

Plantation crops for socio-economic upliftment

The plantation crop sector is well integrated with many other sectors of the economy through vertical and horizontal linkages. The sector also contributes a significant amount to the foreign exchange earnings through export earnings. The raw materials for many agro-industries also originate from the plantation crop sector. The magnitude of direct and indirect employment provided by the sector, especially in rural areas, makes it a vital cog in policy perspectives for overall economic development of the nation. The plantation crops constitute an important segment of the agricultural economy of our country. The sector has evolved as a significant driving force of growth and development of the agrarian economy in many states. The major plantation crops are coconut, arecanut, oil palm, cashew, tea, coffee and rubber. Besides, spice crops and cocoa can also be considered as plantation crops. The rising in population and the increase in purchasing power means that the demand for the major agricultural produce from the plantation crops sector will continue its robust growth. The combined production of tea and coffee increased from 0.5 million tonnes in 1970-71 to 1.3 million tonnes during 2013-14. Similarly in case of natural rubber, production increased from 0.14 to 0.85 million tonnes during the same period. The area and productivity of major plantation crops has also witnessed significant positive trend during the last five decades. The weight assigned in calculation of whole sale price index to the products directly linked to the plantation crop sector has increased by 12.1 per cent in the WPI index for base year 2004-05 from the earlier base year of 1993-94. This increase is indicative of the growing importance of products from plantation crops in our daily life, says Dr N K Krishna Kumar, DDG (Hort. Sci.), at ICAR Headquarters, New Delhi.

PLANTATION crops have always maintained a place of interest in socio-economic and political mainstream discourse due to its trade significance and international character of the produce from the sector. Cultivation of plantation crops in India also has a rich and varied history. It has played a key role in the development and transition from a subsistence agrarian economy to market-oriented commercial cultivation. Each crop in the plantation crop sector has its own peculiarities and distinct historical and economic context of establishment and development. Though the organized development of some of the plantation crops like tea, coffee and rubber was initiated during the colonial era, cultivation of coconut, arecanut and spices were already well established even at that time.



High-density multispecies cropping system

The comparatively higher growth in GDP growth witnessed in the country in the last two decades has also lead to an increased demand for the output from plantation crop sector. The increased demand has come, both from increased consumption demand from the household sector and increased demand for the raw materials from the industrial sector as an intermediate good. Some of the problems faced by various constituent crops in plantation crop sector are similar in nature and a holistic understanding of the sector is required to design policies to effectively address these issues. The declining trend in real prices, inability to adjust quickly to market situations due to inelastic supply arising from a high magnitude of price response lag, shortage of labour, issues related to sustainability of

Table 1 Area and production of major plantation crops

Crop	1970-71		1980-81		1990-91		2000-01		2010-11	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
Tea	0.35	419.0	0.38	569.6	0.42	720.3	0.50	848.4	0.58	966.7
Coffee	0.14	110.2	0.19	118.7	0.22	169.7	0.31	301.2	0.41	302.0
Areca nut	0.17	0.14	0.19	0.20	0.22	0.24	0.29	0.33	0.40	0.48
Coconut	1.05	60.75	1.08	57.2	1.48	97.3	1.84	125.9	1.90	157.5
Cashew	0.30	0.13	0.46	0.19	0.53	0.29	0.72	0.45	0.95	0.67
Rubber	0.14	0.10	0.19	0.15	0.31	0.33	0.40	0.63	0.48	0.86

Source: Directorate of Economics and Statistics, Ministry of Agriculture and FAOSTAT

Area in million ha and production in million tonnes unless otherwise mentioned. The area under rubber pertains to tapped area. The production of tea and coffee in million kilograms; production of coconut in '00 million nuts

the production systems etc are some of the key area of concern for the plantation crop sector as a whole.

SECTORAL TRENDS IN PLANTATION SECTOR

The area and production of plantation crops have shown a steady increase over the last few decades. Presently, cumulative area under six major plantation crops (coconut, areca nut, cashew, tea, coffee and rubber) comes to 5.12 million ha. Apart from this, crops like oil palm, cocoa, cardamom, pepper, nutmeg etc cover an area of 0.60 million ha. The area under these crops was 2.15 million ha during 1970-71 and increased to 3.18 million ha during 1990-91. During the next two decades the area increased by 1.54 million ha. Though the magnitude of area expansion varied, it is significant to note that the area expansion occurred across the crops. The area and production of major plantation crops during the recent decades is given in Table 1.

