TABLE 1
Increases in rice output, 1967-69 to 1991-93

Nation*	Rice production (million tons/year) 1967-69	1991-93	Percent increase in production	Total area planted to rice 1992 (million hectares)	Area planted to modern varieties
China	97.6	185.3	90%	32.4	100
India	58.9	110.8	88	42.0	66
Indonesia	18.2	46.7	157	10.6	77
Bangladesh	17.2	27.3	59	10.1	51
Vietnam	8.8	21.0	138	6.7	80
Thailand	12.4	18.6	50	9.5	68
Myanmar	7.9	14.5	84	4.7	50
Japan	18.6	11.7	–37	2.1	100
Brazil	6.6	9.8	48	4.7	23
Philippines	4.8	9.4	96	3.2	94
U.S.A.	4.3	7.6	77	1.3	100
South Korea	5.0	7.0	40	1.2	100
Egypt	2.5	3.7	48	0.5	100

Source: Adapted from Khush, Gurdev S., "Modern Varieties—Their Real Contribution to Food Supply and Equity," pp. 275-284, *GeoJournal,* March 1995.
* Countries are ranked by volume of rice output, annual average, 1991-93.

50% of that is grain. [Their harvest index, 0.5.] So they can produce 9-10 tons/ha. We reasoned that the rice varieties of the future must produce a biomass of 21 tons, of which 60% should be grain. [Harvest index, 0.6.] They would then produce 12.0 to 12.5 tons of rice per hectare."

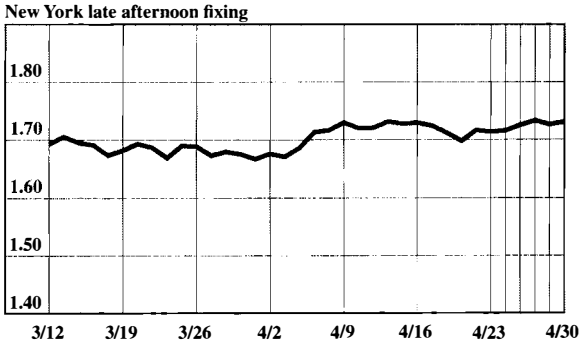
Dr. Khush described the process of achieving this desired "quantum increase" in yield, in "Breaking the Yield Frontier of Rice,"[3] an article in which he listed the attributes of the desired ideotype of the new plant, based on the principle that "yield is a function of the total dry matter or biomass, and the harvest index. Therefore, yield can be increased by enhancing either the total biomass production, or the harvest index, or both." Desired attributes to achieve both, include: fewer tillers (stems), no unproductive tillers, 200-250 grains per ear (panicle), 90-100 cm tall, very sturdy stems, dark green, thick and erect leaves (for maximum photosynthesis), vigorous root system, 100-130 days growth duration, multiple disease and insect resistance, acceptable grain quality.

As of 1996, these features were being successfully bred into the plant types at IRRI. Dr. Khush said, "We are now incorporating genes for disease and insect resistance into the new plant type lines. When finally ready by the turn of the century, they should outyield existing high-yielding varieties by 20-25%."

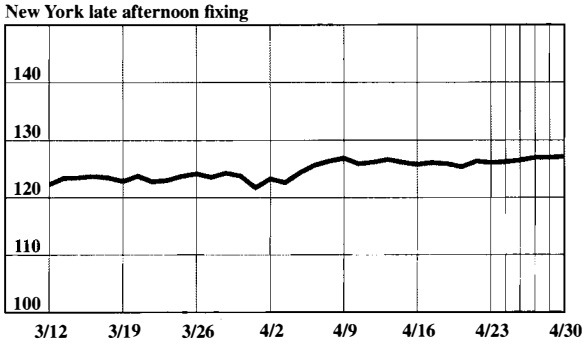
3. "Breaking the Yield Frontier of Rice," by Dr. Gurdev S. Khush, pp. 329-32, *GeoJournal,* March 1995.

Currency Rates

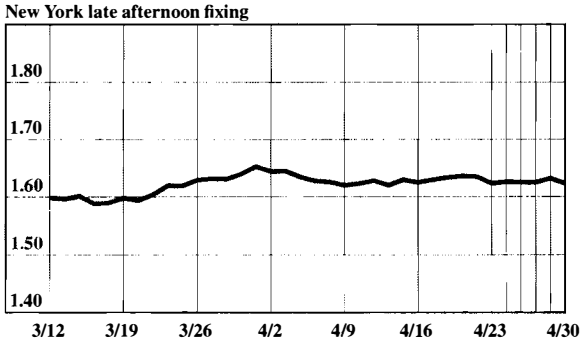
The dollar in deutschemarks
New York late afternoon fixing



The dollar in yen
New York late afternoon fixing



The British pound in dollars
New York late afternoon fixing



The dollar in Swiss francs
New York late afternoon fixing