenders or landlords at the beginning of the season. At the end of the season, the loan becomes due; the farmer sells his crop to pay off the loan. Many other farmers are also harvesting crops and selling at the season's end; supply is high, and prices low.[32]

1998 was a bad year for cotton. Drought and insects decimated the cotton crops. Unable to pay back their loans, some farmers committed suicide.[33] Some attempted to kill themselves by drinking the insecticide meant for the cotton crop, only to discover an additional cause of their woes: the poor quality pesticide contained little of the active ingredients, and the attempted suicides failed.[34]

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[27] VISION 2020, *supra* note 25, at 175.

[28] PIMBERT & WAKEFORD, *supra* note 22.

[29] *Id.*

[30] *Id.*

[31] THE POWER OF PEOPLE'S TRADITIONAL KNOWLEDGE: HOW TRIPS THREATENS BIODIVERSITY AND FOOD SOVEREIGNTY: CONCLUSIONS AND RECOMMENDATIONS FROM NGO PERSPECTIVES (2003).

[32] For a discussion of distress sales in Southern Andhra Pradesh, see WENDY KAY OLSEN, RURAL INDIAN SOCIAL RELATIONS: A STUDY OF SOUTHERN ANDHRA PRADESH 3 (Oxford Univ. Press 1996).

[33] *Farmers in India Commit Suicide as Crop Fails*, THE DAILY RECORD (BALTIMORE, MD.), Jan. 8, 1998, at 2, *available at* www.westlaw.com.

[34] ROBERT POLLIN, CONTOURS OF DESCENT: U.S. ECONOMIC FRACTURES AND THE

Venkat Reddy, a farmer in Andhra Pradesh, was caught like the others with debts he couldn't pay. Like many others, he considered killing himself, but decided instead that "it's better to actually donate something rather than . . . kill himself and leave his family."[35] Instead, he sold a kidney for one thousand dollars.[36] At the time, Bt cotton was not yet available to Indian farmers. We know of Venkat Reddy because, oddly enough, he was interviewed by an NPR reporter in neighboring Katarnaka at a demonstration opposing Bt cotton—cotton genetically engineered to resist pests and require fewer insecticides.[37] Reddy represents the vulnerability of many of Andhra Pradesh's small farmers to the devastating toll of a bad crop year—or a bad market. His story indicates how delicately many farmers rest each year in the unpredictable balance of nature, the market, government policy, and luck.

## III. PERSPECTIVES ON POWER AND GMOS IN ANDHRA PRADESH

### *A. Chief Minister Chandrababu Naidu:[38] Power as a Place in the World Market*

Power may be seen as the ability to affect others' choices[39] along with the ability to effect one's own market power. Biotechnology can be viewed as a key to ascendance to market power both as an industry in its own right and as part of the modernization of agriculture. The Chief Minister of Andhra Pradesh, Chandrababu Naidu, came to of-

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LANDSCAPE OF GLOBAL AUSTERITY 141 (2003).

[35] John Biewen, *Engineering Crops in a Needy World* (National Public Radio, Dec. 26, 2000) [hereinafter Biewen, *Engineering Crops*]. The audio report can be accessed at http://www.americanradioworks.org/features/food_politics/index.html. A transcript of the report is available at http://www.agbioworld.org/bitech_info/artcles/interviews/npr_engcrops.html.

[36] Biewen, *Engineering Crops*, *supra* note 35.

[37] The protest was sponsored by the Katarnaka State Farmers Association (KRRS). *Id.* Some of the farmers indicated they did not know why they were protesting. John Biewen, *Reporter's Notebook*, *at* http://www.americanradioworks.org/features/gmos_india/reportersnotebook.html [herinafter Biewen, *Reporter's Notebook*]. These came to the demonstration because KRRS "just gave them a train ticket and asked them to come." Biewen, *Engineering Crops*, *supra* note 35. Another protester claimed the farmers paid their own way to the gathering. Biewen, *Reporter's Notebook*.

