POTATO IN ASIAN COUNTRIES -
AN ANALYTICAL COMPARISON*

S.M. Paul Khurana and P.M. Govindakrishnan

Asia accounts for one third of the potato acreage (7.7 m ha) of the world and in 2002 was next only to Europe (8.4 m ha). Moreover it is showing increasing trend in Asia, while in Europe it is almost static for the last few years (3). The other continents are way behind both these continents (Fig.1). The potato productivity in Asia is also comparable to that of Europe (Fig. 2) being 15664 and 15554 kg/ha, respectively (2002). As regards total production, Asia is having an almost linear increase (Fig. 3) and is now second (1,20,575

---

* Based on oral presentation in the World Potato Congress, Kuming, China, March 2004.

1 Central Potato Research Institute, Shimla 171 001
Fig. 2. Trend of potato yield in continents

Fig. 3. Potato production in different continents

Fig. 4. Per capita potato availability in the world and continents

thousand metric tons) only to Europe (1,30,487 thousand metric tons). Despite all this progress, the per capita availability in Asia is rather low (30.05 kg/person/year in 1999) followed only by Africa (13.75 kg/person/year) which is of course the lowest (Fig. 4). Europe has the highest per capita availability of 185.14 kg/person/year while the world average is 50.01 kg/person/year (1, 2). Among the countries in Asia, the per capita availability is the highest in Cyprus (208.23 kg/year) followed by Kyrgyzstan (204.92 kg/year). However, the per capita availability in other Asian countries especially in less developed countries, is quite low. Since potato has got the potential to feed the masses and also because Asia is the most populous continent, there is a need to find ways and
means of increasing potato production in Asia. Moreover, there is a wide variation both in acreage and productivity among the countries in the region. Thus, there is need to comparatively analyze the area, production and yield trends in different countries of the region so that countries with low growth rate could be identified and necessary steps to increase the growth rate be taken up.

ACREAGE

The countries of the region could be grouped into 7 classes depending upon the current acreage (2002) under the crop. China with 4.4 m ha and India with 1.4 m ha accounted for 56.8 and 18.2% of the area under the crop in the Asian continent. Bangladesh, Turkey, Korea DPR, Iran, Kazakhstan, Nepal and Pakistan had acreage ranging from 1 m ha to less than 2.5 m ha and together accounted for 15.8%. Japan, Uzbekistan, Kyrgyzstan, Indonesia and Azerbaijan accounted for 5.0% of the area and the area in these countries ranged from 0.5 m ha to less than 1 m ha. About 3.02% of the area was accounted for by Iraq, Georgia, Vietnam, Armenia, Myanmar, S. Korea, Syria and Tajikistan having acreage ranging from 0.2 m ha to less than 0.5 m ha. Yemen, Saudi Arabia, Afghanistan, Israel and Lebanon together cover only 0.12% of the area under the crop. Estonia and the acreage in these countries ranged from 0.1 m ha to 0.2 m ha. Mongolia, Turkmenistan, Cyprus, Philippines, Laos, Sri Lanka, Jordan, Bhutan, Gaza Strip, Thailand, Oman and Kuwait had less than 0.1 m ha each under the crop and accounted for only 0.72% of the area in Asia (3).

Analysis of the acreage trend shows that eight countries, viz., India, Indonesia, Iran, Israel, Lebanon, Nepal, Pakistan and Syria had almost linear increase over the years (1979-2001). Therefore, the data (area in thousand ha) was smoothened using the double moving average and linear regression fitted with year as the 'X' coefficient. The analysis showed that the linear regression gave a good fit (Table 1). Perusal of the regression coefficients showed that among the eight countries the rate of increase was the highest in India (32.26) followed by Nepal, Iran and Pakistan, which had almost similar range of values i.e. 3.05 to 3.50. Indonesia had about 2.42 while Israel, Lebanon and Syria had the low rates of increase ranging from 0.25 to 0.38.

Other countries of the region showed a curvilinear trend. Among these countries, Bangladesh showed an almost linear increase initially and recently the rate of increase improved further and is almost exponential now, reaching a high of 249 thousand hectares in 2002 from 98 thousand hectares in 1979-81.

