BIODIVERSITY

Implications for Global Food Security

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Historical Path of VASKhNIL* (All-Union Lenin Academy of Agricultural Sciences of USSR)

It is for the last time today that I take the floor as VASKhNIL President, head of a scientific society which has existed for 62 years, 7 months and 11 days. Considering which, it is worth summarising the results of VASKhNIL's historical path, indicating the heritage that we hand over to future generations of scientists, concentrating on modern problems.

I reject the widely spread opinion that VASKhNIL has died. VASKhNIL is alive, it lives and will live in the ideas and deeds of its best representatives that have contributed to the glory of national and world science. Their labour and their traditions are our priceless legacy, our pass to the future.

From this point of view it will be relevant to remember the basic tasks of our agrarian science and its main centre, the All-Union Academy. It should be never forgotten that science in the USSR has never been entirely free of ideology and politics. We have been children of our times.

John Bernal wrote that progress in science development alternates with longer periods of stagnation and even decay.[z]

HISTORICAL ROOTS OF AGRARIAN SCIENCE

The second half of the nineteenth century and the beginning of the twentieth century in Russia witnessed the appearance of

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* The All-Union Lenin Academy of Agricultural Sciences (VASKhNIL) was established in 1930 at the initiative of N.I. Vavilov, who was also its first President. A.A. Niconov was the last President of the Academy, before it was dissolved early in 1992. This valedictory address was delivered at Moscow on February 4, 1992.

[z] J. Bernal. Science in the history of society. IL. M. 1956. p. 9.

scientific schools. Our first scientist-economist, a fervent partisan of Peter's reforms, Ivan Tikhonovich Pososhkov, half a century before Adam Smith wrote *A book on scarcity and riches* and spent all his life in prior as a penalty. Many a scientist and reformer of our country shared a similar fate.

After encyclopedist Andrey Bolotov the bosom of free economic society nursed prominent agronomists, economists, soil scientists, botanists and physiologists. An exclusive influence in the world in the last quarter of the last century was enjoyed by Alexey Sergeyevich Yermolov with his classic works in the systems of agriculture. But his name was removed from all libraries and never mentioned during the years of Soviet power.

Of great importance were the experimental agricultural institutions that were created from the Baltic Sea and the Ukraine to Transcaucasus, Siberia and the Far East. Their numbers increased from 25 in 1895 to 210 in 1912.

Schools organised by Vasily Dokuchaev, Pavel Kostychev, Alexander Izmailsky, Ivan Stebut, Alexander Sovetov, Kliment Timiryazev and others have laid the fundamentals of rational use of soils, water and plants with care towards these resources. In fact, these were the fundamentals of future ecology. In the course of the prewar period (World War I) the organisational and production school was formed by young Alexander Chayanov, Nikolai Kondrat'yev and Nikolai Makarov that united the galaxy of talented researchers and organisers of agrarian science. The activity of that group widely developed in the 20th century, especially during NEP period, when they published such works as *"Peasant's Economy and its Evolution"* by N.P. Makarov; *"Organisation of Peasant's Economy"* and *"Basic Ideas and Forms of Agricultural Cooperation"* by A.C. Chayanov; *"Market of Breads* by N.D. Kondrat'ev; *"On Vegetative Societies"* by V.N. Sukachev; *"Forest and Soil"* by Vysotsky; and *"Meadow Science"* by V.R. Vil'yams. N.I. Vavilov published "The *Law of Homological Rows."*

BASIC STAGES OF VASKhNIL DEVELOPMENT

On June 25, 1929 the Council of People's Commissars of the USSR adopted the decision of organising the All-Union Academy of Agricultural Sciences, as an association of research institutes. The Academy was directly subordinated to the Government. It was constituted of the Institutes of

agricultural economy and large economies, applied botany and new crops, plant growing, drought control, plant protection, animal husbandry, fishery and craft research, amelioration, and fundamental library. Individual membership was established later. Initially nine members joined the Academy, who were engaged with agrarian problems in the Academy of Sciences of the USSR: Alexandrov I.G., energetics specialist, Britske E.V., chemist, Vavilov N.I., biologist, Vil'yams V.R., soil and meadow specialist. Keller B.A., botanist, Osinsky V.V., economist, Pryanishnikov D.I., agrochemist, Richter A.A., physiologist and biochemist, Tulaikov N.M., agronomist and soil specialist. N.I. Vavilov was elected President.

The first 42 members of the VASKhNIL were appointed in 1935 by the decision of the Council of People's Commissars. Fourteen of these were soon subjected to repression and died in Stalin's jails.

Appointment of leaders and members of the Academy continued later. So, I.V. Tsitsin was appointed VASKhNIL academician in 1938, and then in 1948, 35 other new members. Elections were held for the first time in 1956 to 75 proclaimed vacancies of Academicians and 75 Associated Members.

