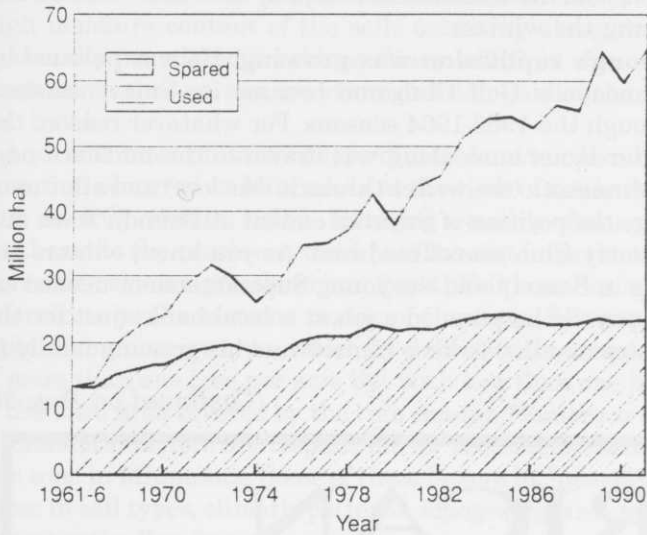


# How Much Land Can Ten Billion People Spare for Nature?

- If people keep on eating and multiplying and farmers keep on tilling and harvesting as today, the imperative of food will take another tenth of the land, much from Nature. So farmers work at the hub of sparing land for Nature.

- Calories and protein from present cropland would give a vegetarian diet to ten billion. A diet requiring food and feed totaling 10,000 calories for ten billion. However, this obviously would exceed the capability of present agriculture on present cropland.

- The global totals of sun on land, CO<sub>2</sub> in the air, fertilizer and even water could produce far more food than ten billion need.



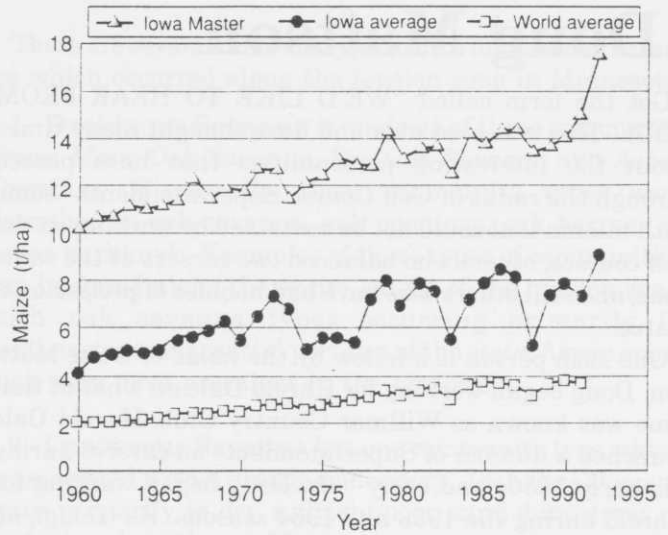
The land that Indian farmers spared by raising wheat yields. The upper curve shows the area that they would have harvested at 1961-1966 yields to grow what they produced. The lower curve shows the area that they actually harvested. They spared the difference. The figure extends a table compiled by Borlaug (1987).

- By eating different species of crop and more or less vegetarian diets, people can change the number who can be fed from a plot. And large numbers of people do change diets.

- Encouraged by incentives, farmers use new technologies to raise more crop per plot and more meat and milk per crop, keeping food prices down despite rising population. Differences in yields among nations and between average and master farmers continue showing that yields can be raised more.

- Foreseeing the future demands seeing through fluctuations in crop production.

- For each ton of production, growing more food per plot lessens the fallout, for instance, of silt and pesticides, into the surroundings. If several limiting factors are improved together, even adding water and fertilizer can diminish fallout.