Table 1. Regression coefficients of potato acreage and yield in asian countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Acreage</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>India</td>
<td>-63279</td>
<td>32.256</td>
</tr>
<tr>
<td>Indonesia</td>
<td>-4786</td>
<td>2.4246</td>
</tr>
<tr>
<td>Iran</td>
<td>-6715</td>
<td>3.4398</td>
</tr>
<tr>
<td>Israel</td>
<td>-496.5</td>
<td>0.2524</td>
</tr>
<tr>
<td>Lebanon</td>
<td>-747.1</td>
<td>0.3809</td>
</tr>
<tr>
<td>Nepal</td>
<td>-6883</td>
<td>3.4967</td>
</tr>
<tr>
<td>Pakistan</td>
<td>-6022</td>
<td>3.0585</td>
</tr>
<tr>
<td>Syria</td>
<td>-452.7</td>
<td>0.2378</td>
</tr>
<tr>
<td>Vietnam</td>
<td>-234880</td>
<td>122.6</td>
</tr>
</tbody>
</table>
China is another country in the region having obtained high potato acreage of 4.2 m hectares in the mid 80's which decreased to around 3.0 m hectares in the early 90's. However, the acreage in China has risen again and is now about 4.4 m hectares. Many other countries of the region also had higher peaks earlier than at present viz. Afghanistan, Bhutan, Cyprus, Japan, S. Korea, Mongolia and Vietnam.

YIELD

Oman is the highest yielder in Asia with 32,617 kg/ha closely followed by Israel with 31,250 kg/ha. China and India with the largest and second largest area in the region had average yields of 14,779 and 17,021 kg/ha (2002), respectively. Perusal of the yield trends of different countries in the region reveal that Japan, Jordan, S. Korea, Kuwait, Saudi Arabia, Turkey, Gaza Strip, Lebanon, Syria, Cyprus, Iran and UAE had higher yield levels between 20,000 to 30,000 kg/ha while in Tajikistan, India, Pakistan, Iraq and Kyrgyzstan, the yield levels were more than 15,000 kg/ha but less than 20,000 kg/ha. China, Uzbekistan, Kazakhstan, Sri Lanka, Indonesia, Bangladesh, Georgia, Philippines, Armenia, Azerbaijan, Yemen, Thailand, Vietnam, Bahrain, Nepal, Myanmar and Qatar had yield levels between 10,000 and 15,000 kg/ha. The yield levels were less than 10,000 kg/ha in Korea DPR, Mongolia, Bhutan, Laos, Turkmenistan, East Timor and Afghanistan.

Analysis of the yield trends show that eleven countries viz. India, Indonesia, Korea DPR, S. Korea, Laos, Mongolia, Nepal, Philippines, Syria, Turkey and Vietnam had almost linear growth over the years. Therefore, the data were smoothened using the double moving average and regression equation fitted which adequately described the data (Table 1). Among these countries, Indonesia, Turkey and S. Korea had higher rates of growth (ranging from 514.89 to 474.30 kg/ha.) while India, Nepal, Philippines and Syria had growth rates ranging from 216.70 to 275.31 kg/ha , and Vietnam had the lowest rate of increase of 122.65 kg/ha. The yields in China have also increased steadily from 9,254 kg/ha in 1971 to 15,242 kg/ha in 2001. On the other hand Israel and Yemen having had higher yield (Israel: 46,606 kg/ha in 1983 and Yemen: 14,056 kg/ha in 1993 ) but is almost static now.

As regards other countries, yields in Korea DPR and Mongolia decreased over the years though Korea DPR had yield levels of 13,376 kg/ha in 1990 and in Mongolia it was 12,689 kg/ha in 1984, the yields have fallen to 9515 and 7183 kg/ha, respectively, in 2002. 

PRODUCTION

Production is a function of area and yield. Therefore, among the countries of the region 53.95% and 19.90% of the production was accounted for by China and India, respectively (65.05 and 24.0 m metric tons, respectively). Among the other countries, Turkey, Iran, Bangladesh, Japan and Kazakhstan had production levels between >2 to <5 m metric tons and together accounted for 14.06% of the overall production of potato in Asia. Korea DPR, Pakistan, Nepal and Kyrgyzstan had production ranging from 1 to 2 m metric tons and accounted for 5.2% of the Asian potato production. Indonesia, S. Korea, Uzbekistan, Azerbaijan, Iraq and Syria accounted for 3.45% of the potato production of Asia and the production levels in these countries ranged from 0.5 to 1 m metric tons. In Georgia, Saudi Arabia, Tajikistan, Vietnam, Israel, Armenia, Myanmar, Lebanon, Afghanistan and Yemen the production levels ranged between 0.1 to 0.2 m metric tons and accounted for 2.79% of the total production of Asia. The other countries of the region together accounted only for about 0.5% of the total production in Asia (3).
EXPORTS

