

Professor Dr. Akira Tanaka (1924–2016),

<Biography>

Professor Akira Tanaka was born in 1924 and graduated from the Department of Agricultural Chemistry, Hokkaido University, Japan, in 1947 and granted Doctor of Agriculture degrees from the same university with the dissertation entitled “Studies on the Nutriophysiology of Leaves of Rice Plant” in 1960. He held a senior position in the Physiology Department at the International Rice Research Institute (IRRI), Manila, Philippines in 1962-1966 and moved back to Hokkaido University to chair the Laboratory of Plant Nutrition, Department of Agricultural Chemistry, as Professor in 1967 and retired as Professor Emeritus in 1988. He also served as President of the Japanese Society of Soil Science and Plant Nutrition (JSSSPN) in 1980-1981, President of the International Society of Soil Science (ISSS) in 1986-1990, a member of the Consultative Group on International Agricultural Research (CGIAR) Technical Advisory Committee (TAC) and a member of the Board of Trustees of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).



<Major Scientific Achievements>

Professor Akira Tanaka was a leading scientist in plant nutrition and rice physiology whose work connected fundamental understanding of the rice plant with practical strategies for raising productivity, especially in Asia during the early decades of international rice research (beginning early in 60's). His research achievements can be summarized in three tightly connected themes described in detail below.

1) Mineral nutrition and deficiency physiology

A central feature of Tanaka's work was his deep expertise in mineral nutrition of plant, particularly the identification and interpretation of nutrient requirements and how these constraints shape rice growth. At IRRI, colleagues mentioned that “mineral nutrition” was his particular passion, and that his role required “taking the tropical rice plant apart” to analyze the physiological role of stems, leaves, and overall architecture, bringing rigorous plant physiological analysis to practical yield improvement. This emphasis on nutrition physiology, especially diagnosing constraints and understanding plant responses, provided a foundation for evidence-based nutrient management. In the context of Asia's rapidly intensifying rice systems, the ability to interpret nutrient limitation and crop response was essential for formulating fertilizer recommendations that were both productive and locally suitable.

2) Whole-plant physiological/architectural analysis supporting high-yield genotypes

Tanaka joined IRRI on April 1, 1962, to head the institute's newly forming Physiology Department, and he is described by IRRI as its first physiologist at the age of 38. From the beginning, his physiology

program helped shape the research direction of IRRI at a formative stage. According to IRRI accounts, the institute's first Director General, Dr. Robert F. Chandler, noted that Tanaka established a "first-class physiology program" and brought extensive expertise to the new institution. Importantly, his contributions were not merely supportive but strategic for the development of early high-yielding semi-dwarf rice. In IRRI's historical narrative of IR8, he is portrayed as having a contribution "equivalent to that of a breeder," helping define the course of early semi-dwarf variety development through physiological analysis and "ideal plant type" (ideotype) thinking. He was working in close interaction with IRRI's first breeder, Dr. Peter Jennings. This ideotype perspective, explicitly connecting plant architecture, organ function, and resource capture/reallocation, remains a highly influential framework in crop improvement. Tanaka's work helped establish the idea that yield breakthroughs can be accelerated when breeding targets are informed by physiological understanding rather than selected only from empirical performance.

3) Soil fertility diagnosis and appropriate fertilizer use across diverse Asian environments especially in tropical Asia

Tanaka also contributed strongly to the agronomic and soil side of yield improvement. He conducted extensive assessments of soil fertility in various Asian countries, contributing significantly to the establishment of appropriate fertilizer management practices. This type of work, i.e., translating knowledge of crop nutrient needs into regionally optimized fertilizer strategies, was crucial for ensuring that the yield potential of improved cultivars could be expressed across diverse soil constraints.

Professor Tanaka's publication record is described as substantial: nearly 200 research papers, many reviews, and monographs, with broad participation in international meetings, e.g., Tanaka et al. (1964) and Tanaka (1971). He received the Award of the Japanese Society of Soil Science and Plant Nutrition in 1959, the Japan Agricultural Research Institute Award in 1967, the Japan Prize of Agricultural Science in 1975, and the Japan Academy Prize in 1975 jointly with Professor Yoshiaki Ishizuka of Hokkaido University, who was elected Honorary Member of ISSS/IUSS in 1978.

<ISSS/IUSS and international contributions: global soil science leadership>

Professor Tanaka's international service reached the highest level of global soil science governance. He served as President of the International Society of Soil Science (ISSS) during 1986-1990. This is a particularly notable accomplishment because it signifies recognition by the international community not only of his scholarship but also of his capacity to lead global scientific collaboration.

The late 1980s were a period when soil science increasingly confronted global-scale challenges: intensification of agriculture, land degradation, and environmental pressures. The ISSS presidency requires balancing disciplinary breadth (physics, chemistry, biology, fertility, classification, land evaluation) and the practical interface with agriculture and environmental stewardship. Tanaka's

background, spanning soil fertility diagnosis, plant nutrition, and crop physiological function, was well matched to these integrative demands.

He actively participated in a wide range of international organizations and scientific networks (e.g., FAO, CGIAR and others), reflecting his role as a connector between disciplinary science and institutional action. Such connectivity was particularly important in soil science, where solutions often require combined work across agronomy, ecology, climate policy, and development practice, and thus brought a great success of the 14th World Congress of Soil Science (WCSS) in Kyoto, Japan, in 1990. He was elected Honorary Member of IUSS in 2002.

<Contributions to the national society: leadership in the Japanese Society of Soil Science and Plant Nutrition (JSSSPN)>

Professor Tanaka played important roles not only as a researcher but also as a leader in Japan's soil and plant nutrition community. He served as President of the Japanese Society of Soil Science and Plant Nutrition (JSSSPN) in 1980-1981. While the society's broader chronicle documents many institutional milestones over decades, his presidency is best understood as a period when Japan's soil and plant nutrition community was increasingly engaged internationally, strengthening publication, terminology standardization, educational activities, and international congress participation as part of long-term capacity building.

In practical terms, Tanaka's national-society impact can be framed in three ways:

1) Setting scientific direction and standards

As President, he would have influenced the society's emphasis on rigorous soil and plant nutrition science, supporting the integration of plant physiology and soil fertility, an intersection central to his own career.

2) Strengthening Japan's international visibility

The JSSSPN chronicle shows sustained participation in international soil science congresses and global engagement (e.g., ICSS/WCSS), reflecting Japan's active presence in global soil science networks. Leadership figures like Professor Tanaka helped position Japan as a constructive partner in international soil science during the period when global environmental and food-security concerns were becoming increasingly prominent.

3) Linking soil science and plant nutrition to societal needs

Tanaka's career narrative consistently ties scientific work to practical outcome, especially crop productivity and fertilizer strategy. This alignment is in direct continuity with JSSSPN's mission to connect soil science, plant nutrition, and sustainable food production.

<References>

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