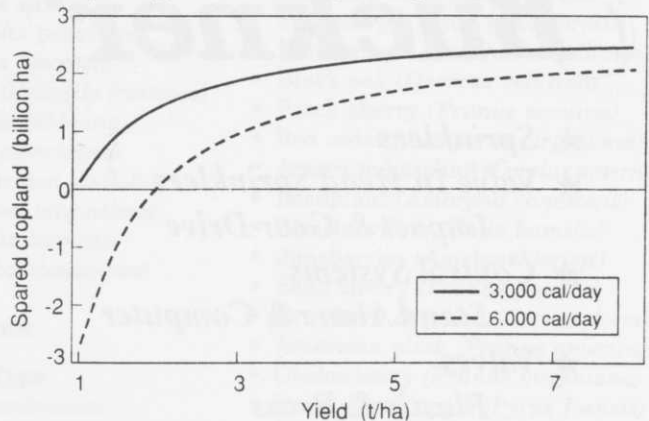


Annually since 1960, the farmers of the world lifted average corn yields 0.06 t/ha. In the Tall Corn State, Iowa farmers lifted their average 0.10. And winners of the Iowa Master Corn Grower's Contest stayed ahead, pushing up winning yields 0.14. So far, rising averages continue sparing land, and the persisting gap between averages and winners sustains hope for future sparing.

- Although the uneven distribution of water among regions and its capricious variation among seasons plague farming, opportunities to raise more crop with the same volume of water kindle hope.

- In Europe and the United States, rising income, improving technology and leveling populations—which all nations aspire to—elicit forecasts of shrinking cropland.

- So by harvesting more per plot, farmers can help ten billion spare some land that unchanging yields would require to feed them. Glimmers can be seen even of changing diets, never-ending research, encouraging incentives and smart farmers feeding ten billion at affordable prices while sparing some of today's cropland for Nature.



Sparing part of 2.8 billion ha as farmers raise yields and ten billion people each account for 3,000 or 6,000 calories daily. The 2.8 is

(Continued on Page 36)

## Where Are They Now? —

(Continued on Page 9)

groceries, housing and clothing.

This arrangement worked out so well that Doug kept it up for six seasons. Finally Northern National Bank of Bemidji wanted him as a full-time banker. Reluctantly, he gave up the job as Superintendent and became a full-time banker. He was with Northern National for 14 years and eventually was recruited by First Federal of Bemidji and in 1993 was promoted to a position with Twin City Federal Mortgage Corp. in the Twin Cities.

The writer likes this story. It's a success story that we would all like to live. Congratulations to Doug Mattson and to the many talented Superintendents who sometimes labor in the wrong field but are so dedicated they fail to look at the field instead of the individual grass plants.

Doug may be embarrassed by this story but he did confess to missing the golf industry and would like to know how he could subscribe to *Hole Notes*. In closing it should be pointed out that Doug had done the cartoon letterhead for the first issues of *Hole Notes*. For those of you who were not around back then (about 1961) Doug's cartoon letterhead showed a passive Golf Course Superintendent, standing by a green and observing a frustrated golfer driving his putter into the turf after missing a putt.

Doug's address is 1414 Laurel Ave., Apt. L. 305, Minneapolis, MN 55403.

*Sincerely,  
Jack Kolb*

P.S. I had Doug's permission to write this.

## Land —

(Continued from Page 10)

*twice the present cropland as ten billion is roughly twice the present population. On the left of the graph at a yield of 1 t/ha. people accounting for 3,000 would spare none, and for 6,000 would take more than 2.8 a negative sparing. Near the middle, a yield of 4 t/ha would spare much of the 2.8 billion ha. If farmers lifted yields to 6 t/ha on the right, they would spare a bit of today's cropland, even if each of the ten billion accounted for 6,000 calories daily.*

*How Much Land Can Ten Billion People Spare for Nature?* was written by Paul E. Waggoner of The Connecticut Agricultural Experiment Station, New Haven. The report was published in cooperation with the Program for the Human Environment, The Rockefeller University, New York, New York. The full 64-page report, R121, is available for \$15.00 plus \$3.00 shipping and handling from the Council for Agricultural Science and Technology (CAST), 4420 West Lincoln Way, Ames, Iowa 50014-3447. Individual and student members of CAST may request a free copy; please include \$3.00 postage and handling.



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