The productivity of major plantation crops has also

shown a significant increase during the same period (Table 2). The increase in productivity was driven by availability of improved technologies developed mainly in the public sector research and development institutions. The varietal technology, better plant protection technologies, concerted efforts for technology dissemination and institutional support for crop production has all played a vital role in enhancing the productivity of major plantation crops. The increase in yield level was as high as 176 per cent for rubber between the period 1970-71 and 2010-11. For a more recent comparison of gain in productivity for the crops, the per cent change in productivity between 1980-81 and 2010-11 is also provided in the table. Despite commendable achievements in productivity enhancement of many crops in plantation sector, there is considerable room for improvement. The productivity of rubber in India is the highest in the world and the present level of productivity was achieved from a very low level of 654 kg/ha during 1970-71. The present level of area production and productivity of major plantation crops

Table 2 Yield trends of major plantation crops (1970-71 to present)

	1970-71	1980-81	1990-91	2000-01	2010-11	Present	Change (%) in yield (1980-81 to 2010-11)
Tea	1182	1491	1727	1682	1669	1891	11.9
Coffee	814	624	759	959	838	828	34.3
Areca nut	843	1058	1099	1138	1195	1364	12.9
Coconut	5811	5280	6595	6847	8291	10600	57.0
Cashew	420	399	636	710	720	760	80.5
Rubber	654	788	1075	1573	1806	1633	129.2

Yield in kg/ha except for coconut where yield is given in nuts/ha

Table 3 Present status of area, production and productivity of major plantation crops

Crop	Area	Production	Productivity	India's share in total production (%)
Tea	0.58 mha	1095.46 million kg	1891 kg/ha	24.9
Coffee	0.44 mha	304.5 million kg	828 kg/ha	3.7
Areca nut	0.45 mha	0.61 mt	1364 kg/ha	46.6
Coconut	2.14 mha	22700 million nuts	10600 nuts/ha	16.4
Cashew	0.99 mha	0.75 mt	760 kg/ha	15.7
Rubber	0.52 mha	0.85mt	1633 kg/ha	8.1
Oil palm	0.23 mha	0.86 mt	3.8 tonnes FFB/ha	1.8
Cocoa	56.5 '000 ha	14.4 '000 tonnes	255 kg/ha	Neg
Cardamom	92.4 '000 ha	18.4 '000 tonnes	199 kg/ha	31.2
Pepper	124.6 '000 ha	52.6 '000 tonnes	422 kg/ha	13.8
Nutmeg	18.7 '000 ha	12.7 '000 tonnes	670 kg/ha	11.1

The temporal point of comparison may vary since the latest data available may not pertain to the same year

are summarized in Table 3 along with India's share in global production for each of the crop.

Though the plantation crops share some similarities with respect to the technological and developmental challenges, each crop economy has distinct features which are unique to the crop. Therefore a disaggregated analysis of major crops in the sector is necessary to mark out the similarities and to identify the underlying patterns. The major aspects of the production and market economy of major plantation crops are briefly outlined.

MAJOR PLANTATION CROPS

Tea

One of the major components of world beverage market, tea industry is one of the oldest organized agro-industry in the country. India has a significant share in the international tea market with a 12 per cent share of world tea exports in 2013-14. The global market for hot beverages, which includes tea and coffee, is forecasted to display robust growth both in terms of value and volume. The country is also one of the largest consumers of tea in the world. During the XI plan period between 2007-08 and 2011-12, exports of tea grew at a rate of nearly 10 per cent per annum. The per caput availability of tea in India has increased from 296 grams per year in 1960-61 to 728 grams in 2011-12. India stands second in terms of global tea production with a share of 24.9 per cent, next to China. But the country exports only about 18 per cent of the tea produced due to rising demand for tea in domestic markets.

Tea plantation



Coffee

India is the seventh largest coffee producer and the third largest in Asia. The planted area of coffee is more or less equally divided between Arabica and robusta types in India. But in terms of production, the share of Arabica coffee, which was more than 50 per cent till 1980s, has declined to 31 per cent during 2012-13. The state of Karnataka accounts for 55.6 per cent of area under coffee and 70 per cent of the coffee production in the country.