Asia is emerging as a major exporter of potato standing next only to Europe and almost at par with N.C. America (Fig. 5). The total export from Asia was about 3,87,919 MT in 1979 representing 7.79% of the total potato exports. The countries which contributed a major share to this were Cyprus (1,46,410 MT) and China (81,047 MT) which amounted to more than 60% of the total exports of Asia (4). China (Hong Kong), Lebanon, Pakistan and Singapore were the other major exporters accounting for about 31.43% of the exports. The other exporting countries were Israel, Turkey, India, Thailand, Indonesia, Syria, Bhutan, Kuwait, Nepal and Jordan, together accounting for about 10%.

However, volume of the exports have increased tremendously over the years and now stands at 7,78,637 MT (in 2001). The number of exporting countries has also risen over the years. Presently China, Oman and Iraq account for about 40% of the total exports from Asia while Cambodia, Thailand, Sri Lanka, Laos, Indonesia, Georgia and India together account for about 45% of the exports and Qatar, Saudi Arabia, Cyprus and Bangladesh account for only about 7% (4). The other exporting countries of the region are Kuwait, Japan, Turkmenistan, Jordan, Macau, Nepal, Vietnam, Yemen, UAE, Afghanistan, Israel, Korea DPR, Philippines, Brunei, Tajikistan, S. Korea and Singapore.

IMPORTS

As regards imports also, Asia is the major importer today next only to Europe, and imports as much as NC America (Fig. 6). Out of the total of 3,42,215 MT in 1979 the largest
imports were made by Saudi Arabia, China (Hong Kong), Singapore and Lebanon together accounting for about 52.5%. Malaysia, Jordan, Kuwait and Iraq were the other major importers together accounting for 26.5%. Over the years many other countries have also started importing potatoes and presently the total imports stand at 7,13,112 MT (1999). The major importers are Sri Lanka, Malaysia, UAE and Lebanon representing 48.7% of the total imports. Singapore, Azerbaijan, Kuwait, Kazakhstan and Turkey together account for 20.9% imports, while Jordan, Israel, Pakistan, S. Korea and Vietnam account for about another 12%.

CONCLUSIONS

Potato cropping in Asian countries is input intensive. It also requires more infrastructural investment in the form of cold stores, irrigation facilities, etc. Therefore, the scope for potato cultivation increases with the overall improvement in socio-economic situation of a country. Analysis of the acreage and yield trends clearly indicates that higher yields can be obtained in several countries in the region. Besides there is scope for increasing the area in many countries.

Both yield and acreage are affected by numerous technological factors like fertilizer, irrigation, pest management, improved seeds, etc. In cases where trends of yield and area show a linear growth, the 'b' coefficient would indicate the response by area/yield to technological inputs. Thus, in these countries (India, Indonesia, Iran, Israel, Lebanon, Nepal, Pakistan, Syria, S. Korea, Laos, Philippines, Turkey and Vietnam) increased availability of such inputs would certainly help to increase the growth further. This relationship is, however, valid only up to a certain limit. Therefore, in these countries the first step would be to assess the limit of sustainable acreage and productivity (which would vary from country to country). Thereafter, the current level of use of technological inputs is to be assessed and steps taken to reach an optimal acreage with sustainable yield levels after identifying areas with suitable agroclimatic situations.

In countries where the yield or acreage is currently lower than in the past (Sri Lanka, Laos, Bhutan, Mongolia, Afghanistan, S. Korea, Vietnam, Philippines and Iraq), the reasons for the same have to be found out and steps taken to address them so that the decline could be arrested.

As potato is input intensive (seed, fertilizers, irrigation, pesticides, energy, etc.) the investment for potato crop is higher than other crops, especially in Asian countries. It is therefore, essential to have policies to augment the purchasing power of people to help them invest on inputs.

LITERATURE CITED


MS Received: 01.03.2004