Members of the first VASKhNIL Presidium were N.I. Vavilov, the President, and his Deputies, N.P. Gorbunov, former business manager of the Council of People's Commissars, and member of the Academy of Sciences of the USSR, N.M. Tulaikov. All three, like the successors of Nikolai Ivanovich in his post of President, were A.I. Muralov and G.K. Meister, subjected to repression and died in the GULAG and jails.

N.I. Vavilov thus formulated the basic missions of the Academy: profound original research directed to solving important practical agricultural missions, maximum attention to the synthesis of odd knowledge, be at the level of the world science, assist the country, assist their scientists in the periphery, train new personnel, closely coordinate the research, master new ranges in the north and in the south*.

*N.I. Vavilov, Organisation of agricultural science in the USSR. Selected articles and speeches. Agropromizdat. M., 1987, p. 10-12. Vestnik sel'skokhozyaistvennoi nauki. No 5, 1985. Vestnik Akademii nauk SSSR No. 5, 1988.

These principles were the basis of the Academy's activities. The number of scientific institutions grew in every field. Especially active was the work in the field of agronomy, mechanisation, amelioration, veterinary science.

If in the '20s it was the A.V. Chayanov Institute that collected the most progressive economists of the country and Europe, (its members were Chayanov's foreign teachers—Evgeny Laur and Frederic Aereboe), such a centre in the '30s became N.I. Vavilov's Institute. It was definitely a kind of Mecca for biologists and geneticists. However, these prominent intellectuals were severely persecuted, mistrusted, envied and slandered. 1930 was the year when leading economists were dismissed upon Stalin's sanction; the biologists shared the same fate at the end of the '30s. [Only was practical selection been encouraged and fundamental research and genetics were discouraged.] In 1938 Trofim Lysenko appeared in the scientific as well as sociopolitical arena.

The outcome of all this was that our science was thrown backwards, isolating it from world science.

In the '40s the Academy's life was divided into two periods: war and postwar restoration. The Academy actively participated in the defence of the Motherland.

Famous in the history of science is the vicil deed of VIR members that preserved the collection of crop seeds in blockaded Leningrad. Through they died, people preserved the samples of rice, wheat, potato tubers and crop seeds.

Those were political decisions. But Trofim Lysenko appeared again in VASKhNIL walls. At the well-remembered conference of leaders and ministers of agriculture of union republics in January 1961, N.S. Chroushchev declared that he could not see anybody in agricultural science except Lysenko. Once again, half-scientific, half-charlatan guidelines were being sent to the institutions. Non-constitutional acts had been adopted in those years that had far-reaching consequences. The agrarian crisis deteriorated again after favourable years in the second half of the '50s, since 1963 grain imports had been started that increased from year to year in future.

The second half of the '60s years passed under the badge of solutions adopted by the March (1965) Plenary session of CC in agriculture which expressed quite reasonable proposals ensuring

temporary success. But five years later the tempo dropped. The country has been even forced into importing food at the expense of exporting to the world market natural fuels and other irreversible resources. Large investments in agriculture that reached up to 28% of the total capital investments became dead in giant prestigious construction sites. The countryside obtained little of these; labour power had been pumped out from the villages. The peasantry steadily became impoverished, the villages desolated, village labour devalued more and more. The agrarian crisis continued deepening.

Food Programme which development involved the science was not fulfilled, it seems, for two reasons: first: it was exclusively technical and technological, without any resources provided; secondly, the new socio-economical basic was practically not available in it. This is the main point. It simply never reached the people as the socio-economical basis, material and technical conditions had not been created.

The first years of perestroika raised optimistic expectations. The active search of constructing a democratic society and solving peasants' problems passed before our eyes and with our participation.

It is hard evaluating perestroika processes in fresh tracks, the search being so active. Unfortunately, wide glasnost and democratisation, so natural for any civilised state, together with necessary purification of society, released uncontrollable centrifugal forces. Having preserved monopolism in economy and demolished the old management structures, the new ones being rather weak, all that caused the decay and breakdown of the formerly united economical organism. The country suffers a deep crisis; it is in a deadlock which is difficult to compare with any other period of our history but solely 1917-1981. Are we capable of overcoming it? Science will play but the least part, as a consolidating and integrating force.

Which work has been done in anticipation, what is our potential? What has been done in the course of decades?

IMPORTANT ACHIEVEMENTS OF AGRARIAN SCIENCE IN THE LATEST DECADES

Prior to all, some statistical data. The Academy has issued 13,656 units of printed matter in the course of six decades, including 1,312 collected works issues, 333 volumes on scientific sessions and 276 monographs. It goes without saying that the scientific value is different but these contain rich information.

All in all, 147 sessions and general meetings have been conducted in the period from 1932 to 1991 included, almost three times a year.

Much work has been done by our selectionists: 53 selection centres and 200 other selection and test stations work on 180 agricultural crops. On an average 700-800 new varieties and hybrids are being created every year, about 150-200 are being zoned.

In the course of the latest 20 years (1971-1991) they have created and zoned 1,100 varieties and hybrids in grains, legumes, cereals and maize, 700 in fodder crops, 150 in potatoes. All fields in the country are being sown with variety seeds.