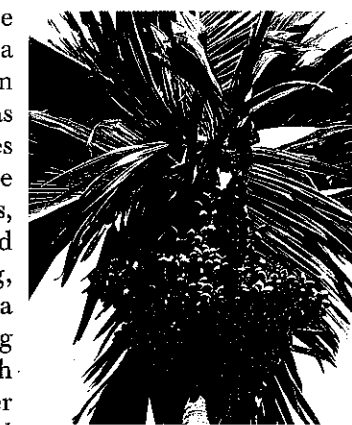
Coffee-Congensis x Robusta (CxR) hybrid of Robusta

India's share in world coffee production and exports are less than 5 per cent. About 70 per cent of the coffee produced in the country is exported to global markets and the

international prices for the commodity plays a significant role in the profitability of the crop. The major share of Indian coffee exports is headed for European countries. During the period 2007-08 to 2011-12, the revenues from coffee exports grew at growth rate of 13.8 per cent per annum. The domestic consumption of coffee in India showed strong growth since the turn of the century. The consumption grew at a compound annual growth rate of 6.1 per cent since 2000-01.

Areca nut

Areca nut has the potential to develop as a highly profitable plantation crop in the country. It has numerous alternative uses in diverse applications like preparation of medicines, confectionery, food colouring, cloth dyeing, leather industry etc. India is the world's leading producer of areca nut with a share of nearly 50 per cent of the total production. The areca nut economy is driven by strong domestic demand which is estimated to be more than 0.33 million tonnes per year. The yield level of areca nut in India is well below that of China (2745 kg/ha), which is major producer of the commodity in the world. The bulk of the domestic consumption of areca nut goes towards the 'gutkha' industry. The growing apprehensions about the potential health hazards of gutkha consumption, the alternative uses of the crop need to be developed and strengthened.



Mangala

Coconut

India is one of the major producers of coconut in the world with a share of 16.4 per cent in 2012-13. Along with Indonesia and the Philippines, it constitutes more than 75 per cent of the global coconut production. Among major producers, India has the highest productivity in coconut with a productivity level of 10,600 nuts/ha whereas the average global productivity stands at 5,833 nuts/ha. Though India is a major producer of coconut,



Chandrakalpa

the entire production is consumed in the domestic markets. Edible oil from coconut constitutes 14.4 per cent of the secondary source of edible oil in the country. The coir industry, a major small scale industry in the country is inherently dependent on coconut plantations for the raw material. Even though Kerala has the maximum area under the crop, Tamil Nadu is the major producer due to high level of productivity. The productivity in Kerala and Tamil Nadu were 8109 nut/ha and 16387 nuts/ha respectively during the year 2012-13. The economic returns from coconut plantations need to be augmented through coconut based mixed cropping and judicious practice of intercropping in view of higher magnitude of price fluctuation of the commodity in the international market.

Cashew

India is one of the leading producers, processors and exporters of cashew in the world. India stands third in the production of raw cashew nut in the world



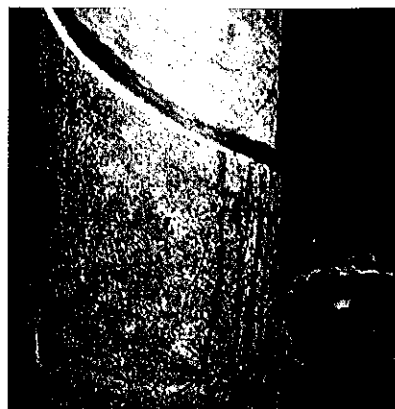
Red coloured apple

behind Vietnam and Nigeria. India is also the leading exporter with a share of 65 per cent of the global exports. The Indian cashew industry is known globally for its superior product quality. The country exported 1.3 lakh tonnes of cashew kernals during the year 2012-13. The major destination of exports of cashew from India was the United States of America, which accounted for 36 per cent of the total exports of cashew from India. The crop

has attained the status of an export-oriented commodity and earns considerable foreign exchange for the country. Presently, the crop is cultivated in nearly 1 million hectares of land with a productivity of 760 kg/ha. The growth rate in export of cashew kernels from India has decelerated in the recent times whereas the imports of raw cashew has remained robust. The rising domestic demand for cashew kernels seems to be behind this trend.

