The original glass greenhouse which was built in 1875 was only about 100 m2, much smaller than the present building. It was one of the very first of its kind in Japan. The garden was then called the Naito Shinjuku Experimental Station, named for the feudal lord who had owned the property, and was under the jurisdiction of the Department of the Interior. Its mission was to improve the level of agriculture in Japan and to introduce modern agriculture methods and technology from the West.

In 1879 control of the park was transferred to Ministry of the Imperial Household, and it became the Shinjuku Imperial Botanical Garden. The greenhouse was unheated, and was, under the influence of the pioneering efforts of Hayato Fukuba (1856–1921), the first place in Japan to grow grapes, gooseberries, and other fruits and vegetables indoors.

After 1893, heated greenhouses were built, and orchids, melons, pineapples and other non-native species were collected and studied here. The produce was originally destined for the imperial kitchens, but over time, in addition to training botanists and gardeners, the garden began to disseminate its knowledge to the private sector, and the facility played a leading role in advancing indoor cultivation in Japan.