[38] Since the presentation of this article at the March 31, 2004 symposium on National and Global Implications of Genetically Modified Organisms, Chandrababu Naidu lost reelection to the position of chief minister and resigned from his post. *Defeat for India Coalition Ally*, BBC NEWS, May 11, 2004, *at* http://news.bbc.co.uk/2/hi/south_asia/3702701.stm.

[39] Structural power has been defined as "'the power to shape the context in which others make decisions.'" NEWELL, *supra* note 10, at 24 (quoting S. STRANGE, STATES AND MARKETS: AN INTRODUCTION TO INTERNATIONAL POLITICAL ECONOMY (1988)). Though liberties are taken here with this characterization of power, the definition of power described in this section evolved from the aforementioned quotation in Newell's article.

fice on a political platform of reforming and modernizing the Andhra Pradesh economy. Regarding biotechnology, Naidu has said, "I want [Andhra Pradesh] to be [number one] in biotech. That is our goal. I think we are marching ahead."[40]

Andhra Pradesh is actively courting the biotechnology industry. In its effort to become the new headquarters of biotechnology, the state has implemented incentives such as a "single-window" clearance system for biotechnology licensing and approvals,[41] state participation in contributing venture capital for biotechnology start-up companies,[42] a research park area dedicated to biotechnology ("Genome Valley"),[43] and tax breaks and reimbursement incentives for biotech companies locating in Andhra Pradesh.[44] Andhra Pradesh has adopted a development plan, Vision 2020, which includes an outline of the State's long-term plans and goals for biotechnology and for agriculture.

Vision 2020 calls for Andhra Pradesh to become a "powerhouse of Indian agriculture",[45] while at the same time "shifting [its economy] from a predominantly agrarian to an industry- and services-led economy."[46] To do this, the state will "consolidate today's fragmented farming operations, foster research and development, and en-

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[40] Srinivas Rao, *BioSpectrum Awards State of the Year Andhra Pradesh*, BIOSPECTRUM, Dec. 12, 2003, *at* http://biospectrumindia.com/general/aboutus.asp/archive/articledetail.asp?arid=54219&mode=disp. The article includes a questionnaire interview with Chief Minister Naidu.

[41] Srinivas Rao, *supra* note 40. In India, where most states are larger and more populous than many countries, cultivars are released at the state level rather than at the national level. ICRISAT, *Swetha (Chickpea Kabula Variety ICCV2)*, *at* http://www.ICRISAT.org/web/ASP/mainsection.asp?cid=79 (last visited Jan. 24 2004).

[42] Rao, *supra* note 40. APIDC Venture Capital, Ltd., is a joint venture between the Andhra Pradesh Industrial Development Corporation and the U.S.-based Dynam Venture East. Investors in APIDC Venture Capital Limited include the Andhra Pradesh state government, Andhra Bank, and others. *Id.*

[43] *Id.* The Andhra Pradesh government is committed to providing the Genome Valley with uninterrupted water and electricity, a truly important commitment for attracting biotechnology experiments in a developing state. *See id.*

[44] *Id.* In a 2003 interview, Chief Minister Naidu spoke of some of the current incentives for biotech entrepreneurs, including

[a] 25 percent capital subsidy in the cost of the land for the biotech parks, and a rebate in the land cost at the rate of Rs 30,000 for every job created in bioinformatics and other related fields in the parks and a concessional sales tax of only [one] percent as against [twelve to fourteen] percent outside the park areas. The other incentives available to potential biotech entrepreneurs in AP [Andhra Pradesh] include the provision of water supply and power supply up to the doorstep and excellent roads. A residential accommodation proposal for the personnel working in Genome Valley at concessional rate has also been initiated recently. The government has created an IPR facilitation cell for helping companies in their patenting and other aspects as well as a virtual library and documentation center in ICICI Knowledge Park.

*Id.*

[45] VISION 2020, *supra* note 25, at 167.