Rubber

India holds a place of pride among the natural rubber producing countries in the world. The productivity of rubber in India is the highest in the world and the country is the third largest consumer of natural rubber. It is estimated that the annual turnover from the rubber industry



Rubber-panel application for tapping

surpasses 500 billion rupees. The entire domestic production is consumed by the well developed rubber based industries dominated by the auto tyre and tube industry. The production is not sufficient to meet the demand domestic demand and the country remains a net importer of natural rubber accounting for nearly 10 per cent of global consumption. Small holder producers dominate the rubber production economy with more than 90 per cent of the area under the crop being operated by small holders. Traditionally, Kerala has dominated the production domestic scenario of rubber and the share of the state in total production stands at 86 per cent during 2011-12. The import of natural rubber has shown a steady increase over the last few years. Imports of rubber increased from 0.72 lakh tonnes in 2004-05 to 3.25 lakh tonnes in 2013-14.

Oil Palm

Oil palm cultivation has assumed added significance in the recent past due to its potential for augmenting the indigenous availability of edible oil in India. Oil palm enjoys the status of being the commercial crop with the highest oil yield per unit area. The Commission for Agricultural Cost and Prices (CACP) has pointed out the need to promote the cultivation of oil palm in India in view of the steeply rising edible oil import bill. The potential area that can be brought under the crop is estimated to be 1 million ha. About 4 million tonnes of palm oil can be produced from 1 million ha of oil palm plantation. Presently, an area of 0.23 million ha of land has been brought under oil palm cultivation, largely due to the efforts undertaken through the Oil Palm Development Programme (OPDP). Globally, oil palm is cultivated in an area of 13.41 million ha. Andhra Pradesh accounts for about 60 per cent of the area under oil palm in India. Considering the limited scope for increasing gross cultivated area under oilseed crops, oil palm cultivation offers immense scope to address the goal of attaining self-sufficiency in edible oil production.



Cocoa

The production of cocoa at the global level has witnessed a significant growth riding on the sustained increase in demand for chocolate across major developed and developing economies. The global production of cocoa beans increased from 1,695 thousand tonnes in 1980-81 to an estimated 4,345



VTLCH-1

thousand tonnes in 2013-14. India's share in global cocoa production is negligible, but the crop has immense potential to develop as a major commercial plantation crop, especially in the southern parts of the country. The rising domestic demand for chocolate confectionery should also drive the expansion in area and production of the crop. The present level of domestic production is barely sufficient to meet 30-40 per cent of the domestic demand. India has emerged as the fastest growing market for chocolate with the chocolate market growing at a rate 15 per cent per annum. India produced 14.4 thousand tonnes of cocoa beans from an area of 56 thousand ha during 2012-13.

PLANTATION CROPS IN ECONOMIC DEVELOPMENT

The plantation crops sector plays a vital role in predominantly agrarian economies. The history of economic development of many third world countries is intrinsically linked to the development of plantation crop sector and allied economic activities. In India, the structural change in the economy witnessed over the last two decades has reduced the share of agriculture in GDP to less than 15 per cent. But the importance of the agriculture sector cannot be undermined as it is the major source of raw materials to the industrial sector including agro industries.

The economy associated with the major plantation crop has significant forward and backward linkages to a large number of other sectors. The vertical linkages by way of value-addition and post-harvest processing for each crop increases the significance of the plantation crop sector, both in terms of employment generation and livelihood security. Most of the plantation crops in India are cultivated by small holder producers. For example 93 per cent of the

The direct and indirect employment generation potential of the sector is well documented. The tea industry is India's second-largest employer with over 3.5 million workers employed across the tea-growing estates. The average number of persons employed daily in coffee plantations is estimated to be 0.62 million during 2012-13. In rubber plantations, the average daily employment increased from 0.16 million in 1976 to 0.46 million in 2010-11. Similarly other plantation crops also provide productive employment to the significant number of workers. The indirect employment provided through the respective industries and its associated firms will be more than the direct employment provided by the crop production activity in plantation crop sector since most of the crops require extensive post harvest processing and value-addition before its final consumption.



