# Washington State University Dryland Winter Wheat Nitrogen Needs Worksheet and Application Record*

<table>
<thead>
<tr>
<th>Grower:</th>
<th>Rainfall zone:</th>
<th>Assisted by:</th>
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<tr>
<th>Tract:</th>
<th>Crop class:</th>
<th>Field description:</th>
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<tr>
<th>Date:</th>
<th>Soil type:</th>
<th>Field size:</th>
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<tr>
<td></td>
<td></td>
<td>acres</td>
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## A N supply needed by the crop to meet yield and quality goals

1. **Yield goal**
   - Estimated based on grower practices and experience: ______ bu/ac
   - Estimated based on soil moisture + expected rainfall (in inches):
     \[
     \frac{\text{soil moisture} + \text{expected rainfall} - 4}{\text{bu/inch}} = \frac{\text{bu/ac}}{}
     \]

   1 bushel yield per inch available moisture (bu/inch): soft white winter wheat = 7; all other winter wheat = 6

2. **N supply needed**
   \[
   \frac{\text{bu/acre (line A1 above)} \times \text{lbs N/bu}^2}{\text{lb N/ac}} = \frac{\text{lb N/acre}}{}
   \]

   2 lbs of N per bushel yield: soft white winter and club = 2.7 +/- 0.2; hard red and hard white winter = 3.0 +/- 0.2

## B Soil N inventory

1. Current soil test N (nitrate + ammonium) (see text) +______ lb/acre
2. Credit from previous legume crop (see text) +______ lb/acre
3. Credit from organic matter release (see text) +______ lb/acre
4. Debit for residue decomposition (see text) -______ lb/acre
5. Other credit (source: ____________) +______ lb/acre
6. Total soil N inventory (lines 1 through 5) =______ lb/acre

## C N to apply (fertilizer recommendation)

1. Line A2 _______ - line B6 _______ = _______ lb N/acre

## D N application, yield, and protein record

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<th>Date</th>
<th>Form</th>
<th>Method</th>
<th>Rate (lb N/ac)</th>
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Total N applied (lb/acre):

Yield: _______ bu/acre  Protein: _______ %

Notes:

## E Post-harvest N efficiency calculation

\[
\frac{\text{yield, bu/ac} \times \text{protein} \times \text{factor}^1}{\text{N uptake}} = \frac{\text{lb/ac}}{}
\]

\[
\frac{\text{Total N applied (left)} + \text{Soil N inventory (line B6)}}{\text{N supply}} = \frac{\text{lb/ac}}{}
\]

\[
\frac{\text{N uptake} + \text{N supply}}{\text{yield, bu/ac}} = \frac{\text{lb N/bu}}{}
\]

\[
\frac{\text{N supply} - \text{N uptake}}{\text{lb N/ac}} = \frac{\text{lb N/ac}}{}
\]

\[
\text{N uptake efficiency} = \frac{\text{N uptake} \times \text{protein} \times \text{factor}^1}{\text{N supply}} \times 100 = \frac{\%}{}
\]

* Factor to convert yield from bu to lbs, % grain protein to %N, and grain N to whole-plant N. Use 0.15 for soft white and club; use 0.13 for hard red and hard white.

* Attach this form to the current soil test report and archive as part of the field record.