The animal breeders have selected in the course of VASKhNIL's existence 11 high-production breeds in cattle, 16 in pigs, 30 in sheep, 11 in horses and 7 in poultry.

Seventy scientists became Lenin Prize and State Prize winners, 60 Honoured Scientists; 35 VASKhNIL members were conferred the title of Hero of Socialist Labour, and the Academicians N.V. Juriev, T.S. Maltsev, V.S. Pustovoit, P.P. Lukyanenko and V.I. Remeslo twice Heroes of Socialist Labour. Three Academicians B.A. Runov, V.G. Trushechkin and T.A. Khachatryan became Heroes of the Soviet Union for courage displayed during the Patriotic War.

Discoveries and inventions have been made. Over 200 Academy members possess more than 2,500 patents and author's certificates, significantly increasing the specific weight of scientific studies that were introduced into production and ensuring high economic effect. 37 Academicians and 21 Associate Members were elected members of foreign academies and scientific societies, or honoured as Doctors of Universities.

Academy members trained 600 Doctors of Science and over 5,500 candidates of science. At present 22 institutes train 94 doctorant and 124 institutions 3,821 post-graduates in 60 specialities.

At the beginning of this year VASKhNIL counted 158 Academy Members, 146 Associate Members and 81 foreign members; 202 Academy Members live and work on the territory of the Russian Federation.

Traditionally a prominent place in the Academy has been occupied by research in the field of plant growing, soil science,

forestry and hydroamelioration. Rich material has been accumulated in these fields, helping many talented scientists.

We are talking today about the disastrous situation in agriculture, destruction of soil cover, chernozem degradation, further drying of our steppe; but not the least dramatic is the situation in the forests. It is hard reasoning in common sense and answering the question why has this country for 30 years imported grain while it possesses half of the world chernozem areas? It is not easy to comprehend another thing: why the same country has no timber for construction, no paper for book publishing, while in possession of most of the world forest reserves. One of the answers that thoughtless axe has been for long decades the sole owner of the forest despite all the demands of science. But science has always existed and exists now.

Resistance to different stresses, diseases, pests, heat, frost-hardiness, economy in water and nutrient consumption, high quality and commodity shape became basic requirements in selection. The decisive word belongs here to biotechnological methods at the level of tissues, cells, genes. This work acquires even greater significance.

An exclusive, irreplaceable part in the development of plant breeding belongs to VIR, N.I. Vavilov's prodigy. Basic fields of activity imply the mobilisation of world genetic resources; preservation of gene pools its compound study; creation of initial materials for selection by hybridisation methods, mutagenesis, biotechnology; developing the theoretical basis and methods of genetics, molecular biology, immunity biotechnology, cytology, anatomy, botany, and systematics.

The Institute created the largest collection in the world of cultural crop seeds containing 562,267 samples. It is being permanently replenished. It was only for the previous 5 years that 190 expedition groups, working with this aim, have selected and studied 150 thousand new samples of major cultural plan 477 donors and 15.735 genetic sources have been handed over into selection centres.

Plant-protecting science possesses rich history and no small luggage of research. The first President was rather interested in the development of this field. Work has been done since the first years on biological methods of protecting plants against diseases and pests. The Institute of Biomethods was created later.

Agrotechnical and mechanical methods of plant protection were developed by VASKhNIL members N.M. Kulagin, V.N. Shchegolev and N.N. Arkhangelsky.

Well known are the studies by I.E. Mozgov in veterinary pharmacology, A.I. Studentsov and V.S. Shipilov in obstetrics, V.N. Siurin and A.I. Belov in virology and radiobiology. It was not surprising that the XXI World Veterinary Science Congress took place in 1979 in our country. The Institute of Experimental Veterinary Science led by G.F. Koromyslov became not a the large scientific centre but also a school for training scientific personnel for our country and foreign states.

Promising work has been done recently. VASKhNIL Academician I.A. Rogov, N.N. Lipatov, V.I. Ivashov, N.G. Sarishvili, Associate Members V.V. Molochnikov, T.V. Chizhikova and others accomplished a series of works in biotechnological and other fields which when extended would help to save raw materials getting high-quality food, milk, meat, vegetable and fruits enriched with valuable nutrients.

Special mention should be made about VASKhNIL Academician Neo Gdal'yevich Belen'kiy. He has worked in the Academy since 1940, participated in the Patriotic War, created many compound waste-free technologies for production of biologically active preparations used in medicine and veterinary science. Well-known is his method for processing the blood of slaughter animals into human plasma substitute. Three factories were built during the war based on his proposal, which helped to save thousands of lives of people, especially wounded and scalded patients.

I feel sad that the life of our Academy is ending, just when it has become most effective and productive. The legacy of the Founder-President of the Academy, N.I. Vavilov, will however continue to guide and inspire us. Let us pursue relentlessly research which can help to make hunger a problem of the past.