Tender nut sales



Climbing mach

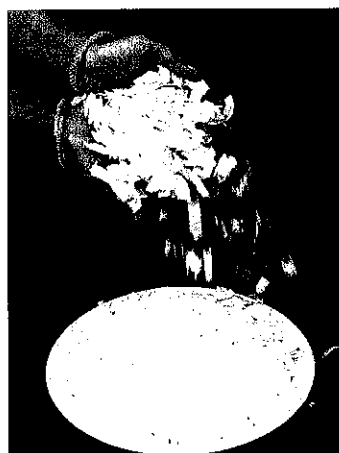
total rubber production in the country is done by nearly 1.3 million units of small farm holdings whose average holding size is 0.54 ha. Only 10 per cent of the total area under rubber can be classified as being in the estate sector with more than 10 ha of land holding. Similarly holdings less than 2 ha constitute 81 per cent of the total number of holdings in case of cultivation of coffee. The case is similar for all the major plantation crops grown in the country.

Apart from meeting the demands of a huge domestic market for the diverse products from the plantation crop sector, the exports originating from plantation crop sector earns considerable foreign exchange for the country. The value of rubber products exported was more than 7,000 crores during the year 2010-11. India is one of the major exporters of cashew and coffee in the international market. The cashew sector exports alone brought in 832 million USD, whereas the value of coffee exported was 793 million USD during 2013-14. The 225 million kilogram of tea exported during 2013-14 was valued at 747 million USD during the same period. Considering the direct exports from the plantation crop sector and the indirect exports from the associated sectors like the coir industry, rubber products industry etc., it can be seen that the sector offers huge potential for maintaining a favourable trade balance.

MAJOR CHALLENGES

The plantation crop sector has seen a host of policy initiatives and reforms intended to maintain sustained growth. The livelihood security of a number of small holder producers is dependent on this sector makes it imperative that plantation crop economy shows vibrant growth. Despite these efforts, plantation crops have been continuously facing the problem of under investment and

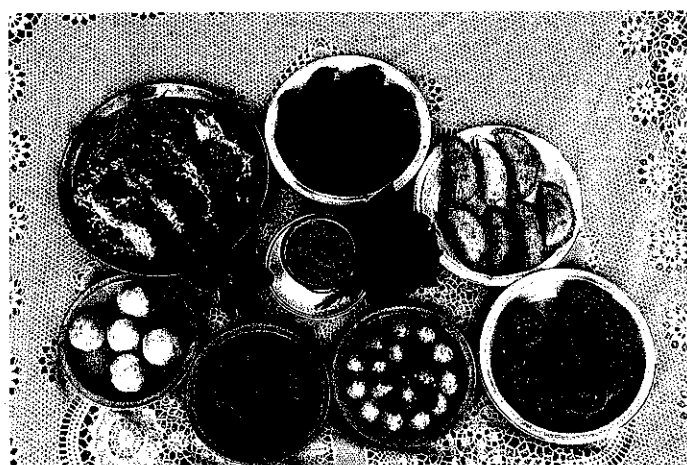
Coconut Products



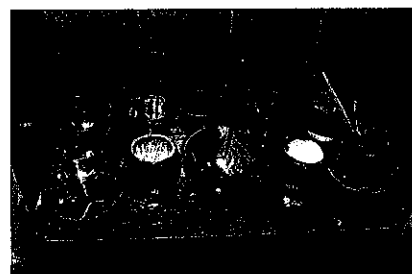
Chips



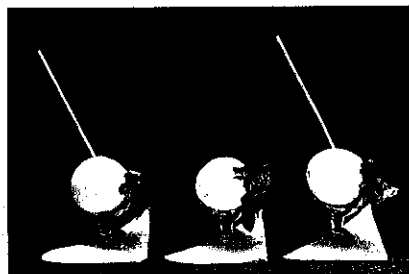
Keramruth virgin coconut oil



Coconut delicacies



Shell products



Snowball

low capital formation. The yield levels of some of coffee and arecanut continue to be well below the desired level compared to the global average productivity level.