[46] *Id.* at 168.

courage the use of modern technology."[47] "[A]griculture's share of employment will actually reduce, from the current [seventy] per cent to [forty to forty-five] per cent . . . ."[48] Vision 2020 projects "a shift of surplus labour from agriculture to other sectors as agriculture itself becomes more productive, efficient, and technology-intensive, and moves from being a subsistence activity to an economic one."[49]

*B. Lakshmi and the Citizens' Jury: Power as Autonomy*

Another view is that power is freedom from having one's decisions dictated by the choices and economic pressures of others. It is the inverse of the first view. Some subsistence farmers who hold this view are suspicious of tying their year-to-year fortunes to the whims of the world market and the obligations of loans for cash outlays. That suspicion can extend to GM crops when GM crops are presented in the context of a modernized future for agriculture, particularly when that future includes drastic reduction of small and marginal farming and the conversion of practically all agriculture to industry, rather than subsistence living.[50]

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[47] *Id.* at 225.

Today, achieving high productivity is difficult due to the small size of agricultural holdings. The small size of holdings has another disadvantage: it hinders the ability of farmers to raise resources and market their produce. To increase productivity, the State will need to find ways to help farmers increase the scale of farming operations. Farmers' cooperatives and contract farming would be two successful options.

*Id.*

[48] *Id.* at 168. Note, though, that the desired percentage of agricultural workers is projected to change not just due to consolidation of farming and a shift of labor out of agriculture, but also by the projected addition of other jobs within the state. *Id.*

[49] *Id.* at 168-169.

[50] To glorify poverty is repulsive and not the point here. To demand the preservation of traditional subsistence farming as it exists today without thought to the desires of subsistence farmers is patronizing and without grounds in reality. Perhaps the greatest tradition in agriculture since its inception is change: adaptation to new environmental and social dynamics and the adoption of new plant varieties and farming practices when those varieties and farming practices are useful, profitable, or simply necessary to avert some threat to food security.

Those who currently live as subsistence farmers, however, are particularly vulnerable in the context of a plan to eliminate or drastically reduce subsistence farming over the course of twenty years. Where will they go? And how will they earn enough money to purchase the little bit of food they were formerly producing for themselves? Many of the poorest farmers cannot read and write and have few skills to market in the city.

K. Akbal Rao, Deputy Commissioner and Deputy Director of Agriculture for Andhra Pradesh, told the citizen jurors in Pimbert and Wakeford's study (see *infra* note 57 and accompanying text):

You need to find other jobs [than as part-time workers on wealthier farms] and diversify into various other fields such as business. As I said earlier, 70 out of 100 people depend on agriculture. There will be some drawbacks arising from mechanisation—unemployment is one of them—but machines will speed up the work, and increase production also.

Some in India are not as dependent on loans as Venkat Reddy. These are not wealthy, self-sufficient farmers, but are some of the poorest people in Andhra Pradesh. Lakshmi, who is of the very lowest of classes in the caste system, lives in the dry landscape of the Deccan Plateau in Andhra Pradesh.[51] She maintains more than eighty traditional varieties of seeds in her house.[52] Indeed, eighty percent of seeds planted in Andhra Pradesh are seeds "saved over" from the previous season, not seeds bought with a loan at planting time. Lakshmi's seeds are notable not only for their source, but also for their diversity. One of Lakshmi's neighbors plants twenty-two varieties of seeds on her three-acre farm; another plants thirty varieties on four acres.[53] For generations upon generations, the people of this area have been "genetically engineering" their own varieties of seeds—creating through traditional breeding varieties of food plants suited to the harsh climate.[54]

When asked what Lakshmi would tell M. S. Swaminathan[55] when he came to see her, Lakshmi replied, "With GE [genetically engineered] crops we would have to purchase many different inputs. [This] technology would come with many uncertainties and with hidden costs . . . . I have no interest in or need for genetic engineering because in my hands I have all these seeds, which I can also share with others."[56]

Pimbert and Wakeford conducted a citizens' jury to study perspectives on the future of farming in Andhra Pradesh. The group of jurors included farmers and one urban juror; jurors were chosen from among various castes and tribal groups.[57] The jury opposed many of

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MICHEL P. PIMBERT & TOM WAKEFORD, PRAJATEERPU: A CITIZEN'S JURY/SCENARIO WORKSHOP ON FOOD AND FARMING FUTURES IN ANDHRA PRADESH, INDIA 18 (2002), *available at* http://www.ids.ac.uk/biotech.