The products from the plantation crops have an essentially international character and the move towards open economy means that the international prices of the commodities and the price shocks are easily transferred to

- Cocoa (ICCO), International Cocoa Organization daily price, average of the first three positions on the terminal markets of New York and London, nearest three future trading
- Coffee (ICO), International Coffee Organization indicator price, Robustas, average New York and Le Havre/Marseilles markets, ex-dock
- Tea, average three auctions, arithmetic average of quotations at Kolkata, Colombo and Mombasa/Nairobi.
- Rubber (Asia), TSR 20, Technically Specified Rubber, SGX/SICOM nearby futures contract.

the domestic markets. Over the last 5 decades, the prices of commodities from the primary sector showed a declining trend in real terms. This is especially true in case of the products from the plantation crop sector. The increase in demand for the products did not translate to higher prices due to the rise in productivity of the crops and consequent increase in supply of the commodities. In short, productivity enhancement did not benefit the primary producer of the commodity and the benefits mainly went to the consuming classes. The depressed prices of commodities continue to be a major challenge in plantation crop sector. The secular decline in real prices, except for the period of oil shock during early 1970's and the period of global food inflation witnessed during the first decade of 21st century, is clearly seen.

Prices

Apart from these, the concerns about the sustainability of production practices followed in plantation crops sector, the unexploited latent potential for value-addition and the need to enhance the relevance and role of research and developmental institutions working in the sector are some of the key areas of concern for plantation crop sector in our country.

POLICY OPTIONS AND ROAD MAP FOR FUTURE

The plantation crop sector, is too vital to be neglected in terms of conscious developmental initiatives. The policy perspectives should not only give cognizance to the specific needs of constituent crops, but also address the common challenges faced by the plantation crop sector as a whole. The emerging challenges need to be specifically marked out in the perspective policy outlines. The policy options, research orientation, developmental initiatives and market prescriptions briefly outlined below follows from the analysis of the sectoral

trends and the discussion on the challenges faced by the plantation crop sector. The elements given herein are not exhaustive by any means and are should be seen as indicative constituents of a coherent road map for the future.

- Develop innovative platforms of research for addressing knowledge gaps in plant physiology, abiotic stress tolerance, assimilate partitioning etc.

- The small holder perspective in research needs to be emphasized, considering the structure of operational holdings. Technologies appropriate for small holdings need to be developed for faster and wider technology adoption.
- Incorporate emerging biotechnological tools like marker assisted selection (MAS), RAPD markers in research for generating relevant research information and outcome.
- The bulk of production of plantation crops is concentrated in limited geographical area. Identifying the major crop ecological zones of each plantation crop and ensuring the availability of all physical, financial and institutional support can help in promoting intensive cultivation of a crop.
- The ecosystem services rendered by the plantation crops sector need to be quantified to study the sustainability of major production systems. The sustainability of the existing production practices also need to be carefully scrutinized for their environmental viability and economic sustainability.
- The Inclusive development of the sector should be targeted through addressing the constraints faced in aggregation of the produce for marketing, value-addition through the promotion of Farmer Producer Organizations (FPO). The FPOs have been identified as one of the key strategies for achieving inclusive agricultural growth during the Twelfth Plan. Capacity building of producers in plantation crop sector by organizing them into farmer producer organizations and farmer producer companies need to be strengthened.
- The role and importance of crop diversification and consequently income diversification need to be conveyed to many plantation crop producers. The crop diversification opportunities reduce the market risk associated with plantation crops and enhance the livelihood security.
- The adoption of mechanization needs to be promoted through suitable policy incentives so that higher efficiency in production can be attained. Small

The sector has shown considerable inertia to adopt modernization. This is visible across the prevalent practices followed in post-harvest operations, level of technology adoption, mechanization and cultivation practices. There is an urgent need for modernization of plantation crop sector and allied activities. The small size of holdings in plantation crops presents both challenges and opportunities for sustainable growth. The small holding size brings along with it, a host of problems associated with it. Developing suitable marketing channels and value chains suited for widely disaggregated production environment is one of the biggest challenges faced in almost all the plantation crops. The technologies available, especially in mechanization of operations, are often not suitable for adoption in small holdings. This presents considerable challenges for increasing the efficiency of production through mechanization.



Processing in cashew

better institutional linkages and cross disciplinary approach to address common challenges.

SUMMARY

The plantation crop sector can evolve as a major determinant of growth of agriculture sector while retaining its relevance for the industrial sector as a provider of raw materials. The road to achieve this scenario is full of challenges and it requires unstinting resolve and determination to pursue the path. A well-reasoned and cohesive application of cutting edge research, institutional support for development and creative policy initiatives for creating an enabling atmosphere can create a vibrant plantation crop economy in the country.

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