Note, though, that industrialization of agriculture is not the only context for the future of GM crops, particularly for poor and marginal farmers. *See, e.g.*, G. Pakki Reddy & P. Janaki Krishna, *Tailoring Modern Biotechnologies for Resource-Poor Farmers: a Case Study of Andhra Pradesh*, ISB NEWS REPORT (Oct. 5, 2003), *at* http://www.isb.vt.edu/news/2003/news03.oct.html#oct0305.

[51] Caspar Henderson, *Turning the World Upside Down*, *at* http://ddsindia.com/publications.htm (last visited Jan. 23, 2004). Caspar Henderson writes for Greenpeace.

[52] *Id.*

[53] Henderson, *supra* note 51. The survival technique is simple, similar to the advice financial planners give their investment clients: diversify to avoid losing everything in a single calamity.

[54] *See id.*; *Uncultivated Foods and the Poor*, *at* http://ddsindia.com/unculti.htm (last visited May 13, 2004).

[55] Swaminathan was one of the Indian founders of the Green Revolution. Shiv & Chandrika, *supra* note 8, at 1215-16.

[56] Henderson, *supra* note 51.

[57] MICHEL P. PIMBERT & TOM WAKEFORD, PRAJATEERPU: A CITIZEN'S JURY/SCENARIO WORKSHOP ON FOOD AND FARMING FUTURES IN ANDHRA PRADESH, INDIA 7-8, 37 (2002),

the provisions of Vision 2020, proposing instead a model of agriculture that allowed them to be independent of the farmers' loan cycle—"grain that does not mean debts, and crops which do not mean expenditure" was often repeated throughout the process.[58] The jury did not want to see their farming become dependent on cash.[59] They opposed the overall plan to reduce the number of farmers in Andhra Pradesh and to consolidate rural land into large farms.[60] Regarding GM crops, they were skeptical of their safety and feasibility.[61]

The jury did not consider GM crops in isolation, but as part of the development model for the future of agriculture.[62] Within this context and after hearing more evidence on GMOs than on any other issue before them, they soundly rejected GMOs, including Bt cotton and rice engineered to be high in Vitamin A.[63] They associated GMOs with the cycle of cash outlays and loans, analogizing biotech crops to the Green Revolution crops, which require outlays for pesticides, fertilizers, and other inputs.[64]

## IV. P. CHENGAL REDDY: POWER AS CHOICE

Others among Andhra Pradesh's farmers are not so opposed to the idea of biotechnology in agriculture. For them, power is choice, and they want the power to choose for themselves individually

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*available at* http://www.ids.ac.uk/ids/env/PDFs/Prajateerpu.pdf. None of the jurors had heard of GM crops before participating in the jury. *Id.* at 21. Jurors were not randomly chosen, but were selected from a list provided by the Dutch Ministry of Foreign Affairs, the AP Dalit Farm Workers' Union, and several NGOs. *Id.* at 8. Though the jurors were chosen on the basis of criteria that included "open-minded[ness]", *id.* at 8, one might question whether the sample was truly representative. In their report, Pimbert and Wakeford explain the reasoning behind their jury selection process and the citizens' jury method. *Id.* at 7-9. The jurors were asked to evaluate three separate potential scenarios for the future of agriculture. The scenarios were presented in video form. One of the oversight panel members noted that "[t]he three videos on food and farming futures exaggerate some of the possible consequences of policy decisions. It's a bit of caricature at times, but it works!" *Id.* at 42. In evaluating the competing visions of agriculture's future, jurors heard testimony from and questioned various experts, including a deputy director of agriculture of the Andhra Pradesh government, a representative of SYNGENTA (a multinational seed corporation), agricultural scientists, and representatives of NGOs. *Id.* at 13.

[58] *Id.* at 16. The feasibility of the model put forward by the citizens' jury is beyond the scope of this discussion.

[59] *Id.*

[60] *Id.* at iii-iv.

[61] *Id.* at 24.

[62] PIMBERT & WAKEFORD, *supra* note 57, at 42.

[63] *Id.* at 21.

[64] *Id.* at 24. Interestingly, in calling for a future that nurtured traditional agriculture, the jurors called for traditional seeds as well as "improved seeds." *Id.* at 19. This, along with the fact that jurors rejected GMOs within the context of a future of mechanized, Western-style agriculture may indicate that jurors would consider incorporating GM crops in their traditionally diverse cropping patterns.

whether to adopt GM crops. Perhaps P. Chengal Reddy, President of the Federation of Farmers Associations in Andhra Pradesh,[65] best articulates this view:

> Certain well-known activist organizations in developed countries have been attacking the general concept of agricultural biotechnology—perhaps as the result of living in an affluent society, where choices abound and hunger and malnutrition are far removed from daily existence .... It is the very height of callous disregard to deny modern agricultural technologies to the world's most needy, simply at the urging of misguided youth. Rather, the West should permit farmers to test new scientific innovations and allow them to make their own decision whether to reject or adopt those innovations. Leave the choice of selecting modern agricultural technologies to the wisdom of Indian farmers.[66]

The fact that before Bt cotton was legally approved in Andhra Pradesh, illegal "Bt" cotton was grown there, is itself illustrative of the fact that some farmers do wish to choose for themselves whether to grow GMOs.

## V. CONCLUSION

Whether one sees power as economic influence, as independence from the economic influence of others, or simply as the ability to choose how one will participate in the market, how one views power influences the opinion one will have of GMOs. If power is market influence, modernization of agriculture is key to wealth, the currency of power, and to escaping the powerlessness of subsistence living. In this context, GMOs are highly useful for improving crop profitability and marketability. If power is autonomy, modernization of agriculture is synonymous with loss of autonomy for the poorest subsistence farmers—it represents that others have chosen for them the loss of what little livelihood they are able to create for themselves. In this context, GMOs represent a loss of autonomy, an indebtedness for cash outlays to purchase seeds for production of a crop for an unpredictable market, rather than for local consumption. If power is choice, as it is particularly for those able to participate meaningfully in the market, then GM crops represent power: another choice equals another potential tool for gaining wealth and escaping the bonds of poverty.

I do not seek here to glorify or romanticize poverty or to use the term "autonomy" to suggest that marginal farmers are free to choose whether to live as they do or to adopt some other lifestyle. Instead, my point is that much resistance to GM foods, both in Andhra

[65] Pimbert and Wakeford describe the Federation of Farmers Associations as consisting largely of higher-caste, medium to large farmers in Andhra Pradesh. *Id.* at 43.
[66] Reddy, *supra* note 12.

Pradesh and throughout the world, is tied not to the essence of GMOs themselves, but to a perception that these crops are a threat to the poorest farmers who will be unable to compete with modernized agriculture and GM cash crops; this perception connects GMOs with the prospect that, because of competition, poor farmers will be forced off their small farms and into the shadows of society, unable to earn the money to purchase what little food they previously had produced for themselves. To reject GM crops wholesale on the basis of this perception does a disservice to the very poor, for whom malnutrition and adversity are real problems—problems for which GM foods hold some measure of solution. After all, the power to change and to incorporate new varieties of farming practices is perhaps the longest-standing tradition of traditional agriculture. Agriculture's ability to adapt is its greatest strength, and its greatest promise.